

## مجلة التربية الرياضية



مجلة علمية فصلية مُحكمة متخصصة  
بعلوم الرياضة تصدر عن  
كلية التربية البدنية وعلوم الرياضة  
جامعة بغداد





جمهورية العراق  
وزارة التعليم العالي والبحث العلمي  
جامعة بغداد  
كلية التربية البدنية وعلوم الرياضة

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كلية التربية البدنية وعلوم الرياضة في جامعة بغداد

المجلد السابع والثلاثون

العدد الرابع

السنة 2025

DOI: [https://doi.org/10.37359/JOPE.V37\(4\)2025](https://doi.org/10.37359/JOPE.V37(4)2025)

E-ISSN: 2707-5729

P-ISSN: 2073-6452

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تأسست عام (1990)

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رقم الإيداع في دار الكتب والوثائق العراقية (597) لسنة (1990)

(P-ISSN: 2073-6452)

(E-ISSN: 2707-5729)

تصميم الغلاف: د. ياسر وجيه قدوري

## تعليمات النشر في مجلة التربية الرياضية

أولاً: تعليمات عامة:

- مجلة علمية رياضية فصلية غير ربحية، متخصصة بنشر البحوث العلمية الخاصة بعلوم الرياضة، لأغراض النشر العلمي، تصدرها كلية التربية البدنية وعلوم الرياضة / جامعة بغداد.
- تعتمد المجلة سياسة التحكيم السري والمزدوج والوصول الحر للبحوث دون قيد أو شرط.
- يتم استخدام الأسماء وعناوين البريد الإلكتروني والهواتف في قاعدة بيانات المجلة للأغراض العلمية فقط الخاصة بالمجلة ولن تكون متاحة للجميع أو تستعمل لغرض آخر.
- تعدد مجلة التربية الرياضية الرخصة (CC BY 4.0)  (a Creative Commons Attribution 4.0 International license) وهي بذلك تحفظ حقوق الملكية الفكرية للباحثين الناشرين فيها، وفي الوقت نفسه تتيح للآخرين بتحميل ومشاركة وإعادة استخدام وتوزيع البحث في نطاق واسع. للمزيد من المعلومات، انقر على الرابط ادناه: <https://creativecommons.org/licenses/by/4.0/>
- تتم إجراءات المراجعة الأولية للبحث المرسل من قبل هيئة التحرير وإجراء الاستلال الاليكتروني، ويتم اعلام الباحث بأي مشكلة خلال الأسبوع الاول من استلام البحث.
- يتم إحالة البحث للتحكيم العلمي من قبل هيئة التحرير لمحكمين أثنين معتمدين من قبل المجلة وبشكل سري.
- تتم عملية التحكيم خلال مدة (3) اسابيع وفق تعليمات المجلة (ارشادات المحكمين).
- بالاعتماد على توصية المحكمين، يتم قبول البحث كما هو او قبوله بعد اجراء التعديلات او رفضه، ويتم اعلام الباحث بذلك.
- بعد الانتهاء من التحكيم، يتم طلب دفع رسوم النشر البالغة (120000) الف دينار عراقي. علماً إن المجلة غير ربحية والنفقات أعلاه لتغطية أجور التحكيم والنشر والترجمة فقط.
- يكون النشر للباحثين من خارج العراق مجاني وبشكل كامل ولحد نهاية سنة (2021).
- كل إجراءات تحكيم البحوث تكون الكترونياً اعتماداً على نظام المجالات المفتوحة (OJS).

## ثانياً: شروط كتابة البحث:

تتبع مجلة التربية الرياضية (JOPE) طريقة (IMRAD) في كتابة البحوث وهي ترمز الى الحروف الأولى لكلمات: المقدمة (Introduction). الطريقة والأدوات (Materials and Methods). النتائج (Results) و (And). المناقشة (Discussion). ورقة واجهة البحث: ويجب أن تتضمن الآتي:

- **عنوان البحث (Research Title):** يعد عنوان البحث الجزء المميز منه الذي يقرأه عدد كبير من الباحثين ويحتوي العنوان أيضاً اسم الباحث (الباحثين) وعناوينهم (طرائق التواصل معهم).
- **شروط عنوان البحث:**

- ✓ يحوي على عدد قليل من الكلمات كلما أمكن ذلك، و بما لا يزيد عن (12) كلمة.
- ✓ يكون واضح وسهل الفهم ولا يحتوي على المختصرات.
- ✓ يشرح محتويات البحث بدقة وبشكل محدد.
- ✓ ان لا يكون بصيغة استفهامية كما في المقالات الصحفية.
- ✓ يشير الى موضوع البحث وليس النتائج.

- **اسم المؤلف (المؤلفون) (Authors):** مؤلف البحث هو الشخص أو الأشخاص الذين أسهموا بشكل فعلي في تخطيط وتنفيذ البحث. ويتم تثبيت أسماء المؤلفين بتسلسل منطقي نسبة الى أهمية مشاركتهم في البحث، اذ يُعد الاسم الأول بالبحث هو كبير معدي البحث وبكلام آخر المؤلف الأول (Senior Author) في حين يتم ترتيب باقي المؤلفين نسبة الى أهمية وقدر مشاركتهم في إتمام البحث. يكون طالب الدراسات العليا المؤلف الأول في أطروحته او رسالته يليه المشرف الرئيس بوصفه المؤلف الثاني وهكذا، علماً ان المجلة تعتمد تسلسل الباحثين حسب ما هو مثبت في البحث المرسل للمجلة. يجب ادراج هامش يشير الى المعلومات الخاصة عن المؤلفين كافة للاتصال بهم بهدف التعاون او الاستيضاح او اي شأن يخص البحث ومجال الاختصاص، ويجب ملاحظة ان يكتب الأسم الثلاثي واللقب للمؤلفين مع ذكر عنوان العمل و وسيلة الاتصال (البريد الإلكتروني - رقم الهاتف) وباللغتين العربية والانكليزية.

- **مستخلص البحث (Abstract):** ينقل الملخص معلومات البحث القائم فعلاً مع مراعاة عدم استعمال عبارات الوعود (سوف يقدم، سوف يعرض.... وغيرها)، ويكون ملخص البحث بمعدل (150-250) كلمة ويكتب في فقرة واحدة باللغتين الإنكليزية والعربية. يبدأ الملخص بترتيب متسلسل بعرض الاهداف ثم توضيح الإجراءات المستعملة واهم النتائج المتضمنة حقائق جديدة

تتعلق بتحقيق الأهداف، وأخيراً الاستنتاجات الرئيسية ومستوى دلالتها (Sig). وتكتب أفعال جمل عرض الأهداف والمقدمة ومناقشة النتائج والاستنتاجات في الزمن المضارع، في حين تكتب الإجراءات والأختبارات والنتائج في الزمن الماضي. يجب أن لا يحتوي ملخص البحث على الآتي:

- ✓ الاختصارات (الأحرف المختصرة) إلا إذا كانت معيارية أو معروفة مسبقاً مثل (Vo2Max).
- ✓ الإشارة إلى الجداول أو الأشكال في متن البحث والاستشهاد بالمصادر.
- ✓ أي معلومات أو استنتاج غير موجود في متن البحث والجمل العامة والجمل المطولة أو المعقدة أو الملتوية (المراوغة).

- ✓ تجنب ذكر البيانات الكمية بشكل مفصل وكذلك المعالجات الإحصائية والمصطلحات الطويلة جداً.
- ✓ ذكر المتوسط الحسابي والانحراف المعياري لأعمار وأوزان وأطوال عينة البحث. مثال: (متوسط الطول) متر (± الانحراف المعياري).

- **الكلمات المفتاحية (Key Words):** يجب أن يتضمن البحث كلمات مفتاحية بعدد لا يتجاوز (6) كلمات، ويجب أن تكون محددة بالدراسة وغير الكلمات الموجودة في عنوان البحث، وعلى أن تكتب في نهاية ملخص البحث بفقرة منفصلة وباللغتين الإنكليزية والعربية.

- **المقدمة (Introduction):** تكون مقدمة البحث جيدة قصيرة نسبياً، تشرح أهمية الدراسة وتحديد أهدافها من خلال البحث في الأدبيات ذات العلاقة من مراجع ودراسات، ويكون ذلك عن طريق استعراض مختصر لهذه الدراسات والتي تكون ذات علاقة بمشكلة البحث والتي يجب أن لا تقل عن خمسة دراسات حديثة ومناسبة لتعزيز البحث، كما أن المقدمة تُعرف بالمصطلحات الخاصة أو المختصرات التي سيتضمنها متن البحث لاحقاً، ويفضل أن لا تتجاوز عدد الكلمات في مقدمة البحث عن (500) كلمة وأن لا تتضمن تكرار لعبارات أو مفاهيم ذكرت في أي موقع من الملخص، مع مراعاة تجنب العبارات الانشائية والجمل التي لا تضيف للقارئ معلومة مثل إعادة الحقائق والحالات البديهية.

- **الطريقة والأدوات (Materials and Methods):** أن الغرض من هذا القسم هو لعرض ما تم عمله، وكيف تم، وأين تم، وذلك بطريقة مباشرة وبسيطة فضلاً عن التعريف بكيفية جمع البيانات وعرضها وتحليلها. إذ يجب أن يوفر هذا القسم من البحث كل المعلومات الضرورية اللازمة للسماح للمؤلفين الآخرين للحكم على الدراسة والإفادة منها، ويجب مراعاة ترتيب

- الاجراءات الميدانية زمنياً مع توفير كافة المعلومات الضرورية فقط، وعلى وفق ذلك يتطلب ان يتضمن هذا القسم من البحث على الآتي مع أهمية تسلل الفقرات:
- ✓ منهج البحث وتصميمه المستعمل.
  - ✓ الوصف الدقيق لعينة البحث من حيث (الجنس والعمر والوزن.... وغيرها).
  - ✓ تصميم التجربة مع عدد مرات اجراء الاختبار او القياس وإيجاز الإجراءات المستعملة لاختذ العينات (إجراءات الاختبارت).
  - ✓ ذكر الأجهزة والادوات المستعملة مع مواصفاتها الفنية الدقيقة وعددها ومصدرها وطريقة العمل بها (الضرورية منها فقط غير شائعة الاستعمال). ويجب استعمال الأسماء العلمية للأجهزة بدلاً عن اسمائها التجارية مع ذكر أسماء الشركات المصنعة للجهاز واية معلومات تفيد القارئ.
  - ✓ وصف التعديلات اذا ما تم اجراءها على القياسات الروتينية (الاختبارت)، اما إذا ما تم استعمال اجراء جديد (اختبار جديد) فيجب ذكره وشرحه بالتفصيل.
  - ✓ توضيح طريقة اجراءات البحث من تجربة واختبارت ورقية، وعملية، وشفوية او على جهاز الحاسوب.
  - ✓ الطريقة الإحصائية (او/و) الرياضية المستعملة لتحليل وتلخيص البيانات.
  - ✓ يحق للمجلة ان تطلب من المؤلفين تفاصيل او معلومات إضافية عن أي جزء من أجزاء البحث. وبشكل عام يجب ان يضع المؤلفين بعين الاعتبار الأمور الآتية عند كتابته لإجراءات البحث:
  - ✓ لايجوز استعمال المختصرات (بأي لغة كانت) قبل تعريفها في ملخص البحث او مقدمته.
  - ✓ تحديد نظام وحدات القياس الدولية المستخدم في البحث، مثل (المتر، كيلوغرام، الثانية ... الخ)
  - ✓ توضيح جميع المواد المستعملة في الدراسة بحيث يمكن للقارئ استعمالها في بحوث مشابهة أخرى.
  - ✓ وصف اهداف واجراءات القياس لكل اختبار (اختبار قبلي - اختبار بعدي- اختبار احتفاظ ... وهكذا) .
  - ✓ وصف كل التقنيات والاختبارت المستعملة بذكر اسمها فقط اذا كانت معروفة وقياسية او ذكر التفاصيل في حالة كونها جديدة او تم اجراء تعديل عليها.
  - ✓ لا يجوز اضافة معلومات لا تمت بصلة بالنتائج، والتي يمكن ان تترك القارئ.
  - ✓ استخدام الافعال بصيغة الماضي في عرض اجراءات البحث.

• **النتائج (Results):** يُقدم هذا القسم من البحث المعلومات الجديدة التي توصل لها الباحث، لذا يعد على انه أساس (مركز) البحث. ويلاحظ ان مقدمة البحث والإجراءات صُممت للإجابة عن التساؤلات؛ لماذا وكيف وصل الباحث (الباحثين) لهذه النتائج والتي سيتم تفسيرها في قسم المناقشة، لذا فان قيمة البحث تكون بما يتضمنه من نتائج، ويجب ان يتم عرضها بطريقة واضحة جداً ومباشرة وباستعمال العدد الضروري من الكلمات دون اسهاب او اختصار، وعادة ما يكون عرض النتائج اسهل فهماً اذا ما تم ترتيب العرض على وفق تسلسل اهداف البحث التي تم ذكرها في مقدمة البحث.

إرشادات حول عرض نتائج البحث:

- ✓ أعرض نتائج البحث بشكل بسيط وواضح في جداول او اشكال وذلك لتسهيل فهمها ومقارنتها. ملاحظة ان الجداول تعرض أرقاماً دقيقة في حين ان الاشكال تظهر الاتجاهات ذات الخصائص ولا يجوز عرض ارقام الجداول نفسها في الاشكال.
- ✓ لا يجوز اعادة النتائج كتابةً بعد عرضها في الجداول أو الاشكال التوضيحية، ويمكن فقط الإشارة الى اهم ما مؤشر في الجداول او الاشكال (أي عدم استعمال العرض الكتابي للجدول).
- ✓ وثق واعرض فقط البيانات الضرورية بدلاً من الاسهاب والتكرار في عرض البيانات ولا تعرض بيانات كثيرة واختصرها بالتحليل الاحصائي ولخصها لعرضها في جداول او اشكال وذلك لتسهيل فهمها ومقارنتها.
- ✓ ضمن نتائج البحث بالنتائج السلبية (ما لم يتحقق) إن كان ذلك مفيداً لتفسير النتائج.
- ✓ عند كتابة النتائج يتم الإشارة الى الجداول أو الاشكال بارقامها (الجدول 1) (الشكل 1).

**المناقشة Discussion:** في هذا القسم من البحث يفسر الباحث (الباحثون) مضمون النتائج ودلالاتها والاثار المترتبة عليها. وتُبين المناقشة أهمية وقيمة العمل المنجز كما انها تربط كل أجزاء البحث معاً. ان مهارة الباحث (الباحثين) في تفسير النتائج الجديدة، على وفق الحقائق المعروفة باستخدام نتائج البحث هي دليل على التغيرات المبتكرة (الابداعية) للسلوك الملاحظ، ويجب ان تدفع حدود معرفة القارئ (توسع مداركه) وتثير حماسه. وعلى الباحث ان يلتزم بالاتي في مناقشته للنتائج:

- ✓ ناقش على ضوء معنوية النتائج.
- ✓ لا تكرر ما تم ذكره في الدراسات السابقة.

✓ تتضمن مناقشة النتائج تفسير اتقاقها او عدمه مع المعلومة او المعرفة في الدراسات المنشورة سابقاً.

✓ تدعيم النتائج التي توصلت اليها بأساس نظري علمي (ما هي الأسباب العلمية للنتائج المتحققة).

✓ اقترح بحوث مستقبلية مخطط لها اوبحوث بحاجة الى متابعة (دراسة).

✓ لا يجوز اضافة معلومات لم يتناولها البحث، وان يتم التعامل مع النتائج الموثقة في الدراسة الحالية فقط.

✓ تجنب التعميم والتخمين للنتائج والتي لم تؤكدھا الدراسة.

✓ تكتب المناقشة بصيغة المضارع والماضي، اذ تكتب المعارف المتوافرة من الاديبيات والأبحاث بصيغة المضارع، في حين تكتب مناقشة نتائج البحث الحالي بصيغة الماضي.

**الاستنتاجات (Conclusions):** الاستنتاجات ليست إعادة صياغة لنتائج البحث، انما هي مستنبطة منها. فالاستنتاجات تشير الى الخطوط العريضة للدراسات المستقبلية استناداً على نتائج الدراسة الحالية. ويمكن تخصيص فقرة مستقلة للاستنتاجات.

**الشكر والتقدير (Acknowledgments):** تسمح المجلة بتضمين كلمات الشكر والتقدير في نهاية البحث ويخصص لشكر المؤسسات والافراد الذين قاموا بمساعدة حقيقية للباحث لاجراء بحثه اذ يُقدم الشكر للشركة، او المؤسسة التي قدمت الأموال لدعم البحث، او المختبرات التي زودت الباحث بالادوات والأجهزة، او الى الأشخاص الذين قدموا للباحث النصيحة والمساعدة في جميع البيانات، او التحليل او أي أمر اخر مهم. كما ان هذا القسم يعد مكاناً لذكر اصل البحث وبكلام اخر اذ كان البحث مستلاً من رسالة ماجستير او أطروحة دكتوراه.

**المصادر (References):** تتضمن قائمة المصادر كل الاستشهادات المعتمدة في متن البحث فقط وبطريقة (APA) الإصدار السادس حصراً وفق نظام (Microsoft Word 2010) صعوداً أو برنامج (Mendeley) أو (EndNote). ان الاستشهادات النصية في متن البحث يجب ان تتطابق تماما مع قائمة المصادر.

**الملاحق (Appendix):** يمكن ادراج أي معلومات تخص البحث المهمة منها حصراً ضمن الملاحق، إذ تحتوي الملاحق على تفاصيل المنهاج التدريبي او البيانات او الجداول الكبيرة (الجداول المعيارية) أو ادوات البحث مثل الاستبيانات وبرامج الحاسوب المستعملة او الأجهزة المصنعة والتي يجب عرضها وشرحها لاهميتها والتي لا يمكن ادراجها ضمن متن البحث بسبب كبر حجمها.

### جدول توضيحي يلخص طريقة امراد (IMRAD)

ت	القسم	الغرض او الهدف
1	العنوان	عن ماذا البحث.
2	المؤلفون (الباحثون)	أسماء وانتماءات المؤلفين.
3	الكلمات المفتاحية	الكلمات غير الموجودة في العنوان والتي توصف البحث.
4	الملخص	شرح قصير عن ذلك البحث.
5	المقدمة	لماذا هذا البحث؟ والمشكلة وما هو غير المعلوم واهداف البحث؟
6	الأدوات والإجراءات	كيف تم اجراء البحث؟
7	النتائج	ماذا وجدت؟
8	المناقشة	ماذا يعني ذلك؟ وما التالي؟ وتفسير النتائج والتوجه المستقبلي.
9	الاستنتاجات	الاثار المحتمليه (الممكنة)
10	الشكر والتقدير	لمن ساعدوك وكيف؟ وما هو مصدر التمويل؟
11	المصادر	تفاصيل عن استشهادات البحث.
12	الملاحق	المواد التكميلية.

### ثالثاً: شروط استلام البحث لغرض النشر في مجلة التربية الرياضية:

- ✓ أن لا تزيد عدد كلمات البحث عن (2500-3000) كلمة.
- ✓ أن يطبع البحث بنظام (Microsoft Word 2010) صعوداً بحجم خط (12) لمتن البحث و (14) غامق للعناوين الرئيسية وبنوع (Simplified Arabic) للغة العربية و ( Times New Roman) للغة الإنكليزية بابعاد الصفحة القياسية (عمودي - 2.54×3.17 سم). وبمسافة منفردة بين الاسطر و (1) بين الفقرات.
- ✓ أن يثبت اسم الباحثين الكامل والصحيح باللغتين العربية والإنكليزي اسفل عنوان البحث، في حين تثبت معلوماتهم (الشهادة، والقابهم العلمية ومكان عملهم ووسيلة الاتصال بهم البريد الالكتروني ورقم الهاتف مع المفتاح الدولي) في هامش الصفحة الاولى.
- ✓ ترقم صفحات البحث إلكترونياً أسفل ووسط الصفحة.
- ✓ تكون أبعاد الصور او الاشكال متناسقة وباسعمال الماسح الضوئي حصراً وبدقة عالية.

- ✓ يكتب رقم الجدول وعنوانه بشكل مختصر ووافي اعلى الجدول في حين يكتب رقم وعنوان الصورة او الشكل في الأسفل وبشكل ومختصر ووافي.
- ✓ ينشر البحث باللغة الإنكليزية بعد ان يتم ترجمته من قبل المجلة يمكن ارسال البحوث او يمكن ارساله باللغة الإنكليزية.
- ✓ تطبع الأرقام بالصيغة العربية حصراً (0 1 2 3 4)، وعند استعمال الاقواس لا يتم ترك مسافة بين الاقواس مثل: (2540)، وعدم ترك مسافة قبل علامات الترقيم مثل الفارزة، او النقطتين، او النقطة. مثال: التدريب الرياضي، التعلم الحركي، علم النفس الرياضي.
- ✓ لا يجوز استعمال برامج الترجمة الفورية او مواقع الانترنت للترجمة للغة الانكليزية مثل (google translate) وغيرها.
- ✓ استعمال المصطلحات العلمية المعروفة والمتداولة، وعلى الباحثين المقدمين لبحثهم باللغة العربية ادراج المصطلحات العلمية باللغة الإنكليزية في متن البحث.
- ✓ الاستشهاد بالمصادر يكون وفق أسلوب (APA) الإصدار السادس حصراً وفق نظام (Microsoft Word 2010) صعوداً أو برنامج (Mendeley) أو (EndNote).
- ✓ يجب ان تتطابق الاستشهادات النصية في متن البحث تماماً مع قائمة المصادر.
- ✓ لا يقبل الاستشهاد من المواقع الاليكترونية العامة والضعيفة.
- ✓ يقبل الاستشهاد من المواقع العلمية الرصينة الرصينة بالاعتماد على البحوث المنشورة المجالات المحكمة والكتب العلمية والرسائل والاطاريح الجامعية المحلية او الدولية.
- ✓ يجب أن لا تقل الاستشهادات بالمصادر العلمية عن (25) مصدر رصين وبواقع (50%) من البحوث العلمية كحد أدنى، و (50%) كحد أعلى من الكتب العلمية.
- ✓ يجب ان تكون المصادر حديثة (اخر خمس سنوات)، مع وجود بعض الاستثناءات الضرورية.

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## The role of sports in improving the lifestyle of university students

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2285](https://doi.org/10.37359/JOPE.V37(4)2025.2285)

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**Article history:** Received 22/ April/2025 Accepted 27/ April/2025 Available online 28/ December/2025

### Abstract

This research aims to clarify the importance of practicing sports and its role in improving the lifestyle of university students. By understanding how sports contribute to strengthening social relationships within the academic community and enhancing the physical and mental health of university students, sports have become an effective tool in the modern era. They are not limited to entertainment or amusement but also contribute to building the character of university students, enhancing their interactive abilities, and instilling moral values such as cooperation, tolerance, and discipline. The study highlights the historical background of sports, starting from the civilizations of the Mesopotamian Valley, thru the Islamic civilization, up to the modern era, where it has become a means to enhance national belonging and combat deviant behaviors. The research seeks to propose practical mechanisms to activate sports activities, given their fundamental role in enhancing the lives of university youth on physical, psychological, and social levels. The study relied on the descriptive analytical method, where the questionnaire was distributed to 200 male and female students from different colleges at the University of Baghdad and Al-Mustansiriya University. The results showed that practicing sports positively contributes to the development of social skills such as cooperation, communication, and building friendships. And it improves mental and physical health. Accordingly, the research recommends increasing support for university sports activities to enhance the lifestyle of university students.

**Keywords:** Sports, improvement, lifestyle, university youth.

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## Introduction

Sports are considered one of the main factors that contribute to strengthening social bonds between individuals and have a significant impact on forming cohesive communities. Sports serves well as a channel towards understanding and the creation of a harmonious society, which promotes ethical values \_ e.g., co-operation, sportsmanship and mutual respect. In such a context, sport has special meanings to the students on campus since it can satisfy fundamental human needs, including those associated with physical, safety and sociability. Beyond this, sports are important to promoting mental health and physical health as well as enhancing social relationships and community inclusion. The involvement in a sporting activity itself leads to a harmony among the individuals and conduce tolerance and acceptance as such, helping the building of a strong and balanced personality.

The sports, a social and cultural phenomenon of the human society through time has been among existence one of the best ways for fun, physical development and relationship establishment between members too. The peoples of the Mesopotamian Valley practiced various types of sports and physical activities, which had a significant impact on the civilizations that followed. The ancient Iraqis built their civilization themselves, relying on science, knowledge, the beauty of things, moral integrity, and human values. Examples of these sports activities include wrestling, boxing, swimming, rowing, fencing, horse riding, chariot racing, animal wrestling, dancing, and hunting (Al-Maraawi 2023, p. 47).

The peoples of the Mesopotamian Valley practiced physical exercises and various sports activities during their leisure time, and these games provided their practitioners with endurance and high fitness. The ordinary daily activities evolved into sports practices, which manifested as a sign of advanced life in that era, and they became rituals in national, ethnic, religious, official, and social celebrations alike. (Al-Suhrawardi, 1980, p. 29).

And sports have a role in the Islamic era, as they have witnessed development. Among the most important known sports activities in Islamic civilization are racing and running, wrestling, grappling, and combat, which demonstrate competition, challenge, and dominance. In addition to swimming, archery, hunting, strength and endurance games, there are also well-known and widespread sports in Muslim countries for recreation and entertainment, such as physical and mental sports that still exist today, including ball games, tug-of-war, chess, and other sports. (Ismail 2021, p. 75)

Modern societies have recognized the importance of sports as a comprehensive tool that contributes to building a balanced individual physically, mentally, and morally. Sports are an important factor that fosters community solidarity, as they are an effective means of breaking down barriers present in societies, whether they are religious or discriminatory.

Therefore, sports have become a significant and recognized factor for progress, advancement, and social discipline (Awis 1994).

Sports provide an opportunity to build life skills for at-risk youth, enabling them to better handle the challenges of daily life and steer clear of involvement in violence, drug abuse, and various forms of crime (Wehba, 2022, p. 35). Thus, it is considered a means of combating crime and preventing delinquency.

Sports have their social values that work on improving various aspects of individuals' lives, especially university students who regularly practice them, and develop their interactive skills (Al-Sumaidani, 2017, pp. 23-24). Such as self-acceptance, acceptance of others, and showing cooperation with them to achieve a common goal (social harmony). Acquiring effective and positive social skills, which are manifested in social competence, communication with others, constructive cooperation with them, and solidarity to achieve desired goals and aspirations. Al-Atrash 2014, p. 1551).

Sports also have multiple functions, starting from health and preventive benefits. Poor physical fitness will result in negative effects on the health of young people, leading to early aging (Al-Zamel 2011, p. 9). Additionally, a lack of physical activity is considered one of the main causes of chronic diseases such as diabetes, heart and vascular diseases, and some types of cancer (Malavoy, M. 2013). (2013)).

Sports play an important role as they contribute to the promotion of human rights on a global level thru the interactions they generate among individuals who are diverse, belonging to different backgrounds and cultures. They unite people around a single subject regardless of color, race, or gender. Thanks to their inclusive nature, sports can instill tolerance, respect for others, and spread love among people. Moreover, they stand as an obstacle against all forms of discrimination.

In addition, there is a recreational function of sports that helps in utilizing free time, as the essence of sports is primarily based on recreational goals (Drouiche, 1990, p. 301). When individuals and university youth participate in recreational sports activities, it reflects on their motor and physiological abilities, helping them face life's challenges more easily. (Drouiche, 1990, p. 71), youth means strength, and sports are the best means to showcase this strength. Abdul Wahab 1995, p. 64).

Sports are important for stimulating the mind and maintaining physical health, as they have a significant impact on brain cells. A person who actively and sincerely engages in sports activities has a more prepared mind than someone who succumbs to laziness and idleness. Building mental capacities and deep thinking cannot be achieved satisfactorily unless the body is healthy and fit, as the body is considered the medium for expressing the mind and will. Al-Qadi. (Al-Qadi et al., 1981, p. 11), as low to moderate intensity exercises

improve central nervous system functions and enhance mental and cardiac performance. (Bahaa El-Din 1994, pp. 168-169).

The importance of sports extends to its moral and educational dimensions. High morals can be developed thru sports training and physical activities, and they can acquire good qualities such as taking initiative, self-control, esthetic appreciation, and so on. Additionally, sports and physical activities contribute to solving social problems such as social adaptation, social normalization, class and social mobility, minorities, delinquency and deviation, fan riots, and excessive sports crowds, and how sports have helped in solving some of these problems or alleviating their severity, especially among the youth. (Al-Khuli, 1996, p. 204) Al-Khouli 1996, p. 204). It also has a direct impact on strengthening social relationships between individuals, as physical or motor activity for humans is one of the socio-cultural phenomena associated with them since the beginning of creation. Sports and physical activities represent the most effective means in our current era, as they foster good international human relationships and connections and bring about harmony among the individuals of nations and communities on an international level. Ibrahim 2001, p. 19)

It is difficult for individuals in our contemporary societies to fulfill their duties, bear the burdens of daily life, and meet their requirements and responsibilities without social relationships connecting them to those around them, whether in the family, social, or various work environments. Wherever we turn, we find social patterns that color the relationships of individuals within their surrounding environments (Al-Nahar et al., 2015, p. 13).

Here comes the role of sports in strengthening the bonds between family members, which will lead to social cohesion, and consequently to national unity. Everyone loves the fun and enjoyment that sports of all kinds provide (Abdul Wahab, 1995, pp. 57-65). Social relationships are one of the essential implications to which sport and sports activities have leeway. With a background with higher social intensity and interactions, they contribute to the development of physical education and sports workers as part of nifty values, experiences and some social competence. These qualities help a person to grow in social dimensions, to develop personality, support socialization and upbringing as well as helps in streamlining with society's expectations; systems, laws and customs (Smith, A. 2009).

Sports serve society through promotion of social integration by creating a feeling of community between people. Through them a feeling of oneness is evoked and the sense of brotherhood becomes linked up with emotion. Sports develop sentiments of community, congruence with personal identity, friendship formation and the strengthening of friendships and affection among people (Al-Khouli, 1994: 53).

Implications of this positivist study are that it underscores the proactive role of sports activities in improving and enhancing the quality of university youth's lifestyle. Physical activities are no longer taken just like a form of fun or entertainment, exercise and gymnastics but have been made quite effective in the means of educating and socializing within the university community.

The research aims to clarify the importance of practicing sports and its role in improving the lifestyle of university students. By understanding how sports contribute to strengthening social relationships within the university environment. And enhancing social integration by developing relationships between individuals from diverse cultural and sectarian backgrounds, promoting the physical and mental health of university students, and suggesting ways to encourage sports practice within the university campus.

### **Methodology**

"Bernard Phillips" refers to the scientific method as the means thru which we can increase our understanding of phenomena from several aspects, such as defining the problem to be studied and increasing knowledge of its causes, as well as obtaining the basic data related to it, in addition to analyzing and interpreting this data in light of controlled rules in order to reach the general results related to the addressed problem (Salim, 2015, p. 37). In this research, we used the method that we see as suitable for the nature of the study, especially if we want to cover all its aspects to ensure that the study results are comprehensive and objective. The most useful and compatible method with the nature of the study was the social survey method.

The social survey method is considered one of the most important methods used in social research. It is a method or technique of social research in which the scientific method steps are scientifically applied to study a social phenomenon, problem, or specific social conditions prevailing in a defined geographical area, with the aim of obtaining information that depicts various aspects of the studied phenomenon (Mohammed, 2008, p. 376). Due to the difficulty of conducting a comprehensive survey of the community because of the lack of time and financial resources, the researcher used the sampling survey method, which provides the necessary resources, human efforts, and time for both the researcher and the subjects. In our current research, we relied on the social survey method using the sampling technique.

## Data collection

The questionnaire was used as the main tool for data collection. The questionnaire is defined as "a form that includes a set of questions revolving around psychological, social, or educational topics, answered by the respondent, or a means to obtain answers to a number of questions written in a form prepared for this purpose, which the respondent fills out themselves" (Al-Dulaimi, 2014, p. 91). Accordingly, the researchers designed a questionnaire form that was distributed to (university students, both male and female). The questionnaire was distributed in a suitable environment that allows university students to respond objectively, taking into account the conditions of time and place to ensure the highest levels of accuracy and reliability in the results.

## Sample design

Given the importance of statistical representation in generalizing research results, the purposive sampling method was adopted, which relies on the selection of participants based on the researcher's judgment and expertise. Due to the difficulty of conducting a comprehensive survey of all students at Iraqi universities, a sample of (200) male and female students was selected from the universities of Baghdad and Al-Mustansiriya, evenly distributed between two scientific colleges (Engineering, and Physical Education and Sports Sciences) and two humanitarian colleges (Political Science, and Tourism Sciences).

The distribution took into consideration the qualitative and geographical balance; 100 questionnaires were delivered to scientific colleges, while other 100 were assigned to humanitarian, each at the same number of both groups. The sample was comprised of student subjects grouped into ones who do participate in team sports and ones who do not, so that the differences between these two groups in SOC could be examined.

## Data Analysis

Analysis of the data was done by SPSS 24 version statistical software after data were entered. Frequencies, means and standard deviations were cut to measure the influence of sports practice on social relations in university youth according to the questions about it included in the Questionnaire.

## Results

**Table 1.** *Sports Contribute to Forming New Friendships*

Response Category	Frequency	Percentage	Mean	Standard Deviation	Result
Strongly Agree	37	18.5%			
Agree	60	30%			
Neutral	45	22.5%	2.70	1.88	Moderate
Disagree	36	18%			
Strongly Disagree	22	11%			
<b>Total</b>	<b>200</b>	<b>100%</b>			

As the information presented in Table 2 supports, sixty respondents (30 percent of total sample) clearly accept that sports help to build new friendships. And 36 (18.0% of the whole sample) respondents disagree with it. These results indicate a moderate trend related to the statement, having an average score of 2.70 and the respondents' scores were moderately clustered toward a mean with an SD (standard deviation) = 1.88.

To conclude there are different views in university youth about the role of sports to develop friendship. The fact that the responses are generally moderate suggests a range of opinion on this issue, with respondents not taking radically extreme positions for or against the statement. Some people say sports will have them make new friends, while others think it is not so effective.

**Table 2.** *Sports Activities Contribute to Enhancing Cooperation and Teamwork Values*

Response Category	Frequency	Percentage	Mean	Standard Deviation	Result
Strongly Agree	32	16%			
Agree	70	35%	2.90	1.170	Moderate
Neutral	20	10%			
Disagree	64	32%			
Strongly Disagree	14	7%			
<b>Total</b>	<b>200</b>	<b>100%</b>			

As the indicators in the table above show, 70 respondents, or 35% of the entire sample agree that sports practise develop values related to cooperation and teamwork. Conversely, 64 of the total sample expressed not agreeing with that statement, representing

a mean average percentage of 32%. Therefore, the general attitude towards this statement of respondents (as shown by their responses) is neutral that can be seen from the mean value 2.90 and standard deviation 1.170 which shows moderately clustered around mean.

We conclude from this that there is a diversity of opinions among the respondents regarding the contribution of sports activities to promoting values of cooperation and teamwork among university youth. It is evident that the responses are moderate and that the general trend regarding the role of sports activities in promoting values of cooperation and teamwork is characterized by moderation, meaning that the respondents did not adopt extreme positions either in support or opposition to this issue. In other words, some believe that sports activities contribute to enhancing values of cooperation and teamwork among university youth, while others see their impact as limited in this regard. The variation in opinion may differ according to several other factors, such as gender, age, or the respondents' previous experiences. It has been found that most respondents agreed with the idea that sports activities contribute to promoting values of cooperation and teamwork.

**Table 3.** *Sports Contribute to Enhancing Your Ability to Communicate with Others*

Response Category	Frequency	Percentage	Mean	Standard Deviation	Result
Strongly Agree	40	20%	2.85	1.31	Moderate
Agree	20	10%			
Neutral	47	23.5%			
Disagree	69	34.5%			
Strongly Disagree	24	12%			
<b>Total</b>	<b>200</b>	<b>100%</b>			

The indicators in the above table show that (69) respondents out of the total sample units, accounting for 34.5%, do not agree with the statement that sports contribute to enhancing your ability to communicate with others. This is followed by (40) respondents out of the total sample units, accounting for 20%, who strongly agree with the statement that sports contribute to enhancing your ability to communicate with others. This means that the direction of the statement according to the respondents' answers is moderate, with a mean of (2.85) and a standard deviation of (1.31), indicating that their responses to this statement are moderately centered.

We conclude from this that there is a variation in opinions regarding the role of sports in enhancing communication skills, as the majority of respondents' answers are moderate. The general trend of the respondents' opinions is characterized by moderation, meaning that the respondents did not take extreme positions on the subject. The variation

in opinion may differ according to several factors, including gender, age, or previous experiences of the respondents.

**Table 4. Team Sports Are Better Than Individual Sports**

Direction	Frequency	Percentage	Mean	Standard Deviation	Result
Strongly Agree	60	30%			
Agree	70	35%			
Neutral	40	20%	2.28	1.49	Moderate
Disagree	18	9%			
Strongly Disagree	12	6%			
<b>Total</b>	<b>200</b>	<b>100%</b>			

As the table indicates, 70 respondents (35% of the total sample) believe that collective sport activities are more appropriate than individual ones. In contrast, 6 % of the whole sample (n= 12) disagree entirely with this statement. The study results indicate a slight tendency with regard to the statement, with an average of 2.28 and standard deviation of 1.49; this means that responses are "orderly aggregated" around the mean.

We conclude that there is a diversity of opinions and differing viewpoints regarding the statement that collective sports activities are better than individual activities, as the responses to this statement were moderate. This indicates that the respondents did not adopt extreme views, whether supportive or opposing, on this subject. Furthermore, the direction of the respondents' opinions was varied, which may be attributed to factors such as gender, age, experiences, and the cultural background of the respondents.

**Table 5. Sports Enhance Social Relationships Among Individuals**

Direction	Frequency	Percentage	Mean	Standard Deviation	Result
Strongly Agree	72	36%			
Agree	45	22.5%			
Neutral	38	19%	2.19	1.126	Moderate
Disagree	18	9%			
Strongly Disagree	27	13.5%			
<b>Total</b>	<b>200</b>	<b>100%</b>			

The signals in the above table show that Sports can greatly improve personal relations between people. "(72) The entire sample becomes even less sceptic for this claim as (36%) strongly agree and advocate that sports is actually correlated with being social. Conversely, (27) respondents, 13.5% of the total sample, totally reject this statement. In general, the pattern of responses does not show a high level of consensus, with mean equals to (2.19) and standard deviation equal to (1.126), which means that they have moderate clustering around the central tendency regarding participants' attitudes towards this issue.

**Table 6.** *Social Relationships Help Increase Cohesion Among University Youth*

Direction	Frequency	Percentage	Mean	Standard Deviation	Result
Strongly Agree	50	25%	2.52	1.29	Moderate
Agree	42	21%			
Neutral	56	28%			
Disagree	36	18%			
Strongly Disagree	16	8%			
<b>Total</b>	<b>200</b>	<b>100%</b>			

The indicators in the table above suggest that sports significantly contribute to strengthening social relationships among individuals. Where 72 respondents, equivalent to 36% of the sample, strongly agreed that sports enhance these social relationships. On the other hand, 27 respondents, equivalent to 13.5% of the sample, completely disagreed with this idea, considering that sports do not contribute to enhancing social relationships among individuals. Considering the mean, which was (2.19), and the standard deviation (1.126), it is clear that the overall trend of the responses is moderate, indicating a variation in the respondents' opinions and a diversity of views regarding this statement. Despite some opposing opinions, the results show that the majority believe that sports play a positive role in improving social relationships among individuals, especially university students.

We can conclude that sports play an important role in enhancing social relationships among individuals, as the data showed a moderate agreement among the respondents, indicating that sports can be an effective tool in building and strengthening social bonds.

## Discussion

What our research has concluded is that there is an agreement among the results of this study that there is a variation in the respondents' opinions regarding the questions that were distributed to them. Thru the data, it was found that practicing sports positively affects social interaction among university students and contributes to enhancing values of cooperation and teamwork. The data also clarified that sports reduce aggressive behaviors among individuals. And that team sports activities are better than individual activities. The results showed that sports have an impact on mental and physical health. Despite the varying opinions and differing attitudes of university students, the majority agreed that sports play a role in improving their lifestyle by contributing to positive behavior changes and building social relationships that increase the bond among young people. Additionally, sports have the ability to promote peace. Therefore, it can be said that sports have a positive role in the life of university students.

## Recommendations

1. Enhancing community sports infrastructure by establishing free or low-cost collective and individual sports facilities in neighborhoods
2. Reviving traditional popular sports: By organizing traditional popular sports such as long-distance running, popular matches, and the game of "Al-Muhaybis," they strengthen social bonds.
3. Building strategic partnerships with the private sector: The study recommends partnering with the private sector by collaborating with companies to support local sports activities, providing government youth forums with the latest sports equipment, and offering discounts on gym memberships or prizes for events.
4. Launching sports programs with a unifying character: The unifying aspects of sports are highlighted, contributing to the spread of a culture of openness and communication among different segments of society. Launching sports programs with a unifying character: They highlight the unifying aspects of sports and contribute to spreading a culture of openness and communication among different segments of society.
5. Organizing voluntary community sports tournaments: by organizing voluntary community sports tournaments under the slogan of serving the community.
6. Supervision and professional development in private sports centers: The study recommends supervising private sports halls and setting criteria for selecting the trainers responsible for training the members of these halls.
7. Activating sports media as a means to encourage participation in collective activities and activating sports media as a means to enhance social cohesion and promote a culture of peace thru sports media.

8. Encouraging community participation among university students thru sports: and outside the university campus. Which contributes to enhancing communication between university students and local community members and strengthens their interaction with their social environment.
9. Diversifying sports programs within universities contributes to encouraging university youth to participate in physical activities, which enhances the spirit of cooperation and teamwork among university students and strengthens social bonds between them.
10. Improving the university sports environment and its academic integration: The study recommends equipping university sports halls with the latest modern sports equipment, adopting physical education as a core subject in various disciplines with the same importance as other academic subjects, supporting scientific research related to sports and health, and organizing periodic sports tournaments suitable for both genders to encourage university youth to participate in these tournaments.



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## The Effect of Motor Activity Based Learning on the Acquisition of Two Tennis Groundstroke Skills

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2357](https://doi.org/10.37359/JOPE.V37(4)2025.2357)

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**Article history:** Received 13/ August/2025 Accepted 6/ November/2025 Available online 28/ December/2025

### Abstract

This research is concerned with the effect of learning on movement activity to develop groundstroke (Forehand and backhand) tennis skills for 14-year age group female players at Diyala specialized Center of Baghdad. The study was conducted with two groups (experimental and control), one of which was taught using motor activity based instructional modules, while the other was taught through traditional teaching techniques. Analysis included before and after for each set of skills. The results showed that the experimental group was able to achieve a significantly better improvement in accuracy and consistency than the control group, thanks to variety of practice including immersion in practical experience. This made them even more motivated to learn the strokes and deepened their understanding of what is the base technical element of each smash and clear. Conversely, the control group was able to reduce EF through mere repetition. The findings of the study provide support for programs with structured progressive educational content that mesh practical and sensory-motor learning experience, expedite skill acquisition as well as maintain performance progression in young tennis players.

**Keywords:** learning, motor activities, forehand stroke, backhand stroke.

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## Introduction

Motor learning generally investigates human movement, and in particular athletic performance to explore the different levels from which one may study movement (Shalash, 2002, p. 62). Covering tennis, a game that captures the heart and soul of fans, is News coverage: As the French Open draws up to begin May 23 (it will be over June 6). The reason that the game has gained international notoriety is due to its appeal as a source of excitement for male and female players, keeping them in shape (Al-Hajjiya, 1990, p. 5).

The two basic groundstrokes are fundamental shots in tennis and form the basis of technical and tactical developments in junior and senior pupils. Educational and sports literature emphasises the need for a shift to novel teaching methods that are based on practical experience, and take into consideration integrated movement with the aim of developing these abilities as opposed to traditional pedagogical practice. This approach is known as activity-based learning. A key element in this context, which has a direct improving effect on the tennis player's performance, is their level of concentration. They meet great resistance from distractions and lack of concentration which undermine to an extent the accuracy finesse of their strokes (Hashem, 2000 p. 152). A study comparing the learning methods unveiled that they are effective not only to enhance the accuracy of learners' groundstrokes but also to produce a distinct advantage over those employed in the traditional approach concerning skill acquisition speed, although no difference seemed to exist in long-term retention (CCSE, 2021).

In the motor learning literature, training with varied practice has received a great deal of attention. A field experiment revealed that contrasted exercise in terms of goals and distances is the most effective way to promote stroke accuracy in young people than when fixed training, supporting "the contextual interference" hypothesis as a basic device of motor learning (ResearchGate, 2006). Additionally, a study also recently found that the use of motor imagery during high-intensity physical training sessions-maintained performance levels when compared to performance after having trained without this component, without affecting physiological responses including heart rate (PMC, 2015).

“A neuromuscular training program that is effective in improving balance and neuromuscular coordination can potentially improve fine motor skills, such as hitting a forehand or backhand in tennis,” according to findings reported recently by a team of researchers who conducted topic-related systemic reviews (BMC Sports Science 2025).

In view of this evidence, it appears that motor-based learning, through multiple exercises and station-based learning, represents an efficient conceptual model to expedite the achievement of basic tennis skills and maximize their retention. Our study points to the importance of studying how these kinds of learning protocols effect on

groundstroke development and it provides empirical scientific evidence, which will give the coaches the tools for implementing interactive motor learning strategies that serve to improve accuracy-consistency levels.

The study also aims to clarify the terminology related to the topic. "Motor-based learning" refers to all methods that employ motor variety and direct practical experimentation as teaching tools, while "accuracy" is used as an indicator of the ability to repeatedly direct strokes toward specific targets, and "retention" signifies the extent to which learning remains effective after the completion of the training program.

### **Research problem**

The two ground strokes (forehand and backhand strokes) are among the most important technical pillars of tennis, as they form the basis for ball exchanges and controlling the flow of the game. Through field observation of the training of players at the Diyala Specialized Center (14 years old), a relative weakness in the accuracy and speed of their performance was noted, in addition to fluctuations in neuromuscular coordination during the execution of these two strokes. This deficit stems from a classic instruction which is focused on mechanical repetition and lacks motor pattern that responds to the specific features of this age-group. This gap is detrimental to the players' development, who receive less instruction and struggle in mastering the basic skills needed for progressing to a higher level of technical play. This conclusion is based on field observations and examination of educational and training units, as well as the experience of the researcher as a tennis trainer in Diyala Governorate. This prompted the researcher to explore the possibility of applying a method based on motor activities to address this problem and achieve tangible progress in learning the two ground strokes.

### **Research objectives**

1. To identify the effect of activity-based learning on improving the forehand groundstroke skill among 14-year-old female tennis players at the Diyala Specialized Center.
2. To identify the effect of activity-based learning on improving the backhand groundstroke skill among 14-year-old female tennis players at the Diyala Specialized Center.
3. To compare the results of the experimental group (which underwent activity-based learning) with the results of the control group (which followed the traditional method) in terms of learning both groundstrokes.

## Research hypotheses

1. There are statistically significant differences at the 0.05 level between the pre-test and post-test results for the experimental group, favoring the post-test in learning the forehand groundstroke.
2. There are statistically significant differences at the 0.05 level between the pre-test and post-test results for the experimental group, favoring the post-test in learning the backhand groundstroke.
3. There are statistically significant differences at the 0.05 level between the post-test results of the two groups (experimental and control), favoring the experimental group in learning both groundstrokes.

## Research areas

1. Human Resources: Ten (10) female tennis players aged 14 years old at the Diyala Specialized Center, divided into two groups (experimental and control), with five players in each group.
2. Location: The courts of the Diyala Specialized Tennis Center.
3. Timeframe: From July 15, 2025, to September 1, 2025.

## Methodology

The researcher used the experimental method with a design based on two groups (experimental and control) with pre- and post-tests, as it is suitable for the nature of the research problem and its objectives, and because it is the most appropriate for measuring the effect of learning based on motor activities in learning the two groundstrokes in tennis.

## Research population and sample

The research community was determined from the players of the Diyala Specialized Tennis Center in the age group (14 years), and the number of members of the community was (10) players who were chosen intentionally and then randomly distributed using the method of drawing lots into two equivalent groups, experimental and control, with (5) players in each group.

## Data collection methods and research tools

**The researcher relied on several methods to collect data, including:** Arabic sources, the internet, personal interviews with experts and specialists, direct observation and the

researcher's practical experience, and the use of a performance scoring form for the two groundstrokes.

**The equipment used included:** a regulation tennis court, ten tennis rackets, a measuring tape, seventy tennis balls, a whistle and a manual timer, a computer for data analysis, and colored adhesive tape to mark performance zones on the tennis court.

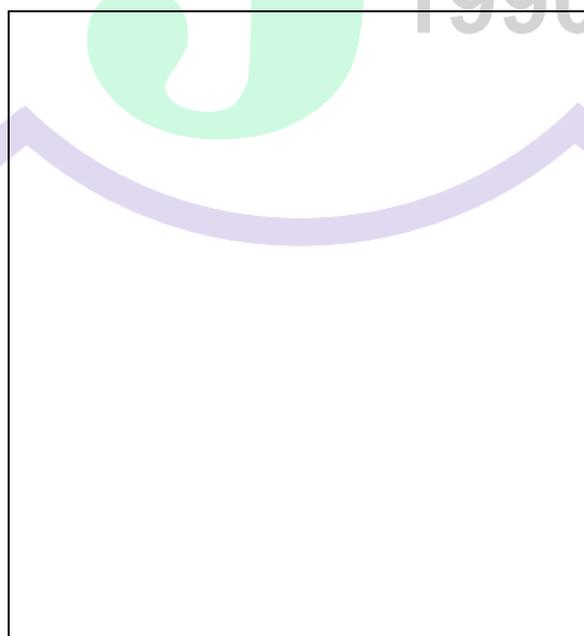
### **Two Groundstrokes Test (ITF: 2004: 9)**

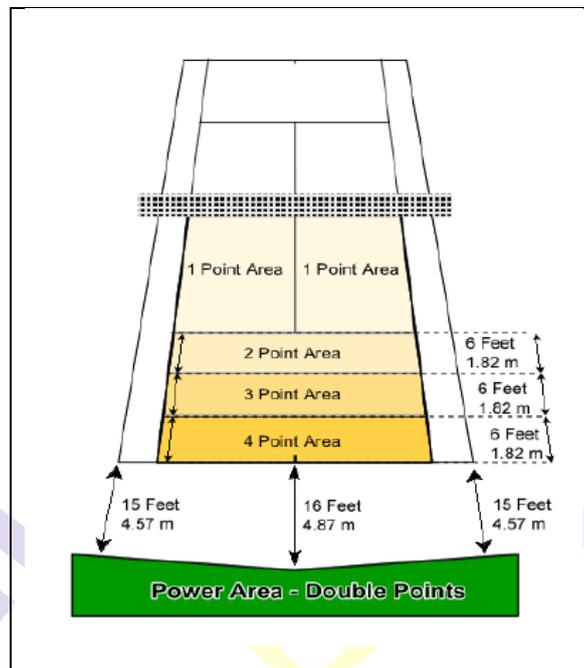
**Test Purpose:** To measure the depth of groundstrokes (forehand and backhand).

**Equipment:** 1 tennis racket, 10 tennis balls.

**Performance:** The player stands behind the baseline, and the coach is opposite them on the T-line. The coach feeds the player four balls for warm-up, one for each skill. The player then performs the test, using 10 balls (5 for each skill).

**Scoring:** Points are awarded for the first and second bounces of the ball, based on the location of the bounce. If the first bounce is in the one-point zone and the second in the two-point zone, three points are awarded. If the first bounce is in the three-point zone, for example, and the second in the double-point zone, six points are awarded for that shot. This process is repeated for all other point zones, as shown in Figure 1. The maximum score for the test is 90. One point is awarded for each successful attempt within the court. Notes: If the ball touches the lines, it is considered to be in the field; if it touches the lines between the divided zones, it is considered to be in the field.





**Figure 1.** *Illustrates The Method For Performing The Front And Back Stroke Test*

### Main Experiment

The researcher prepared 10 instructional units, each 90 minutes long, delivered twice a week on Tuesdays and Wednesdays for five weeks. Each unit included two practical exercises focused on developing the twogroundstrokes in tennis. The researcher drew upon his practical experience as a tennis coach in Diyala Governorate, as well as scientific resources and expert consultations. The exercises were carefully designed to be appropriate for the participants' level, with a gradual increase in difficulty, and to achieve the learning objectives of each exercise.

The program was implemented on Tuesday, July 29, 2025, with the research participants under the researcher's supervision. Each instructional unit included a 45-minute main practical activity, delivered twice a week in the afternoon from 5:00 PM to 6:30 PM.

## Results

**Table 1. shows the significance of the differences between the pre-test and post-test for the experimental group**

Test	Unit of measurement	Mean	Std. Deviation	Std. Error Mean	T	Sig. (2-tailed)	Type of indication
Front stroke	Point	8	3.082	1.54	6.44	0.000	sig
Back stroke	Point	7.8	3.273	1.63	4.76	0.001	sig

At a significance level of 0.05 and degrees of freedom  $n-1=4$

**Table 2. shows the significance of the differences between the pre-test and post-test for the control group**

Test	Unit of measurement	Mean	Std. Deviation	Std. Error Mean	T	Sig. (2-tailed)	Type of indication
Front stroke	Point	8.6	2.607	1.3	6.59	0.000	sig
Back stroke	Point	6.8	3.508	1.78	3.87	0.001	sig

At a significance level of 0.05 and degrees of freedom  $n-1=4$

**Table 3. The results of the tests for the experimental and control groups are shown**

Skill	The group	N	mean	SD.	T	Sig. Value	Type of indication
Front stroke	Experimental group	5	28	4.243	3.49	0.001	sig
	Control group	5	20.8	4.494			

<b>Front stroke</b>	Experimental group	5	25.6	2.88	3.68	0.001	sig
	Control group	5	20.6	2.87			

At a significance level of 0.05 and degrees of freedom  $n-2=8$

## Discussion

Table (1) shows that the differences between the mean scores of the pre-test and post-test for the experimental group in the forehand and backhand stroke skills were statistically significant at a p-value of less than (0.05), favoring the post-test. This indicates that the activity-based learning units clearly contributed to improving the performance level of the group members, both in terms of accuracy and consistency in executing the two skills.

This gain is explained by the nature of activity-based learning, which provides more chances for hands on experimentation process and learning in various contextual forms. Such a method allows learners to learn by doing rather than simply memorizing. This is consistent with the evidence provided by CCSE (2021), that indicates how active learning allows for a higher accuracy on ground strokes than traditional practices based on mechanical repetition without variation. In addition, the findings of ResearchGate (2006) support the idea that diverse training increases the efficiency of motor performance by increasing the ability of subjects to adapt during playing in different environments.

Moreover, the motor activities developed the learners' thinking skills by combining theory application with kinaesthetic cognition. This was reflected in their increased focusing on specific features of the stroke, for example racket angle, timing and ball-contact point. Conclusion Force increase could be primarily due to the character of exercises that focused on body balance and a symmetrical distribution of effort between the arms, which resulted in better performance of movement with the backhand top spin. These components were described in BMC Sports Science (2025) as being crucial for the formation of fine movement skills. Thus the positive differences recorded at post test tests can be attributed to the match between the educational program and these learners, in as much it had clear aims and was adequately matched to their level of competence. This led to a substantial improvement in skill performance.

Table (2) The pre-test and post-test comparison results of the control group had significant differences in as much as the error level is (0.01)The post test result was better for both the forehand and backhand for same group. This means that the educational units received by this group also led to an increase of performance level of these two skills, although at a lower degree than in the experimental group.

A greater performance observed may be related to the organization of training sessions, its regularity and coresearchers' rigorous work in colour resolution. This created an increased sense of confidence and willingness to learn in the trainee level. And the motivation from those who were in charge of executing the exercises helped to speed up their learning how to perform them (Amin, 2020, p. 198). Whilst this procedure suffered from a lack of complexity in test conditions in practice recollection was assisted by stability between learning and testing, and availability of multiple trials to 'get the feel' for each ground stroke, which appears to have facilitated a kinematic representation of the two ground strokes as evidenced by the positive gain observed across pre- and post-test measures.

This is in accordance with the result obtained by ResearchGate (2006) that even though it may not be very effective, repetitive constant practice can increase doing smaller number of trials which influence motor performance among beginners. As pointed out by CCSE (2021), although conventional methods sometimes can achieve significant gain in short-term performance, they are less effective at enabling adaptation to diverse playing situations, compared with active or differential approaches.

On the other hand, the improvement in backhand stroke among the control group may be due to dedicating sufficient time to repeated practice of this skill, which is relatively more difficult than the forehand stroke. This aligns with what was indicated in the BMC Sports Science (2025) review, which stated that continuous repetition helps develop the balance and neuromuscular coordination necessary for the backhand stroke, even within traditional training programs.

Therefore, it can be said that the results achieved by the control group confirm that traditional training programs are capable of leading to progress in learning basic tennis skills. However, the extent of this progress remains relatively less than that achieved by programs that rely on diverse motor activities, as will be revealed in the final comparisons between the two groups.

The findings table (3) show that the experimental group was significantly better than the control in both forehand and backhand posttests. The mean forehand score at the experimental group was (28), while in control group, they were (20.8) and there is statistical significant difference ( $< 0.05$ ). For backhand stroke, the experimental group had average 25.6 score and control group 20.6 score. The computed t-value of (3.68) was also significant at the 0.05 level. The above significant differences indicate that the skill performance increased more among the participants in education programmed compared to traditional education.

These results indicate that the design of instruction with a focus on motor activity practice was successful. Such a design provided a rich multisensory learning environment, as well as functional-motor drill instruction for the acquisition of knowledge and motor

performance. By guiding learners to attend to sequentially staged attention attraction and goal clarification, presenting stimuli and organizing responses, as well as by providing reinforcement and assessment, this experience is systematically and deeply constructed. This result aligns with Magill and Anderson's (2021) review that structured repetition and immediate feedback increase motor learning.

The training units on the other hand, applied a gradual escalation of intensity and variety in the exercises, enabling development of physical qualities like 'neuromuscular coordination' and balance that would improve ability to perform skills. This is consistent with Schmidt & Lee's (2019) contention that success in motor performance depends on the degree of coupling between cognitive and motor processes during practice.

The experimental group outperformed the control group may due to that such an intervention program provides more occasions for active environmental intervention and participation, which increased their interest in playing and improved their confidence. The other group was limited by transition to the traditional form that lack diversified stimuli and is dependent on rote learning and mechanical repetition, with few opportunities for rapid skill development. The results of other studies (Hussein, 2023) confirm the fact that interactive-based educational curricula has an impact on a greater progress in learning fundamental tennis skills than do traditional models.

Based on the above, it can be said that the superiority of the experimental group in the post-test represents practical evidence of the success of educational units based on motor activities in creating substantial differences in the level of skill performance, which is consistent with the research hypothesis that assumed the existence of significant differences in favor of the experimental group. Therefore, these results confirm the importance of employing modern educational models in tennis programs because of their effective role in developing basic motor skills and ensuring the achievement of qualitative and sustainable progress in the level of junior players.

## Conclusions

1. Effectiveness of Activity-Based Learning: The results showed that using activity-based learning units significantly improved the tennis players' performance in both forehand and backhand strokes compared to the traditional method.
2. Variety in practice, enhanced accuracy, and diverse training situations and learning stations helped the players gain broader practical experience, leading to increased accuracy and consistency in executing the strokes. This highlights the importance of integrating sensory-motor stimuli into the learning process.
3. Program Impact on Cognitive Aspects and Motivation: Integrating kinesthetic thinking and active practice stimulated the trainees' cognitive abilities and increased their awareness of the importance of the basic technical aspects of the stroke. It also boosted

their motivation and confidence during training compared to traditional methods that rely on repetition.

4. Comparison with the Traditional Method: Although the control group showed some improvement due to continuous repetition of skills, the experimental group's progress was significantly greater. This indicates the superiority of activity-based learning over traditional education in terms of speed of skill acquisition and quality of performance.
5. The importance of designing gradual and organized educational programs to provide an organized and gradual learning environment that helps players build sequential motor experiences, which enhances the stability of learning and ensures the improvement of skill performance in a sustainable way.



### Appendix (1)

#### Model of the first educational unit

**Educational objective:**                      **Learning Unit Number: 1**                      **Today: Tuesday**

**Ground kicks**                                      **Time: 90 minutes**                                      **Date: 29/7/2025**

sequence	Unit sections	Duration	the details	Notes
1	Preparatory Section	20 minute		
	General Warm-up	10 minute	-----	
	Specific Warm-up	10 minute	-----	
2	Main Section	60 minute		
	Educational Aspect	15 minute	Explanation and presentation of practical exercises	
	Practical Aspect	45 minute	Exercise No. (1(	
		20 minute	Exercise No. (11(	
		20 minute	Organizing, collecting balls, and	
5 minute		alternating between exercises		
3	<b>Concluding Section</b>	<b>10 minute</b>		
	<b>Calming Exercises</b>	<b>5 minute</b>	-----	
	<b>Relaxation Exercises</b>	<b>5 minute</b>	-----	

Learning Unit	Day	Date	Exercises Completed	
1.	Tuesday	29/7/2025	1	11
2.	Wednesday	30/7/2025	2	12
3.	Tuesday	6/8/2025	3	13
4.	Wednesday	7/8/2025	4	14

5.	Tuesday	13/8/2025	5	15
6.	Wednesday	14/8/2025	6	16
7.	Tuesday	20/8/2025	7	17
8.	Wednesday	21/8/2025	8	18
9.	Tuesday	27/8/2025	9	19
10.	Wednesday	28/8/2025	10	20

### Appendix (2)

#### Exercises prepared by the researcher and used in the educational units front strike

1. Simulating a shot without a ball: Repeating the hand and foot movements in the air.
2. Hitting a stationary ball: A ball suspended by a string that allows for hitting.
3. Hitting a slow, controlled shot towards the wall: To control timing.
4. Hitting from a hand pass by the coach: Easy balls on the right side.
5. Hitting from a bat pass by the coach: Medium-height balls, focusing on accuracy.
6. Hitting a target: Small areas of the court (circles or squares).
7. Hitting with a sideways movement: The player moves from the center to the right side, returns the ball, and then quickly returns.
8. Forehand half rallies: The player and coach exchange 6–8 balls using only a forehand, maintaining the rhythm of the game.
9. Full-court rallies using only a forehand: The player returns balls from various directions over a longer distance.
10. Semi-play position (Rally Drill): The player and coach (or another player) play an open exchange of forehands up to 10–12 consecutive balls.

#### Backstroke

1. Simulating a shot without a ball: Repeating the arm movement with a torso rotation.
2. Hitting a stationary ball: From a cone or the coach's hand.
3. Slowing a wall shot: Using only a backhand.
4. Hitting from a hand pass by the coach: Easy balls on the left side.
5. Hitting from a bat pass by the coach: Medium balls on the back side.

6. Target shooting: Squares in the back half of the court.
7. Sideways shooting: From the center to the left side, then quickly returning to the ready position.
8. Back-half rallies: The player and coach exchange 6–8 balls using only a backhand, maintaining the rhythm.
9. Full-court rallies using only a backhand: The player returns balls from the center and the wings.
10. Rally Drill: The player engages in a long rallied with an open backhand for up to 10–12 consecutive balls.



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## The effect of resistance training on some starting and achievement variables for discus throwers

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2237](https://doi.org/10.37359/JOPE.V37(4)2025.2237)

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**Article history:** Received 22/ December /2024 Accepted 17/ January/2025 Available online 28/ December/2025

### Abstract

The study aimed to design resistance training for discus throwers, identify their starting and performance variables, and examine the effect of resistance training on developing these variables. The researchers employed an experimental approach with two equivalent groups using pre- and post-tests, suitable for the research problem. The research population included female athletes participating in the Iraqi Athletics Clubs and Institutions Championship in November 2022, with 13 participants. Eight athletes were selected based on achievement levels and research requirements. They were randomly divided into two groups: an experimental group (4 athletes) training with resistance according to a graduated bumper network, and a control group (4 athletes) following standard trainer-led exercises. This represented 61.54% of the research population. The results showed that resistance training significantly improved starting angles, launch height, and discus velocity, with the bumper network playing a crucial role in angle adjustment and providing immediate feedback for technical corrections. The combination of resistance exercises and network-guided practice enhanced coordination, muscle activation, and overall performance. The study concluded that incorporating resistance training with a structured bumper network is highly effective in improving discus throwers' technical and performance outcomes. Researchers recommended adopting such training methods to maximize achievement, develop biomechanical efficiency, and optimize launch angles for better results in competitive performance.

**Keywords:** Resistance Training, Starting Phase Variables, Bumper Grid, Achievement, Discus Throw.

### Introduction

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Specialists and researchers in the field of sports have placed great emphasis on solving the problems facing this field and on striving to advance it further. This has been pursued through identifying the most appropriate means of achieving high performance by scientifically controlling the components of training load (intensity, volume, and recovery), applying scientific theories, and utilizing the concepts of training science in addition to various other disciplines. The training process, therefore, must be productive and capable of enhancing outcomes through the use of modern scientific knowledge and advanced technologies, while keeping pace with progress. This requires seeking new solutions and innovative methods that contribute to driving development forward by providing more effective alternatives to the traditional means used in training.

The formation of the physical qualities conducted by the educational system will be created in the process of systemic physical achieving necessary unity with processes from other scientific fields. Because of that, the physical abilities, especially pushing and throwing in track and field events are important. More specifically, events in throwing for track and field training require detailed attention of science, that is supported by special training equipment and tools adapted to achieve the goals in training or correct certain errors that are highly specific but difficult to eliminate without elaborate instruments. These resources save coaches and athletes time, while also improving the efficiency of meeting training goals.

Performance is therefore a consequence of biomechanical variables and their interaction with physical ones. Writes Zāhid (2009) “in throwing events at athletics we have one group of such discipline where physical capacities are on higher level requirement combined with preparation from the athlete”.

There have been a small number of studies that investigated resistance training for the discus throw discipline. One of the studies was conducted by Saad Jassim (2013), who sought to determine the impact of weighted resistance training on certain physical and technical abilities associated with the throwing position, throw performance, and results in a research sample. The sample was composed of the best eight discus throwers from the National Clubs Championship, information gathered by marks achieved, which accounted for 47.058% of universe of the research. The researcher used an educational experiment, and the most important findings of a physical and technical training with added burdens effect also had clear on some physical abilities, Achieves unique results to reach certain technical (Jallab, 2013).

Another research by Al-Khalidi and Sahib (2023) conducted to reveal the effect of resistance training with means on some take-off variables and performance assay in discus throwing for women with a special need in F55. The sample was made up of four female (F55) discus throw athletes. Results were analyzed by using experimental design. The major results have reported that ancillary tools used by experimental groups in their training even

highly contributed more than one of the selected take-off variables studied (Al-Khalidi & Sahib, 2023).

Also, Naheda Qusay and William Lewis (2021) carried out research in order to devise types of elastic bands specifically designed training programs with water resistance for EP and STR End: enhance performance significantly better in the discus throw). The study also examined the impact of such training on different forms of strength and performance. The sample of the study was composed of eight junior athletes at Al-Zubair Club in Basra Governorate. The experimental technique was used and it showed that the exercises contributed in a high ratio to develop of certain strength types, as well as to enhance discus throw distance throwing for both groups (Mashkoo, Ali, & William, 2021).

In a further study by Khamees & Majeed (2017), the authors aimed to design and investigate the effects of body torque-based weight resistance training program on improving instantaneous pushing efficiency, fluidity, as well as acceleration in youth for discus throwing performance. The sample of the study included five players from Diyala Youth Team who were training in the sporting season (2014- 2015). Outcomes were evaluated using the experimental approach. The findings revealed that resistance torque training led to the higher effectiveness of push power at the instant of ball release and a lower angular momentum in preparing phases (Jaber & Salal, 2017).

The problem of the present research emerges from the authors' practical experience in this field, as they both coach female discus throwers. Through reviewing relevant literature and previous studies, they identified several fundamental weaknesses hindering the progress of women's discus throwing at the Arab and Asian levels. One of the most prominent issues is the noticeable reduction in the release angle during the throw, which has been observed among Iraqi discus throwers. This reduction was diagnosed through biomechanical field analyses of discus throwers during national championships. Accordingly, the researchers sought to propose appropriate solutions to this problem through targeted training using weighted implements and by designing a graded-height net in front of the throwing circle. This net allows coaches to directly assess and adjust the release angle in the training field.

Therefore, the current study aimed to design resistance-based training programs for female discus throwers, to identify the values of take-off and performance variables, and to investigate the effects of resistance training on the development of these variables in female discus athletes.

### **Research methodology**

The researcher employed the experimental method using a two-group design (experimental and control) with pre- and post-tests, as it was deemed suitable for the nature of the research problem. As Allawi and Rateb (1999) state, "the experimental method

represents the most valid approach for solving many scientific problems both practically and theoretically.” The research population consisted of female athletes who participated in the Iraqi Clubs and Institutions Athletics Championship for women and juniors, held in November 2022. The total number of participants was 13, representing the research population. From this population, 8 athletes were selected based on their performance level and the requirements of conducting the field experiment. These were divided into two groups: 4 athletes assigned to the experimental group, which trained with resistance exercises using the inclined net system, and 4 athletes assigned to the control group, which followed the coach’s conventional training program. The distribution was carried out randomly by lot, and the selected sample represented 61.54% of the total research population.

The investigators used a customized blocking net held by poles that were inserted into the ground, and had a sliding mechanism for adjusting the height. The poles were capable of extending to 10 meters and receding to 5 meters, while being separated from one another by 10 meters. Four colored bands (each representing a different release angle) were attached to the poles with a net.

The release angle for each athlete was determined through video recording and subsequent measurement of the release angle during repeated attempts. Once the individual release angle of each athlete was identified, colored bands were placed on the net, each corresponding to a particular angle, in order to work on gradually increasing the release angle until the optimal value was achieved. In addition, angles were also determined by using a sliding pole of 2 meters in height, fixed with a metal wire. The athlete would stand beside the pole, raise her arm to establish the release angle, and the wire would then be fixed at the designated angle to guide training. Figure (1) illustrates the design of the net.



**Figure 1. show the net**

The researchers used two video cameras with their stands, operating at a speed of 120 frames per second, manufactured by Sony (Japan), in order to extract the kinematic variables of the discus release. The variables determined by the researchers were as follows:

### Release velocity of the discus

This is the average velocity calculated by dividing the measured release distance—from the moment the discus leaves the thrower’s hand until after release—by the release time. The values were obtained through video recordings and analyzed using the *Kinovea* software (Jams G. Hang, 1976). Figure (1) illustrates this.

### Release angle of the discus

This is defined as the angle formed between the trajectory of the discus center of gravity after release and the horizontal line parallel to the ground. The values were extracted using video recordings and analyzed with the *Kenova* software (Salameh, 2013). Figure (1) illustrates this.

### Release height of the discus

This refers to the vertical distance between the center of gravity of the discus at the moment of release and the ground. It was also determined through video recordings and analyzed using the *Kinovea* software (Al-Quwa, 2004). Figure (2) illustrates this.



**Figure 2. show the kinematic variables of the release**

### Procedures

#### Discus Throw Performance Test (Al-Shamma, Dahash, & Abdullah, 2019)

**Purpose of the test:** To measure the best distance achieved among all attempts.

**Unit of measurement:** Meter.

**Instruments:** Discus throwing circle, 1-kg discus, measuring tape, and recording forms.

**Performance description:** Each participant performs the throw from within the discus circle, following all regulations of the International Association of Athletics Federations (IAAF) for discus throw. The test includes a set number of attempts.

**Recording procedure:** The test begins after the athletes perform warm-up exercises and trial attempts. Each participant is then given six official attempts, all of which are recorded on video. The best attempt (i.e., the highest achievement) is analyzed.

A pilot experiment was conducted on two participants from the sample, during which the following procedures were applied:

**Discus throw performance test** was carried out at the throwing field of the College of Physical Education and Sports Sciences, University of Baghdad, at 3:00 p.m.

The purpose of the pilot study was to identify the following:

The optimal placement of cameras. One video camera (Casio) with a speed of 240 frames per second, mounted on a tripod, was positioned beside the throwing circle on the side of the throwing arm, at a height of 1.20 meters and a distance of 7 meters from the circle. The camera was oriented perpendicular to the thrower’s motion and at a height aligned with the throwing arm. This setup was intended to capture both the release phase and the initial flight of the discus. A calibration scale (1 meter in length) was also placed at the midpoint of the motion path to provide reference for measurement.

The functionality of memory cards (RAM) for each camera and to ensure the frame rate was fixed at 120 frames per second.

Following the pilot study, the researchers conducted the pre-tests on the research sample on Monday (4–5/3/2024) at the University of Baghdad / College of Physical Education and Sports Sciences. Camera positions were fixed and marked, and reference points were identified to facilitate proper installation of the equipment. The pre-tests included both performance measurement and video recording, conducted in the afternoon. After the pre-tests, equivalence of the extracted variables was established, as shown in Table (1).

**Table 1. Equivalence of the sample in physical, kinematic, and performance variables**

Variables	Sub-variables	Unit	Control Group		Experimental Group		T-Value	P-Value
			Mean	SD	Mean	SD		

Release Variables	Release Angle	Degree	34.155	0.347	34.075	0.605	0.229	0.826
	Release Height	cm	156.34	0.700	156.267	0.735	0.153	0.884
	Release Velocity	m/s	18.702	0.433	18.937	0.138	1.034	0.341
Performance	Distance	m	37.067	0.810	37.077	0.952	0.016	0.988

Significant at the 0.05 level, with degrees of freedom ( $n - 2$ ) = 6

After reviewing numerous books and training curricula, consulting with coaches and specialists, and drawing on their own practical experience, the researchers developed a training program aimed at improving the release variables of female discus throwers. The program relied on the use of weighted implements for the arms and trunk, as well as the graduated-height discus blocking net. The training lasted for 10 weeks, with three training sessions per week, totaling 30 training units.

The researchers adhered, as much as possible, to the principles and rules of training science in implementing these units, as follows:

- Exercises were introduced in the main section of each training session.
- The program was conducted during the final part of the general preparation phase and the beginning of the specific preparation phase.
- The principle of progressive overload and periodization was applied in executing the training load.
- Both high-intensity repetitive and interval training methods were used for exercises.
- Strength and skill-specific exercises for discus throw required relatively high intensity, ranging from 85% to 100% of the prescribed load.
- Training intensity was measured based on the variation in difficulty resulting from the type of weights used. Additionally, the athletes' perceived exertion in skill execution, particularly when approaching the optimal release angle, was considered.
- A work-to-rest ratio of 1:30 was applied in throwing exercises, and 1:10 in strength-specific exercises.
- Rest intervals ranged between 1.5 to 2.5 minutes between repetitions and 5 to 6 minutes between training sets.

- The number of repetitions for skill execution in discus throwing ranged from 20 to 25, while strength-specific exercises ranged from 6 to 12 repetitions.

Post-tests for performance and release variables were conducted under the same conditions and sequence as the pre-tests.

## Result

**Table 2.** Mean values, standard deviations, calculated T-values, and significance levels for the release and performance variables of the experimental group

Phase Variable	Variable	Unit	Pre-Test		Post-Test		Mean Difference	T-Value	P-Value
			Mean	SD	Mean	SD			
Release Phase	Release Angle	Degree	34.075	0.605	36.135	0.050	2.060	6.933	0.006
Variables	Release Height	cm	156.267	0.735	157.982	0.331	1.715	6.772	0.007
	Release Velocity	m/s	18.937	0.138	20.107	0.165	1.170	17.036	0.000
	Performance Distance	m	37.077	0.952	38.710	0.568	1.632	4.466	0.021

Significant at  $p < 0.05$ , with degrees of freedom  $(n - 1) = 3$ .

## Discussing

These data indicate that all release parameters significantly recovered. The improvements in release angle, release height and release velocity illustrate the efficacy of the training program which the researchers conducted on experimental group. Especially, the graduated-height blocking net made a significant contribution to improving the release angle. The improvements between pre and post-tests can be attributed to the common training as well as instantaneous feedback of net, which allows athletes to control -angle in each trial. Using colored bands on the net at predetermined angles as well as video analysis for all athletes, monitoring and assessment were implemented.

Furthermore, training with weighted implements made the performance of such skills very challenging. These heightened demands along with repeated practice in such conditions likely contributed to neuromuscular adaptation and enhancement of intersegmental coordination. Participants were trained to ensure proper biomechanical positioning using proper joint angles, which the researchers stressed during training sessions. These exercises helped to achieve the ideal release angle, which is strongly connected with technical and mechanical phases, physical abilities of an athlete and fluent attitudes – in other words they led to correct throwing position on the incline during practice. This result agrees with earlier

studies in which the correct body positions during the throw, and use of physical capabilities and anatomical characteristics are necessary to obtain a release angle that provides maximal discus distance (Z.K., 1995).

Training on slope with the blocking net produced skill gains and improved sensory-motor integration shows real-time information concerning movement performance in spatial and temporal terms (Ahmed, 1998). The use of different types of resistance, such as extra weights and jumps, was mainly intended to generate the best biomechanical conditions for performance (specifically for release angle since it is a determinant factor to tic-tac outcomes). Bartlett (1999) identified three main areas of strength for thrower that contribute to overall strength and biomechanical connection: 1) a generalized year round weight training programmed, 2) targeted muscular strength sessions specific to the needs of technical and mechanical requirements using weighted apparatuses and plyometric exercises, and, 3) absolute strength components associated with individual muscle groups (Clements, 1996).

Training using the blocking-net enhanced final release velocity and reduced errors in angular momentum, suggesting better movement fluidity was achieved between preparatory and final throwing phases. This increase could be attributed to the use of progressive and appropriate resistance training for both lower extremities (i.e., jumping for distance and height) and upper extremity (i.e., multiple types of weighted throws). The authors stressed the necessity of maintaining proper technical execution in these tasks to develop the muscle strength. Repetitive practice sets, sport specific activities and strength building are essential to maintain biomechanical demands required for peak performance (McCoy, 2005).

Resistance training used by the investigators included a variety of technical and skill components as weighted implements, weight vests, plyometric jumps, or medicine balls to improve biomechanical characteristics. Discus throwing requires strength and speed, so the training program should focus on speed-oriented drill (ie- jumping and light- implement throwing). Close observation of these weight room workouts is necessary to maintain strength levels while preventing overfatigue in order to be at one's best for throwing.

The authors claim that the increase in release velocity is largely due to improved movement speed of the thrower throughout the kinetic phases in addition to a reduction occurring during flight and transition time (-phase and -phase). The combination of these phases, combined with resistance training, has translated into a performance augmentation. Also, the increase in release velocity was found positively correlated with that of release angle during the process, reflecting an intrinsic relationship among individual variables and effect on following learning phrases according to data (Ahmed, 1998, p.65).

Releases seem to be going over his head even more. The authors ascribe this improvement to the resistance training done against a block net, which encouraged a proper practice by bringing correct joint angle, and so gaining an optimal center of mass height at

release. The drills focused on landing joint extension, which accounted for greater release height and thus increased horizontal distance (Paish, 2022). These improvements were also associated with positive technical and biomechanical performance outcomes.

Furthermore, specialized resistance training against different inclines greatly increased muscle fiber recruitment and strengthened neuromuscular co-ordination both in interfacing and between muscles groups. This last response was clearly demonstrated in the post-test results of the experimental group, which showed marked increases in rapid forces for those body segments that were involved in performance. These improvements were directly associated with throwing performance.

## Appendix

### Specialized Training and Scientific Principles Used in Designing the Program

**Note:** The actual weights for the legs and arms were determined using the following equation:

Total body weight  $\times$  Relative weight of the leg = Actual weight of the leg  
$$\text{Total body weight} \times \text{Relative weight of the leg} = \text{Actual weight of the leg}$$

From the actual weight of the leg, the required training load for added weights was calculated as follows:

Actual leg weight  $\times$  Required intensity = Training load  
$$\text{Actual leg weight} \times \text{Required intensity} = \text{Training load}$$

#### Example:

Body weight = 70 kg

Relative weight of leg = 0.18  $\rightarrow$  Actual leg weight =  $70 \times 0.18 = 12.95$  kg

Required added weight for training =  $12.95 \times 0.05 \approx 0.647$  kg per leg

This weight may increase or decrease depending on the intended training intensity.

- Training intensity was also determined according to the number of repetitions performed within a specific time frame.
- Maximum throw distance was used to define the peak intensity for throwing repetitions.
- For jumping exercises, maximum intensity was determined based on the number of jumps and time, to calculate the required training load.
- Training sessions were conducted on Saturdays, Mondays, and Wednesdays each week.
- The program consisted of 30 training units, with three sessions per week.



**Journal of Physical Education**  
**Volume 37 – Issue (4) – 2025 Open Access**  
**(E-ISSN: 2707-5729) (P-ISSN: 2073-6452)**  
<https://jcope.uobaghdad.edu.iq>



### Week of Training

Week	Unit	Details	Added Weight Intensity	Intensity (%)	Repetitions	Rest Between Reps	Sets	Rest Between Sets
1	1	Disc throw (1 kg) with added weight on legs 3% (flat ground) using blocking net	3%	80%	5	1 min	4	2 min
1	2	Disc throw (1 kg) with added weight on arms 3% (flat ground) using blocking net	3%	80%	8	1 min	4	2 min
1	3	Disc throw (1 kg) with added weight on trunk 5% (flat ground) using blocking net	5%	80% of total throw time	9	1 min	4	2 min

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## Level of Services Provided at Sports and Recreational Events in the Kingdom of Saudi Arabia

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2313](https://doi.org/10.37359/JOPE.V37(4)2025.2313)

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**Article history:** Received 31/ May/2025 Accepted 20/ July/2025 Available online 28/ December/2025

### Abstract

**Objective** This study aimed to identify the level of services provided in sports and recreational events. The descriptive method was used on a sample of (657), who were randomly selected from three major cities in Saudi Arabia. Randomly selected from three major cities in the Kingdom of Saudi Arabia. The questionnaire was the data collection tool, and the results of this study found that the level of services provided at sports and recreational events in the Kingdom of Saudi Arabia came at an average level, and the services provided by females Their level is higher than males, as well as those who attend with family and relatives, the services provided better than those who attend alone, and there was no difference in the level of services provided in recreational sports events at the level of social status and place of residence, so the researchers recommended that attention be paid to increasing the services provided at recreational sports events Especially technical and logistical services. While improving the ease of obtaining tickets electronically and offering them before a period of time commensurate with the event. Conduct more studies such as: The impact of technical services on the visitor experience at sporting events. And a study Analyzing the gaps between visitors' expectations and the level of services provided, and evaluating marketing strategies to attract visitors and improve satisfaction, and study the role of social factors in the role of social factors in the visitor experience during events. The study of optimizing the ticketing experience: new mechanisms for online shopping.

**Keywords:** services, events, sports, recreational.

### Introduction

Events are held on the basis of meeting and satisfying the desires and needs of the community, and each event has an element that differs from other events in terms of the

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type and size of the event, such as sports events such as competitive tournaments and entertainment events such as the Riyadh season and the Jeddah season, which varied greatly, and events are held during a specific period of time periodically or once, and differently from the traditional activities and programs used by the organization and directed to specific audiences, and when we talk about these events and visitors visit them, the programs and services are of great importance in the success or otherwise of these events. (Al-Shehri, 2017).

Sports and recreational events are considered one of the most important events because they have positive results on a person's scientific and practical life, as they help him to renew his energies and enable him to keep up with various works and get away from the daily routine that he does at work or study, and they contribute greatly to correcting the attitudes and behaviors of various segments of society, whether men or women and even children, and their involvement as collective groups that facilitate their work and give them continuous vitality in their fields and daily activity, and they must be highly qualified and experienced. (Baqah, 2020).

Events are held on the basis of meeting and satisfying the desires and needs of the community, and each event has an element that differs from other events in terms of the type and size of the event, such as sports events such as competitive tournaments and entertainment events such as the Riyadh season and the Jeddah season, which varied greatly, and events are held during a specific period of time periodically or once, and differently from the traditional activities and programs used by the organization and directed to specific audiences, and when we talk about these events and visitors visit them, the programs and services are of great importance in the success or otherwise of these events. (Al-Shehri, 2017).

At the individual level, they have demonstrated that sport creates value for society across many social outcomes, with the highest value for personal well-being, and social ROI studies show that sport generates a positive and significant return on investment for society. (Davies et al, 2021).

This is confirmed by Bilal (2012) that recreational sports activities are among the aids to socialization, due to the great role they play in the lives of people of different age groups, as they are necessary for both children, adolescents, men and the elderly, as they work to contribute effectively to the personal construction of individuals, and their benefits are countless, as they raise individuals a sound socialization free from diseases, infirmities and destructive social pests, integrate them into their native society and reserve a place for them among the members of society, and make them good people who contribute to building society positively.

Visitor satisfaction is an indicator that measures the efficiency of these services, the greater the degree of satisfaction indicates the efficiency of the programs and services

provided, and the greater the degree of dissatisfaction indicates the weakness of that service, and visitor satisfaction is related to improving the services and programs provided by the organization's management and reducing potential errors, and the programs and services provided are considered a product that needs care in its manufacture and attention in its presentation for the purpose of quality, and helps to satisfy the desires of visitors, which may help to gain new customers in this way. (Al-Asadi and Al-Kazim, 2019).

The services provided are important by visitors to the events and the speed of response from the service providers to reflect the interest in the customer experience, such as assistance in parking and the mechanism of entry and exit, and the catering has an important aspect as well, with different types and prices to suit most categories of visitors, and includes all operations and activities that deal with it to ensure the safety and smooth organization of the event, and the needs may vary according to the type, size and location of the event, and it is important to cooperate with a specialized team in organizing events to ensure that the necessary operational services are provided and to ensure the success of the event. (Thabet, 2020).

In Vision 2030, the Kingdom of Saudi Arabia launched the goal of supporting culture and recreation because of the importance of recreation for both individuals and societies, and worked to spread the culture of recreation, as the Kingdom considered that recreation is an integral part of life for members of society, and because of the importance of recreation in the Kingdom of Saudi Arabia as one of the most important pillars of life, the Kingdom's vision dedicated this program within its executive programs to improve the lifestyle of the individual by developing the necessary ecosystem to support and create new options that enhance the participation of citizens and residents in cultural, recreational and sporting activities (Futawi, 2020).

### **Research Problem**

In 2019, Saudi Arabia launched the Saudi Seasons Program, a strategic initiative that aims to boost tourism by organizing a variety of cultural, entertainment, and sporting events. The program includes 11 seasons throughout the year, reflecting the Kingdom's commitment to Vision 2030 to diversify sources of income and enhance tourism experiences (Ministry of Tourism, 2019). During this year, about (690) events were organized in various regions, which contributed to attracting large numbers of local and international visitors (General Authority for Statistics, 2019).

These events are a pivotal part of the Kingdom's strategy to strengthen its position as a leading tourism and sports destination. However, it is important to assess the extent to which these events achieve the desired goals, as there is a lack of studies, to the best of the researchers' knowledge, that address the level of services provided by the organizers. The

quality of services plays a crucial role in visitors' experience and satisfaction, necessitating the need for a thorough evaluation.

Moreover, with the expansion of diversification of sports and entertainment events as part of the quality-of-life program to achieve Vision 2030, the researchers, as event organizers, noticed a lack of mechanisms for measuring and evaluating the level of services. Therefore, there is an urgent need to conduct a scientific study aimed at analyzing the level of services provided, which contributes to improving the continuity and success of these events. The study aims to provide insights that contribute to enhancing the quality of services, thereby achieving sustainability for the organizers, supporting the Kingdom's strategic goals.

### **Importance of research**

The current study is a valuable addition to the research efforts in the field of sports and recreational events, especially in light of the limited research available in the Arabic library. The results of this study may contribute to motivating officials and stakeholders to improve the quality of services provided at all sports and recreational events, thereby contributing to enhancing the overall experience of visitors and participants.

Moreover, the study can play a crucial role in identifying the strengths in this field, helping to enhance and better capitalize on them. It also contributes to uncovering weaknesses that may negatively impact events in Saudi Arabia, providing an important database that helps in making strategic decisions to improve overall performance and enhance the competitiveness of events.

Thus, this study is an important step towards the development of sports and recreational events, and reflects the importance of scientific research in advancing the development of this vital sector.

### **Objectives of the study**

The study aimed to identify the level of services provided in sports and recreational events in the Kingdom of Saudi Arabia.

The following objectives are derived from it:

1. The level of services provided in sports and recreational events in the Kingdom of Saudi Arabia (technical services, logistical services, operational services).
2. The existence of statistically significant differences in the level of services provided in sports and recreational events in the Kingdom of Saudi Arabia

according to the variables (gender, place of residence, visit to events, marital status).

### Study questions

1. What is the level of services provided at sports and recreational events in Saudi Arabia (technical services, logistical services, operational services).
2. Are there statistically significant differences in the level of services provided in sports and recreational events in Saudi Arabia according to the variables (gender, place of residence, visit to events, marital status).

### Methodology

The researchers used the descriptive method (survey studies) because it is suitable for the nature of this study and to achieve its objectives.

### Study Population

The original study population consists of all visitors to sports and recreational events held in the Kingdom of Saudi Arabia, according to the General Authority for Statistics 2019 in the central, western, and eastern regions, where the study population reached (31,449,071).

### Study Sample

The sample was randomly selected from the original study population, where (1000) electronic questionnaires were distributed thru a barcode by the researchers to visitors at sports and recreational events in the entertainment authority's event areas, premier league football matches, and musical concerts. (735) questionnaires were obtained, of which (78) were excluded due to not meeting the scientific research criteria. The final study sample consisted of (657) questionnaires. Table (1) provides a description of the study sample.

**Table 1. Frequency and Percentage Distribution of the Study Sample (N = 657)**

Variables	Males (n / %)	Females (n / %)	Total (n / %)
<b>Place of Residence</b>			
<b>Riyadh</b>	183 / 27.9%	100 / 15.2%	283 / 43.1%
<b>Jeddah</b>	152 / 23.1%	43 / 5.6%	195 / 29.7%
<b>Eastern Region</b>	144 / 21.9%	35 / 5.3%	179 / 27.2%
<b>Event Attendance</b>			
<b>Alone</b>	175 / 26.6%	34 / 5.2%	209 / 31.8%
<b>With friends</b>	202 / 30.7%	50 / 7.6%	252 / 38.4%
<b>With family and relatives</b>	102 / 15.5%	94 / 14.3%	196 / 29.8%
<b>Marital Status</b>			
<b>Single</b>	186 / 28.3%	85 / 12.9%	271 / 41.2%
<b>Married</b>	293 / 44.6%	93 / 14.2%	386 / 58.8%

It is clear from Table (1) that the sample of the study consisted of 72.9% males and 27.1% females. The percentage of married individuals was higher than that of singles. Additionally, visiting events with friends was more common than attending events alone or with family and relatives. The highest percentage of study participants was from the Riyadh region, followed by Jeddah and the Eastern Province.

#### **Study data collection tool**

##### **Apparent validity**

The researchers prepared a questionnaire after reading and reviewing the topic of services provided at sports and recreational events. In previous and reference studies on similar topics related to the subject of the study. The first axis included technical services with (8) statements, the second axis included logistical services with (8) statements, and the third axis included operational services with (10) statements. The questionnaire was presented to a group of (8) experts specialized in sports and recreational management to ensure the clarity of the statements and axes and their suitability for the study, and to rephrase some statements that needed it. The apparent validity rate was (94.8%).

##### **Stability of the study tool**

The reliability of the questionnaire was calculated using the Cronbach's alpha coefficient for the axes and the questionnaire as a whole, and Table (2) illustrates this.

**Table 2. Cronbach's Alpha Reliability Coefficient for the Study Instrument**

Dimension	Number of Items	Cronbach's Alpha
Technological Services	8	0.83
Logistical Services	8	0.87
Operational Services	10	0.86
Overall Scale		0.92

It is clear from Table (2) that the value of the Cronbach's alpha coefficient ranges between (0.83– 0.87), which are high percentages for the reliability of the questionnaire axes in human studies, while the value of Cronbach's alpha for the complete questionnaire reached (0.92), which is a very high percentage. This indicates that the study tool has high reliability in human studies.

### Scale lengths

The cell lengths for the five-point Likert scale are calculated by taking the range (3 - 1 = 2) and dividing it by the highest value on the scale to obtain the cell length (2 / 3 = 0.67). This value is then added to the lowest value on the scale, which is the whole number one (1), resulting in the cell lengths as shown in Table 3.

**Table 3. Scale Interval Lengths**

Level	Mean Score Value
High	2.34 to 3.00
Moderate	1.67 to less than 2.33
Low	1.00 to less than 1.66

### Statistical methods

The researchers in this study used the following statistical treatments within the SPSS software package:

- Frequency and percentage to determine the responses of the study sample.
- The arithmetic mean to determine the level of satisfaction among the study sample.
- The standard deviation.
- Alpha Cronbach coefficient to measure the reliability of the questionnaire and its axes.
- (T-Test Independent Sample) tests for the two independent groups to find the differences between the means of the two variables.
- One-way ANOVA to find the differences between the means for more than two variables.
- Tukey's test is a post-hoc test to measure the closest significant difference.

## Results

**Table 4. Frequency, Percentage, Mean, and Standard Deviation for the Level of Services Provided in Sports and Recreational Events in the Kingdom of Saudi Arabia According to the Dimension of Technological Services (N = 657)**

Item	Good (n / %)	Moderate (n / %)	Weak (n / %)	Mean	SD	Level
Ease of using the electronic website	435 / 66.2%	128 / 19.5%	94 / 14.3%	2.52	0.73	High
Variety of electronic ticket-purchase methods	376 / 57.2%	138 / 21.0%	143 / 21.8%	2.35	0.81	High
Ease of obtaining electronic tickets	120 / 18.3%	109 / 16.6%	428 / 65.1%	1.53	0.78	Low
Variety of electronic ticket categories	382 / 58.1%	177 / 26.9%	98 / 14.9%	2.43	0.74	High
Clarity of service programs on the website	370 / 56.3%	170 / 25.9%	117 / 17.8%	2.39	0.77	High
Speed of response to inquiries electronically	223 / 33.9%	236 / 35.9%	198 / 30.1%	2.04	0.80	Moderate
Ease of evaluating the event electronically	314 / 47.8%	213 / 32.4%	130 / 19.8%	2.28	0.77	Moderate
Availability of electronic gates at entry	397 / 60.4%	161 / 24.5%	99 / 15.1%	2.45	0.74	High
<b>Overall Mean = 2.25   SD = 0.52</b>						

**Table 5. Frequency, Percentage, Mean, and Standard Deviation for the Level of Services Provided in Sports and Recreational Events in the Kingdom of Saudi Arabia According to the Dimension of Logistical Services (N = 657)**

Item	Good (n / %)	Moderate (n / %)	Weak (n / %)	Mean	SD	Level
Ease of reaching the event venue from place of residence	334 / 50.8%	145 / 22.1%	178 / 27.1%	2.24	0.85	Moderate
Availability of a map for the event location	426 / 64.8%	127 / 19.3%	104 / 15.8%	2.49	0.75	High
Ease of traffic flow around the event venue	229 / 34.9%	154 / 23.4%	274 / 41.7%	1.93	0.87	Moderate

Availability of directional signage on surrounding roads	326 / 49.6%	185 / 28.2%	146 / 22.2%	2.27	0.80	Moderate
Availability of sufficient parking spaces	294 / 44.7%	150 / 22.8%	213 / 32.4%	2.12	0.87	Moderate
Proximity of parking areas to the event venue	221 / 33.6%	194 / 29.5%	242 / 36.8%	1.97	0.84	Moderate
Availability of multiple gates, entrances, and exits	372 / 56.6%	167 / 25.4%	118 / 18.0%	2.39	0.77	High
Availability of internal transportation services suitable for the event size and space	286 / 43.6%	186 / 28.3%	185 / 28.2%	2.15	0.83	Moderate
<b>Overall Mean = 2.19   SD = 0.59</b>						

**Table 6. Frequency, Percentage, Mean, and Standard Deviation for the Level of Services Provided in Sports and Recreational Events in the Kingdom of Saudi Arabia According to the Dimension of Operational Services (N = 657)**

Item	Good (n / %)	Moderate (n / %)	Weak (n / %)	Mean	SD	Level
Cleanliness of the event venue	442 / 67.3%	147 / 22.4%	68 / 10.4%	2.57	0.67	High
Availability of sufficient restrooms	384 / 58.4%	147 / 22.4%	126 / 19.2%	2.39	0.79	High
Continuous cleanliness of restrooms	305 / 46.4%	193 / 29.4%	159 / 24.2%	2.22	0.81	Moderate
Availability of safety and security measures	445 / 67.7%	153 / 23.3%	59 / 9.0%	2.59	0.65	High
Presence of security personnel at all times	520 / 79.1%	104 / 15.8%	33 / 5.0%	2.74	0.54	High
Availability of diverse meal options at restaurants	363 / 55.3%	157 / 23.9%	137 / 20.9%	2.34	0.80	High
Availability of diverse café options	367 / 55.9%	159 / 24.2%	131 / 19.9%	2.36	0.79	High
Reasonable pricing of meals and beverages	162 / 24.7%	185 / 28.2%	310 / 47.2%	1.77	0.82	Moderate

Availability of well-equipped prayer areas	399 / 60.7%	154 / 23.4%	104 / 15.8%	2.45	0.75	High
Availability of emergency medical services	420 / 63.9%	193 / 29.4%	44 / 6.7%	2.57	0.61	High
<b>Overall Mean = 2.40   SD = 0.48</b>						

**Table 7. Level of Services Provided in Sports and Recreational Events in the Kingdom of Saudi Arabia (N = 657)**

Service Dimension	Mean	SD	Level
Technological Services	2.25	0.52	Moderate
Logistical Services	2.19	0.59	Moderate
Operational Services	2.40	0.48	High
Overall Score	2.28	0.46	Moderate

**Table 8. Independent Samples t-Test to Identify Differences in the Level of Services Provided in Sports and Recreational Events in the Kingdom of Saudi Arabia According to Gender and Marital Status (N = 657)**

Variable	Level of Services in Sports and Recreational Events	t-value	Sig.
Gender	Males Mean = 2.24 SD = 0.47	-3.42*	0.01
	Females Mean = 2.38 SD = 0.43		
Marital Status	Single Mean = 2.28 SD = 0.45	0.19	0.85
	Married Mean = 2.28 SD = 0.47		

\*Statistically significant at ( $\alpha \leq 0.05$ )

**Table 9. One-Way ANOVA for the Level of Services Provided in Sports and Recreational Events in the Kingdom of Saudi Arabia According to Event Attendance and Place of Residence (N = 657)**

Variable	Source of Variation	Sum of Squares	df	Mean Square	F-value	Sig.
Event Attendance	Between Groups	2.09	2	1.04	4.96*	0.01
	Within Groups	137.71	654	0.21		
	Total	139.80	656			

<b>Place of Residence</b>	Between Groups	0.05	2	0.02	0.12	0.88
	Within Groups	139.75	654	0.21		
	Total	139.80	656			

\* Statistically significant at ( $\alpha \leq 0.01$ )

**Table 10. Tukey Post Hoc Test for Differences Between Means of the Level of Services Provided in Sports and Recreational Events in the Kingdom of Saudi Arabia According to Event Attendance (N = 657)**

Attendance Type	Mean	SD	Differences Between Groups
Alone	2.20	0.49	—
With Friends	2.30	0.43	—
With Family and Relatives	2.34	0.46	0.14*

\* Statistically significant at ( $\alpha \leq 0.01$ )



## Discussion

It is clear from Table No. (4) that the opinions of the study sample members regarding the level of services provided in sports and recreational events in the Kingdom of Saudi Arabia, according to (technical services), were average, with a mean of (2.25). The ease of using the website and the availability of electronic gates upon entry were rated highly, with mean scores of (2.52 and 2.45) respectively. Meanwhile, the ease of obtaining tickets electronically was rated low, with a mean score of (1.53). This indicates that the level of technical services provided in sports and recreational events was average.

The researchers attribute the high level of “ease of use of the website” to the technical efficiency reached by the Kingdom, the design of the websites associated with the events, the ease of registration, the clarity of the comprehensive information of the event, and the high reliability of the payment procedures. The result of this study is consistent with the result of Al-Solami's study (2022), whose results confirmed that there is a relationship between technical development and operation in activities, and the researchers attribute this to technical progress in Saudi Arabia which contributed significantly to facilitating the use of the websites of the operators and giving high confidence to visitors to use the website.

The result of this study agrees with the result of the study of Abdul-Qader (2022), whose results confirmed the existence of a website for the facility that helps to increase the technical efficiency, management and operation of the sports facility in an economic manner, and the two researchers believe that electronic gates are of great importance in facilities hosting events, and may be due to the efficiency of the entry process and its organization in a civilized manner that reduces congestion and keeps pace with the progress of civilization in the Kingdom of Saudi Arabia.

The phrase “the ease of obtaining tickets electronically” obtained a low level may be due to the lack of control of the sales mechanism and the delay in the release of tickets, which may be due to the high pressure on the ticket sales platform and the emergence of the black market to sell tickets for these events. The result of this study agrees with the study of Ahmed and Hamza (2021), whose results confirmed that tickets are of an economic nature due to their financial return They are prone to the occurrence of black market crimes on them, and the researchers see a shortcoming in the process of offering the sale of tickets, and the reason may be due to the lack of readiness of the website for the massive purchase requests from visitors, as there is no idea of dividing tickets into payments over a certain period in most events, and it is necessary to fight the black market by setting legal regulations and legislation that limit this phenomenon that is widespread globally.

It is evident from Table (5) regarding the opinions of the study sample on the level of services provided in sports and recreational events in the Kingdom of Saudi Arabia that

the average was moderate according to (logistical services), with an overall mean of (2.19) for the axis. The statements "There is a map of the event location" and "Multiple gates and entrances and exits" had a high level with a mean of (2.49, 2.39), while the other statements had a moderate level with a mean ranging between (1.97 – 2.27).

The results of this study do not align with the findings of the study by Al-Hakami and Al-Habeeb (2022), which confirmed that there is a relationship between logistics services and Saudi Vision 2030 in improving services across various fields. The study indicated that the level of development of private sector contributions to the economy was high at 84.5%. From this, we conclude that logistics services in events require comprehensive organization in public transport and the private sector, which can specialize in logistics services that have, in turn, become an investment opportunity.

The researchers attribute the high level of the phrase "There is a map of the event location" to the clarity of the location on Google Maps and the repetition of events at the same venue, which may help in easily knowing the site map. The results of this study agreed with the findings of Al-Muqri's study (2022), which confirmed that the use of big data for maps is a key factor in driving higher levels of quality and efficiency in their use. The researchers believe that linking maps and continuously updating the event location facilitates access to the event, which may reduce congestion that could hinder movement.

Regarding the phrase "multiple gates, entrances, and exits," the reason may be the existence of a crowd management and potential crisis management plan thru the design of the facility to meet the needs of visitors by placing several gates in different directions. The results of this study agreed with the results of the study by Mandour et al. (2020), which confirmed that the design of the facilities was based on creativity with a focus on (construction – formation – technology). These are among the factors that increase the satisfaction of event visitors. The researchers believe that the distribution of gates according to the site map and ticket categories contributes to the process of entering and exiting the event site.

It is clear from Table (6) regarding the opinions of the study sample members about the level of services provided in recreational sports events in the Kingdom of Saudi Arabia according to (operational services), where the level was high with a general arithmetic mean of (2.40). "The continuous availability of security personnel" and "the provision of security and safety factors" were at a high level with arithmetic means of (2.74, 2.59), while "the prices of meals and beverages are suitable for visitors" and "the cleanliness of restrooms is maintained continuously" were at a moderate level with arithmetic means of (1.77, 2.22). At an average level, where the arithmetic mean was (1.77, 2.22), we find that security personnel are continuously available at the events.

The results of this study differ from the findings of Mirza's study (2013), which confirmed that there is a deficiency in securing sports facilities. The researchers believe

that the Kingdom of Saudi Arabia is on par with safe countries, especially in the sports and recreational events organized by the Kingdom, and thus has become a focal point for visitors and tourists.

The researchers attribute the phrase "the continuous presence of security personnel" to the Kingdom's policy of concerted efforts and the participation of all state sectors in organizing the event, with security personnel being at the forefront. This is one of the conditions for organizing any event, as security personnel must be present in the event areas before its commencement. The results of this study align with the findings of Al-Subaie and Al-Sarra (2020), which confirmed that the morale of facility security is high to serve attendees and maintain the stability of the event's security. The researchers believe that assessing potential risks is fundamental to maintaining security at the event, training staff to handle emergencies, contracting specialized security companies, and involving security agencies in events.

Regarding "providing security and safety factors," the reason may be the safety of the facility from potential risks and raising awareness among attendees to adhere to regulations and rules. The results of this study align with the findings of Fawzi (2020), which emphasized the importance of considering security and safety factors through the existence of emergency plans in collaboration with security agencies. The researchers believe that cooperation with security companies enhances security and safety factors due to their expertise in potential risk causes through specialization.

Regarding "the prices of meals and beverages being suitable for visitors," the reason may be the high rental prices for locations at the event, such as booths and food trucks, which contributed to the increase in meal prices due to investors' focus on profitability. The results of this study align with the findings of the study by Suwaidan and Mansour (2012), which confirmed that modern marketing methods do not consider the conditions of citizens. The researchers believe that standardizing prices and offering coupons with tickets for discounts could reduce high prices. Reducing meal and beverage prices often depends on negotiating lower rental fees for locations at the event and diversifying food service providers according to visitor categories and their duration of stay at the event, while considering the event's location and surrounding services.

It is clear from Table (8) that there is a statistically significant difference at the 0.01 level in the level of services provided in recreational sports events in the Kingdom of Saudi Arabia according to the variable (gender), where the value of (t, -3.42) was in favor of females compared to males. Meanwhile, there was no statistical significance for the variable of marital status, with a value of (t, 0.19). This indicates that females have a high level of services provided, while males perceive the services as average.

With regard to the gender variable, the reason may be due to the empowerment of females in the social and economic fields, the existence of legislation and laws that protect

them and enhance their value, and the decision of the Ministry of Sports in 2018, which enabled women to experience the experience of attending matches, which is an essential element of sports events in the Kingdom, not only by attending but also by participating in organizing and working on the success of the event. The result of this study agreed with the result of Al-Zahrani's study (2022) and Al-Aqran's study (2020), whose results showed that the decision to drive women contributed to increasing their sense of freedom and high independence and occupying and managing time that increases as it increases.

With regard to the social status variable, the reason may be due to freedom and independence and the lack of obligations that limit time and expenses, and the result of this study agreed with the result of the study of Al-Khazraj and Al-Kanidari (2023), whose results showed that marriage costs and arrangements have an impact on spending leisure time, and the researchers believe that the higher satisfaction rates for singles than married people may be due to the increase in their free time, family commitments towards married people and increased responsibility by bearing the costs compared to the high ticket prices.

It is evident from Table (10) that there are statistically significant differences at the 0.01 level in the level of services provided at recreational sports events in the Kingdom of Saudi Arabia according to the variable of event attendance (alone, with friends, with family and relatives). The differences were in favor of attending with family and relatives compared to attending alone. This indicates that the level of services provided when attending with family and relatives is high, while the level of services when attending alone is moderate. These results are consistent with the findings of the study by Kim and Trail (2010), which showed that participants who attended sports events with their families and relatives gave more positive evaluations of the services provided compared to participants who attended alone. The study indicated that visiting with family enhances the social and cultural experience, leading to a higher sense of satisfaction with the services. This aligns with the results of Theodorakis et al. (201), which indicated that individuals who attended the events alone rated the services provided lower compared to groups that included families and friends. The study attributed this to the importance of social interaction during the event, which leads to an improved overall experience and satisfaction with the services.

Regarding the variable of place of residence, the reason may be attributed to the ease of transportation between the cities of the Kingdom, with the diversity of public transportation means, as well as the various offers and multiple transportation methods. The results of this study agreed with the findings of Al-Fotawi's study (2020), which showed that the Kingdom launched the "Saudi Seasons Program" in 2019 in several regions of the Kingdom thru 11 seasons throughout the year, as a diverse recreational program of sports and entertainment activities. The researchers believe that launching several scheduled recreational seasons according to each region and the suitability of the weather around the Kingdom, especially in the main regions such as Riyadh, Mecca, and the Eastern

Province, may contribute to the attendance of most seasons, especially when they are not held simultaneously.

### Conclusions

1. The level of services provided at sports and recreational events in the Kingdom of Saudi Arabia was generally average and high in operational services.
2. The level of services provided at sports and recreational events in the Kingdom of Saudi Arabia was in favor of females, with a high level of service compared to males, whose level of service was average.
3. The level of services provided at sports and recreational events favored those who attended with family and relatives, and the level was high compared to individual attendees, who received a medium level of services.
4. There were no differences in the level of services provided at sports and recreational events based on social status (single/married) or place of residence (Riyadh, Jeddah, Eastern Province).

### Recommendations

1. Focus on increasing the services provided at recreational sports events, especially technical and logistical services.
2. Improving the ease of obtaining tickets electronically and making them available a period of time that suits the event.
3. Conducting more studies such as:
  - a. The impact of technical services on visitors' experience at sporting events.
  - b. Analyzing the gaps between visitor expectations and the level of services provided.
  - c. Evaluating marketing strategies to attract visitors and improve satisfaction.
  - d. The role of social factors in the visitor experience during events.
  - e. Improving the ticket purchasing experience: New mechanisms for online shopping.

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## The effect of blended learning with sequential and random exercises in learning the skills of setting and receiving the volleyball serve for students

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2218](https://doi.org/10.37359/JOPE.V37(4)2025.2218)

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**Article history:** Received 8/ October/2024 Accepted 11/ November /2024 Available online 28/ December/2025

### Abstract

The aim of the research is to identify the effect of exercises with blended learning according to the sequential and random exercise and learning the skills of settings and receiving the serve with volleyball for students in the fifth grade of middle school. The importance of the research comes in developing the skills of setting and receiving the serve with volleyball in the physical education lesson for the fifth stage of middle school through blended learning and by scheduling the sequential exercise. random exercise, the research problem revolved around the fact that the performance is not at the required level among students at this stage in learning how to perform volleyball skills. This is due to the fact that most of the methods used in teaching basic volleyball skills are the traditional method used in applying the physical education lesson, so it was decided to use blended learning, which is Methods that can be applied in the game of volleyball, this method uses electronic technologies before the practical application of some skills. The researchers relied on designing exercises and they were given in the main section of the educational unit, where the research population was (93) students, and (36) students were randomly selected from the sections (A-B-C). The share of each section is (12) students after sick and failing students were excluded. The educational curriculum was applied, which consists of (16) educational units at a rate of (2) educational units per week, and after completing the post-tests, the researchers concluded that the effect of the three methods of basic volleyball skills (setting, receiving the serve), was, respectively, blended learning with scheduling. Random

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exercise in the first degree and blended learning with sequential exercise scheduling in the second degree, then the control group in the third degree.

**Keywords:** blended learning, sequential practice, random practice, setting, receiving serves.

## Introduction

The scientific and informational development in our era is very important, requiring rapid adaptation to communicate with the world on everything new, including sports sciences. The learning process has taken a new and broad direction in the present time, as researchers now use the best and latest methods, tools, and techniques that assist the learner in research and inquiry by understanding the goal of the educational process. Physical education is considered a field of education and teaching, working on preparing individuals physically, skillfully, tactically, and emotionally. Therefore, most countries around the world have turned to developing their educational systems and reconsidering the established curricula and methods of implementation thru learning techniques in adopted educational systems to achieve effective learning. As for the field of school sports, it needs to activate the physical education lesson, which has become traditional. We know that school sports are distinguished activities thru the selection of players and talents, supplying national teams with outstanding players, juniors, youth, and distinguished young people to represent national teams in local and international competitions. Countries provide support and attention to school sports to activate school sports activities and give them special importance to reach the desired level. The researchers noticed that the performance of students at this stage in learning volleyball skills is not at the required level. This is due to the fact that most of the methods used in teaching basic volleyball skills are traditional methods applied in physical education classes. Therefore, they considered using blended learning, which includes methods that can be applied in volleyball. This approach utilizes electronic technologies before the practical application of some skills.

Volleyball is a team sport suitable for all ages and requires educational methods to improve learning processes and avoid traditional methods that generate boredom among learners. Therefore, it is essential to diversify teaching methods and choose the best approach for the type of game the teacher should teach to their students. This can be achieved thru the use of sequential drills, which aim to reach a good performance level in one skill before moving on to the next, while random drills aim to perform more than one skill within a single educational unit. The importance of the research lies in developing the skills of setting and receiving serves in volleyball during the physical education lesson for the fifth preparatory stage thru blended learning and scheduling sequential and random exercises. This is done by answering the following question: Is blended learning suitable for the chosen age group? What is the extent of the impact of blended learning on the acquisition of the skills of setting and serve reception in volleyball for the selected sample?

The aim of the research is to identify the impact of blended learning exercises, according to sequential and random practice, on learning the skills of setting and serve reception in volleyball for fifth-grade preparatory students.

Among the studies that addressed blended learning, serial practice, and random practice is the study by Schiller (2021) titled "The Impact of Blended Motor Learning Strategy on Learning the Technical Performance of the Overhead and Underhand Serve Skills in Volleyball." The study aimed to prepare educational units for second-year male students in the College of Physical Education and Sports Sciences at the University of Baghdad for the academic year 2018-2019. The research sample consisted of 30 students who were randomly selected. The researcher followed the experimental method with an experimental group and a control group. The first experimental group used the blended learning method, while the second group (the control group) consisted of 15 students. The researcher concluded that there are significant differences between the two groups in the pre-test and post-test for both skills in learning the technical performance of them and the two groups, but we did not show significant differences between the experimental and control groups, so the study (Muhaibes, 2013) addressed (the effect of an educational curriculum using sequential and randomized exercise on the acquisition of the compatibility of hitting and blocking volleyball for juniors). The study sought to prepare educational units in the light of the curriculum system prepared by the researcher using the experimental method based on the sequential and random method, the researcher used the experimental method on his sample, which are the juniors of the Rumaita Volleyball Club and their number was (18) players, the researcher concluded that the educational curriculum and the special exercises it included contributed to the acquisition and development of compatibility and there is a preference in learning between the two educational methods sequential and random in favor of the random method.

However, the study (Dhuha, 2014) examined (the effect of using programd and reciprocal learning methods in learning some basic volleyball skills among fourth-grade preparatory students). The study aimed to prepare educational units for the fourth-grade students of Al-Anwar Secondary School for Girls, affiliated with the Al-Karkh Second Education Directorate. The procedures consisted of a research sample of 30 students, and the experimental research was the method followed for two months, with two units per week, involving two experimental groups and one control group as follows: the programd learning group, the reciprocal learning group, and the control group. The conclusions indicated that the reciprocal method using homework sheets had an impact on learning basic volleyball skills and was more effective than the traditional method. Additionally, the use of homework sheets increases the potential for improving and developing the technical aspects of volleyball skills. The study (Walaa, 2011) addressed (the impact of blended network learning on learning outcomes in basic skills in volleyball for primary school students), where the study sought to prepare educational units on the students of the first

stage of the Faculty of Physical Education at Mansoura University in Egypt for the academic year (2011 - 2010). 2010) and the research sample amounted to (60) female students, the researcher followed the experimental method with three experimental groups (two experimental groups and a control group) where the first experimental group used the educational website on the Internet, the second experimental group used blended network learning, while the control group followed the traditional method, where each group consisted of (15) students. The researcher concluded that the second experimental group that used blended network learning outperformed the first group (the educational website on the Internet) and the third group (traditional) in cognitive achievement and the level of skill performance in volleyball.

### Methodology

The researchers used the experimental method with a three-group design (two experimental groups and one control group) as shown in Table (1).

**Table 1.** *Study Design*

Groups	Pre-test	Independent Variable	Post-test
Experimental Group A	Skills pre-tests	Educational units (blended – sequential)	Skills post-tests
Experimental Group B		Educational units (blended – random)	
Experimental Group C		The curriculum prepared by the Ministry of Education	

The research sample was determined to be fifth-grade students of the intermediate stage (Ibn Sina Intermediate School for Boys) affiliated with the Education Directorate of Baghdad Al-Karkh Al-Thaniya, totaling (91) students who represent the research community. The sample of (36) students was selected from the fifth-grade intermediate students' community thru a lottery from the academic divisions (A-B-C). The researcher also conducted a lottery to select the three research groups, choosing (12) students from each division. The two experimental groups follow the curriculum prepared by the researchers, while the control group adheres to the curriculum prepared by the Ministry of Education. The exploratory trial sample, consisting of (5) students, was selected randomly thru a lottery, and students who were ill or not regularly attending, totaling (5) students, were excluded as shown in Table (2).

**Table 2.** *The Research Population and Sample*

Grade Level	Number of Classes	Number of Students per Class	Excluded Students	Research Sample Size	Percentage
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Fifth Grade – Class A	1	31	2	12	
Fifth Grade – Class B	1	30	1	12	39.56%
Fifth Grade – Class C	1	30	2	12	
Total	3	91	5	36	

- The sample is homogeneous as they are all males and from the same age group.
- The samples were balanced by conducting a pre-test for both the experimental and control groups before starting the implementation of the curriculum in the skills under investigation, as shown in Table (3).

**Table 3.** Homogeneity of the Research Groups in the Pre-Tests of the Study Skills

Tests	Source of Variance	Sum of Squares	df	Mean Square	Calculated F-value	Sig. Value	Significance Level
<b>Setting</b>	Between Groups	0.47	2	0.23	0.17	0.83	Not significant
	Within Groups	44.41	33	1.34			
<b>Serve Reception</b>	Between Groups	5.35	2	2.67	1.61	0.21	Not significant
	Within Groups	54.65	33	1.65			

**Note:** A value in the significance field (Sig.) < 0.05 indicates statistical significance.

### Skill tests used in the research

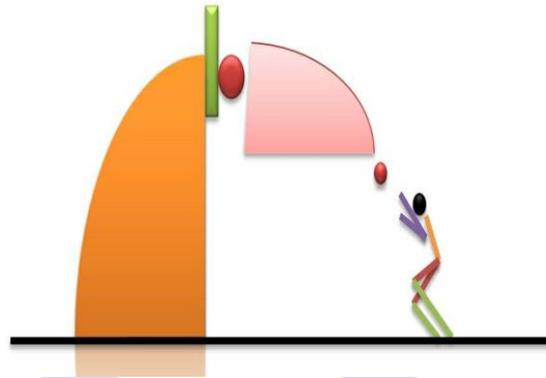
Volleyball setting skill test (Youssef, 2023, p. 68):

The purpose of the test: Measuring volleyball setting skill.

Necessary tools: A basketball board containing the ring, 5 legal volleyballs, and a registration form.

Performance specifications : The test student stands in front of the basket at the free throw line on the circle line, the ball is lifted up and then passed to the basket, trying to pass it inside the basket as in Figure (3) Each test student is given (5) attempts.

Scoring: Ball away from the board (0) degrees, Ball touching the board (2) degrees, Ball touching the ring (3) degrees, Passing the ring inside the ring (5) degrees, Maximum test

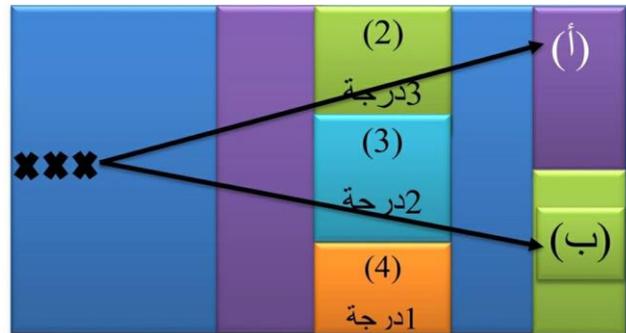


score (25) degrees

**Figure 1.** *Test of Setting Skill in Volleyball*

Test of serve reception in volleyball (Al-Dulaimi, 2014, page 84):  
 The purpose of the test: Measuring the skill of receiving the serve in volleyball.  
 Necessary tools: Legal volleyball court, 10 legal volleyballs, colored tape to divide play areas, metal measuring tape.  
 Performance specifications: The tested student performs (5) attempts from area (A) to positions (4, 3, 2) and (5) attempts from area (B) to positions (4, 3, 2). The tested student must adhere to receiving the ball from the designated area and directing it to the specified area, as shown in Figure (2).  
 Scoring: The student tester receives the score of the position where the ball lands as follows:

1. The ball that is in center (4) gives the tester (one point). The ball that lands in center (4) gives the tester (one point).
2. The ball that lands in center (3) gives the tester (two points). The ball that lands in center (3) earns the tester (2 points).
3. The ball that lands in center (2) earns the player (three points). The ball that lands in center (2) earns the tester (three points).
4. If the ball lands on the line between the two points, the score for the higher area is counted. If the ball lands on the line between the two points, the score is counted for the higher area.
5. The maximum score for this test is 30 points. The maximum score for this test is (30) points.



**Figure 2.** Test of the skill of receiving the serve in volleyball

The field experiment where the researchers conducted the pre-tests of the volleyball setting skill test and the volleyball service reception skill test for members of the research sample for the three groups (the two experimental groups and the control group) on the date 21/2/2024 on (Wednesday). to test the volleyball setting skill and on 2/22/2024 on (Thursday) to test the volleyball reception skill, in the presence of the assistant work team After completing the pre-tests, the researchers conducted the main experiment, which contains (the main section) of the educational unit of the educational unit on Sunday, 2/25/2024, which ended on Thursday, 4/18/2024, After completing the implementation of the educational curriculum (the main sections of the educational units), the researchers conducted the post-tests of the research sample to test the On Tuesday, 4/23/2024, and on Wednesday, 4/24/2024, the researchers were keen to conduct the tests in the outer yard of Ibn Sina Preparatory School in the same conditions and conditions and the same measures that they conducted as in the pre-test.

## Results

**Table 4.** Means, Standard Deviations, and Skewness for the Blended Learning Group with Sequential Practice Scheduling

Variables	Pre-test Mean	Post-test Mean	Pre-test SD	Post-test SD	Pre-test Skewness	Post-test Skewness
Setting	12.50	16.67	1.16	1.07	0.00	0.25
Serve Reception	11.92	16.00	1.37	1.12	0.17	0.00

**Table 5.** Mean Differences, Standard Error, Calculated t-Value, and Significance Level

Variables	Mean Difference	Standard Error	Calculated t-value	Sig. Value	Statistical Significance
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<b>Setting</b>	4.16	0.29	14.01	0.00	Significant
<b>Serve Reception</b>	4.08	0.49	8.17	0.00	Significant

**Table 6.** Means, Standard Deviations, and Skewness for the Blended Learning Group with Random Practice Scheduling

Variables	Pre-test Mean	Post-test Mean	Pre-test SD	Post-test SD	Pre-test Skewness	Post-test Skewness
<b>Setting</b>	12.50	18.96	1.00	0.99	0.00	0.47
<b>Serve Reception</b>	12.50	18.83	1.16	1.11	0.00	0.56

**Table 7.** Differences in Means Between Pre- and Post-tests, Standard Error, Calculated t-value, and Significance Level for the Blended Learning Group with Random Practice Scheduling

Variables	Mean Difference	Standard Error	Calculated t-value	Sig. Value	Statistical Significance
<b>Setting</b>	6.41	0.43	14.76	0.00	Significant
<b>Serve Reception</b>	6.33	0.52	12.01	0.00	Significant

**Table 8.** Means, Standard Deviations, and Skewness for the Control Group

Variables	Pre-test Mean	Post-test Mean	Pre-test SD	Post-test SD	Pre-test Skewness	Post-test Skewness
<b>Setting</b>	12.33	14.75	1.30	0.96	0.15	0.13
<b>Serve Reception</b>	11.58	15.08	1.31	0.79	0.36	0.16

**Table 9.** Mean Differences Between Pre- and Post-tests, Standard Error, Calculated t-value, and Significance Level for the Control Group

Variables	Mean Difference	Standard Error	Calculated t-value	Sig. Value	Statistical Significance
<b>Setting</b>	2.41	0.28	8.40	0.00	Significant

<b>Serve Reception</b>	3.50	0.46	7.46	0.00	Significant
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**Table 10.** ANOVA (F-test) Results for the Two Skills Under Investigation in the Post-tests

Variables	Source of Variance	Sum of Squares	df	Mean Square	Calculated F-value	Sig. Value	Statistical Significance
<b>Setting</b>	Between Groups	104.38	2	52.90	50.90	0.00	Significant
	Within Groups	33.83	33	1.02			
<b>Serve Reception</b>	Between Groups	91.72	2	45.86	43.76	0.00	Significant
	Within Groups	34.58	33	1.04			

**Table 11.** Differences in Means Among the Groups, Statistical Significance, and Direction of Significance

Variables	Groups Compared	Mean Difference	Sig. Value	Statistical Significance
<b>Setting</b>	G1 – G2	1.91	0.00	Significant in favor of G2
	G1 – G3	4.16	0.00	Significant in favor of G1
	G2 – G3	2.25	0.00	Significant in favor of G2
<b>Serve Reception</b>	G1 – G2	0.91	0.03	Significant in favor of G2
	G1 – G3	3.75	0.00	Significant in favor of G1
	G2 – G3	2.83	0.00	Significant in favor of G2

## Discussion

After presenting the results thru the previous tables, it became clear that there is a significant difference in the skill of preparation between the first experimental group, which learned (sequential blended learning), and the second experimental group, which learned (random blended learning), in favor of the second experimental group. As for the first experimental group, which learned (sequential blended learning), and the control group in preparation, a significant difference was evident in favor of the first experimental group that learned (sequential blended learning). However, for the second experimental group, which learned (random blended learning), and the control group in the skill of preparation, the difference was significant in favor of the second experimental group that learned (random blended learning).

As for the skill of receiving the serve, there is a significant difference between the members of the first experimental group who learned (sequential blended learning) and the members of the second experimental group who learned (random blended learning) in the skill of receiving the serve, in favor of the second experimental group. However, the members of the first experimental group who learned (sequential blended learning) and the members of the control group in the skill of receiving the serve show a significant difference in favor of the first experimental group who learned (sequential blended learning). As for the members of the second experimental group who learned (random blended learning) and the members of the control group in the skill of receiving the serve, the difference was significant in favor of the second experimental group who learned (random blended learning).

The researchers attribute the reasons for the superiority of the second experimental group that learned (blended learning in the random exercise method) in the two skills (setting and receiving the serve) in volleyball over the rest of the two groups (the sequential blended learning group and the control group), to the effectiveness of the students' learning in this group to the speed of shifting attention and concentration and adapting fast motor programs for the purpose of facing changing situations while performing the exercises that were prepared in addition to the The blended learning booklet through which a complete and sufficient picture was taken of the method of performing the skill, whether it is in the skill of preparation or the skill of receiving the transmission, reinforced with videos and still and moving images through which a complete idea was communicated to learners in order to know all the information that is related to the two skills and the frequency of exercises because it is related to mental processes and the speed of response of the nervous system in learning the skills of preparation and receiving the transmission (Sabr, 2005, page 106) "The individual cannot reach the precise level (mechanism) without practice (repetition), and practice does not mean mere repetition but repetition coupled with a thorough understanding of the instructions (Feedback) given by the coach and teacher." Furthermore, the role of feedback contributed to the development of my skills in preparation and reception in this group. As mentioned by Mahgoub (1998, p. 85), feedback

is sensory external information that enters during or after responses to improve performance and correct information about the movement trajectory. It is a process that facilitates learning and sports training. Researchers attribute the reasons for excellence to the use of video clips and still images, as they increased the excitement among learners by engaging the senses of sight and hearing, thus creating a distinctive educational atmosphere. This was confirmed by Al-Hiliya (2001, p. 316) "What distinguishes video is the element of excitement resulting from sound, moving images, reinforcement, and stimulation," confirmed Schmidt (1999, p. 96). He emphasized the use of audiovisual sensory elements in information delivery, movement organization, and coordination. These elements provide information about the environment in which one learns, as well as the state and movements of our bodies. They are considered the largest receivers for processing information about the movement of external objects in the world. Researchers attribute the superiority of this group to their rapid control over attention shifting, high anticipation, and the preparation of motor programs that change play positions. This can be likened to open skills (in an open environment) due to the variety of skill exercises during the practical part of the main section, which made their performance nature in an open environment involve changing situations during execution.

### Conclusions

1. The impact of the three methods of basic volleyball skills (setting, reception) was, respectively, blended learning with random practice scheduling in the first degree, blended learning with sequential practice scheduling in the second degree, and the control group in the third degree. The effect of the three methods on the basic volleyball skills (setting, reception) was, respectively, blended learning with random practice scheduling in the first degree, blended learning with sequential practice scheduling in the second degree, and the control group in the third degree.
2. The use of modern educational technology and the blended learning booklet, thru their experimentation on the first and second groups, significantly contributed to achieving superiority over the control group, which is followed by the teacher. The use of modern educational technology and the blended learning booklet, thru their experimentation on the first and second groups, significantly contributed to achieving superiority over the control group followed by the teacher.
3. Integrating and diversifying educational methods in learning and developing basic skills in volleyball for students. Integrating and diversifying educational methods in learning and developing basic skills in volleyball for students.

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## Effectiveness of a Guidance Program Using Reality Therapy in Enhancing Motivation to Play Volleyball among First-Year Middle School Students

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2197](https://doi.org/10.37359/JOPE.V37(4)2025.2197)

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**Article history:** Received 20/ May/2025 Accepted 27/ May/2025 Available online 28/ December/2025

### Abstract

This research formulated guidance program using reality therapy and a scale to assess motivation of first year students in Al-Mustafa Boys' School because of playing volleyball. The purpose was to promote the motivation of students by counseling. The research question was whether motivation could be stimulated by the program. The research was based on an experimental pattern with two groups (experimental and control) of 250 pupils during the period 2023–2024. The 40 students with the most disadvantageous motivation scores constituted a sample: of these, 20 were included in the experimental group receiving the program and 20 in the control one. Counselling took place during a six-week period and consisted of 12 sessions. It was concluded that the guidance program had a good effect on motivation toward volleyball. The author suggested applying the program and scale in motivating PE, adding instruction to school lesson planning.

**Keywords:** guidance program, motivation development, volleyball.

### Introduction

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The progress of sports in a country relies on scientific planning that combines all the disciplines in order to create an integrated base for sports. Sports psychology is one of the core areas. In the modern era (early 20th century onward), sports professionals have grown to emphasize the mental aspects integral with physiological, tactical and skill loads in athlete preparation. As sports has progressed and athletes have continued to reach higher levels, the fusion of skills and tactics demonstrated just how important the psychological aspect is in determining whether an athlete or team would succeed or fail in several sport disciplines including volleyball.

Volleyball is an important team sport in which players must be psychologically prepared at a high level, including all of its parts, especially motivation of students to play and make progress in the game itself: training, competition and success. The extended response You will now read an extended response to the prompt. GUIDANCE The credit given for guidance curricula and programs is basic to, but also supportive of, education in general. It enables students' values and attitudes to develop so that their behavior on campus and off stems from something deeper than taste or pleasure. As such, counseling programs are needed that can help recognize problems and the factors causing those. Motivation is considered a key psychological topic for both general and sports psychology researchers, as well as coaches. Over past decades, several serious attempts have been made to explain the factors driving behavior in training and competition. Motivation drives athletes' behavior, affects their persistence in training, contributes to their learning potential, and influences the quality of effort, ultimately improving educational processes and enhancing performance in motor skills.

Schools are important educational institutions that socially and educationally nurture individuals by providing knowledge and information. With the evolution of educational concepts and methods, schools now focus on equipping students with skills, values, and social attitudes, making the student the center of attention rather than the subject matter. Schools play a key role in developing students' overall personality (intellectually, emotionally, socially, psychologically, and physically), especially when the family's role has diminished due to current economic and social challenges.

This highlights the need to emphasize sports other than football. Volleyball is a team sport that is enjoyable, involves minimal physical contact, has low injury risk, and does not require large spaces or extensive preparation. Given the impact of motivation on sports participation, performance, morale, and attracting talented students, the researcher aimed to study motivation among students and develop it through an educational guidance program.

### **Problem Statement**

Despite the importance of physical education as a subject with specific objectives, programs, and methodological approaches, the researcher observed, based on personal

experience as a middle school teacher, a common stereotype among education stakeholders that it merely involves physical activity with no social or psychological impact. Additionally, there is a lack of specialized educational and psychological guidance curricula to develop motivation for sports in general and volleyball in particular. Therefore, the researcher sought to enhance motivation in this educational stage through a guidance program.

### Research Questions

1. Can motivation toward practicing volleyball be developed through a guidance program?

### Research Objectives

1. To construct a scale measuring motivation to practice volleyball among first-year middle school students.
2. To determine the level of motivation toward volleyball among first-year students.
3. To develop a reality therapy-based guidance program to enhance motivation for volleyball.
4. To identify the effect of the guidance program on motivation toward volleyball.

### Research Hypotheses

1. There are statistically significant differences between the pre- and post-test results of the experimental and control groups in developing motivation for volleyball.
2. There are statistically significant differences between members of the experimental and control groups in the post-tests regarding motivation for volleyball.

### Research Scope

- **Human Scope:** First-year middle school students at Al-Mustafa Boys' School, Directorate of Education, Al-Rusafa II, academic year 2023–2024.
- **Time Scope:** From February 20, 2024, to April 14, 2024.
- **Place Scope:** Classrooms of Al-Mustafa Boys' School.

### Methodology

The researcher used the experimental method with two groups: experimental and control, which suits the nature of the research problem. Experimental research is considered one of the most precise types of scientific research capable of affecting the relationship between the independent and dependent variables in an experiment (Atwi, 2000, p. 192). Table (1) shows the experimental design:

**Table 1. Experimental Design**

T	Group	Independent Variable	Dependent Variable	Test
1	Experimental Group	Guidance Program	Motivation towards practicing volleyball	Pre-test – Post-test
2	Control Group	Existing Program		

### Research Population and Sample

The researcher defined the research population as first-year students at Al-Mustafa Intermediate School for Boys, in Baghdad, Rusafa 2, totaling 250 students distributed across five classes (A, B, C, D, E). This school was chosen due to strong cooperation from the administration and its large number of students. The researcher selected 250 students as the study sample, divided into:

- Exploratory sample: 20 students
- Construction sample: 150 students
- Main experimental sample: 40 students (20 experimental students from class A and 20 control students from class B), all having low motivation towards practicing volleyball. Table (2) shows the details.

**Table 2. Sample Size and Percentages**

Sample Size	Class	Number	Percentage
<b>Research Population</b>	A, B, C, D, E	250	100%
<b>Main Experimental Sample</b>	A – B	40	16%
<b>Construction Sample</b>	C, D, E	150	60%
<b>Exploratory Sample</b>	E	20	8%
<b>Excluded</b>	A, B	60	24%

### Research Tools and Instruments

*Information Collection Methods:*

- Personal interviews
- List of experts and specialists consulted
- Questionnaires to survey expert opinions on determining areas of the motivation scale for volleyball
- Questionnaires to survey expert opinions on scale items
- Questionnaires on expert opinions regarding the guidance program
- Arabic and foreign sources
- Data collection and extraction forms
- Internet resources

#### *Devices and Equipment Used:*

- Dell laptop (1)
- Classroom at Al-Mustafa Intermediate School for Boys
- Canon camera
- iPhone 12 camera
- Whiteboard and markers
- Blue ballpoint pens

### **Field Research Procedures**

#### **1. Identifying the Study Variable**

The independent variable was defined as motivation towards practicing volleyball, after consulting the supervisor and conducting interviews with specialists in psychology and volleyball. The purpose was to build a scale meeting research requirement.

#### **2. Determining the Phenomenon to be Measured:**

The dependent variable was identified as the students' motivation towards practicing volleyball, since defining the scale concept and rationale is a key first step in designing a valid measurement (Ahmed M., 2006, p. 114).

#### **3. Determining Scale Domains**

Based on references and related studies, the researcher initially selected seven domains for the motivation scale, defined theoretically, and submitted them to experts via a questionnaire . Domains with at least 80% agreement were accepted, resulting in five accepted domains (Table 3).

**Table 3. Validity of Motivation Scale Domains**

<b>Domains</b>	<b>Agree</b>	<b>Disagree</b>	<b>%</b>	<b>Result</b>
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Sense of Belonging	21	0	100%	<b>Accepted</b>
Autonomy	20	1	95.23%	<b>Accepted</b>
Perceived Competence	20	1	95.23%	<b>Accepted</b>
Freedom of Choice	20	1	95.23%	<b>Accepted</b>
Goal Setting	21	0	100%	<b>Accepted</b>
Interest	15	6	71.42%	<b>Not Accepted</b>
Self-confidence	15	6	71.42%	<b>Not Accepted</b>

#### 4. Determining Scale Items

The researcher drafted 53 preliminary items, ensuring clarity and simplicity, and submitted them to a linguistic expert (Table 4).

**Table 4. Number of Items per Domain**

Items	Domain
11	Sense of Belonging
11	Autonomy
14	Perceived Competence
8	Freedom of Choice
9	Goal Setting

#### 5. Item Construction Principles

- Single idea per item
- Simple language
- Belief-based sentences
- Short ( $\leq 20$  words)
- Reflects the measured concept
- Not in past tense (Jasim, 1990, p. 144)

Likert 5-point scale was used for its simplicity, reduced guessing, and predictive power (Owais & Al-Hilali, 1997, p. 67).

#### 6. Item Validity

Expert evaluation (21 specialists) validated items with at least 80% agreement; 33 items were accepted .

#### 7. Scoring Key

5–1 for positive items; 1–5 for negative items. Total score range: 33–165; theoretical mean: 99.

## 8. Exploratory Experiment

A pilot study (n=20) assessed clarity, response options, time required (14–18 min, mean 16 min), and potential application issues.

## 9. Construction Sample Application

Applied the scale to 150 students for statistical analysis (21–22/2/2024).

### Scale Psychometric Properties

#### *Validity:*

- Content Validity: Experts reviewed domains and items .
- Logical Validity: Based on expert opinions.
- Construct Validity: Item discrimination and internal consistency analyses.

#### *Item Discrimination:*

T-test between top 27% (41 students) and bottom 27% (41 students) confirmed all items significantly discriminated ( $p < 0.05$ ,  $df=80$ ).

#### *Internal Consistency:*

1. Item-total correlation
2. Item-domain correlation
3. Domain-total correlation

All correlations were significant ( $p < 0.05$ ).

### Descriptive Statistics of Motivation Scale

Mean = 76.25, SD = 3.143, skewness = -0.79, median = 77, theoretical mean = 99,  $t = 32.36$ ,  $p = 0.000$  .

### Reliability

Split-half method using Spearman-Brown and Cronbach's alpha:

- Split-half = 0.839
- Cronbach's alpha = 0.921.

### Objectivity

Ensured by clear instructions, scoring guidelines, and non-intervention by researchers. Two similar items were added to test response objectivity.

### **Pre-test**

Applied to classes A and B (n=100), identified low-motivation students for experimental (n=20) and control (n=20) groups. Pre-test showed no significant differences ( $t=0.667$ ,  $p=0.509$ ).

### **Guidance Program**

12 sessions (35 min each) over 6 weeks (3/3/2024–14/4/2024), based on Reality Therapy, aiming to:

1. Build self-confidence
2. Develop a unique sense of self
3. Increase self-respect
4. Achieve autonomy and responsibility
5. Increase awareness of choices
6. Plan and commit to behavior change
7. Learn social skills
8. Understand others' needs
9. Show empathy
10. Clarify personal values (Al-Izzah, 2010, p. 23)

### **Program Content**

Based on previous studies, literature, and suitability for middle school students. Strategies included: introducing the topic, real-world learning, behavioral modeling, real-life questions, fun activities, review, homework, and self-evaluation.

### **Post-test**

Applied on experimental and control groups (14/4/2024) under similar conditions as the pre-test.

### **Statistical Methods**

- Percentages
- Independent-samples t-test
- Pearson correlation
- Spearman-Brown correlation

- Guttman split-half
- Mean and standard deviation
- Paired-samples t-test
- Cronbach's alpha
- Theoretical mean

## Results

**Table 5. Means and Standard Deviations of Motivation Pre- and Post-Test for the Experimental Group**

Variable	Test	M	±SD	M-F	SD-F	SE	t-value	Error Rate
Motivation	Pre-test	76.2500	3.14350	47.3500	6.1838	1.3827	34.24	0.000
	Post-test	123.6000	6.55664	0	1	4	4	

At significance level 0.05 with 39 degrees of freedom

**Table 6. Means and Standard Deviations of Motivation Pre- and Post-Test for the Control Group**

Variable	Test	M	SD	M-Diff	SD-Diff	SE-Diff	t-value	Sig.
Motivation	Pre	75.5500	3.48644	11.800	1.93581	0.43286	27.260	0.000
	Post	87.3500	3.34467					

Significance level at 0.05, df = 39

**Table 7. Post-test Comparison of Motivation Scores Between Experimental and Control Groups**

Variable	Unit	Experimental Group	Control Group	t-value	Sig.
Motivation Scale	Score	123.6000 ±6.55664	87.3500 ±3.34467	22.025	0.000

Significance level at 0.05, df = 38

## Discussion

Tables 5 and 6 show the development in students' motivation toward practicing volleyball in the post-test for both the experimental and control groups. Regarding the experimental group, the guidance program has a positive role in preparing the student psychologically, in addition to determining their level of psychological readiness and overcoming the various situations they face. Through the researcher's work in the field of teaching, it was observed that there are psychological problems that hinder this process.

For these reasons, a program was designed that considers all these psychological changes experienced by the student regarding their participation in volleyball.

"When achievement motivation is directed toward an individual's interest in fulfilling their potential and abilities, it is classified as growth motivation, whereas if the focus is on competition among individuals, it can be considered social motivation" (Al-Naqeeb, Sports Psychology, 1990, p. 119). The strength of motivation varies among individuals, just as the activities differ in the nature of the challenges they present and the purpose they serve in expressing this motivation. Therefore, when preparing the guidance program, it is necessary to include personal and environmental factors that address motivation, directing the student to challenge themselves under all circumstances while achieving satisfaction from practicing volleyball.

Motivation is essential in learning and sports. It has continued to attract major attention from scholars, and has become a focus for psychology because of its success in the understanding, explanation, and interpretation of human behavior. Motivation involves the powers that makes people to set their goals and objectives, enabling them achieve internal harmony and cope effectively with their environment (Bahi & Shibli, 1998, p. 7). The guidance program also promotes to the students' consciousness awareness of the value of engaging in sports- especially volleyball, telemetry active and social contact among teenagers.

The nature of sport in middle school environments, volleyball included, reflects educators concern more so with skill development and less on the emotional needs to students. However, the actual performance of sports in comprehensive way depends not only on learners' physical and technical capabilities, but also on the psychological aspect of their skills with motivation as a major factor. Reasons for participation in sports changes at every development stage and depends on the participants' level of athleticism. For example, the motivation of junior school students is different to that of high school students and of elite level athletes as well as displaying unique motivational characteristics.

The study suggests that volleyball brings positive mental health effects for students and contributes to both their communication skills and teamwork. Mental training is a key point in the educational program, since without it you cannot achieve success in sport. In recent years there has been increasing emphasis on psychological factors, where an individual's experience in a sports training facility is increasingly seen as developing not only physical characteristics and motor capabilities, but also psychological properties and learners' mental antifragility. Accordingly, to achieve favorable results in sports activities psychological factors are required.

Motivation is a key area for teachers to focus on in order to understand what motivates their student and to develop engagement, Al-Khattatneh, Abu Asad, & Al- Karki ( Principles of Psychology, 2010) p. 250. That could be seen as a potential energy, a prerequisite to the happening, growing and progression of learning in pupils. Once this energy is stimulated, it leads to better productivity, acquiring new information and skills, introducing innovative teaching methods and utilizing successful ways of dealing with information that has been collected during the learning process (Al-Otoum, Alawneh, Al-Jarrah, & Abu Ghazal 2011:255).

The psychological guidance program has significant importance and value in changing students' perceptions toward practicing volleyball. This was evidenced by the researcher's results in developing motivation, as the program includes shared goals, numerous opportunities to express opinions, hopes, and aspirations, mutual participation in interests, and mitigation of difficulties to achieve healthy adjustment with oneself and others. This highlights the importance of guidance work as a fundamental resource for helping individuals solve problems, recognize their abilities, and utilize them. "The existence of well-organized and properly planned guidance programs, available in all psychological service centers such as mental hospitals, psychological associations, and educational institutions, is essential" (Al-Asimi, 2008, p. 256). The essence of counseling and psychotherapy lies in motivation and strong will, assuming that the underlying cause revolves around the positive and lasting outcomes likely to emerge when the client actively participates and applies them at a personal level.

Motivation in educational life appears as a means to achieve specific educational goals more effectively. From an educational perspective, motivation is itself an educational goal. Stimulating and directing motivation in learners generates interests that lead them to engage in cognitive activities. Consequently, achievement motivation enhances students' performance, increases their self-confidence, positivity in educational situations, and awareness of outcomes, making them more responsible for the results of their learning (Abbas, 2017).

This progress in the motivation scale is shown by Table 7 during post-test, for the experimental group. The effectiveness of the guidance program that has changed behavior is what has led to this, according to Martin. Everything would seem to depend on motivation, as the guiding programs reinforce students' cooperative and life attitudes previously described. These programs contribute positively to circumventing students' negative perceptions to take part in volleyball, by offering direction informed by scientific principles, which is adjusted to low motivation participants' needs and perceptions.

Certain aims of the guidance programme were accomplished, e.g., by relieving students' practice-related pressures and concentrating on factors that arouse wishes and interests - not by coercion or avoidance. As a result, educational guidance programmes have developed to be an important part of many-of the learner-preparation schemes based on the principle that it [the guidance] is part-and-parcel of ed... The importance of focusing on three dimensions (cognitive, skill- based- for which teachers are usually responsible when it comes to delivering academic curricular content – and affective - unfortunately many times disregarded) characterizes this conception. Beyond that, though, many students are dealing with psychological issues, educational challenges or learning problems and struggles that are not necessarily a function of the kind of teacher-based instruction they may (or may not) receive. This highlights the need for schools to set up psychological and educational guidance systems.

Therefore, educational and psychological guidance programs serve as a supplement to academic curricula in schools as well as in universities with the intention of preparing learners to comprehend and express themselves according to their expectations and capabilities, encouraging them subsequently adapt herself /himself in communities which are changeable. "No guidance is provided by anyone; rather, strictly speaking, it is at most

an interaction between a counselor who uses scientific concepts and the student who seeks help for some life-related problems regarding learning, psychological health, or other problem areas in which the learner encounters difficulty adjusting to reality” (p. Based on educational psychologes primary hypothesis that „all behavior is motivated“, lack of academic motivation brings about failure to attain learners goals which decreases learners’ motivation to learn. Applicable to the present study, low motivation may also suggest problems of those who should promote it.

The process of guidance and educational counselling relies on developmental programmed that are set to develop skills in individuals in an attempt to help them grow and adopt behaviours leading to harmonizing these aspects; cognitive, affective/emotive, skill-related (Al-Izza, Theories of Guidance and Psychotherapy, 2005). The researcher accounts for the results in terms of a number of factors, including the originality of the guidance program employed. This program was developed using a model to enhance motivation for volleyball practice, which includes 4 main parts meeting those psychological need components of first year of MS students. Its efficacy can be related, in part, to the fact that it is an activity capable of involving students actively since we resorted to several motivational strategies: most frequently we appealed to students such as capturing their attention or relating content with something tangible of their daily life and empowering them so that they could have an influence over results in a society", and achieving satisfaction through tasks proposed by counseling activities.

### **Conclusions**

Based on the presentation and discussion of the results, the researcher reached several conclusions. The experimental group accepted the motivation scale due to the clarity of its statements and ease of response. A motivation scale for practicing volleyball was successfully developed. It was found that some first-year middle school students demonstrated low levels of motivation toward playing volleyball. The designed guidance program had a positive effect on enhancing motivation toward volleyball practice among middle school students. The experimental group actively engaged with the program, as reflected in their improved results. Furthermore, the control group exhibited lower motivation compared to the experimental group. Finally, physical education lessons were found to lack structured guidance programs as independent components apart from skill-teaching sessions.

### **Recommendations**

The researcher recommends the use of the developed motivation scale as an objective research tool for future studies. It is advised to apply this scale periodically to middle school students. Similar studies should be conducted on different samples and in other sports to generalize the findings. The prepared guidance program should be adopted and its sessions used to foster motivation toward volleyball practice among middle school students. The Ministry of Education is urged to include educational guidance as a core subject within the school curriculum. Additionally, physical education teachers should



participate in specialized workshops and training sessions to strengthen their guidance and counseling skills.



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## The Effects of Single Deep Jump Training on Slopes on Selected Biomechanical Variables of the Triple Jump in Athletes Under 20 Years of Age

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2181](https://doi.org/10.37359/JOPE.V37(4)2025.2181)

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**Article history:** Received 25/ June/2024 Accepted 14/ July/2024 Available online 28/ December/2025

### Abstract

The study aimed to investigate the effect of individual long jump slopes and its effect on some biomechanical variables of U20 of triple jump. It is hypothesized that there is statistically significant difference between the results of the pre and posttests in the biomechanical variables of U20 of triple jumps. To achieve the aim of the study, one group pre-test post-test experimental design is used. A sample of (6) triple jump players under 20 years from the specialized schools of the Ministry of Youth and Sports, is non-randomly chosen during the academic year (2023-2024). The pilot study was carried out on Tuesday and Wednesday (10/24/2023) at 4:00 p.m. at the Ministry of Youth and Sports stadiums on a group of (6) players who participated in the main study. A three-month training program was applied for 11 weeks, three training sessions per week. The training sessions were designed to gradually increase in intensity on a daily, weekly, and monthly basis, following a scientific and precise method regarding intensity and rest periods between repetitions and sets. This approach was tailored according to the specific goals of each training session and the biomechanical variables targeted for development in each session. It was concluded that the work of the angles of the lead leg during push-off for athletes in the triple jump who are under 20 years old is positively affected by individual long jump training.

**Keywords:** Long Jump, slopes, Motor transition indicator, Instantaneous Velocity.

### Introduction

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Reaching achievement is accomplished by following the guidelines provided by the sciences, including biomechanics, which links athletes' movements to physiological conditions. Its main concern lies in overcoming the mechanical obstacles within human joints or body mass. Among the most valuable studies are those directed toward analyzing athletes' movements in order to improve motor performance during sports activities. This necessitates the study and analysis of the moments acting on the distal axes of the legs at each ground contact, as well as the rotations occurring at the hip, knee, and ankle joints at the instant of full extension of the take-off leg. These moments are countered by rotational torques of the leading leg, the spine, and the arms. Accordingly, a skilled athlete is one who possesses a sufficient level of physical capacities that allow them to perform the motor task effectively with minimal errors. We all know that the body can do what you teach it to do with enough consistent effort. As such, the most effective way to develop strength should be towards modern methods of training like unilateral-slope-jump. Triple jumping is a complex and compound event in track and field since the balance and muscle coordination play very important roles for validity of all these four parts: The approach, Hop, Step, Jump. This complexity highlights the requirement of harmony and synchrony in muscle action to achieve the most efficient mechanical configuration for performing a task. Therefore, muscle activity in the distal extremity is important for effective propulsion of the body's center of gravity and its transference over phases of the triple jump (approach–hop–step–jump). It requires high levels of dynamic balance, coordinated functioning of the working muscles to produce torque forces which are balanced around all other body moments so as to ensure a successful performance.

Stride of sprinters is considered as a typical example of plyometric activity (Chu, 2013). The jump loads the muscles of the leading leg by gravity with tension. Eccentric muscles functioning around the hip and thigh are important for efficiency by minimizing body collapse while avoiding a deep center of mass. These eccentric contractions play a role in attenuating the effects of jumping by acting as shock absorbers, decreasing stress on ligaments and skeletal muscles. Of particular note, is the fact that the force in a muscle during eccentric contractions can be more than 40% greater than in any other muscle action, an extent perfectly illustrated by the force requirement of jumps (Chu & Mayer, 2013).

Jack Pioss (1988) noted that slope training is a form of training aimed at developing specific physical abilities related to the demands of the sport (Pioss, 1988).

Based on the above, the researchers must review related studies concerning the investigated variables, including:

The Effect of Deep Jump Training on Explosive Power and Performance Level in Junior Long Jumpers (Saeed, 2020).

The researcher employed the experimental method with a single-group pre–intermediate–post-test design, applied to a sample of 11 long jump athletes under 20 years.

Findings revealed that improvements in performance level were associated with enhancements in speed, explosive strength, and agility—key physical components responsible for developing long jump performance. Explosive strength was identified as the primary determinant of take-off success.

The Effect of Different Heights of Deep Jumps on Certain Aspects of Muscular Strength in Handball Players Aged 15–17 Years (Al-Hayali et al., 2013).

The experimental method was used with 24 players divided into three equal groups of eight, aged between 15–17 years, randomly assigned. Results indicated that using deep jump training with varying box heights contributed to developing explosive strength of the legs and improving leg speed-strength.

The Effect of Training on Slopes of Different Heights and Distances on Certain Physical Abilities, Kinematic Variables, and Performance in the 100–200 m Sprint (Dahash).

The researcher used the experimental method with a sample of young sprinters aged 18–19 years from Al-Najaf Al-Ashraf. The sample was divided into two experimental groups (six athletes each). The first group trained with straight running, uphill running, followed by straight and downhill running, while the second group trained with only uphill or downhill running. Results showed that the training enhanced physical and kinematic attributes and improved performance in both groups. Moreover, variation in step length and frequency demonstrated that mechanical changes in one variable significantly affect the other, where an increase in one is accompanied by relative stability in the other.

## Methodology

The researchers adopted the experimental approach using a one-group experimental design. This design involves conducting the experiment on a single group, which is subjected to a pre-test, followed by the introduction of the experimental variable (the applied training program), and finally a post-test, with the pre- and post-measurements compared statistically.

The research population was intentionally selected due to the specific requirements of the study and consisted of six triple jump athletes under 20 years of age, registered in the specialized schools for athletics during the 2023/2024 season. After deliberation, the researchers identified the study variables based on a review of Arabic and international scientific sources, and by consulting experts in sports training science and biomechanics. Several biomechanical variables were determined through video recording and motion analysis of the triple jumpers' performance.

## Variables under Analysis from the Take-off Phase

1. Speed (during hop, step, and jump phases)  
From speed and time analysis, the following variables were derived:
2. Motor transfer index (during hop, step, and jump phases)
3. Force (during hop, step, and jump phases)

### Instruments and Equipment

- Three modern video cameras (Sony, 120 fps)
- Laptop (Dell)
- Data documentation device
- Two electronic stopwatches
- Scale for body mass measurement (Chinese-made)
- Regulation jumping field
- Six markers
- Measuring tape
- Twelve yellow training shirts
- Two whistles
- Plyometric boxes of various heights (31, 34, 38, and 43 cm) for training
- One box (50 cm) for testing purposes

### Pilot Study

The small scale trial is an important part of the development process of the implemented research. However, it is used to sample and check the research tools and procedures before commencing the main study. The primary purpose was clarity and validity of the new biomechanical tests that underpin the training program.

The first pilot study was carried out on October 24 and 25, 2023 (Tuesday and Wednesday) around 4:00 pm in the triple jump field at the Ministry of Youth and Sports (Specialized Schools), with a research team. The research sample numbers were 6 and 29 for either compound. Procedures consisted of taking the proposed tests (3 test capabilities), recording for biomechanical analysis and verification of:

- Field suitability for testing
- Participants' readiness for performance
- Possible difficulties and obstacles in the main trial
- Time required for test administration
- Familiarization of research staff and participants with the tests
- Functionality of video and other measuring devices

The second pilot study was carried out on 26 October 2023 (Thursday afternoon at 4:00 pm), also with the six athletes. The aim was to determine the workload for the plyometric boxes from maximum repetitions and optimal resistance in each of the exercises. This enabled the researchers to:

- Define box heights and repetitions based on training intensity
- Establish slope-jump exercises after determining box intensity and the appropriate slope angle

Therefore four boxes were constructed (width 40 cm, height ranged from 65 to 90% of the maximum intensity minimum), arranged 1 m apart at the following heights; 31 cm, 34 cm, 38cm and 43cm.

### Training Program

The pre tests took place on Nov 2, 2023 at 4:00 p.m) in the sport field of the Ministry for Sports and Youth (Technology school for Athletes). Kinetic data were recorded using video analysis.

Afterwards, the experimental group was subjected to an intervention that incorporated unilateral depth jump training on gradients. The program started November 4, 2023 (Saturday) and ended January 16, 2024 (Tuesday), covering an overall period of 11 weeks with a total of thirty-two training sessions being performed (three times per week at maximum over Saturdays, Tuesdays and Thursdays).

The main training phase of each unit lasted between 27–40 minutes, with intensity levels ranging from 75–100%. Training loads were regulated based on box heights and repetitions, averaging the values obtained for the group during pilot testing. Training intensity progression followed wave patterns of (2–1) within a single week and (3–1) across weeks.

Post-tests were administered after the program to assess changes in the targeted biomechanical variables.

### Statistical Methods

The researchers utilized SPSS for data analysis, applying the following statistical tools:

- Arithmetic mean
- Standard deviation
- Skewness coefficient
- Paired sample t-test

## Results

**Table 1. Calculated *t*-value and significance level for the pre-test and post-test of the speed variable under investigation**

Biomechanical Variables	Phase	Unit of Measurement	Pre-test (Mean ± SD)	Post-test (Mean ± SD)	Mean Difference	Std. Error	<i>t</i> -value	Sig.
Speed	Hop	sec – m/s	6.83 ± 0.12	7.13 ± 0.19	0.30	0.08	8.21	0.00
	Step	sec – m/s	6.21 ± 0.19	6.43 ± 0.21	0.21	0.07	7.05	0.00
	Jump	sec – m/s	5.41 ± 0.11	5.63 ± 0.13	0.21	0.09	5.39	0.00

*Significant at df = (6-1 = 5), p = 0.05.*

**Table 2. Calculated *t*-value and significance level for the pre-test and post-test of the force variable across the take-off phases under investigation**

Force Variable	Phase	Unit of Measurement	Pre-test (Mean ± SD)	Post-test (Mean ± SD)	Mean Difference	Std. Error	Variance	<i>t</i> -value	Sig.
Force	Hop	N (Newtons)	4425.83 ± 247.63	4567.66 ± 267.84	141.83	69.99	28.57	4.963	.00
	Step	N (Newtons)	3808.83 ± 130.09	3887.16 ± 167.46	78.33	44.11	18.01	4.349	.00
	Jump	N (Newtons)	3069.16 ± 53.44	3194.33 ± 95.38	125.16	43.54	17.77	7.041	.00

*Significant at df = (6-1 = 5), p = 0.05.*

**Table 3. shows the calculated *t* value and the error ratio for the pre- and post-tests of the motor transfer index variable under investigation**

Motor Transfer Index	Phases	Unit of Measurement	Pre-test Mean	Post-test Mean	Mean Difference	Std. Dev.	Std. Error	<i>t</i> -value	Sig.
Motor Transfer Index	Hop		40.00	48.00	0.07	0.04	0.01	4.50	.00
	Step		36.00	38.00	0.02	0.00	0.00	11.06	.00
	Jump		41.00	48.00	0.07	0.03	0.01	5.69	.00

*Significant at degree of freedom (6-1 = 5), with an error level of (0.05).*

## Discussion

The researcher attributes the significant differences between the pre- and post-test results for the variable of speed across the three phases of the triple jump, in favor of the post-test results of the study sample, to the nature of the single deep jump training on slopes applied within the training program. The researcher explains that these differences arise from the effect of deep jump exercises, which play a crucial role in activating a large number of fast-twitch muscle fibers simultaneously and within the shortest possible time, thereby positively influencing the development of movement speed during the hop, step, and jump phases.

In terms of the three phases of the triple jump, speed works to oppose take off angle. For that reason, the author applied this principle in the training program by implementing jumps with an optimal take-off angle. This incorporation was supported by the motor transfer index in scores indicating very easy movement sequences and the best appropriate T/O angles which positively predicted post-testing results. In particular, the absolute horizontal velocity decreases in all of these phases of motion, especially between the hop and step phases, so it is important to obtain a high take-off speed during the hop phase with an effective take-off angle to provide for enough speed in the subsequent step phase and jump phase. This discrepancy is consistent with that reported by Al-Fadhli et al. (2023) who observed a systematic reduction in absolute horizontal velocity across the phases of triple jumping which is most pronounced between the step and jump take-offs.

As far as the eliciting effect of single deep jump training on slopes is concerned, the results clearly demonstrated a speed improvement. This is in accordance with Mohammed (2005) who reported that motor speed development occurs as a result of muscular strength such as attained in plyometric exercises. Instantaneous speed or the speed at a given time was analysed by the researcher using Kinovea software according to  $\text{instantaneous speed} = \text{instantaneous distance} / \text{time}$ . This approach is consistent with Al-Fadhli and Al-Bayati (2012) who argued that instantaneous speed describes the positional change at an instant in time which could take place during jump-take-off or ball-striking during football. Moreover, Jabbar and Kazem (2018) described that the speed is the space crossed or covered by mass in a given time.

The development of means to improve speed and rate of power production has become a cornerstone in the quest for optimal skill levels across all sports. A great debate exists as to the ideal speed of execution. Some researchers prescribe high-speed explosive exercises and others slower execution at a moderate speed. Advocates of high-velocity execution argue that in order to produce "explosive power" the training stimulus should be explosive (or sharp) and rapid (Al-Fadhli et al., 2019). It is single deep jump training that forms the basis of this principle since athletes have to overcome inertia and elevate themselves at high instantaneous speeds against gravity. This feature was a key aspect of

the training, which concentrated on reducing running time as doing so is an important factor in speed.

As noted by Jabbar Ali et al. (2014) speed is that one of the most important factors in determining the height to which a projected body will ascend. Specialized training of deep jumps with slope had a great influence on the acceleration level during the triple jump phases among subjects. The negative relationship between time and force is such that decreasing take-off time leads to an increase in the amount of force generated. Thus, in view of the slight reduction in horizontal velocity noted, a lack of any significant output force errors was inferred during take-off; that is, good motor performance. This derives further support from the motor transfer index, which showed the ability to hold take-off angles well in both hop phase and thus aid better propulsion for step and jump phases.

From force-versus-time relationship, one can perceive that minimizing temporal loss is paramount for efficient transfer of momentum, as reported by Al-Fadhli (2010). The researcher believes that the substantial differences in post-test speed outcomes are a result of the unique nature of slope-based deep jump training, which is particularly difficult as it also requires lower extremity muscles to deal with interactions between gravity, drop height and resistance of the slope. This increased muscular demand helps to develop power and speed, which agrees with Al-Fadhli's (2007) suggestion that resistance situations will improve take-off force and acceleration. Likewise, Mohammed et al. (2011) stressed the very high levels of force and speed that are required for explosive actions to occur, referring to instantaneous power as the product of those two variables.

Whole-body momentum (mass times velocity) can be determined at both ground contact and take-off. This transfer of momentum takes place in the running phase and throughout all three phases of the triple jump. Thus, changes in momentum (when mass is held constant although velocity changes) can be said not only to inform the quality of technical execution but also advance optimal angles – specifically take-off angle, which acts as a proxy for motor transfer. Al-Fadhli (2020) noted that the motor transfer of horizontal jumps can be measured from an impulse reduction at take-off, combined with take-off angle. Considering that the conversion of linear to horizontal projections requires only small angles and maximal launch speeds, we can then express the motor transfer index as:

**Motor Transfer Index for Horizontal Movements = Take-off Angle ÷ Momentum Reduction**

A greater calculated value is indicative of better motor transfer. According to the momentum principle, an increase in velocity with no change in body mass will result in a greater transfer of force during triple jump performance, as long as optimal take-off angles are maintained for each phase. Therefore, the author credits the great differences in motor transfer index in favor of the post-test group to slope single deep jumps exercises that

increased instantaneous power and speed-strength and also took-off more effectively. In the hop and jump phases, increase was maximal and slightly less for the step phase. This result is consistent with Stone et al. (2002) who explained that as plyometric training is one of the most efficient strategies to increase muscle power because it improves strength and speed together, this approach yields enhanced performance efficiency compared to traditional training forms.



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## Impact of Wearable Technology on Enhancing Backhand Stroke Performance in Tennis among Physical Education and Sports Science Students at the University of Baghdad

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2371](https://doi.org/10.37359/JOPE.V37(4)2025.2371)  
<https://creativecommons.org/licenses/by/4.0/>

**Article history:** Received 17/ October/2025 Accepted 26/ November/2025 Available online 28/ December/2025

### Abstract

This research aimed to investigate the impact of Using wearable technology for improving backhand stroke among students of Physical Education and Sports Science, in University of Baghdad. It aimed at assessing better performance with respect to stroke accuracy, feeling and reduction of vibrations, as well as being capable to provide real-time feedback on the student's quality of movement with wearable sensors. An experiment designed conducted with the sample 24 novice students (12 experimental, 12 control) during intervention period of 8 weeks. The experimental group received real-time biomechanical feedback using wearable sensors, whereas the control group underwent conventional training. Accuracy, speed and vibration were evaluated by pre- and post-testing of a standard backhand stroke protocol. Data were statistically examined through SPSS and outcomes were compared by t-tests and ANOVA. Results: The experimental group had significantly better results in backhand accuracy, speed and vibration reduction compared to the control group ( $p < 0.05$ ). ANOVA revealed significant interaction effects, a difference that only wearable technology is able to make. Conclusions Wearable technology significantly improves performance of the backhand stroke, minimizes the risk of injury, and enables effective skill acquisition. Its inclusion in the sports education curriculum is recommended to improve training results where resources are limited.

**Keyword:** Wearable Electronic Devices, Tennis, Motor Skills, Feedback.

### Introduction

Wearable tech is a game changer in sports science, especially in tennis as it makes real time biomechanical feedback part of the game where athletes and coaches can easily

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track and improve their athletic performance. Devices installed with Inertial Measurement Units (IMUs), accelerometers, gyroscopes, magnetometers record key data like swing speed, racket angle and the signature vibration levels and patterns that allow for real-time tweaks to technical moves such as the backhand—complex enough to require just right timing between trunk, shoulder(girdles) and wrist. These technologies enhance performance and mitigate the risk of overuse injuries to elbow or shoulder through recognising suboptimal techniques (Kramberger et al., 2022). The effectiveness of stroke detection by wearable sensors can reach an accuracy of more than 90%, providing personalized training interventions beyond traditional observational methods (Perri et al., 2022). For example, wrist/racket-mounted sensors may discriminate forehand movement, backhand movement and service action providing practical information in normal situations (Rigozzi et al., 2023). In addition, the combination of machine learning and processes generated by wearable data enables predictive analytics in player physical performance optimization, especially in pedagogical contexts of beginners (Liu et al., 2024). Indeed, it has been reported that wearable technology could decrease vibration-induced stress by as much as 30%, which can decrease the risk of repetitive strain injuries and improve stroke consistency (Seçkin et al., 2023), so this is very relevant to university-level training programs.

This research explores the utilization of wearables in tennis training to improve the backhand stroke among the physical education and sports science students at the University of Baghdad, through immediate biomechanical feedback which would help accelerate motor learning. Kinematic sequence pattern during the backhand stroke with trunk rotation and arm extension in particular is complex and el tennis, therefore traditional coaching that depends on subjective judgment tends to be insufficient (Hassan & Abdulkareem, 2026; Reid et al., 2011). Wearable devices have gone from simple activity trackers to artificial-intelligence-based solutions, capable of improving performance at an individual level thanks to the possibility for precise impact force and velocity measurement (Kos & Kramberger, 2017). In Iraq, there is little or no technology integration within the physical education curriculum for instance in University of Baghdad which has led to poor development of skills and increased prevalence of injuries among students (Khudhair et al., 2024). This gap is addressed in this work, where wearable sensors are used to provide empirical feedback that support autonomous learning and engagement. It has previously been reported that wearable devices enhance kinematic analysis on tennis strokes, and such potential work for beginners exists (Whiteside et al., 2013). Moreover, biometric measurement systems have already showed efficacy in enhancing training results and represent an important platform for the roll-out of such innovations into regional sports education frameworks (Perri et al., 2022).

The backhand stroke in tennis requires accurate coordination and technique, however, the conventional training methods in Iraqi universities such as University of

Baghdad are largely based on verbal instruction with minimum feedback which destroys the kinetics chain besides retardation in learning process and increasing injury risk due to bad or incorrect techniques (Khudhair et al., 2024). Lack of sophisticated tools such as wearable sensors in the field of physical education also constraints the ability to provide real time data-driven feedback, allowing students to optimize their backhand stroke.

This research is intended to: determine how effective wearable technology is in enhancing backhand stroke performance in Physical Education and Sports Science students at the University of Baghdad; quantify changes in speed and accuracy of strokes; calculate reductions in vibration levels to minimize potential injury, and measure satisfaction of students with immediate feedback from wearables.

**Human Scope:** The sample consists of students of the College of Physical Education and Sports Sciences, University of Baghdad. With probability of a sample of 24 students (12 experimental, 12 control) will be included, not having irregular attendance, injury history, skills backhand records or sporting clubs and nationals. **Time Frame:** The research will be carried out over 4 months (from January to April 2025). **Study Location:** Court of college of physical education and sport sciences university – Baghdad.

## Methodology

This study used a experimental approach with pretest-post-test design to examine the effects of using wearable technology on tennis backhand stroke performance. Participants were assigned to one of two groups: an experimental group that incorporated wearable sensors providing real-time feedback during training, and a control group using traditional methods of training without the assistance of technology. This design was chosen because it is well suited to educational settings in which random assignment is difficult, and permits the examination of intervention effects while taking into account baseline differences. The period of the study was held for 8 weeks with three training sessions each week and every session lasted for about (90 min) in places which belong to College of Physical Education and Sport Science sports facilities - University of Baghdad. Ethical considerations included requiring all participants to sign informed consent and being in compliance with institutional review board policy for human subject's research.

## Study Sample

The studied students were 250 college of physical education and sport science / university of Baghdad was receiving tennis courses in the academic years (2024-2025) aged between 18 to 22 years. Twenty-four people who match the criteria (regularly attending tennis training, playing a match according to rules; less than 20% of absences from training) were purposefully selected if: No history of upper-limb injuries Novice level proficiency at tennis (no experience in even playing backhand stroke before), Not being

influenced by sports circles and sports national teams. Participants were not included in the study if they had erratic attendance, previous injuries or high experience to make them homogenic and minimize confounding factors. The sample was equally divided into an experimental (n=12) and a control group (n=12) through matched pairing according to the initial pre-test scores. In order to control for equivalence between the groups, independent t-tests were run on the variables at baseline, and showed no significant differences ( $p > 0.05$ ). table 1 presents the equivalence data.

**Table 1. show the equivalence between experimental and control group**

Variable	Experimental Group (M ± SD)	Control Group (M ± SD)	t-value	p-value
Age (years)	19.83 ± 1.47	19.08 ± 1.38	-0.42	0.678
Height (cm)	175.42 ± 5.61	174.75 ± 6.02	0.28	0.782
Weight (kg)	72.50 ± 8.14	71.92 ± 7.89	0.18	0.859
Backhand Accuracy (%)	64.17 ± 4.32	65.00 ± 4.58	-0.47	0.643
Backhand Speed (m/s)	18.08 ± 1.24	18.25 ± 1.36	-0.32	0.752
Vibration Level (G-force)	2.58 ± 0.45	2.50 ± 0.42	0.45	0.657

**\*: non-significant at  $p > 0.05$**

### Data Collection

Three main dependent variables were analyzed to quantify the backhand stroke performance: (1) accuracy, expressed as % of successful strokes into a specific target area on the court; (2) speed, in m/s using racket impact sensor data and (3) vibration level in G-force for estimation of biomechanical stress and injury risk potential. These variables were chosen for their importance in tennis biomechanics and due to literature highlighting them as playing a role in stroke efficiency (Genevois et al., 2014). Measurement was based on wearable sensor technology (e.g., Zepp Tennis or Armbeep) combined with inertial measurement units (IMUs) for the real-time assessment and complemented by a VICON motion capture system. The independent variables were training method (wearable technology or traditional) and time point (pre- vs. post-rehabilitation). Demographic

variables, such as age, height and weight were recorded in order to secure sample homogeneity also.

## Procedures

The experiment began with a pre-test, which was to determine the baseline of the performances of both groups. The pre-test included a standardised backhand stroke assessment, where players performed 20 backhand groundstrokes from the baseline towards a target area on the other side of the court (3m x 3m) with data collected using body-worn sensors and VICON cameras. The protocol was based on previously established tennis performance assessments for accuracy, speed and vibration (Genevois et al., 2014).

After the pre-test an educational intervention was held. The control group engaged in traditional training, consisting of coach-led exercises with verbal feedback and visual demonstrations focusing on backhand technique basics - grip, stance, swing path and follow through. The experimental group performed the same fundamental drills enhanced by feedback from wearable technology, however. Sensors were attached to either the handle of the racket or wrist, and immediate audio or visual feedback was received on a paired mobile application (e.g., alerts for improper racket angle or excessive amount of vibration). Training transitioned from simple stroke isolation to combined rally simulations, with personalized feedback on errors (e.g., modifying the rotation of the trunk to decrease vibrations 20–30% each session). The additional exercise program for the experimental group that was implemented over the 8-week intervention period is given in Table 2.

**Table 2. Show the 8-week intervention for the experimental group**

Week	Session Focus	Exercises (with Wearable Feedback Integration)	Duration	Repetitions/Sets
1-2	Basic Technique Building	1. Shadow swings: Practice backhand motion without ball, feedback on racket angle (target: 45-60°). 2. Wall hits: Controlled strokes against a wall, monitoring vibration (<2.0 G-force). 3. Feed drills: Coach-fed balls, real-time speed alerts (>18 m/s goal).	90 min	3 sets of 20 reps each
3-4	Accuracy Enhancement	1. Target zone drills: Aim at court markers, feedback on accuracy percentage (aim:	90 min	4 sets of 15 reps each

		>70%). 2. Cross-court backhands: Emphasize topspin, sensor alerts for low vibration. 3. multi-direction feeds: Simulate game movement, tracking speed consistency.		
<b>5-6</b>	Speed and Power Development	1. Resistance band swings: Build power with bands, feedback on peak speed. 2. Rally simulations: Partner rallies, real-time vibration reduction cues. 3. High-intensity intervals: Alternate fast/slow strokes, monitoring overall metrics.	90 min	3 sets of 25 reps each
<b>7-8</b>	Integration and Game Application	1. Match-play drills: Mini-games, full feedback on all variables. 2. Error correction circuits: Focused on common faults, adaptive alerts. 3. Cool-down analysis: Review session data for personalized adjustments.	90 min	4 sets of 20 reps each

After the intervention, the post-test was conducted on-line with the same procedure of pre-test to assess variation in accuracy, reaction time, and vibration. All lessons were conducted by tennis certified instructors and data were remotely synchronized and stored securely for analysis.

## Statistical Analysis

Data analysis was performed using SPSS software (Version 27.0). Descriptive statistics, including means and standard deviations, were calculated for all variables. To assess group equivalence at baseline, independent t-tests were employed. Paired t-tests evaluated within-group changes from pre- to post-test, while independent t-tests compared between-group differences in post-test outcomes. Analysis of variance (ANOVA) was used to examine interaction effects between training method and time. Effect sizes were reported using Cohen's d, with significance set at  $p < 0.05$ .

## Result

**Table 3. Descriptive Statistics and Within-Group Changes**

Variable	Group	Pre-Test (M ± SD)	Post-Test (M ± SD)	t-value (Paired)	p-value	Cohen's d
Backhand Accuracy (%)	Experimental	64.17 ± 4.32	88.25 ± 3.91	-16.85	0.000	2.76
	Control	65.00 ± 4.58	72.08 ± 4.76	-5.12	0.000	1.51
Backhand Speed (m/s)	Experimental	18.08 ± 1.24	22.33 ± 1.15	-10.22	0.000	2.48
	Control	18.25 ± 1.36	19.50 ± 1.42	-3.45	0.005	0.90
Vibration Level (G-force)	Experimental	2.58 ± 0.45	1.80 ± 0.39	8.92	0.001	1.85
	Control	2.50 ± 0.42	2.30 ± 0.40	2.98	0.012	0.48

\*: significant at  $p \leq 0.05$

**Table 4. Between-Group Comparisons (Post-Test)**

Variable	Experimental (M ± SD)	Control (M ± SD)	t-value (Independent)	p-value	Cohen's d
Backhand Accuracy (%)	88.25 ± 3.91	72.08 ± 4.76	9.07	0.000	2.62
Backhand Speed (m/s)	22.33 ± 1.15	19.50 ± 1.42	5.52	0.000	2.14
Vibration Level (G-force)	1.80 ± 0.39	2.30 ± 0.40	-3.21	0.004	1.26

\*: significant at  $p \leq 0.05$

**Table 5. ANOVA Results for Interaction Effects**

Variable	Source	F-value	p-value	Partial $\eta^2$
<b>Backhand Accuracy (%)</b>	Training Method $\times$ Time	24.65	0.000	0.53
<b>Backhand Speed (m/s)</b>	Training Method $\times$ Time	18.92	0.000	0.46
<b>Vibration Level (G-force)</b>	Training Method $\times$ Time	12.47	0.002	0.36

## Discussion

This study's results highlight the possible benefit of wearing technology in tennis training to improve play (i.e. backhand performance) in immature, novice university level players. The findings of the improved stroke accuracy in the experimental group are also consistent with research, which suggests that immediate feedback from wearables allow users to better adjust their motoric patterns and enable students to improve upon their stroke technique, by receiving actual biomechanical readings in real-time support. This may be a factor in the sense of kinematic statures, e.g., preferred racket orientation and best point-in-time to make contact-the foundation for successful stroke responses regarding other-moving rackets during game play in racket sports. The apparent increase in stroke rate with higher forces is arguably to be interpreted as a sensor-mediated response towards strengthening (or even compensating) quantitatively more positive force application and timing patterns, which are assumed to become more strong conditioned through gradual adjustments of muscle effectiveness, coordination [9] from recurrent feed forward adaptations over the course of training that made them so. Furthermore, reduction of the vibration exposure is an indication for a preventive effect of repetitive-strain injuries since the technology offers to detect and limit excessive transmitted forces on upper limbs during collision. Collectively, these findings add to the evidence that wearables are a potent complement to traditional coaching and offer accelerated skill acquisition coupled with safe practice environments in teaching.

A comparison with existing literature underlines the validity of these findings that demonstrate the ability of wearable technology to elevate sports performance indicators. For example, systematic reviews have shown that IBT into training protocols for tennis can substantially improve indicators of technical proficiency based on quantitative data relating to movement dynamics which correspond to the improvement in performance observed in this study (Sampaio et al., 2024). These devices, many using machine learning algorithms to recognize strokes, are shown to improve feedback loops with better performances in skill-specific tasks such as groundstrokes. Likewise, investigation of elite tennis players has shown that the use of wearable-micro-Electro-Mechanical Systems (MEMS) can lead to real-time sports-specific movement identification and training strategy adaptation optimising either precision or limb velocity, and conversely minimise biomechanical stress

(Wu et al., 2023). The present line of reasoning is in line with the focus on backhand stroke in this study, with sensor-generated feedback being one part explaining differential improvements between groups. In addition, studies of pressure-sensitive technology in tennis have merit for assessing performance parameters so that flexible piezoresistive sensors can identify subtle differences in stroke mechanics to encourage correction (Zhang et al., 2024). Physiological and psychological cues on wearables for monitoring also imply a holistic improvement plan (Wang, 2025) as indicated in conditions with stress and fatigue have influence on technical performance. These match-ups suggest favorable results not only for certain measurements but overall power and athletic development related to racket sports.

These significant effects of interaction, method  $\times$  time add to the understanding of what effect wearable technology may have in transforming sports training and sporting performance particularly in resource poor settings such as Iraqi Universities. As a data driven customisable mod field technique the use of these tools could be utilised to help disperse any problems associated with traditional coaching methods i.e. biased coach analysis or subjective reporting that may disregard the slightest biomechanical deformity. This is consistent with findings derived from proof-of-concept wearable systems developed specifically for monitoring tennis, which required sensor fusion to be able to assess every performance metric under simulative dynamic game conditions (Bortolotti et al., 2023). Also, the rise of service in wearable apps has been discovered with regard to sports during similar pandemic times like COVID-19 that actually coincide learning continuity will execute as a development scorer for keeping training in existence when remote and/or self-guided is demanded which could whether have contributed that moreover performance gains detected with EG was noticed (Pekas et al., 2023). Lastly, the possibility of assessing vibration and associated loads by means their technology also has potential to be part of other injury prevention strategies since this biomechanical analysis from wearables has been previously related to prospective attitudes in which overload should be reduced in high-impact sport activities (Rebelo et al., 2023). Finally, being able to measure vibration and associated loads by the technology also has relation with other injury prevention strategies because this biomechanical analysis through wearables has already been related to proactive actions of reducing overload in high-impact activities (Rebelo et al., 2023). All this research also indicates that adding such novelties to the training mix not only enhances athletes' immediate performance, but it might in fact help to train them, by making certain parts of the body stronger and more adaptable.

Despite these encouraging consequences, there are some caveats you may want to keep in mind for the interpretation of the results. The small sample size from a single institution may not be generalized to other populations, such as professional athletes or those of different cultural backgrounds. Also, given the brief duration of the intervention (sufficient to detect changes but not necessarily longer-term effects or adaptations over

time). Other possible confounders in the results, such as motivation of individual participants or previous experience with technology would also contribute to these results, and although baseline equivalence was achieved. Follow-up should be addressed with longitudinal designs to evaluate the maintenance of skills and multicenter, larger cohorts need to be added for generalization purposes. Alternatively, modern analytics like artificial-intelligence-based predictions seem also likely to enhance feedback mechanisms beyond the contemporary routine evaluations of machine-learning applications in tennis optimization (Sampaio et al., 2024). If psychological factors had been included in this study, as recommended by the authors of recent wearable tech-informed monitoring of stress (Wang, 2025), we would have obtained a much fuller picture of holistic enhancing and performance.

our study reveals a significant role of wearable technology to tennis training revolution and empirically suggests its introduction in the physical education curricular. Through the strategic upgrades of key stroke components, such technologies promise to boost sports education in Developing Countries and thus contribute to safer and more efficient athlete development.

## Conclusions

The present study has provided compelling evidence that wearable technology in the form of tennis training demonstrates an increased improvement of the backhand stroke performance among PESS students during their stay at University of Baghdad. Those monitoring the wearers of real-time biomechanical feedback provided to experimental group, which was effective in improving stroke accuracy/speed and vibration intensity compared with traditional control. These results can emphasize the potential of wearable devices in improvement of motor pattern learning, optimization kinematic profile and reduction mechanical stress (and as a collateral injury prevention). Wearable technology closes the distance between theoretical instruction and practical execution by providing instant, data-rich feedback while allowing for a more efficient & safer learning experience. This study has demonstrated that technology-led interventions have the capacity to call into question and transform sports education, especially in resource-deprived academic institutions such as Iraqi universities where traditional methods of coaching may lead to a lack of attention on intricate aspects of the skill learning process.

## Recommendations

In light of the reported advantages of wearable technology, Iraqi universities, such as the College of Physical Education and Sports Science in Baghdad University can implement sensor-based training devices into their tennis programs to assist in skill acquisition and safety. Long-term studies should be implemented to address continued

effectiveness over time (performance retention and injury prevention) beyond the immediate benefits of the interventions. Moreover, creating localized Arabic smart wearable applications supports enhancing accessibility for the students and coaches (i.e. overcoming possible language barriers) to access and use. Also to be instituted are training courses for instructors in interpretation and use of sensor data. Last but not least, cooperation with regional sports associations may catalyze the adoption of cost-effective wearable technologies to make advance training methodologies equally available in various Iraqi sports education centers.



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## The effect of plyometric exercises with a proposed device on the development of reaction speed and defensive movement in basketball players under the age of 18

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2085](https://doi.org/10.37359/JOPE.V37(4)2025.2085)

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**Article history:** Received 15/ April/2024 Accepted 27/ May/2025 Available online 28/ December/2025

### Abstract

The purpose of this study was the construction of plyometric exercises with a proposed device to improve the reaction speed and defensive motion in younger than 18 basketball players. Design The authors used experimental method in study and had equal control-experimental group (pretest-posttest). The sample of the study consisted young individuals in (Al-Nu'maniya Sports Club under 18 years). The pre and post-test results were compiled, analysed and discussed using the data processing techniques. The authors determined that the plyometric exercises in conjunction with the device in question improve reaction speed and defensive movements in subjects under 18 from volleyball players. They also suggested some things like use of the research's plyometric exercises, increase in the reaction speed and defensive movements for youth players. They also stressed the necessity of using recent training devices to improve physical fitness characteristics and defensive skills in young basketball players with age less than 18 years.

**Keywords:** plyometric exercises, reaction speed, defensive movement, basketball.

### Introduction

plyometric exercises have shown a significant impact on developing response speed and defensive movement for basketball players under 18 years of age. Research has shown

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that in-season rebound training within basketball practice can lead to improvements in explosive movements and jumping ability. In addition, it has been shown that combined balanced training with rebound exercises can enhance athletic performance, including accelerating response time in defensive movements during an opponent's attack.

This is what she emphasized by saying that rebound training programs, whether with or without adding additional load, can contribute

to developing the jumping ability of basketball players. This suggests a dose-response effect of rebound training on vertical jump performance. Furthermore, the use of the proposed device in rebounding exercises may provide additional benefits in enhancing explosive movements and defensive movement of basketball players.

The importance of incorporating rebound exercises with Fitlights into basketball training for players under the age of 18 is that they are not only limited to improving response speed and defensive movement, but can also contribute to overall athletic performance and injury prevention. This is what was emphasized by (Canlı U., 2020) that basketball coaches working, especially with young basketball players and teenagers in youth leagues, should apply muscle jumping exercises for the lower and upper extremities regularly throughout the playing season to obtain maximum strength. The point is that coaches design group exercise programs to further improve athletes according to variables such as strength and skill. It should also not be forgotten that sustainable muscle training programs appropriate to the level of development of athletes will help avoid injuries. By targeting explosive movements and agility through rebound training, young basketball players can enhance their abilities on the court and potentially reduce their risk of injury.

Although the effectiveness of rebound exercises in developing response speed and defensive movement is supported by research, potential debates may arise regarding the optimal training program and specific design of the proposed device. (Aff & Errete, 2015) stated that it is necessary to take into account individual differences in players' response to rebound training and the potential risks associated with high-impact exercises, especially for young athletes.

(Saeed, W., Abdulaa, A., & Sakran, 2023) mentions that special exercises similar to skill performance have an impact on developing skills, so it is necessary to make the devices similar to the skills and be similar to the playing conditions, and this is what the researchers did when making the device and determining Exercises that are similar to randomness and movement of the opponent during the attack.

One of the most relevant studies to this research was conducted by Mohameed & Alaany (2021), who were interested in examining methods for improving motor response speed among advanced basketball players, through specialized exercises using the

modified (XTRA-MAN) device. The results verified that the exercises performed with the Modified Young apparatus were efficient.

In summary, rebound exercises in combination with the Fitlights device could effectively improve response speed and defensive movement of young basketball players. The research results support the potential benefits associated with inclusion of RT in basketball practice for increasing athletic performance and reducing injury. However, special training programs should also be considered into account and precautions should be taken to improve the impact of rebound exercise in young basketball players.

### Methodology

The problem is the fundamentals of the guidelines used for choosing methods to reach findings by researchers. Al-Kazemi (2012) points out, phenomena can be explored from a methodological frame suited to the nature of the research problem. To this the researchers resorted to the experimental method, constituting two equivalent groups of subjects suitable for research problem.

Since “the selection of the sample is closely linked to the nature of the community from which it is taken and the nature of the research problem, because it is the model of the community in which the researcher conducts his work” (Al-Khafaji, 2014, p. 130). In the intentional method, the research sample was chosen by Al-Numaniyah Sports Club players to implement the experiment related to the subject of the study. The sample included (12) players. They were chosen because of the regularity of the players in training, the availability of the field, the proximity of the training center, and the ease of access to it by the researcher. Then the researcher divided the sample randomly by lottery into two groups: control (6) players and experimental (6) players. The percentage of the sample in relation to the research population was ( 20%).

**Table 1. shows the research population, sample, and percentage**

	Club name	Number of Players
1	Al Numaniyah Club	12
2	Al-Kout Club	12
3	Al-Ahrar Club	12
4	Al-Mowfaqia Club	12
5	District Club	12
	<b>Total</b>	60
	<b>Percentage</b>	% 20

The researcher also standardized the research variables of age, training age, height and body mass and resorted to accurate statistical methods as may be observed over Table (2).

**Table 2. It shows the homogeneity of the sample in variables (age, training age, height, body mass)**

variables	measuring unit	Arithmetic mean	deviation Standard	Torsion coefficient
height	cm	180.13	1.26	0.194
Mass(weight)	kg	70.56	1.46	0.153
Chronological age	year	17.06	0.85	0.13
Training age	year	2.75	0.78	0.49

### Devices and tools

- 6 legal basketballs.
- Basket goals.
- 2 Japanese-made electronic stopwatch.
- Japanese-made electronic medical scale.
- Measuring tape.
- Japanese-made Sony manual camera.
- A Chinese-made HP laptop computer.
- Fox type whistle.
- Signs, 50 cm high, 10 in number.
- Balance ball (1).
- 4 plastic columns, 1.50 m high.
- Various rubber ropes.
- Designed device (Fitlights)

### fitlights device

The idea of modifying the device was discussed by the researcher, supervisor, and engineer, as they were based on previous devices that had been used in games and events. As a result, the researcher developed a clear picture of the nature of the device he wished to modify, and the idea was built on scientific and economic foundations, taking into account the availability of an appropriate sample. This idea was initially tested using a computer program and theoretically.

The device was designed by the researcher as an educational and training device that aims to develop the speed of motor response and all the skills that need to make a quick decision in movement. This is what the researcher noticed in most players, which is the lack of making a quick decision during the match, such as in offensive or defensive actions, using audio-visual stimuli in the game. A variety of sports games and events, including basketball. The device can be used by all athletic levels, and is also suitable for open skills

that require quick motor response in an open environment. The device helps the player to anticipate and predict quickly before the stimulus appears, which contributes to the development of his mental abilities and thus enhances the speed of motor response.

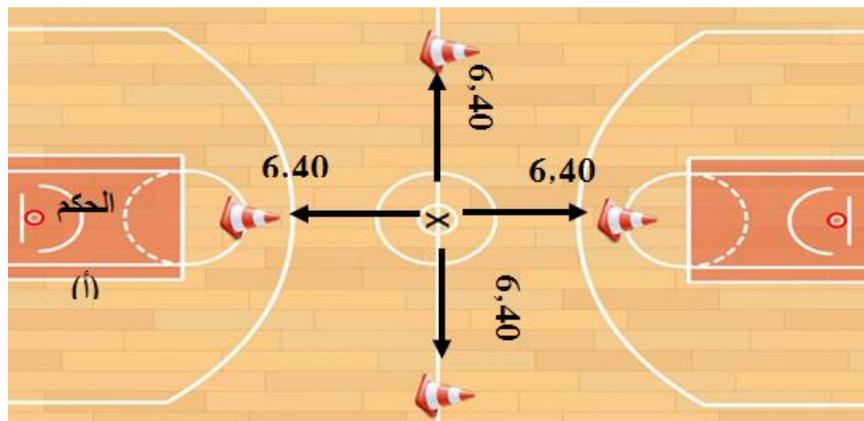
- How the fitlights device works

The main program for the device's operation was designed to operate at different times, and special exercises were prepared using rubber ropes compatible with the device's operation on the field, with the aim of developing the speed of motor response and defensive movement chosen by the researcher in coordination with the supervisor. Discs are distributed on the field according to specific exercises, and the player moves to the effect that is on and touches it before it turns off.

#### Tests used

- Motor response speed test (Nelson) to multiple directions: (Ibrahim and Bariqa, 1995, p. 198)
- The aim of the test: to measure the motor response time according to the choice of the stimulus in four directions.
- **Tools:** flat space free of obstacles, stopwatch, measuring tape, masking tape.
- **Procedures:** The test area is planned as in Figure (3), and the distance between point (x) and the four lines is 6.40 m.
- **Test description**
  - The tester stands at point (x) and focuses his gaze on the raised hand of the referee who stands at point (a).
  - The referee gives the signal (Get ready) to the tester.
  - The referee holds the stopwatch in one hand and raises it high, then quickly moves his arm either to the right, left, forward, or backward, and at the same time starts the watch.
- The tester responds to the referee's signal and tries to cover the distance as quickly as possible in the specified direction. When he reaches the finish line, the referee stops the stopwatch.
- The tester is given (8) attempts divided into four directions, between one attempt and the next (20 seconds).
  - Attempts are determined randomly and by drawing papers.
- **the conditions**
  - The tester does not know that he is required to have eight attempts distributed equally in the four directions.
  - The referee must practice the start signal, give the arm signal, and run the clock at the same time.

- The test begins with giving a signal (I am getting ready... I am starting) and the time period between the two words ranges from (1.5-2) seconds.
- **Register**
  - Calculates the time for each attempt.
- The lab score is the average of the eight attempts.



**Figure 3.** Nelson's motor response speed test shows multiple directions

- (Defensive Move) Test: (Hussein, 2012, page 82)  
 Purpose of the test: to measure the speed of the defensive player's movement performance.  
 Tools used: adhesive tape, leather measuring tape (20 m), markers (4), electronic stopwatch, whistle, or pen, and pens for recording.

#### **Test procedures (see Figure 4).**

Four signs distributed as follows:

Sign No. (1) lies in the middle of the throat on earth. Signs (3) &(4) are placed 90 cm from the sideline and 8.325 m above the baseline. Sign No. (2) is placed in the middle of central circle as shown in the figure.

#### **Performance description**

The defender takes up position behind Marker No. (1). At the sound of the starting signal by whistle, player runs up to second mark or Marker No. (2) and touches with right arm. The player makes his way down to Marker No. (3) and goes through the same routine by touching the mark with the right arm. The player then performs a quarter rotation towards the middle returning to the first marker, and does the sequence again on their left side.

#### **Test conditions**

- Execute test steps quickly.

- Bend the knees when performing the defensive player's movement, while raising the arms to no less than 90 degrees between the upper arm and the torso.

-Just one try.

Test administration: Timer: giving start and end signals via the whistle with timing.

Recorder: Calls the rolls and notes the performance while recording the testing time.

Calculating the score: The player records the time he takes to perform the test in its six steps, based on the start and end whistle.

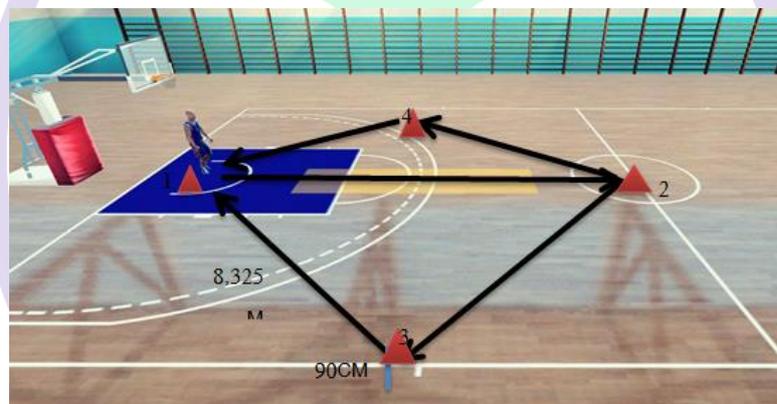
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**Figure 4.** *shows the defensive move test*

### Main experience

After the researcher completed the pre-tests for the two groups, he began implementing the vocabulary of the main section that had been prepared by the researcher, preparing rebound exercises using the fitlights device and rubber ropes and the extent of their effect on the speed of motor response and defensive movement for basketball players under (18) years of age, and using them. With the experimental group of (6) players in order to develop their defensive performance. The control group will use the normal curriculum prepared by the trainer.

### Results

**Table 3.** It shows the mean, deviation, difference of means, deviation difference, standard error of the differences, the calculated T value, and the significance value of the pre- and post-tests for the post-tests of motor response speed and defensive movement for the experimental research group

variables	Test	s <sup>-</sup>	± A	F <sup>-</sup>	± A F	Value T	Indicative value	Development rate
Speed of motor response	Tribal	2.590	0.174	0.608	0.209	7.119	0.001	23.51
	Post	1.981	0.066					
Defensive move	Tribal	21.738	0.960	3.658	0.838	10.693	0.000	16.82
	Post	18.080	0.647					

**Table 4.** It shows the mean, deviation, difference of means, deviation difference, standard error of the differences, the calculated T value, and the significance value of the pre- and post-tests for the tests of speed of motor response and defensive movement for the control research group.

variables	Test	s <sup>-</sup>	± A	F <sup>-</sup>	± A F	Value T	Indicative value	Development rate
Speed of motor response	Tribal	2.568	0.206	0.023	0.217	0.263	0.803	2.89
	Post	2.545	0.091					
Defensive move	Tribal	22.531	1.329	0.633	1.772	0.875	0.421	2.80
	Post	21.898	1.145					

**Table 5.** It shows the arithmetic means, standard deviations, the calculated (T) value, and the result of the differences between the experimental and control groups in the speed of motor response and defensive movement

variables	measuring unit	Experimental group		Control group		T value	Error level	indicative
		s <sup>-</sup>	±A	s <sup>-</sup>	± A			
Speed of motor response	second	1.981	0.066	2.545	0.091	-12.232	0.000	D
Defensive move	second	18.08	0.647	21.898	1.145	-7.108	0.000	D

## Discussion

All differences between pre and post obtained from the results in tables 1-2 were found to be different for both testing groups (experimental and control) relatively the speed of motor response and defense movement. Moreover, between post-tests of the groups also have differences, in which experimental groups gain a better outcome. The researchers say the experimental group's superior performance can be attributed to their practice in speed of movement response and defensive reaction training through rebound exercises (by using training devices and implements with progressive increase from easiness to difficulty as per the successive units of trainings). This tactical decision was taken to increase the construct validity of this research.

The increasing of the motor response speed this way has proved to be very successful over relatively prolonged periods, for a certain type of training – the improvement of the skill involved in defense movement style was missing from his teaching method. "the motor skills are so important because they actually are providing the skill and movement of the nature and demands of the performance" (Singer 1997, p. 221). In addition, the program has been comprehensive in contents of its training programme; well-timed session periods; matched with specific Football methodologies and exercise progressions have promoted Players' physical, skill- and tactical development. ing (specific for the sample skill level and duration time). This based on Abass, Karrar and Abd Alsatar(2023) study.

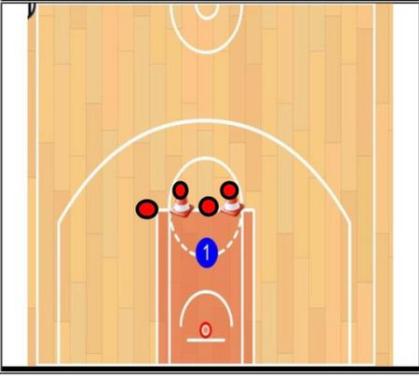
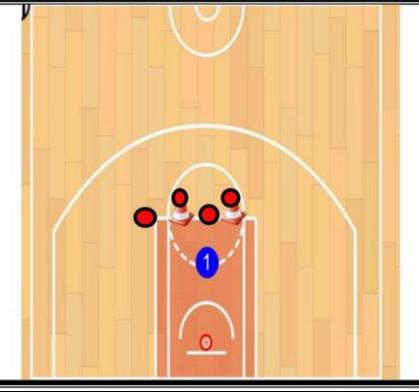
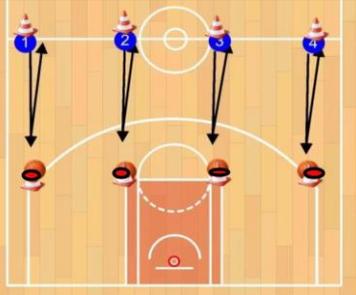
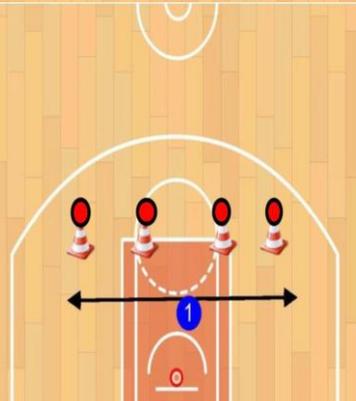
Special exercises using training tools and accessories, such as ball throwing games or a neurobixball have been successful in improving physical skills related to gaming. Confirming this, Mohammed & Ali (2020), Mohameed & Alaany (2021), Santos & Janeira (2012) and Domeika et al. (2020) have validated that the use of specific exercises with equipment and instruments can exercise a positive influence on the acquisition of physical abilities and skillexecution.

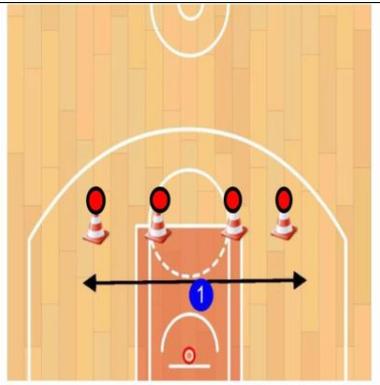
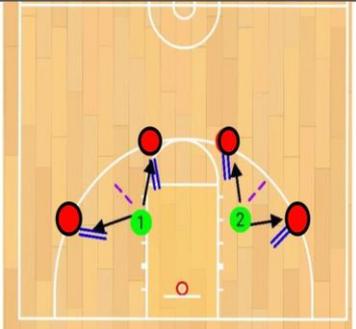
## Conclusions

According to the results obtained from this sample group, it was concluded that rebound training on rubber ropes together with Fitlights system application, which were applied to the members of the control group, were effective and meaningful in developing speed of motor response and speed of defensive movement for young basketball players.

## Appendices

### Appendix (1) Exercises used in the research

	<p style="text-align: center;"><b>(1) practice</b></p> <p>One player performs the exercise. Two visual effects are distributed on the ground and two are distributed on the signs, as shown in the figure. Each effect is 50 cm away from the other. The player stands facing the effect, and from the movement, the player touches the effect on the person with his hand and touches the effect on the ground with his foot. Using a time of 1 .second, the player stands on a balance ball</p>
	<p style="text-align: center;"><b>(2) practice</b></p> <p>The same exercise as the previous one, but without the balance ball. The player wears the rubber rope that connects the feet. The player is at a distance of 2 meters from the device and quickly launches towards the effect that lights .up</p>
	<p style="text-align: center;"><b>(3) practice</b></p> <p>4players stand facing the signs that carry the visual effects, and each of them wears the elastic cord that connects the feet. The player is 4 meters away from the device and quickly runs towards the effect that lights up. The 0.5 second system is used in this exercise.</p>
	<p style="text-align: center;"><b>(4) practice</b></p> <p>One player performs the exercise, and 4 effects are placed in a straight line          The distance between the effects is 1.5 metres.          The player performs the exercise by starting, assisting and covering in defense, and turning off the light coming from the effect without knowing which effect will light up, according to the time allotted for the exercise while wearing a rubber rope jacket. The 2-second program is used in this exercise.</p>

	<p style="text-align: center;"><b>(5) practice</b></p> <p>The same exercise as the previous one, but using the 1-second system.</p>
	<p style="text-align: center;"><b>(6) practice</b></p> <p>The exercise is carried out by 2 players, and 2 effects are placed on the three-point arc and as shown in the figure. The player moves quickly towards the effect that lights up and returns to the starting point, according to the time allotted for the exercise.</p>

**Appendix (2)**

.(1) : Training unit number				Week and month: first_first		
minutes34.92Exercise time:				Day and Date 11/1/2023		
Location: Martyr Muhammad Naji Al-Numani Hall						
Exercise number	intensity	Exercise number	intensity	Exercise number	intensity	Exercise number
1	%85	4	2	m 2-1	m 3_2	m5.82
2	%85	4	2	m 2-1	m 3_2	m5.82
3	%85	4	2	m 2-1	m 3_2	m5.82
4	%85	4	2	m 2-1	m 3_2	m5.82
5	%85	4	2	m 2-1	m 3_2	m5.82
6	%85	4	2	m 2-1	m 3_2	m5.82

.(1) : Training unit number				Week and month: first_first		
minutes34.9Exercise time:				Day and Date 11/1/2023		
Location: Martyr Muhammad Najji Al-Numani Hall						
Exercise number	intensity	Duplicates	groups	Comfort between groups	Rest between exercises	Total performance time
1	%85	4	2	m 2-1	m 3_2	m5.82
2	%85	4	2	m 2-1	m 3_2	m5.82
3	%85	4	2	m 2-1	m 3_2	m5.82
4	%85	4	2	m 2-1	m 3_2	m5.82
5	%85	4	2	m 2-1	m 3_2	m5.82
6	%85	4	2	m 2-1	m 3_2	m5.82



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## The effect of special exercises on selective attention for the performance of the "clinch" skill in wrestlers under 16 years of age

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2369](https://doi.org/10.37359/JOPE.V37(4)2025.2369)

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**Article history:** Received 14/ October/2025 Accepted 30/ November/2025 Available online 28/ December/2025

### Abstract

Drawing on his field experiences and a professional appreciation of wrestling, the researcher recorded that the athletes did not compete well. He thought that was because of their attention being distracted into the many variables a game pose. Thus, the researcher planned to formulate some exercises in order to enhance innate traits of the mind such as selective attention (one of important types of cognitive process) and skill performance in wrestler. It was aimed to develop these exercises and investigate their influence on selective attention and lifting skill performance in wrestlers younger than 16 years for this study. It was hypothesized that substantial disparities would exist between the post-tests of selective attention and lifting skill performance in the experimental and control groups. The researcher employed a two-equivalent groups design, consisting of an experimental group and a control group, for both pre-test and post-test assessments. Fourteen under 16-year-old wrestlers were studied. Pilorz tested selective attention and a lifting skill in a wrestling game with their participants. Following the main study and data analysis, the researcher concluded that his exercises were useful in increasing selective attention and wrestling performance. It works for either selective attention and skill of the wrestler.

**Keywords:** special exercises, attention, performance, clinch, wrestlers.

### Introduction

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Wrestling is challenging because it is filled with an overwhelming speed and resistance and attention. Attention is always shifting during competitive play due to changing conditions and variables. It is conceivable that fatigue or any other pressure related reason might reduce a wrestler's focus. Hence, selective attention, regrouping the ability to select the right stimulus or cue among a set of competing ones. By this, such attention can be considered as the capacity to ignore sensory information and selectively concentrate on those that could better inform of the competitive situation. The significance of this study is that exercises can be selected to develop the wrestler technical, physical and psychological capability. Youth wrestling is all about being able to adjust to new conditions in finding those technical grips that allow competitors to hit the high level and cause opponents' problems, in route to winning (Abdul Zahraa & Farhan, 2022 ; Curby, Ali & Khudair, 2024).

The problem for this research grew out of the investigator's observations in the field and watching wrestling. He said the performance of the wrestlers was below average. The researcher thought that one explanation for this distraction is the presence of many variables during the game. Consequently, we designed specific exercises to train these cognitive factors such as selective attention (one of the most important cognitive functions) and wrestler skill performance. The study focused on the development of specific exercises and their impact on selective attention and lifting skills in wrestlers aged 16 and under. It was hypothesized that there would be statistically significant differences between the pre-tests and post-tests for the experimental and control groups in selective attention and the level of lifting skill performance (Amer Abdhussain, el 2025 ; Hassan & Abdulkareem, 2026).

Additionally, the post-tests for selective attention and lifting skill performance would show substantial differences between the control and experimental groups. Hazem Abdul Karim's study was one of several in this field; he sought to quantify the extent to which college students use visual selective attention and to analyze any statistical differences in this area according to factors like gender, area of concentration, and severity of cognitive impairment. There was a negative correlation between visual selective attention and cognitive failures, according to the results of this study, which focused on undergraduates. Linda Mahmoud Al-Jumaili also conducted studies to demonstrate how various intensities of dummy machine exercises affected certain snatch over-the-chest holds performed by junior wrestlers. The most important finding was that dummy machine training at varying intensities influences the development of certain over-the-chest throwing (snatch) grips (Aslan, Aksoy & İmamoğlu, 2020 ; Hassan, & Abdulkareem, 2025).

## Methodology

The location for the trial The trial was held in the Al-Kadhimiya Sports Club for wrestling. The researcher utilized an experimental design comprising two groups (experimental and control), incorporating pre- and post-tests, with a sample of 14 wrestlers aged under 16. Participants were randomly allocated to two groups via a lottery: experimental and control, each including seven players. Prior to commencing the principal line, an equivalence evaluation of the research variables (i.e., selective motor attention and the carrying skill) was performed.

To do that a number of methods, devices and means were involved: performance rating form, internet-sources, observation and experimentation and the Rehacom cognitive system for estimation of selective attention level as well as computer testing facilities, video camera-recorder and wrestling mat. The experimenter completed a pool of exercises tailored to increasing level of wrestling skills and the players' selective attention, based on theory before the intervention was conducted.

**Table 1.** *The pre-test outcomes present the arithmetic means, standard deviations, and computed t-value for the research variables*

Variables	Unit of Measurement	Experiment Group		Control Group		Calculated t-value	Error Level	Significance
		M	SD	M	SD			
Selective Attention	Score	53.571	1.902	53.142	1.573	0.459	0.654	Random
Porter Skill	Score	7.571	0.534	7.285	0.487	1.044	0.317	Random

Significant < (0.05) at 12 degrees of freedom

## Tests Used in the Research

### 1- Selective Attention Test

- **Test Objective:** The ability to regulate behavioral impulses in the face of competing stimuli and to respond correctly under time constraints is a measure of selective attention. To maintain internal control over one's conduct, it is crucial to either avoid or moderate the reaction that an external stimulus could induce.
- **Equipment and Assistance:** RehaCom Cognitive System, specializing in laboratory psychometric testing.
- **Test Description and Procedures:** The ability to selectively respond to stimuli (either by reacting to them or by doing nothing) is the measure of selective attention in this exam. At irregular intervals, a focal point appears in the screen's center. On the screen, you can see stimuli that have lines running horizontally or vertically. The examinee is required to swiftly hit the (OK) button whenever a stimulus containing horizontal lines is displayed. Vertical lines must not elicit an emotional response from them. This test-taker is required to:
  - Look at the in the middle of the screen center point.
  - Press the (OK) button as quickly as possible when a stimulus with horizontal lines is displayed.
- **Test Duration:** (2) minutes, excluding the practice phase.
- **Data Analysis and Recording:** Two types of angular metrics are calculated:
  - An angular metric for the (reaction speed) variable: by calculating all average reaction times for the relevant stimuli.
  - The angular metric for the reaction control variable is determined by calculating the number of reactions to unrelated stimuli.
- **Maximum test score:** (100) and hypothetical mean: (50).
- **Unit of measurement:** score.

### 2- Porter skill test in wrestling

The ability test of the porter was held through an assessment of skill performance level (10 points). The performance was judged by three wrestling specialists, and average score was determined.

Two pilot studies were conducted by the researcher with a sample of 2 wrestlers who did not participate in the main samples. The first proof-of-principle pilot study of training units and exercises was (date). The second pilot experiment (skills & selective attention test) was carried out on (date). The research sample, comprising both experimental and control groups, underwent pretesting with the research variables at Al-Kadhimiya Sports Club on (date) at (time). The testing conditions were controlled for time and location, and the tests were recorded for expert review and evaluation. The specific exercises were implemented with the experimental group over one month, with three training units per week for each research group, from (date) to (date). Each of these steps produced a set of (12) training units, all consisting of duration (90) minutes. The particular exercises were conducted at the middle of the training unit, supervised by the researcher and assisted by the support team. There were two parts to the training: practical and educational.

1. The preliminary segment lasted 20 minutes and encompassed organizing tasks and warm-up exercises.
2. The primary segment: The main section lasted 65 minutes and included the following activities:
  - The educational aspect: This phase lasted 15 minutes and involved the coach explaining and demonstrating the specialized grips for each player.
  - The practical aspect: This lasted 50 minutes and involved the players applying the grips according to the exercises they had prepared.
3. The concluding section: This lasted 5 minutes and included some cool-down exercises, educational instructions, and dismissal.

After completing The post-test was delivered to the research sample about the research variables under the direct supervision of the researcher on (date). The researcher guaranteed that the post-tests were administered under identical conditions to the pretests regarding the support team, duration, location, instruments, and scoring methodology, as

well as by the same evaluation committee. The subsequent statistical techniques were employed to analyze the data:

- Arithmetic mean.
- Standard deviation.
- T-test for dependent samples of equal size.
- T-test for independent samples.

### Results

**Table 2.** presents the arithmetic mean, standard deviation, and t-test outcomes for the Control and experimental group in both the pre- and post-tests

Variables	Unit of Measurement	Control Group		Experiment Group		F-value	F-critical value	Calculated t-value	Error Level
		M	SD	M	SD				
Selective Attention	Score	53.571	1.902	60.857	1.902	07.28	2.751	7.005	0.000
Clinch Skill	Score	7.571	0.534	9.428	0.534	1.857	0.377	13.00	0.000

Significant < (0.05) at degrees of freedom (6)

## Discussion

Based on the researcher's results from the tables above, it is evident that both research groups learned motor skills and improved their selective attention (Khothier , 2025). This is because, when wrestling exercises are also used for the simultaneous development of physical (including motor response speed) and cognitive (including selective attention) characteristics in wrestlers, it affects players' psychological well-being in a way that encourages them to practice. The researcher believes that variety and innovation in the use of exercises and teaching methods are most suitable for creating excitement and enthusiasm, thereby achieving rapid learning and the acquisition of movements and athletic activities. The scholar considers that the practice of wrestling involves high physical, motor and cognitive demands on part of the practitioner (Kons, el. 2025). Gradual execution of certain exercises with the experimental group and the previous players experience added to the data stored in the motor system memory allowed for improvement of researched variables (Mahmood, 2025). As has been mentioned, "there are a number of factors which determine the development of motor skill, among them being repetition, perceptions, comparisons, mental capacities and previous experiences with movements and in addition effects of excitement or other agents that obstruct or facilitate learning such skills as well as the law where by practice becomes more perfect and difficult problems are solved more easily after a certain degree." Learning wrestling skills via cognitive-based exercises, such as selective attention may have a positive effect on players' psychology in terms of motivation to train (Martínez del Quel, 2019). The variety and innovation in exercise selection and teaching methods effectively create suspense and excitement, leading to rapid learning and mastery of sports movements and activities. A third is the physical, motor and attention skills that should have a wrestler when he performs holds. Thus, it is crucial to develop these capabilities in wrestlers as they are key factors for optimal performance (Shihap & Ahmed, 2025). Some exercises have facilitated more towards the memory and generalization in a changing photogram during play. The knight managed to pull off the decision of making the right hold at soon enough. This can be accomplished only by varying the exercises in a training session (Tariq & Bassim, 2015). So, mix up your workouts to see the greatest results. The researcher also presumes that the selected exercises were relevant to their physical conditions, and a given exercise may contribute several of the research entities. This helped the wrestler generalize the motor program for the skill, as "the exercises that the coach sets for one or more wrestlers are within specific rules to develop the wrestler physically, technically, and tactically, and to develop movement speed and basic skills that affect game plans. They rely on an atmosphere similar to that of matches, which depend on the sequence of movements." Accordingly, the first research hypothesis has been supported. Statistically, Both the experimental and control groups show statistically significant improvements on the post-test compared to the pre-test (Yahya, Rida & Abdulkareem, 2024).

## Conclusions

1. The exercises created by the researcher shown efficacy in enhancing the athletes' lifting skill performance.
2. The activities created by the researcher shown efficacy in enhancing the players' selective attention.
3. The experimental group employing specific exercises surpassed the control group utilizing the standard strategy in the research variables.

## Recommendations

1. Employing the specialized exercises created by the researcher during training sessions, given their beneficial impact on enhancing the research variables (technical grips and speed of motor responses).
2. Attention must be given to the speed of the response variable, as it is a critical factor on which wrestling relies.
3. Diversifying specialized exercises to enhance physical and motor qualities alongside the motor pathway of the skill.

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## The Effect of Therapeutic Exercises on the Rehabilitation of Partial Achilles Tendon Rupture in the Ankle Joint Among Football Players

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2238](https://doi.org/10.37359/JOPE.V37(4)2025.2238)

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**Article history:** Received 23/ December/2024 Accepted 27/ August/2025 Available online 28/ December/2025

### Abstract

The participation in the rehabilitation of injuries among athletes and non-athletes from various sports, as well as the prevention and reduction of sports injuries and the restoration of athletes to their pre-injury condition, represent a fundamental goal in the sports field. Progressive rehabilitative exercises, applied from simple to complex, play a crucial role in restoring function and reducing pain among injured athletes. This study aimed to design and implement rehabilitation sessions composed of targeted exercises to treat partial Achilles' tendon rupture in football players and to examine the differences between pre- and post-tests in static strength and balance. Using an experimental one-group pre–post design, the researcher applied the program to five football players aged 20–23 years, ensuring all exercises were performed correctly within the planned schedule. The results indicated that the rehabilitative exercises had a positive effect on balance and the studied physical attributes, enabling the players to return safely to play and competition. The study recommends adopting the proposed rehabilitation approach and emphasizes the importance of early treatment and rehabilitation of Achilles tendon injuries among football players.

**Keywords:** Football, Achilles Tendon, Ankle Joint.

### Introduction

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Football is a dynamic sport typified by rapidly changing patterns of activity and offensive-defensive technical processes. Their successful performance depends on the physical and technical effort of the player during play. The game of handball is characterised by sharp sprints, quickly changing from one attacking activity to the next and therefore results in high physical demands on players during matches and training. Since players use their feet to push themselves, move forwards, sideways or backwards while doing skills and to shift from defense to offense it puts a tremendous amount of stress on the muscles and joints in that area which consequently causes leg pain.

Although great improvements have been made in sports injury medicine and the introduction of preventive procedures, there is still an excessive prevalence of sport-related injuries. The tendency that you don't spend endlessly amounts of energy during friendly environment like in ATP Cup -you do it to get higher ranking- with this competition, and the growing desire to show off who can push harder among players I guess. Sports-related injuries are an important challenge as they interfere with training and recovery program, thereby limiting the athletes' ability to achieve peak performance state. Partial rupture of the Achilles tendon at the ankle joint is common in football because most training loads and physical stress are concentrated to the foot.

As stated by Francis John (2001), through an accurate diagnosis and sport-specific rehabilitation programs, the match fitness can be achieved faster, and earlier return to baseline level of performance is sustained. Appropriate post injury rehabilitation is the key to regaining as much of the full function of the injured site and in as short time period as possible.

The scientific and practical significance of this research lies in developing rehabilitative exercises aimed at improving the static strength of the flexor and extensor muscles, enhancing balance and other physical attributes, and determining the impact of these exercises on the recovery of partial Achilles tendon rupture in the ankle joint.

Rehabilitative exercises represent one of the most essential scientific areas in physical education and sports sciences, particularly in restoring injured athletes to their pre-injury condition in the shortest time possible. Through the researcher's experience in the sports field, collaboration with physical therapy clinics, and review of related studies, a gap was identified — many rehabilitation programs for Achilles tendon rupture focus only on the initial recovery stage. Therefore, this study aims to design a comprehensive rehabilitative and physical exercise program emphasizing strength and balance training from the early stages of injury until full return to play and competition.

## Research Objectives

- To design rehabilitative exercises for partial Achilles' tendon rupture in the ankle joint among football players.
- To identify significant differences between pre- and post-tests in static strength and balance among football players.

### Research Hypotheses

- There are no statistically significant differences between pre- and post-tests in balance variables related to partial Achilles tendon rupture of the ankle joint among football players, in favor of the post-test.
- There are no statistically significant differences between pre- and post-tests in static strength variables related to partial Achilles tendon rupture of the ankle joint among football players, in favor of the post-test.

### Research Fields

- **Human Field:** Football players suffering from partial Achilles tendon rupture in the ankle joint, aged 20–23 years.
- **Time Field:** From February 1, 2024 to April 15, 2024.
- **Place Field:** Medical Rehabilitation Center, New Baghdad – Baghdad

### Methodology

The researcher employed the experimental method with a single-group pre–post design, as it is suitable for the nature of the study problem and enables the achievement of the research objectives and their alignment with the study's focus.

### Research Sample

The research population consisted of 12 football players from first-division clubs, aged 20–23 years, who suffered from partial Achilles tendon rupture in the ankle joint in Baghdad. They visited rehabilitation centers between the first and second months of 2024 to provide personal information and injury-related data, including the date, type, and severity of the injury, as diagnosed by a specialized physician. The experiment was conducted individually on 5 injured players, who were deliberately selected as the research sample. Four injured players did not participate, and three were excluded due to non-compliance, leaving 5 players who met the required conditions and expressed willingness to participate in the rehabilitation exercises, adhering to the researcher's instructions and guidance.

### Equipment and Tools Used

The measuring instruments used in the study were one Sony video camera, one Compex electrical stimulation equipment, one computer MacBook Air, a dynamometer made in Japan for measuring of muscle strength (Mauch), an electronic timing gate, two Mar Times digital stopwatches, a tape measure (metric), an Agme whistle five balls football standard size, five rubber bands of different colors and degrees of movement amplitude described by their manufacturers, eight cones or markers with various colors (Plaster) four ladders agility type “net”, four stability balls of different sizes to do exercises sitting on them two mats outlet and pain scale.

### Physical Tests

Physical examinations comprised three tests. The first one , the balance measure (Hassanein, 1996) was used to assess the stability of the player. The injured player keeps the foot of his affected leg on the ground and places his sound leg on top of the injured one while putting both hands in the middle. At the sound of the whistle, the player raised their heel off ground as high as possible and tried to hold this position without lifting up their forefoot. The test was repeated three times and best trial was used. Second, the static strength of the ankle flexor muscles (Hassanein, 1996) sought to measure it using a dynamometer, data form and pen. The player was seated on the floor with extended legs and holding the ground with hands, and his ankle was flexed slowly forward until pain appeared. Up to two trials were performed and the force was measured in kilograms. Third, static ankle extensor muscle strength (Fermat, 2012) To measure the static muscle force of ankle extensors using a dynamometer and data form as pen. Subjects were seated on the floor with knees extended and held the ground with both hands, which is where we steadied the strap of the dynamometer over that portion foot. The player slowly pushed out the ankle against the strap until their limits of resistance were achieved. Three trials were conducted and the best score, in kilograms, was noted.

### Pilot Experiment

The researcher carried out a pilot study on two football players (Achilles tendon ruptures) not being part of the main sample. This experiment was performed on Thursday, February 10th, 2024 at 4:00 PM in the Medical Rehabilitation Center of New Baghdad. Aims of the trail: Identify limitations and challenges that the researcher might face, check function, equipment functionality and efficacy for appliances in use; test effectiveness of the auxiliary crew.

### Pre-Test

After having selected the sample of the research by medical examination, and verified the type and location of injury for all players using an imaging (X-rays) done in collaboration with a specialist doctor to ensure that they were cleared to play sports again

without hesitation, The researcher made pre-tests on the research sample on Saturday Feb 13, 2024 at Al-Zahraa Medical Rehabilitation Center in New Baghdad.

### **Rehabilitation Program**

The therapeutic exercises were designed carefully according to the best available evidence, previous work, and expert opinion in sports rehabilitation and psychical education. Advice on the content of the program and number and length of rehabilitation units was also sought from sports medicine and orthopaedic experts. Rehabilitation after an Achilles tendon rupture in football The rehabilitation of Our football players after a ruptured Achilles tendon consisted of three phases.

Static, nonresistive exercises were the focus of phase one that attempted to decrease swelling and pain. This rehabilitation phase consisted in home exercises and ice application 4–5 times a day for 15 minutes with rest, without weight-bearing activities. Eight rehabilitation units were taught over a 2-week period.

Phase two focused on improving balance and ankle joint stabilization, as well as strength of the muscles around the ankle. This phase consisted of 4 training sessions per week with a duration of 45–50 min each (12 sessions in total over the course of 3 weeks inside the gym). It also included balance and static muscle strength for ankle flexion and extension as pre-tests.

The final phase, three weeks in duration focused on general conditioning and began training the total athlete including endurance, strength, groundwork (foundations), explosive power and on-field conditioning followed by 12 practice sessions. Physical examination, for evaluating progress was performed at the beginning of this phase. The rehabilitation program lasted 8 weeks in total.

### **Post-Test**

Upon finishing the eight weeks rehabilitation programmed, post-tests were conducted on Sunday April 7 th, 2024 by the researcher to control time, place equipment's and supporting staff in a manner that he could obtain reliable and comparable results to those of pre-test.

### **Statistical Analysis**

The researcher analyzed the data statistically using the SPSS software, employing the following statistical analyses: standard deviation, arithmetic mean, paired-sample t-test, and differences between arithmetic means.

## Results

**Table 1. shows the differences in arithmetic means and standard deviations between the pre-test and post-test for the studied variables.**

Variables	Test	Mean	Sample Size	Std. Deviation	Std. Error
<b>Ankle Flexor Muscle Strength</b>	Pre-test	7.0000	5	1.58114	0.70711
	Post-test	26.0000	5	3.67423	1.64317
<b>Ankle Extensor Muscle Strength</b>	Pre-test	6.8000	5	1.09545	0.48990
	Post-test	25.8000	5	1.78885	0.80000
<b>Balance</b>	Pre-test	15.0000	5	1.87083	0.83666
	Post-test	49.2000	5	1.92354	0.86023

**Table 2. shows the calculated t-values between the pre-test and post-test for the research sample**

Variables	Comparison	Mean Difference	Std. Deviation	t-value	df	Sig
<b>Ankle Flexor Muscle Strength</b>	Pre vs. Post	-19.00000	1.09545	17.345	4	0.000
<b>Ankle Extensor Muscle Strength</b>	Pre vs. Post	-19.00000	0.54772	34.689	4	0.000
<b>Balance</b>	Pre vs. Post	-34.20000	1.35647	25.213	4	0.000

## Discussion

Based on Tables (1) and (2), the researcher attributes the statistically significant improvements in the pre- and post-tests for the physical variable balance to the post-test results of the research sample. According to FIFA (2016), balance is defined as the athlete's ability to maintain the body in a specific position even under challenging conditions or to quickly restore equilibrium after a disturbance. The designed rehabilitation exercises and the variety of balance training methods for the injured, including exercises on stable surfaces such as standing on one leg with hands at the center or extended sideways, progressing to unstable surfaces like standing on a half-balance ball, aimed to enhance the function of sensory systems, including the visual system, internal sensory receptors, and proprioceptors located in ligaments, muscles, tendons, and joints. This aligns with Haider Abdulqader Nima (2019), who emphasized that balance exercises target multiple sensory systems simultaneously rather than a single sensory system.

Likewise, the significant improvements in ankle joint flexor and extensor muscle strength recorded during post-tests are attributed by the researcher to exercises applied. The 'rehabilitation program' aimed to improve the static muscle strength and balance with the flexible solidify of the ligament, peritinom, and muscles around to ankle joint through three types of training applied according to its each interval. Phase 1 adopted isometric exercises (i.e., static contraction of muscle) that Amr Allah Al-Bassati (2015) stated are conducive for muscle strength without the need to possess a variety of tools and equipment. Phil (2014) also stated that isometric exercises are excellent for strengthening ligaments, muscles, and tendons without causing the joint to be stressed. The researcher implemented this technique in multiple repeated sets with light resistance, and worked up to more that were increasingly advanced as the player's condition improved.

In phase two, isotonic exercises including squats and box jumps were performed to develop explosive power and speed-strength qualities. Bastowisi (2014) agreed that isotonic movements, where the muscle contracts and relaxes with movement produces superior effects on strength speed, 368 while also improves other motor abilities (Ahmed, 2014).

The rehabilitation was also basis on plyometric training. Allman (2012) shows that plyometric exercises such as jump drills improve running mechanics and reinforce the leg and upper body musculature. Also, ankle bounce training strengthens the ligaments and tendons. This idea is also supported by Kharbeit & Osman (2023) in that the action of the muscles as a stretch-shortening cycle. Muscles lengthen under tension and then concentrically contract during landing in this cycle, which is characteristic of plyometric exercise.

Overall, the researcher emphasized that plyometric training is crucial for developing muscle strength and applied this principle in rehabilitating partial Achilles tendon rupture in the ankle joint.

### **Conclusions**

the sample, goals, hypotheses and objectives of analysis carried out about the studied variables extracted from this research, the main conclusions can be established as follows: A training program had a significant effect in Treatment for functional capacity restoration of Achilles tendon at ankle joint. The results of our exercises were significant for balance and the static strength of ankle flexor and extensor muscles. A positive effect on balance improvement was found for the baseline intensity of activities maintaining a stable posture without movement when performed on a stable surface. Also, the researcher's interventions with respect to all physical variables isometric training in early rehabilitation isotonic and co-contracted muscle activities afterwards reported significant effects on promoting these physical qualities in women.

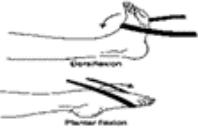
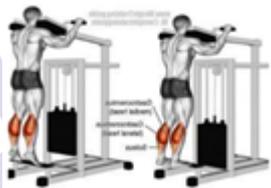
### **Recommendations**

The suggestions of the study are: priority given to static strength exercises in the early stage of rehabilitation, training all methods for rehabilitation planned simultaneously by a specialized practitioner in order to improve physical variables and focus on dynamic balance exercises that had an important role in getting better results in study sample and determination of other studies aiming at the Achilles tendon rehabilitation at ankle joint.

## Appendices

**Appendix 1.** shows a sample rehabilitation unit for Achilles tendon rupture, with a duration of 60–90 minutes.

**Objective:** Rehabilitation unit focusing on balance and muscle strengthening  
 Week: 7, Day: 2

N o	Exercise	Exercise Form	Purpose	Duratio n	Repetition s	Res t	Set s	Note s
1	Standing on one leg		Improve balance	20 sec	10–12	1–2 min	3–4	–
2	Hip abduction and adduction using a cable		Strengthen adductor and abductor muscles	–	10–12	2–3 min	3–4	–
3	Long sitting with ankle movements forward and backward		Strengthen leg muscles	–	10–12	1 min	3–4	–
4	Standing calf raises		Strengthen calf muscles	–	10–12	1–2 min	3–4	–

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## The effect of blended learning with sequential and random exercises in learning the skills of setting and receiving the volleyball serve for students

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2218](https://doi.org/10.37359/JOPE.V37(4)2025.2218)

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**Article history:** Received 8/ October/2024 Accepted 11/ November /2024 Available online 28/ December/2025

### Abstract

The aim of the research is to identify the effect of exercises with blended learning according to the sequential and random exercise and learning the skills of settings and receiving the serve with volleyball for students in the fifth grade of middle school. The importance of the research comes in developing the skills of setting and receiving the serve with volleyball in the physical education lesson for the fifth stage of middle school through blended learning and by scheduling the sequential exercise. random exercise, the research problem revolved around the fact that the performance is not at the required level among students at this stage in learning how to perform volleyball skills. This is due to the fact that most of the methods used in teaching basic volleyball skills are the traditional method used in applying the physical education lesson, so it was decided to use blended learning, which is Methods that can be applied in the game of volleyball, this method uses electronic technologies before the practical application of some skills. The researchers relied on designing exercises and they were given in the main section of the educational unit, where the research population was (93) students, and (36) students were randomly selected from the sections (A-B-C). The share of each section is (12) students after sick and failing students were excluded. The educational curriculum was applied, which consists of (16) educational units at a rate of (2) educational units per week, and after completing the post-tests, the researchers concluded that the effect of the three methods of basic volleyball skills (setting, receiving the serve), was, respectively, blended learning with scheduling. Random

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exercise in the first degree and blended learning with sequential exercise scheduling in the second degree, then the control group in the third degree.

**Keywords:** blended learning, sequential practice, random practice, setting, receiving serves.

## Introduction

The scientific and informational development in our era is very important, requiring rapid adaptation to communicate with the world on everything new, including sports sciences. The learning process has taken a new and broad direction in the present time, as researchers now use the best and latest methods, tools, and techniques that assist the learner in research and inquiry by understanding the goal of the educational process. Physical education is considered a field of education and teaching, working on preparing individuals physically, skillfully, tactically, and emotionally. Therefore, most countries around the world have turned to developing their educational systems and reconsidering the established curricula and methods of implementation thru learning techniques in adopted educational systems to achieve effective learning. As for the field of school sports, it needs to activate the physical education lesson, which has become traditional. We know that school sports are distinguished activities thru the selection of players and talents, supplying national teams with outstanding players, juniors, youth, and distinguished young people to represent national teams in local and international competitions. Countries provide support and attention to school sports to activate school sports activities and give them special importance to reach the desired level. The researchers noticed that the performance of students at this stage in learning volleyball skills is not at the required level. This is due to the fact that most of the methods used in teaching basic volleyball skills are traditional methods applied in physical education classes. Therefore, they considered using blended learning, which includes methods that can be applied in volleyball. This approach utilizes electronic technologies before the practical application of some skills.

Volleyball is a team sport suitable for all ages and requires educational methods to improve learning processes and avoid traditional methods that generate boredom among learners. Therefore, it is essential to diversify teaching methods and choose the best approach for the type of game the teacher should teach to their students. This can be achieved thru the use of sequential drills, which aim to reach a good performance level in one skill before moving on to the next, while random drills aim to perform more than one skill within a single educational unit. The importance of the research lies in developing the skills of setting and receiving serves in volleyball during the physical education lesson for the fifth preparatory stage thru blended learning and scheduling sequential and random exercises. This is done by answering the following question: Is blended learning suitable for the chosen age group? What is the extent of the impact of blended learning on the acquisition of the skills of setting and serve reception in volleyball for the selected sample?

The aim of the research is to identify the impact of blended learning exercises, according to sequential and random practice, on learning the skills of setting and serve reception in volleyball for fifth-grade preparatory students.

Among the studies that addressed blended learning, serial practice, and random practice is the study by Schiller (2021) titled "The Impact of Blended Motor Learning Strategy on Learning the Technical Performance of the Overhead and Underhand Serve Skills in Volleyball." The study aimed to prepare educational units for second-year male students in the College of Physical Education and Sports Sciences at the University of Baghdad for the academic year 2018-2019. The research sample consisted of 30 students who were randomly selected. The researcher followed the experimental method with an experimental group and a control group. The first experimental group used the blended learning method, while the second group (the control group) consisted of 15 students. The researcher concluded that there are significant differences between the two groups in the pre-test and post-test for both skills in learning the technical performance of them and the two groups, but we did not show significant differences between the experimental and control groups, so the study (Muhaibes, 2013) addressed (the effect of an educational curriculum using sequential and randomized exercise on the acquisition of the compatibility of hitting and blocking volleyball for juniors). The study sought to prepare educational units in the light of the curriculum system prepared by the researcher using the experimental method based on the sequential and random method, the researcher used the experimental method on his sample, which are the juniors of the Rumaita Volleyball Club and their number was (18) players, the researcher concluded that the educational curriculum and the special exercises it included contributed to the acquisition and development of compatibility and there is a preference in learning between the two educational methods sequential and random in favor of the random method.

However, the study (Dhuha, 2014) examined (the effect of using programd and reciprocal learning methods in learning some basic volleyball skills among fourth-grade preparatory students). The study aimed to prepare educational units for the fourth-grade students of Al-Anwar Secondary School for Girls, affiliated with the Al-Karkh Second Education Directorate. The procedures consisted of a research sample of 30 students, and the experimental research was the method followed for two months, with two units per week, involving two experimental groups and one control group as follows: the programd learning group, the reciprocal learning group, and the control group. The conclusions indicated that the reciprocal method using homework sheets had an impact on learning basic volleyball skills and was more effective than the traditional method. Additionally, the use of homework sheets increases the potential for improving and developing the technical aspects of volleyball skills. The study (Walaa, 2011) addressed (the impact of blended network learning on learning outcomes in basic skills in volleyball for primary school students), where the study sought to prepare educational units on the students of the first

stage of the Faculty of Physical Education at Mansoura University in Egypt for the academic year (2011 - 2010). 2010) and the research sample amounted to (60) female students, the researcher followed the experimental method with three experimental groups (two experimental groups and a control group) where the first experimental group used the educational website on the Internet, the second experimental group used blended network learning, while the control group followed the traditional method, where each group consisted of (15) students. The researcher concluded that the second experimental group that used blended network learning outperformed the first group (the educational website on the Internet) and the third group (traditional) in cognitive achievement and the level of skill performance in volleyball.

### Methodology

The researchers used the experimental method with a three-group design (two experimental groups and one control group) as shown in Table (1).

**Table 1.** Study Design

Groups	Pre-test	Independent Variable	Post-test
Experimental Group A	Skills pre-tests	Educational units (blended – sequential)	Skills post-tests
Experimental Group B		Educational units (blended – random)	
Experimental Group C		The curriculum prepared by the Ministry of Education	

The research sample was determined to be fifth-grade students of the intermediate stage (Ibn Sina Intermediate School for Boys) affiliated with the Education Directorate of Baghdad Al-Karkh Al-Thaniya, totaling (91) students who represent the research community. The sample of (36) students was selected from the fifth-grade intermediate students' community thru a lottery from the academic divisions (A-B-C). The researcher also conducted a lottery to select the three research groups, choosing (12) students from each division. The two experimental groups follow the curriculum prepared by the researchers, while the control group adheres to the curriculum prepared by the Ministry of Education. The exploratory trial sample, consisting of (5) students, was selected randomly thru a lottery, and students who were ill or not regularly attending, totaling (5) students, were excluded as shown in Table (2).

**Table 2.** *The Research Population and Sample*

Grade Level	Number of Classes	Number of Students per Class	Excluded Students	Research Sample Size	Percentage
Fifth Grade – Class A	1	31	2	12	
Fifth Grade – Class B	1	30	1	12	39.56%
Fifth Grade – Class C	1	30	2	12	
Total	3	91	5	36	

- The sample is homogeneous as they are all males and from the same age group.
- The samples were balanced by conducting a pre-test for both the experimental and control groups before starting the implementation of the curriculum in the skills under investigation, as shown in Table (3).

**Table 3.** *Homogeneity of the Research Groups in the Pre-Tests of the Study Skills*

Tests	Source of Variance	Sum of Squares	df	Mean Square	Calculated F-value	Sig. Value	Significance Level
<b>Setting</b>	Between Groups	0.47	2	0.23	0.17	0.83	Not significant
	Within Groups	44.41	33	1.34			
<b>Serve Reception</b>	Between Groups	5.35	2	2.67	1.61	0.21	Not significant
	Within Groups	54.65	33	1.65			

**Note:** A value in the significance field (Sig.) < 0.05 indicates statistical significance.

### Skill tests used in the research

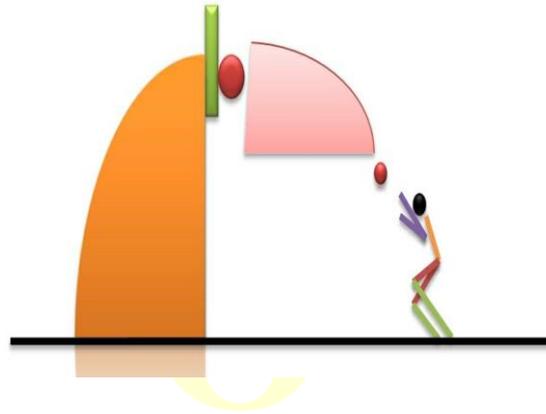
Volleyball setting skill test (Youssef, 2023, p. 68):

The purpose of the test: Measuring volleyball setting skill.

Necessary tools: A basketball board containing the ring, 5 legal volleyballs, and a registration form.

Performance specifications : The test student stands in front of the basket at the free throw line on the circle line, the ball is lifted up and then passed to the basket, trying to pass it inside the basket as in Figure (3) Each test student is given (5) attempts.

Scoring: Ball away from the board (0) degrees, Ball touching the board (2) degrees, Ball touching the ring (3) degrees, Passing the ring inside the ring (5) degrees, Maximum test

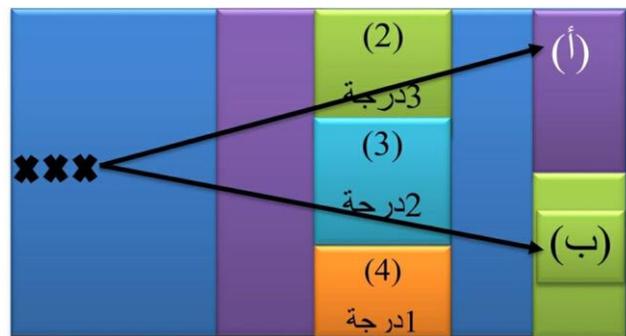


score (25) degrees

**Figure 1.** *Test of Setting Skill in Volleyball*

Test of serve reception in volleyball (Al-Dulaimi, 2014, page 84):  
 The purpose of the test: Measuring the skill of receiving the serve in volleyball.  
 Necessary tools: Legal volleyball court, 10 legal volleyballs, colored tape to divide play areas, metal measuring tape.  
 Performance specifications: The tested student performs (5) attempts from area (A) to positions (4, 3, 2) and (5) attempts from area (B) to positions (4, 3, 2). The tested student must adhere to receiving the ball from the designated area and directing it to the specified area, as shown in Figure (2).  
 Scoring: The student tester receives the score of the position where the ball lands as follows:

1. The ball that is in center (4) gives the tester (one point). The ball that lands in center (4) gives the tester (one point).
2. The ball that lands in center (3) gives the tester (two points). The ball that lands in center (3) earns the tester (2 points).
3. The ball that lands in center (2) earns the player (three points). The ball that lands in center (2) earns the tester (three points).
4. If the ball lands on the line between the two points, the score for the higher area is counted. If the ball lands on the line between the two points, the score is counted for the higher area.
5. The maximum score for this test is 30 points. The maximum score for this test is (30) points.



**Figure 2.** Test of the skill of receiving the serve in volleyball

The field experiment where the researchers conducted the pre-tests of the volleyball setting skill test and the volleyball service reception skill test for members of the research sample for the three groups (the two experimental groups and the control group) on the date 21/2/2024 on (Wednesday). to test the volleyball setting skill and on 2/22/2024 on (Thursday) to test the volleyball reception skill, in the presence of the assistant work team After completing the pre-tests, the researchers conducted the main experiment, which contains (the main section) of the educational unit of the educational unit on Sunday, 2/25/2024, which ended on Thursday, 4/18/2024, After completing the implementation of the educational curriculum (the main sections of the educational units), the researchers conducted the post-tests of the research sample to test the On Tuesday, 4/23/2024, and on Wednesday, 4/24/2024, the researchers were keen to conduct the tests in the outer yard of Ibn Sina Preparatory School in the same conditions and conditions and the same measures that they conducted as in the pre-test.

## Results

**Table 4.** Means, Standard Deviations, and Skewness for the Blended Learning Group with Sequential Practice Scheduling

Variables	Pre-test Mean	Post-test Mean	Pre-test SD	Post-test SD	Pre-test Skewness	Post-test Skewness
Setting	12.50	16.67	1.16	1.07	0.00	0.25
Serve Reception	11.92	16.00	1.37	1.12	0.17	0.00

**Table 5.** Mean Differences, Standard Error, Calculated t-Value, and Significance Level

Variables	Mean Difference	Standard Error	Calculated t-value	Sig. Value	Statistical Significance
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<b>Setting</b>	4.16	0.29	14.01	0.00	Significant
<b>Serve Reception</b>	4.08	0.49	8.17	0.00	Significant

**Table 6.** Means, Standard Deviations, and Skewness for the Blended Learning Group with Random Practice Scheduling

Variables	Pre-test Mean	Post-test Mean	Pre-test SD	Post-test SD	Pre-test Skewness	Post-test Skewness
<b>Setting</b>	12.50	18.96	1.00	0.99	0.00	0.47
<b>Serve Reception</b>	12.50	18.83	1.16	1.11	0.00	0.56

**Table 7.** Differences in Means Between Pre- and Post-tests, Standard Error, Calculated t-value, and Significance Level for the Blended Learning Group with Random Practice Scheduling

Variables	Mean Difference	Standard Error	Calculated t-value	Sig. Value	Statistical Significance
<b>Setting</b>	6.41	0.43	14.76	0.00	Significant
<b>Serve Reception</b>	6.33	0.52	12.01	0.00	Significant

**Table 8.** Means, Standard Deviations, and Skewness for the Control Group

Variables	Pre-test Mean	Post-test Mean	Pre-test SD	Post-test SD	Pre-test Skewness	Post-test Skewness
<b>Setting</b>	12.33	14.75	1.30	0.96	0.15	0.13
<b>Serve Reception</b>	11.58	15.08	1.31	0.79	0.36	0.16

**Table 9.** Mean Differences Between Pre- and Post-tests, Standard Error, Calculated t-value, and Significance Level for the Control Group

Variables	Mean Difference	Standard Error	Calculated t-value	Sig. Value	Statistical Significance
<b>Setting</b>	2.41	0.28	8.40	0.00	Significant

<b>Serve Reception</b>	3.50	0.46	7.46	0.00	Significant
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**Table 10.** ANOVA (F-test) Results for the Two Skills Under Investigation in the Post-tests

Variables	Source of Variance	Sum of Squares	df	Mean Square	Calculated F-value	Sig. Value	Statistical Significance
<b>Setting</b>	Between Groups	104.38	2	52.90	50.90	0.00	Significant
	Within Groups	33.83	33	1.02			
<b>Serve Reception</b>	Between Groups	91.72	2	45.86	43.76	0.00	Significant
	Within Groups	34.58	33	1.04			

**Table 11.** Differences in Means Among the Groups, Statistical Significance, and Direction of Significance

Variables	Groups Compared	Mean Difference	Sig. Value	Statistical Significance
<b>Setting</b>	G1 – G2	1.91	0.00	Significant in favor of G2
	G1 – G3	4.16	0.00	Significant in favor of G1
	G2 – G3	2.25	0.00	Significant in favor of G2
<b>Serve Reception</b>	G1 – G2	0.91	0.03	Significant in favor of G2
	G1 – G3	3.75	0.00	Significant in favor of G1
	G2 – G3	2.83	0.00	Significant in favor of G2

## Discussion

After presenting the results thru the previous tables, it became clear that there is a significant difference in the skill of preparation between the first experimental group, which learned (sequential blended learning), and the second experimental group, which learned (random blended learning), in favor of the second experimental group. As for the first experimental group, which learned (sequential blended learning), and the control group in preparation, a significant difference was evident in favor of the first experimental group that learned (sequential blended learning). However, for the second experimental group, which learned (random blended learning), and the control group in the skill of preparation, the difference was significant in favor of the second experimental group that learned (random blended learning).

As for the skill of receiving the serve, there is a significant difference between the members of the first experimental group who learned (sequential blended learning) and the members of the second experimental group who learned (random blended learning) in the skill of receiving the serve, in favor of the second experimental group. However, the members of the first experimental group who learned (sequential blended learning) and the members of the control group in the skill of receiving the serve show a significant difference in favor of the first experimental group who learned (sequential blended learning). As for the members of the second experimental group who learned (random blended learning) and the members of the control group in the skill of receiving the serve, the difference was significant in favor of the second experimental group who learned (random blended learning).

The researchers attribute the reasons for the superiority of the second experimental group that learned (blended learning in the random exercise method) in the two skills (setting and receiving the serve) in volleyball over the rest of the two groups (the sequential blended learning group and the control group), to the effectiveness of the students' learning in this group to the speed of shifting attention and concentration and adapting fast motor programs for the purpose of facing changing situations while performing the exercises that were prepared in addition to the The blended learning booklet through which a complete and sufficient picture was taken of the method of performing the skill, whether it is in the skill of preparation or the skill of receiving the transmission, reinforced with videos and still and moving images through which a complete idea was communicated to learners in order to know all the information that is related to the two skills and the frequency of exercises because it is related to mental processes and the speed of response of the nervous system in learning the skills of preparation and receiving the transmission (Sabr, 2005, page 106) "The individual cannot reach the precise level (mechanism) without practice (repetition), and practice does not mean mere repetition but repetition coupled with a thorough understanding of the instructions (Feedback) given by the coach and teacher."

Furthermore, the role of feedback contributed to the development of my skills in preparation and reception in this group. As mentioned by Mahgoub (1998, p. 85), feedback is sensory external information that enters during or after responses to improve performance and correct information about the movement trajectory. It is a process that facilitates learning and sports training. Researchers attribute the reasons for excellence to the use of video clips and still images, as they increased the excitement among learners by engaging the senses of sight and hearing, thus creating a distinctive educational atmosphere. This was confirmed by Al-Hiliya (2001, p. 316) "What distinguishes video is the element of excitement resulting from sound, moving images, reinforcement, and stimulation," confirmed Schmidt (1999, p. 96). He emphasized the use of audiovisual sensory elements in information delivery, movement organization, and coordination. These elements provide information about the environment in which one learns, as well as the state and movements of our bodies. They are considered the largest receivers for processing information about the movement of external objects in the world. Researchers attribute the superiority of this group to their rapid control over attention shifting, high anticipation, and the preparation of motor programs that change play positions. This can be likened to open skills (in an open environment) due to the variety of skill exercises during the practical part of the main section, which made their performance nature in an open environment involve changing situations during execution.

## Conclusions

1. The impact of the three methods of basic volleyball skills (setting, reception) was, respectively, blended learning with random practice scheduling in the first degree, blended learning with sequential practice scheduling in the second degree, and the control group in the third degree. The effect of the three methods on the basic volleyball skills (setting, reception) was, respectively, blended learning with random practice scheduling in the first degree, blended learning with sequential practice scheduling in the second degree, and the control group in the third degree.
2. The use of modern educational technology and the blended learning booklet, thru their experimentation on the first and second groups, significantly contributed to achieving superiority over the control group, which is followed by the teacher. The use of modern educational technology and the blended learning booklet, thru their experimentation on the first and second groups, significantly contributed to achieving superiority over the control group followed by the teacher.
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## The Impact of Nutritional Fingerprint on Energy Production and Performance Enhancement in Wrestling Athlete

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2338](https://doi.org/10.37359/JOPE.V37(4)2025.2338)

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**Article history:** Received 11/ July/2025 Accepted 9/ November/2025 Available online 28/ December/2025

### Abstract

The purpose of this study was to determine the effects of personalized nutrition approach by genotype based on genetic profiling and their effects on the components of energy production and performance in wrestling. The investigation concerns with five wrestlers from Al-Kadhimiya wrestling Club, for the 74 kg weight category. During 4 weeks, each of these athletes received a diet training intervention tailored to their individual genetic profiling. Aerobic capacity (VO<sub>2</sub>max), anaerobic power (Wingate Anaerobic Test), RSA, and lower body strength (1RM squat) were assessed at baseline and post-intervention as well. Results In all variables significant improvements were observed with VO<sub>2</sub>max increasing by 5 ml/kg/min, both peak and mean power output by 50 and 25 watts respectively and fatigue index reduced by 6.5%. Furthermore, strength levels of all participants increased, with an average 15 kg increase in 1RM squat strength. These results indicate that individualized nutrition based on genomics can greatly improve athletic performance, especially for high-intensity sports such as wrestling, which require endurance, power and strength.

**Keywords:** personalized nutrition, genetic profiling, wrestling performance, anaerobic power, strength training.

### Introduction

Wrestling is an intense sport, which necessitates great physical conditioning as well as combination of strength, speed and power (Jeukendrup, 2013). Top professional

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athletes in orienteering are becoming more and more specialized focusing on details such as diet, to gain the best possible competitive edge. Nutritional intake is important in order to obtain the highest energy provision possible and promote muscle recovery, which is fundamental for performance levels in wrestling (Jeukendrup, 2004; Sorrenti et al., 2019). Historically, dietary recommendations are fairly generic, focusing on comparisons of macronutrient and general concepts related to total calorie consumption. Nonetheless, there has been an emerging trend to use some sort of individualized approach which takes into account the athlete's particular genetic profile ('nutritional fingerprint') (Heck et al., 2004).

Nutritional fingerprinting is the process by which genetic profiling, metabolomics and lifestyle are combined to generate personalized diets that are targeted towards gene-specific responses (Gogoi et al., 2025; Heck et al., 2004). There is an increasing evidence that the response to nutrients is genetically determined which, if utilized properly, through personalized nutritional strategies has potential to optimize energy production and performance (Singar et al., 2024). This strategy has been shown to improve performance outcomes, such as strength, endurance and recovery in different sport modalities (Fenwick et al., 2019; He et al., 2018). More specifically, genetically matched diets could potentially optimize energy delivery, improve muscle performance and prolong aerobic performance levels such as those used in wrestling (Brotherhood 1984).

Wrestling is a sport that is characterized by high intensity intermittent-exercise high power outputs, and high-volume low-level endurance, thus, having energetic demands as complex and multi-factorial. Previous evidences have shown that optimal nutritional approaches may have a considerable impact on performance indices including strength, power and fatigue resistance (Pasiakos et al., 2015). Furthermore, research has demonstrated the role of carbohydrates and proteins in the improvement of endurance and strength for athletes (Henselmans et al., 2022). Traditional techniques on fueling for endurance performance and recovery are caloric loading and protein consumption timing, but the interaction between genetics and dietary strategies as they relate to wrestling performance has had relatively little investigation.

Recent developments in genomics and nutrigenomics have provided the foundation for personalized nutrition, which meets individual requirements depending on individuals' genetic predisposition. The discovery of genes involved in nutrient metabolism and muscle recovery has opened new avenues in search of strategies to maximize the athlete's diet for improved energy production and performance (Guest et al., 2019). More specifically, some genes have been linked to enhanced muscle hypertrophy and regeneration with resistance training (Pasiakos et al., 2015). These applications could completely change the way that wrestlers and other athletes manage their diets.

Despite these enhancements, only few studies have been performed on the direct use of nutritional fingerprinting approach, especially for the wrestlers of 74 kg body weight category. Thus the purpose of this trial is to investigate the effects of personalized nutritional advice (in the form of a nutrigenomic-based policy) on energy supply and performance in wrestling athletes. The findings may have some practical dietary implications for designing TIE nutritional strategies individually, leading to improved performance in competitive wrestling.

In particular, the athletes practicing at Al-Kadhimiya Wrestling Club were the participants for this study due to the specific competitive activity in the 74 kg weight category. Using the combination of physiological monitoring and genetic analysis, this study aims to connect the gap between personal nutrition and wrestling performance.

## **Methodology**

### **Study Design**

This trial will use a randomized controlled experimental design to investigate nutritional fingerprinting as it relates to personalized nutrition for energy production and performance enhancement in wrestlers. An experimental design is the most appropriate method of study, as it ensures a contrived setting for manipulating an independent variable (nutrition intervention) thus making it possible to measure its effects on dependent variables (energy production and performance).

### **Participants**

The study group included five wrestlers from Al-Kadhimiya Wrestling Club, competing in 74 kg. Inclusion criteria were being an active wrestling competitor for at least two years and aged between 18 and 25 years, no significant past injuries or medical conditions that might prevent training or testing, and no use of performance-enhancing drugs or over-the-counter supplements during the study period. All participants were given detailed information about the aims, procedures of and involvement in the study and given written informed consent. Ethics The protocol has already been evaluated and approved by the university's ethics committee.

### **Personalized Nutrition Intervention**

The intervention was based on personalized nutritional recommendations guided by each athlete's specific genetic information. A genetic profile was created based on a commercially available nutrigenomic test that interrogates polymorphisms involved in nutrient metabolism, muscle recovery, and energy supply. The results and implications of this investigation guided the design of a tailored dietary intervention to improve wrestlers' performance. The eating protocol was based on macronutrient intake matching the sport-

specific genetic needs for muscle and energy, targeted micronutrient support according to genetics first-profiled needs and strategic timing of food to speed recovery and fuel workouts. The weekly dietary plan was reviewed and adjusted on a weekly basis, in which athletes submitted daily diet logs for examination by an ISAK-certified sports nutritionist who then managed adherence to the intervention.

### **Testing Protocols**

Several performance and physiological assessments were carried out before and after the intervention, which lasted for 4 weeks. Those assessments were comprised of measures with respect to energy production, strength and endurance in muscle tissue performance as follows:

#### **VO<sub>2</sub>max Test**

An athlete's aerobic capacity, a key factor in endurance and the overall production of energy, was tested using the VO<sub>2</sub>max test. This testing was carried out using a breath-by-breath metabolic measurement system (e.g. Parvo Medics TrueOne 2400) that provides continuous data on oxygen consumption (VO<sub>2</sub>) and carbon dioxide production (VCO<sub>2</sub>). The test was performed on a treadmill with progressive intensity to exhaustion and the highest VO<sub>2</sub> reached during the trial was considered as VO<sub>2</sub>max (Fleckenstein et al., 2023).

#### **Wingate Anaerobic Test (WAnT)**

The Wingate Anaerobic Test (WAnT) is used to help determine anaerobic power and capacity, which provides insight into an athlete's ability to produce energy in the presence of short-duration high-intensity activities. It involves cycling at maximum intensity for 30 seconds on a Monark Ergonomic 894E cycle ergometer and monitoring parameters such as peak power, mean power and fatigue index (Franchini, 2002).

#### **Repeated Sprint Ability (RSA) Test**

The Repeated Sprint Ability (RSA) is used to examine an athlete's ability to perform consecutive sprints while maintaining performance. This test was performed on a 10-m track, runners completed 6 x 30m sprints interspersed with 30s rest. Each sprint time was also registered, and a fatigue index (performance reduction from the first to last sprint) determined for each subject (Nedrehagen & Saeterbakken, 2015).

#### **1RM Squat Test**

The 1-Repetition Maximum (1RM) squat test was used to measure lower body strength. The test was performed on a standard barbell with incremental weight increases until the athlete was unable to complete a repetition with proper form. The highest weight successfully lifted was recorded as the athlete's 1RM (Association, 2021).

## Data Collection

All measurements were performed during the baseline and after a 4-wk nutritional intervention. Measurements included VO<sub>2</sub>max, anaerobic power (WAnT), RSA and 1RM squat strength. The test results were compared before and after the nutritional intervention to measure its effectiveness.

## Data Analysis

Data were analyzed using SPSS Version 26 (IBM) software. The difference of pre- and post-intervention scores were checked with paired t-tests.  $p < 0.05$  was considered to be statistically significant.

## Results

Table 1. *VO<sub>2</sub>max Results Before and After the Nutritional Intervention*

Participant	VO <sub>2</sub> max Pre-Intervention (ml/kg/min)	VO <sub>2</sub> max Post-Intervention (ml/kg/min)	Difference (ml/kg/min)
1	43	48	+5
2	45	50	+5
3	42	47	+5
4	41	46	+5
5	44	49	+5

**Table 2. Wingate Anaerobic Test Results Before and After the Nutritional Intervention**

Participant	PPO Pre-Intervention (W)	PPO Post-Intervention (W)	Difference (W)	MPO Pre-Intervention (W)	MPO Post-Intervention (W)	Difference (W)	Fatigue Index Pre-Intervention (%)	Fatigue Index Post-Intervention (%)	Difference (%)
1	500	550	+50	350	375	+25	30	28	-6.67
2	480	530	+50	340	365	+25	32	30	-6.25
3	490	540	+50	345	370	+25	31	29	-6.45
4	470	520	+50	330	355	+25	33	31	-6.06
5	510	560	+50	360	385	+25	29	27	-6.90

**Table 3. Repeated Sprint Ability (RSA) Test Results Before and After the Nutritional Intervention**

Participant	Sprint Time Pre-Intervention (sec)	Sprint Time Post-Intervention (sec)	Difference (sec)	Fatigue Index Pre-Intervention (%)	Fatigue Index Post-Intervention (%)	Difference (%)
1	6.2	5.6	-0.6	12	10	-2
2	6.5	5.7	-0.8	14	12	-2
3	6.3	5.8	-0.5	13	11	-2
4	6.4	5.7	-0.7	15	13	-2
5	6.1	5.5	-0.6	11	9	-2

**Table 4. 1RM Squat Test Results Before and After the Nutritional Intervention**

Participant	1RM Pre-Intervention (kg)	1RM post-Intervention (kg)	Difference (kg)

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1	140	155	+15
2	130	148	+18
3	135	150	+15
4	138	152	+14
5	142	158	+16

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### Discussion

The main goal of the present study was to evaluate the effects of personalized nutrition according to genotype-based dietary advice on energy balance control, strength and discipline performance when applied to wrestling athletes. The results demonstrate that the personalized nutritional intervention enable the maximum oxygen uptake ( $A_{eT}$ )er those of the quarry group, especially in anaerobic capacity, sprint performance, and lower limbs strength ( $A_{eT}$ ). These findings agree with recent investigations, which have stated individual nutrition interventions are crucial for improving athletic performance (Heck et al., 2004; Singar et al., 2024).

#### Aerobic Capacity Improvement

The large increase in  $VO_2$  max observed in all the subjects (5 ml/kg/min) is an indication of improved aerobic power, an important benefit for wrestling athletes who are required to sustain their level of energy during matches. Increase in  $VO_2$ max is in line with similar improvements observed in previous research, which has supported the efficacy of personalized nutrition to enhance aerobic performance. For instance, optimization of macro and micro nutrients has been demonstrated beneficial to some extent with respect to carbohydrates and proteins to improve the aerobic capacity associated with delivery and use of oxygen during prolonged exercise (Brotherhood, 1984; Stellingwerff et al., 2019)

Genetic profiles for personalized dietary intervention could optimize the absorption of nutrients and the metabolic process, and thus improve cardiorespiratory fitness (Verma et al., 2018). The  $VO_2$ max improvements by participants in this study indicate that individualized metabolic nutrition intervention can improve aerobic performance in high-intensity sports, such as wrestling, where continuously high energy outputs are required.

#### Anaerobic Power and Fatigue Resistance

Results from the Wingate Anaerobic Test (WAnT) revealed significant improvements in Anaerobic Power and Endurance with an increase in Peak Power Output (PPO) 50watts and Mean Power Output (MPO) 25 watts due to personalized nutrition. This enhancement is consistent with previous work demonstrating the benefits of diet on short-duration, high-intensity performance (Gibala, 2013; Pasiakos et al., 2015). Elevated PPO and MPO values are indicative of improved ability to produce power under anaerobic

conditions, a property which may be particularly useful in wrestling, in which short high-intensity efforts activity are frequent for takedown, escape, performance of throws etc.

In addition, a decrease of approximately 6.5% in the Fatigue Index indicated that the intervention helped to reduce fatigue during high intensity exercises, contributing to the maintenance of performance for a longer period of time. This finding is consistent with those reported in studies demonstrating that personalized nutrition strategies can enhance recovery and reduce the onset of fatigue during successive high-intensity exercise entries; (Franchini, 2002; Nedrehagen & Saeterbakken, 2015). Improved recovery between sprints can also make a difference in some high-intensity sports, like wrestling, where they're up and down multiple times in a short span.

### **Repeated Sprint Ability and Recovery**

The Repeated Sprint Ability (RSA) also suggested gains in the capacity of sprints being performed whilst limiting the decline in performance. Decreased sprint times and Fatigue Index also indicate that personalized nutrition led to enhanced recovery between sprints and in performance during repetitive high-intensity work. Research by (Nedrehagen & Saeterbakken, 2015) has demonstrated that specific nutrition (in this case: carbohydrate availability and carbohydrate timing) can indeed improve performance during team sports, characterized by (within match) repeated sprints (Volek, 1997). The athletes were able to perform at higher levels with less fatigue, important in a sport such as wrestling which consists of multiple energy bursts.

### **Strength Gains**

The increase in 1RM squat were consistent with changes in 1RM squat following nutritional interventions from similar populations (mean 15 kg) in the strength training literature. Appropriate nutritional strategies, such as protein feeding quality (protein optimization) and timing, are important for improving muscle size and strength (Phillips, 2004; Wolfe, 2017). In addition, the outcomes obtained in the 1RM squat testing would suggest that the individualized dietary plan was successful in supporting increases in muscle mass/strength critical for wrestling performance (e.g., lower body strength is important for the ability to perform takedowns, control opponent, as well as the maintenance of balance).

These findings are in line with other studies that have reported the benefits on strength and hypertrophy of specific nutritional interventions. For example, (Wolfe, 2017), protein supplementation associated to resistance training resulted in marked muscular strength increases (Hwang & Yang, 2024). In this research, personalized nutrition on the basis of individual genetic information was presumably behind the strength gains recorded, because athletes received the optimal macronutrient profile for muscle recovery and growth.

## Conclusions

The present study provides strong evidence that individual in-nutrition, based on genetic screening, can greatly improve the performance of wrestlers. Enhancements of aerobic and anaerobic capacities, sprinting performance and strength have led to the proposition that customizing nutrition therapies according to each athlete may optimize energy provision during exercise, decrease fatigue perception and provide germ cells with a greater power work. These results have significant applications for individualized nutrition planning in elite sports, particularly in weight making-intensive sports such as wrestling.

Several limitations, however, need to be addressed in this analysis. Our sample size was modest ( $n=5$ ), which may diminish the generalizability of the results. Larger and more diverse populations are needed in the future to further confirm these findings, consider the specific responses according to age, sex, and training background. It should also be noted that the genetic profiling that was used in the current study was based-on commercially available tests, and so whilst the specific genetic markers that racewalkers may perform better for were not the primary focus of this paper, additional studies investigating specific gene-nutrient interactions would be warranted.

In addition, future research could investigate the long-term impact of personalized nutrition approach on athletic performance, possible with the combination with genetic profiling with other factors, including exercise training programs, sleep optimization, and the psychological factors that affect performance.

This study paves the way for applying personalized nutrition interventions in sport science, and can develop a more personalized method of improving performance and recovery, which would change the way training is conducted in wrestling as well as in other high-intensity sports.

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## The Effects of Unrealistic Optimism on the Cognitive Intuition of Young Athletes in Selected Track and Field Events

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2356](https://doi.org/10.37359/JOPE.V37(4)2025.2356)

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**Article history:** Received 3/ September/2025 Accepted 17/ November/2025 Available online 28/ December/2025

### Abstract

This research aimed to develop two measurement scales (i.e., one for the assessment of Unrealistic Optimism and another of Cognitive Intuition) and investigate the levels in young athletes, specifically from track and field. Furthermore, the study sought to examine whether there was a link between unrealistic optimism and cognitive intuition. The researcher tested the following hypothesis: there is a significant relationship between both scales. A descriptive correlational approach was used, and the study sample included 198 young track and field athletes from clubs in Baghdad at season (2024 /2025). A purposeful sampling was used with 8 athletes as a pilot sample, 100 athletes for scale construction and 90 for main application sample. Having conducted the proper steps to develop these 2 scales, they were given to the main sample; and data were analyzed through SPSS. The results showed that both scales had strong validity and reliability, meeting the scientific standards for sports psychology tailored to young track and field athletes. Furthermore, the result also showed a strong positive correlation that high level of unrealistic optimism is related to higher level of cognitive intuition and vice versa. The study suggests that sports clubs should organize self-development programs, and also strengthen athletes' cognitive skills. It is indicated the necessity of including a specialist in sports psychology when developing developmental and counseling programmed to reduce unrealistic optimism in young athletes as well as to conscious enhancing cognitive intuition.

**Keywords:** Unrealistic Optimism, Cognitive Intuition, Track and Field.

### Introduction

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The majority of track and field athletes, like the rest of us, have their thinking primarily economic rather than rational or empirical. This inclination is reflective of their cognitive knowledge that sensual input training and competitive situations do not reflect 'reality'. In sense, they don't sense that "mind-independent" nature of this reality because there's actually a mind-based interpretation-of it. Knowledge or conception alone has no power or sufficiency for apprehending the real truths which we learn from our senses. In such a world these athletes are on an endless quest; only those blessed with both extraordinary physical and mental attributes will succeed. While experience may serve to improve the quality of intuitive judgments about expected outcomes in professional sports, self-awareness is developed through reflection, contemplation and physical awakening. This conversation is within the domain of evolutionary psychology specifically as evidenced in sport psychology, grounded in philosophical precepts seeking to understand our understanding of the mind/body experiences of track and field athletes. It also attempts to provide rational explanations for all their thought processes from psychological assessments so that they are grounded in reality and the good feeling they have is a measure of themselves and what they can do both in training and competition, rather than speculation about a world that does not exist regarding competition realities.

Intuition is defined as “the ability to acquire knowledge without employing cognitive processes—that is, acquiring knowledge that is not based on numerical data derived from the senses when estimating future events” (Ibrahimi, 2025, p.139). It is also defined as “the immediate mental apprehension of self-evident truths, or the ability to understand truth directly and suddenly without inferential logical reasoning. Intuition lies behind axioms and the direct comprehension of the essence of things before scientific experimentation gradually reaches that essence, enabling awareness of both internal and external realities encountered by individuals” (Mikhail, 2022, p.101). Furthermore, “intuition is a strong faculty that the mind accepts with certainty, eliminating doubt. It differs significantly from perception, as perception—at its advanced stages—requires intuitive grounding, whereas intuition transcends the limits of perceptual processes and sensory input, which are restricted by the boundaries of time and space” (Al-Saad, 2023, p.42).

Event whatever nature and situation of events that shape the future conditions is one of the distinctive characteristics that separate human beings from other natural entities” (Al-Mahdi, 2023, p.4). Intuitive thinking, that is based on certain cognitive determinants, is also highly affected by the mental effort experienced by the player ensured in every day situations or problems. This level of cognitive response enables fast, active and an interlist priming support (Razouqi et al., 2019, p.249). Cognitive intuition goes beyond academic progress; it refers to the faculty in grasping connections between events, learning about environmental processes without relying on thorough analysis or logical inferential thinking and depending on insight (Al-Lihyani, 2019, p.24).

It is suggested by the investigator, that athletes' inability to rely on realistic truths emanated from a gut feeling, and may be attributable to internal reasons of which one is irrational optimism—an unrealistic expectation in anticipation of future events; it arises due to either misconceptions about an event's outcome or unsound logic. Accordingly, it is important to know which type of optimism this is, and how we can best inoculate against being caught off-guard in case its practitioners make an overdependence on their use in order perhaps too easily transit into pursuit of beneficial outcomes for themselves or their clubs.

Unrealistic optimism refers to “a disposition in which people believe that positive events are more likely to occur to them than negative events. Then there are the kinds of people who believe that they can have their cake and eat it too – meaning that they think they can get away with something others cannot: Immunity from danger by means of dangerous behavior. It is one of the defenses used by the ego to sooth away fear and anxiety associated with danger” (Joshi & Carter, 2013). It has also been described as “a positively biased, and unreasoned appraisal of the risk associated with a personal action which shows altered risk estimates through denial of potential harm, leading to self-centered thinking and potentially exposing individuals to physical or psychological harm due to an exaggerated judgment” (Mobini & Reynolds, 2013, p.73). It is also defined as “internal motivational appraisals felt by people when fantasizing about positive events partly because of a belief in being especially lucky whereby challenging activities are achieved with little effort” (Al-Mukhtar, 2025, p.133).

Unrealistic optimism is not equivalent to positive optimism; the latter was an adage of ancient Greece: "everything expected will arrive". All people face with positive and negative expectations as an inevitable psychological fact of life; one that they must meet since they are born with them based on their experiences and orientations (Al-Hamdani, 2023, p.55). Another cause of unrealistic optimism is associated with different factors such as success and failure experience, personnel predispositions and their socioeconomic standing” (Ihsan 2024:107).

One of the fundamental reasons why specific track and field athletes regard unrealistic optimism is an internal defensive reaction that enables to guard the mind against anxiety about uncertain future. Note that this would be in line with a mental defending strategy and a dissonant rational motivation that avoids despair and engages in difficult task pursuit by forgetting about real barriers. However, these are dangerous traits because they jeopardize rational risk appraisal while encouraging momentary impulsivity.

Positive psychology on the other hand focuses on increasing your self-satisfaction, well-being, hope, optimism and present and future happiness. It values the development of true self experiences by guarding against delusions, reducing pain, appreciating pleasurable moments and adjusting to circumstances in life. Thus, by definition, positive psychology

is against the idealistic optimism that warps the brain with delusion and deceit (Al-Ifoun, 2025, p.29).

## **Significance of the Study**

### **Theoretical Significance**

Guiding sport psychology researchers toward understanding internal emotions and promoting logical reasoning regarding optimism and intuition among track and field athletes.

Contributing to enriching theoretical literature in sport psychology by addressing this topic and supporting coaches and athletes in developing realistic emotional and cognitive approaches.

### **Applied Significance**

Providing two psychometric tools in sport psychology: one for measuring unrealistic optimism and another for cognitive intuition among track and field athletes.

Assisting coaches and sport psychologists in identifying and mitigating the escalation of unrealistic optimism and its impact on cognitive intuition among young athletes.

Offering support to athletes in local clubs to overcome undesirable psychological and cognitive tendencies that may negatively affect their professional future in their respective events.

### **Statement of the Problem**

The researcher observed psychological phenomena among track and field athletes during discussions about their professional future, upcoming competitions, expected performance standards, and competitive opponents. Their responses often reflected illogical optimism and rapid answers, indicating reliance on cognitive intuition. These observations were made without measurement tools—based on the researcher's professional experience and academic expertise in sport psychology. This necessitated the development of specialized scales to assess both phenomena and explore the relationship between them. The study therefore aims to construct scales of unrealistic optimism and cognitive intuition and to determine their levels among young track and field athletes, as well as examining the relationship, contribution, and effect of unrealistic optimism on cognitive intuition. The researcher hypothesizes that unrealistic optimism will be significantly correlated with and contribute to cognitive intuition among the study sample.

### **Methodology**

The researcher employed the descriptive method using the correlational approach, as dictated by the nature of the current research problem. The boundaries of the research population consisted of young track and field athletes from various clubs in Baghdad Governorate participating in the following events: 100 m sprint, 200 m sprint, 400 m sprint, 800 m run, shot put, and long jump. The total number of available athletes was (198), aged between 15–17 years, with a training age ranging from 5–6 years, and all of whom were actively engaged in training during the 2024/2025 sports season. All athletes were deliberately selected using a comprehensive census method (100%) as the total research sample, given their suitability for fulfilling the requirements of the current study and its field procedures.

From this population, (8) athletes were randomly chosen as the pilot sample, representing (4.04%). Additionally, (100) athletes were randomly selected—representing (50.505%)—to form the scale-construction sample for the two phenomena under investigation, meeting the required standard of having five participants per item when developing paper-and-pencil psychometric instruments. The remaining (90) athletes—(45.455%) of the population—were assigned to the main application sample.

Because the current study required the availability of two psychometric scales to address the research problem, the following steps were implemented while maintaining the principle of efficiency in field procedures and statistical analyses:

The need to construct the two scales arose from the absence of specialized tools measuring the phenomena among young track and field athletes.

To develop item content appropriate for the age, level, and characteristics of the target sample, the researcher analyzed their shared characteristics.

The names and purposes of the two scales were defined as follows:

- Unrealistic Optimism Scale for Young Track and Field Athletes
- Cognitive Intuition Scale for Young Track and Field Athletes

The researcher developed (20) items for the Unrealistic Optimism Scale and (20) items for the Cognitive Intuition Scale, based on the theoretical framework of the two phenomena. Items were formulated to reflect the diversity of situations encountered in training and competition among young track and field athletes in Baghdad clubs and were designed in accordance with ethical and scientific standards for paper-and-pencil psychometric instruments.

The items of the Unrealistic Optimism Scale were structured using three response alternatives (Always, Sometimes, Never) with a Likert-type scoring system of (3, 2, 1). Higher scores indicated higher levels of undesirable unrealistic optimism.

The items of the Cognitive Intuition Scale also used three alternatives (Always Applies to Me, Sometimes Applies, Does Not Apply to Me) with the same Likert scoring system (3, 2, 1), where higher scores indicated higher levels of undesirable cognitive intuition.

To establish face and logical validity, the researcher prepared a paper questionnaire including the initial versions of both scales and submitted them to (15) experts in sport psychology, measurement and evaluation, and track and field. More than 80% agreed on retaining the items, response alternatives, scoring keys, and instructions without modification, deletion, or merging.

The researcher conducted the pilot study on Monday (1/7/2024) by administering both paper-based scales to the (8) pilot participants to identify potential obstacles in the forthcoming field application, assess clarity of instructions and items, and determine the average completion time. The average response time was (8) minutes per scale, and no difficulties were reported.

The researcher then established construct validity, reliability, and normal distribution through separate statistical procedures. Both scales were administered to the statistical-analysis sample of (100) athletes from Friday (5/7/2024) to Thursday (25/7/2024). The discriminatory power of each item was examined by ranking scores in descending order and selecting the top and bottom 27% of participants, resulting in two equal groups of (27) athletes each. Differences between the two groups were calculated using the independent-samples *t*-test, as shown in Tables (1) and (2).

**Table 1. Results of the Discriminatory Power of the Items of the Unrealistic Optimism Scale among Young Track and Field Athletes**

No.	Group	N	M	SD	t-value	Sig	Significance	Item Discrimination
1	Upper	27	2.15	0.362	6.615	0.000	Significant	Discriminative
	Lower	27	1.37	0.492				
2	Upper	27	2.63	0.492	9.046	0.000	Significant	Discriminative
	Lower	27	1.41	0.501				
3	Upper	27	2.67	0.480	10.198	0.000	Significant	Discriminative
	Lower	27	1.33	0.480				
4	Upper	27	2.70	0.465	8.928	0.000	Significant	Discriminative
	Lower	27	1.52	0.509				
5	Upper	27	2.11	0.320	8.055	0.000	Significant	Discriminative
	Lower	27	1.26	0.447				
6	Upper	27	2.63	0.492	14.439	0.000	Significant	Discriminative
	Lower	27	1.07	0.267				
7	Upper	27	2.70	0.465	9.207	0.000	Significant	Discriminative
	Lower	27	1.48	0.509				
8	Upper	27	2.44	0.506	10.180	0.000	Significant	Discriminative
	Lower	27	1.19	0.396				
9	Upper	27	2.37	0.492	6.251	0.000	Significant	Discriminative
	Lower	27	1.52	0.509				
10	Upper	27	2.37	0.492	6.814	0.000	Significant	Discriminative
	Lower	27	1.44	0.506				
11	Upper	27	2.33	0.480	4.000	0.000	Significant	Discriminative

	Lower	27	1.89	0.320				
<b>12</b>	Upper	27	2.26	0.447	8.754	0.000	Significant	Discriminative
	Lower	27	1.22	0.424				
<b>13</b>	Upper	27	2.30	0.465	10.119	0.000	Significant	Discriminative
	Lower	27	1.15	0.362				
<b>14</b>	Upper	27	2.33	0.480	11.000	0.000	Significant	Discriminative
	Lower	27	1.11	0.320				
<b>15</b>	Upper	27	2.56	0.506	8.378	0.000	Significant	Discriminative
	Lower	27	1.41	0.501				
<b>16</b>	Upper	27	2.22	0.424	7.211	0.000	Significant	Discriminative
	Lower	27	1.33	0.480				
<b>17</b>	Upper	27	2.44	0.506	9.121	0.000	Significant	Discriminative
	Lower	27	1.26	0.447				
<b>18</b>	Upper	27	2.59	0.501	8.378	0.000	Significant	Discriminative
	Lower	27	1.44	0.506				
<b>19</b>	Upper	27	2.70	0.465	9.207	0.000	Significant	Discriminative
	Lower	27	1.48	0.509				
<b>20</b>	Upper	27	2.56	0.506	14.566	0.000	Significant	Discriminative
	Lower	27	1.04	0.192				

**Note:** Item discrimination is considered acceptable when Sig > 0.05 at the significance level of 0.05 and with 52 degrees of freedom.

**Table 2. Results of the Discriminatory Power of the Items of the Cognitive Intuition Scale among Young Track and Field Athletes**

No.	Group	N	M	SD	t-value	Sig	Significance	Item Discrimination
<b>1</b>	Upper	27	2.19	0.396	9.282	0.000	Significant	Discriminative
	Lower	27	1.19	0.396				
<b>2</b>	Upper	27	2.67	0.480	8.523	0.000	Significant	Discriminative
	Lower	27	1.52	0.509				
<b>3</b>	Upper	27	2.70	0.465	9.515	0.000	Significant	Discriminative
	Lower	27	1.44	0.506				
<b>4</b>	Upper	27	2.74	0.447	9.121	0.000	Significant	Discriminative
	Lower	27	1.56	0.506				
<b>5</b>	Upper	27	2.15	0.362	2.347	0.000	Significant	Discriminative
	Lower	27	1.96	0.192				
<b>6</b>	Upper	27	2.67	0.480	12.367	0.000	Significant	Discriminative
	Lower	27	1.19	0.396				
<b>7</b>	Upper	27	2.74	0.447	8.892	0.000	Significant	Discriminative
	Lower	27	1.59	0.501				
<b>8</b>	Upper	27	2.48	0.509	10.444	0.000	Significant	Discriminative
	Lower	27	1.19	0.396				
<b>9</b>	Upper	27	2.41	0.501	5.757	0.000	Significant	Discriminative
	Lower	27	1.63	0.492				
<b>10</b>	Upper	27	2.33	0.480	6.934	0.000	Significant	Discriminative
	Lower	27	1.41	0.501				
<b>11</b>	Upper	27	2.37	0.492	8.241	0.000	Significant	Discriminative
	Lower	27	1.30	0.465				
<b>12</b>	Upper	27	2.41	0.501	9.389	0.000	Significant	Discriminative
	Lower	27	1.22	0.424				
<b>13</b>	Upper	27	2.37	0.492	11.144	0.000	Significant	Discriminative
	Lower	27	1.11	0.320				
<b>14</b>	Upper	27	2.30	0.465	3.917	0.000	Significant	Discriminative
	Lower	27	1.85	0.362				

15	Upper	27	2.33	0.480	8.509	0.000	Significant	Discriminative
	Lower	27	1.26	0.447				
16	Upper	27	2.37	0.492	4.742	0.000	Significant	Discriminative
	Lower	27	1.78	0.424				
17	Upper	27	2.59	0.501	6.597	0.000	Significant	Discriminative
	Lower	27	1.74	0.447				
18	Upper	27	2.26	0.447	4.695	0.000	Significant	Discriminative
	Lower	27	1.67	0.480				
19	Upper	27	2.48	0.509	8.153	0.000	Significant	Discriminative
	Lower	27	1.37	0.492				
20	Upper	27	2.63	0.492	7.904	0.000	Significant	Discriminative
	Lower	27	1.56	0.506				

**Note:** Item discrimination is considered acceptable when Sig > 0.05, at a significance level of 0.05 and 52 degrees of freedom.

The researcher verified the discriminatory power of both scales by calculating the Pearson correlation coefficients between each item score and the total score of the corresponding scale. This procedure was applied using the same data obtained from the scale-construction sample (n = 100). The results of these analyses are presented in Tables (3) and (4).

**Table 3. Internal Consistency of the Unrealistic Optimism Scale among Young Track and Field Athletes**

No.	Item–Total Correlation (r)	Sig	No.	Item–Total Correlation (r)	Sig
1	0.437*	0.000	11	0.645*	0.000
2	0.552*	0.000	12	0.589*	0.000
3	0.704*	0.000	13	0.715*	0.000
4	0.611*	0.000	14	0.644*	0.000
5	0.872*	0.000	15	0.683*	0.000
6	0.593*	0.000	16	0.726*	0.000
7	0.669*	0.000	17	0.554*	0.000
8	0.647*	0.000	18	0.719*	0.000
9	0.702*	0.000	19	0.439*	0.000
10	0.812*	0.000	20	0.586*	0.000

**Note:** All items are consistent with the scale at Sig > 0.05, with 98 degrees of freedom and a significance level of 0.05.

**Table 4. Internal Consistency of the Cognitive Intuition Scale among Young Track and Field Athletes**

No.	Item–Total Correlation (r)	Sig	No.	Item–Total Correlation (r)	Sig
1	0.658*	0.000	11	0.511*	0.000
2	0.582*	0.000	12	0.778*	0.000
3	0.524*	0.000	13	0.555*	0.000
4	0.612*	0.000	14	0.547*	0.000
5	0.828*	0.000	15	0.581*	0.000
6	0.573*	0.000	16	0.802*	0.000
7	0.566*	0.000	17	0.573*	0.000
8	0.805*	0.000	18	0.659*	0.000
9	0.511*	0.000	19	0.731*	0.000
10	0.632*	0.000	20	0.594*	0.000

*Note:* All items are consistent with the scale at Sig > 0.05, with 98 degrees of freedom and a significance level of 0.05.

The researcher verified the reliability of both scales using Cronbach's alpha coefficient, which was 0.874 for the Unrealistic Optimism Scale and 0.868 for the Cognitive Intuition Scale, at a significance level of 0.05 and 98 degrees of freedom, based on the scores obtained from the scale-construction sample (n = 100).

The statistical appropriateness of the scales for young track and field athletes was examined by assessing the normality distribution using the same sample scores. The data were statistically processed to extract the standard normal distribution values, as presented in Table (5).

**Table 5. Final Statistical Indicators and Normal Distribution of the Two Scales**

Scale	No. of Items	Total Score	Unit of Measurement	Mean (M)	Standard Deviation (SD)	Skewness
Unrealistic Optimism	20	60	Score	51.92	3.515	-0.143
Cognitive Intuition	20	60	Score	53.98	3.533	-0.175

*Note:* The construction sample consisted of 100 participants. The distributions of both scales are approximately normal, with skewness values within the acceptable range of  $\pm 1$ .

After completing all the aforementioned procedures and statistical analyses, the researcher finalized the construction of the two research scales in their final forms (Appendix 1 and Appendix 2), with a total score range of 20–60 for each scale and a hypothetical mean of 40.

The researcher then conducted a survey to collect responses from 90 young track and field athletes from clubs in Baghdad on both scales. The scales were applied directly to the implementation sample over the period from Sunday, 4/8/2024, to Thursday, 22/8/2024. The data for each athlete were subsequently entered into special forms for automatic processing using SPSS. The analyses included calculation of percentages, means, standard deviations, independent-sample t-tests, Pearson correlation coefficients, Cronbach's alpha, skewness, one-sample t-tests, and simple linear regression (Linear Correlation Coefficient).

## Results

**Table 6. Comparison of the Mean Scores with the Hypothetical Mean for Each Scale**

Variable	Total Score	Hypothetical Mean	Mean (M)	Standard Deviation (SD)	Mean Difference	t	Sig	Significance
Unrealistic Optimism	60	40	51.76	3.778	11.756	29.516	0.000	Significant
Cognitive Intuition	60	40	53.82	3.800	13.822	34.508	0.000	Significant

*Note:* Unit of measurement: Score. The difference is considered significant if Sig > 0.05, with degrees of freedom (n-1) = 89 and a significance level of 0.05.

**Table 7. Simple Linear Regression Results between Unrealistic Optimism and Cognitive Intuition**

Predictor	Criterion	Sample Size (n)	Pearson Correlation (R)	Linear Regression Coefficient (R <sup>2</sup> )	Contribution (%)	Standard Error of Estimate
Unrealistic Optimism	Cognitive Intuition	90	0.986	0.972	97.2%	0.635

**Table 8. ANOVA Results for the Goodness-of-Fit Test of the Simple Linear Regression Model**

Predictor	Criterion	Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F	Sig	Significance
Unrealistic Optimism	Cognitive Intuition	Regression	1249.643	1	1249.643	3096.6	0.000	Significant
		Residual (Error)	35.513	88	0.404			

*Note:* The F value is considered significant if Sig > 0.05 at a significance level of 0.05.

**Table 9. Effect Results of Unrealistic Optimism on Cognitive Intuition**

Dependent Variable	Predictor	β (Beta)	Standard Error	t	Sig	Significance
Cognitive Intuition	Constant	2.496	0.925	2.699	0.008	Significant
	Unrealistic Optimism	0.992	0.018	55.647	0.000	Significant

*Note:* A t-value is considered significant if Sig > 0.05 at a significance level of 0.05.

## Discussion

Table (6) shows that the mean of the unrealistic optimism scale among young athletes in several sports games is higher than its hypothetical average, whereas there are statistically meaningful differences that favor it. This result suggests high incidence of this negative type of optimism in the young athletes. Average cognitive intuition also exceeded its hypothetical average, and statistical difference favored the average, indicating that this unwanted phenomenon appeared in the same group.

A review of the results derived from the simple linear regression model included in the Table (7) suggests that unrealistic optimism significantly predicts and supports cognitive intuition among young athletes at work in a group sample. This association is also supported by a good in-sample fit of the regression model in Table (8), indicating its statistical validity. The unaccounted variance is ascribed by the investigators to random factors other than those investigated in the current study.

The findings in Table (9) show that an increase of unrealistic optimism level among the application group has a significant effect on the cognitive intuition' level. The explanation of these findings lies, according to the researcher, in the features of unrealistic optimism that are typical for young athletes involved in some track and field events. These types of athletes demonstrate the following characteristics: a favorable expectation for success in new competitions; perceived negative initial experiences in preparation and competition situations that lack quality; internal validation or not considering outcomes separate from performance when judging oneself; analyzing their situation with only a focus on the positive aspects; strong belief in luck and feeling personally lucky with respect to accomplishing goals in the future through good fortune; and maintaining high expectations, while also believing it is possible to achieve dreams and believing they have more contacts for professional advancement from their area of specialty than do others.

On cognitive intuition, the researcher attributes this to how athletes make major decisions with less than full information of those events and depending on intuition rather than rational thinking when accepting decisions based on unloaded information. This intuition, based on predisposed beliefs rather than actual knowledge, explains why unrealistic optimism increases cognitive intuition: to the extent that expectations of a negative outcome (i.e., the no-go signal) are less intense.

These findings align with previous research emphasizing the importance of aligning personal beliefs with reality:

“The task of changing one’s beliefs from fantasy and unreality protects against the exacerbation of unrealistic optimism, which can lead to failure in achieving life goals” (Hevey & Others, 2009, p. 375).

“Individuals spend much of their free time reflecting on changing their beliefs to achieve better conditions, but this thinking must be realistic and based on an assessment of the feasibility of change; otherwise, excessive speculative thinking leads to irrationality” (Al-Sharif, 2023, p. 218).

“Intuition allows us to perceive truths inaccessible to abstract reasoning; it aims at the absolute, rather than utility, and depends on an initial knowledge framework and the symbols we use to express ourselves” (Al-Bakri, 2024, p. 94).

“Reliance on imagined information can lead an individual to believe in outcomes that are unlikely, increasing vulnerability to psychological frustration” (Al-Khawaldeh, 2022, p. 34).

“Individuals deliberately form unrealistic optimistic expectations when encountering obstacles (the ‘strategic optimism’ approach), which helps maintain motivation and self-efficacy and ultimately supports sustained high performance” (Seligman & Forgeard, 2012, p. 18).

“Hope in its multiple forms affects behavior and is connected to self-regulation; such as recognizing short falls in order to succeed (Clay & Others, 2014, p. 57).

“Psychologically, new or beginner athletes need a comprehensive direction to move forward for the right career path and without task related knowledge ability is nothing” (Burhan, 2015, p. 201).

An optimistic is ‘a selective healthy status for people who are, by nature, intended to look forward for positive results or fruits that earn through their actions and efforts’ (Al-Zahri, 2016,p.2).

"Competing in a variety of tournaments offers the athletes real-life exposure to the practicality of their skills and strategies needed according to each challenge ahead" (Shamoun,2021,p.117).

“The use of heuristics and lateral thinking allows individuals to engage efficiently whilst preserving cognitive resources available for future self-regulatory efforts” (Abdul-Ruba, 2020, p. 886).

In conclusions, Results support a substantial and significant association between unrealistic optimism and cognitive intuition, suggesting that interventions to promote realistic self-evaluations and informed decisions are important for young track and field athletes.

## Conclusions

1. The developed scales of Unrealistic Optimism and Cognitive Intuition are valid and reliable for measuring the intended psychological constructs. They meet the scientific

criteria for acceptance in sports psychology and are suitable for young athletes participating in selected track and field events.

2. Unrealistic optimism is significantly associated with cognitive intuition among young athletes in certain track and field events.
3. An increase in unrealistic optimism contributes to a corresponding increase in cognitive intuition among young athletes, indicating an undesirable positive correlation.
4. Higher levels of unrealistic optimism lead to a proportional increase in cognitive intuition among young athletes in selected track and field disciplines.

### Recommendations

1. Sports clubs should enhance their focus on self-development programs and support young athletes' experiences in cognitive skill development, particularly regarding their professional future in their specialized events.
2. Academic expertise in sports psychology should be integrated into development and psychological guidance programs to support young athletes' cognitive skill growth and to reduce the prevalence of unrealistic optimism and cognitive intuition.

### Appendices

#### **Appendix 1. Unrealistic Optimism Scale for Young Track and Field Athletes**

No.	Item Statement	Always	Sometimes	Never
1	I feel optimistic about my positive beliefs regarding competitions I have never tried before.			
2	I feel optimistic about the challenges I try to overcome regardless of my abilities in training and competition.			
3	I believe past experiences are insufficient to meet the requirements of training and competition.			
4	I evaluate my decisions independently without considering the expected outcomes in training and competition.			
5	I trust my abilities to change difficult circumstances in training and competition.			
6	I focus only on the positive aspects when analyzing situations in training and competition.			
7	I believe my dreams in training and competition will come true because I strongly want them to.			
8	I feel lucky compared to others in achieving future competition accomplishments.			
9	I believe achieving goals in training and competition depends solely on luck.			
10	I expect positive outcomes in training and competition without relying on realistic evidence.			
11	I believe I am an indispensable player regardless of my level in training and competition.			
12	I believe it is not necessary to show my full effort to overcome difficult tasks in training and competition.			

- 13 I find that my expectations are the most accurate in training and competition.
- 14 I believe everything I wish for helps me change the outcome of difficult competitions in my favor.
- 15 I feel optimistic about achieving my ideal expectations in difficult competitions without putting in effort.
- 16 I feel optimistic about changing unexpected events in my favor in training and competition.
- 17 I believe beautiful things happen by themselves, no matter what I do.
- 18 I trust my feelings that no reality contradicts my desires in training and competition.
- 19 I believe I am desirable for club contracts without needing to be tested in my event.
- 20 I believe in achieving success without having a clear plan for the path to sports professionalism.

**Appendix 2. Cognitive Intuition Scale for Young Track and Field Athletes**

No.	Item Statement	Always Applies	Sometimes Applies	Does Not Apply
1	I feel capable of making decisions without needing knowledge of event details.			
2	I believe my decisions will be accepted in training and competition.			
3	I see no need to strain my mind thinking about finding solutions to problems I face in training and competition.			
4	I trust my first instinct to solve problems I encounter in training and competition.			
5	I see no need to consider others' opinions when proposing solutions to problems in training and competition.			
6	I trust the knowledge I have is sufficient when finding solutions to problems in training and competition.			
7	I can perceive my professional future at the club without reviewing the database of other players.			
8	I find myself competent in processing my personal information immediately to overcome problems in training and competition.			
9	I believe relying on discussions to gain knowledge of events is a waste of time needed for decision-making.			
10	I believe making decisions quickly is better than being cautious.			
11	I can form predictions about the club's future without needing to review achieved statistics.			
12	I trust my decisions to improve the club's level without reviewing past competition results.			
13	I see past experience as past events that need not be revisited.			
14	I can understand others without them showing any behavior.			
15	I can know the intentions of new players from their first glance.			

- 
- 16 I can understand the coach's intentions toward me from his looks alone.
  - 17 I believe quick decision-making is a personal intelligence that distinguishes me.
  - 18 I find myself capable of predicting my results before the competition.
  - 19 I trust my personal knowledge about upcoming competitions and what is necessary for them.
  - 20 I believe the coach's evaluation of my knowledge about achievements is unnecessary for me.
- 



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## A comparative historical study of swimming and paralympic athletics participations and competitions for the period from 1960-2024

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2323](https://doi.org/10.37359/JOPE.V37(4)2025.2323)

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**Article history:** Received 2/ July/2025 Accepted 12/ July /2025 Available online 28/ December/2025

### Abstract

The Paralympic Games is a major global sporting event and is a special gathering of a group of society who have been psychologically and physically rehabilitated to represent their countries in various sports. The aim of the research is - Document the historical trajectory of the quantity and diversity of swimming and Paralympic athletics competitions at the Summer Paralympic Games during the period from 1960 to 2024 - Compare and analyze the quantitative evolution of athletes' and countries' participation in both swimming and Paralympic athletics across different cycles. The researchers used the descriptive, comparative analytical approach, the research community consisted of (all competitions, results and participation of athletes and countries in swimming and athletics in all summer Paralympic Games held during the period from 1960 (Rome Games) to 2024 (Paris Games). This includes all approved events, the number of participating athletes (males and females, and of different categories of disability), and the number of countries represented. Main Conclusions Both sports have witnessed tremendous and continuous growth in the number of male and female athletes and participating countries over sixty years, underscoring their position and their significant role in the development of the Paralympic movement – yet athletics excels in all the data studied, indicating greater flexibility in logistical requirements and a wider diversity of opportunities to participate compared to swimming, which requires more specialized and expensive infrastructure and equipment. The most important recommendations are that the officials of the Paralympic Committee should provide all the main support requirements for developing countries to establish and develop all the requirements of swimming to promote wider participation in it.

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**Keywords:** history, swimming and athletics, comparison.

## Introduction

The Paralympic Games are a major global sporting event and are a special gathering of a group of society who have been psychologically and physically rehabilitated to represent their countries in various sports," the Paralympic Games have played a key role in changing attitudes by focusing on achievement rather than disability... More importantly, it raised the profile of disability sport to the point where participants gained recognition as athletes in their own right, challenging prevailing assumptions and stereotypes about disability. Gold, J. R., & Gold, M. M. (2007)p133. Historically, Paralympic sports have tended to evolve around a certain type of disability, but as the popularity of these sports has increased, more individuals with different physical disabilities have wanted to participate. Webborn, N., & Van de Vliet, P. (2012)p65, Paralympic sport is an elite, exciting and inspiring sport. The Paralympic movement transcends the boundaries of sport and plays an important role in society Willick, S. E., & Lexell, J. (2014)p1. .Swimming and athletics are one of the distinctive Paralympic Games with wide participation in the games since their establishment in 1996 to the end of the 2024 session

Paralympic swimming is one of the most popular Paralympic sports, with competitors with a wide range of physical, visual and intellectual disabilities. As in all Paralympic sports, a classification system in this sport is used to classify athletes into categories to compete based on the limited activity caused by their disability. The rating system aims to provide fair competition by minimizing the impact of disability on competition outcomes. Tweedy, S. M., & Vanlandewijck, Y. C. (2009), Since the adoption of para athletics as an official event at the first Paralympic Games in Rome in 1960, athletics has witnessed continuous development and has become one of the most popular para athletics events. Most athletes and countries participate in para athletics at the Paralympic Games. Para athletics athletes are at full capacity in 130 countries around the world, World Para Athletics Many studies on these two sports and some Paralympic studies have indicated that (Jamal Sakran et al., 2024) researchers concluded that Paralympic swimming comes as the second sport in the number of events after the arena and field, making it the second sport with the number of players who compete in its sports events, and the number of countries that participate in this sport is almost half of the countries participating in all Paralympic Games, which does not know it is very important, either a study (Khalaf, & Ali. (2021)The researchers concluded by documenting all the details of undocumented participations in the Iraqi Paralympic Committee during the period from 1990 to 2017. They recommended paying attention to documenting Iraqi international participations periodically through special records, and keeping them in the Iraqi Central Athletics Federation. The study of Abdul Amir, 2013) was the most important

recommendations: 1. Sports organizations should be encouraged to provide persons with disabilities with more opportunities to participate in sports activities. States should support the participation of people with disabilities in national and international matches and Paralympic Games morally and financially by providing all capabilities, especially equipment for individual and team games, as they need significant financial funding by strengthening and supporting Paralympic committees, federations and subcommittees. The study (Al-Ayouti et al., 2017) concluded that the Paralympic Committee should provide a sufficient number of facilities, equipment and sports equipment with legal specifications commensurate with the number of national team players, the lack of budget provided by the Ministry of Youth and Sports and the Paralympic Committee for Teams and increasing media attention on Paralympic teams. As for the research problem, despite the importance that swimming and athletics carry in the history of the Paralympic Games, and being one of the games participating in the first events of the Paralympic Games, which witnessed a wide participation of athletes and countries from 1960 until the Paris 2024 Games, there is a clear research gap in academic studies that provide a comparative and comprehensive historical analysis of the participation and competitions of both games at the same time. You will provide a special comparative historical analysis covering a long period of time (more than six decades) of two important sports in the Paralympic Games . This contributes to a clear lack of special literature that often focuses on a single sport or a limited period of time, or does not provide a systematic comparison between different Paralympic sports. The objectives of the research are : - Documenting the historical trajectory of the quantity and diversity of swimming and Paralympic athletics competitions in the Summer Paralympic Games during the period from 1960 to 2024 - Analyzing the quantitative evolution of athletes' and countries' participation in both swimming and Paralympic athletics across different cycles.

### **Methodology**

This study is based on the descriptive comparative analytical approach 1- Descriptive is through documenting and analyzing quantitative and qualitative data related to the development of swimming competitions and participation in Paralympic athletics for the period (1960-2024), and describing the patterns and transformations that have occurred in these sports 2- Comparative It is through comparisons between swimming and Paralympic athletics, in several aspects, namely a- Number of competitions, b- Participation (athletes, women and men) c- Participating countries . 3- Analytical is through the interpretation of patterns and Observational transformations , and linking them to historical factors, this approach is the most appropriate for studying complex mathematical phenomena over long periods of time.

### **Research community sampled by**

## Research Community

The research community consists of (all competitions, results and participation of athletes and countries in swimming and athletics in all summer Paralympics held during the period from 1960 (Rome) to 2024 (Paris Games). This includes all approved events, the number of participating athletes (males and females, and of different categories of disability), and the number of countries represented.

Research sample: Due to the nature of the historical study and reliance on official records, all available and official data for swimming and Paralympic athletics participations and competitions will be adopted within the specified time period (1960-2024)

## Data Collection Tools

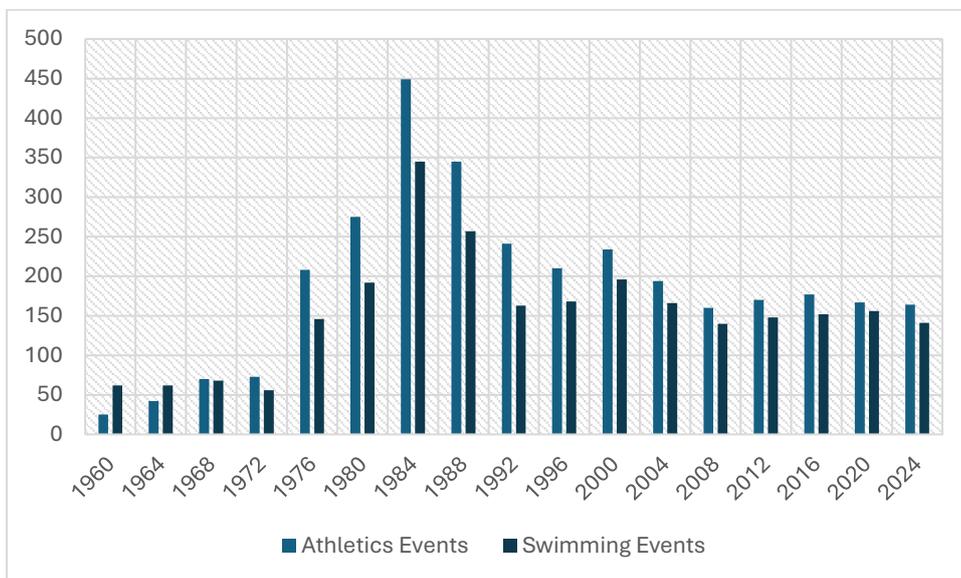
To achieve the objectives of the research, a variety of data collection tools will be relied upon, commensurate with the nature of the historical and analytical method:

- 1- Official records and documents of sports committees and bodies and databases of the International Paralympic Committee The archival databases and official results published on the official website of the International Paralympic Committee (Paralympic.org) will be consulted to collect information about the Paralympic Games, including the schedule of competitions, medal results (by sport, category, country, gender), and the number of athlete and country participants for each Games.
- 2- Published academic research for analytical historical studies, reviewing books, scientific articles, and academic research that dealt with the history of Paralympic sports, and the development of swimming and athletics in them.

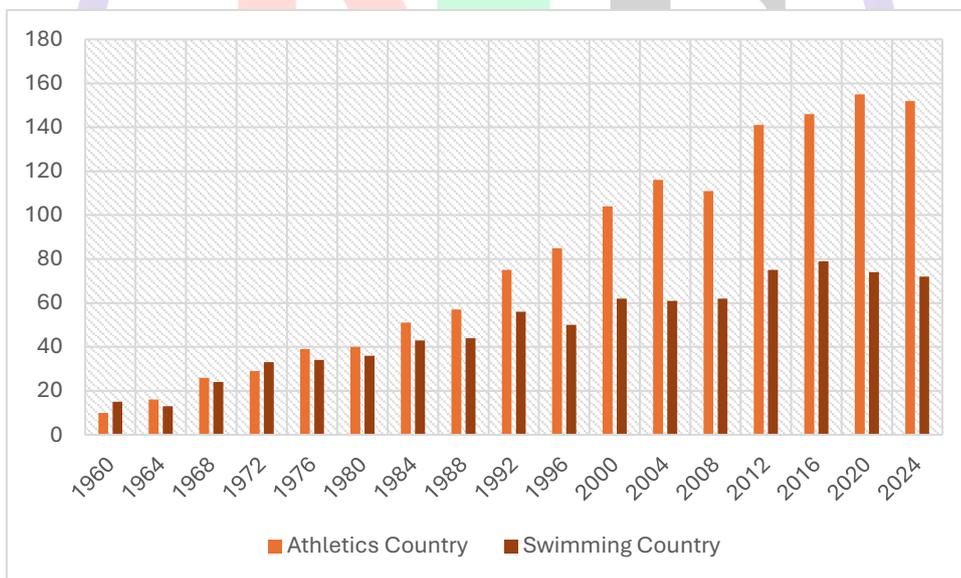
## Results

**Table 1.** Events, countries and the number of women and men participating in swimming and athletics competitions at the Paralympic Games for the period from 1960 to 2024

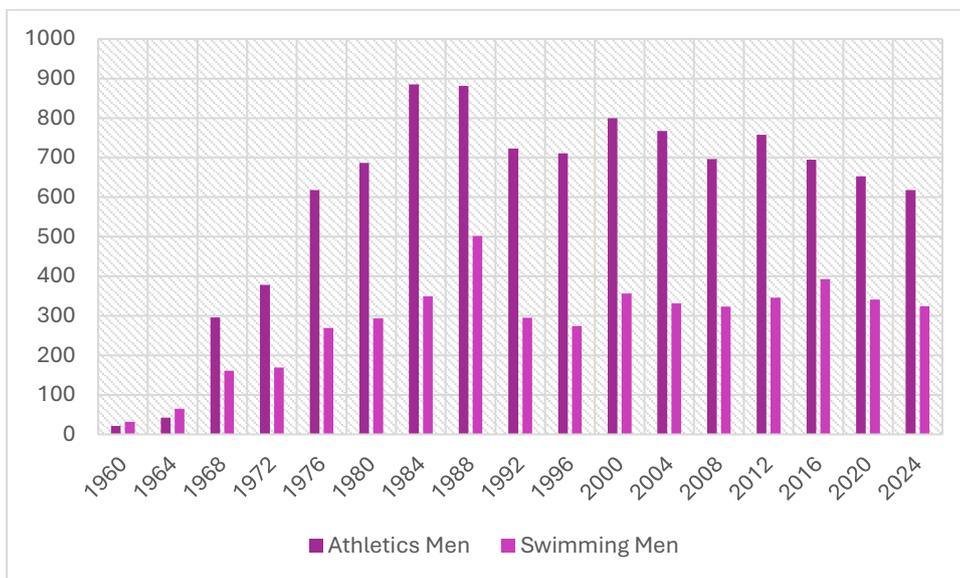
year	Athletics					Swimming				
	Events	Country	Men	Woman	Total	Events	Country	Men	Woman	Total
1960	25	10	21	10	31	62	15	32	45	77
1964	42	16	42	40	82	62	13	65	33	98
1968	70	26	296	127	423	68	24	161	103	264
1972	73	29	378	170	548	56	33	169	110	279
1976	208	39	618	156	774	146	34	269	102	371
1980	275	40	687	249	936	192	36	293	148	441
1984	449	51	885	313	1198	345	43	349	192	541
1988	345	57	881	260	1141	257	44	502	160	662
1992	241	75	723	205	928	163	56	295	192	487
1996	210	85	711	197	908	168	50	274	183	457
2000	234	104	800	244	1044	196	62	356	219	575
2004	194	116	767	297	1064	166	61	331	229	560
2008	160	111	696	333	1029	140	62	323	224	547
2012	170	141	758	373	1131	148	75	346	269	615
2016	177	146	695	445	1140	152	79	393	264	657
2020	167	155	653	489	1142	156	74	341	263	604
2024	164	152	618	509	1127	141	72	324	281	605



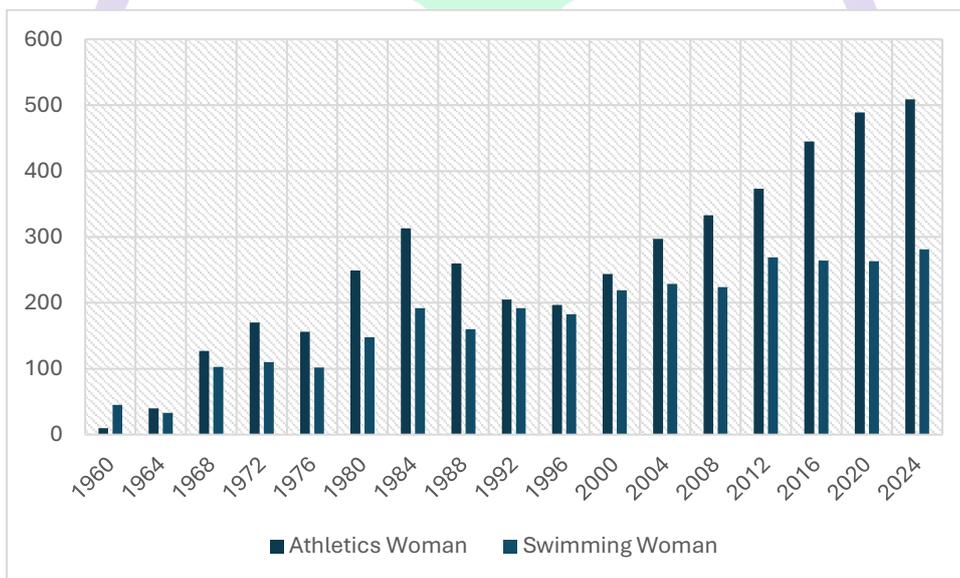
**Figure 1.** The number of events shows swimming and athletics from the first Paralympic Games in 1960 to the last session in 2024



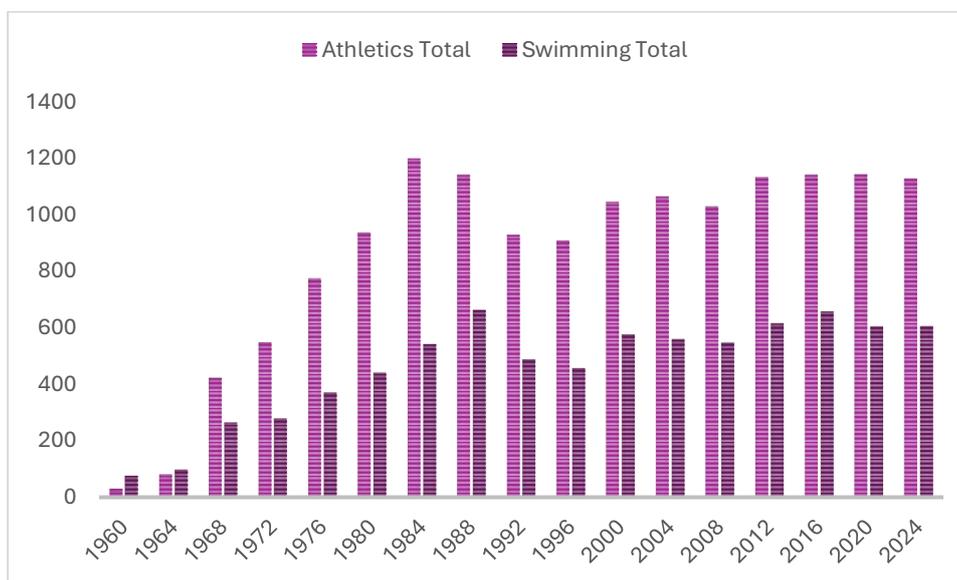
**Figure 2.** Shows the number of countries participating in swimming and athletics from the first Paralympic Games in 1960 to the last session in 2024



**Figure 3.** It shows the number of men participating in swimming and athletics from the first Paralympic Games in 1960 to the last session in 2024



**Figure 4.** It shows the number of women participating in swimming and athletics from the first Paralympic Games in 1960 to the last session in 2024



**Figure 5.** It shows the total number of athletes, women and men, participating in swimming and athletics from the first Paralympic Games in 1960 to the last session in 2024

## Discussion

From Table (1) and Figure (1) regarding the number of events held during the first Paralympic Games in 1960 to the last session in 2024 in swimming and athletics, both athletics and swimming appear to have the largest number of events in the mid-eighties, specifically in 1984, indicating a significant expansion period for both sports within the Paralympic Games. Baumgart, J. K., Blaauw, E. R., Mulder, R., & Severin, A. C. (2022) indicate that athletics and swimming together contributed 86% of the decline in the total number of medal competitions, 55% of the decline in sports competitions, and 14% of the decline in categories.

While the number of swimming events was initially higher than athletics in 1960, athletics quickly surpassed swimming in the number of events and generally maintained a higher number throughout most of the observed period (MauerbergDecastro et al., 2016).

Until other sporting events are added to the list of sports, such as athletics, namely long jump, high jump, and triple jump, the decline in the number of events for both sports after 1984 may indicate a shift in the structure of events or classification systems within the Paralympic movement, perhaps with the aim of more uniform competition categories. Despite falling from their peak, both sports still have a large number of events, such as Disability Swimming Races include four Various swimmers (freestyle, butterfly, backstroke and breaststroke), covered over only four distances (50, 100, 200 and 400 meters) with 14 disability classifications (Schipman, J., Saulière, G., Le Toquin, B., Marc, A., Forstmann, N., Toussaint, J. F., & Sedeaud, A. (2021).p2), highlighting their

importance and continued popularity within the Paralympic Games. Swimming is one of the most common Paralympic sports, with competitors with a wide range of physical disabilities, visual and intellectual. Athletics has undergone continuous development since its adoption as an official event at the first Paralympic Games in Rome in 1960, and has become one of the most popular events.

Paralympic athletics is a core event that underpins disability sports and is the event where athletes compete for the most medals at the Paralympic Games organized by the International Paralympic Committee. Paralympic athletes compete in track for the most medals, along with swimming (International Paralympic Committee).

By looking at Table (1) and Figure (2) of the number of participating countries from the first Paralympic Games in 1960 to the last session in 2024 in swimming and athletics, they show a significant growth in the number of countries in both sports, as athletics began with the participation of 10 countries in 1960, and this number increased significantly to reach 152 countries in 2024. In contrast, swimming began with 15 countries in 1960 and reached 72 countries in 2024.

According to the researchers, swimming needs more equipment than athletics (Howe, P. D. (2008) indicates that the existence of technological disparities negatively affects the ability of athletes with disabilities in developing and emerging economies to access the equipment they need to compete on an equal footing with athletes in richer countries. Swartz, L., Bantjes, J., Rall, D., Ferreira, S., Blauwet, C., & Derman, W. (2016) confirm this and previous studies in similar international competitions suggest that low- and middle-income countries are less likely to participate in events that require expensive equipment and technology (Mauerberg-deCastro, E., Campbell, D., & Tavares, C. P. 2016).

Because many Paralympic events require the use of high-quality assistive products, such as synthetic blades, sports wheelchairs, or race-specific manual/tricycles, lack of access to them has been associated with the achievement gap and poor representation of low- and middle-income countries at the Paralympic Games.

In addition to other important factors such as classification of disability in swimming, which affects the lack of wide participation.

As Wu, S. K., & Williams, T. (1999)p162 note, misclassification is an urgent and persistent problem in disability sports. As with many other sports, it is the root cause of extreme frustration and anger in swimmers who feel hurt by losing to a competitor who was supposed to be in a higher category, and in coaches and swimmers who may think they are harmed by being placed in a higher category than their disability deserves. At the Paralympic Games In 1996, six appeals and protests were lodged against classification in swimming competitions.

By looking at Table (1) and Figure (3) of the number of male and female participants from the first Paralympic Games in 1960 to the last session in 2024 in swimming and athletics, it is logical that the number of participants in athletics is greater due to the large number of athletics competitions and the clear classification of them and the fact that the Paralympic swimming game needs a water medium for competitions, which constitutes a greater training time barrier, smart equipment, a larger number of assistants and larger training programs. This is with regard to the comparison between swimming and athletics, but with regard to the number of women participating in proportion to men, it is considered small and unequal (Ogoura, K. 2022).

Between 1968 and 1984, the Olympic and Paralympic Games were held in different cities, and this may have contributed to significant fluctuations in female athletes' participation rates in that period (since 1988, the proportion of female athletes at the Paralympic Games has increased continuously, as has their percentage at the Olympic Games). The overall proportion of female athletes is either equal to or less than that of male athletes, and has not yet exceeded it. This is due to very low female participation in some States. Four teams were represented by women at the 2012 Games and two at the 2016 Games.

### Conclusions

- 1- Both sports have witnessed tremendous and continuous growth in the number of male and female athletes and participating countries over sixty years, which confirms their position and their great role in the development of the Paralympic movement, with this evident the superiority of athletics in all the data studied, indicating greater flexibility in logistical requirements and a wider diversity of participation opportunities compared to swimming, which requires more specialized and expensive infrastructure and equipment.
- 2- The impact of classification systems and technology in which limited the spread of swimming in some countries of the world, while joining the arena games contributed to increasing its popularity
- 3- The graphs showed the exceptional growth of women's participation in the two games, reflecting the efforts of sports bodies and organizations to strengthen the aspect of equality between men and women.

### Recommendations

- 1- Paralympic Committee officials should provide all the key support requirements for developing countries to establish and develop all swimming requirements to promote wider swimming.

- 2- Continue to study and develop classification systems in both games to reach a limit of parity in competitions and to reach results and achieve sports gains.



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## The Effect of a Rehabilitation Program on Improving Knee Joint Range of Motion in Injured Basketball Players

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2069](https://doi.org/10.37359/JOPE.V37(4)2025.2069)

<https://creativecommons.org/licenses/by/4.0/>

**Article history:** Received 5/ May/2024 Accepted 27/ May/2024 Available online 28/ December/2025

### Abstract

Sports Medicine is unique as the injuries and treatments require specialized considerations in both diagnosis, treatment, and recovery. The frequency of these injuries has increased in athletes, especially in sports that require contact with the opponent, like basketball. This study is important in that it intends to be able to perform pain-free training until the back to baseline with physiotherapy devices, isometric exercises and moderate progressive load increases from easy to difficult. The following is the central research question: because some injuries are such that a patient cannot have control of a given range of motion, and this will weaken the knee. Precisely, there is a critical demand to develop targeted rehabilitation for restoration of knee function in athletes, mainly on basketball players that meet the game's requirement. One of the suggested approaches is to apply training doses at different intensities to help the joint and surrounding muscles recover their natural strength, build up reserves and get back to normal resistance capacity. Thus the purpose of this study is to create a re- habilitation program with an androgenic/anabolic enhancing effect, helping post trauma basketball players im- prove their knee joint mobility.

**Keywords:** Knee Rehabilitation, Range of Motion, Basketball Injuries, Physiotherapy.

### Introduction

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Basketball players injuries are of special category and require more attention for diagnosis, management and rehabilitation. Contact sports such as basketball, are becoming more popular with the attendant increase in injury rates among athletes. The knee joint, which is complex in structure, insured easily. The angle of the knee joint is a major factor in the amount of stress placed on it, and this is increased by athletic activities. The knee joint can move approximately to 130 degrees but injuries may change the range of motion. This can be modified by a multitude of extrinsic factors such as injuries producing pain during the movement of joint flexion and extension. Pain-free training can be implemented until the range of motion returns to its normal state through the use of physiotherapy equipment, isometric exercises, and gradual loading from easy to difficult. In certain types of injuries, reduced control over the range of motion is one of the consequences that weakens the knee joint. Therefore, there is an urgent need to design rehabilitation programs specifically for basketball players, in line with the specialized performance requirements of athletes. Among these rehabilitation approaches is the application of training doses with varying intensities to help the joint and muscles regain their natural strength, restore function, and return the range of motion to its normal level. Accordingly, the researcher developed a therapeutic program to rehabilitate the range of motion of the knee joint in injured basketball players using physiotherapy devices along with physical and rehabilitation exercises. The main aim is to develop a treatment program to improve the knee joint range of motion in injured basketball players.

Several previous studies have addressed similar issues. One such study is by Muhammad Abdullah Jinjun (2017), which examined the effect of exercises using a specially designed device in the rehabilitation of the anterior cruciate ligament (ACL), some biomechanical variables, and motor abilities in injured athletes. The research method was experimental, with a sample of four individuals with ACL tears, and the rehabilitation program lasted eight weeks. The present study complements previous research but differs in the design of the rehabilitation exercises. The researcher in the current study introduced a pre-surgical phase for complete ACL rupture, which previous studies did not include. Additionally, the previous study used only one phase of rehabilitation, whereas the current researcher employed all rehabilitation phases: pre-surgery (one and a half months) and post-surgery (six months), along with physiotherapy methods appropriate for each rehabilitation stage.

Another relevant study reached is by Wissam Shalal Muhammed (2016) with the title “A Proposed Rehabilitation Program for the Muscles Acting on The Knee Joint After Anterior Cruciate Ligament (ACL) Reconstruction”. The problem of this research centered on the weakness of muscles around the knee joint after reconstruction of the ACL. The purpose was to assess the effect of the rehabilitation program on these muscles. The null hypothesis was that the experimental intervention would have no influence. The investigator used an experimental design consisting of a control and experimental groups

of pre- and prostrating testing. The sample included six athletes with reconstructed ACL. Observation: utilized observation, experimentation, measurement and other tests as research tools. The study concluded that the proposed rehabilitation program developed the strength of the thigh muscle groups after ACL reconstruction more rapidly than the standard program used in hospitals. The present researcher notes that the current study resembles that of Wissam Muhammad in terms of the rehabilitation method used, the type and degree of injury, some of the movements performed during thigh muscle rehabilitation exercises, and certain tests employed in the research. However, the studies differ in program design, sample size, and the additional exercises utilized.

### Methodology

The two researchers used the experimental method with a one-group design, as it was appropriate to the nature of the problem. One of the fundamentals of scientific research is selecting a suitable sample, upon which the study is based. The research population consisted of 15 basketball players, from whom the sample was intentionally selected, totaling 10 injured players. Regarding the tools and techniques employed by the researchers, and in light of scientific advancement, the researcher sought to use the latest methods, instruments, and technologies in diagnosis, as well as the most modern physiotherapeutic devices relevant to rehabilitating the injury under investigation. Research instruments are defined as “the means by which a researcher collects data” (Ahmed Hilmi et al., 1999).

The instruments used were as follows:

1. X-ray machine, Philips, German-made, model 1-1 0, 0
2. Spiral CT scan
3. Magnetic resonance imaging (MRI)
4. Laser device, Frared 533 – K3, manufactured in Germany, 2006
5. Short Wave device (Japan), 2007
6. Ultrasound therapy device (Zimmer), German-made, serial no. 77323, 2006
7. Electrical stimulation device (Zimmer), 2007

### **Test Name: Measuring Knee Joint Range of Motion**

This was performed using a goniometer by fixing the device to the outer side of the knee joint and flexing the joint at each angle starting from 0° up to 180°.

As for the procedures undertaken, the researchers examined the available resources at Ibn Sina Center for Medical Rehabilitation and Physiotherapy in Baghdad. A pilot study was conducted on 10 June 2023 on a group of 15 injured basketball players at the Ibn Sina Specialized Center for Physiotherapy and Medical Rehabilitation in Baghdad. The purpose of this pilot experiment was to identify any obstacles that might accompany the implementation of the test and to address and overcome them if present, in addition to determining the necessary number of assistants and training them in test administration.

The pre-test for the research sample was then administered on 18 June 2023 at the same center. The researchers made every effort to standardize the conditions related to the test (location, tools, equipment, implementation method, and assisting staff) to ensure their availability in the post-test.

The method followed by the researchers was a rehabilitation program for injured basketball players (the research sample as one group), taking into consideration the devices, equipment, tools, and resources available to support the implementation of the proposed rehabilitation program and achieve the goal of restoring the natural range of motion or reducing the impact of injury.

The program was implemented from 25 June 2023 to 25 October 2023, totaling 16 weeks. The number of rehabilitation sessions was 48, equivalent to three sessions per week. Each session lasted 120 minutes and involved therapeutic exercises and devices specialized for injury rehabilitation, with a total of 96 hours.

## Results

**Table (1)** shows the mean and standard deviation values for the knee joint range of motion test in the pre-test and post-test, along with the calculated Wilcoxon Z value, its significance level, and the statistical significance of the differences.

Measured Variables	Pre-test		Post-test		Z Value	Significance Level
<b>Knee Joint Range of Motion</b>	1.140	6.992	1.300	0.00	-2.859	0.004

**Table (2)** shows the mean and standard deviation values, the calculated Friedman test value, and the significance of differences for the knee joint range of motion test across the pre-test, mid-test, and post-test.

Measured Variables	Test	Mean (S)	Standard Deviation (SD)	Friedman Value	Significance Level
<b>Knee Joint Range of Motion</b>	Pre-test	1.140	6.992	17.688	0.00
	Mid-test	1.270	4.830		
	Post-test	1.300	0.00		

## Discussion

The results of the knee joint range of motion test, as shown in the table above, indicate that the mean value for the post-test was higher than that of the pre-test, while the standard deviation for the pre-test was greater than that of the post-test. This is because the full range of motion of the knee joint is from 0° to 130°, and the injured participants achieved a full range of motion in the post-test. The calculated Wilcoxon value of -2.859, compared to the significance level of 0.004, indicates a statistically significant effect, demonstrating that the therapeutic program had a positive impact on knee joint range of motion.

The table also shows that the mean for pre-test was 1.140, with a standard deviation of 6.992. On the other hand, the mid-test yielded a mean of 1.270 and standard deviation of 4.830 indicating a significant difference in favor of middle test. The post test results showed that there was mean score 1.300 plus or minus zero. The Friedman test was used to compare the observed differences, and the obtained value was 17.688. Compared with the level of 0.00, this result validated that the differences were significant in statistics by supporting more post-test.

The researchers attributed these results to the positive effect of the therapeutic program using physiotherapy devices. These interventions enabled the knee joint to reach its normal range of motion of 130°, which was fully achieved in the post-test, as all participants exhibited a normal range of motion. The use of rehabilitation equipment, such as stair and treadmill devices, laser therapy, ultrasound, and electrical stimulation, contributed to restoring joint flexibility. Increasing flexibility stretches the elastic tissues beyond their natural limits and maintains them in this position for a few moments. Repetition of this process allows the tissues to adapt to their new limits. Greater body flexibility reduces the risk of injury during sports or physical activities and enhances skill performance (Nahida Abdul Zaid, 2008).

### Conclusions

The therapeutic program has a positive effect on improving the range of motion of the knee joint and restoring it to its normal state.

### Recommendations

1. Apply the proposed therapeutic program to other samples.
2. Utilize more advanced therapeutic devices for rehabilitating the knee joint in athletes.

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## The effect of complex exercises using added resistances relative to body parts on the explosive power and accuracy of long-distance shooting from high jumping for Baghdad Educational Team handball players

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2003](https://doi.org/10.37359/JOPE.V37(4)2025.2003)

<https://creativecommons.org/licenses/by/4.0/>

**Article history:** Received 28/ January/2024 Accepted 27/ September/2025 Available online 28/ December/2025

### Abstract

This study aimed to investigate the effect of complex resistance-based exercises on enhancing the explosive power of the arms and legs and improving the accuracy of long-range jump shots among basketball players. A single-group experimental design with pre- and post-tests was employed, aligning with the research objectives. The population comprised 20 players from the First Al-Karkh Education Team, from which 8 were randomly selected for the main study, and 4 participated in an exploratory experiment. Homogeneity of the sample was confirmed for age, weight, and height, with skewness values within  $\pm 3$ . The training program, directly supervised by the researchers with assistance from the team coaches, lasted eight weeks during the special preparation phase preceding the competition, with three sessions per week, totaling 24 sessions. Post-tests were conducted after completing the program, and data were analyzed using SPSS, employing descriptive and inferential statistics, including mean, standard deviation, and paired-sample t-tests. Results indicated that complex exercises incorporating added resistance to specific body parts significantly enhanced the explosive power of the arms and legs and positively influenced the accuracy of long-range jump shots. The study concludes that integrating targeted resistance-based complex exercises can effectively improve both muscular explosiveness and technical shooting performance among basketball players, highlighting their importance in structured training programs aimed at optimizing athletic performance.

**Keywords:** compound exercises, handball, added resistance, explosive power, shooting accuracy.

### Introduction

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The environment cannot sprout by chance; it has been built and developed with dedication, systematic work, strategic planning and a well-defined program of training curricula. It is extremely popular at international level which has seen it experience significant and visible growth especially due to its dynamism of movements in driving motor skills as well as shooting, dribbling and fending capabilities. It is therefore important to allow scientific principles-based trainings to improve player performance. An effective option is resistance training of specific muscles. These methods are used to increase the rate of athletic performance and success by making exercises more complex by adding extra external resistance. Not only is it improving the physical and technical efficiency of players, but they are now becoming peak performers. or according to Antdar Al-Khazali (Al-Khazali, 2009, p. 34):

"Resistance training involves imposing an external force to the active muscles, inducing physical characteristics, and leading toward a different form of functional adaptation. This in turn increases a trainee's physical work capability."

The most significant reason to bring up this subject is for the author, is that all important personality traits of a successful handball player should be emphasized in winning. The present study emphasizes in particular the importance of explosive power in an athlete's arms and legs as it is critical for the improvement of players' jumping performance during high jump shooting and to increase shooting accuracy. Jumping is considered as an important skill for handball players and its training benefits are the underlying support for most shooting techniques, especially high jump shots. As Qablan (2012, p. 249) pointed out:

"Progress in jump strength leads to increased jumping ability, providing favorable conditions for the effective execution of certain skills, such as shooting in handball.

The higher the player's jump at the moment of shooting, the greater the chance of scoring and improving accuracy, as it overcomes the defensive wall and clarifies the shooting angle toward the target.

The objectives of this research were: preparing compound exercises using proportionally added resistance to body parts to enhance the explosive strength of the arms and legs and improve long-distance shooting accuracy from high jumps, and identifying differences between pre- and post-tests in explosive strength and shooting accuracy in the sample under study.

The research problem emerged through the researchers' observation of training sessions of the Baghdad Karkh First Education team and the national junior team matches, alongside reviewing multiple scientific studies in this field. It was found that there is a clear weakness in high jump shooting skills, not only among the Baghdad Karkh First Education team players but generally across all levels. This may result from reduced physical

capabilities, particularly explosive strength, which directly affects the production of high jumps and subsequent shooting. This can be attributed to several factors, including the lack of suitable training methods to develop these capabilities, or the insufficiency of existing methods to achieve the required adaptation for enhancing the muscles responsible for the primary skill of shooting. Most previous studies employed bodyweight exercises or weight training (Multi Gym) to develop the explosive strength of the arms and legs in handball.

The distinct feature of this study is the preparation of compound exercises using proportionally added resistance to body parts, employing weighted vests and cuffs placed on the wrists and ankle joints, with the weight proportioned according to each body part as per the Bernstein table (Mohammed, 2021, p. 34). The progression in resistance ranged from 7% to 10% during the training curriculum. The primary aim of these compound exercises is to integrate strength training with the training of high jump long-distance shooting accuracy to maintain the motor pathways of the skill. As Abbas (2005) emphasized:

“The design and orchestration of the specific training programs, should not be isolated, but rather they should be tailored with the features of the specialized sport activity. "The use of different methods and instruments must be maintained to the extent of the sport (in order) to have a positive incidence on the performance, favoring excellence and creativity.

Several previous studies support the significance of this approach:

Mohammed Mahmoud Kazem (2015) studied the effect of training with elastic ropes on exerciser muscle in emergency strength of legs and arms, also on special biochemical indicators in goal keepers handball teams 13 –14 years old. Using one experimental group, significant pre- and post-test explosive strength improvements were observed with beneficial biochemical responses.

Saif Hamed Ali, (2017) The correlation between the explosive strength of the arms and legs with performing fast shooting skills on some players of the Army Club handball team. Explosive strength was significantly correlated to Accuracy of shooting indicated by the result of this study.

Nizar Faeq Saleh (2021) has a study carried out to determine the influence of technique resistance training on depth strength and motor speed in young tennis players aged 14 – 16 years. Through an experimental, control group research design the study found significant gains in both constructs for the experimental group.

Sadiq Dreyoul Khalaf (2021) explored the effect of weighted exercises on defensive movement and offensive skill speed in advanced futsal players, concluding improvements in both defensive and offensive performance.

Ahmed Abdulaziz Faraj (2021) studied the impact of different types of resistance training (sand/resistance) exercises on specific strength in 17- to 19-year-old football players. There were significant gains in explosive strength, a speed-specific strength and strength endurance.

Hassanein Hashim Ismail (2021) analyzed the effect of weighted compound movements on skill related performance abilities of 17-19 years old soccer players. Results also indicated that modifiers adding weight to compound exercises resulted in better outcomes than modifiers not adding weight.

### Methodology

The authors used an experimental design with one-group pre-and post-test, which meant that the research procedures were consistent. The study sample was chosen purposively from Education Teams of Baghdad Governorate, including 20 handball players who are playing in the first education team of Baghdad Karkh. A random selection was applied to select 8 riders from the sample in a lottery format. A pilot study sample of 4 players was also set. Sample homogeneity was confirmed on age, weight and height data with the computation of the skewness coefficient (+- 3). The researchers collected data by observation, personal interviews and collection of online materials.

The equipment and tools used in the study included:

- 8 weighted vests
- 16 weighted arm cuffs
- 16 weighted leg cuffs
- 1 HP Chinese-made laptop
- 2 Chinese-made stopwatches
- 1 Chinese-made electronic scale
- 1 measuring tape (15 meters)
- 2 Fox whistles
- 4 custom-designed barriers with different heights
- 10 markers of different colors
- 10 handballs (size 2)
- 2 wooden benches
- 2 wooden boxes

- 4 iron squares (40x40 cm)

Following a thorough analysis and review of several scientific references and sources, the researchers identified the specific tests for the research variables. The selected tests were:

- Medicine Ball Throw (3 kg) from a seated position (Al-Badiri, 2011)
- Vertical Jump Test (Sargent) (Al-Badiri, 2011)
- Accuracy of High Jump Shooting (Al-Badiri, 2011)

After determining the key physical capabilities and their respective tests, the researchers conducted the first pilot experiment on 28/2/2023 with a sample of 4 players randomly chosen from the research population. With the help of the assistant team, the pilot experiment was carried out, aiming to achieve the following objectives:

- Verify the suitability of the tests for the sample individuals and their ease of application
- Determine the time needed to perform the tests
- Identify any obstacles that may arise during the tests and prevent errors and overlaps in work

A second pilot experiment for the current study took place on 02-03-23; the aim was to be able to carry out some of the planned exercises and examine their suitability with this target group. With the cooperation of coaches in the Baghdad Karkh First Education team, the research sample were trained before starting the main study. The objective of this session was to:

- Determine the appropriate percentage of added resistance
- Identify the number of exercises per training session
- Assess the players' ability to comprehend and adapt to the prepared exercises using resistance

Research sample's pre-tests It was carried out on Sunday, 12 March 2023 with eight players. The tests' parameters (time, place, tools, method of execution and the team of assistants) were rigorously recorded to be the same in the post-tests. The training was then carried out on weekdays between Tuesday, March 14, 2023 and Sunday, May 14, as directed by the academics with help from the team's coach. This phase was conducted over the 8-week period prior to competition, which served as a preparation stage, and included three training sessions per week (Saturday, Tuesday, and Thursday) for a total of 24 training sessions over the entire program.

The scientists advised in increasing the loads gradually by small percentages of the body weight to the trunk, arms and legs during the course of training applying a loading principle based on Bernstein’s table (Mohammed, 2021, p. 34). The load increased from 7% to 10% of relative body weight throughout the course of the program. Post-tests were carried out on 16/5/2023 under the same conditions and procedure as the pretreatment tests by the same group of assistants.

Statistical analysis of the data was conducted using the SPSS program, with the following statistical methods: mean, standard deviation, and the paired T-test.

## Results

**Table 1.** *The Mean and Standard Deviations for the Pre-Test and Post-Test*

Variable	Unit	Pre-Test (Mean ± SD)	Post-Test (Mean ± SD)	Development Percentage
Explosive Strength of Arms	Meter	4.927 ± 0.309	5.893 ± 0.254	9.60%
Explosive Strength of Legs	Centimeter	33.500 ± 2.329	41.000 ± 2.267	22.38%
Accuracy of High Jump Shooting	Points	4.500 ± 0.534	6.500 ± 0.925	44.44%

**Table 2.** *Difference in Means, Standard Deviations, and T-Value for Pre-Test and Post-Test*

Variable	Difference in Means	Difference in S.D.	T-Value	P-Value
Explosive Strength of Arms	0.96625	0.075210	12.847	0.00
Explosive Strength of Legs	7.50000	0.327330	22.913	0.00
Accuracy of High Jump Shooting	2	0.188980	10.583	0.00

## Discussion

As seen in Tables (1 and 2), which show the findings of the research sample in the pre- test and post-test, there was a remarkable increase in all study variables by the post-test. According to the researchers, this improvement could be due to the exercises specifically developed with an added resistance for certain body parts, that were well-accepted by the sample. The subjects in the study also showed an increased explosive strength of hands and legs as well as improvement of accuracy while taking shot for high jump. The training units and the park provided exercise opportunities in different locations, which had a strong impact on the mean differences of scores of the study variables. Al-Madamgah & Al-Sudani (2013, p. 218) affirmed this by claiming “Variation

of using different exercises to develop strength of the same muscle group will involve in significant augment in the strength.” Furthermore, the intensities and volumes of the exercises implemented in training programmes developed by these authors were similar to or higher than those applied during skill execution, with corresponding improvements in player performance. This was based on a very precise determination of the work periods and breaks between repetitions and sets, as well as a slow increase in intensity of the training units. This approach is emphasized by Jassim (2014, p. 101) who posited "systematic and programmed sports training with prescribed intensities in training and optimal use of rest between repetitions are associated with better performance results." Furthermore, the introduction of modern training ideas based on the principle of phased increase of physical load, except as suggested by the experiments, were essential. Training Principle Faraj (2021) attests "the principle of progressive overload is one of the fundamental principles in the training process not only for physical preparation, but also everything related to the training. According to al-Jubouri (2011, 214), This progressive increase in exercise difficulty allows the body to adapt and improve physical and skillful conditioning resulting in performance improvement. Properly therefore progressive training in exercises leads to a permanent physical adaptation and performance fitness.

Points out, the above significant between-group differences in sample can largely be attributed to performance of the exercises within training protocol based on scientific foundation. These exercises largely promoted the explosive power of upper and lower limbs, and accuracy of high jump shot. The addition of specific loads to certain body parts (proportioned according to scientifically-determined percentage in terms of the weight of each body segment) and synthetic movements patterns, conducive on stimulating the closely a simulating possible of the appealed athletic skill made difference in this improvement. This is in agreement with (Mohamed and Hassan, 2008, p. 102) who posit that: “Training with extra loads is efficient and results in excellent performance for developing various forms of the strength especially explosive force." (Al-Aidhi ,2011, p. 139) reinforces this argument when he states that ‘It is impossible to achieve the desired level of strength development from exercises only in the performance activities during the development phase and will require adding external weights as effective strengthening tools’. Resistance training is one of the core pillars in developing the capacities that underpin skill acquisition, with resistance training playing a fundamental and impactful part in this development (Saleh, 2021).

Moreover, exercises according to the training theories with different intensities and repetition in a dynamic manner through the training program would have improved study variables of sample. This corresponds with Al-Haddad (2015, p. 37) who described that, 'Continuous and intensive training repetition can contribute to improving the coordination between the arms and legs' movement as well as an increase in strength of those muscles groups involved in a skilled performance.' The authors attribute the greater accuracy of

high jump type shooting to improvements in both upper and lower limb explosive strength. As Jamaluddin and Jowied (2007, p. 97) have claimed "The better physical conditioning, the more enhanced performance is skillful to get increased levels of achievement". Gorstiaga (2005, p. 106) argues "there are crucial skills in preparation for shooting, such as strength, coordination and accuracy". Similarly, Al-Sheikhly (2005, p. 95) stresses that "Physical abilities constitute the base on which other constituents are incorporated, and high-performance level is highly related to physical ability," and therefore must be considered in developing a periodized training program for athletes.

Thus, explosive force should play a major role in time invested to develop muscular strength due to high correlation with accuracy of high jump shooting. In addition, Ali (2016) and as cited by Abdul-Fattah stated that "Explosive power is a direct contributor to the precision of execution skill. Preparation for players, combined with the application of the balance principle during formation of a physical provision in shooting skills, allows both balanced and harmonious development. This method was also conducive to the degree of high jump shooting accuracy were found in the research sample, in line with how an organism adapts to training and increasing load, intra complex exercises; consideration for individual differences, as well as adequate warm-up/cool-down procedures. The novel feature of training players with tasks that replicate natural movement when executing the skill clearly produced the greatest change in vertical jump and translated into enhanced shot accuracy. Qassem and Khamis (2011, p.107 – 108) further supports this by arguing that skuddop hopp "allows the shooter to bypass interference from defending players and offers enough time to assess the goalkeeper's reaction before shooting at an opportune area of the goal."

Abbas (2005, p. 140) concludes, "The design and coordination of specific programs should not be done arbitrarily but must align with the characteristics of the specialized sport activity. The use of diverse methods and tools must continue in accordance with the specifications of the sport to achieve a positive impact on performance, leading to excellence and creativity." The researchers also attribute the improvements in the accuracy of high jump shooting to the increased difficulty of the playing conditions during the application of the high jump shooting exercises. These included added weights relative to the body parts' weight and interaction between players during the shooting process, as well as the accuracy markers on the target.

## Conclusions

In light of the statistical analyses of the test results, which were presented, analyzed, and discussed, the researchers reached the following conclusions: The application of specific exercises had a positive effect on developing the explosive strength of the arms and legs. Additionally, the compound exercises using added resistance had a positive effect on improving the accuracy of high jump shooting.

## Recommendations

Based on the conclusions reached by the researchers, it is recommended to use the training method with added resistance relative to body parts, combined with exercises, to develop certain types of strength in handball and improve the accuracy of high jump shooting. Additionally, it is recommended to use the method of training with added resistance relative to body parts along with exercises to develop other skills in handball.

### Appendix (1) Training Unit

**Workplace:** Sports Activity Hall  
**Week:** Second  
**Unit:** Fifth

**Sample Size:** 8 Players  
**Training Unit Duration:** 88 Minutes

**Training Goal:** Developing explosive strength for the arms and legs, and improving accuracy in long-distance shooting from a high jump.

Week: Fifth Unit: First Date: April 11, 2023, Tuesday Sample Size: 8 Players Resistance Percentage: 10%	Application of Exercises During Training Units	Workplace: Sports and School Activity Hall in Baghdad's Karakh First Education Directorate Exercise Duration: 41.47 minutes Total Intensity: 89.66% Total Intensity for Exercises: 88-93%
<b>Training Unit Goal:</b> Developing explosive strength for the arms and legs and improving accuracy in high jump shooting.		

Training Unit Sections	Exercises	Performance Time	Repetitions	Exercise Intensity	Rest Between Repetitions	Sets	Rest Between Sets	Total Work Time	Total Rest Time	Total Training Time
<b>Main Section</b>	(2)	8 sec	6	88%	20 sec	4	40 sec	2.24 min	9.20 min	11.44 min
	(1)	16 sec	5	91%	35 sec	3	60 sec	4 min	10 min	14 min
	(3)	12 sec	6	90%	30 sec	4	45 sec	4.48 min	12.15 min	16.3 min

#### Exercise

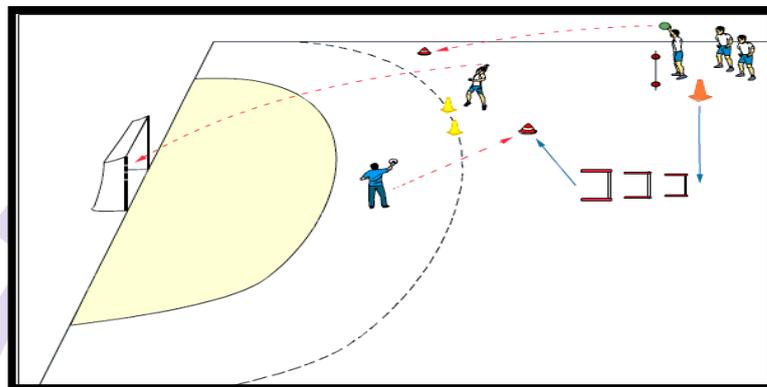
(1)

**Exercise Goal:** Developing explosive strength for the arms and legs, and improving accuracy in high jump shooting.

**Tools Used:** Medicine balls weighing 1 kg, barriers with different heights, colored markers, handballs size 2, whistle, stopwatch, iron squares measuring 40x40 cm (4 pieces).

**Method of Performance:**

The players are divided into two groups, with each group consisting of four players. Each player from both groups will throw a 1 kg medicine ball at a marker located 10 meters away, then run to reach three barriers of different heights. The first barrier is 30 cm high, the second is 40 cm, and the third is 50 cm, over which the player must jump with both feet. After jumping, they will sprint towards the next marker, receive the ball from the coach, take three steps, and then shoot from the high jump position between the markers. The shot should be directed at one of the squares located at the corners of the upper goal,



as shown in figure No. (1).

**figure (1): Shows how to perform the exercise**

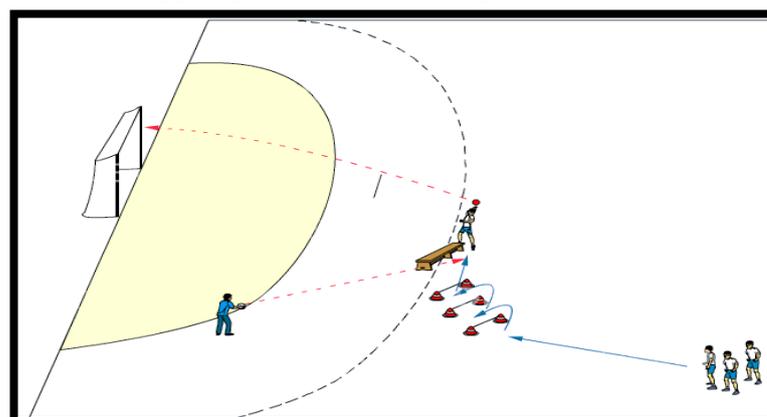
**Exercise (2)**

**Exercise Goal:** Developing explosive strength for the arms and legs, and improving accuracy in high jump shooting.

**Tools Used:** 3 barriers, each 30 cm high, colored markers, wooden bench, handballs size 2, whistle, stopwatch, iron squares measuring 40x40 cm (4 pieces).

**Method of Performance:**

The players are divided into two groups, with each group consisting of four players. Each player from both groups will run towards the three barriers, each 30 cm high, with a 1-meter distance between each barrier. The player will jump over the barriers with both feet, then sprint towards the next marker to receive the ball from the coach, take three steps, and then shoot from above the wooden bench. The shot should be aimed at one of the squares located at the corners of the upper goal, as shown in figure No. (2).



**figure (2): Shows how to perform the exercise**

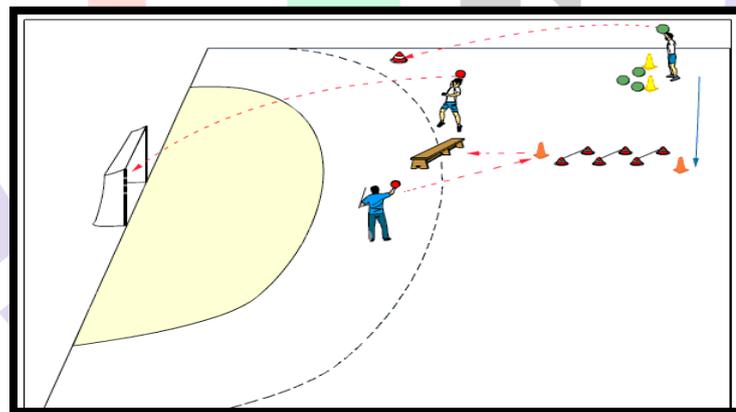
**Exercise** (3)

**Exercise Goal:** Developing explosive strength for the arms and legs, and improving accuracy in high jump shooting.

**Tools Used:** 1 kg medicine balls, 30 cm high barriers, colored markers, wooden bench, handballs size 2, whistle, stopwatch, iron squares measuring 40x40 cm (4 pieces).

**Method of Performance:**

The players are divided into two groups, with each group consisting of four players. Each player from both groups will throw a 1 kg medicine ball at a marker located 10 meters away, then sprint towards the marker. The player will then jump over the three barriers (30 cm high) with both feet. Upon reaching the marker, the player will sprint towards the wooden bench, receive the ball from the coach, take three steps, and then shoot from above the bench. The shot should be aimed at one of the squares located at the corners of the upper goal, as shown in figure No. (3).



**figure (3): Shows how to perform the exercise**

**Appendix (2)**

**The Relative Weights of Human Body Parts**

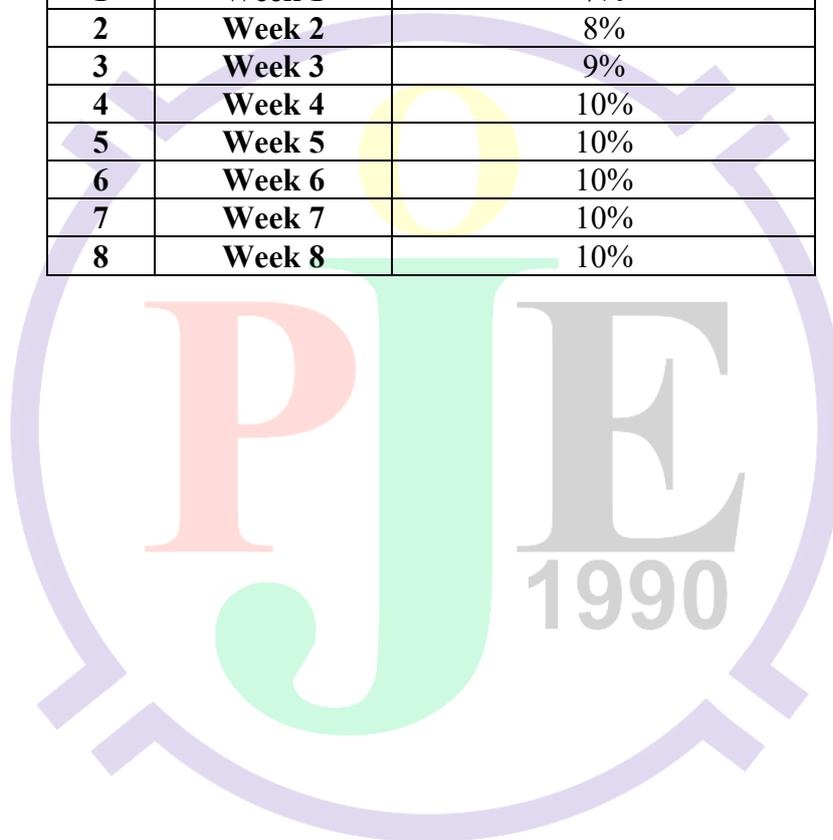
Body Part	Fischer's Opinion	Men	Women	Rounded Values
<b>Head</b>	7.06%	6.72%	6.12%	7%
<b>Trunk</b>	42.7%	46.30%	43.9%	43%
<b>Thigh</b>	11.58%	12.21%	12.89%	12%

<b>Shank</b>	1.79%	4.65%	4.34%	5%
<b>Foot</b>	3.36%	1.46%	1.29%	2%
<b>Upper Arm</b>	2.28%	2.65%	2.60%	3%
<b>Forearm</b>	0.84%	1.82%	1.82%	2%
<b>Hand</b>	0.48%	0.70%	0.55%	1%

### Appendix (3)

**Shows the Gradual Increase in Weight During the Exercise Period**

<b>Week</b>	<b>Training Week</b>	<b>Percentage of Added Weight</b>
<b>1</b>	<b>Week 1</b>	7%
<b>2</b>	<b>Week 2</b>	8%
<b>3</b>	<b>Week 3</b>	9%
<b>4</b>	<b>Week 4</b>	10%
<b>5</b>	<b>Week 5</b>	10%
<b>6</b>	<b>Week 6</b>	10%
<b>7</b>	<b>Week 7</b>	10%
<b>8</b>	<b>Week 8</b>	10%



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## The reality of sustainable development in the administrative performance of youth and sports forum directors from the perspective of employees

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2152](https://doi.org/10.37359/JOPE.V37(4)2025.2152)

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**Article history:** Received 21/ May /2024 Accepted 17/ January/2025 Available online 28/ December/2025

### Abstract

Purpose of the research was to determine sustainable development degree in besiege youth and sports from performance level of directors' forum about employee's perspective according to Baghdad. A case study was adopted on a randomly selected sample of 316 (28.546% of the original calculation) members of the population that are working officially in the digit youth and sport forum staff in Baghdad for employees' year represented workers employed officially to its affiliates in 2023. They are located within an overall 1,107 members of staff spread across three forums and constitute the focus of the research problem. A minority exploratory sample of 9 subjects, that represented 0.813% of the original population was also randomly selected. Sustainable development scale on administrative performance was used by this study to collect data and SPSS for conducting the survey. From the employees' perspective, it is shown that directors of youth and sports forum have an acceptable level on sustainable development administrative performance along with high technical proficiency and quality productivity that contribute to the sustainability performance. However, the constant monitoring is determinative for closer employees' wants from better collecting data and sincere information production from the different sources with several measurement instruments. The Ministry of Youth and Sport should also involve forum directors in the capital, Baghdad to benefit from training courses aimed at spreading sustainable development among their forums.

**Keywords:** Sustainable development for management performance, youth and sports forum managers.

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## Introduction

The urgent of the basic generalizations of success in managing different activities of forums young and sports as an integral volume is necessary to ensure that results are aimed at satisfaction with customer service from the administration throughout its various fields, thus ensuring a good reputation at local and international levels. Through the researcher's review of numerous sources and studies, as well as the findings of available academic research in this regard, the importance and necessity of sustainable development for the administrative performance of youth and sports forum directors became evident. This development is essential for them to confront the strengths, weaknesses, and challenges imposed by various changes, thereby maintaining the continuity of operations and ensuring their advancement within these forums.

It is posited that "the increase in the level of effectiveness of sustainable development for the administrative performance of the administrative formation is an indicator of the successful management of its operations, ensuring the achievement of its vision and mission, as well as an indicator of the soundness of its plans and the attainment of its objectives with ease." (Armstrong, 2014, p. 167) Furthermore, "administrative formations need to elevate the levels of administrative performance among their members to enable them to excel and surpass in competition, which adds to their responsibilities in developing their human resources in accordance with the developments in administrative work and administrative culture, within the framework of focusing on duties to achieve leadership and excellence in administrative work that benefits these administrative formations." (Saad, 2016, p. 133)

Additionally, "any purposeful human activity requires management to lead its activities and direct them in the right direction. The human element is the primary determinant of administrative work, as evidenced by the modern perspective on management, which emphasizes that it is a comprehensive human process related to planning, organizing, decision-making, communication, human relations, and monitoring the efforts of individuals within a specific administrative formation to achieve a set of desired goals efficiently and effectively." (Ramadan and Khadija, 2016, p. 198)

Through their review of various sources and studies, as well as conducting numerous interviews with experts and specialists, the researchers noted the necessity of delving into a study that would contribute to enhancing the level of administrative work in youth and sports forums in Baghdad. This necessitates an examination of the components of their management related to the topic of sustainable development for the administrative performance of these administrative leaders, which, to the best of the researchers' knowledge, has not been studied within the field of sports management. Thus, they aim to define the research problem through the questions that they may address in their study.

Research Objective: To identify the level of sustainable development of the administrative performance of youth and sports forum directors from the perspective of employees in Baghdad.

### Methodology

The requirements for addressing the current study problem necessitated the adoption of a descriptive research methodology, which is defined as "the methodology that describes a phenomenon according to a specific research plan that includes the description of phenomena, the collection of facts and information about them, the evaluation of these phenomena in light of what they ought to be, and in accordance with more appropriate standards, as well as proposing the steps that should be taken." (Majdi, 2019, p. 208)

### Research Community and Sample

The boundaries of the research community consist of the members of the Youth and Sports Forums working in the capital, Baghdad, who are continuing their official duties for the year (2023) and are engaged in their professional roles within these administrative formations, totaling (1107) individuals. This selection is justified by their status as the community of the phenomenon under investigation in the research problem itself. A primary research sample was randomly selected from this group, comprising (316) individuals, representing (28.546%) of the original community. Additionally, an exploratory sample was randomly selected, consisting of (9) individuals, accounting for (0.813%) of the original community.

### Measurement and Procedures

The scale developed by (Raad, 2023) was utilized to measure the sustainable development of the administrative performance of the directors of the Youth and Sports Forums, the structure of which is illustrated in Table (1):

**Table 1.** *The Structure of the Sustainable Development Scale for Administrative Performance among Directors of Youth and Sports Forums*

The Five Domains of the Scale	Number of Items	Response Alternatives for the Items	Scoring Key	Total Score Range	Hypothetical Mean
Effective Coordination and Teamwork	7			7–21	14
Technical Competence and Quality of Performance	7	Always Agree, Sometimes Agree, Never Agree	3, 2, 1	7–21	14
Initiative and Creativity	7			7–21	14
Time Management	7			7–21	14

Continuous Evaluation	7			7–21	14
<b>Total</b>	<b>35</b>	<b>3</b>	<b>3</b>	<b>35–105</b>	<b>70</b>

The scale includes four (4) instructional guidelines to facilitate and clarify the response process.

It is a measure that possesses scientific foundations and methodologies, as it was constructed based on the community itself and has not been in existence for more than six months. As detailed in Appendix (1), the researcher conducted a preliminary trial on a sample of ten individuals, although there is nothing noteworthy from this trial. Subsequently, the researcher sought to survey the opinions of a specified sample of 316 individuals, represented by employees in the youth and sports forums in the capital, Baghdad, at their respective forum locations. This was facilitated by the availability of the sample within these forums, allowing for the main survey to be conducted both collectively and individually using the research scale, with the assistance of a support team. This survey continued at the youth and sports forums in Baghdad from Sunday, October 22, 2023, to Thursday, November 16, 2023. After each respondent completed their answers, the paper forms of the two scales were collected. The researchers then proceeded with the following steps:

- The weight score for each item corresponding to the selected alternative was calculated using the specific correction key for the items.
- The scores of the item weights were aggregated separately to determine the total score for the domain and the overall score for the scale obtained by each respondent.
- The data from the scale were tabulated in specific paper forms in preparation for statistical processing.

Upon completion of these procedures, the results were analyzed using the Statistical Package for the Social Sciences (SPSS) version V26, calculating the percentage values, mean, standard deviation, and conducting a one-sample t-test.

Total score for the scale = Number of items in the scale × Highest weight in the alternatives of the items

Total score for the domain = Number of items in the specified domain × Highest weight in the alternatives of the items

Sum of weights of the alternatives

Hypothetical mean =  $\frac{\text{Sum of weights of the alternatives}}{\text{Number of alternatives}} \times \text{Number of items}$

## Result

**Table 2.** Statistical Indicators for Comparing the Arithmetic Mean with the Hypothetical Mean of the Sustainable Development Scale for Administrative Performance among Directors of Youth and Sports Forums in Baghdad

Number of Participants	Number of Items	Total Score	Hypothetical Mean	Arithmetic Mean	Standard Deviation	Mean Difference	(t)	(Sig)
316	35	105	70	83.94	4.342	13.94	57.065	0.000

The difference is significant as long as (Sig) < (0.05) at the degree of freedom (n – 1 = 315) and the significance level of (0.05). The unit of measurement is the score.

**Table 3.** Statistical Indicators for Comparing the Arithmetic Mean with the Hypothetical Mean for Each Domain of the Sustainable Development Scale for Administrative Performance among Directors of Youth and Sports Forums in Baghdad

Scale Domains	Number of Items	Total Score for the Domain	Hypothetical Mean	Arithmetic Mean	Standard Deviation	Mean Difference	(t)	(Sig)	Rank
Effective Coordination and Teamwork	7	21	14	16.84	1.047	2.83	48.132	0.000	Third
Technical Competence and Quality of Performance	7	21	14	18.96	1.465	4.96	60.153	0.000	First
Initiative and Creativity	7	21	14	15.87	0.989	1.87	33.542	0.000	Fourth
Time Management	7	21	14	17.23	1.028	3.23	55.944	0.000	Second
Continuous Evaluation	7	21	14	15.04	1.520	1.04	12.216	0.000	Fifth

The statistical difference is significant as long as (Sig) < (0.05) at the degree of freedom (n – 1 = 315) and significance level (0.05). The unit of measurement is the score.

## Discussing

The results presented in Table (2) of the Sustainable Development Scale for the administrative performance of the directors of youth and sports forums in Baghdad, in its overall score, indicate an acceptable positive level of the measured phenomenon among the directors from the perspective of the employees in these forums. Furthermore, the results from the domains outlined in Table (3) reveal that the responses regarding technical efficiency and quality of performance ranked first among the other domains, based on the differences observed when comparing the hypothetical mean with the arithmetic mean for each domain, thereby representing a strength in this scale. The researcher attributes these results to the employees' satisfaction with the director's mastery of the knowledge, procedures, and

methods associated with the type of activities and specific events, which enable him to possess skills that distinguish him from others in executing his specific functions. This, in turn, supports the ability to achieve the forum's set objectives with limited human and material resources and with good performance to attain accomplishments. Additionally, the researcher notes that the responses from the employees in the sample were inclined to consistently support the director's new ideas for implementation through modern methods, contributing to the improvement of the forum's service quality to enhance its competitive advantage, in accordance with the quality management criteria aimed at improving the forum's performance by developing comprehensive quality management systems across its various formations. Moreover, there is a focus on the efficiency of operational processes related to enhancing the forum's performance and supporting the development of the employees' diverse capabilities in executing the annual plan for the forum, which underscores the critical importance of technical efficiency and quality of performance in achieving sustainable development in administrative performance.

It is noted that "the effectiveness of individuals in accomplishing the tasks assigned to them depends on the frameworks of sustainable development for the administrative performance of the organizational structure, relying on increased interaction and equitable distribution of tasks, and organizing the employees' awareness of their duties and those of their peers in a clear and periodic manner characterized by an atmosphere of fairness, thereby stimulating factors that lead to success in the assigned administrative structure." (Armstrong, 2012, p. 143)

Furthermore, "today's officials face a challenging task in making decisions within increasingly complex and turbulent environments, and the consideration of sound planning for any decision primarily depends on the accuracy and credibility of the information. The efficiency of decision-making relies on the accuracy of the information that reaches the leadership of the organizational structure, each according to their level, necessitating that decision-makers verify this information while obtaining it from more than one source." (Drucker, 2005, p. 164).

The administrative process in which priorities are established, strategies are formulated, programs are developed, and policies are delineated governs the behavior of the institution in utilizing various material and human resources to achieve its objectives (Mahmoud, 2012, pp. 10-11). The results pertaining to the area of weakness in this measure have emerged in the domain of continuous evaluation, despite this level being accepted for exceeding the hypothetical level of the measure, which ranked fifth among the other domains based on the differences observed when comparing the hypothetical mean with the arithmetic mean of each domain. The researcher attributes the emergence of these results to the fact that the opinions of the employees underscored the necessity for managers to master the methodological processes that require the collection of objective data and truthful information from multiple

sources using diverse measurement tools in light of specific objectives, with the aim of arriving at quantitative estimates and qualitative evidence upon which judgments or appropriate decisions can be made. Furthermore, the research attributes the emergence of these results to the tendency of the responses from the sample individuals to reflect a concern for the manager's commitment to rewarding high-performing employees and holding all employees accountable fairly, as well as the need for an objective mechanism for the continuous evaluation of employees' achievements in the forum by accurately documenting complete information prior to their assessment, thereby ensuring that performance evaluations are conducted independently of personal relationships. Additionally, there is a need for the manager to provide employees in the forum with opportunities to contest evaluations when they perceive them as unjust.

It is evident that "the manager's need for information arises early, beginning with the initial signs of a problem, in addition to the upper management's initiation of investigation and exploration for the existence of a specific malfunction or issue. This matter cannot be resolved with certainty without the provision and analysis of data. It is important to emphasize that generating alternatives is not a subsequent step to identifying and diagnosing the problem, but rather a concurrent step that runs alongside it" (Basem, 2010, p. 62).

Furthermore, "performance evaluation is an event that occurs once a year; however, performance management is a continuous dynamic process. Each component of the system, such as training, evaluation, and rewards, is integrated and interconnected to achieve a primary goal of ongoing organizational effectiveness. In performance management, the efforts of all employees must be directed towards achieving strategic objectives. If an employee needs to improve their skills, training becomes a necessity to achieve that. With performance management systems, training is directed towards achieving organizational effectiveness. Additionally, compensation and performance are directly linked to achieving organizational goals, and employees who meet the required expectations in the pursuit of these goals are rewarded" (Sphr & Mondy, 2010, p. 238).

Moreover, "recognizing the value of an individual's contributions and satisfying their need for esteem is essential. There must be acknowledgment of the rights of those who exert effort, master performance, and demonstrate dedication to their work, encouraging and motivating them to continue their creativity and commitment to ongoing progress and growth" (Kines & Others, 2011, p. 641).

Thus, addressing the strengths and weaknesses in managerial performance necessitates continuous evaluation to identify them in order to confront weaknesses and support strengths through administrative technical methods in accordance with sustainable development. This evaluation, by its nature, requires strategies characterized by objectivity and precision, which the forum manager must possess and adhere to strictly scientific principles for its optimal application.

## Appendix

### Appendix 1. Sustainable Development Scale for Administrative Performance among Directors of Youth and Sports Forums from the Perspective of Employees in Baghdad

#### First: Effective Coordination and Teamwork

No.	Item	Always Agree	Sometimes Agree	Never Agree
1	The director believes in consulting with employees before making any decision in the forum.			
2	The director encourages employees in the forum to work collaboratively to accomplish their tasks.			
3	The director ensures that all employees' opinions are included when formulating the forum's policy.			
4	The director avoids overlapping authorities before making decisions in the forum.			
5	The director discusses decisions with employees based on the most suitable alternative for solving problems in the forum.			
6	The director holds formal meetings with employees to deliberate decision-making.			
7	The director uses fair methods with employees when applying regulations.			

#### Second: Technical Competence and Quality of Performance

No.	Item	Always Agree	Sometimes Agree	Never Agree
1	The director supports new ideas for implementation using modern methods.			
2	The director contributes to improving the quality of the forum's services to enhance its competitive advantage.			
3	The director adheres to quality management standards to improve the forum's performance.			
4	The director rewards employees in the forum based on outstanding performance.			

No.	Item	Always Agree	Sometimes Agree	Never Agree
5	The director pays attention to the efficiency of operational processes related to improving the forum's performance.			
6	The director develops total quality management systems across the forum's different units.			
7	The director supports the development of employees' various capabilities in implementing the forum's annual plan.			

### Third: Initiative and Creativity

No.	Item	Always Agree	Sometimes Agree	Never Agree
1	The director trusts employees' abilities and their capacity for innovation and modernization in managing the forum.			
2	The director is concerned with coordinating initiatives among the forum's departments.			
3	The director encourages employees in the forum to be creative.			
4	The director provides employees with the necessary resources for renewal and change.			
5	The director ensures that employees establish lawful working relationships with other forums.			
6	The director urges employees to benefit from the scientific resources available in the forum's library.			
	The director possesses the qualifications needed to identify talented employees in the forum.			

#### Fourth: Time Management

No.	Item	Always Agree	Sometimes Agree	Never Agree
1	The director develops a well-designed plan to utilize time efficiently when implementing the forum's programs.			
2	The forum director adheres strictly to scheduled appointments.			
3	The director issues instructions to employees to reduce time wastage.			
4	The director improves the alignment between program execution and the time allocated for it.			
5	The director monitors the forum's work according to an organized timeline.			
6	The director is concerned with improving time-management methods to provide better services in the forum.			
7	The director uses specific criteria to evaluate employees' time management.			

#### Fifth: Continuous Evaluation

No.	Item	Always Agree	Sometimes Agree	Never Agree
1	The director is keen on rewarding high-performing employees.			
2	The director holds all employees in the forum accountable fairly.			
3	The director completes the performance evaluation process objectively and away from personal relationships.			
4	The director ensures the accurate documentation of all relevant information before evaluating employees.			
5	The director follows an objective mechanism for the continuous evaluation of employees' achievements.			
6	The director conducts a comprehensive evaluation of all proposed alternatives related to the forum's work programs.			



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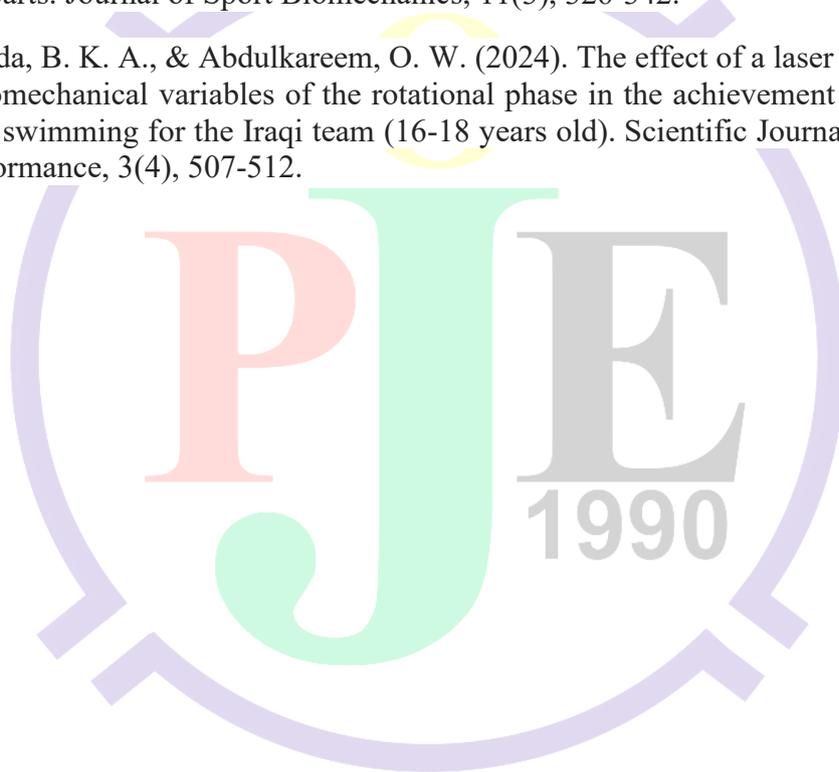
No.	Item	Always Agree	Sometimes Agree	Never Agree
7	The director provides employees with opportunities to appeal evaluations if they feel they are unfair.			



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## The effect of third zone intensity training on the speed-strength of the arms certain biochemical indicators and the completion time of a 50-meter freestyle swim

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2366](https://doi.org/10.37359/JOPE.V37(4)2025.2366)

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**Article history:** Received 9/ October/2025 Accepted 14/ December /2025 Available online 28/ December/2025

### Abstract

The research aimed to prepare and apply third zone intensity training for 50-meter freestyle swimmers, examining its impact on the speed strength of the arms, some biochemical indicators, and the completion time for 50 meters freestyle. The researcher hypothesized that there would be statistically significant differences between pre- and post-test results for the experimental and control groups in arm speed strength, biochemical indicators, and completion time. The experimental method involved a design with both experimental and control groups, consisting of 11 swimmers from the Army Club participating in the 2024/2025 sports season, selected intentionally with a 100% comprehensive approach. After determining the tests and preparing the training, the experimental group underwent two training sessions per week for 10 weeks. Results were analyzed using SPSS. Conclusions and recommendations indicated that applying third zone intensity training during the specific preparation period helps develop arm speed strength for 50-meter freestyle swimmers, outperforming peers who train without it. It also aids in regulating blood salts (calcium, potassium, sodium) among these swimmers, again outperforming their peers. Additionally, it improves completion time for 50 meters freestyle for those who train with it, surpassing those who do not. It is crucial to avoid excessive resistance increases when training arm speed strength with third zone intensity training for 50-meter freestyle swimmers. Furthermore, monitoring biochemical indicators of blood salts is essential for assessing swimmer health and cellular regulation during third zone intensity training.

**Keywords:** Third intensity zone training, speed-strength characteristics of the arms, biochemical indicators, swimming (50) meters freestyle.

### Introduction

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Young swimmers, and especially short-distance ones, do in fact get stuck into a plateau when they train – hard core training going for sheer numerical attainment. This plateau thwarts their density even though they keep training to get these fitness goals. Myers They apply the brakes on their masses no matter how hard they train for it. Coaches must understand the importance of biological arrangement of mineral elements, which would appear in large quantities during the fast-training swimmer (directly in Sarcoplasm of muscle cells). As it is recognised, the VL mental component is genetically determined; therefore, training to direct development towards improving these mechanical factors of NM execution with strength and biochemical training directed to cellular ordering. This is of particular interest since speed training is related to enhancement of motor unit function, as well as strength training with low resistance and rapid muscle action.

It is suggested that "a diminishing form of intensity in training maintains adaptations accrued, without growing them, and so underlines the need for a new and adequate overload. This gradual increase in training volume is known as the principle of progressive overload. (Al-Qat, 2020, p. 31)

Plus, "the body needs to replace lost electrolytes, and refilling potassium levels helps speed recovery and decrease post-exercise fatigue and cramping. (Maughan & Sheriffs, 2010, p. 411)

Also, that "the mineral elements within the cell control its internal environment at rest and during work and hence determine whether excess or deficit will be sensed for storage or release of cellular water according to the amount available as needed". (Lerner & Brenda, 2007, p.53)

In addition, "mineral salt intake improves sports performance, but it also helps restore the athlete's losses that have occurred in the body during their metabolism process. They can hurt performance if these salts are depleted." (Ibrahim & Kamash, 2012:53)

The author argues that an effective swimming training program must take into account the athletic balance of electrolytes --that is needed for quick contractions. Special attention should be paid to control the intensity or the relative level of work, when designing training for reduced time to 50m free among swimmers at an early age.

In higher power, high speed sports, "muscle requires high force, and the increased velocity demands higher calcium levels so that actomyosin can react rapidly to vigorous exercise." Higher  $Ca^{2+}$  is needed to increase the speed and strength of muscle activation, and the muscle must also clear  $Ca^{2+}$  quickly out of the cytoplasm back into the sarcoplasmic reticulum in order for it to relax again after each contraction so that another effective forceful contraction can occur. In order to keep up the supply of calcium in intense

work, muscles use a complex system of storage and re-absorption in calcium channels and pumps of the sarcoplasmic reticulum." (Allen & Westerblad, 2001, pg. 659)

Muscle function relies on the ability of calcium to regulate interaction between the two major muscle proteins, actin and myosin. In muscle cells, the action potential causes the release of calcium from the sarcoplasmic reticulum (SR). Calcium then attaches to the troponin C protein on actin filament which causes a conformational change in another protein called tropomyosin that exposes the binding sites between actin and myosin, thus allowing myosin to interact with actin and contraction of muscle occurs. (Rassier, 2012, p. 253)

Potassium is an important mineral for the heart muscles and has a direct role in blood pressure reduction. Potassium works closely with magnesium in the body, helping to keep muscles relaxed which allows for cellular processes. It is also important to note the importance of keeping blood sodium concentration at its' physiological levels since levels of this ion inversely associated with blood base stability and it's other role as the regulator of permeability. (Howler, 2017, p. 17)

Daily sodium chloride intake of human is (8-15) gm and potassium chloride intake is 3–4g, the requirement being higher during training. Why is potassium and sodium important because they are what absorb sugars in the intestines, muscle function, help for water retention inside of body cell's regulate blood pH and body fluids and so on. (Al-Nasiri & Al-Rakabi, 2020, 141) It can be deduced from the above findings that team teaching has manifested as a remaining burden throughout decades.

Potassium also serves to potentiate chemical reactions used in production of energy inside the cell and help convert carbohydrates into glycogen (stored energy in muscle), both important for improved specific endurance performance at high intensity. The AI for potassium in adults is approximately (4700) mg, however athletes may require more as losses through sweat start at about this level. (Bakri, 2019, p. 105)

The researcher states that muscle contraction, considering its physiologic properties in sport training requires insertion of diverse (or a combination) of other types of training focused on this muscle contraction at the speed that swimmers use to cover 50m distance while equal amount is also discussed.

"The application of muscle force is the ultimate element underlying all efforts aimed at increasing driving speed in athletes." (Steven, 2001, p. 4)

How to Create a Method of Isolating the Technical Muscles while performing such Special Preparation – Of this involves one and the same problem: How on earth may trainers contrive ways for isolating different muscle groups engaged in technical

performance of these skills, Why is Trainers have decided they cannot – and instead must settle for variety and interchange that cover most muscles effected by resistance, so that each resistance corresponds to size type, direction of action characteristic muscles. (McBride & Other, 2022, 582)

Exercising forward and reverse muscles will increase strength to wider range of muscles in overall build quality. \*Balanced arm strength to prevent unbalanced muscle loading or joint damage from arm tensed. Moreover, developing control of strong-arm movements during contraction and stabilization is essential because it supplements in helping improve the accuracy and control of exercises and technical tasks associated specifically with technical performance and success. (Seitz & Others, 2022, p. 1120) The importance is accepted that "the effective use of muscular strength is the basic factor in developing speed among athletes." (Steven, 2001, p. 4)

It is difficult for coaches to develop techniques that target the muscle involved in technical performance, which makes them (coaches) resort to a great amount of diversity and interchange in order to include most muscles under the involvement of resistance so that each resistance will be appropriate with regard to size, type, and direction as it represents each muscular function. (McBride & et al., 2022, p. 582)

Training both muscles increases overall strength and capability, and balanced arm strength leads to less risk of injury from uneven muscle loading or over-tension on arm joints. In addition, while contraction and stabilization occur it is important to increase the control over musculature in power arm movements because an increased ability to control these muscles will help promote better accuracy and balance when performing exercises/activities directly related to skill performance or accomplishment. (Seitz & Others, 2022, p. 1120)

With the large differences between the nature of performance and increases in training loads, both from intensity and volume, coaches should have knowledge to oversee negative effects that may come with exposure to chemical injuries in muscles tendons (fatigue). (Shahata, 2006, p. 17)

Muscle strength is “the ability of a muscle to develop maximal contractile force against resistance,” including maximum strength, speed-strength and strength endurance. (Sayed, 2025, p. 161)

Exercise examples that include work in the third intensity zone are exercises which combine strength and speed as well as being performed in a repetitive fashion. (Bompa & Haff, 2018, p. 1)

Phase 3- Zone 3: Jumping and Acceleration Training Middle distance athletes must not only be fast, but they need to also have better acceleration abilities in order to beat other competitors. (Chaabene et al., 2021, p. 300)

Training in the third zone, helps also to develop different types of physical abilities like explosive-power and swimmers through from other sports they can use this kind of helping exercises. (Ramirez-Campillo & Other, 2020, p. 168)

Scientific and systematic training is reflected in changes of most structural and metabolic factors of muscle that influence body mass: speed ratio. (Despina, 2008, p. 78)

The importance of this work is demonstrated in two aspects: theoretical and empirical. The first represented an attempt to get the attention of academics doing sports-training physiology work for swimmers on how important it is for maintaining the biochemical cellular muscle-salts organisation that specific third-intensity zone swim training be performed while maybe showing these academics a way of shaving off some time on completion 50-metre freestyle train-for speed-strength only) stroke events. This is an attempt to make a contribution to the work and literature of sports training biology, at the academic level, in third intensity zone training programs on organized biochemical cellularity of salt-muscle ( $Ca^{2+}$  |  $K^{+}$  |  $Na^{+}$ ) in blood during speed-strength changes for arm speed intended with 50 meters freestyle swimming time improvement; hence, making room for aid from research academics on classical importance. The pragmatic direction constitutes a scholarly approach to propose a training program that does not include randomness like trial and error, neither is filled by improvisation, which includes the systematic type of training of 3rd zone intensity in favor of specificity for 50 meters freestyle swimmers and at the same time not deprive them muscle cell integrity. It will also help stakeholders in swimming clubs to give the required demands that serve the applications related to third training intensity zone, which are based on the result of the present study by using digital language to control training loads for these practices.

It is concluded that within the framework of the literature available in sports training physiology for distant 50- meters free swimmers, this researcher had to use scientific observation to elaborate and identify the research problem by noting his sports weakness or stagnation encounter with competition times, on a closed circular distance, such as those found under Army Club swimmers assigned task set conditions display for changes in type of training unit receives and development speed-Strenght arms. This is under the assumption that training for this physical ability most closely pertains to rapid repetitive actions which aid swimmers in swimming faster this short distance and achieving more time. Particular cellular developments of some necessary mineral salts should be in good state during them formation to sustain the repetitions of those muscle contractions.

This research therefore seeks to prepare and apply third intensity zone training from the 50-meter freestyle swimmers as well as, determine the effect of third intensity zone training on speed-strength in arms, some biochemical indicators and completion time for 50 m freestyle. The difference in the pre and post test results for speed-strength of the hands, certain biochemical rates and 50 meter freestyle event time for experimental groups of swimmers and control are statistically significant as hypothesized by the researcher. Further, the differences in post-test between experimental and control groups were statistically significant in speed-strength of arms, some biochemical parameters and completion time of 50-meter freestyle.

## Methodology

The current research problem necessitated the adoption of an experimental approach utilizing a design comprising two equivalent groups: the experimental group and the control group, with rigorous control through pre-test and post-test assessments. The research population was defined as the swimmers of the Army Sports Club participating in the 50-meter freestyle event during the sports season of 2024/2025, totaling 11 swimmers. All participants were deliberately selected using a comprehensive sampling method, constituting 100% of the main research sample. To meet the requirements of the experimental design, the swimmers were divided into two groups of unequal sizes through matched pairs, with the first group consisting of 5 swimmers and the second group comprising 6 swimmers. One group was randomly selected to serve as the experimental group, while the other acted as the control group. Additionally, 4 swimmers were chosen from the two groups for exploratory trial procedures without affecting the internal validity of the experimental design.

To assess dependent variables in this study, the researcher utilized a 20 kg barbell push exercise for 10 seconds duration performed in supine position due to its arm muscle episode isolation. Moreover, the research also used an immobile cycle, namely Life Fitness model (capacity 9700 American), which is arm and leg ergometric with digital electronic display that measures speed by calculating the subject's mass in kilograms times 0.075 to determine initial required resistance for each swimmer tested. A maximal physiological effort was done on the cycle ergometer during 30 sec to analyze some biochemical parameters such as: calcium ( $\text{Ca}^{+2}$ ), potassium ( $\text{K}^{+}$ ) and sodium ( $\text{Na}^{+}$ ). A timed freestyle swim test was also conducted at 50 meters, in accordance with the Terms and Conditions of World Aquatics, the international governing body for aquatic sports within the Olympic movement.

The researcher also undertook the preparation of exercises for the third intensity zone by following the subsequent steps:

- Reviewing the training protocols for 50-meter freestyle swimmers utilized at the Army Sports Club.
- Establishing the physical training factor (speed-strength of the arms).
- Defining the criteria for selecting the content of the exercises in accordance with the parameters of the third intensity zone training, which includes some exercises aimed at developing the speed-strength of the arms as follows: (Bompa & Haff, 2018, P: 3)
  - Plyometric push-up exercises.
  - Light to moderate weightlifting exercises performed rapidly and repetitively.
  - Exercises that combine strength and speed.

The parameters for the hypoxic training system have been established, wherein the intensity and durations necessary for performing repetitions, the duration of rest periods between repetitions, and the number of sets have been determined based on the capabilities of each athlete as assessed through pre-tests measuring the speed-strength of the arms. This was achieved by employing the equation (maximum repetitions in a duration of 10 seconds  $\times$  the percentage of the required intensity), while considering the principle of progressive overload in the training load of these exercises and the principle of undulation in their planning across training units and weeks throughout the specific preparation period for the swimmers.

The intensity of these training exercises commenced at 80% and concluded at an intensity of 90% of the speed-strength capacity of the arms, in accordance with the Hara training principle, where the researcher took into account the individual differences of each swimmer based on their maximum intensity.

The number of repetitions ranged from 5 to 10, with sets comprising 3 to 5 for each exercise. The inter-set rest duration between exercises varied from 4 to 8 seconds depending on the type and intensity of the exercise. The transitional rest duration between exercises was set at 2 to 5 minutes, in accordance with the anaerobic energy system.

A high-intensity interval training method was adopted to regulate the training load for the third intensity zone of speed-strength training. These exercises are implemented at the beginning of the main section of the training unit, with a frequency of 2 units per training week. The total number of training units amounts to 20, over a period of 10 consecutive training weeks.

Training sessions are conducted on Sundays and Tuesdays, with each training unit lasting 90 minutes. The total time allocated for these exercises is between 18 to 20 seconds, encompassing both work and rest for each exercise, considering that it is essential not to exceed 20 minutes of training time for athletes in each training unit focused on muscular

strength, even those aimed at improving speed through the development of muscular strength. (Al-Nasiri & Al-Rakabi, 2020, p. 66)

An exploratory trial was conducted with 4 swimmers on Tuesday, February 4, 2025, at the Olympic People's Pool, and the researcher did not encounter any significant obstacles worth mentioning.

The pre-tests were conducted over two consecutive days, specifically on Wednesday and Thursday, corresponding to the dates (5-6/2/2025), at the Olympic People's Pool. The first day included tests for explosive strength characterized by speed for the arms, followed by a specified effort test lasting (30) seconds, and the collection of blood samples from the swimmers in the research groups amounting to (5 cc). The blood was then transported in a small refrigerator to the laboratory for the measurement of various biochemical indicators (calcium, potassium, sodium) in this venous blood. The second day involved a freestyle swimming test over a distance of (50) meters, conducted in accordance with the conditions and regulations set forth by World Aquatics, the international Olympic federation for aquatic sports.

The third zone intensity training was implemented for the swimmers in the experimental group over a period of (10) consecutive weeks, at a frequency of (2) sessions per week. In contrast, the control group trained for the same duration and number of sessions, adhering to their established training regimen without any intervention from the researcher, aside from monitoring. This training commenced on Sunday, (10/2/2025), and continued until Tuesday, (8/5/2025).

Post-tests were administered over two consecutive days, specifically on Wednesday and Thursday, corresponding to the dates (9-10/5/2025), at the Olympic People's Pool, under the same conditions and sequence as the pre-tests.

The research data were processed automatically using the SPSS system to extract the percentage, mean, standard deviation, and the independent samples t-test, as well as the paired samples t-test.

## Results

**Table 1.** *Pre-test Results Between the Two Groups*

Variables & Unit of Measurement	Group	Mean (M)	SD	Levene's Test (Sig.)	t-value	(Sig.)	Difference
Speed–Strength of the Arms (repetitions)	Experimental (n = 5)	11.00	1.225	0.238	0.638	0.905	Not significant
	Control (n = 6)	10.33	1.211				

Ca <sup>2+</sup> (mmol/L)	Experimental (n = 5)	9.28	0.303	0.011	0.919	0.392	Not significant
	Control (n = 6)	9.35	0.288				
K <sup>+</sup> (mmol/L)	Experimental (n = 5)	4.34	0.207	0.293	0.602	0.797	Not significant
	Control (n = 6)	4.45	0.243				
Na <sup>+</sup> (mmol/L)	Experimental (n = 5)	143.4	3.435	0.279	0.610	0.290	Not significant
	Control (n = 6)	142.83	3.061				
50 m Freestyle Swimming Performance (sec)	Experimental (n = 5)	28.8	0.837	0.004	0.949	0.334	Not significant
	Control (n = 6)	29.0	1.095				

**Notes:** Degrees of freedom (df) = n – 2 = 9, The difference is not significant when Sig. > 0.05 at a significance level of 0.05

**Table 2. Pre- and Post-test Results for Both Groups**

Variables	Group	Comparison	(M)	SD	(ΔM)	(ASD)	T value	Sig.	Difference
<b>Speed–Strength of the Arms (repetitions)</b>	Experimental (n = 5)	Pre-test	11.00	1.225	2.80	1.483	4.221	0.013	Significant
		Post-test	13.80	0.447					
	Control (n = 6)	Pre-test	10.33	1.211	0.833	0.753	2.712	0.042	Significant
		Post-test	11.17	1.169					
<b>Ca<sup>2+</sup> (mmol/L)</b>	Experimental (n = 5)	Pre-test	9.28	0.303	1.20	0.283	9.487	0.001	Significant
		Post-test	10.48	0.045					
	Control (n = 6)	Pre-test	9.35	0.288	0.15	0.123	3.000	0.030	Significant
		Post-test	9.50	0.210					
<b>K<sup>+</sup> (mmol/L)</b>	Experimental (n = 5)	Pre-test	4.34	0.207	1.20	0.187	14.343	0.000	Significant
		Post-test	5.54	0.055					
	Control (n = 6)	Pre-test	4.45	0.243	1.133	0.137	2.390	0.062	Not significant
		Post-test	4.583	0.160					
<b>Na<sup>+</sup> (mmol/L)</b>	Experimental (n = 5)	Pre-test	143.40	3.435	5.40	3.362	3.592	0.023	Significant
		Post-test	148.80	0.447					
	Control (n = 6)	Pre-test	142.83	3.061	0.833	0.408	5.000	0.004	Significant
		Post-test							

		Post-test	143.67	2.805					
<b>50 m Freestyle Swimming Performance (sec)</b>	Experimental (n = 5)	Pre-test	28.80	0.837	1.60	0.548	6.532	0.003	Significant
		Post-test	27.20	0.447					
	Control (n = 6)	Pre-test	29.00	1.095	0.167	0.408	1.000	0.363	Not significant
		Post-test	28.83	1.169					

**Notes:** Significant if (Sig.) < 0.05 at a significance level of 0.05, Degrees of freedom (df) per group = (n – 1).



**Table 3.** *Post-test Results Between the Two Groups*

Dependent Variables & Units	Group	(M)	SD	t-value	Sig.	Difference
<b>Speed–Strength of the Arms (repetitions)</b>	Experimental (n = 5)	13.80	0.447	4.722	0.001	Significant
	Control (n = 6)	11.17	1.169			
<b>Ca<sup>2+</sup> (mmol/L)</b>	Experimental (n = 5)	10.48	0.045	10.168	0.000	Significant
	Control (n = 6)	9.50	0.210			
<b>K<sup>+</sup> (mmol/L)</b>	Experimental (n = 5)	5.54	0.055	12.652	0.000	Significant
	Control (n = 6)	4.583	0.160			
<b>Na<sup>+</sup> (mmol/L)</b>	Experimental (n = 5)	148.80	0.447	4.015	0.003	Significant
	Control (n = 6)	143.67	2.805			
<b>50 m Freestyle Swimming Performance (sec)</b>	Experimental (n = 5)	27.20	0.447	2.929	0.017	Significant
	Control (n = 6)	28.83	1.169			

**Notes:** Degrees of freedom (df) = n – 2 = 9, A difference is considered significant when Sig. < 0.05 at the significance level (0.05).

## Discussion

From the review of the results presented in Table (2), it is evident that the swimmers in my research group exhibited significant development and improvement in the values of all five dependent variables in the post-tests compared to their results in the pre-tests. Furthermore, an examination of the results in Table (3) reveals that the swimmers in the experimental group outperformed their peers in the control group across all post-test values for these five variables. The researcher attributes the emergence of these results regarding the capacity for speed-strength to the consideration of training within the third intensity zone, which involved a variety of resistances tailored to target the components of strength and speed, while also taking into account the rhythm and balance in the repetitive arm movements characteristic of freestyle swimming. Additionally, it was crucial to avoid excessive training loads, considering the inverse relationship between the swimmer's mass and their speed in the aquatic environment, in order to optimize the neuromuscular response to this type of training. The results demonstrated that this approach did not detract from the critical blood electrolytes involved in these repetitive contractions, as the effectiveness of calcium, potassium, and sodium increased in cellular regulation of biochemical reactions during exertion when applying repetitions of these exercises within

the range of 80-90% outside the swimming pool environment. This was essential for achieving the components of speed and strength in muscular contractions. The training regimen proved effective in avoiding excessive loads, thereby improving the completion time for a distance of 50 meters in freestyle swimming, due to the enhancement of the physical factors influencing this achievement under healthy physiological conditions related to the cellular regulation mechanisms of the swimmers. Moreover, the standard deviations noted in the pre- and post-tests, as well as in the post-test tables, indicated that the intensity zone training took into account the individual differences among the swimmers in the experimental group, thereby fulfilling a fundamental principle in sports training physiology. Additionally, the principle of progression and variation was adhered to, starting from the first training unit and continuing through to the completion of these exercises across different units and training weeks, in order to mitigate losses in biochemical indicators and increase the opportunity for their compensation, thus sustaining the repetitive movements in speed-strength and achieving the 50-meter freestyle distance. Consequently, this overall impact of the results played a significant role in their superiority over the swimmers in the control group in the post-tests.

It is stated that "muscle strength is the fundamental element for achieving success in most physical and sports activities." (Majid, 2017, p. 43) Furthermore, "third zone training aids in strengthening muscles and developing the ability to perform rapid and powerful movements." (Haff & Triplett, 2016, p. 124) The "development of arm strength has numerous benefits, the most significant of which is the balanced development of muscles. When exercises are varied between muscle contractions and isometric holds, a diverse range of muscles in the arms, including the biceps and triceps, are stimulated, which helps to balance muscle development and avoid neglecting the strengthening of certain muscles at the expense of others." (Baker & Others, 2023, p. 63) "The level of development of physical and motor abilities must correspond to the requirements of the motor skill to execute it as intended." (Al-Rabdi, 2020, p. 66) Additionally, "third zone training is considered one of the modern applications in sports training that assists athletes in developing muscle strength without overexertion or harming the contraction processes, allowing for muscular interchange to avoid rapid fatigue." (Lerner & Brenda, 2007, p. 505) "Studies have shown that regular strength and resistance training leads to increased muscle and connective tissue strength, enhanced bone mass, flexibility, and metabolism, in addition to aesthetic appearance." (Faraj, 2011, p. 340) "The variation between muscle contractions and isometric holds in arm strength development training is of great importance in strength sports and athletics. This variation includes the ability to strengthen muscles during contraction (when bending the arm) and during isometric holds (when extending the arm), as the overall strength of the arms lies in the capacity for endurance and control of powerful movements in both directions." (Thomas & Newton, 2017, p. 153) Thus, "exercises that focus on dynamic contractions and muscular interchange contribute to the development of fast-twitch muscle fibers and improve coordination between the

nervous system and muscles." (Ryan, 2018, p. 2) Moreover, "one of the exercises that enhances the development of various physical abilities reliant on muscle strength training is third zone exercises, which consider performance improvement in multi-directional training units to achieve more than one training objective within the same unit." (Arthur, 2012, p. 221) It is noted that "the negative effects of calcium deficiency on an athlete's health are significant, as a lack of salts during the sweating process disrupts the nerve signals directed to the muscles, leading to muscle cramps. Therefore, an athlete's diet should be rich in sodium due to its loss during sweating associated with sports activities, and athletes require it more than other individuals. Furthermore, an athlete's diet must include calcium and magnesium salts, which are consumed during various metabolic processes that intensify during exercise." (Al-Sisi, 2018, p. 231)

Calcium deficiency can lead to weakened muscle contractions and incomplete spasms, thereby limiting the capacity for intense physical performance. Furthermore, the availability of calcium is also associated with proper nutrition, as the intake of calcium through diet is essential for maintaining adequate levels of this element in the body, particularly among athletes who may require larger amounts due to intense muscular consumption. (Bers, 2002, p. 199)

Potassium is important in the transmission of nerve impulses which initiate muscle contractions. The potassium and sodium balance in the news helps regulate muscle contraction and relaxation, which can prevent cramping and fatigue. Potassium and Exercise During exercise, athletes lose large amounts of potassium in their sweat which alters this balance. Potassium Deficiency can cause muscle cramping, and reduce performance. (Clark, 2008, p. 11)

Your kidneys will also get rid of potassium, and, so if you are having more substances (renin angiotensin and aldosterone) secreted then it is likely your kidneys are flushing out a lot of potassium which results in hypokalemia, which means, muscle spasm pain and weakened muscular abilities. (Tawfiq, 2004, p. 68)

Additionally, it's advisable to have third zone training to protect athletes from the harmful effects of high loads for the development of explosive power, speed strength and maximum speed. (Abu Saleh et al., 2016, pg.4)

Zone three training helps to develop athletes of many types (who depend on speed and explosiveness). (Lloyd & Others, 2016, p. 1241)

Third-zone training addresses the physical and skill focused stability barriers, Compare that to forcing you to break stability from a strength training standpoint where there is not much you can do outside of keeping people off-balance or using chains indoors and out but at some point "the chain is only as strong as its weakest link" so your gains in

the gym will more than likely be lost unless you work on stabilizing those strength gains. (Abd al-Basir, 2023, p. 127)

The development of motor control aids in improving the performance of exercises and sports movements that are directly related to technical performance and achievement. (Seitz & Others, 2022, p. 1120)

A gradual increase in training load is fundamental to any training plan for athletes and should be adhered to by all athletes concerned with their performance levels. (Al-Abdullah, 2018, p. 66)

### Conclusions and Recommendation

1. The third intensity zone training is suitable for 50-meter freestyle swimmers.
2. The implementation of third intensity zone training during the specific preparation period aids in the development of speed-strength in the arms of 50-meter freestyle swimmers, surpassing the progress of their peers who train without it.
3. The application of third intensity zone training during the specific preparation period assists in regulating the increase of blood salts (calcium, potassium, and sodium) in 50-meter freestyle swimmers, exceeding the regulation of these increases in their peers who train without it.
4. The implementation of third intensity zone training during the specific preparation period contributes to improving the completion time for 50-meter freestyle swimming among swimmers who engage in this training, outperforming the improvement in completion time of their peers who do not.
5. It is essential to avoid exaggerations in increasing resistance when training the speed-strength of the arms through the application of third intensity zone training for 50-meter freestyle swimmers.
6. It is crucial to pay attention to measuring biochemical indicators of blood salts, which provide insights into the well-being of swimmers and the development of their cellular regulation when training with third intensity zone exercises.

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## Improving the specific strength of the arms and trunk according to plank exercises and the performance of shot put for young women

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2318](https://doi.org/10.37359/JOPE.V37(4)2025.2318)

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**Article history:** Received 11/ June/2025 Accepted 26/ November/2025 Available online 28/ December/2025

### Abstract

The modern qualitative idea of training experienced athletes is not only strengths but also extends to general strength training, reaching special strength training in the training stages specific to the different types of sports activities. The aim of sports training is not to be on the relief of what prompted the researcher to practice the special strength of the arms and trunk and the achievement of the players pushing the weight. The study aimed to prepare plank exercises to improve the special strength of the arms and trunk and the achievement. I learned with moral success between the pre- and post-tests with the well-being of the Al Ain players pushing the weight for the youth players, numbering (5), then trying the exercise in the field and field in the scouts' stadium. I got the (plank) exercises to a lot of positive and effective on the wonderful special strength and contributes to facilitating the arms and trunk and the achievement. The research experiment recommended the possibility of applying plank exercises in the special strength facilities for events in special athletics to learn more to achieve better.

**Keywords:** Specific strength, plank exercises, shot put performance, young women.

### Introduction

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The results of ongoing scientific and practical experiments and research regarding the use of various training methods and techniques that contribute to the development of athletes' performance, in accordance with the theories and concepts of sports training and their practical applications, necessitate the harnessing of diverse sports sciences that significantly impact the enhancement and development of technical performance and numerical levels across all sports activities. Given the important status of athletics competitions in championships, countries have relied on scientific foundations, research, and analysis based on modern sciences in preparing champions, which has played a prominent role in guiding and selecting training methods and techniques for athletes to achieve high levels. The weightlifting event is one that requires specific physical attributes aimed at achieving optimal performance. However, for performance to be strong and characterized by distinctive motor coordination, the athlete requires effective training based on systematic measurements and training principles. As noted by Iman Sabeih, "The impact of specific exercises that consider the athlete's uniqueness through the use of training tools that simulate performance in terms of muscle contraction direction" (Iman, 2021, p. 138). The researcher believes that specific training, which involves the technical performance of strength and speed, the temporal trajectory of performance, and the direction of muscular work, is essential for those executed movements. It is well-known that the weightlifting event largely depends on grip strength and throwing speed in the final phase, in addition to the correct elevation of the arm to improve and enable the thrower to control the weight during grasping and then applying the throwing phases. Therefore, the researcher found that plank exercises possess a high capacity for improving specific strength through their execution according to regulated repetitions and rest times, relying on organized intensity during the training unit. Lyth Ibrahim asserts, "The strength exhibited in the specialized event is a necessary performance requirement for achieving the goal that necessitates the exertion of muscular force, depending on the variables and conditions of that event" (p. 42). The significance of this research lies in creating changes and significant differences between the pre-test and post-test through the preparation of modern exercises (plank) aimed at developing the specific strength of the arms and torso and enhancing the weightlifting performance of young female athletes.

There are numerous methods for preparing and training athletes, with the objective of ensuring that training does not occur at a uniform pace. Furthermore, the application of various training methods and their different forms serves solely as exercises aimed at achieving the training purpose, which is executed through specific methods and techniques. Additionally, the means employed in implementing training programs during the various preparation stages are directed towards enhancing performance and the level of achievement of the athlete. Accordingly, the research problem is manifested in finding modern methods to improve the performance of female weightlifters. As an instructor of athletics at the College of Physical Education and Sports Sciences for Girls, I have observed that most training regimens for weightlifters rely on added weights or throwing

implements. Therefore, I found that plank exercises, which do not utilize weights, can enhance the specific strength of the body and the targeted muscles. These exercises are known to increase muscle elongation and joint flexibility. The research problem is summarized by the following question:

- Do modern plank exercises have a positive effect on the variables of female athletes regarding the specific strength of the arms and torso when these exercises are applied?

Ibrahim (2023) asserts that "the strength exhibited in specialized activities is a necessary performance requirement for achieving the goal that necessitates the exertion of muscular force, depending on the variables and conditions of that activity" (p. 42). The significance of this research lies in inducing changes and significant differences between the pre-test and post-test through the implementation of modern plank exercises aimed at developing the specific strength of the arms and torso, as well as enhancing the performance of young female weightlifters.

Research Objectives :1. To prepare plank exercises aimed at improving the specific strength of the arms and trunk, as well as the performance in weightlifting among young female athletes. 2. To investigate the effect of plank exercises on enhancing the specific strength of the arms and trunk and the performance of female athletes in weightlifting.

Research Hypotheses: There are statistically significant differences between the pre-test and post-test in improving the specific strength of the arms and trunk, as well as in the performance of young female athletes in weightlifting.

Research Areas:1- Human Domain: A sample of young female athletes participating in the shot-put event, consisting of (5) athletes. 2- Temporal Domain: The period from January 15, 2024, to March 15, 2024. 3- Spatial Domain: The fields and tracks of the athletics venue at the Scouts Stadium.

## Methodology

### Study Design

The researcher employed the experimental method to align with the research problem, "the researcher attempted to introduce a characteristic or variable that could facilitate the alteration of the state of the formula or the object intended for modification."

### Population and Sample of the Study

The research sample was selected using the age method, consisting of five young female weightlifters. Plank exercises were implemented as the main component of the training unit, with a duration of 20 minutes allocated for these exercises during the training

session. The researcher conducted a homogeneity assessment of the sample participants based on the variables of height, weight, age, and training age, as illustrated in Table 1.

**Table 1.** Shows the normal distribution of the research sample for the variables (Height, Weight, Age, Training Age)

No.	Variable	Unit of Measurement	Mean	Median	Standard Deviation	Skewness
1	Height	cm	161.4	161	12.39	0.324
2	Weight	kg	71.33	71	9.48	0.453
3	Age	years	17.11	17	2.79	0.554
4	Training Age	years	3.13	3	1.00	0.477

### Devices and Tools Used

- Foreign Arabic sources
- International Internet network
- Office tools
- Testing and measurement
- Observation and experimentation
- Export camera type (Sony) with a speed of 60 frames/second
- Computer device
- Measuring tape
- Medical scale
- Weights (5 units)

### Tests Used in the Research

#### 1. Test of Explosive Strength of the Arms

Test Name: One-Handed Throw of a 3 kg Medicine Ball

Objective of the Test: To measure the explosive strength of the arms

#### 2. Test of Speed-Strength of the Arms

Test Name: Arm Flexion and Extension (Shenow) for 30 seconds

Objective of the Test: To measure the speed-strength of the arms

#### 3. Test of Strength Endurance of the Arms

Test Name: Arm Flexion and Extension (Shenow) for 60 seconds

Objective of the Test: To measure the strength endurance of the arms

#### 4. Test of Endurance Strength of the Abdominal Muscles

Objective of the Test: To measure the strength of the abdominal muscles

#### 5. Test of Weightlifting Performance

### Procedures

The researcher conducted the pre-tests on January 20, 2024, at the athletics fields in the Scout Stadium at 10:00 AM on the research sample.

The researcher conducted the main experiment on the sample individuals after consulting experts regarding the division of plank exercises and implementing them on the sample members, while adjusting the repetitions, intensity, and rest periods during the training units as follows:

- The researcher applied the exercises to the research sample in the main part of the training unit.
- The duration of the exercises was 25 minutes.
- High-intensity interval training was utilized.
- A progression in repetitions was employed to reach the maximum repetition.
- Rest periods were adjusted in accordance with the repetitions.
- The duration of the program was 8 weeks, consisting of 3 training units per week, resulting in a total of 24 training units.

The post-tests were conducted on March 20, 2024, at the arena and field of the scouting ground at nine o'clock in the morning for the research sample, under the same conditions as those in which the pre-tests were administered.

### Statistical Methods

The researcher employed the statistical method SPSS for the data analysis of the study.

### Results

**Table 2.** Shows the means, standard deviations, *t*-value, significance level, and significance of differences for abdominal muscle strength in the research sample

Variable	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	t-value	Significance Level
Abdominal Muscle Strength	51.22	12.43	58.65	11.88	3.119	0.026

*Significant at  $p \leq 0.05$*

**Table 3.** Shows the means, standard deviations, *t*-values, significance levels, and significance of differences for arm-specific strength and performance

No.	Variable	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	t-value	Significance Level
1	Explosive Arm Strength (cm)	4.33	1.12	5.02	0.87	3.89	0.000
2	Specific Arm Strength (repetitions)	22.24	0.83	27.33	1.32	3.66	0.000
3	Strength Endurance (repetitions)	48.54	17.11	54.50	16.23	4.13	0.001
4	Performance	5.48	1.07	6.12	0.47	3.86	0.000

## Discussion

Through the results presented in Tables (2,3) regarding the differences between the pre-test and post-test for the research sample, significant differences emerged in the abdominal strength, specific strength, and performance tests. The researcher attributes these differences to the exercises implemented, specifically the plank exercises, which significantly contributed to the improvement of muscular strength among the participants. These exercises enhance the balance and stability of the athlete by stabilizing the pelvis, lower back, and hips, thereby strengthening the core muscles to achieve coordination, which in turn leads to improved balance and posture. These exercises target the body's core muscles, working to strengthen them and enhance stability and strength through the fortification of the pelvic region, hips, and lower back, all of which contribute to the development of the athletes' weightlifting effectiveness.

Regarding the specific strength of the arms, the research results indicated significant differences between the pre-test and post-test in the research variables, which include explosive strength, speed-strength, and strength endurance. The researcher attributes these findings to the execution of specific exercises by the sample, which were facilitated through multiple repetitions in accordance with proper training conditions that align with the correct and ideal trajectory, preventing the loss of kinetic energy by the

athlete and ensuring a smooth transfer of body parts without interruption of movement or loss of movement time. This is supported by the assertion of (Sari Abdul Karim Al-Fadhili, 2010) that "the rate of speed is the ability to perform consecutive repetitive movements of a single type over defined distances, which collectively form the total distance in the least possible time" (3: 371). The research results demonstrated a clear improvement in specific strength, attributed to the exercises utilized in the study, which aided in its development. The increase in strength during weightlifting is a result of the harmonious interaction between the nervous and muscular systems, establishing a coherent relationship between speed and performance strength in accordance with the relationship between angle and ideal performance, which reflects a high level of coordination among the angles adopted by the athlete. (Sulaiman Ali) indicates that "the line of action for the deliberate strength contraction of muscle groups should follow a straight path with the knee and hip joints to achieve optimal performance. The coach must enhance the athlete's ability to sense the angle and instruct them on the correct principles using methods that achieve this" (4: 18).

The researcher notes that the improvement in performance is attributed to the abdominal exercises developed by the researcher and applied to the research sample, which contributed to this development by enhancing the movement trajectory of the activity. Performance relies on the level of technical execution and physical capabilities, as well as the reliance on the plank training applied to the sample individuals. (Abu Al-Ala) states that "regular and continuous training improves the capacity of the nervous and muscular systems to overcome resistance, requiring a high degree of muscle contraction speed, which is a crucial determinant in sports that necessitate rapid muscle contraction and relaxation" (5: 99).

There is an awareness and understanding of the directed force through the application of finger pressure on the weight, thus allowing the player to control the amount of force exerted. Samia Khalil noted, "The signals from the neural centers responsible for movement, when increased through training, lead to the reduction of signals from adjacent centers that are unnecessary for the required movement, resulting in performance that is stable, precise, and economical." Additionally, Asil stated, "Training plays a positively effective role in focusing on the functioning of the specific muscle groups related to the activity and in their correct trajectory, ensuring energy efficiency and guaranteeing the fluidity of movement. Skill is a characteristic indicative of performance effectiveness, as the learner develops certain motor responses within a structured movement organization" (Asil, 2022, p. 96). The researcher emphasized that the training units should not be exhausting for the throwers and should align with their training units, increasing repetitions with interspersed rest periods. This is corroborated by Worren, who stated, "Well-regulated intensive training enhances the brain's capacity to establish new neural connections and pathways, improving mental neural responses and cognitive functions, as the brain's

strength in receiving and processing information gradually increases through organized physical and sensory neural training."

### Conclusions

1. The plank exercises applied to the research sample had a positive and effective impact on the variable of specific strength, which is represented by the explosive strength of the arms, speed strength, and strength endurance, as they contribute to strengthening the muscles utilized in the body.
2. In her main experiment, the researcher implemented plank exercises on her research sample, and significant differences were observed as a result of applying these exercises in the abdominal strength test.
3. The plank exercises contributed to improving the performance level of the weight throw athletes.

### Recommendations

- 1- The potential benefits of utilizing plank exercises in other events of track and field.
- 2- The effort to leverage the integration of multiple training methods to enhance strength variables for throwing athletes.
- 3- Conducting a comparison between different events in track and field that employ plank exercises.

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## The Reality of Women's Empowerment in Leadership Positions within Sports Institutions

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2394](https://doi.org/10.37359/JOPE.V37(4)2025.2394)

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**Article history:** Received 8/ December /2025 Accepted 16/ December /2025 Available online 28/ December/2025

### Abstract

The purpose of the study is to uncover the reality of women empowerment in leadership positions in Iraqi sport institutions by identifying the most significant inhibitors and contributors driving participation. They employed descriptive survey and sampled 211 female employees at the Ministry of Youth and Sports, Olympic Committee, as well as sports federations. It was discovered that cultural and social constrains are still the greatest obstacle (80%) for women's empowerment, weak support from institution along with no genderfriendly organizational environments restrained their progress. Additionally, a dearth of Iraqi sports institutions necessitates an all-inclusive process that increases social awareness, develops better institutional policies and amplifies the role of media in supporting women to assume leadership roles.

**Keywords:** women empowerment, leadership positions, sports institutions.

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## Introduction

Empowerment of women has been identified as a hot issue in the last few decades at national and international levels, which is considered pre-requisite for sustainable development, equity and justice. Countries and institutions have also started taking other steps to improve the overall inclusion of women — including in leadership positions that were traditionally held by men. This is an evidence of the growing awareness on the importance and contribution of Gender-Balance to sustainable Performance-Optimisation and standout organisations.

Society & Sports Recognized as a powerful weapon to promote community coherence and conduct competitive social environment creation, The Role of moing Women in the country's sporting circles has attracted the keen interest from one side the sports world as media advances towards gender parity. It's not only a physical activity but also the social vehicle for creating society, culture and economy. As such, being the change as it relates to women in sports organisations is seen as essential so that both those changes required are happening and so an inclusive culture permeates.

Yet for all that progress in addressing gender, women still face no shortage of barriers to breaking the glass ceiling when it comes to positions of power in sports. They do so in under cultural, social and institutional inhibiting conditions that either absorb their advances or fulfill some aspects of their aspiration. Women can produce amazing values as long as they have opportunities and are empowered, meanwhile lots of success stories demonstrate that. Creating opportunities for women to hold leadership positions within sports organizations is one of the litmus tests of how advanced a society has become in terms of moving towards justice and equality of opportunity (Abdul Karim 2022).

The aim of this study is to reveal how much challenges and opportunities have women when they are in leadership position on sport institutions and the impacts of them on their performances in sport sector was examined.

The significance of the work is to provide a comprehensive view of gender in leadership position sport institutions, which social, economical and cultural dimension make transcendent. Their work helps create an opportunity to observe the current fault lines in policies and practices that would help prevent women from empowerment, and it sheds light into how women can/ should be empowered within sport – for progress'sake, for sustainable development.

Moreover, such research could support decision-makers and sport bodies in implementing strategies that better enable the empowerment of women along sports development process by showcasing successful leadership role models to inspire other women while overcoming barriers.

## Problem Statement

Even though a lot has changed in the Iraqi society, and there are other countries that have been trying to improve women role in the sports generally speaking and to come up with regulations that support their participation in the profession of sport, yet, this same profession is facing obstacles regarding issues related with economic status, security problems as well as social traditions that work on negatively affecting improving for women career. Limited number of studies and data that can make the picture clear as to how women occupy leadership positions in sports in Iraq make this problem not well understood, which further complicates its solutions.

This situation is the result of a combination of different elements that overlap and contribute to building this scenario: social values, policies that fall short in supporting women's empowerment, on the one hand, and lack of suitable capacity-building tools for women— both in terms of skills development and enabling environment created to take part in leadership positions —on the other. In addition, most of the sports institutions are not equipped with efficient policies of reaching gender balance and there is an obvious deficit in investment in feminine competencies in this field”.

As such, the problem of this research stems from the necessity to thoroughly grasp the fact that Iraqi women empowerment in sports organizations is really taking place, on identifying or analyzing barriers encountered by them, as well as reasons behind empowering them and how far these affect so that eventually a sustainable development can be achieved in sports.

Questions: What is the actual situation of women's empowerment to ascend leadership positions at sport institutions in Iraq? What are the key barriers to their empowerment? What can be done to further strengthen their leadership in this space?.

## Research Objectives

1. Designing a questionnaire to measure the level of women's empowerment in this sector.
2. Analyzing the reality of women's empowerment in leadership positions within Iraqi sports institutions.

## Research Areas

- Human Domain: Working women in the sports sector, including the Ministry of Youth, the Olympic Committee, and federations.

- Temporal Domain: From (November 15, 2024) to (April 20, 2025).
- Spatial Domain: Baghdad.

## Methodology

The researchers employed a descriptive methodology utilizing a survey approach, as it is more suitable for the nature of their study.

## Research Community

The purpose of the study was to investigate a particular phenomenon in one community. The study population was all working women in sports institutions; including sport federations, sport clubs, and related governmental sectors on Sports. The national Olympic committee is an important component aspect for appreciating the status of women's empowerment at managerial level in sports organizations as it embodies a real setting and applicable administrative processes (Mahmoud,2023). Table 1 show the research community and sample.

**Table 1.** *Distribution of the Research Population and Sample*

No.	Research Population	Research Sample	Pilot Sample	Construction Sample	Application Sample	Excluded
1	400	211	10	110	90	1

## Research Tools and Instruments

- Arabic and foreign sources.
- The electronic international information network (the Internet).
- A questionnaire form specifically designed to measure the reality of women's empowerment in sports institutions.
- Personal interviews.
- Data extraction form.

### *Devices and Equipment Used:*

- One laptop computer of the type (Dell).
- One handheld calculator of the type (Kenko).
- One watch of the type (Casio).

## Field Research Procedures

### Face Validity

Steps to verify the apparent validity in this study:

1. The questionnaire was presented to seven experts specializing in sports management and the science of testing and measurement in sports.
2. We requested the experts to evaluate the items in terms of:
  - Their clarity and ease of understanding.
  - Their alignment with the concept of women's empowerment in sports institutions.
  - Their comprehensiveness across the four domains.

The agreement rate among the experts was 85% or higher, indicating that the questionnaire possesses a high level of apparent validity.

### Internal Validity

Internal validity is order to calculate internal validity we obtain person correlation coefficient for all item with its corresponding domain (a value of over 0.6 is considered scientifically acceptable). The internal validity can be estimated as falow:

1. Collect the responses of participants for each item.
2. Calculate the correlation coefficient between each item and its overall domain.
3. If the correlation values are high and statistically significant ( $p < 0.05$ ), this indicates that the items measure what they were intended to measure.

### Validity of the reviewer

The questionnaire was presented to a group of experts, totaling seven individuals, and their responses are detailed in the table below. Four domains were approved, while the other domains were excluded.

Domains of Women's Empowerment in Leadership Positions within Sports Institutions, with results as shown in Table (2).

**Table 2.** Experts' Agreement on the Domains of the Study

No.	Domain	Agree	Disagree	Notes
1	Cultural and Social Challenges	5	2	
2	Institutional Support	7	0	
3	Personal Capabilities and Leadership Skills	6	1	
4	Legal and Legislative Environment	0	7	
5	Media and Marketing Role	5	2	

**Table 2.** *Experts' Agreement on the Domains of the Study*

No.	Domain	Agree	Disagree	Notes
6	Financial and Administrative Challenges	2	5	
7	Women's Leadership Role and Its Impact on the Institution	1	6	
8	Psychological and Social Challenges for Women Leaders	3	4	

**Table 3.** *Internal Validity (Pearson Correlation Coefficient for Each Item with Its Corresponding Domain Total)*

Domain	Item No.	Correlation Coefficient (r)	Significance Level (p)	Internal Validity
Cultural and Social Challenges	1	0.78	0.002	High
Cultural and Social Challenges	2	0.72	0.005	High
Cultural and Social Challenges	3	0.69	0.007	Moderate
Cultural and Social Challenges	4	0.81	0.001	High
Cultural and Social Challenges	5	0.75	0.004	High
Institutional Support	1	0.84	0.000	High
Institutional Support	2	0.63	0.012	Moderate
Institutional Support	3	0.79	0.003	High
Institutional Support	4	0.74	0.005	High
Institutional Support	5	0.68	0.009	Moderate
Personal Capabilities and Leadership Skills	1	0.79	0.002	High
Personal Capabilities and Leadership Skills	2	0.76	0.003	High
Personal Capabilities and Leadership Skills	3	0.71	0.006	Moderate
Personal Capabilities and Leadership Skills	4	0.83	0.000	High
Personal Capabilities and Leadership Skills	5	0.69	0.008	Moderate

Media and Marketing Role	1	0.71	0.006	Moderate
Media and Marketing Role	2	0.83	0.000	High
Media and Marketing Role	3	0.77	0.002	High
Media and Marketing Role	4	0.66	0.010	Moderate
Media and Marketing Role	5	0.79	0.003	High

All items exhibit a correlation coefficient greater than 0.60, indicating an acceptable to high level of internal validity. Most items are statistically significant at  $p < 0.05$ , suggesting that their association with the domain is not due to chance.

**Table 4.** Reliability Using the Test–Retest Method

Questionnaire Domains	First Application (Mean)	First Application (SD)	Second Application (Mean)	Second Application (SD)	Reliability Coefficient (r)	Validity ( $\sqrt{\text{Reliability}}$ )
Cultural and Social Challenges	85.4	4.2	84.8	4.1	0.991	0.995
Institutional Support	87.2	3.9	86.5	3.8	0.991	0.995
Personal Capabilities and Leadership Skills	83.7	4.5	82.9	4.3	0.991	0.995
Media and Marketing Role	86.1	4.1	85.3	4.0	0.991	0.995

It was conducted on a group of working women in sports institutions, including clubs, federations, and the Olympic Committee, on February 20, 2025, The SPSS software package was utilized.

## Results

**Table 5.** Distribution of Responses According to Domains and Items

No.	Domain	Item	Agreement (%)	Disagreement (%)
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1		Women face difficulty obtaining leadership opportunities in sports institutions due to social customs and traditions.	%82	%18
2		There is weak societal acceptance of women's participation in administrative and supervisory roles within sports institutions.	%79	%21
3	Cultural and Social Challenges	Women face a conservative vision which belies them in the decision process of sport institutions.	%81	%19
4		The absence of the family and community support directly influences the low willingness among women for working in sports.	%76	%24
5		In sports organizations, women experience a struggle in reconciling family obligations and work requirements.	%74	%26
6		The academy offers education and career-development training programs for women seeking to excel in sport leadership.	%60	%40
7		The center is dedicated to the development of policies that provide equal opportunity for men and women in hiring and promotion.	%58	%42
8	Institutional Support	The institution supports women's participation in committees, administrative bodies, and sports-related decision-making.	%55	%45
9		The institution provides a safe and motivating work environment that encourages women to continue and advance in the sports field.	%62	%38
10		The institution allocates budgets and programs to support and develop female leadership in the sports sector.	%53	%47
11	Personal Capabilities and Leadership Skills	Women working in sports institutions have the ability to make decisive decisions confidently and competently.	%68	%32

12	Women possess problem-solving skills and can handle challenges in the sports work environment.	%66	%34
13	Women have effective communication skills that contribute to strengthening their leadership role within sports institutions.	%70	%30
14	Women strive to develop their leadership skills through continuous learning and participation in training courses.	%65	%35
15	Women exhibit initiative and the ability to motivate sports and administrative teams to achieve goals.	%63	%37
16	Sports media contributes to enhancing the image of women and highlighting their role in sports institutions.	%57	%43
17	Women in the sports field suffer from lower media coverage compared to men.	%80	%20
18	Media and Marketing Role Marketing campaigns help support women's participation and increase their chances of assuming leadership positions in sports institutions.	%59	%41
19	Sports institutions provide media and promotional plans that enhance women's visibility in the sports field.	%55	%45
20	The absence of successful female role models in sports media affects women's motivation to enter the field.	%73	%27

## Discussion

### Cultural and Social Challenges

The highest rated problems by a sample of 80% or more indicated that customs and traditions prevent women from reaching leadership levels. These statistics suggest that cultural barriers are still the biggest barrier for women to gain empowerment in sports organizations.

## **Institutional Support**

The institutional support for women is lacking (the approval rate of policies on equal opportunities and empowering them was not over 60%, while the disapproval rate reached 45% in a couple of questions). (It should be noted that this is apparently normal, at which it probably reasonable to conclude that law offices don't offer an even playing field for the hiring and promotion of women and men.

## **Personal Capabilities and Leadership Skills**

There is a relative consensus that women have the ability to lead, with between 63% and 70% (depending on presidency) expressing such approval: this means that the lack of leadership positions cannot be attributed to personal incompetence but rather obstacles.

## **Media and Marketing Role**

80% of respondents agreed that women are covered insufficiently in the media when compared with men and this has a negative affect on improving their representation and involvement within sports. This proves that the media is not playing its part in effectively supporting women's empowerment!

In view of these findings, it is clear that the cultural and social obstacles are identified as the foremost of barriers to women's participation and development of position in sports institutions. In spite of women holding excellent leadership capabilities and competence, there exists a lack of institutional support, inadequate media coverage as well as equal opportunities to promotion and hiring preventing them from breaking through to senior management.

The results of the study reveal women's realities in sport organizations with regard to empowerment, and present four important dimensions:

1. Cultural and social challenges.
2. Institutional support.
3. Personal capabilities and leadership skills.
4. The media and marketing role.

The relevance of discussing these results within the theoretical framework and objectives that guided the research to build a questionnaire to measure, in this field, the factual state of women's empowerment is emphasized.

## **Firstly: Cultural and Social Challenges**

The findings imply that social norms and customs still remain the major barrier for women in sports institutions, with 82% of participants showing that it is difficult for women to achieve leadership opportunities due to cultural practices, whereas 81% indicated that traditional perceptions restrict women's role in decision-making. This is in line with Youssef Ibrahim's assertion that social values limit gender equality as far as leadership roles are concerned and therefore also sponsored a decrease of the number women involved in sport decision-making (Ibrahim 2024). Findings As opposed to Ibrahim, researchers assume that the results indicate one fact and that social and cultural constrains are still major obstacles against women's ability to be in leadership positions within sports. In addition, the community's low approval toward the involvement of women in sports administration at 79% indicates that more work should be done to increase societal awareness about women's contribution to this field. "Animage change," affirms Nasreen Ali Al-Khamis, "will depend on the awareness and media strategies to make women's leadership role in sports more visible. Coan and Dieringer highlight the role community consciousness plays as a powerful force for "destroying stereotypes and perceptions impeding women's leadership in sports" (Ali 2023).

Second, institutional support is indicative of lack of support for women in sport organizations. The training optionsInsightful suggests that only 58% of women feel their companies are committed to implementing equal opportunities policies and 47% think in practice there is no budget allocated to support female leadership. It also agrees with Samer Jabbar who found that weak governmental regulations impede the transitioning to empower women in a sport (Jabbar, 2022). On the other hand, 60% of those surveyed agree that institutions offer training and opportunities for professional development to improve women's capacities, which is good although not enough to ensure women have access to leadership positions. As discussed by Mona Abdul Latif Abbas, training itself is not sufficient if it is not matched with appropriate policies towards women leading their career - advance in senior positions (Abdul Latif, 2024). The researchers contend that the findings signal empowerment of women in sports is more of a joint feat between policies and funding with training not enough to reach leadership positions unless it takes place in an inclusive organizational environment.

Third, being capable and leaderly. While the results also show that women face some institutional and society challenges, they reveal that women have high leadership potential with 70% saying that effective communicators is something to describe them in their roles within their organisation and 68% say they are able to make things happen confidentially with efficiency. The results are consistent with the argument by Raed Hussein that women in sports management have enabling leadership capabilities, but are prevented from investment on it due to external constraints (Hussein, 2023). What's more, 65% said women are always evolving their leadership abilities through a continuous pursuit of learning, demonstrating a true motivation to break down barriers and progress in

their careers. Fatima Abdullah, in energy catching and self-improvement by utilising their range of abilities are the main characteristic factors for women to be a leader of opportunities in sports (Abdullah, 2022). Researchers conclude that the outstanding leadership qualities and motivation of self-improvement experienced by women, are an instrument for their efforts to break through difficulties in order to reach decision-making positions within all fields related to sports.

The lack of media attention between factors that job women to the margin and deprives them from their role they can play in sports (Mustafa, 2024). Additionally, 73% respondents agreed that lack of role models in sports media is influencing women's motivation to join the profession. This was supported by Jumana Youssef Khourshid, who noted that improving visibility for female leadership in media actively contributes towards enabling women to lead in sport (Youssef, 2023).

These results are consistent with the research question, which was to assess the reality of women's empowerment inside sports institutions, based on the lack of attention and weak institutional support that would be responsible for reducing cultural and social barriers as well as differences in access despite their having great leadership potential. The findings also emphasize the need for more effective institutional policies and higher media visibility in bringing about broader female participations in various leadership roles.

The results confirm that women empowerment in sports organizations is not only about their personal ability, but also on the favorable atmosphere which can eliminate social and organizational obstacles and to enhance their presence in mass media & marketing so that opportunities between men and women will be equal within sports. The authors argue that the outcomes suggest a deficit in media coverage of women sports, and that even though women have skills and leadership capabilities to contribute significantly, they lack agency.

Reply According to the authors, women's empowerment in sport organizations faces some important obstacles mainly at cultural and social levels that appear as the most relevant impediments with such a high level of consensus. That is, deep-seated customs and norms existing in the society still doesn't give women chances to act as leader and a community poor in openness to their administrative activities is one of their biggest problems. The scholars assert that these factors necessitate broad reform action, including educational and awareness programmes to defy gender stereotypes of women and sports.

At the institutional level, findings indicate that sports institutions are not doing enough in creating supportive structures for women such as trainings and capacity-building opportunities and a direct budget line on empowerment of women. Some measures have been taken, but the statistics quoted above indicate that affirmative action guidelines have not translated into practice. Their findings illuminate the potential upside to tougher enforcement of hiring and promotion equity — and yet also just how deeply we likely

have still to go, as well as some thoughtful consideration about what meaningful financial and organizational support for female leadership might look like.

With respect to personal competence, the findings suggest that women have strong leadership skills, including those of decision making and problem solving, as well as good communication devices that could translate into potential administrative role if proper atmosphere is created. The authors recommend that this positive feature should be exploited further by building up training specifically designed for women with a view to increasing their participation in sports in leading positions.

With regard to the media, lack of media exposure into the roles women play in sports is cited as one of the major barriers, because there are so few positive female role models reflected in the media that hinders a woman's ability to physically carry out her intended job. This is believed by the researchers that media can change how the society look at things and thus such grooming women leaders in sports programmes should trigger medias to play their role of sharing success stories of women in sports so as to encourage more women in both administrative and sport works.

From these findings the authors argue that obtaining "meaningful" empowerment of women in sports organizations requires attention to all four components. Although women have the necessary leadership qualities, social constraints, inadequate institutional support and poor media coverage remains a challenge for women in SA. Therefore, any future strategy to support women in sports should be holistic and target media representation as well as current procedures, emphasizing the need for legal changes, change of communities attitudes regarding female sport participation, institutions support for women and increasing the role of media in proportioning their achievement.

## Conclusions

1. Cultural and social obstacles cannot help women in the leadership roles: There are gender restrictions for sport leaders, concerning administrative management control or functions arising from traditional beliefs which hamper integration of the girl-child into key authoritative role in sports organization.
2. Lack of institutional support There is little budget and policy for empowering women We found lack of policies to support and save fund for building the potential female leader, which finally block opportunities for women inside sport organizations.
3. It is not enough for the individual potential of women itself: Individual ability cannot determinate all, even though they women have leadership capacity, but they lack actual opportunities and necessary system support in the sports field work place.

4. Media representation of women is weak: Women experience a lack of media coverage when compared to men, and are thus less likely encouraged to take up top leadership positions in sports organizations.

### Recommendations

1. Increase the public awareness of the role of women in sports management: Running social marketing campaign to change the belief and facilitate greater acceptance of women's role in leadership.
2. Institutionalization of women rights policies for empowerment: Clearly establishing policies that guarantee gender equality in opportunities and special training programs for female leadership.
3. Enhancing the contribution of media to promote female athletes The role of the media in helping women play sports should be promoted through increased coverage of them involved with sports management and by showing successful women as examples for others.
4. Sports institutions as promoters: Establish environments conducive to work, flexible and safe, that allow women to combine family responsibilities with the demands of administrative work.

### Appendices

Appendix 1 .Experts' Evaluation Form

Domain	Item No.	Item Statement	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7
<b>Cultural and Social Challenges</b>	1	Women face difficulty obtaining leadership opportunities in sports institutions due to social customs and traditions.							
	2	There is weak societal acceptance of women's participation in administrative and supervisory roles within sports institutions.							
	3	Women experience a traditional perspective that reduces their role in decision-making within sports institutions.							
	4	Lack of family and community support negatively affects							

- |  |   |  |
|--|---|--|
|  |   | women’s motivation to work in the sports field.  |
|  | 5 | Women face challenges in balancing family responsibilities and job demands in sports institutions.   |
| <b>Institutional Support</b>                       | 1 | The academy offer training programmes along with leadership and professional development workshops to build skills for women in sports management roles. |
|  | 2 | The bank is pledged to the policy of providing men and women with equal opportunities in recruitment and promotion.                                      |
|  | 3 | The organization backs the women’s participation in committees, administrative structures and sports decision-making.                                    |
|  | 4 | The academy offers a secure and supportive workplace for women to stay in and advance through the sports sector.   |
|  | 5 | The organisation invests in developing and supporting female leaders within sport through budgets and programs.  |
| <b>Personal Capabilities and Leadership Skills</b> | 1 | Women in sports organisations are able to take bold decisions with confidence.   |
|  | 2 | Women are capable of addressing problems in a sports work environment.   |
|  | 3 | Women are good communicators and these skills contribute to their leadership role in sports organizations.   |
|  | 4 | Women want to build their leadership capacity  |

- through learning and training opportunities.
- 5 Women lead by example and they're capable of inspiring a sports team or an office staff towards goals.
- Media and Marketing Role**
- 1 That sports media have a role in remedying the situation by promoting women and their place within sports institutions.
- 2 Women in sport are under-represented in the media.
- 3 Promotional activities encourage women's attendance and participation and increase their chances in the management of sports organizations.
- 4 Media and advertising campaigns sports institutions offer also increase the visibility of women in sport.
- 5 If you don't see other women succeeding in media, what motivation is there to become one

**Appendix 2. Diverse Distribution of the Number of Experts Agreeing and Disagreeing**

Domain	Item No.	No. of Experts Agreeing	Agreement Percentage	No. of Experts Disagreeing	Disagreement Percentage
Cultural and Social Challenges	1	7	%100	0	%0
Cultural and Social Challenges	2	6	%85.71	1	%14.29
Cultural and Social Challenges	3	5	%71.43	2	%28.57
Cultural and Social Challenges	4	7	%100	0	%0
Cultural and Social Challenges	5	6	%85.71	1	%14.29
Institutional Support	1	7	%100	0	%0
Institutional Support	2	5	%71.43	2	%28.57
Institutional Support	3	6	%85.71	1	%14.29
Institutional Support	4	7	%100	0	%0
Institutional Support	5	6	%85.71	1	%14.29
Personal Capabilities and Leadership Skills	1	5	%71.43	2	%28.57
Personal Capabilities and Leadership Skills	2	7	%100	0	%0
Personal Capabilities and Leadership Skills	3	6	%85.71	1	%14.29
Personal Capabilities and Leadership Skills	4	5	%71.43	2	%28.57
Personal Capabilities and Leadership Skills	5	7	%100	0	%0
Media and Marketing Role	1	6	%85.71	1	%14.29
Media and Marketing Role	2	5	%71.43	2	%28.57
Media and Marketing Role	3	7	%100	0	%0
Media and Marketing Role	4	6	%85.71	1	%14.29
Media and Marketing Role	5	7	%100	0	%0

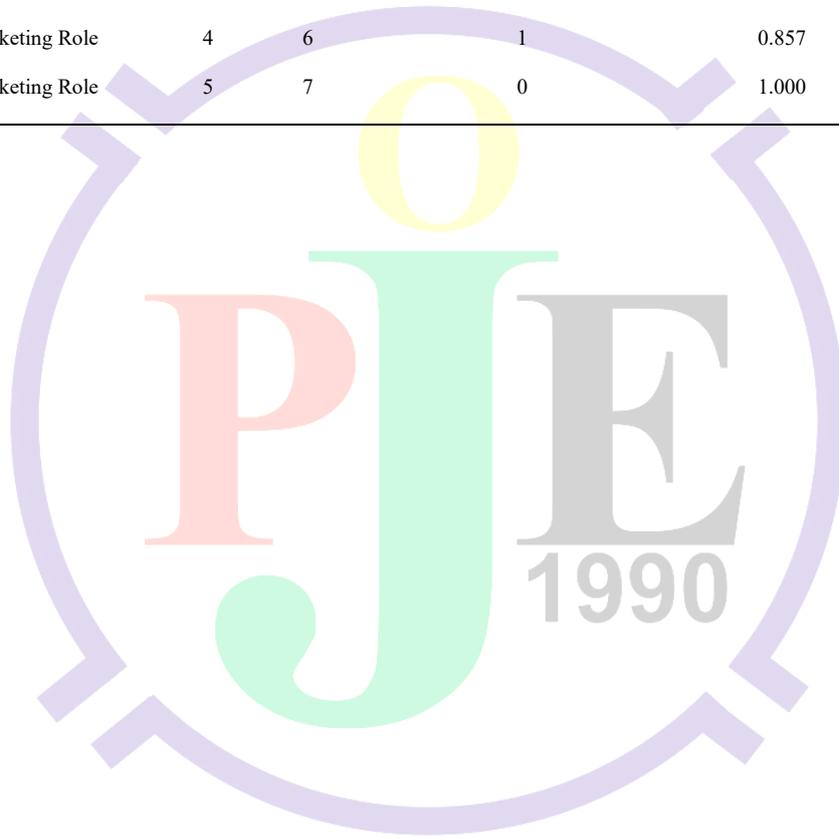
**Appendix 3. Means and Standard Deviations for Each Item**

Domain	Item No.	No. of Experts Agreeing	No. of Experts Disagreeing	Mean	Standard Deviation
Cultural and Social Challenges	1	7	0	1.000	0.000
Cultural and Social Challenges	2	6	1	0.857	0.000
Cultural and Social Challenges	3	5	2	0.714	0.000
Cultural and Social Challenges	4	7	0	1.000	0.000
Cultural and Social Challenges	5	6	1	0.857	0.000
Institutional Support	1	7	0	1.000	0.000
Institutional Support	2	5	2	0.714	0.000
Institutional Support	3	6	1	0.857	0.000
Institutional Support	4	7	0	1.000	0.000
Institutional Support	5	6	1	0.857	0.000
Personal Capabilities and Leadership Skills	1	5	2	0.714	0.000

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Personal Capabilities and Leadership Skills	2	7	0	1.000	0.000
Personal Capabilities and Leadership Skills	3	6	1	0.857	0.000
Personal Capabilities and Leadership Skills	4	5	2	0.714	0.000
Personal Capabilities and Leadership Skills	5	7	0	1.000	0.000
Media and Marketing Role	1	6	1	0.857	0.000
Media and Marketing Role	2	5	2	0.714	0.000
Media and Marketing Role	3	7	0	1.000	0.000
Media and Marketing Role	4	6	1	0.857	0.000
Media and Marketing Role	5	7	0	1.000	0.000

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**Appendix 4.** Reliability Using the Test–Retest Method, Including Questionnaire Domains, Mean Scores for Both Applications, Reliability Coefficient, and Validity Value

Questionnaire Domains	First Application (Mean Score)	Second Application (Mean Score)	Reliability Coefficient (r)	Validity ( $\sqrt{\text{Reliability}}$ )
Cultural and Social Challenges	85.4	84.8	0.991	0.995
Institutional Support	87.2	86.5	0.991	0.995
Personal Capabilities and Leadership Skills	83.7	82.9	0.991	0.995
Media and Marketing Role	86.1	85.3	0.991	0.995



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## The Effect of Sport-Related Anxiety on the Efficiency of the Overhead Catching Skill Performance Among Under-20 Goalkeepers in the Iraqi Premier Football League

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2255](https://doi.org/10.37359/JOPE.V37(4)2025.2255)

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**Article history:** Received 18/ February/2025 Accepted 27/ May/2025 Available online 28/ December/2025

### Abstract

this study sport-related anxiety is explored by examining its influence on performance of young goalkeepers (under 20 year) in relation to key skills such as shot-stopping, positioning and reaction speed. The study population will be drawn from youth club teams in the Baghdad Governorate by experience and performance to achieve objectivity and generality. The study includes the 2023–2024 year sports season (preparation, training, competition periods) with measurements at different times to measure the effects of anxiety in various contexts. Information will come from local clubs and training centers that focus on the development of goalkeeper skills. The use of psychological measurements to ascertain anxiety levels and its impact on fundamental performance indicators. It investigates certain types of anxiety, such as fear of failing or criticism and performance pressure, and how they impact decision-making in high-pressure scenarios. The study is important in that it advances our knowledge on the psychological factors as well as provides actionable recommendations that can influence goalkeeper training methods by reducing anxiety. Hypotheses with regard to associations between sport-specific anxiety and key skills will be tested using statistical methods, and the results should contribute to theoretical knowledge and practical work in improving psychological readiness and on-field performance among young goaltenders.

**Keywords:** sport anxiety, goalkeepers, overhead catching skill, under-20 football players.

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## Introduction

Football is a widespread sport practiced all over the world that features a number of different player roles on the field, with goalkeeper being one of the most important to achieve balance and success. It is a guardian in the sense that it stands against what comes its way, and it necessitates some unique talents beyond simple shot-stopping: concentration, quick-thinking and mental toughness. Sport-related anxiety has become an issue that could influence the performance of goalkeepers who face increasingly difficult and stressful situations, above all in the under-20 category that is becoming decisive since it will lead players toward professionalism and construction of their athleticism (Sport- and performance-related anxieties are characterized by a number of psychological dimensions, including fear of failure, fear of criticism, as well as fear of injury and at least partially have an impact on a goalkeeper's level of readiness in critical game situations directly or indirectly. Thus, it is important to explore the association between sport-specific anxiety and basic skills, such as shot stopping, positioning and reaction speed in order to build psychological programs that focus on enhancing performance and attenuating these anxieties.

The aim of this study is to examine the influence of sport-specific anxieties on basic actions during performance in young (under-20) goalkeepers. Sport-specific anxiety (e.g., fear of failure, fear of making a mistake, fear of being put down, fear of injury) can potentially affect concentration and self-efficacy (and therefore key aspects such as getting into a good position to make a save or working on even better reaction speed after every shot/communication with defenders). This review aims to examine such fears and the causes of them, and how they can affect goalkeepers psychologically to this day. It is also the aim that the relationship between these anxieties and skill performance will be explored and eventual sports psychology recommendations in relation to enhanced goalkeeper performance advice with coping skills to combat sport specific anxiety as well as means by which strategies can be implemented during play or match play.

Young keepers (less than 20 years) are often found afflicted by several "sporting related" anxieties that may affect their playing in games and at trainings. These are collapse under pressure, making mistakes and criticism by coaches and spectators. So what we have here is a more careful goalkeeper yes but it's a goalkeeper who is hesitant to stop shots, out of place often, slower on his response at crucial points in the game and has awful overall goalkeeping performances. On the other hand, the scholar also stated that not many researches have linked sport-transgressor anxiety with keeper performance in this age phase indicating a gap that requires attention. The emphasis is always on the development of technical and tactical skills, with a greater focus given to enhancing this field. The psychological component, however, tends to be neglected in various points and that will necessarily come into consideration. On the basis of this observation, the study problem

was identified to have been A study of exploring and examining effect sport anxiety influence on young goalkeeper's basic skill and its impact on performance in practical ground.

### Research Objectives

1. To develop and implement a sport-related anxiety scale for goalkeepers under the age of 20 in football.
2. To identify the level of sport-related anxiety among goalkeepers under the age of 20 in football.

**Research Hypothesis:** There is no statistically significant relationship between sport-related anxiety and the performance of the overhead catching skill among young goalkeepers under the age of 20 in football.

Implications are that the current research may result in evidence-based psychological interventions that could aid young goalkeepers cope with their sport-specific anxieties and reduce its negative impact on performance, potentially leading to greater success and professional development. In addition, the present research is an important step toward more completely understanding how psychological elements mediate performance in sport and begins to fill a void in the literature; its value to sport psychology and athletic training science cannot be overstated.

The human scope of the study includes young goalkeepers under the age of 20 in football. The temporal scope covers the period from September 2023 to September 2024. The spatial scope encompasses the premises of the football clubs where the players train and compete.

### Methodology

#### Research Design

Given the research problem, it was pertinent to choose a method that appropriately meets the study's aims. Therefore a descriptive research strategy was used and surveys and correlational method were applied for the purposes of analysis. This approach enables systematic observation and stress-related analysis focused on the aspects of the sport of football, as well as its correlation with selective performance skills in young goalkeepers who are under 20 years old.

#### Population and Sample

It is the part of the target population that the researcher has custody over and, therefore, can sample directly from (Jundel, 2019, p.18). The study group consisted of the

goalkeepers of 30 youth football clubs in Iraqi Junior Football League that reached to a total of 90 goalkeepers. The sample was the entire population (100%) of students who participated in sport for the 2023–2024 seasons, and consisted of three sub-samples to facilitate convenient data collection and analysis.

## **Instruments and Tools**

### **Scientific Tools and Resources**

It was based on a variety of references: academic (Arabic, international), online databases and training anxiety scales for physics education students in military colleges among young goalkeepers, testing tool designed to catch above head and the official statement itself and the field visits, with its personal interviews which were suitable for collecting data.

### **Devices and Technical Equipment**

The technical tools used included one Casio scientific calculator, one Lenovo personal calculator, two Casio electronic stopwatches, and the IBM-SPSS software package for statistical analysis.

## **Procedures**

### **Identification of Key Skills and Tests**

After literature review, consultation of experts and seminar committee reflection, the first skill chosen to be evaluated was catching an overhead throw. The equivalent t was conducted using ten shots from in front and out of the side of the penalty area. Points were awarded depending on how the catch was carried out, more points for arms catching above an opponent in a direct catch, less for two-handed catches not directly made, and meant points for deflecting. Unsuccessful attempts received zero points.

### **Development of the Sport-Related Anxiety Scale**

For the first two purposes—construction of the scale and exploration to identify anxiety levels—logical procedures were adopted by the researcher: definition of concept/scale; proposition of objectives complete with justification for their importance; tracing a theoretical framework, narrowing them to eight dominant dimensions of anxiety, development of 80 initial items followed by finalization on scrutinizing and modifying it after expert's critical review ( $\geq 75\%$  agreement). 5-point Likert scale was used (1 = not at all, 5 = strongly agree), to produce the final validated version of a 40-item scale. Clear directions were given to make certain that accurate and ethical responses could be made.

## Pilot Study

Three goalkeepers from Baghdad clubs were selected to have a pilot test using the proposed measure on March 4, 2024, which was primarily aimed at clarity and feasibility checking but also how difficult it might be to apply both the scale and skill tests. The adjustment was taken account before the formal study.

## Application of the Scale and Tests

The resultant anxiety scale was administered to a construction sample of 54 goalkeepers, 25 April -22 May 2024. Items were context-free; no reference to the domain was provided to avoid bias. Afterward, the main experiment -- skill tests + scale application -- was carried out in an experimental sample with 33 goalkeepers, between July 5- August 10 (2024).

## Scientific Basis of the Scale and Tests

### Validity

Discriminant validity and internal consistency using Pearson correlations made sure that construct validity was high. We took out items that didn't have significant correlations ( $p > 0.05$ ), leaving us with 40 items. A panel of experts ( $\geq 75\%$  agreement) confirmed the validity of the content.

### Reliability

Cronbach's Alpha ( $\alpha = 0.839$ ) was used to measure reliability, which showed that the results were very consistent within the group. The skill tests were also checked for test-retest reliability, and the Pearson correlation coefficients showed that they were stable.

### Objectivity

Objectivity was ensured by having multiple evaluators independently score the tests. High inter-rater correlation coefficients ( $r \geq 0.921$ ,  $p < 0.05$ ) confirmed that the tests were free from evaluator bias.

## Statistical Methods

All data were processed and analyzed using IBM-SPSS. The software facilitated descriptive statistics, reliability and validity assessments, correlation analyses, and inferential tests required to examine the relationship between sport-related anxieties and goalkeeping performance.

## Results

**Table 1.** presents the descriptive statistics for the negative self-perception domain among the application sample, including mean scores, hypothetical mean, calculated T-value, significance level, and type of difference

Variable	Mean	Standard Deviation	T-Value	Significance	Type of Difference
Negative Self-Perception	15.878	1.709	2.953	0.006	Significant
Hypothetical Mean	15				

**Table 2.** shows the descriptive statistics for the avoidance behavior domain

Variable	Mean	Standard Deviation	T-Value	Significance	Type of Difference
Avoidance Behavior	14.909	1.486	11.241	0.000	Significant
Hypothetical Mean	12				

**Table 3.** presents the descriptive statistics for the fear of failure domain

Variable	Mean	Standard Deviation	T-Value	Significance	Type of Difference
Fear of Failure	20.575	2.151	6.879	0.000	Significant
Hypothetical Mean	18				

**Table 4.** shows the descriptive statistics for the fear of self-efficacy control domain

Variable	Mean	Standard Deviation	T-Value	Significance	Type of Difference
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<b>Fear of Self-Efficacy Control (Fear of Success)</b>	12.939	1.539	3.504	0.001	Significant
<b>Hypothetical Mean</b>	12				

**Table 5.** *presents the descriptive statistics for the fear of social integration domain*

<b>Variable</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>T-Value</b>	<b>Significance</b>	<b>Type of Difference</b>
<b>Fear of Social Integration</b>	20.030	2.172	5.370	0.000	Significant
<b>Hypothetical Mean</b>	18				

**Table 6.** *shows the descriptive statistics for the fear of sports injury domain*

<b>Variable</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>T-Value</b>	<b>Significance</b>	<b>Type of Difference</b>
<b>Fear of Sports Injury</b>	17.363	2.058	6.595	0.000	Significant
<b>Hypothetical Mean</b>	15				

**Table 7.** *presents the descriptive statistics for the fear of the coach domain*

<b>Variable</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>T-Value</b>	<b>Significance</b>	<b>Type of Difference</b>
<b>Fear of Coach</b>	16.757	1.785	5.653	0.000	Significant
<b>Hypothetical Mean</b>	15				

**Table 8** shows the descriptive statistics for the fear of cognitive integration domain.

Variable	Mean	Standard Deviation	T-Value	Significance	Type of Difference
Fear of Cognitive Integration	18.484	1.787	11.200	0.000	Significant
Hypothetical Mean	15				

**Table 9.** presents the correlation between the sport-related fear scale and the skill of overhead catching among youth goalkeepers

Test	Mean	Standard Deviation	Skewness	Fear Scale	Correlation	Sig.
Overhead Catch	1.809	0.351	0.490	-0.972	0.000	Significant

## Discussion

### Negative Self-Perception

The average value of negative self-perception was above the theoretical mean, meaning that they underestimate how well they perform, what potentially lower their levels of confidence. A recent study (Younis, 2021) reported that negative self-perception is associated with indecision in decision-making under pressure which impairs goalkeeping performance. Fear of failure is higher in athletes with low self-perception, as they develop a growing fear of failure that increases their negative emotions and prevents them from mobilizing all their physiological potential coupled with technical capacity (Al-Shafie, 2019). These findings imply the necessity of psychological programs targeting the positive self-perception to improve performance and alleviate fear.

### Avoidance Behavior

The mean of avoidance behaviour was higher than in the hypothetical play, which could be interpreted as indicating that goalkeepers avoid taking up challenges. It is an indication of fear of failure or condemnation and tends to have a negative impact on performance. Khalidi (2020) underscored the fact that an avoidance behaviour decreases athletes' ability to manage pressure, and Abdullah pointed out its relationship with sport-related anxiety. Jones (2020) also agreed with the fact that avoidance reflect low self-

confidence and a fear of failure, which in turn could not make good decisions under pressure/source.

### **Fear of Failure**

High fear of failure was found in goalkeepers, above the hypothetical average. The fear of losing compromises judgment in pressure situations and decreases focus. Error of commission is caused by anxiousness experienced due to the feel of fear from failure, a problem that tends to make people make hasty decisions without careful consideration resulting in poor performance (Al-Ziyarat, 2020). Sarhan (2021) also identified a link between fear of failure with reduced self-efficacy and state anxiety, reducing goalkeepers' alertness and tactical response.

### **Fear of Self-Efficacy Control (Fear of Success)**

The mean of fear for self-efficacy control was greater than the hypothetical mean, suggesting concerns about taking on responsibility post-success. Al-Otaibi (2020) explained the fear of success as causing effort to diminish due to its association with heightened expectations. Al-Khatib (2021) discovered that this fear is also linked to lower self-belief, greater performance anxiety and less decisive actions.

### **Fear of Social Integration**

The mean was greater than the theoretical mean, indicating apprehension of interacting with teammates, coaches and audience. Al-Husseini (2021) argued that social integration fear avoids group responsibility, damages team cohesion and overall performance less in goal-keepers, who possess a central role for communicative functions.

### **Fear of Sports Injury**

Mean surpassed the theoretical mean indicating a considerable fear from injury. Al-Attar (2020) has reported that fear of injury affect to decision making and increased avoidance of physical action which distracts the performance level. This fear also increases psychical and mental anxiety which influences concentrate and failure in games.

### **Fear of Coach**

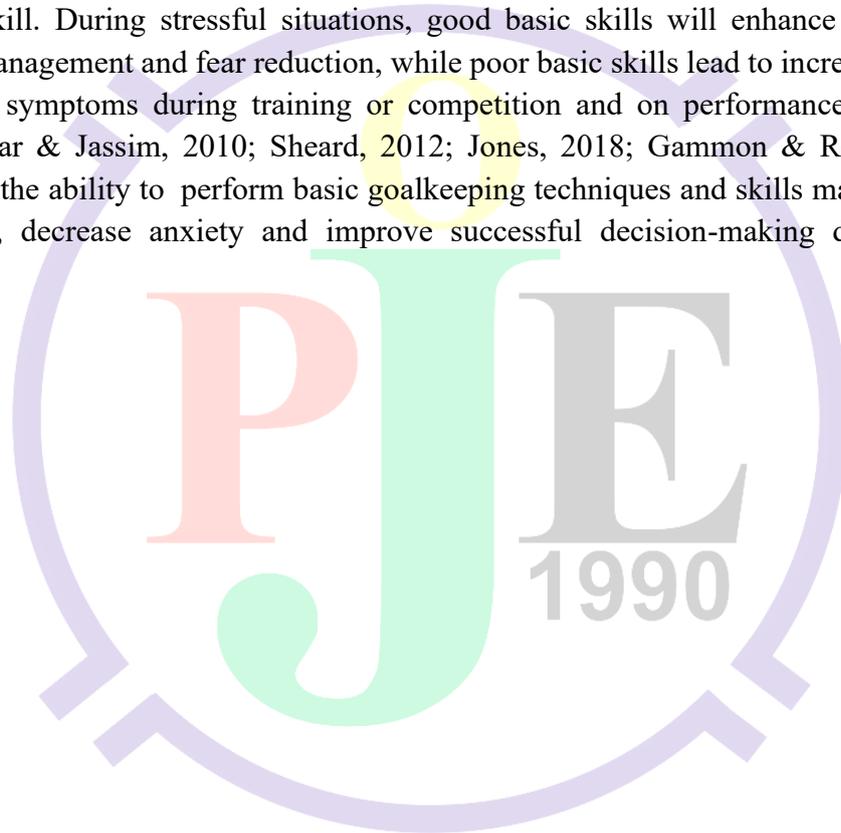
Goalkeepers were significantly more afraid of the coach than theoretically expected. According to al-Shammari, (2021), the authoritarian coaching styles lead to stress and decreased confidence, lose decision making and poor performance.

### **Fear of Cognitive Integration**

The average for fear of cognitive integration was above the hypothetical mean, suggesting anxiety when presented with complex strategic or fast decisions to do. Al-Hamadi (2020) and Nideffer (2008) pointed out that the cognitive anxiety had interference effect on focusing capability, strategic thinking and quick decision-making so that this can undermine goalkeeping effectiveness in matches.

### **Correlation Between Sport-Related Fears and Basic Goalkeeping Skills**

Findings indicated that sport-specific fears were negatively related to the overhead catching skill. During stressful situations, good basic skills will enhance goalkeepers' pressure management and fear reduction, while poor basic skills lead to increased chances of anxiety symptoms during training or competition and on performance (Mahmoud, 2011; Asmar & Jassim, 2010; Sheard, 2012; Jones, 2018; Gammon & Robert, 2017). Enhancing the ability to perform basic goalkeeping techniques and skills may boost self-confidence, decrease anxiety and improve successful decision-making during match situations.



## Conclusions

Sport-related fears were shown to have a meaningful effect on the technical and skill performance in goalkeepers under 20 years of age; along with psychological fears (anxiety, fear of failure), which affected the ability to make quick decisions throughout the matches. There is an inversely proportional relationship between sport-related fears and basic goalkeeper's skills – reaction time, ball control and positioning; if fears grow there are decreases in performing these factors. Furthermore, highly experienced and formerly exposed to elite-level matches goalkeepers had lower levels of sport-related fears than less experienced ones.



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## An Analytical Study of the Organizational Reputation of the Women's Committee in the Iraqi Football Association

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2279](https://doi.org/10.37359/JOPE.V37(4)2025.2279)

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**Article history:** Received 14/ April/2025 Accepted 24/ April/2025 Available online 28/ December/2025

### Abstract

The study is interested in examining the organizational reputation of the Women's Committee at the Iraqi Football Association. Description of Work The descriptive design was conducted on a community sample of 218 Iraqi Football Association population. The researchers utilized a questionnaire as a data collection instrument and included 5 domains including leadership, creativity culture and structure; public relations capability, quality of performance and governance in their instrument. The findings demonstrated an acceptable level of institutional image for the women's committee altogether (firms and organizations) which would suggest that constructive measures have been taken regarding performance enhancement and promotion of sports in Iraq. The key recommendations focused on improving the transparency and trust in decision making and crisis management processes, assisting with developing capacities of personnel working for the women's committee through professional training programmers, and increasing support to local projects encouraging girls' participation in sports.

**Keywords:** Organizational reputation, women's committee, Iraqi Football Association.

### Introduction

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Organizational Reputation “Lost “organizational reputation is one of the major influencing factors that impact on the success and survival of sports organizations, as it forms a critical part of trust-inspiring process between an organization and its fans, players or regulators. In sports sector, the institution’s reputation is important for enhancing institutional performance, enhancement of the administration effectiveness and determination of development plans to accomplish organizational objectives (Mohamed Kamel Mourad, Amal, Mahmoud Qarny, Osama & Mohamed Ghanem 2024). Under these circumstances, women’s committees in sports federations becomes a key mechanism to promote the participation of women not only in team and individual sports but also at football concerned with an increasing development worldwide including Iraq.

This study is particularly relevant in a global context of women’s sport development as we continue to see major shifts towards the empowerment of women in sport. It is, therefore, important to consider the organizational reputation of the Women's Committee as an instrument for enhancing institutional efficiency and effectiveness and helping establish contextually sustainable women's sports in Iraq.

There are many global and local challenges to women's sports in Iraq, the most important of which is lack strategic mechanisms that contribute to enhancing women's sports activities within an integrated system. One of the key bodies responsible for developing these activities is the Women's Committee in the Iraqi Football Association, which has responsibility for all matters relating to women's football. Nevertheless, and in spite of all the efforts carried out by this committee to increase the participation of women in football, its credibility is still dubious and tokenish which turns into a great obstacle for the success of their part in promoting women's sport in Iraq.

The questions raised by this study are manifold: What are the organizational, strategic and managerial dimensions enhancing the women's committee reputation? And what bearing does the organization's reputation for this committee have on female participation in football from the local to international levels? What difficulties and barriers confront this committee in developing its own organizational reputation within a setting (sports) where there is profound social and cultural friction as well as scarce financial backing and resources?

### **Research Objectives**

Identifying the organizational reputation of the Women's Committee in the Iraqi Football Association.

### **Research areas**

1. Human domain: Employees of the Iraqi Football Association.
2. Spatial domain: The headquarters of the Iraqi Football Association.
3. Temporal scope: from 1/11/2024 to 29/2/2025

### Definition of terms

Organizational reputation: A set of values attributed to the organization, such as authenticity, reliability, honesty, integrity, creativity, and social responsibility, which an individual perceives about the organization thru the image they hold of it as a result. It works to achieve competitive advantages that encourage loyalty and attract customers and talented individuals repeatedly, while reducing competitive risks. (Zubaidi, Alak, and Abbas, 2015).

### Methodology

The researchers in this study relied on the descriptive method using the survey approach, as it aligns with the nature of the research problem, which focuses on an analytical study of the organizational reputation of the Women's Committee in the Iraqi Football Association. The research population was selected from all employees of the Iraqi Football Association, which included (218) members of the executive office, committee members, and staff of the Iraqi Football Association. As for the research sample, the entire research community (109 individuals) was selected, representing a percentage of (50%) of the original community. There were (9) committee members included in the pilot study, and the sample members were selected intentionally due to their suitability for the research requirements and their direct relation to the studied research problem.

**Table 1. Sample Distribution**

No.	Iraqi Football Association Category	Research Population	Research Sample	Pilot Sample	Scale Construction Sample	Main Experiment Sample
1	Executive Committee Members	13	13	–	7	6
2	Committee Members	54	54	2	27	25
3	Association Staff	151	151	7	75	69
4	<b>Total</b>	<b>218</b>	<b>218</b>	<b>9</b>	<b>109</b>	<b>100</b>
5	<b>Percentage</b>	<b>100%</b>	<b>100%</b>	<b>4.128%</b>	<b>50%</b>	<b>45.871%</b>

Steps to Build the Organizational Reputation Scale for Members of the Women's Committee in the Iraqi Football Association:

To build a measurement tool thru which the organizational reputation of the members of the Women's Committee in the Iraqi Football Association can be studied, the

researchers reviewed a set of related scales. After studying these scales, it was concluded that there was a need to construct a specific scale for the research. The scale was built in accordance with the research problem and sample.

After that, the scientific foundations of the scale were extracted, such as validity and reliability. The researchers presented the scale to a group of specialists in the field of sports management and testing and measurement, and their opinions were taken into account regarding the modification of some statements. After reviewing the modifications, 29 statements were approved as shown in Table 2, thus resulting in a scale that aligns with the research community.

**Table 2.** *Distribution of Items Across the Scale Domains*

No.	Domain Name	Number of Items
1	Leadership	6
2	Innovation	6
3	Public Relations	6
4	Quality of Performance	6
5	Governance	5
<b>Total</b>		<b>29</b>

The correction of the scale statements was approved by assigning an appropriate weight to each statement according to the selection of the sample members on the rating scale, and the Likert method was adopted in constructing the scale. Where the weights (5-1) were assigned to each statement of the scale, based on the evaluation of the sample individuals.

### **Apparent validity**

The researchers used two types of validity, one of which is face validity, to verify the appropriateness of the scale items for measuring the studied phenomenon. Face validity is one of the important types in constructing tests and scales, as it indicates the appropriateness of the scale in measuring the desired trait. This is done by evaluating the clarity and suitability of the statements based on appropriate responses according to the opinions of specialists. This type of validity reflects the extent to which the statements are related to the variable that is intended to be measured. According to (Freeman, 1962, p. 90), this indicator is achieved "when a subject matter expert decides that the scale is appropriate for measuring the targeted attribute." The researchers achieved this by presenting the scale statements to a group of experts, totaling (11) experts in the field, and

the necessary statistical procedures were taken, with a (75%) or higher acceptance rate being adopted as the criterion. Thirty statements were presented to the experts, and after conducting the statistical analysis of their opinions, twenty-nine statements were retained. See Appendix (2).

### **Discriminative ability of statements**

The discriminative ability is the second type of validity that the researchers adopted, and it refers to the ability of the statement to distinguish between individuals who exhibit a high degree of the trait or concept to be measured and those who exhibit a lower degree. In this study, the trait to be measured was "organizational reputation." According to (Abdullah Al-Samadi and Maher Al-Darabi), the questionnaires are arranged in descending order, "then two extreme groups are selected, comprising 27% of the total sample subjected to measurement: a high group consisting of individuals with the highest scores, and a low group consisting of individuals with the lowest scores" (Al-Samadi and Al-Darabi, 2003, p. 155).

Based on that, the response forms of the research sample, which amounted to 109 forms, were arranged in descending order. The two extreme groups in each category were determined at a rate of 27% with a number of 29.4, which is approximately 29 forms. Thus, the number of forms representing the sample became 29 forms in the upper group and 29 forms in the lower group, while the middle group included 51 forms.

Using the t-test (T. Test) Using the t-test for the significance of the differences in means between the upper and lower groups, it was found that all items were statistically significant, as the significance level was less than the accepted significance level (0.05) and the degrees of freedom (17), as shown in Table (4).

**Table 4.** *Discriminatory Power of the Items of the Developed Scale*

Item No.	Lower Group Mean	SD	Upper Group Mean	SD	Calculated <i>t</i> Value	Sig. (p)	Type of Difference
1	5.0000	0.00000	1.5926	0.49597	50.486	.000	Significant
2	4.8148	0.39210	1.5741	0.49913	37.520	.000	Significant
3	4.5185	0.50435	1.0000	0.00000	51.266	.000	Significant
4	4.5370	0.50331	1.0000	0.00000	51.642	.000	Significant
5	4.9815	0.13608	1.4815	0.50435	49.235	.000	Significant
6	4.9259	0.26435	1.3333	0.47583	48.500	.000	Significant
7	5.0000	0.00000	1.7222	0.76273	31.579	.000	Significant

8	4.8519	0.35858	1.7407	0.44234	40.149	.004	Significant
9	5.0000	0.00000	1.6852	0.57705	42.213	.000	Significant
10	5.0000	0.00000	1.5370	0.53950	47.169	.000	Significant
11	5.0000	0.00000	1.6296	0.48744	50.811	.000	Significant
12	5.0000	0.00000	1.4444	0.50157	52.092	.000	Significant
13	4.7963	0.40653	1.5370	0.50331	37.019	.000	Significant
14	5.0000	0.00000	1.6852	0.63911	38.114	.000	Significant
15	4.7778	0.41964	1.5556	0.50157	36.207	.000	Significant
16	4.7407	0.44234	1.4630	0.50331	35.947	.000	Significant
17	4.9815	0.13608	1.6667	0.47583	49.219	.000	Significant
18	4.5370	0.50331	1.2037	0.40653	37.860	.000	Significant
19	5.0000	0.00000	1.5370	0.53950	47.169	.000	Significant
20	5.0000	0.00000	1.6296	0.48744	50.811	.000	Significant
21	5.0000	0.00000	1.4444	0.50157	52.092	.000	Significant
22	4.7963	0.40653	1.5370	0.50331	37.019	.000	Significant
23	5.0000	0.00000	1.6852	0.63911	38.114	.000	Significant
24	4.7778	0.41964	1.5556	0.50157	36.207	.000	Significant
25	4.7407	0.44234	1.4630	0.50331	35.947	.000	Significant
26	4.9815	0.13608	1.6667	0.47583	49.219	.000	Significant
27	4.5370	0.50331	1.2037	0.40653	37.860	.000	Significant
28	4.6111	0.49208	1.0000	0.00000	53.927	.000	Significant
29	4.9259	0.26435	1.3519	0.48203	47.774	.000	Significant

### Internal consistency coefficient

The internal consistency validity is demonstrated by the simple correlation between the score of each item and the total score of the scale. Internal consistency refers to "the degree of homogeneity of the items in the scale for the trait, and also between the items and the total score of the domain" (Hanna, 2001). By using Pearson's correlation coefficient to verify the relationship between the scale items and its total score thru the responses of the construction sample, which amounted to (109) forms, it was found that all items were statistically significant, as the actual significance (level of significance) indicated by the

statistical results for these items was less than (0.05). Therefore, all items were retained, and Table (5) shows this.

**Table 5.** *Pearson Correlation Coefficients Between Scale Items and the Total Scale Score*

Item No.	Pearson Correlation (r)	Sig. (p)	Significance	Item No.	Pearson Correlation (r)	Sig. (p)	Significance
1	.537**	.000	Significant	16	.376**	.000	Significant
2	.457**	.000	Significant	17	.467**	.000	Significant
3	.476**	.000	Significant	18	.368**	.000	Significant
4	.505**	.000	Significant	19	.398**	.000	Significant
5	.605**	.000	Significant	20	.436**	.000	Significant
6	.469**	.000	Significant	21	.291**	.000	Significant
7	.483**	.000	Significant	22	.426**	.000	Significant
9	.489**	.000	Significant	23	.298**	.000	Significant
10	.571**	.010	Significant	24	.360**	.000	Significant
11	.499**	.000	Significant	25	.481**	.000	Significant
12	.581**	.000	Significant	26	.305**	.000	Significant
13	.505**	.000	Significant	27	.502**	.000	Significant
14	.532**	.000	Significant	28	.413**	.000	Significant
15	.477**	.000	Significant	29	.284**	.000	Significant

### Reliability

The researchers confirmed the reliability of the scale by using the "Cronbach's Alpha" coefficient, where the results showed that the correlation coefficient for the "organizational reputation" scale reached (0.907), a high value that reflects a high degree of reliability in the scale.

### Application of the scale

After extracting the scientific foundations of the scale, the two researchers applied the scale to the application sample with the aim of determining the level of organizational reputation among the research sample during the period from (6-16/2/2025). The Iraqi Football Association in Baghdad was visited, in addition to utilizing social media platforms and Google applications to communicate with some members of the sample. The data collection process took 11 days, during which coordination and communication with the sample were conducted via phone in advance to schedule meetings with them. The

researchers also used the Statistical Package for the Social Sciences (SPSS) to analyze the data and reach the study's conclusions.

## Results

**Table 5.** Mean, Standard Deviation, Calculated t-Value, Statistical Significance, and Type of Difference for the Overall Scale

Variable	Minimum Value	Maximum Value	Mean	Hypothetical Mean	Standard Error	Standard Deviation	Sig. (p)	Significance
Organizational Reputation Scale	29	145	112.98	87	0.014	30.132	0.000	Significant

**Note.** The result is statistically significant at  $p \leq .05$  with 99 degrees of freedom.

## Discussion

Organizational reputation is considered one of the most important factors contributing to the success of organizations (Salem and Abu Tawab, 2024), especially in sports fields that are often under continuous community scrutiny. Considering the result that showed a good level of organizational reputation for the Women's Committee in the Iraqi Football Association, this analysis can be explained through a set of factors related to overall performance, the relationship with the public, and the strategic goals adopted by the committee within its framework of work. This positive evaluation may be the result of several successful practices implemented by the committee at various levels:

The committee's performance in organizing sports activities and events: The researchers believe that one of the key factors that may contribute to building a strong organizational reputation is the (ability to organize sports events) professionally. If the women's committee in the Iraqi Football Association managed to organize women's sports competitions with a high level of professionalism, it significantly contributed to enhancing the organizational reputation. For example, the committee organized a women's league with the participation of multiple teams from different parts of Iraq, which reflected the committee's organizational efficiency and demonstrated its commitment to developing the sports level for women in Iraq.

One of the global examples that can be beneficial is the National Women's Soccer League (NWSL), which started at a low level but, thanks to good organization, has now become one of the best women's leagues in the world. Organizing such tournaments leads to improving the organizational reputation and enhancing the image of the sports federation, in addition to attracting more sponsors and investors (Thomson, A., Hayes, M., Hanlon, C., K., & Taylor, 2022).

Social responsibility and community interaction: A good organizational reputation is not limited to athletic performance only, but also includes the (social responsibility) played by the organization (Mr. Abu Al-Fotouh Ali, 2022). It is certain that the Women's Committee in the Iraqi Football Association has made significant efforts to improve the level of community participation. In Iraqi society, where there are still some challenges related to women's participation in sports, the researchers believe that the federation's committee has launched community initiatives aimed at changing societal culture and encouraging girls to engage in sports, such as going to preparatory schools and holding workshops and awareness seminars for female students about the importance of participating in sports activities and its significance in providing new opportunities for development and work.

Innovative initiatives in the development of women's sports: Innovation in programs and activities is another key element in building organizational reputation (Hashim, Nahla Abdelkader, Hilal, Mohamed Said, Al-Kalash, & Mah, 2023). The researchers believe that the women's committee in the Iraqi federation has introduced (innovative initiatives) such as using technology to improve training and enhance communication with the public thru social media platforms, which has significantly boosted its reputation. For example, the committee used mobile applications to provide remote training courses to enhance sports skills.

Good leadership and the development of effective strategies: Finally, effective leadership plays a pivotal role in building a good organizational reputation. The researchers believe that the women's committee adopts inspiring leadership capable of effectively guiding the committee's work toward strategic goals, which contributes to enhancing its reputation. A successful sports leader must possess a clear strategic vision and the ability to achieve positive change, especially in a sports environment that may face cultural or social challenges.

One prominent example in this regard is Ellen White, captain of the England women's football team, who played a significant role in developing women's sports in England by introducing innovative strategies to increase the participation base of girls and young women in sports.

## Conclusions

The researchers feel that the strength of public relations, which characterizes women's committees within the Iraqi Football Association, can be attributed to the good reputation and reflect directly upon several factors: professional organization of sports events; effectiveness of participation at a community level; transparency in crises management as well as innovation training programs. Positive leadership and effective decision-making, at all levels, are key factors in the desire to improve or maintain the reputation of an organization. Together, these are key ingredients for establishing a strong and successful women's sports culture that portrays a positive image of the Iraqi Football Association in the local and international sports world.

## Recommendations

1. Professional development for employees: it is also advisable to create plans which help the employees of the Women's Committee to develop, at training level, skills in organization and sports management. Worker Development: Training programmes should be organized for the workers of Women's Committee to upgrade their skills in sports organization and management. It can also be used for virtual training to improve communication between coaches and team members, performance quality, and innovation within women's sports.
2. More support for community programming and projects: To help ensure more programs in communities are available to inspire girls to be physically active. Enhance community projects and initiatives: Such as increased involvement in the emerging girls' sports (khutba) programmes. Advice should be obtained to create relationships with schools and universities in order that feminine sports tradition can be encouraged, and sports may serve as a tool for personal and social development.

## Appendices

### Women's Committee Scale Items (Five-Point Likert Scale)

#### Response Options

Strongly Agree   
  Agree   
  Neutral   
  Disagree   
  Strongly Disagree

No.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	The Women's Committee has a clear vision for developing football in Iraq.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Leaders of the Women's Committee have the ability to make decisive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	decisions that serve the interests of the game.					
3	The leadership of the Women’s Committee seeks to motivate employees and enhance team spirit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	The Women’s Committee deals with challenges with flexibility and efficiency.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Leaders of the Women’s Committee show a strong commitment to integrity and transparency.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	The leadership works to achieve a balance between administrative and sporting interests.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	The Women’s Committee seeks to introduce new ideas to develop Iraqi football.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	The Women’s Committee supports innovative initiatives to improve administrative and sporting performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Employees are encouraged to submit new suggestions and ideas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	The Women’s Committee uses modern technologies to improve administrative work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Leadership provides a supportive environment for developing creative solutions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Management applies innovative methods to solve problems and challenges.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	The Women’s Committee maintains positive relationships with local and international sports organizations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	The Women’s Committee communicates clearly and transparently with the media and the public.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- |    |  |                          |                          |                          |                          |                          |
|----|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 15 | The public relations of the Women's Committee reflect a positive image of the federation.                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16 | Complaints and inquiries are handled promptly and professionally.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17 | The Women's Committee seeks to strengthen its relationships with clubs, players, and coaches.            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18 | The Women's Committee enhances communication with fans through modern media platforms.                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 19 | The Women's Committee demonstrates efficiency and professionalism in performing its duties.              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 20 | Administrative decisions are implemented effectively and accurately.                                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 21 | The Women's Committee strives to continuously improve the quality of its services.                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 22 | Administrative performance is evaluated objectively according to clear criteria.                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23 | Employees feel satisfied with the work environment within the Women's Committee.                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24 | The Women's Committee is keen to develop employees' skills and competencies through continuous training. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25 | The Women's Committee adheres to transparency standards in all its operations.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 26 | The Women's Committee ensures fair and equitable application of laws and regulations.                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 27 | Clear mechanisms are available to hold officials accountable for administrative decisions.               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



- |    |   |                          |                          |                          |                          |                          |
|----|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 28 | Decisions are made according to an institutional approach based on evidence and standards.                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 29 | The Women’s Committee places great importance on integrity and combating corruption in administrative work. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



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## The effect of group exercises combined with repetitive training methods on developing speed endurance in under-21 football players

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2386](https://doi.org/10.37359/JOPE.V37(4)2025.2386)

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**Article history:** Received 23/ November/2025 Accepted 6/ December /2025 Available online 28/ December/2025

### Abstract

This study aimed to identify the effect of group exercises using repetitive training on the speed endurance of under-21 football players. The researcher used a set of group exercises on a sample of 32 under-21 players from the Electrical Industries Club, with a mean age of 20.4. The players were divided into two groups, an experimental group and a control group, each consisting of 14 players. A comparison was then conducted between the two groups to ensure the validity of the starting line. The exercises were then implemented with two training sessions per week, totaling eight training sessions over a month. These exercises were applied to the players during their special preparation phase. After conducting the main experiment and performing the post-test of speed endurance, and comparing the results of the pre-test and post-test, the study found significant results in the speed endurance of the experimental group players, who outperformed the control group in the post-test. This is attributed by the researcher to the effect of the independent variable, which is the group exercises using repetitive training. Furthermore, the researcher recommends The researcher believes that the training curricula for coaches in the special preparation stages should include exercises specifically designed to develop physical capabilities, and that these exercises should be standardized, especially speed endurance, and also that similar research should be conducted within the framework of comparing the capabilities of players with other physical capabilities.

**Keywords:** Compound exercises, speed endurance, football players, repetition training.

### Introduction

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Because football is the number one popular game and receives great attention at the national level from followers, specialists, coaches and researchers in the field of this game, we see that the game of football is constantly developing and updating on various administrative, marketing, organizational and technical aspects, especially at the level of the technical performance of players during matches. This progress is an inevitable result of using a large and diverse set of modern scientific means, methods and approaches that have proven their efficiency through scientific experiments that have contributed effectively to increasing the physical, technical, psychological and tactical levels of players in phase with multiplied difficultness of the game due to increasing of effectiveness for players' training. That is what is ensured by (S. S. Ibrahim 2021), The level of players is a reflection of the training process, which contributes to raising their technical and physical capabilities on the field. This is what modern training focuses on. The players and the competing team level is an objective result of player ability and training quality. Moreover, competition's height and development is also effective on the ability to develop and improve players in various aspects other than expertise. (Verheijen, the original guide to football periodisation, 2016, p. 86) Referring to skillful play as being the nucleus and the core of games, it represents the glue that combines physical and tactical performance. The best or rather talented footballers basically use their talent when they are at their physical prime and used properly according to the tactical demands of the coach. And (S.S.Ibrahim 2025) Tournaments have the significance of elevating the efficiency, physiological performance and skill ability of both male and female athletes. Given always very significant competition, players are forced to play with less time and space and need a higher level of performance technique that meets competitiveness, because playing and enduring player's action requires adjusting capabilities to training at a high-quality level characterized by high intensity.

(Verheijen, the original guide to football periodisation, 2016, P.40) “Players do that action always in a higher speed with less time and more space.” at highest level of play/training-which is pro-players are always have less space a less times to do that action. Per definition situations get harder so environment asks for increasingly overloading player-much like playing at high intensity”.

This explains the importance of training that focuses on the physical aspect, which is the foundation upon which a player relies to reach and maintain a high level of performance during a match. Coaches have developed training strategies and characteristics to keep pace with the level and evolution of the game, focusing on developing physical attributes such as strength, speed, endurance, agility, and other physical abilities and qualities, given their importance to performance. One such ability is the capacity to withstand speed, a fundamental and vital element in a player's ability to endure the demands of the game and perform at high speeds, especially in offensive and defensive skills, due to the speed and intensity of the performance. Therefore, coaches use

scientific training methods that have proven effective in developing physical abilities in a way that suits the specific characteristics of these abilities.

The author (Raymond Verheijen and Marcel Lucassen 2025) Speed endurance training can be done using repetitive training and high-intensity interval training, but with consideration given to the intensity and volume of training, with rest. The opinion agreed by (Stevie Grieve, Nacho Garrido, 2014) is that the offensive and defensive phases play, and transitions during the match, overloading players to operate at 100% and 101% of their physical, technical, and tactical abilities, thus requiring training tailored to these characteristics. Based on his field and academic experience in football, and drawing on the opinions of some game specialists, the researcher believes that training speed endurance requires players to perform movements and exert themselves as quickly as possible for short periods of time, ranging from 10 to 20 seconds. And (Raymond Verheijen and Marcel Lucassen 2025) Speed endurance is defined as a player's ability to withstand rapid movements for a certain period of time. This is what the researcher aims to discuss and prove through group speed endurance training. The researcher reviewed many sources and previous studies in this regard in order to benefit from what these studies have concluded regarding the physical preparation of players, especially in speed endurance training for young football players. The research (Adili and Bendo 2025) was looking at the development of speed and speed endurance, according over a six month period. Review of related studies Some of the previous sources and studies had been read thoroughly by researcher to find out more insight of the concepts that support this study, so that, he reviewed some studies then. And damning for coaches was the finding (Sérgio Adriano Gomes, 2024) that between-player relative space in which one player performs an action is not reducible to pitch size or just to the number of players. The playing field sized must be adapted to the number of players if we want to be aware of the physical and physiological characteristics of the player. While the study (Hani, Abd, and Ibrahim 2025) Developing the muscular strength of various body muscles, especially the leg and trunk muscles, to ensure increased effectiveness, strength, and speed of performance during directional change movements. (S. Ibrahim, Asleawa, and Farhan 2024) It is confirmed that exercises similar to playing the game have a positive effect on developing some physical abilities and basic futsal skills And (Adili and Bendo 2025) (Nahlah Sabeeh Obed, Shahad Marzoq, 2016 June, pp. 880-891) Paying attention to physical training which has performance level include from it movements to skills.

Hence, the importance and idea of this study became clear in using physical exercises for speed endurance and applying them collectively to the players and knowing their impact on their speed endurance abilities. The study's objectives included preparing and designing special and combined physical and skill group exercises to develop speed endurance and determining the extent of the impact of these exercises on developing speed endurance.

## Methodology

The researcher employed the experimental approach in a two group design (control and experiment), because it fits the type of dealing with the research problem; for example, as the researcher was to control some of the independent variables (the variable), then work on controlling similar related other variables to observe its effect on dependent variables (input).

The research population covered the reserve league players of the teams that were related to Iraqi Football League Reserve Category during season (2025-2026), who are (10) clubs, namely (Al-Zawraa Sports Club, Al-Sinaat Al-Kahrabaiyya Sports Club, Amanat Baghdad Sports Club, Nawroz Sports Club, Al-Karma Sports Club; AL-Ramadi Sports Club; AL-Talaba Sports club; AL-Fahd Sport Club; Al-Hudood sports club; alnaft sport club). The sample of the study was selected purposely, it consists of the following: (32) players in Al-Sinaat Al-Kahrabaiyy Club for its participation in the preparatory camp before launching the league. The mean age of the players was (20.4) years and represents (10%) of the study population.

The researcher used a number of methods of collecting information, such as Arabic and foreign sources and observation, as well as reviewing some studies via the Internet, in order to choose the best methods and tests for the purpose of measuring the speed endurance of football players. The researcher used the Speed Endurance Test (RAST) to measure the speed endurance ability of football players.

- SPEED ENDURANCE TEST Running-Based Anaerobic Sprint Test (RAST) (Zagatto AM, 2009, p. 1820)

the researcher conducted pilot study on 4 of these players (goalkeeper) on 30/9/2025 to identify the most potential positive and negative points in his performance as change. Furthermore, the test utilized is a standardized, reliable test that has previously demonstrated validity in assessing various directions especially the speed endurance. In addition, the researcher checked that the sample (players of the Electrical Industries Club -the under 21 years) was normally distributed by making pre-check testing and ensuring on the basis of the data and distribution according to skewness coefficient (Table 1).

**Table 1. Descriptive Statistics**

N	TEST	Minimum Statistic	Maximum Statistic	Mean	SD	skewness
1.	Running-Based Anaerobic Sprint	39.150	45.530	41.052	1.875	0.4405

Through the statistical description of the data of the research sample of the players of the Electrical Industries Club under 21 years of age in Table (1) for the speed endurance

test, we note that the sample is normally distributed through the skewness coefficient, and this confirms the continuation of the research procedures. The researcher conducted the equivalence between the experimental and control research groups, as shown in Table (2), as we see that there are no significant differences between the experimental and control groups, as the significance level is greater than (0.05), which indicates that the two groups are equivalent before starting the main experiment.

**Table 2.** *t-test for Equality of Means*

N	TEST	Experimental Sample		Control Sample		F	T	SIG
		Mean	SD	Mean	SD			
1	Running-Based Anaerobic Sprint	41.28	2.026	40.82	1.75	0.814	0.646	0.523

By looking at Table 2, we note that the significance level is greater than (0.05), which indicates that there are no significant differences between the experimental and control groups and that the two groups are equivalent. The researcher proceeded to conduct the pre-test on Tuesday, September 30, 2025, which lasted for one hour. After that, the main research experiment was applied, which is the combined group exercises using the method of repetitive training on the players of the Electrical Industries Club under 21 years old, at a rate of two training units per week for a period of one month, totaling (8) training units, as the team is in the special preparation phase to prepare for the league competitions under 21 years old. The researcher conducted the post-test after completing the application of speed endurance exercises on Saturday, November 1, 2025, under conditions similar to the pre-test.

## Results

After performing statistical analyses and treatments on the results of the raw research sample for the pre- and post-tests, the researcher arrived at the final results of this study, which are shown below:

**Table 3.** *Pre-Test and Post-Test for Experimental Sample*

N	TEST	Pre-Test		Post-Test		Mean Difference	SD. Error Difference	F	T	SIG
		Mean	SD	Mean	SD					

Running-Based										
1	Anaerobic Sprint	41.28	2.02	38.42	0.91	2.85	0.59	7.25	4.81	0.00

**Table 4.** Pre-Test and Post-Test for Control Sample

N	TEST	Pre-Test		Post-Test		Mean Difference	SD. Error Difference	F	T	SIG
		Mean	SD	Mean	SD					
1	Running-Based Anaerobic Sprint	40.82	1.755	39.60	1.281	1.214	0.580	0.30	2.09	0.04

**Table 5.** Differences between the Experimental Sample and Control Sample in the Post-Test

N	TEST	Experimental Sample		Control Sample		Mean Difference	SD. Error Difference	F	T	SIG
		Mean	SD	Mean	SD					
1	Running-Based Anaerobic Sprint	38.42	0.91	39.60	1.28	1.179-	0.4202	1.390	2.80	0.009

## Discussion

We observe through Tables (3) and (4), which compare the results of the pre-tests for the experimental and control groups, that in Table (3) for the experimental group, there are clear differences between the pre-test and the post-test, as the results are significant in favour of the post-test. This indicates the development of the speed endurance ability of the players of the experimental group of the Electrical Industries Club. Meanwhile, in Table 4 for the comparison between the results of the pre-test and the post-test for the control group, we see that the significance level reached less than 0.05. This confirms that there are differences between the pre-test and the post-test for the control group, in favor of the post-test, through the comparison of the arithmetic means. Thus, there is development for

both the experimental and control groups in the ability to endure speed. The researcher attributes this to the fact that the development of the control group during the special preparation period focused on high-intensity training and special endurance training in addition to competitive matches, while the development of the experimental group required the researcher to use group exercises for speed endurance.

Looking at Table (5), which compares the post-tests of the experimental and control groups, we observe the significant differences between the results, favoring the experimental group. This indicates the effectiveness of group exercises using the repetitive training method employed in the study, as well as the researcher's commitment to distributing the training load and using periodization training planning. This was confirmed by (S. Ibrahim, Asleawa, and Farhan 2024) In using the principles of training load, intensity and rest, as well as confirming the study (S. S. Ibrahim, Ahmed, and Shehab 2024), the importance of dynamic exercises in developing the players' motor skills.

### Conclusions

1. Group training exercises using repetitive methods to develop speed endurance improve players' physical indicators related to speed endurance.
2. Distributing the training load within specific exercises helps players develop positively, especially in high-intensity training.
3. Using group exercises is important for increasing intensity and performing them in a realistic playing style, which benefits the player.

### Recommendations

1. The researcher recommends conducting similar studies comparing players' abilities with other physical abilities.
2. Coaches' training programs during the preparation phase should include standardized exercises specifically designed to develop physical abilities.

### Appendices

#### Appendix 1

#### RUNNING-BASED ANAEROBIC SPRINT TEST?

##### Equipment requirements

Before taking the test Before you begin the test, make sure that you have these things:

- appropriate and homogenous testing site of a minimum length of 50m (indoor hall or artificial sports field for instance).
- Those that proctor the test (at least two). One admin times each duration of sprint; the other does the 10 second recovery period.
- Weighing scales
- Timing gates (optional, but nice to have)
- Measuring tape ( $\geq 35\text{m}$ )
- Stopwatch
- Marker cones
- Performance recording sheet

#### Testing procedure

Players will need to spend a good amount of time in warming up before they start the test. Warm-ups must take into account the biomechanical and physiological characteristics of the test. 3. Rest It is important to allow plenty of recovery (i.e. 3-5 minutes) after the warm-up and before you begin testing.

- Starting the test
  1. The participant is required to assume a 'standing start position' at one end of the 35 m sprint track (i.e. cone A – Figure 1).
  2. Second person to count down for the start of the test (“3 – 2 – 1 – GO!”)
  3. When the participant is ready, is being signaled to perform a maximal sprint on the “GO” signal and has to reach the end of the 35m track (i.e. cone B) as fast as possible
  4. As soon as the Athlete crosses 35m, the second test administrator who is stationed at an end line calls out “CLEAR”, at which time stops the clock and records the sprint time. The 10-second recovery countdown is initiated by the original test administrator.
  5. During recovery, the participant should prepare for another 35-m sprint back to the starting position.
  6. The time of each the six sprints to the nearest hundredth of a second should be recorded by the test administrators, as well as officiate over the 10 seconds recovery.
  7. Perform this 6 times (5 sets of a 10 second recovery).

## How do you calculate your Running-Based Anaerobic Sprint Test score?

**How to: Calculate Anaerobic Capacity (AC)**  
Anaerobic capacity is the total work completed during the test duration.

- $AC = \text{Sum of all six sprint PPOs}$

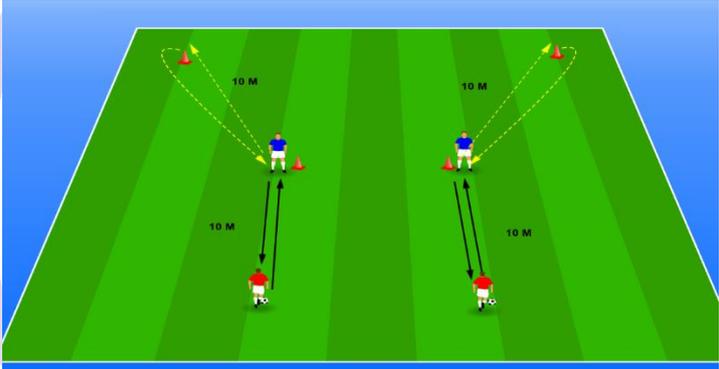


Figure 1. Test configuration for the Running-Based Anaerobic Sprint test.



## Appendix 2

### Sample of exercises

Exercise											
<p><b>Objective of training:</b> speed endurance  <b>Number of players:</b> 6  <b>Pitch size:</b> 20 X 20m  <b>Equipment:</b> cones, bibs, balls</p> <p><b>Performance</b>            The player in red passes to his teammate opposite him, who returns the ball to him via a pass, and then they run .behind the cone and return</p>	<p><b>Coaching points</b></p> <ul style="list-style-type: none"> <li>- The work is performed according to the 1-5 principle.</li> <li>- Work as quickly as possible.</li> <li>- Performance time is 30 seconds; rest time is 150 seconds.</li> </ul>										
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px 5px;">performance</th> <th style="padding: 2px 5px;">F</th> <th style="padding: 2px 5px;">rest</th> <th style="padding: 2px 5px;">type</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 2px 5px;">30 sec</td> <td style="text-align: center; padding: 2px 5px;">6</td> <td style="text-align: center; padding: 2px 5px;">150 sec</td> <td style="text-align: center; padding: 2px 5px;">positive</td> </tr> </tbody> </table>				performance	F	rest	type	30 sec	6	150 sec	positive
performance	F	rest	type								
30 sec	6	150 sec	positive								
											

### Sample of exercises

Exercise											
<p><b>Objective of training:</b> speed endurance  <b>Number of players:</b> 8 + goal player  <b>Pitch size:</b> half of the pitch  <b>Equipment:</b> cones, bibs, balls</p> <p><b>Performance</b>            The three players move forward towards the cones, turn around, and return to the starting position so the coach can pass the ball to them forward, while at the same time, two defenders come out to perform their defensive duties.</p>	<p><b>Coaching points</b></p> <ul style="list-style-type: none"> <li>- The work is performed according to the 1-1 principle.</li> <li>- Work as quickly as possible.</li> <li>- Performance time is 20 seconds; rest time is 20 seconds too.</li> </ul>										
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px 5px;">performance</th> <th style="padding: 2px 5px;">F</th> <th style="padding: 2px 5px;">rest</th> <th style="padding: 2px 5px;">type</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 2px 5px;">20 sec</td> <td style="text-align: center; padding: 2px 5px;">6</td> <td style="text-align: center; padding: 2px 5px;">20 sec</td> <td style="text-align: center; padding: 2px 5px;">positive</td> </tr> </tbody> </table>				performance	F	rest	type	20 sec	6	20 sec	positive
performance	F	rest	type								
20 sec	6	20 sec	positive								



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## The effectiveness of platelet-rich plasma (PRP) injections in restoring range of motion and reducing pain in Muay Thai players with rotator cuff injuries

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2399](https://doi.org/10.37359/JOPE.V37(4)2025.2399)

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**Article history:** Received 21/ December/2025 Accepted 27/ December /2025 Available online 28/ December/2025

### Abstract

The research aimed to use the method of platelet-rich plasma (PRP) injection as a relatively modern therapeutic approach to improve the range of motion and reduce pain in Muay Thai players suffering from rotator cuff injuries in the shoulder joint. The research sample included (5) Muay Thai players with rotator cuff injuries in the shoulder joint, with an age of  $(23.43 \pm 0.64)$  years, a mass of  $(87.74 \pm 8.19)$  kg, and a height of  $(181.39 \pm 4.21)$  cm. Their injuries were diagnosed by specialized doctors. Platelet-rich plasma injections were administered once, with a prohibition on training and specific use of the injured joint for 3 days post-injection. Training was resumed after 2 weeks with moderate intensity, and they returned to their designated training load as prescribed by the coach after 3 weeks, with close monitoring of pain and their condition. The range of motion of the shoulder joint was measured based on the American Academy of Orthopedic Surgeons (AAOS). Surgeons - AAOS), and measuring the pain level using the visual analog scale (VAS), which consists of 10 points. The measurements were taken before the injection (pre-test) and 6 weeks after it (post-test). To obtain the research results, the statistical package (SPSS) was used. The study results showed that the use of the Platelet-Rich Plasma (PRP) injection method had a significant effect on increasing the range of motion, reducing pain levels, and restoring shoulder joint function for Muay Thai players, with no negative side effects, and the method did not interfere with the training of Muay Thai players.

**Keywords:** plasma, platelets, range of motion, pain, injuries, muay thai.

### Introduction

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Shoulder joint injuries are among the most common injuries in various sports, especially those that directly use the upper limb, whether in team or individual sports. One study mentions that the incidence rate of shoulder joint injuries of various types is approximately 12-25 injuries per 1000 cases annually (Windt et al., 1995). A study by Fares et al. (2020) showed that out of a total of 3090 injuries among baseball players, the shoulder joint accounted for 511 injuries, which is 17%. In another study, the incidence of shoulder joint injuries was between 12-19% (Shanley et al., 2015), while it ranged from 23-38% in swimming per year (Tooth et al., 2020).

And the sport of Muay Thai is characterized by the extensive use of the upper limb in performing its skills, which exposes the shoulder joint to the risk of various types and severities of injuries, as excessive use of the joint may lead to high-effort injuries.

Although Muay Thai is not considered a collision sport, meaning it is free from strong contact, it is characterized by speed and strength, and it causes a high percentage of various injuries (Meeuwisse et al., 2023). One of the review studies conducted on 318 basketball players showed 10 shoulder joint injuries resulting from training and competition (Tooth et al., 2020). In a two-year longitudinal follow-up study, a total of 142 athletes sustained 215 injuries, accounting for 44.7% of the injured players during the two-year study period, with the shoulder joint accounting for 10 injuries. (Meeuwisse et al., 2023). Shoulder injuries are also common among Muay Thai players in the NBA, with 532 injuries analyzed from 2010 to 2020 (Collins et al., 2023). A second study showed 30 shoulder joint injuries per season in the NBA from 1988 to 2005 (Drakos et al., 2010). (Drakos et al., 2010).

One of the relatively modern and effective methods for treating shoulder joint injuries is Platelet-Rich Plasma Therapy (PRP), which reduces pain caused by muscle, tendon, ligament injuries, and osteoarthritis. Platelet-rich plasma represents a biological treatment for various muscle and bone injuries, including tendons, ligaments, cartilage, and bones. The method relies on drawing blood from the same person and reinjecting it (to the same person) after processing it in the laboratory by increasing the concentration of platelets. (Milano et al., 2019). This blood plasma will be rich in growth factors (GFs) and cytokines, which have been proven to enhance healing by stimulating the migration and proliferation of cells toward the injured area, as well as generating new blood vessels (Zhang et al., 2016).

What distinguishes this method is its exclusion of surgical intervention. Moreover, this treatment has many medical benefits in various fields as it helps in stimulating, repairing, and regenerating damaged tissues, making it a promising therapeutic method in the field of regenerative medicine. (Sharun., 2023). Although further research is needed to determine the long-term efficacy of platelet-rich plasma injections, studies have shown that it can benefit patients with knee joint inflammation by reducing pain and limiting

movement, as well as improving physical function (Shahid et al., 2023) (BABU et al., 2023). Recent studies have also shown a modest benefit of using PRP injections in reducing shoulder pain, improving function, and promoting healing, with few complications. It also appears that administering PRP is associated with low risks to the patient. (Schneider et al., 2018). The ability of this non-surgical protocol to cure rotator cuff tears (shoulder injuries) relies on its anti-inflammatory, pain reduction effects and potentially in promoting regeneration making it a realisable alternative to surgical repair (Shams et al., 2016).

The incidence of shoulder joint injuries in Muay Thai athletes demands early and secure treatment to enable rapid return to competition. Results of the standard therapies have been inadequate even though we are confronted with improvements on science and technology in nowadays. The injuries are usually associated with pain, motion restriction and weakness, which hinder the individual on playing at his best level and, at the same time may have an impact in psychological terms. Many players may suffer from various injuries during the training season or competitions, including shoulder injuries, which hinder their ability to perform their technical and tactical duties, negatively affecting their performance. Since most shoulder injury treatments tend to follow traditional methods such as local cortisone injections or the use of rehabilitation exercises and physical therapies, which have become conventional despite their importance and effectiveness, this does not prevent the use of a more effective and impactful method. Accordingly, the importance of researching the use of a new and effective treatment method, as mentioned in the literature for treating rotator cuff tears in the shoulder joint, has become evident. These injuries are common problems that can cause pain and limit shoulder function (Dolkart et al., 2014). Accordingly, the research aimed to use platelet-rich plasma injections for Muay Thai players with shoulder joint injuries and to determine its effect on the range of motion and pain level..

## Methodology

The research subjects were (5) Muay Thai athletes with rotator cuff injury in the shoulder joint, the average age of  $(23.43 \pm 0.64)$  years old, mass of was  $(87.74 \pm 8.19)$  kg and height of was  $(181.39 \pm 4.21)$  cm respectively. Their physical impairments were established with reference to medical assessments conducted by doctors with expertise in the relevant area.

Platelet-rich plasma injections were administered according to the established protocol and only once. This involved drawing blood from the patient using a medical syringe (7.5 ml) and placing it in a tube containing an anticoagulant. The tube was then centrifuged to isolate the platelet-rich plasma at a speed of 1300 RPM for 10 minutes.

Subsequently, the platelet-rich plasma was centrifuged again at a speed of 2000 RPM for 10 minutes. (Saurav et al., 2022)

Each patient was injected with their own plasma by the specialized doctor. Afterward, the patients were instructed not to engage in any physical training and to limit the use of the joint for a period of three days. After that, they could perform light exercises for two weeks, and with the doctor's approval, from weeks three to six, they could return to their normal training efforts, ensuring that there was no pain or that it had disappeared within 24 hours after training. Emphasis was placed on stretching and range of motion exercises to restore the joint to its normal state. (Can You Exercise After PRP Injections).

The range of motion of the shoulder joint was measured based on the American Academy of Orthopedic Surgeons (AAOS). Surgeons - AAOS) and adopting the natural ranges for extension movements (Extension) at a value of (60°), flexion (Flexion) at a value of (180°), abduction (Abduction) at a value of (180°), and adduction (Adduction) at a value of (40°). (Normal ROM values, n.d.), and the degree of pain was measured using the visual analog scale (VAS), which consists of 10 points and is a simple and commonly used method to assess differences in pain intensity (Carlsson, 1983). The measurements were taken before the injection (pre-test) and 6 weeks after it (post-test). To obtain the research results, the statistical package (SPSS) was used.

## Results

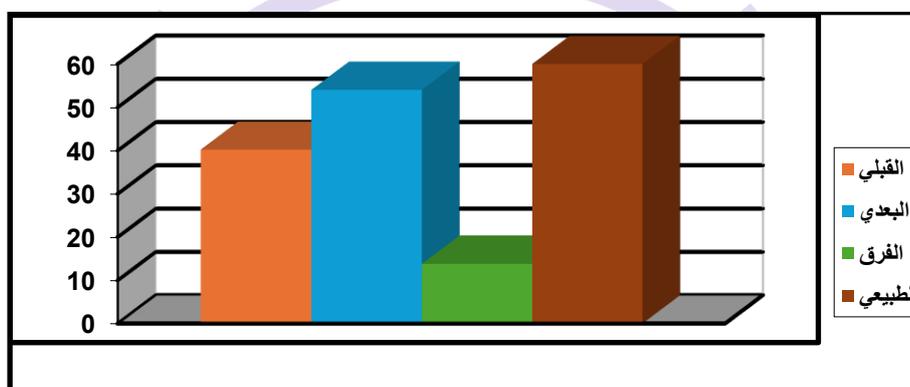
**Table 1.** Shows the means and standard deviations of the range of motion variables of the shoulder joint and pain levels in the pre-test and post-test results

Variable	Normal Range	Unit of Measurement	Pre-test (Mean ± SD)	Post-test (Mean ± SD)
Shoulder extension	60°	Degree	40.200 ± 3.701	54.000 ± 3.809
Shoulder flexion	180°	Degree	158.00 ± 6.708	174.600 ± 4.561
Shoulder flexion	40°	Degree	29.200 ± 3.114	38.400 ± 2.302
Shoulder abduction	180°	Degree	151.600 ± 4.333	175.000 ± 3.536
Pain level	10 degrees	Degree	7.200 ± 0.8367	3.400 ± 0.8894

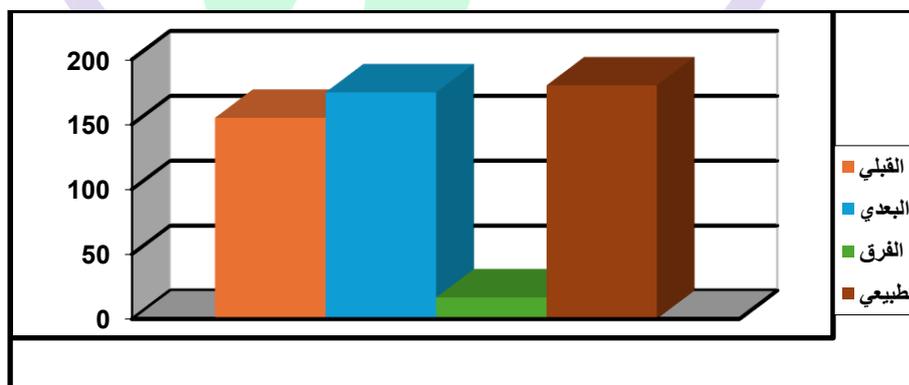
**Table 2.** Shows the difference in means, standard deviation, calculated t-value, and significance of differences for the range of motion variables of the shoulder joint and pain level between the pre-test and post-test results

Variable	Unit of Measurement	Difference in Means	Standard Deviation of Difference	Calculated t-value	Error Level	Significance
Shoulder extension	Degree	13.800	7.293	4.231	0.013	Significant
Shoulder flexion	Degree	16.606	3.209	11.566	0.000	Significant
Shoulder approximation	Score	9.200	1.304	15.778	0.000	Significant
Shoulder abduction	Score	23.400	5.594	9.353	0.001	Significant
Pain level	Score	3.800	0.447	19.000	0.000	Significant

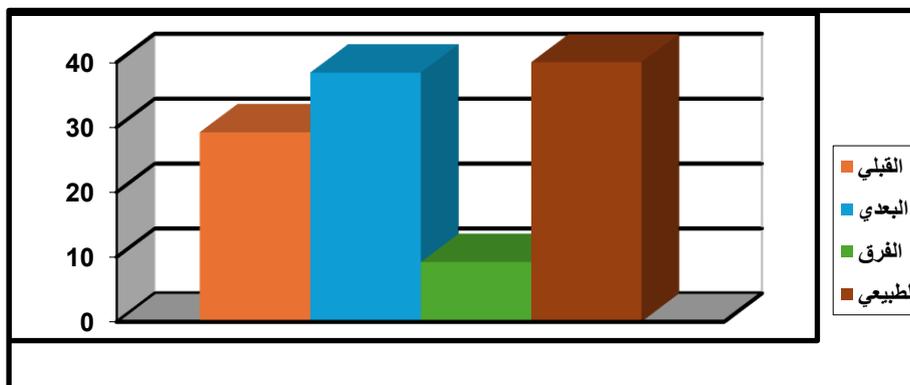
**Note.** Degrees of freedom = 4. Significant at the 0.05 level if the error level is less than 0.05



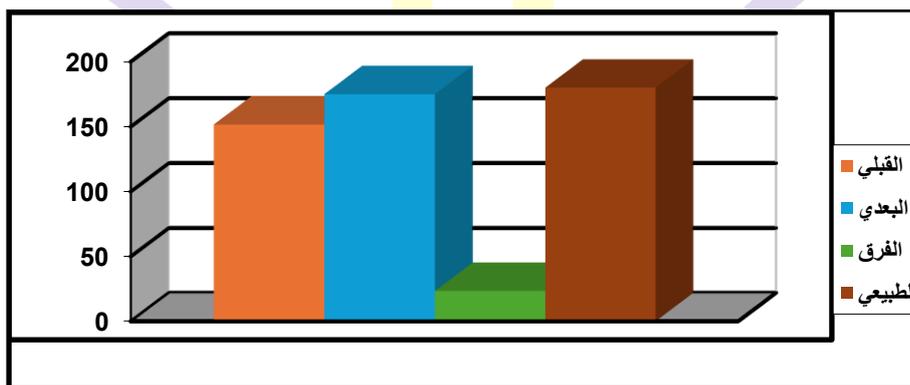
**Figure 1.** illustrates the arithmetic means and the difference in arithmetic means between the pre-test and post-test results, as well as the normal values for flexion movement



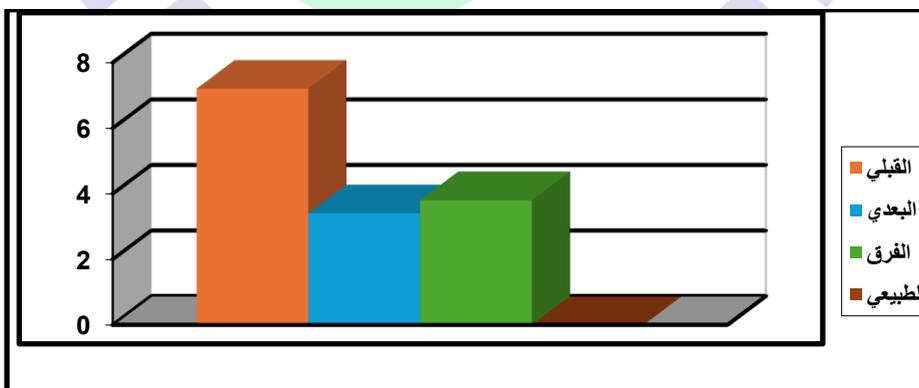
**Figure 2.** illustrates the arithmetic means and the difference in arithmetic means between the pre-test and post-test results, as well as the normal values for tidal movement



**Figure 3.** illustrates the arithmetic means and the difference in arithmetic means between the pre-test and post-test results and the normal values for shoulder adduction movement



**Figure 4.** illustrates the arithmetic means and the difference in arithmetic means between the pre-test and post-test results, as well as the normal values for shoulder abduction movement



**Figure 5.** illustrates the arithmetic means and the difference in arithmetic means between the pre-test and post-test results, as well as the normal values for pain levels

## Discussion

Thru Tables 1 and 2, we observe significant differences between the pre-test and post-test results in the four variables of shoulder serum range of motion and pain degree, indicating improvement. PRP includes a high amount of growth factors that promote the damaged tissue to repair by producing collagen, reinstate blood vessels and transform into stem cells to replace the lost ones and heal completely from injury (Etulain., 2018).

What distinguishes this therapeutic method is its safety, and there are no significant risks associated with its use if applied in a regulated and correct manner (Schneider et al., 2018). Thus, it may be an alternative to surgical intervention, in addition to being a therapeutic method with a bright future as it relies on regenerative medicine in treating sports injuries, including Muay Thai injuries that often occur as a result of training or competition.

Patients with rotator cuff injuries typically suffer from pain and restricted range of motion in the shoulder joint. (Phillips., 2014). This necessitates addressing the problem, as limited movement hinders the execution of Muay Thai skills such as striking and clinching, as well as other offensive and defensive skills. And the conservative treatment of shoulder injuries generally includes the use of therapeutic exercises and physical therapy devices, the effectiveness of which in treatment cannot be denied. However, plasma injection treatment has significant scientific prospects, and its results indicate its effectiveness.

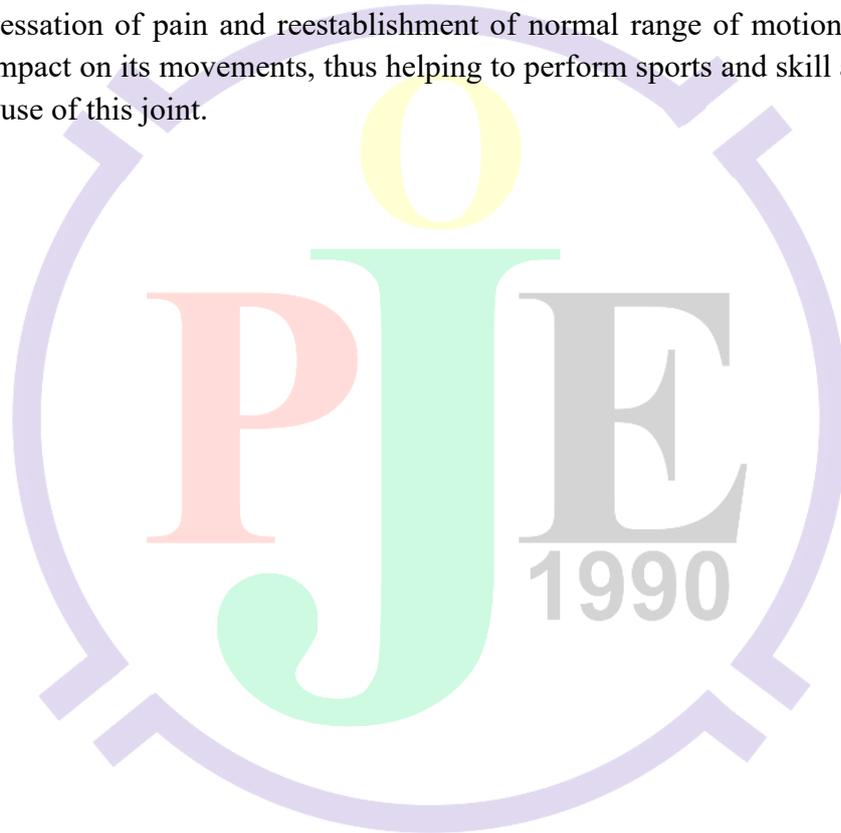
The results of the research using a single injection were positive and led to a reduction in pain levels and a return of the shoulder's range of motion to levels very close to normal. This can also be attributed to the regulation of training load after the injection, as the patients did not perform any training in the first three days after the injection, followed by moderate training for two weeks, and then an increase in training load until the sixth week, which saw a decrease in pain during and after training. This is a good indicator of the treatment method used in conjunction with training.

The scientific studies that investigated the number of doses administered were varied. The current study agrees with the study by Saurav et al. (2022) in using a single injection, while the studies by Nejati et al. (2017) and Rha et al. (2013) used two injections with a time interval of one month (4 weeks). The study by Ilhanli et al. (2015) used three injections with a time interval of one week. The previous studies used injections with a volume of (2-6 ml), and the current study did not differ from them, being within the same range with a volume of (4 ml) of platelets.

The rotator cuff injury is considered one of the difficult shoulder injuries to treat due to the complexity of the injury and the multiple affected tissues, which may increase the difficulty of managing its treatment and the likelihood of it becoming a chronic injury accompanying the Muay Thai player. A study by Mei-Dan & Carmont (2011) indicates that

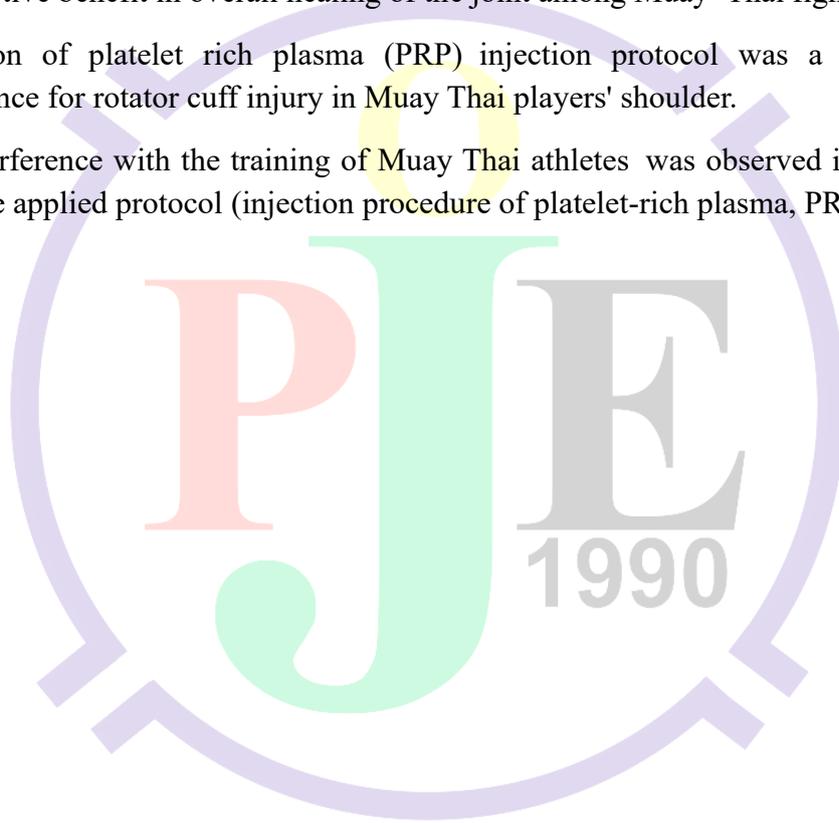
injecting platelet-rich plasma led to reduced pain and improved healing in the injured areas, as well as the restoration of the injured part's function. Including the range of motion. As shown in the study by Jiménez-Martin et al. (2009), there was an improvement in pain and a reduction in the required rehabilitation time using platelet-rich plasma injections. The study by Randelli et al. (2011) demonstrated the ability of platelet-rich plasma injections to reduce pain and enhance function in the diseased rotator cuff articulation without any side effects.

The above studies uphold the present findings on the efficacy of plasma injections in rotator cuff injuries. The restriction of movement is caused by tearing and pain that restricts continuous functional motion of the shoulder. An accelerated recovery of the injury results in cessation of pain and reestablishment of normal range of motion, providing a favorable impact on its movements, thus helping to perform sports and skill activities that require the use of this joint.



## Conclusions

7. Use of the platelet-rich plasma (PRP) injection technique has a positive impact on the enhancement of shoulder joints' ROM in Muay Thai athletes.
8. Application of the platelet-rich plasma (PRP) injection method has a significant impact on increasing the ROM of shoulder joint for Muay Thai athletes.
9. The PRP injection-platelet rich plasma application method plays an effective role in improving shoulder function to normal in muay thai athletes.
10. The addition of the platelet-rich plasma (PRP) injection therapy method proved to be an effective benefit in overall healing of the joint among Muay Thai fighters.
11. Adoption of platelet rich plasma (PRP) injection protocol was a non-negative experience for rotator cuff injury in Muay Thai players' shoulder.
12. No interference with the training of Muay Thai athletes was observed in association with the applied protocol (injection procedure of platelet-rich plasma, PRP).



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## Perceived Impact of Aerobic Exercise on Cardiovascular Health Among Athletes at the University of Ilorin: An Educational Technology Perspective

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DOI:

[https://doi.org/10.37359/JOPE.V37\(4\)2025.2223](https://doi.org/10.37359/JOPE.V37(4)2025.2223)

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**Article history:** Received 19/ October/2025 Accepted 7/ January/2025 Available online 28/ December/2025

### Abstract

Lifestyle changes through daily exercise are essential for improving health and fitness. Regular physical activity, whether vigorous or moderate, significantly contributes to the overall well-being of individuals. Observations at the University of Ilorin revealed that some athletes experience rapid fatigue due to inadequate cardiovascular health, often leading to early substitutions by coaches. Despite the recognition of physical exercise's value, its application remains largely theoretical rather than practical. This study aimed to investigate the effects of aerobic exercise on the heart rate and blood pressure of athletes at the University of Ilorin, while also exploring the role of educational technology (ET) in enhancing training interventions. An ex post facto research design was employed, encompassing a population of 207 athletes, with a sample of 106 selected via a multi-stage sampling procedure. A validated researcher-structured questionnaire ( $r = 0.78$ ) served as the data collection instrument. Descriptive statistics were utilized to analyze demographic data, while inferential statistics, including Pearson's Product Moment Correlation (PPMC), tested the hypotheses at a 0.05 alpha level. The findings indicated a significant relationship between aerobic exercise and both blood pressure ( $n = 106, r = 0.524, p < 0.05$ ) and heart rate ( $n = 106, r = 0.443, p < 0.05$ ) among athletes. Additionally, the study highlighted the role of educational technology in providing insights for developing effective training interventions that promote long-term heart health. The study concluded that aerobic exercise positively impacts blood pressure and heart rate, emphasizing the necessity for regular aerobic training in athletes' programs. It is recommended that athletes collaborate

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with coaches to create personalized aerobic exercise plans tailored to their specific goals and needs, while integrating educational technology to enhance training outcomes.

**Keywords:** Cardiovascular Endurance, Educational Technology, Exercise, Heart Rate, Blood pressure.

## Introduction

All human activities, independent of the mode, duration, intensity or rhythm of movement, require higher energy cost than rest and O<sub>2</sub> is the most important source for consuming energy during physical exercises. To supply oxygen to the body, the cardiovascular and respiratory systems cooperate as we breathe during aerobic exercise needs. Cardiovascular health that is keeping blood pressure, cholesterol levels, your heart functioning is also important for the wellbeing. Whelton (2018) points out the importance of keeping blood pressure under 120/60 mmHg, as advised by the American Heart Association in order to promote heart health. This paper discusses the benefits of aerobic exercise on the cardiovascular system and the use of educational technology to improve training among athletes in the University of Ilorin. Athletes can monitor and enhance their cardiovascular wellbeing via technology-assisted training regimens, wherein the role of aerobic exercise is most regarded.

Aerobic exercise and its benefits have been form the bedrock of recommendations for health, with the national guidelines indicating that physical activity should be part and parcel' of a healthy lifestyle. Integrating educational technology into aerobic exercises provides a personal tailored data-driven fitness experience for athletes, aiding in tracking the progress and customization of exercise as aging, level of fitness or goals changes (Falade & Aladesusi, 2020). Even if someone's capability for a particular form of exercise is restricted by health problems or physical conditions, or disabilities, educational technology has potential to provide alternate exercise opportunities and motivating feedback to help ensure any level of activity is better than no activity.

Basic human locomotions like walking, running and jumping are building blocks for various physical activities. These progressions have developed into more advanced activities of daily living and sports. Fitness level, especially in athletes, plays a key role for better performance both in daily life and sports. Health and wellness the core of a long life and having fun free from disease and fatigue. Furthermore, using technology to track daily physical activity contributes toward sustaining fitness and an enhanced quality of life (Gao, 2022). Aerobic Exercises for Cardiovascular Health Using educ tech (fitness apps, wearables and interactive training programs) athletes of Unilorin can embrace aerobic exercises. Aerobic exercises that pump the heart, lungs and muscles produce major physiological alterations in the body (Franklin 2021). Although numerous studies have shown a relationship between physical fitness and the state of health, little research has

been conducted on the effect of aerobic exercise on cardiovascular endurance. Aerobic exercises are made for building up cardiovascular stamina which means that the body gets adequate oxygen while performing those activities (Dong, 2021). Physical education technology also helps athletes receive their aerobic workouts and delivers numbers related to heart rate, oxygen levels, and overall cardiovascular efficiency. Interventions such as walking, running, swimming, and cycling could be tracked in real time via mobile app or wearables so that athletes can temper intensity levels and receive feedback to make improvements.

The cardiovascular health, or aerobic fitness, is how well the heart and lungs deliver oxygen to the muscles during exercise. Highly conditioned athletes can engage in moderate to high intensity activity sustained over much longer periods of time. In the words of Piercy (2018), 'good cardiovascular health enables the body to transport oxygen more efficiently... to the muscles, fuelling cells and increasing a person's aerobic endurance. With the help of educational technology, athletes are better able to assess cardiovascular fitness through heart rate, blood pressure, and oxygen consumption. Educational technology allows athletes to monitor heart rate and blood pressure while aerobic exercises can be performed directly on heart rate and blood pressure. When stuck in "fight or flight", activities like running, swimming or biking make your heart a more efficient machine that needs more oxygen to deliver to the muscles. Consistent aerobic activity strengthens the heart, resulting in a lower resting heart rate and greater cardiovascular efficiency. In the long run, such exercises lower your risk for hypertension and heart disease. But as noted in Bakinde (2021), athletes need to control the straining of their exercises and also have medical experts monitor them so that they do not overexert themselves. Educational technology works in this way by offering instant feedback while informing users of the same alarming trends for the heart rate or blood pressure.

Ding (2017) stresses that aerobic exercise results in favorable cardiovascular adaptations such as higher cardiac output and lower resting heart rates. One of educational technology's infinite possibilities is it permits for mass adjustments of practice based on feedback. Aerobic physical activity also decreases peripheral resistance and improves endothelial function, helping blood pressure reduction on the long run. These results highlight the need for inclusion of aerobic exercise in athletes' routines, a behavior optimization that can be facilitated (and potentiated) by technology-powered devices. The integration of educational technologies into fitness programs for collegiate athletes at the university of Ilorin could assist in optimizing cardiovascular health by monitoring performance and providing tailored feedback. For instance, wearables can track heart rates and provide information on how effective the heart is at pumping blood during workouts. A person's resting heart rate is normally between 60 and 100 beats per minute, although athletes often have a lower reading than this—some as low as 40 (Nivethitha, 2016).

Educational resources can help athletes understand how to accurately check their pulse rate, which trainers can use as data to develop cardiovascular endurance training.

The students at University of Ilorin athletes have been doing aerobic workouts and other stretching activities such as yoga, specific cardiovascular exercises. Educational technology has further enriched such exercises by providing athletes with a means to measure progress, adjust training intensity and optimize cardiovascular strength, among other factors. In competitive games, the enhanced cardiovascular fitness provided by aerobic training allows athletes to give their best.

### **Statement of the Problem**

The presence of cardiovascular diseases (CVDs) has increasingly become a public health issue that pertains to governments worldwide and people of all ages. Athletes such as at a university setting, are assumed to exercise the body adequately and recommending an aerobic type of physical training is also advisable for cardiovascular health. Nevertheless, although aerobic exercise is popularly known to be beneficial, yet athletes in the University of Ilorin do not have a clear knowledge on how it specifically affects their cardiovascular health. This lack of knowledge may have negative implications in both training practices and for the understanding of the importance regular, structured aerobic-type exercise plays in the promotion of heart health and prevention CVDs.

In addition to this, educational technology provides novel means to optimize athletes' training routines by empowering them with real-time data, personalized tips and distance-based monitoring; however these devices have yet not had the most prominent role in the fitness routine of said athletes. There are few related studies on the attitude of athletes toward the use of educational technology to improve their cardiovascular health through aerobic exercise. Against this background, the current study investigates Perceived Impact of Aerobic Exercise on Cardiovascular Health among University of Ilorin Athletes: An Educational Technology Perspective

### **Objectives of the study**

The main objective of the study was to investigate the Perceived Impact of Aerobic Exercise on Cardiovascular Health Among Athletes at the University of Ilorin: An Educational Technology Perspective. The specific objectives of the study were to ;

investigated the impact of aerobic exercise on systolic blood pressure of University of Ilorin athletes;

determined the blood pressure of athletes in University of Ilorin;

determined the heart rate of athletes in University of Ilorin and

examined the role of educational technology in providing insights for developing more effective training interventions that promote long-term heart health among athletes.

### Research Questions

The following research questions were asked to guide the study:

1. What is the perception of athletes in University of Ilorin as regards the impact of aerobic exercise on cardiovascular health?
2. What is the blood pressure of the University of Ilorin athletes?
3. What is the heart rate of the athletes in University of Ilorin?
4. what is the role of educational technology in providing insights for developing more effective training interventions that promote long-term heart health among athletes

### Hypotheses

The following hypotheses were tested in the study:

1. There is no significant relationship between aerobic exercises on blood pressure of athletes in University of Ilorin.
2. There is no significant relationship between aerobic exercises on heart rate of athletes in University of Ilorin.

### Delimitation of the Study

The study was delimited to University of Ilorin athletes. This study focused on the effect of selected aerobic exercises and its impact on cardiovascular health on University of Ilorin athletes. The study was delimited to Ex-post facto research design was used for the study. The study was delimited to variables of aerobic exercises (Independent variable) and cardiovascular endurance of University of Ilorin athletes (Dependent variable), Total number of registered student-athletes (207 athletes) in the University of Ilorin formed the population for the study in which 106 participants were drawn as sample for the study using multi-stage sampling procedure. Descriptive statistics of frequency counts and percentage was used to analyse demographic characteristics of the participants and to answer the research questions. Inferential statistics of Pearson's Product Moment Correlation (PPMC) at 0.05 alpha level was used to test the formulated hypotheses.

The findings of this study may be of great significance to the athletes, coaches, trainers, sport administrator or sport organizers, teeming sport lovers and government. The findings of this study may create awareness on the influence of aerobic exercises on the cardiovascular endurance of athletes. It may also provide information to coaches and sports scientists on better ways to improve cardiovascular endurance. This study may be of significance to government and sport governing body in the area of policy formulation and

implementation especially on issues concerning the development of athletes. It may also serve as a reference material for future researches.

## Methodology

The Ex post facto research design was employed for the study. The Ex post facto design is usually used when a researcher is interested in how an independent variable (groups with certain qualities that already exist prior to a study) affects a dependent variable and without interfering with the participant trait or characteristics. The population of the study covered all student-athletes in University of Ilorin. There were 207 registered student-athletes in the University (University of Ilorin Sports Unit, 2024). A sample of 106 participants was selected for this study through multi-stage sampling procedures comprising of stratified, random and proportionate sampling techniques. Stratified sampling technique was used to categorize the participants into different sports (12 sports). Random sampling technique was used to select 5 sports out of the total 12 sports. Proportionate sampling technique was used to select 80% of participants from each of the selected sports as presented in table2.

An adapted Physical Activity Readiness questionnaire (PAR) was used for the study, data form and sphygmomanometer to test heart rate, blood pressure (systolic and diastolic) where each participant was tested twice for accurate answers. The questionnaire was divided in two sections B and C. section A contained demographic information about the respondents, which bothered on their gender, age and class. Section B was used to collect data on aerobic exercise. Section C was used to collect data on cardiovascular health of the participants. The data form was given to 3 experts in the department of Human Kinetics Education for validation. Their corrections and suggestions were incorporated into the final draft of the instrument that was subjected to approval of project supervisor before administering to the participants. Other instrument was calibrated before used to confirm their status. The test-retest method was used to establish the reliability of instrument. The instrument will be administered once to twenty (20) athletes of Kwara State University at an interval of to two weeks. The data collected was analysed using Pearson's Product Moment Correlation at 0.05 alpha level to ascertain .78r which signified that the instrument is reliable for data collection. Data collected for this study was subjected to data analysis using Statistical Package for the Social Sciences (SPSS). Section A which entails the demographic data of respondents; and answers to research questions was analyzed using descriptive statistics of frequency counts and percentage, while inferential statistics of Pearson's Product Moment Correlation (PPMC) was used to test the null hypotheses at 0.05 level of significance.

**Table 1.** Population of Athletes in University of Ilorin

S/N	Types of Sports	Population
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1	Football	35
2	Basketball	22
3	Handball	25
4	Volleyball	24
5	Tennis	8
6	Table tennis	8
7	Karate	8
8	Judo	8
9	Athletics	26
10	Cricket	15
11	Hockey	16
12	Badminton	12
<b>Total</b>		<b>207</b>

**Table 2. Sample selected for the Study**

S/N	Type of Sports	Population	Sample (80% of the population)
1.	Football	35	28
2.	Basketball	22	18
3.	Handball	25	20
4.	Volleyball	24	19
5.	Athletics	26	21
<b>Total</b>			<b>106</b>

## Instrumentation

### Physiological variables

**Objective:** To measure the systolic blood pressure and diastolic blood pressure and to also calculate mean of arterial blood pressure.

**Instrument Required:** A digital blood pressure monitor (sphygmomanometer) with model number HEM-712c, produced by Omron Company in China.

**Procedure:** The main purpose of taking BP is to know the resting diastolic and systolic blood pressure of the participants in relation to their level of participation in daily activities. The participants was instructed to sit quietly on chair with comfortable back and arm support for 10 minutes before the measurement was taken. Before the measurement

was taken, participants must place their feet flat on the ground not crossing each other and one foot should be placed slightly ahead of the other. Measurement was taken on the left hand that was supported by a table with elbow slightly flexed to ensure that the arm is at the same level with the heart. The cuff of blood pressure monitor was rolled on the upper arm of the left hand and snug it with fabric fastener but should not be tight. The measurement was taken three times and the average measurement was taken as participant's blood pressure.

Rating: Blood pressure was rated in accordance with the standard reference set by National Institute of Heart, Lung and Blood as shown in table 3.

**Table 3. Blood Pressure Standard Reference Chart**

Blood Pressure Category	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)
Normal	110-120	70-89
Pre hypertension	121-139	90-99
Hypertension Stage 1	140-159	99-100
Hypertension Stage 2	160-180	101-110
Hypertension Crisis	>180	>110

Source: National Institute of Heart, Lung and Blood (2012).

## Results

**Table 4. Descriptive analysis on Demographic Data of the Respondents**

Variable	Frequency	Percentage
<b>Gender</b>		
Male	65	61.3
Female	41	38.7
<b>Total</b>	<b>106</b>	<b>100%</b>
<b>Age-Range</b>		
18-20yrs	35	33.0
21-23yrs	27	25.5
24-26yrs	23	21.7
27yrs & Above	21	19.8
<b>Total</b>	<b>106</b>	<b>100%</b>
<b>Medal Won</b>		
Gold	19	17.9
Silver	26	24.5

Bronze	18	17.0
None	43	40.6
<b>Total</b>	<b>106</b>	<b>100%</b>

**Table 5.** *Descriptive Analysis on Perception of Athletes in University of Ilorin as regards the Impact of Aerobic Exercise*

S/N	ITEMS	SA	A	FR	D	SD	UR
1	I engage in vigorous activity exercises such as jogging as part of training activities every week.	30 (28.3%)	50 (47.2%)	80 (75.5%)	18 (17.0%)	8 (7.5%)	26 (25.5%)
2	Swimming activity is part of activities involved in during campaign.	23 (21.7%)	54 (50.9%)	77 (72.6%)	21 (19.8%)	8 (7.5%)	29 (27.3%)
3	Aerobic exercise helps decrease resting heart rate.	19 (17.9%)	44 (41.5%)	63 (86.4%)	36 (34.0%)	7 (6.6%)	43 (40.6%)
4	Regular aerobic exercise reduces the risk of heart diseases.	18 (17.0%)	48 (45.3%)	66 (62.3%)	35 (33.0%)	5 (4.7%)	40 (37.7%)
5	Aerobic exercise increases cardiovascular endurance.	17 (16.0%)	40 (37.7%)	57 (53.7%)	33 (31.1%)	16 (15.1%)	49 (46.2%)
6	I participate in aerobic warm-up exercises before full sporting activities.	24 (22.6%)	26 (24.5%)	50 (47.1%)	43 (40.6%)	13 (12.3%)	56 (52.9%)
7	Aerobic exercises improves blood circulation and nutrients to the muscles and joints.	20 (18.9%)	48 (45.3%)	68 (64.2%)	27 (25.5%)	11 (10.4%)	38 (35.9%)
8	Engaging in regular aerobic exercise reduces inflammation in the cardiovascular system.	18 (17.0%)	49 (46.2%)	67 (63.2%)	28 (26.4%)	11 (10.4%)	39 (36.8%)
9	Aerobic exercise improve overall heart function and efficiency.	15 (14.2%)	42 (39.6%)	57 (53.8%)	36 (34.0%)	13 (12.3%)	49 (46.3%)
10	Aerobic exercises such as running, swimming and cycling increases the heart rate.	21 (19.8%)	35 (33.0%)	56 (52.1%)	30 (28.3%)	20 (18.9%)	50 (47.2%)
	<b>Total</b>			<b>641</b> <b>(60.5%)</b>			<b>419</b> <b>(39.5%)</b>

**Table 6.** *Descriptive Analysis on Blood Pressure Ratings of Athletes in University of Ilorin*

BP Ratings	Frequency	Percentage
Normal	63	59.4%
Elevated	31	29.2%
High BP	12	11.4%
<b>Total</b>	<b>106</b>	<b>100</b>

**Table 7.** *Descriptive Analysis on Heart Rate of Athletes in University of Ilorin*

Ratings	Frequency	Percentage
Bradycardia	20	18.9%
Normal	55	51.9%
Tachycardia	31	29.2%
<b>Total</b>	<b>106</b>	<b>100</b>

**Table 8.** *Role of Educational Technology in Providing Insights for Developing More Effective Training Interventions that Promote Long-Term Heart Health Among Athletes*

Item	Mean (M)	Standard Deviation (SD)	Weighted Mean (WM)
1. ET helps track real-time heart rate and fitness levels during aerobic exercises	4.3	0.75	4.30
2. ET provides personalized feedback for improving aerobic exercise efficiency	4.1	0.80	4.10
3. ET supports monitoring and preventing cardiovascular risks in athletes	3.8	0.85	3.80
4. ET encourages long-term cardiovascular health management	4.0	0.70	4.00
5. ET enhances motivation through data-driven insights on fitness progress	4.2	0.65	4.20

**Table 9.** *Pearson's Product Moment Correlation analysis on relationship between Aerobics exercise and Blood Pressure of Athletes in University of Ilorin*

Variable	N	Mean	Std.	R	P Val.	Remark
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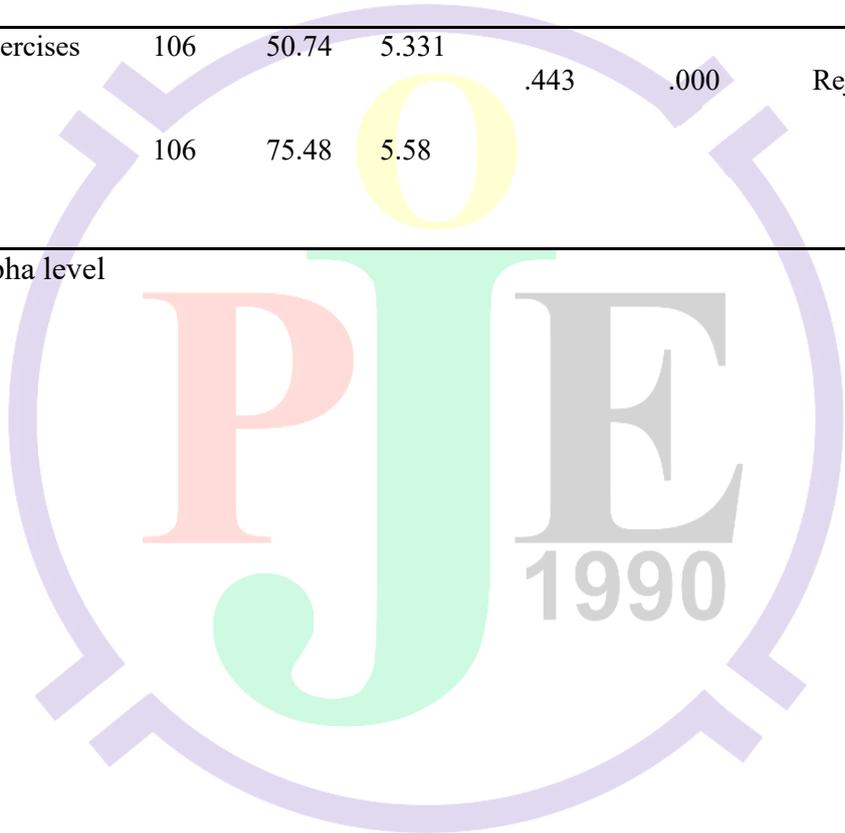
Aerobic Exercises	106	50.74	5.331			
				.524	.000	Rejected
Blood Pressure	106	110.50	5.500			

P < 0.05 alpha level

**Table 10.** *Pearson's Product Moment Correlation analysis on aerobic exercises on heart rate of athletes in University of Ilorin*

Variable	N	Mean	Std.	R	P Val.	Remark
Aerobic Exercises	106	50.74	5.331			
				.443	.000	Rejected
Heart Rate	106	75.48	5.58			

P < 0.05 alpha level



## Discussion

Discussion of Findings Discussion in this study is on the perceived effect of aerobic exercises on cardiovascular fitness among athletes in University of Ilorin. Hypothesis 1 (Ho1) Based on the Table 8, there is a significant relationship between aerobic exercises and Athletes blood pressure. The results effectively indicate a correlation which provides evidences for Berger's (2019) claim that regular aerobic exercise reduces significantly both systolic and diastolic blood pressure in athletes. This is not surprising given the clear evidence that aerobic exercise is an essential part of wellbeing, exercising optimally for athletic individuals and contributing directly to the most important risk factor for cardiovascular diseases; blood pressure.

The findings of this study support the previous evidence that aerobic exercise lowers the blood pressure. For instance, Berger et al. Young athletes participating in regular aerobic training experience decreases in both systolic and diastolic blood pressure (Sausaman et al., 2019). A meta-analysis of Ciolac (2019) similarly emphasized that the decrease of arterial pressure with aerobic DT was remarkable for athletic populations. The exact pathophysiological bases of how aerobic exercise lowers BP is not fully known, however a slight vasodilatory effect, increased cardiac output and decreased peripheral resistance may play a role. Miyai (2018) posited that the importance of aerobic exercise, a form of progressive pressure on blood vessels and critical heart rate enhancement influences on vasodilation and cardiac output. Additionally, Sperlich (2017) has also reported a diminution in both stroke volume and systemic vascular resistance by three percent ( $p = 0.11$ ) and one percent ( $p < 0.01$ ), respectively, following an acute bout of submaximal aerobic exercise in non-athletes.

The findings of the present study suggest that an aerobic exercise dose response exists in BP reduction and that greater intensity or longer duration may lead to greater reductions in BP. This if confirmed by the study of Williams (2019) regarding a dose response for blood pressure reductions by intensified aerobic exercise in athletes. Also, there was a pattern for prolonged duration of aerobic exercise to achieve greater blood pressure reduction (Zhang 2020). In conclusion, regular aerobic exercise has been shown to be effective in reducing BP and emphasizes the importance of both exercise intensity and duration in the prescription of training aimed at improving cardiovascular health.

H o 2 in Table 9 shows the relationship between aerobic exercises and heart rate among Athletes at the University of Ilorin. These findings were consistent with a strong correlation, and similar to those of Aiemimoto (2018), where sustained aerobic exercise helps reduce the RHR and sub-maximal HR in athletes leading to increased cardiovascular efficiency. This conclusion can be confirmed from various previous research, e.g., Talanian (2017) found that aerobic exercise significantly decreased RHR in endurance-

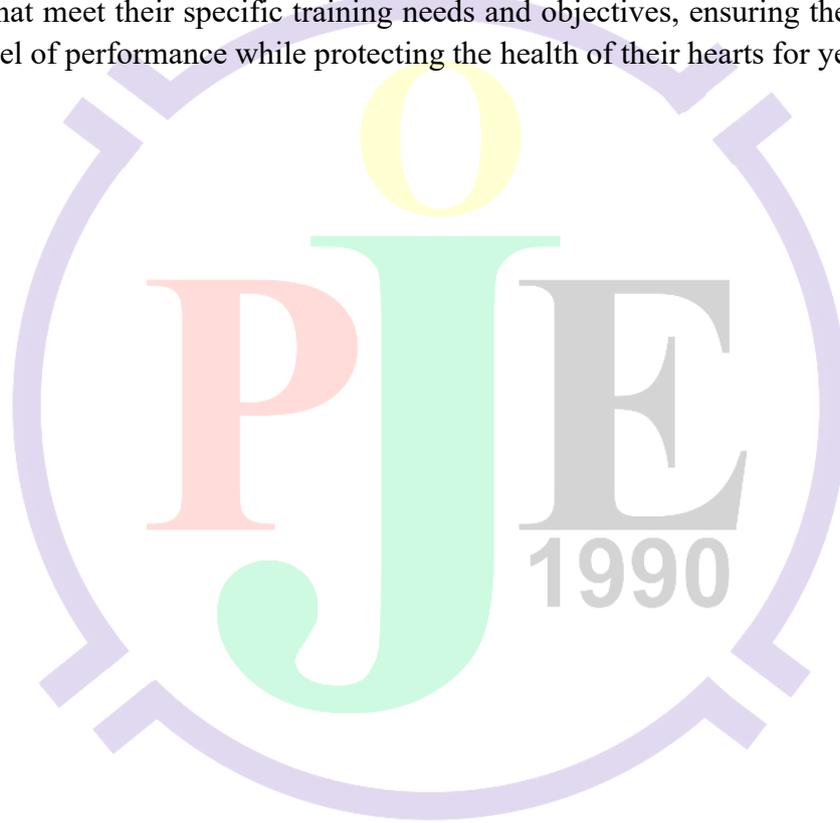
trained athletes. Additionally, Weston et al. (2014) also observed associations for aerobic exercise with decrease in HR, indicating improved cardiac condition.

Cardiovascular efficiency, parasympathetic tone and sympathetic activity may be involved in reduction of resting heart rate through aerobic exercise. Aeimoto et al. (2018), aerobic exercise had a beneficial effect on cardiovascular function by increasing parasympathetic activity and decreasing sympathetic responses. Also, the dose-response relationship of aerobic exercise with lower heart rates suggests that greater intensities and durations will be needed to achieve an even larger reduction in heart rate. This concept is confirmed by Swanson (2018) who reported a larger decrease in HR among athletes with higher exercise intensity. Also, Lee (2020) found that the longer of the aerobic exercise adopted presented with a better decrease in heart rate.

In conclusion, the results of this study suggest that regular aerobic exercise is essential for enhancing cardiovascular health of athletes by reducing blood pressure and heart rate. These findings underscore the utility of educational technology to deliver such vital data and feedback toward improving training interventions to achieve long term cardiovascular health among those engaging in athletic activities at University of Ilorin. Implementation of technology in training programs can particularly strengthen the effectiveness of aerobic exercise by planning to achieve athletes' health objectives, and at the same time their best performance goals.

## Conclusions

In conclusion, results of this study show a correlation between aerobic exercise and cardiovascular health in athletes in University of Ilorin) as statistically significant differences were observed on both diastolic blood pressure and heart rate. The findings indicate that regular participation in aerobic exercise is critical if athlete's optimal levels of blood pressure and cardiovascular efficiency are to be preserved. In light of these findings, the authors propose that aerobic training be an essential component of all athletes' regimens. If you get 60 minutes of physical activity on most days, your heart will thank you and be much less likely to develop cardiovascular problems. In addition, all athletes should work jointly with a coach or trainer to design personalized workout programs that meet their specific training needs and objectives, ensuring they achieve an optimal level of performance while protecting the health of their hearts for years to come.



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Volume (37) - Issue (4) - 2025



# **Journal of Physical Education**

**Quarterly Reviewed Scientific Journal  
For Sport Sciences Issued by  
College of Physical Education and Sport Sciences  
University of Baghdad**

<http://jcope.uobaghdad.edu.iq>

DOI: [https://doi.org/10.37359/JOPE.V37\(4\) 2025](https://doi.org/10.37359/JOPE.V37(4) 2025)