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SPECIAL ISSUE ARTICLE

The Effect of Specialized Exercises Using an Innovative Assistive Device for Motor Balance and Learning the Tucked Forward Roll on the Balance Beam

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Abstract

The science of women's artistic gymnastics is continuously evolving, driven by a constant pursuit of excellence and a commitment to surpassing physical boundaries. The sport has witnessed significant and notable advancements in the level of technical performance, leading to an overall improvement in artistic execution. This progress is directly attributed to scientific and technological developments in apparatus design, supportive tools, and methods for teaching and developing skills. The objective of this study was to design specialized exercises and examine the impact of these exercises, using an innovative supporting device, on motor balance and the acquisition of the tucked forward roll on the balance beam in women's artistic gymnastics. The research hypothesis proposed that there would be statistically significant differences between the pre- and post-test scores of the experimental and control groups across the research variables. It also anticipated statistically significant differences between the post-test results of the two groups in the studied variables. The researchers employed an experimental methodology with two groups (experimental and control), as this approach was appropriate for the nature of the problem under investigation. The research population was intentionally selected and consisted of 428 third-stage female students. The sample was randomly selected from Section (A), which included 23 students. From this section, 10 students were randomly assigned to the experimental group and 10 to the control group. The researchers concluded that the specialized exercises using the supporting device contributed effectively to skill acquisition. Moreover, the innovative supporting device played a significant role in enhancing both static and dynamic balance abilities among the participants, and this achieves one of the sustainable development goals of the United Nations in Iraq which is (Quality Education).

Keywords: Special exercises, Tucked forward roll skill, Balance beam

1. Introduction

Artistic gymnastics for women is continuously evolving driven by the pursuit of excellence and the commitment to pushing physical boundaries. Gymnastics is a sport that requires precision and a high level of focus during performance, and it is considered one of the most challenging and risky sports. The sport of gymnastics has undergone significant development in skill performance levels, which has led to an overall enhancement of competitive technical performance in recent years. This progress is the result of scientific and technological advancements in equipment, auxiliary tools, and methods of skill instruction and within this dynamic context, the integration of innovative auxiliary equipment has emerged as a key factor in enhancing motor abilities and refining the fine skills required to master the balance beam. This introduction delves into a series of carefully designed specialized exercises aimed at

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harnessing the capabilities of an innovative assistive device, with a particular focus on the complex art of forward and backward rolling on the balance beam. Through revealing the synergies between technology and training methodologies our exploration aims to shed light on a transformative path toward enhancing efficiency and artistic expression in gymnastics apparatus. There are numerous fundamental scientific principles that play a crucial role in effectively utilizing these devices to elevate the technical performance level of the athlete on artistic gymnastics apparatus.

The importance of this research lies in the use of specialized exercises involving an innovative assistive device that supports both the athlete and the instructor by accelerating the learning process and achieving the desired skill level within a reasonable time.

The research problem stems from the fact that the balance beam provides a very narrow surface for performance, requiring the gymnast to maintain an exceptionally high level of balance—both static and dynamic—in order to stay on the apparatus without falling. As a result, students often receive low scores in examinations due to their difficulty in performing skills with sufficient precision. Therefore, the researchers proposed the introduction of a supporting device designed to enhance both motor and skill-related performance variables.

Numerous studies have addressed the use of specialized exercises and assistive devices. For example, Hamza et al. (2022) concluded that assistive tools and devices play a significant role in developing the performance of skills under study on the rings apparatus among advanced gymnasts.

Similarly, Saeed et al. (2023) emphasized the impact of specialized exercises using devices and tools on learning skills, particularly in floor exercises in artistic gymnastics. Mohammed and Samir (2021) pointed out that the gymnastics device is of high quality and beneficial within the learning process of artistic gymnastics. The researchers recommended the local manufacturing of equipment and tools as they are more cost effective compared to imported ones.

Research Objectives:

- To develop specialized exercises using an assistive device on the balance beam in women's artistic gymnastics.
- To identify the effect of specialized exercises using the innovative assistive device on motor balance and the learning of the forward roll skill on the balance beam in women's artistic gymnastics for third year students at the College of Physical Education and Sports Sciences, University of Baghdad.

Research Hypotheses:

- There are statistically significant differences between the pre-test and post-test results of the experimental and control groups in the research variables.
- There are statistically significant differences between the post-test results of the experimental and control groups in the investigated variables.

2. Methodology and procedures

The researchers adopted the experimental method with two groups an experimental group and a control group due to its suitability for addressing the nature of the research problem. Accordingly, the study population was purposefully selected consisting of third year female students totaling 428. The research sample was randomly selected from Section (A) which included 23 students. From this group 10 student were randomly assigned to the experimental group and another 10 to the control group. Three students were excluded from the study due to irregular attendance. The details are presented in the following table:

Table 1. Displays the percentage distribution of the sample.

No.	Population	Number	Percentage
1	Research Population	428	100%
2	Research Sample	23	5,37%
3	Pilot Sample	8	018%

Based on Table 1 which shows the number of the research population, its samples and their percentage distribution and the researchers collected data using various methods including personal interviews, observations, measurements, testing, experimentation and online information sources. The tools used included the static balance test, dynamic balance test and the forward roll skill test on the balance beam. Additionally, the innovative assistive device designed by the researchers was used along with a computer, Canon video cameras and an electronic stopwatch and the researchers conducted the pre-test to ensure the equivalence of the sample as illustrated in the following table (Table 2):

Table 2. Displays the equivalence of the sample in the research variables.

Tests	Unit of Measurement	Experimental Group Arithmetic mean	Experimental Group Standard Deviation	Control Group Arithmetic mean	Control Group Standard Deviation	T-test value	Sig
Static Balance	Second	11,90	1,663	12,600	1,349	1,033	0,315
Dynamic Balance	Second	6,90	1,197	6,80	1,135	0,192	0,850
Forward Roll	Degree	2,30	0.94	1.90	0.73	0.97	0.87

At a significance level of 0.05 with 18 degrees of freedom.

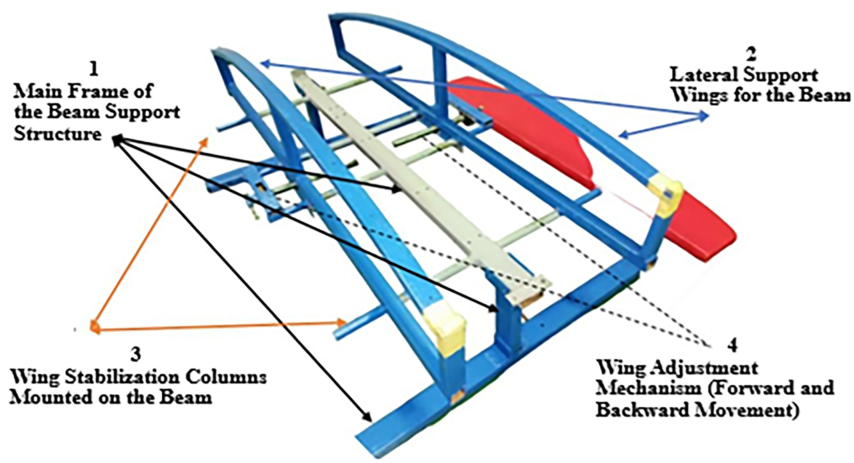

Fig. 1. Illustrates the complete parts of the metal device.

According to Table 2, the researchers found that the differences were not statistically significant based on the calculated *t*-test values. This conclusion was drawn by comparing the *Sig.* values of the research variables, which were greater than the significance level of 0.05. This indicates that the sample was equivalent in both motor and skill-related variables.

Device Design Process:

Following thorough discussions and consultations with field specialists, the researchers examined methods for addressing the study's core problem. An initial solution was proposed by drafting blueprints for a supportive device designed to facilitate gymnastics instruction for both students and instructors. The prototype design was then presented to experts in women's artistic gymnastics, biomechanics, and testing and measurement, and their scientific input was carefully considered and incorporated into the development process.

In designing the apparatus, the researchers prioritized addressing the issue of students falling from the balance beam during the execution of skills—particularly during the forward tucked roll—which often leads to reduced repetition due to time lost in recovery and remounting the apparatus. Accordingly, the device was constructed with specific components intended to support both motor and technical variables.

Device Components and Specifications:

The apparatus consists of the following primary parts, as illustrated in Fig. 1.

Device Components:

1. **The Metal Frame (Structure):**
   It consists of the following:

A. Balance Beam:

The beam is composed of two vertical columns, each with a height of 50 cm. These columns are connected at the bottom, at their midpoint, by a horizontal rectangular iron piece measuring 100 cm in length, 8 cm in width, and 4 cm in height. This lower connector is parallel to the ground. The upper ends of the two columns are also connected by a second horizontal rectangular iron piece measuring 190 cm in length, 8 cm in width, and 4 cm in height, which is likewise parallel to the ground, as shown in Fig. 2.

B. Columns for Supporting the Metal Wings:

These columns consist of four bars made of high-strength steel, capable of withstanding the weight

Fig. 2. Illustrates the parts of the balance beam.

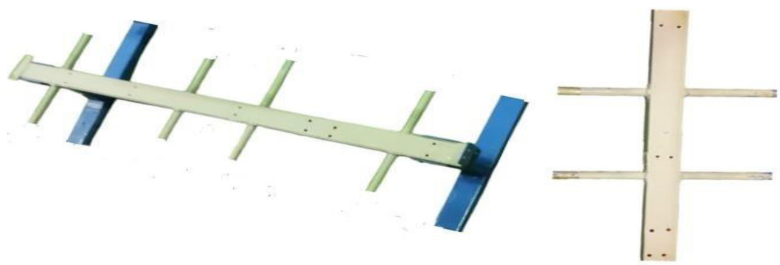

Fig. 3. Illustrates the supporting columns for the metallic wings.

exerted during performance on the device. Each bar measures 100 cm in length and 10 cm in diameter. They are fixed at their midpoint to the underside of the metal beam and are evenly distributed along the length of the beam using identical measurements and spacing, as illustrated in Fig. 3.

C. The Metal Wings:

The wings are constructed from square-section iron, each measuring 200 cm in length, 4 cm in height, and 4 cm in width. Structurally, each wing takes the shape of an arc, with a central height of 50 cm and side heights of 30 cm. The wings are curved in the middle to ensure the gymnast remains within the designated performance path. They are mounted at the base onto the wing support columns in a manner that allows them to move freely forward and backward along the columns, as illustrated in Fig. 4.

D. Axial Motion Levers:

These consist of a central shaft (axle) measuring 60 cm in length and 20 cm in diameter, mounted on two of the wing support columns located at the centre. One end of the shaft is attached to a freely rotating ball bearing, while the other end is secured with an axial nut. When the axial shaft rotates, it propels the wing either forward or backward, as illustrated in Fig. 5.

E. Safety Features of the Device:

The safety system consists of wooden panels shaped to match the contour of the metallic wings. These panels are padded with foam and covered with thick leather fabric to ensure the safety and stability of the students during performance. They are installed over the wings and along the lateral base of the balance beam, as illustrated in Fig. 6.

Fig. 4. Illustrates the metal wings.

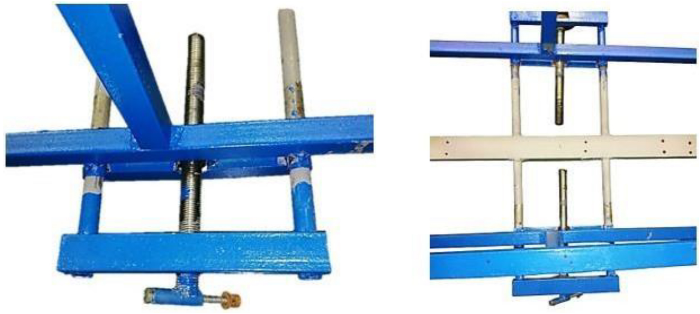

Fig. 5. Illustrates the axial motion levers.

Fig. 6. Illustrates the safety features of the device.

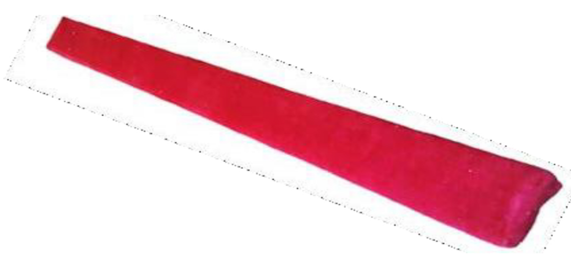

Fig. 7. The wooden balance beam.

F. Wooden Balance Beam:

It consists of a wooden piece measuring 180 cm in length, 17 cm in width, and 10 cm in height. This wooden beam is mounted on the metal frame of the balance structure. The top surface of the wooden beam is initially covered with a thin gelatinous layer, followed by a thick, coarse fabric to prevent the student from slipping during performance, as shown in Fig. 7.

Device Operating Mechanism:

The Skill-Support Balance Beam Wing Apparatus was designed to simulate and guide the student along the correct technical pathway in learning the skill under study. It enhances dynamic balance during movement and improves static balance through correct posture alignment. When using the device, the student leans on the beam and assumes the correct starting position for the tucked forward roll. As the student initiates the skill, she grips the beam and begins the rolling movement. At this point, balance is often lost, and propulsion may shift laterally rather than forward. Here, the device intervenes by providing adequate support and guidance, maintaining the student on the correct path, ensuring proper kinetic transfer, and sustaining both dynamic and static balance throughout the movement. This is achieved through the adjustment of the wings' proximity via the axial shaft mechanism, as illustrated in the following figure (Fig. 8).

Fig. 8. Illustrates the execution method on the assistive apparatus.

The researchers conducted the first pilot study to ensure the proper functioning of the device and to determine the time required for task performance. Additionally, the session aimed to train the assisting team on the testing procedures. This study was carried out on Wednesday, February 7, 2024, with Section (D), involving two students.

After completing the work on the device, the researchers conducted the second pilot study on February 11, 2024, again with Section (D), involving six students outside regular lecture hours. The results demonstrated that the students were able to perform the required skills effectively. Furthermore, this pilot study confirmed the suitability of the device for

Table 3. Displays the curriculum with the tests.

Group	Pre-test	Educational program	Post-test
Experimental Group	1. Static and dynamic balance 2. Forward roll skill on the balance beam	Using the innovative device	Repetition of the same tests
Control Group	1- Static and dynamic balance 2- Forward roll skill on the balance beam	Curriculum approved by the school	Repetition of the same tests

student use and verified that it provided adequate safety during execution.

Motor Ability Tests Used:

The motor ability tests included the dynamic balance test and the static balance test (Palomares et al., 2019).

Skill Test:

Test: Tucked Forward Roll on the Balance Beam

The main experiment began on February 14, 2024, with the support of the assisting team, as outlined in Appendix 2. The researchers conducted the tests for both the experimental and control groups, with assistance from the supporting team. The administered tests included both balance assessments and the tucked forward roll skill. Group equivalence in motor and skill variables was confirmed, as shown in Table 2.

For the control group, the researchers relied on instructional materials, curriculum content, and assessment procedures approved and delivered by the course instructor. In contrast, the experimental group followed an instructional program designed by the researchers, which incorporated the use of the custom-designed assistive device throughout the educational sessions.

The intervention lasted for six weeks and included a total of six instructional units, delivered at a frequency of one unit per week. Each unit had a total duration of 90 minutes. The balance beam segment of the device-based intervention was conducted during the main part of the lesson, with 30 minutes allocated specifically to the use of the apparatus.

The researchers employed the principle of repetition and structured the instructional content according to scientifically grounded curriculum design principles, as detailed in Appendices 1 and 2.

Based on Table 3 the sample was divided into an experimental group and a control group with each group assigned specific tasks and an educational program. After completing the implementation of the proposed instructional curriculum using the specially designed device for performing the forward roll on the balance beam and for developing static and dynamic balance skills among the students, the post test was conducted on Wednesday 20/3/2024 under the same temporal and spatial conditions as the pre-test. The testing took place at 10:30 AM on Wednesday.

The performance of the students in the experimental group was evaluated directly by the subject instructor Prof. Dr. Suzan Salim from the University of Baghdad/College of Physical Education and Sport Sciences

The researchers used the SPSS program to process the raw scores and perform statistical analysis including:

1. Arithmetic mean
2. Standard deviation
3. T-value for dependent samples
4. T-value for independent samples

3. Results and discussion

According to Table 4 the researchers found that the data for the research variables followed a normal distribution as the skewness values were within the acceptable range of (±1). This indicates that both groups started from a similar baseline.

Table 4. Displays the statistical description of the research variables for the control and experimental groups.

	Pre-test			Post-test		
Variables	Arithmetic Mean	Standard Deviation	Skewness	Arithmetic Mean	Standard Deviation	Skewness
Tucked Forward Roll	1,90	0,73	0.672	5,300	0,948	0.562
Static Balance	12,60	1,34	0.892	23,30	3,743	0.823
Dynamic Balance	5,70	1,135	0.345	5,700	0,674	0.704
Tucked Forward Roll	2,30	0,948	0.128	7,400	1,074	0.561
Static Balance	11,90	1,663	0.895	30,80	3,22	0.019
Dynamic Balance	6,90	1,197	0.781	4,00	1,054	0.992

Table 5. Displays the t-value for the pre-test and post-test of the control group for the research variables.

Variables	Mean difference	Standard Error of the Difference	*t*-value	Sig
Tucked Forward Roll	3,400	0,153	20,82	0,000
Static Balance	10,70	1,075	9,949	0,000
Dynamic Balance	1,100	0,433	2,53	0,032

At a significance level of 0.05 and a degree of freedom (9).

Table 6. Displays the t-value for the pre-test and post-test of the experimental group for the research variables.

Variables	Mean difference	Standard Error of the Difference	*t*-value	Sig
Tucked Forward Roll	5,10	0,314	16,21	0,000
Static Balance	18,90	1,11	17,02	0,000
Dynamic Balance	2,90	0,69	4,796	0,001

At a significance level of 0.05 with 9 degrees of freedom.

From Table 5, the researchers found that the differences between the pre-test and post-test for the research variables were not statistically significant, as the values of Sig for the research variables were greater than the significance level of (0.05) in the motor and skill variables studied for the control group. This indicates that there were no significant improvements, and thus, the results favored the post-test only nominally, without reaching statistical significance.

Based on Table 6, the researchers found that the differences between the pre-test and post-test results for the research variables were statistically significant. This was determined by comparing the *t*-test values and the corresponding *Sig.* values, which were lower than the significance level of 0.05. These findings indicate that the experimental group showed significant improvement in the studied motor and skill-based variables in favor of the post-test.

According to Table 5, the researchers found that the differences between the pre-test and post-test scores for the research variables were statistically significant, based on the *t*-test values and their corresponding significance (*Sig.*) levels. The *Sig.* values were less than the significance threshold of 0.05 for the motor and skill-related variables under investigation, indicating statistically significant improvements in both the experimental and control groups, with the advantage favouring the experimental group.

By presenting the data in Table 5 regarding the pre-test and post-test for the research variables of the control group it was found that the differences were significant since the Sig. values were less than the significance level of 0.05 for the skills of the forward roll, static balance and dynamic balance tests. This indicates that the curriculum followed by the subject school is an effective approach that contributed to achieving these results. However, actual assistance was provided by the subject school and this process has significant implications for the school's role in supporting the students before during and after the performance.

The researchers found significant differences between the pre-test and post-test as shown in Table 6 which presents the results of the pre-test and post-test for the research variables of the experimental group. The researchers attributed these differences in the research variables to the use of the innovative device (the assistant) which proved effective in improving the abilities of static and dynamic balance. At the same time, it helped develop the skills related to the forward roll without the assistance of the subject school before during and after performance. This reduced the burden on the school and minimized the risk of injury to both the school and the students during performance, in addition to enhancing safety and self-confidence for the students during performance on the device as well as the repeated correct practice of skills and numerous repetitions this helped the students successfully perform the research variables with high accuracy and proper technical execution. The results of the experiment revealed a significant improvement between the pre-test and post-test, favoring the post-test due to the use of the innovative device by the researchers. This demonstrated its benefits for both the students and the subject school as evidenced by the error free performance accompanied by skillful learning and through the experiment conducted by the researchers it was confirmed that the device facilitated the learning process by placing the student on the correct path for the researched skills especially at the beginning of the educational curriculum before the wings of the device opened. These wings supported the student by preventing falls and stabilizing her body on the beam without falling. This assistance helped in performing the skill on the official device (the balance beam) with proper balance and correct execution of the skills without falling off. Consequently, this contributed to increasing the students' confidence and their sense of safety. And these skills are among the difficult ones that third grade students face when performing them accurately on the official balance beam and it is challenging to advance the students' level toward integrated performance. This difficulty was mitigated through the contribution of the innovative device which helped the students increase their confidence and fostered a competitive spirit among them. It also enhanced excitement during performance especially since the students were in the initial learning stages of the skill. This was the primary purpose behind designing this device. Additionally, the repeated practice on the device, the scientific approach followed in writing and implementing the curriculum and the variety in exercises all contributed to stimulating the students' enthusiasm, attracting them toward performing on the device and increasing their motivation and drive.

Referring to Table 7 which presents the post-test results for both groups a clear improvement in motor abilities related to static and dynamic balance on the balance beam is evident. This improvement is attributed to the specialized exercises performed on the assistive device. Gradually using the device from easy to difficult levels allowed the students to adapt and internalize the correct body positions and movement patterns on the balance beam, which has a wider base, thereby providing a better educational foundation. This helped reduce students' fear during the skill performance in both forward directions. Moreover, the teacher should strive to assist the learner in forming a clear and accurate understanding and visualization of the new movement, relying on appropriate educational tools and aids. Due to the significant role played by educational aids and tools, they cannot be considered secondary Rather, it has become essential to use the latest and simplest tools and aids to teach and develop learners' levels in a way that facilitates mastering correct skill performance. These tools help increase the sense of correct performance and enhance learners' motivation towards the game its learning and development, which is the primary goal of the educational process.

Table 7. Displays the t-values of the post-test for the research variables for both the experimental and control groups.

Variable	Df	F	Sig	T	Sig
Tucked Forward Roll	18	0,260	0,616	4,632	0,000
Static Balance	18	0,180	0,616	4,800	0,000
Dynamic Balance	18	0,018	0,896	2,449	0,024

At a significance level of 0.05 with 18 degrees of freedom.

It is therefore the responsibility of the teacher to select instructional tools and methods that align with the lesson's objectives, content, and the type of skill to be taught. These choices must also consider the learners' level and characteristics, including their chronological and cognitive age, interests, and degree of maturity.

As noted by Saleem (2010), the acquisition of any motor skill requires the learner to develop a mental image of the movement being performed. It is the instructor's responsibility to assist the learner in forming an accurate and clear conceptualization of the new movement by relying on appropriate educational tools and aids. Given the significant role these instructional tools and aids play, they can no longer be regarded as supplementary. Rather, employing the most current and simplified instructional means has become essential for effective teaching and for advancing learners' skill levels. These tools facilitate a better sense of correct performance, enhance learners' motivation toward the sport, and support both the learning and development process—recognized as the core objective of the educational process (Saleem, 2010).

Shihab et al. (2014) emphasized the importance of using multimedia to develop skill performance in gymnastics among students. Regarding the skill performance scores and the actual significance, the objective and hypothesis were confirmed, indicating that the specialized exercises had an effect, and there were statistically significant differences favoring the experimental group in the post-test.

4. Conclusions

The researchers reached several conclusions:

1. The specialized exercises using the device (assistant) contributed effectively to learning the researched skill.
2. The innovative device (assistant) significantly contributed to improving the ability of static and dynamic balance.

5. Recommendation

The researchers recommend the following:

1. The researchers recommend using this device for third-grade female students as an aid to learn the researched skills.

2. The researchers recommend conducting similar studies involving the innovation and manufacturing of assistive tools and devices for other artistic gymnastics apparatuses for female students.

Conflicts of interest

None.

We confirm that all tables and figures in this article are ours and written by the researchers themselves.

Ethical statement

This manuscript approved by Dr. Hasnaa Sttar Jabbar on (5/5/2025).

Author's contributions

All contributions of this study were done by the researchers Zahra Shihab and Hasnaa Sattar and Saja Fadhil and Zahra Haider) who get the main idea and work on writing and concluding also with number of experts. Zahra Shihab in Statistics, Hasnaa Sattar in revision, Saja Fadhil and Zahra Haider in translating.

Funding

This research received no external funding.

Data availability

The data that support the findings of this study are available on request from the corresponding author.

References

Hamza, M., Turky, T., & Hamza, J. (2022). The effect of using a teaching aid on learning backswing to handstand on rings in youth artistic gymnastics. *Journal of Physical Education*, *34*(1), 15–22. https://doi.org/10.37359/JOPE.V34(1)2022.1232.

Mohammed, S., & Samir, L. (2021). The effect of mechanical gymnastic mushroom on learning circle in artistic gymnastics for the young. *Journal of Physical Education*, *33*(2), 23–30. https://doi.org/10.37359/JOPE.V33(2)2021.1138.

Palomares, B. R. A., Palomares, E. M. D. G., Uchôa, F. N. M., Andrade, R. D. A., Deana, N. F., & Alves, N. (2019). Effectiveness of the conjugate influence method in improving static and dynamic balance in rhythmic gymnastics gymnasts. *Journal of Physical Education and Sport*, *19*, 1407–1417. https://doi.org/10.7752/jpes.2019.s4204.

Saeed, W., Abdullah, A., & Sakran, J. (2023). The effect of skill performance – like exercises on the improvement of horizontal bar shtalder and endo skill in artistic gymnastics for men. *Journal of Physical Education*, *35*(2), 483-493. https://doi.org/10.37359/JOPE.V35(2)2023.1400.

Saleem, S. (2010). Effect using of inclusion style and interference with aggregated and distributed in learning and retention some of beam skills in gymnastic. *Journal of Physical Education*, *22*(1), 193–213. https://doi.org/10.37359/JOPE.V22(1)2010.663.

Shihab, Z., Saleem, S., & Saleh, A. (2014). The effect of using multimedia super overlap (Hyper Media) in the learning and keeping to some balance beam skills in the women's artistic gymnastics. *Journal of Physical Education*, *26*(2), 48–64. https://doi.org/10.37359/JOPE.V26(2)2014.72.

Appendix 1

Daily Teaching Unit Using the Designed Educational Device for Learning the Researched Skill.

Daily Teaching Unit						
Week One						
Day One						
Unit	Day	Teaching unit duration: 90 minutes, with the designated part of the main section lasting 30 minutes.				
First	Sunday	20 min 60 min 10 min	Warm-up 30 min 30 min Recovery	 Beam Other	Explanation of the skill for both the control and experimental groups including mentioning all the key elements of correct performance and the negative aspects of accompanying errors to reinforce them. Additionally, an explanation of the components of the assistive device for the experimental group and the method of its use in accordance with the movement paths of the two skills performed in their initial form for the purpose of exploring the method of performance and the device's operation.	What the teaching unit time allows

Appendix 2

Shows the Exercises Used in the Educational Program.

No	Exercise Description	Note
1	From the standing position on the beam sitting on all fours the student grasps the beam with both hands and bends her head toward the chest.	Repetitions as permitted by the teaching unit time
2	From the sitting position on all fours with the feet close together, the student grasps the beam places the head, and performs a half roll.	
3	From the sitting position on all fours the student grasps the beam places the head and performs a forward roll.	
4	The researchers begin by moving the wings away from the beam while the student performs the skill allowing the student to possibly touch the wings.	
5	The wings are moved to their maximum distance while the student performs the skill ensuring that the wings do not touch the student during performance.	
6	The forward roll skill is performed with the wings slightly apart until the student can perform the skill without relying on the wings by increasing the distance between them. Then, the skill is applied on the official balance beam.	