Journal of Physical Education

Volume 36 – Issue (2) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

The effect of using a two-way assistive balance device on some motor abilities and improving the performance of the handstand skill in artistic gymnastics for men

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DOI: https://doi.org/10.37359/JOPE.V36(2)2024.2168

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Article history: Received 10/ June/2024 Accepted 22/ June/2024 Available online 28/ June/2024

Abstract

Advanced methods in training and sports are considered one of the most important ways to succeed and reach high levels of performance in sports skills. Auxiliary devices and tools are considered training methods, as well as special exercises used with assistive devices and tools.

Research objective to know the effect of using a two-way assistive balance device on some motor abilities and improving the performance of the handstand skill ,**But the assumption** Research shows that the use of a two-way auxiliary balance device has a positive effect in improving the performance of the handstand skill in artistic gymnastics for men .**Researchers' experimental method**) With a single group design with pre- and post-tests) to suit the nature of the problem to be solved. As for the research population, it represents (10) players affiliated with the training centers of Baghdad Governorate, Al-Karkh/Al-Rusafa for Gymnastics, and their ages range between (9 - 13) years. As for the research sample, it represented (5) players next to Al-Rusafa who train in the (Al-Amana) hall, and it was determined by (50%). The researchers used (2) players from the Al-Karkh Center for the exploratory experiment **The researcher concluded** the use of the two-way auxiliary balance device has clearly affected some motor abilities and improved the performance of the handstand skill in artistic gymnastics for men. The two-way balance device is of good design .**Researchers recommended** Conducting other studies using the device in artistic gymnastics for women and on its four devices.

Keywords: Assistive device, handstand, artistic gymnastics.

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Journal of Physical Education

Volume 36 – Issue (2) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Introduction

Advanced methods in training and sports today are considered one of the most important ways of success and reaching high levels of performance in sports skills. Auxiliary devices and tools are considered important and even necessary training methods in training halls and arenas, as well as special exercises used with auxiliary devices and tools are also among the most important. The training methods followed by the training staff. Physical and motor abilities are also considered among the reasons for the success of the skill. Trainers work to use devices and tools that affect the work and course of the specific skill performance. .(Saharuddin et al., 2018)

The game of artistic gymnastics is one of the sports games that is specific to the performance of sports skills. Some of its skills require very high balance. Rather, the player is required to be stable (2) seconds in some apparatus skills such as the throat, floor, and parallel apparatus, since if the player is not stable during the performance time, the skill is canceled, which This causes a deduction from the technical performance score of (10) points and thus his loss and failure to win. (MANDOOBMAKKIATI & ABED, 2024) & (Bdulkarim, 2024)

The skill of standing on the hands is considered one of the most important skills in the game of artistic gymnastics, which requires the player to hold for (2) seconds on the floor movement apparatus, the parallel apparatus, and the throat apparatus. It is performed on the pull-up apparatus and the handles, and it must be achieved in performing some of its skills and passing through it with the jumping platform apparatus, due to the importance of this skill. And performing it with all devices, (HalahAtiyah et al., 2024) and due to the importance of the skill of standing on the hands and the difficulty of performing it on the devices that the player must hold on to, (Mahmood et al., 2023) and the difference between standing on the hands on the ground movement mat and on the parallelepiped and ring device, and because each device differs in support with the palms, which affects the balance of the body and its remaining in one line of action, in the mat of movements On the floor, (Muhsen & Mohsin, 2020) the handstand is based on the hands, while standing on the parallelepiped apparatus is held with the palms and is more anxious. As for the throat apparatus, it is one of the most difficult because the player needs high balance since the apparatus is mobile and unstable. Hence lies the importance of the research, (Hammood et al., 2024) as the researchers decided to design and manufacture An auxiliary device that takes into account the skill performance of the handstand skill on some artistic gymnastics devices in an attempt to accelerate the improvement of the skill performance faster and better. From this standpoint, the researchers turned to the idea of designing and manufacturing a training device as well as preparing special exercises using the device that may contribute to the development of some motor abilities. Special and technical performance of the skill, (Abdulhussein et al., 2024)as a new method that serves the above-mentioned training

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P-ISSN: 2073-6452, E-ISSN: 2707-5729
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purpose more efficiently, as the work of the trainer at the present time is no longer dependent on preparing and applying different educational or training curricula only, as emphasis has also been placed on using training devices and means that help him in training the skill(Mousa, A. M., & Kadhim, 2023) ,,**As for the search problem** It manifests itself in overcoming the process of teaching the performance of a skill under research and overcoming the difficulty of performance through the use of training tools in special exercises. .(Kadhim, 2024b) Much scientific research has addressed the importance of using assistive devices and tools, and the two researchers agree with many studies, including one**) Mohsen and Majed, 2022 (**The researchers concluded that the proposed instantaneous feeding device is useful in teaching the skill of the pneumatic posterior curls, as the experimental group outperformed the control group (Abdulhussein et al., 2024) .As for studying**) Abdul Wahid et al., 2019 (**The researchers concluded that using a flexibility development device helps in improving and teaching the cartwheel and back arch skills on the floor movements in artistic gymnastics for women, and a study**) Drunk and Shihab, 2023 (**The most important conclusions were that using the assistive device has a positive effect in teaching the spindle skill on the pommel horse device. As for the study**) Shehayeb et al., 2022 (**The researchers concluded that the assistive device had a clear impact on learning the skill and that the device had good specifications and could withstand the players 'performance. As for the study (ZidaneHmmood et al., 2024))Jihad et al., 2023 (**The researchers concluded that assistive devices and tools have a major role in developing the performance of the skills under research on the throat apparatus for applicants (Kadhim, 2024a)

Research objective It is to know the effect of using a two-way assistive balance device on some motor abilities and improving the performance of the handstand skill in artistic gymnastics for men

Force the search The use of an auxiliary two-way balance device has a positive effect on some motor abilities and improving the performance of the handstand skill in artistic gymnastics for men.

Method and tools :

The researcher used the experimental method with a single sample design to suit the research problem, as the research population was defined as (10) players belonging to the training centers of the Baghdad Governorate, Al-Karkh/Al-Rusafa Gymnastics, and affiliated with the Central Iraqi Gymnastics Federation, and their ages range between (9 - 13) years, and they are the junior category (Muwafaqobayeskhudhair, 2024). As for the research sample, it is (5) Players in Baghdad, Al-Rusafa, for the training center in the (Al-Amana) gymnastics hall. The researcher chose the center on the side of Al-Rusafa due to its proximity to his place of

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P-ISSN: 2073-6452, E-ISSN: 2707-5729
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residence and the use of time and transportation to the hall to follow the course of the curriculum prepared by him in using the auxiliary device. (AbdulsalamWaheeb et al., 2024) and (Kadhim, 2023b) The research sample was chosen intentionally for the purpose of controlling extraneous variables. All of them (the hall, the coach, the training time, and the equipment) were as much as possible, (Adnan et al., 2024) while the exploratory sample consisted of (2) players from the training center in Baghdad/Al-Karkh, and the research sample constituted (50%) of the research community. and exploratory (20%) (Salih, I. H., Yaseen, A. M., Naseer, K. J., Attieh, A., & Kadhim, 2024)

Table (1)

Shows the experimental design of the research group

the group	Pretest	Pilot program	Posttest
Research group	Test performance of the skill on a 1-device floor mat 2- Parallel 3- The throat	The program was prepared by a researcher For auxiliary two-way balance device	Test performance of the skill on a 1-device floor mat 2- Parallel 3- The throat

Table (2)

Shows the sample size and percentages

T	the society	the number	Percentage
1	research community	10	100%
2	The research sample	5	50%
3	Exploratory sample	2	20%

.The researcher used research methods (Arabic sources and references, observation and analysis, tests and measurement, the Internet), as well as (tools and devices, including a stopwatch, a

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P-ISSN: 2073-6452, E-ISSN: 2707-5729
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photographic camera, a legal parallel device, a legal throat device, a ground movement mat, and an auxiliary two-way balance device.

Assistive device (assistive bidirectional balance device)

The safest way to learn, develop, improve, develop and train any sports skill is to provide devices and tools that serve the correct performance and placement of the skill, as well as providing appropriate conditions for the skill. (Salih et al., 2024) If these conditions are appropriate, the results from the training and educational process will be faster and more secure. For this reason, the researcher assisted and consulted. The supervisor, after presenting the idea to him, developed an idea to design a device in a new manner that would address the problem of training the skill (handstand) on gymnastics equipment(Ali et al., 2023).

The idea of the research will address the design and manufacture of a new, innovative assistive device that helps players develop and improve their level and skill performance on artistic gymnastics equipment by performing the handstand skill with high balance, by correcting the special conditions of stability for them to reach the ideal position, as well as developing motor abilities such as (flexibility - agility - Compatibility - balance.((NaseemJoudah, 2024)

After completing the idea for the researcher and supervisor about the device's working mechanism and its purpose, the device was designed in a preliminary three-dimensional form and the appropriate measurements were set in accordance with the physical measurements of the target sample. The device was drawn and the parts that would be used were determined, and accordingly the device was designed as shown in the following figure.(Al-Ali & Abdulzahra, 2024)

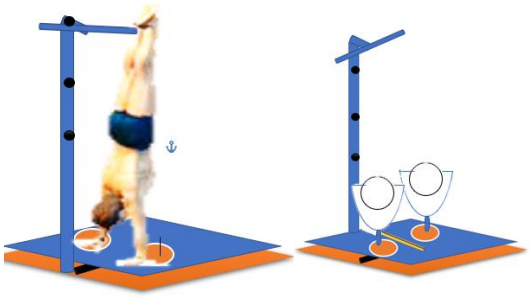

Figure (1)

Explains the theoretical design of the device

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Device components:

Bidirectional balance device

How to design the device :

After studying the problem and its importance, initial solutions were developed through a preliminary design of a device that solves the problem through a model with measurements that suit all players in terms of weight, height, and age. It was designed with good durability to bear high weights and moving parts, not fixed ones, to suit all ages, (Abdulkareem et al., 2024) in addition to paying attention to safety by adding and packaging iron parts. With wood, sponge and leather cloth

Components of the device Bidirectional balance

-1Fixed iron base:

It consists of iron with a height of 4 cm, a width of 8 cm, and a length of 1 square meter. It is square in shape and free of any additions inside the square, in order to allow freedom of movement for the other upper piece of iron and not to hinder its movement. A piece of iron with a height of 4 cm, a width of 8 cm, and a length of 25 cm is added to it from one of its sides in the middle, to increase its stability on the surface. The ground and to install the support piece for the player on the device, as shown in the following figure

Figure (2)

Shows the fixed base

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P-ISSN: 2073-6452, E-ISSN: 2707-5729
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2 - Movable iron base

It is a base with the same specifications as the fixed base and with the same measurements, but with a piece of iron added from the inside, fixed in the form of + from the middle of each side of the movable base.

An iron crossbow with a diameter of 15 cm and a length of 1 meter is attached to it from the inside, and two fixing holes are added to it from the top on each side. These holes are for fixing the movable ring and a movable circular base. As shown in the following figure

Figure (3)

Shows the moving base

3 - The wooden base

It is a wooden base with a height of 2 cm and a width of 1 square meter. It is fixed over the movable iron base and contains four slots above each of the four slots, so that its size does not hinder the work of the device installed on it from above for both the throat and the circular base in addition to the movable parallelepiped.(Al-Bakri & YasirWajeehQaddoori, 2024)

A piece of sponge, 5 cm high and 1 square meter wide, is placed over the wooden piece with a leather cloth attached to it to absorb shocks and provide protection from injury to the player, as shown in the following figure .(Kadhim, 2023a) and .(HalahAtiyah et al., 2024)

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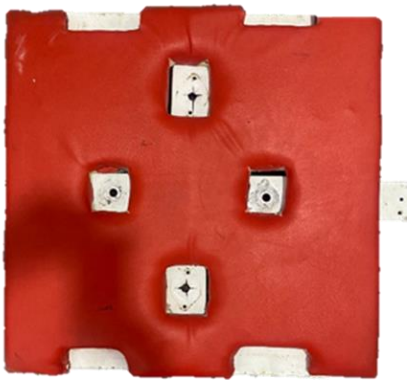

Figure (4)

Shows the wooden base

4 -The supporting column

It is a piece of iron, 8 cm wide, 4 cm high, and 2 meters long. It is fixed on one side to the side piece fixed to the fixed base, and on the other side, a piece of iron is fixed to it at an angle of 90 degrees. The same measurements, but with a length of 25 cm.

Player body stabilization column

It is a piece of iron fixed transversely to the end of the supporting column, with a width of 8 cm, a height of 4 cm, and a length of 50 cm.

Moving mullet

It is a mullet with a diameter of 10 cm and a length of 20 cm, at the end of which is a mullet attached to it from the middle by 15 cm. It is fixed from the middle of the mounting column with an artistic clamp so that it is not fixed, but rather has a simple, tender movement.

As shown in the following figure

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P-ISSN: 2073-6452, E-ISSN: 2707-5729
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Figure (5)

Shows the supporting column and the body stabilizing column

5 -The moving circular base

This piece consists of

A - An iron plate with a width of 12 cm square, to which a piece of steel with a diameter of 3 cm and a length of 5 cm is fixed in the middle.

B- A circular piece of wood, 2 cm thick and 60 cm in diameter, fixed over the iron pallet and covered with leather cloth, as shown in the following figure.

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P-ISSN: 2073-6452, E-ISSN: 2707-5729
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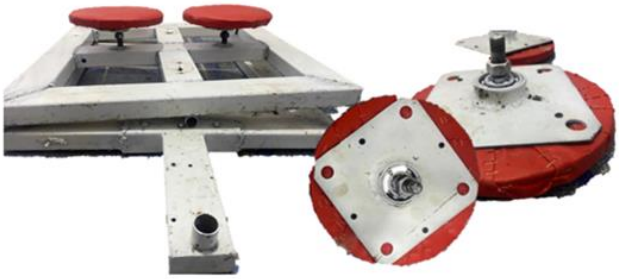

Figure (6)

Shows the moving circular base

6 - Iron parallel bars

Two pieces of iron bars with a diameter of 10 cm and a length of 1 meter, installed in an artistic manner that does not hinder installation on the movable base at a height of 20 cm, as shown in the following figure.

Figure (7)

Shows the iron parallel bars

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P-ISSN: 2073-6452, E-ISSN: 2707-5729
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7 - The moving throat

It consists of two pieces of semicircular iron, one half of which is fixed inside the second half in an artistic way. The first half of the circle is fixed from the middle on a free-moving ball bearing, so the movement is so that the half is 360 degrees to the side, while the second half is fixed to two ends of the first half in a free manner, so that its movement is 360 degrees to the top by half. The diameter is less than the first, as shown in the following figure.

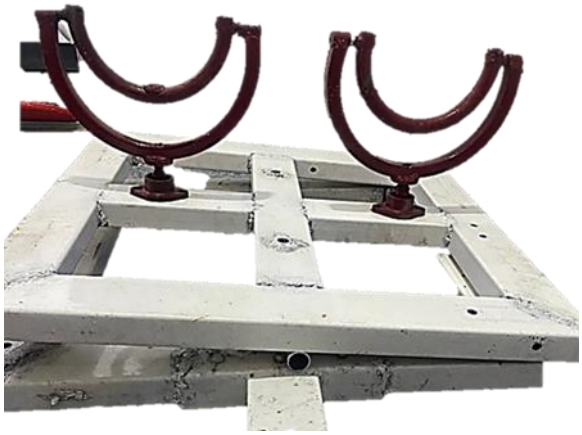

Figure (8)

Shows the moving throat

8 -Electronic part

This part consists of a 6V battery connected to two wires at the ends of which there are two sensors mounted on the fixed iron base in the middle of each side. If they are pressed, they give an alert by emitting a sound from the loudspeaker mounted on the supporting column mounted on the fixed iron base, as in the following figure.

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P-ISSN: 2073-6452, E-ISSN: 2707-5729
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Figure (9)

Shows the electronic part

How the device works:

The device was designed to simulate some artistic gymnastics devices for men in learning, developing and improving the skill of standing on the hands and good balance on the device. When using the device using 1- the circular wooden piece, the player places the palms on the circular piece and leans well, so the player is asked not to touch the two sides of the device. The fixed iron piece maintains a safe distance for balance so that there is no alert from the electronic device through the loudspeaker. Each of the three pieces used, the circular wooden piece, the parallelepiped piece, and the ring, all have two movements in balance, either to the sides or in front of the back, and this is done through the mullet fixed to the middle of the base from the bottom. This is done by changing its direction, either forward or backward, and also trying to attach the legs to the upper piece of the device.

Determining motor abilities:

The researcher prepared a form that would determine the motor capabilities of the skill (handstand) on some artistic gymnastics equipment for men and presented it to the experts (Appendix 1), based on sources and studies related to artistic gymnastics for men and motor

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P-ISSN: 2073-6452, E-ISSN: 2707-5729
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learning and personal interviews with the supervisor and the experts. Jurisdiction and in light of their opinions, the movement was determined.

Table (3)

Shows the motor abilities selected by castration

T	Capacity	Test name	Number of approvers	Non-consent	The ratio	It works or it doesn't fit
1	Agility	Spiral running test	2	4	%33.3	Does not fit
		Test of running zigzag between the signs.	1	5	%16.6	Does not fit
		Standing prone prone test (Bureby test)	Zero	6	zero%	Does not fit
		.Shuttle running.	2	4	%33.3	Does not fit
2	Motor compatibility	Numbered circuit test	Zero	6	hawk%	Does not fit
		Running and rolling with the ball between (4) monuments	1	5	%16.6	Does not fit
		Throwing the ball up and receiving it with the other hand	Zero	6	zero%	Does not fit
		Pass the rope from the bottom of the feet 5 times	3	3	%50	Does not fit

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P-ISSN: 2073-6452, E-ISSN: 2707-5729
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3	Balance	Walking on a balance beam	5	1	%83	Repair
		Stand with your foot on the ball	2	4	%33.3	Does not fit
		Balance by holding the stick and standing on one foot on the balance beam	2	4	%33.3	Does not fit
		Standing test on the instep	6	0	%100	Repair
		Standing holding the stick (shoulder flexibility)	2	4	33.3	Does not fit

In light of the above table, it was agreed on the tests that will achieve an agreement rate of **(%87.5**)Above, the tests are:

Motor ability tests

First: moving balance test

Test name : Walking on a balance beam. (Sports Library(

Purpose of the test : Measuring balance through movement

Tools needed :A balance beam, 10 cm wide, 4 m long, and 3-5 cm thick, flat ground, stop watch.

Performance Description : Upon hearing the signal to start, the experimenter walks on the balance beam to the end, then turns around and returns again to the starting point at maximum speed, without any part of the body touching the ground outside the beam.

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Calculating grades : The time spent walking on the crossbar is calculated to less than (1/10) of a second. When any part of the body touches the ground outside the crossbar, a second is added to the time spent.

Figure (10)

Shows the moving balance test

Second: Static balance test

Test name : Standing test on the instep **(Hassanin, 1982)**

Purpose of the test : Measurement of static balance, when the tester stands on the ground with the instep of the foot.

Tools needed : Stop Watch.

Performance Description : The tester takes a standing position on one foot, preferably the foot of the rising leg, then places the foot of the other (free) leg on the inner side of the knee of the leg on which he is standing. He also places the hands in the middle. When the signal is given, the tester raises his heel off the ground and keeps By balancing for as long as possible without moving the tips of his feet from their position or touching an obstacle on the ground.

Calculating grades : The best time is calculated for two attempts, which is the time that begins from the moment the heel is lifted off the ground until some performance errors are committed and balance is lost.

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P-ISSN: 2073-6452, E-ISSN: 2707-5729
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Figure (11)

Shows static balance test

Exploratory experiment

The researcher conducted a reconnaissance experiment with the help of the assistant work team to determine the effectiveness of the exercises using the assistive device. The exploratory experiment was conducted in the gymnastics hall of the Al-Amana Sports Club in Baghdad on a sample of (2) players from outside the research sample, and its goal was to test the validity of using the special exercises. In its initial form on the players, in addition to knowing whether the assistive device used is suitable for training and developing the skill under research. It became clear after taking into account the opinions of the trainers present in the hall that the exercises on the device achieve the purpose of the study.

Pre-test of handstand skill

Field research procedures:

Skill tests

-1The purpose of the test :Measuring performance ability and knowing the final score that the player obtains for performing a handstand on the parallel bar

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Test tools : Low-height legal parallel device, foam mat with a height of (20) cm,

Test evaluation The test is evaluated according to the technical performance according to what the teachers agreed upon by calculating the player's errors, as the highest score he obtains on the device is (10) degrees.

Test procedures The tested player takes the prepared position, climbs onto the device, and leans on the two bars. From the correct swing position, he is asked to perform three swings, and then he performs the skill with its correct movement paths. Stabilization (2)s

To register : The evaluation is carried out by four referees and according to an internal evaluation of the referees. The average of the two scores is taken and divided by (2) for the purpose of extracting the player's final score. The performance evaluation is made up of (10) scores according to agreement and as shown in the following figure.

Skill tests

-2The purpose of the test :Measuring the ability to perform and knowing the final score that the player obtains for performing the handstand on the throat apparatus

Testing tools: a low-profile legal ring device, distance from the rings to the ground (20) cm, a sponge mat with a height of (20) cm,

Test evaluation The test is evaluated according to the technical performance according to what the arbitrators agreed upon by calculating the player's errors, as the highest score he obtains on the device is (10) degrees.

Test procedures: The tested athlete takes the prepared position, climbs onto the device with the help of the trainer, holds the rings from the anchor position, and then performs the skill with its correct movement paths. Stability (2) seconds

To register : The evaluation is done by four referees and according to an internal evaluation of the referees. The average of the two scores is taken and divided by (2) for the purpose of extracting the player's final score. The performance evaluation is made up of (10) scores according to agreement and as shown in the following figure.

Skill tests

-3The purpose of the test Measuring performance ability and knowing the final score that the athlete obtains for performing a handstand on a floor movement mat

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Test tools: Floor movement mat device

Test evaluation The test is evaluated according to the technical performance according to what the teachers agreed upon by calculating the player's errors, as the highest score he obtains on the device is (10) degrees.

Test procedures The tested player takes the prepared position, standing and raising the arms high, and then performs the skill with its correct movement paths. Stability (2) seconds

To register The evaluation is carried out by four referees and according to an internal evaluation of the referees. The average of the two scores is taken and divided by (2) for the purpose of extracting the player's final score. The performance evaluation is made up of (10) scores according to agreement.

The researcher relied on the vocabulary prescribed and developed by the trainer, while the training curriculum was developed on his own and based on the opinions of the supervisor of the specialty. (Kadhim, M. J., Shihab, G. M., & Zaqair, 2021) He did not change the vocabulary developed, and used exercises for using the device in the curriculum developed for the sample. The experiment lasted for a period of (two months) and included (24) A training unit of (3) units per week, and the time of the total unit was (150) minutes, the time of the device from the main part of the unit, with a time period of (35) minutes for the parallel device. The researchers also relied on the principle of (repetitions), and were keen that the curriculum Which was developed by him and the coach and in accordance with scientific foundations and principles. (jawad kadhim, M., & Mahmood, 2023)

After completing the application of the vocabulary of the training curriculum for the handstand skill ,**The posttest was conducted** In the same manner as was done in the pre-test, the researcher created the atmosphere and conditions in which the pre-tests were conducted. Then the two research skills were photographed, and the evaluation was done directly by (see Appendix 3) of the (specialization) referees for gymnastics, and the evaluation score was approved as a range of (10) degrees for the skill .The referees adopted the technical law of the game by excluding the highest score and the lowest score and adopting the arithmetic mean of the two middle scores from the referees 'scores. Divide it by two to extract the student's final score on the skills test (Jawad Kadhim, M., & Salman Ahmed, 2016)

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Results

Table (5)

It shows the values of the arithmetic means and standard deviations for the pre- and post-group variables in the research variables

Statistical features / Search variables		measruing unit	Pretest		Posttest	
			Q	±s	Q	±s
mahari	Standing on the mat of movements	degree	6.98	192.	8.18	216.
	Stand on a parallel bar	degree	5.86	251.	6.82	130.
	Stand on the throat device	degree	5.16	541.	6.56	517.
Kinetic	Static balance test	Th	9.73	4.30	12.3	3.27
	Moving balance test	Th	6.98	881.	7.86	433.

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Table (6)

It shows the differences between the pre- and post-tests, the T-test value, and the significance of the group in the research variables

Statistical features Search variables	measruing unit	F	A F	value (T(Calculated	The real moral	Type of significance
Standing on the mat of movements	degree	1.20	.255	10.5	000.	spiritual
Stand on a parallel bar	degree	.960	.230	9.324	001.	spiritual
Stand on the throat device	degree	1.40	.764	4.093	015.	spiritual
Static balance test	Th	2.61	1.56	3.73	020.	spiritual
Moving balance test	Th	1.22	.983	2.77	050.	spiritual

*Significant at the confidence level (0.05) if the error rate ≤ (0.05).

Discussion

The results presented in Table (6) and Figure (7) for the skills of standing on the hands on the movement mat, parallel bars,. (Salman et al., 2022) and the throat apparatus showed that there were significant differences between the pre- and post-tests of the research group. (Khlaif & Shnawa, 2022) The researcher attributes the reason for the development of the skill to the innovative assistive device used as a training method, as it is added to the program. (Ahmed Amer Abdul Hussein, 2020) Training for the coach, as the device mainly targets balance. (Nizar, et al., 2014) indicates that the reason for the weakness in the performance of these skills is that most of the teams 'training is conducted on legal devices without serious assistance from educational and training assistance devices. (Karam Salam Ismaeil & Kadhim, 2023) Abdel Wahed also indicates, et al., 2019, p. 27) noted that sports witnessed a significant development in the competitive level of skill performance in individual games, which made coaches search for

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the best ways to innovate in the correct learning methods to raise the level of competitive technical performance. (Abdalah & SalehRadhiAmesh, 2024) Assistive devices also have a major role in learning sports skills, which require many repetitions to reach the mechanism in performance, as assistive devices achieve a good result and reduce the number of repetitions. (Mahmood et al., 2023) They also achieve the correct paths for performing any skill, as they make work in magazines correct in all situations from elementary school. . (Ahmed Fadhil Farhan Mohammed Jawad Kadhim, 2016) And the main thing until the final. It also adds to the player a new educational method outside the routine of the educational units and adds a good psychological factor to continue the training. This is what is confirmed by (Shehaib et al. 2021, p. 92) and the researchers agree with him that the game of artistic gymnastics for men is one of the games that needs many psychological factors. Why this game (Y. F. Mohsen et al., 2024) The game consists of a special motor performance for its skill on multiple gymnastics equipment“ .Also, reaching the skill performance to the highest level is considered an achievement for the coach, and this is what is confirmed by (Yas et al., 2022) that skill performance in the sport of gymnastics is the basic factor on which the achievement is based ”. (Kazim, M. J., Zughair, A. L. A. A., & Shihab, 2019)The researcher agrees. What was indicated by (Jamal and Shehab, 2023, p. 414) is that the artistic gymnastics game is one of the important individual games and for which coaches must provide many assistive devices in the training hall, in addition to the necessity of innovating tools Assistance to all gymnastics equipment, which facilitates the learning process ”.As for In addition to what was mentioned in the same table and the same figure regarding the arithmetic means and standard deviations, (Abed et al., 2022) it is noted that the static equilibrium developed more than the moving equilibrium. The static equilibrium in relation to the media, the time of performance for time increased with a higher time for equilibrium, but with the moving equilibrium, (Y. F. Mohsen et al., 2024)

the time in relation to time decreased by an acceptable percentage, and this confirms that the auxiliary device It may have an impact on some motor characteristics, as (Shehayeb et al., 2022) and (Hammood et al., 2024) and (Abdulhussein et al., 2024) pointed out that auxiliary devices and tools are an important means of advancing the development of the player’s movement through movement paths that lead to the success of performing the skill with high fluidity and with less effort and time, in addition to the development and adaptation of motor and physical abilities in accordance with the performance process. (Mousa, A. M., & Kadhim, 2023)“ . The trainer must stimulate the work of the muscles working in skill performance through some exercises on some tools and aids, as well as the correct paths of performance through neuromuscular work, that is, the correct compatibility of the performance process. (Abdul Reda, et al., 2022) and (Sakran & Shehab, 2023)

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Conclusions and recommendations

-1 The two-way auxiliary balance device has clearly affected some motor abilities and improved the handstand skill on some artistic gymnastics equipment for men.

-2 The assistive device is carefully designed and meets the paths of performing the handstand skill, as well as the durability of its materials

-3 The researchers suggest using the device in artistic gymnastics for women, especially on the balance beam

Appendices

Attachment (1)

Names of experts for selecting motor abilities

Workplace	Specialization	Name of expert	T
University of Baghdad/ College of Physical Education and Sports Sciences	Gymnastics - Biomechanics	Prof. Ismail Ibrahim	1
University of Baghdad/College of Physical Education and Sports Sciences	Gymnastics - Learn to move	Prof. Dr. Tariq Nizar	2
University of Baghdad/ College of Physical Education and Sports Sciences	Gymnastics - tests and measurement	Prof. Dr. Zahra Shehab	3
University of Baghdad/ College of Physical Education and Sports Sciences	Gymnastics - learn to move	A. M. Dali Abdel Wahed	5
University of Baghdad/ College of Physical Education and Sports Sciences	Airplane - test and measurement	Prof. Dr. Khalil Sattar	6

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Attachment (2)

Names of residents

Workplace	Arbitration certificate	the name	T
Al-Nisour College /Physical education and sports sciences	Third degree ruling	Abdullah Jamal	1
Baghdad University /College of Physical Education and Sports Sciences	Third degree ruling	M. M. Ali Saadi	2
Central Federation of Gymnastics	Third degree ruling	M. M. Samer Raad	3
Central Federation of Gymnastics	First instance judge	He is not mighty	4

Attachment (3)

Weekly training unit

Group: Research Unit time: (150) minutes

Objective: Developing the technical performance of the skill (Handstand) Number of group members: 5

Location: Training hall (Al Amana Club(

the week	Unit	the time	Differentials	the shape
The first	**The first is Saturday**		**Explaining the skill and everything related to performance requirements, clarifying the work of the assistive device, and everything**	

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week		floor	35 D	related to the correct performance of the skill according to the position of the body and the importance of motor abilities in performance, with an emphasis on the correct support of the palms.	
	the second Mon day	parallel	35 D	Lean forward on the auxiliary parallel device, stabilize the feet with the upper stabilization pads, emphasize the tension of the back and hip muscles, and emphasize the straightness of the arms.	
	Three Wednesday	throat	35 D	Properly relying on the two rings, stabilizing the feet, and emphasizing the correct direction of the palms outwards by relying on the two rings.	

***Repetitions as permitted by the time of the educational unit**

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the week	Unit	the time	Differentials	the shape
The first week	The first is Saturday		Explaining the skill and everything related to performance requirements, clarifying the work of the assistive device, and everything related to the correct performance of the skill according to the position of the body and the importance of motor abilities in performance, with an emphasis on the correct support of the palms.	
		floor 35 m		
	the second Monday		Lean forward on the auxiliary parallel device, stabilize the feet with the upper stabilization pads, emphasize the tension of the back and hip	

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				muscles, and emphasize the straightness of the arms.	
		par allel	35 D		
	Three Wednesday			Properly relying on the two rings, stabilizing the feet, and emphasizing the correct direction of the palms outwards by relying on the two rings.	
		thro at	35 m		

*Repetitions as permitted by the time of the educational unit

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