



The Effect of Using an Assistive Device in Learning the Walkover backward Skill on the Floor Exercises in Women's Artistic Gymnastics

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Abstract

The aim of the study was to identify the effect of using an assistive device in learning the Walkover backward Skill on the floor exercise in women's artistic gymnastics. The hypothesis of the research is that there are statistically significant differences in the use of an assistive device in learning the Walkover backward Skill on the floor exercise apparatus in artistic gymnastics. The researchers used an experimental approach with two equivalent groups, a control group and an experimental group, to suit the nature of the problem to be solved. The research community was defined as 10 female athletes aged 9-12 years (junior athletes) in Baghdad al-Karkh who train at the Al-Nusoor Hall in the Workers' Sports Club. The research sample was set at 8 athletes, constituting 80% of the research sample. The researchers used a design of two equivalent groups, a control group and an experimental group, to suit the research procedures. The most important conclusions are that the assistive device plays a major role in helping players learn the back arch skill on the floor exercise apparatus. The use of the assistive device aims to provide safety and protection for players, enabling them to perform the skill with confidence and reassurance, and thus focus on improving their performance without fear of injury. The researchers also recommended the adoption of the device in teaching the skill under study. The device should be used in teaching the Walkover forward Skill on the balance beam and placed in the gymnastics hall for use

Keywords: assistive device, Walkover backward, floor exercise.

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Introduction

Teaching basic skills in individual or team sports is a big task for coaches, because what is built on a mistake will affect the training process later and it will be difficult to correct the mistake at advanced stages (Akbar et al., 2024).

Therefore, the use of all the scientific and technical knowledge of the trainers in communicating the correct way to learn any basic skill with its technical requirements and the required path for its technical performance is very important (ahmed et al., 2026), so it is necessary to use everything that facilitates the correct learning method based on a good foundation that qualifies for the continuation of development in the most difficult performance, and by using devices and aids that add to the learning process suspense and facilitate performance in its early stages of skill learning is very important, as it raises the psychological factor, reduces the injury and reduces the load on the trainer. It accelerates the learning time for skills

Artistic gymnastics is one of the important sports that needs a long period of psychological and physical preparation to learn basic skills, so coaches must use all training and educational methods and methods in it, and artistic gymnastics for women is considered one of the types of gymnastics for women (Rahim and Abdulredha, 2025), as some of its devices are different from other types of gymnastics, including the balance beam and parallel of different heights, and the floor movement mat is considered one of the four types of artistic gymnastics for women, which needs a long time to learn its basic skills. It is considered a key to the rest of his other devices, and the skill of the back bow is considered one of the most important skills on the mat of ground movements, because if the player reaches a good level, she will perform it on the rest of the devices, such as the balance beam and in some stages of the jumping platform.

As for the purpose of the research, it is to use an aiding device in learning the skill of the back arch on the floor movement mat in artistic gymnastics for women, and the research problem is the difficulty of performing basic skills on the floor movement mat device, as the skill needs special positions and correct paths for the arms, torso, shoulders and legs, and that any mistake in these parts of the body that occurs in the learning process will delay the learning time, and therefore this delay will be at the expense of the time of learning another skill and manifest The problem is to raise the process of learning the skill of the back arch and overcome the difficulties and the path of skill performance through the design and use of an assistive device.

Many studies have dealt with devices and assistive devices, which the researchers agree with, including a study (Salma and Lama, 2021), as the study aimed to identify the differences between the results of the pre- and post-tests of the experimental and control groups, as well as to know the differences between the experimental and control groups in the post-tests of the circular waving skill to know the role of the designed mechanical auxiliary mushroom device in learning the skill under study. The study (Mohamed et al., 2022) aimed to design an assistive

device in learning to perform a skill from the back-weighted attachment to the snatch to stand on the hands, and to identify the effect of the assistive device on learning to perform the skill, and the researchers assumed that there are statistically significant differences between the pre- and post-tests of the research group. As for the study (Habib and Amin, 2022), the study aimed to design an auxiliary device to improve the performance of the straight posterior reverse decoupling skill on a parallel device. As for the study (Anmar, 2016), the study aimed to use the assistant device to develop the skill of the Russian on the throat horse device, and the research hypothesized that the assistant device has a positive effect on the development of some of the skill of the Russian on the throat horse device, while the study (Amira et al., 2019) aimed to manufacture an assistant device. To develop flexibility and improve the performance of my skills (cartwell and back arch) on the floor movement mat - to identify the effect of the use of an auxiliary device in developing flexibility and improving the performance of the cartwell and back arch skills on the floor movement mat of women's artistic gymnastics. The research imposed a statistically significant difference in the use of a device that helps in developing flexibility and improving the performance of the cartwell and back arch skills on the floor movements mat of women's artistic gymnastics.

The aim of the research is to identify the effect of using an assistive device in learning the skill of the back arch on the floor movement mat in women's artistic gymnastics

As for the hypothesis of the research, there are statistically significant differences in the use of the assistant device in learning the skill of the back arch on the floor movement mat in artistic gymnastics

Method and Tools

The researchers used the experimental method to fit the research problem, as the research population was identified as (10) young female players aged 9-12 years (juniors) in Baghdad Al-Karkh who train in the Eagle Hall in the Workers Sports Club, while the research sample settled on (8 players) and the research sample constituted (80%). The researchers used the design of the equal control and experimental groups to suit the research procedures.

The researchers used research methods Arabic sources and references, observation and analysis, tests and measurement, the Internet, as well as tools and devices such as a stopwatch, a camera, a floor mat, and an assistive device

How to design the device

The design of any device or aid is a challenge for the trainer or any designer or researcher to solve a research problem, as it reduces 50% of the learning process to simulate the correct paths of skill performance for any skill on any device, so after identifying the problem by the researcher and presenting it to the supervisor from here, special designs were developed by them, which would help in the process of support and assistance and provide the

elements of physical and psychological safety necessary for the process of skill performance of the front and back arch on the mat of movements floor.

After reviewing a large group of designs used by the researchers, firstly, in the training halls and through their scenes through social media sites and international search engines, secondly, the researcher found that all the designs are similar and serve the motor duty, but there is a simple part in each design, and this part serves a specific point or part of the three parts of the skill, whether it was primary, main or final. From this point of view, the researcher sought to design an auxiliary device for some physical abilities and learn the skill of the bow. The back of the floor movement mat in women's artistic gymnastics.

The most important thing in the device is to give the player the physical support and psychological support for the performance, when the player stands in the front direction of the device to perform the back arch, the player stands on her hands and descends on her back on the device, and then pushes her arms to support her back on the sliding platform, which first the device will rotate forward, and when the center of gravity of the body moves from the front area of the device to the second area, the platform will help and through the moving foam rollers, reduce friction with the device and transfer it to the The other side is smooth and a good path to performance. As shown in figure 1.

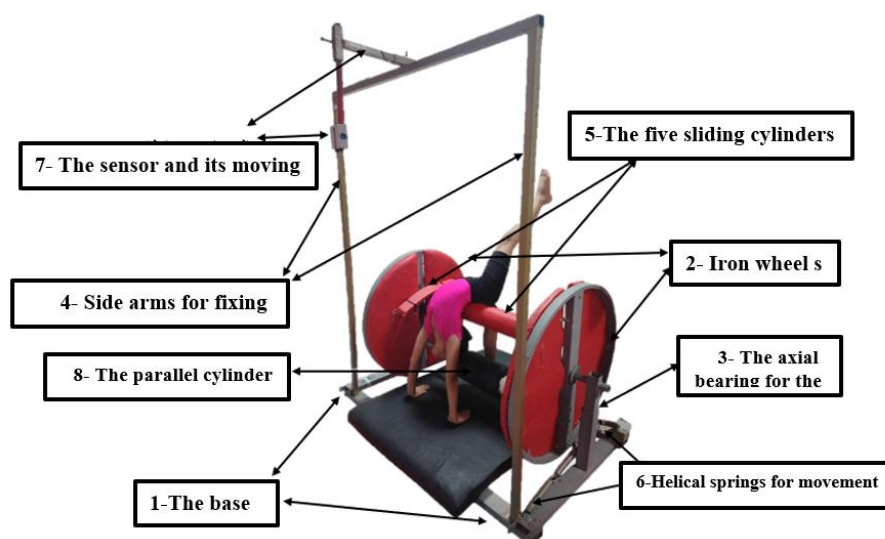


Figure 1. Shows the parts of the Device

Procedures

The researchers conducted a reconnaissance experiment to find out the effectiveness of the ulcerative assistant device's work, as the exploratory experiment was conducted in the gymnastics hall of the Baghdad Workers' Club on a sample of two players outside the research

sample, and its goal was to test the work of the device initially on the female players, as well as to find out whether the device tolerates and agrees to perform education. The skill of the back arch skill on the mat of floor movements in artistic gymnastics It became clear after taking the opinions of the specialized experts from the trainers that the device agrees with the performance of the skill tracks.

Pre-test of the back arch skill on the floor movement mat Skill Test

Objective of the test: to measure the performance capability and to know the final score that the player obtains for performing the back arch skill on the floor movement mat

Test instruments: floor movement mat, clock.

Test Evaluation: The test is evaluated according to the technical performance according to what the referees agreed on in calculating the player's errors, as the highest score obtained by the player on the device is (10) marks.

Test Procedures: The tester takes the preparation position by standing at the beginning of the mat and the arms upwards and starts performing the skill first by leaning on the left leg and lifting the right leg from the hip joint at an angle of 90 D and making an arch with the torso while maintaining the straightness of the hands without flexion and the position of the head is by leaning on the hands and reaching the body to the position of standing on the hands and the hip angle with the legs 180 D and the player starts by leaning on the free leg and maintaining the opening of the legs and descending the other leg with the leg

To register: The evaluation is done by four gymnastics referees according to their internal evaluation, and the average of the two grades is taken and divided by (2) for the purpose of extracting the final grade of the female athlete, and the performance evaluation is of (10) grades according to the agreement and as shown in the following figure

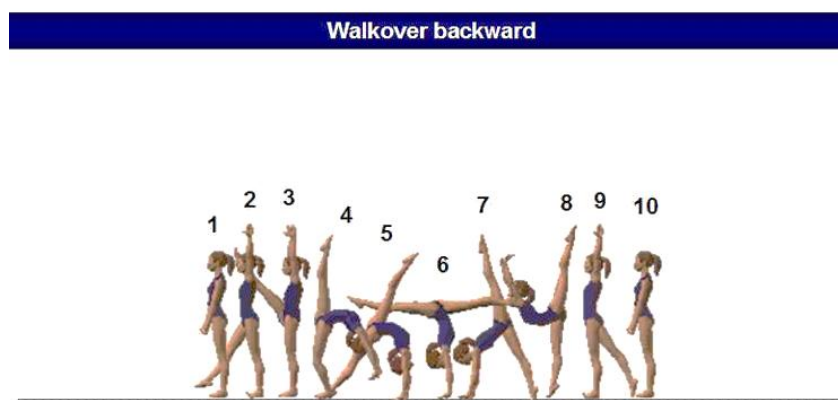


Figure 2. Shows the performance of the Walkover backward Skill on the Floor Exercises

Reward of the research sample

The researchers conducted a sample equivalence test in the posterior arch skill as shown in the following table 1

Table 1. It shows the arithmetic mean, standard deviation, calculated (t) value, error level, significance, differences in arithmetic media, and deviation of differences in the pre-test of the skill of the control and experimental research sample.

Features Statistics Research Variables	n	Unit	Control Group		Experimental Group		T	value	Sig
			M	±SD	M	±SD			
Walkover backward	8	degree	3.22	.221	3.30	.258	.441	.675	non sig

Note. Significant at the confidence level (0.05) if the error rate is $\leq$ (0.05).

The researchers relied on the vocabulary set by the Central Gymnastics Federation on the floor movement mat device , and the assistant device was used in the curriculum set for the sample, and the experiment lasted for (8) weeks and included (16) educational units at a rate of (2) two units per week, and the total unit time reached (120) minutes divided into two devices for each educational unit (floor, beam) and (Floor, Jump) and applied the educational curriculum with a period of time of (35) minutes for the floor movement mat device , and the researchers relied on the principle of (repetition and rest), and they were keen to ensure that the educational curriculum developed by them for the assistive device is in accordance with scientific foundations and principles.

Table 2. Shows a daily learning module of the educational device designed to teach the skill of the back bow

Daily Educational Module				
First Week/Day 1				
reiteration	Course Time (90) minutes		day	unit
What Module Time Allows	Explanation of the skill and how it is performed Knowing all the skill requirements to perform it correctly and explaining to the players the mistakes that hinder their performance. He explained the components of the assistive device that they will perform and learn to perform the skill on, while giving time to the performance of the players and exploring the mechanism of the assistive device's work	Public and private warm-up	25 m	Sunday The first
		Floor Exercises	35 m	
		Another device	35 m	
		Recovery exercises	10 m	

After completing the application of the vocabulary of the educational curriculum using the auxiliary device for the skill of the back bow skill on the mat of ground movements, the

post-test was conducted in the same manner as in the pre-test, where two researchers created the atmosphere and conditions in which the pre-tests themselves were conducted. After that, the skill was photographed, and then it was converted to a calculator and then to laser disks, and then presented to the competent referees. The evaluation grade was approved with a range of (10) points for skill. The referees adopted the International Law of Artistic Gymnastics by excluding the highest and lowest grades and adopting the arithmetic mean of the two intermediate grades from their grades. Divide it into two to extract the player's final score.

Results

Table 3. It shows the arithmetic mean, standard deviation, calculated $t(t)$ value, error level, significance, differences in arithmetic media, and deviation of differences in the pre- and post-tests of the control sample skill.

Variables	n	Unit	Pre-test		Post-testing		F	FD	T	Value
			M	SD±	M	SD±				
Walkover backward	8	reiteration	3.22	.221	5.80	.182	2.57	.287	17.9	.000

Significant at the confidence level (0.05) if the error rate is $\leq (0.05)$.

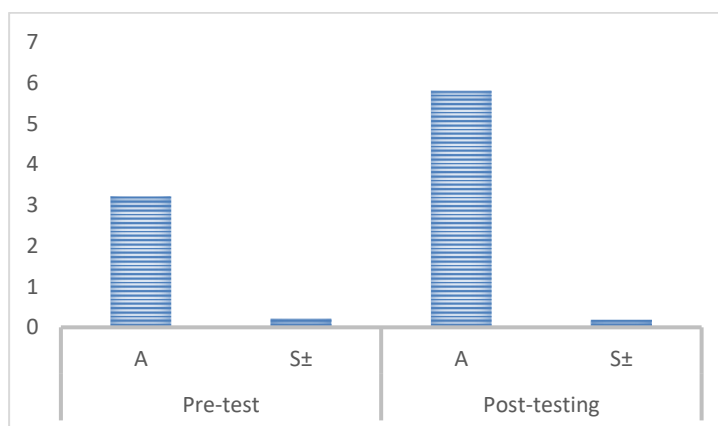


Figure 3. The histogram shows the medians and standard deviations of the pre- and post-test of the control group

Table 4. It shows the arithmetic mean, standard deviation, calculated $t(t)$ value, error level, significance, differences in arithmetic media, and deviation of differences in the pre- and post-tests of research skill for the experimental research sample

Variables	n	Unit	Pre-test		Post-testing		F	FD	T	Value
			M	SD±	M	SD±				
Walkover backward	8	reiteration	3.30	.258	6.65	.129	3.35	.173	38.6	.000

Significant at the confidence level (0.05) if the error rate is $\leq$ (0.05).

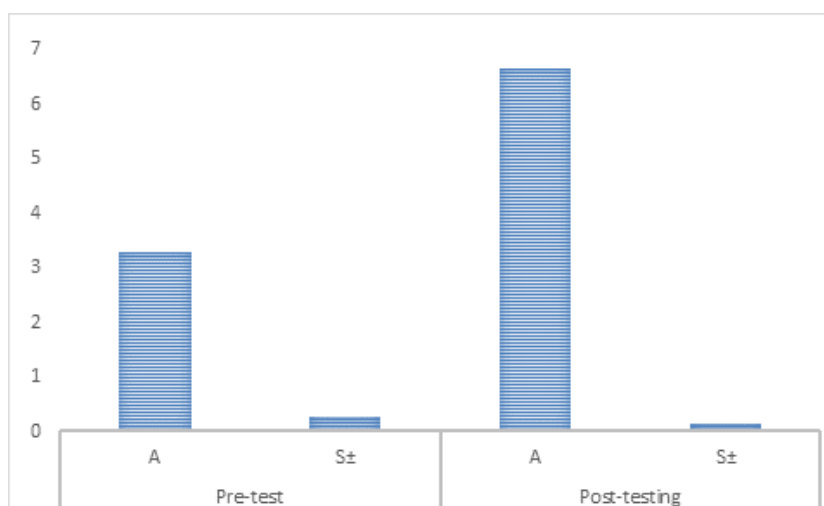


Figure 5. The histogram shows the medians and standard deviations of the pre- and post-test of the experimental group

Table 5. Shows the arithmetic mean, standard deviation, calculated t -value, error level, significance, differences in arithmetic media, and deviation of differences in the two dimensional tests of the control and experimental research samples

Features Statistics Variables	n	Unit	Control Group		Experimental Group		T	value
			M	±SD	M	±SD		
Walkover backward	8	degree	5.80	.182	6.65	.129	7.60	.000

Significant at the confidence level (0.05) if the error rate is $\leq$ (0.05).

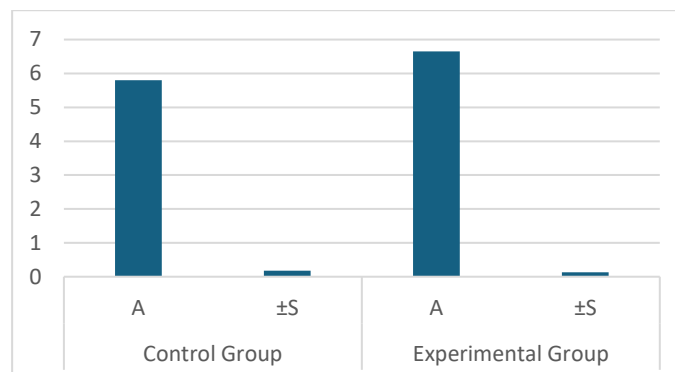


Figure 6. The histogram shows of the medians and standard deviations of the post-test of the two research groups

Discussion

The results presented in Table (4) and Figure (6) of the posterior arch skill in the post-test of the control and experimental groups showed that there were significant differences between the pre- and post-tests. The researchers attribute this to the use of the assistive device, which has proven to be effective in teaching a skill. The back arch on the floor movement mat. This was the reason why the player was put on the right track for skill performance, so that it gave the player a sense of the center of gravity of the body when performing, as well as the range of motion for the flexibility of the torso, the straightness of the arms, and the correct position to pull the body back.

Artistic gymnastics is considered one of the difficult games because it needs physical and motor abilities and in proportion to the age of each player, each stage of the game is a key to the next stage, because its difficult skills are complex movements, depending on basic skills (Nada et al. 2021, p. 155).

The sport of gymnastics depends on the correct technical performance of skills to a great extent, especially skills on the mat of floor movements (Nizar et al., 2014, p. 3).

The assistive devices used in the learning process in the early stages of performance are very necessary for the player and the coach, as they help the player understand the correct path and position that he needs in the performance.

The use of special assistive devices and placing them in basic exercises with special motor paths according to a gradient in the teaching of performance stages plays a major role in simplifying the learning process (Abdul Redha et al., 2021, p. 155).

Assistive tools play a great role in the learning process and mastering many gymnastics skills, as many rely on them in the first steps of learning, as they work to overcome many factors that hinder performance such as the factor of fear and anxiety, as well as facilitating movements by lifting part of the burden on the player in the learning process (Abdul Kazim, 2012, p. 33).

The researchers agree with many studies that praise the role of assistive devices and their presence in the process of learning and training, and this is what Al-Karimi, 2019, p. 20 pointed out, that assistive tools and devices play a great role in improving and developing technical performance and helping the player to understand the motor path that the player goes through, as well as providing the necessary strength to accomplish the main part of the movement, as well as being good safety means.

(Hammadi et al., 2025, p. 196) points out that the skills of the ground movement apparatus are one of the skills that have reached high degrees of difficulty and complexity, so mastering it requires great potentials and abilities from the player, and this in itself has been a burden on the player and the coach because manual assistance is almost unsuccessful in such skills, so the use of training devices and tools can be the best solution to this problem, as it is one of the most important means to achieve this in the sport of gymnastics because it is one of the factors In addition to accelerating the process of player development if used well, in addition to simplifying the training process and facilitating the performance of skills, in addition to having an important and essential role in the process of developing the skill aspect, as (Abdul-Ridha, 2016, p. 76) emphasizes that the use of the proposed device and the variety in the use of exercises on it led to removing boredom from the players and pushing them seriously towards better performance, because the various exercises on the device make the player eager to learn and stimulate different muscle groups according to the type of exercise.

Therefore, sports skills in some individual games require physical and motor qualities to facilitate the process of performing the skill. It also requires the teacher or coach to use more than one strategy, method and method to reach the level of mastery and avoid injury (Shehab et al., 2025, p. 292)

Conclusions

According to the results, the researchers concluded the following:

1. The assistive device plays a great role in helping the players to quickly learn the skill of the back bow on the floor movement mat
2. The use of the assistive device aims to provide the factor of safety and protection to the female players, enabling them to perform the skill with confidence and confidence, thus focusing on improving their performance without fear of being exposed to injuries.

Recommendation

1. The need to adopt the device in teaching the skill under study
2. Use the device to teach the skill of the front arch on the balance beam device and place it in the gymnastics hall to benefit from it.



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