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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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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.

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Introduction

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 orginal 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

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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 conptcepts 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 skillsAnd (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.

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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).

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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.

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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					
1	Running-Based 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

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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.

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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 (≥35m)
- 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.

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- 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).

- AC = Sum of all six sprint PPOs

Figure 1. Test configuration for the Running-Based Anaerobic Sprint test.

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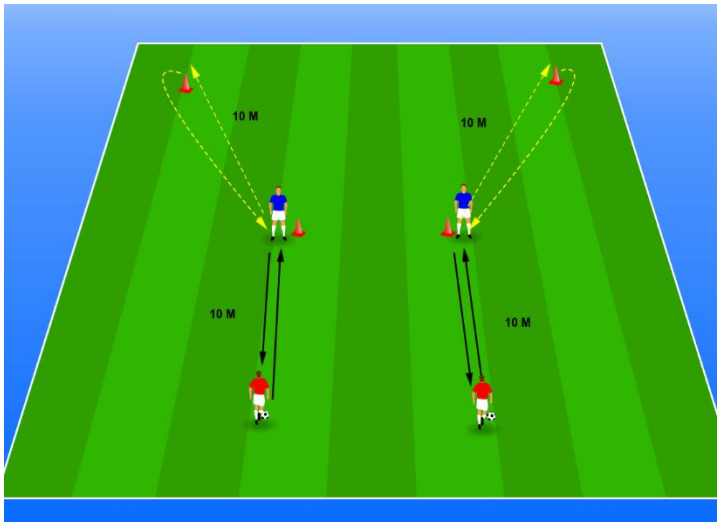
Appendix 2

Sample of exercises

Exercise	
Objective of training: speed endurance **Number of players:** 6 **Pitch size:** 20 X 20m **Equipment:** cones, bibs, balls **Performance** 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	**Coaching points** - The work is performed according to the 1-5 principle. - Work as quickly as possible. - Performance time is 30 seconds; rest time is 150 seconds.

performance	F	rest	type
30 sec	6	150 sec	positive



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Sample of exercises

Exercise

Objective of training: speed endurance

Number of players: 8 + goal player

Pitch size: half of the pitch

Equipment: cones, bibs, balls

Performance

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.

Coaching points

- The work is performed according to the 1-1 principle.
- Work as quickly as possible.
- Performance time is 20 seconds; rest time is 20 seconds too.

performance	F	rest	type
20 sec	6	20 sec	positive

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