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Effect of a proposal of exercises on the development of basic motor abilities in men's artistic gymnastics

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ABSTRACT

The purpose of this study was to recognize the effect of the proposed exercises in developing the particular motor abilities employed in the study as well as some ground skills in men's artistic gymnastics. This study used the experimental method and included 14 players of the directorate of Anbar Education team in the technical gymnastics for men (junior category), aged 10-12 years. The proposed exercises were then performed, which included 30 training units over a ten-week period, three training units each week, and forty minutes of training per unit. The researchers used the Statistical Package for the Social Sciences (SPSS) for data analysis. The results of our study showed that there were statistically significant differences in the results of the pre- and post-tests in all variables of the elements of special motor abilities and ground skills of the research sample, in favor of the post-test ($p < 0.05$). The use of the proposed exercises had a positive effect in developing some special motor skills, and the development of special motor abilities contributed to the development of ground skills in the artistic gymnastics for men.

KEYWORDS

Motor Abilities; Ground Skills; Artistic Gymnastics

1. INTRODUCTION

Artistic gymnastics is a mind-body activity that pushes physical performance to new heights of enjoyment. The bodily expressions resemble paintings in appearance. It also gives an unlimited chance to develop the capacity, to invent and gain joy and delight from successfully executing the forms and motions that make them up. Gymnasts get the capacity to embody consistency, continuity,

compatibility, balance, and perfect timing as a result. The steps for the success of any sport in any culture must follow the suitable and right strategy, which primarily strives to promote that sport (López et al, 2022). This method becomes the actual extension of its practitioners to reach the highest levels through the training methods and scientific methods used in all requirements of that activity, including the appropriate use of physical, kinetic, psychological and social qualities. The development in artistic gymnastics is nothing but the result of various scientific efforts to which many sciences have contributed to ensure this development wide progress on various devices. This progress that we are witnessing today, which may be described as miraculous in some of the movements that lead, is due to the basic scientific circle to which all sciences related to physical education are linked, which is the science of sports training (Bazela et al, 2022).

Attention to youth is considered as the cornerstone of artistic gymnastics, in which the level of technical performance of players has reached the level of imagination. More than one male and female player in the world championships got full marks despite their low average age. As a result, we needed to pay special attention to young people and properly prepare them based on scientific principles. This preparation should include all components of the training process, including physical and skill preparation, because artistic gymnastics varies from other sports in terms of the variety of kinds, equipment, and talents available. It requires the athlete to be characterized by appropriate physical measurements and high motor abilities that qualify him to perform those skills, especially difficult ones, on all devices (Finteel et al, 2022).

The importance of the research consists in the use of suggested exercises aimed at developing some kinetic abilities, which constitute a key factor in performing ground movements in the artistic gymnastics for men. The use of modern training methods is one of the most necessary requirements that must be paid attention to develop the level to the highest possible level. Therefore, the researchers used suggested exercises on a continuous basis for a specific period of time and in a scientific manner in order to know the extent of the impact of these exercises on developing special motor abilities and raising the level of players in some ground skills in the artistic gymnastics for men to reach optimal performance.

Despite the importance of physical fitness and movement in the performance of technical gymnastics skills for men, the researchers believe that by referring to scientific sources and using the opinions of experts and specialists, the researchers believe that despite the importance of physical fitness and movement in the performance of technical gymnastics skills for men. In comparison to the results of this category with developed nations, the training of different categories in technical

gymnastics for men, especially the junior category, is still not at the required level. They also see that this event lacks training programs based on scientific foundations to develop the special motor abilities of male gymnasts. This is what prompted them to use a set of proposed exercises that carry with it the scientific means in developing special motor abilities, and then try to reach the level of optimal skill performance.

The objectives of this research were: 1) Recognizing the effect of the proposed exercises in developing the special motor abilities used in the study. 2) Identifying the effect of the proposed exercises in developing some ground skills in the artistic gymnastics for men. The hypotheses of this research were: 1) There are statistically significant differences between the results of the pre- and post- tests of the research sample in the special motor abilities used in the study. 2) There are statistically significant differences between the results of the pre- and post- tests for the research sample in some ground skills in the artistic gymnastics for men.

2. METHODS

2.1. Study Design and Participants

The nature of the investigated problem is what determines the method used, so the experimental method was used and the design of one group with two pre and post-tests was used to solve the research problem. The study was carried out in the Teachers Syndicate Hall, Heet District, Anbar Governorate, during the period from 25/7/2021 to 11/10/2021.

The research sample was deliberately chosen, represented by the players of the directorate of Anbar education team in technical gymnastics for men for the junior category aged 10-12 years. They were 14 players, representing 100% of the research community.

2.2. Devices, Tools and Means of data collection

The devices and tools used in this study were: metric tape measure, whistle, white masking tape, wooden table, 5 signs, geometric ruler (100 cm), CDs, 2 Sonny cameras, 20 tennis balls, and a stopwatch. The means of data collection were review of the literature, personal interviews, measurements and tests, observation and experimentation, a questionnaire form for the opinions of specialized experts on the selection of special motor abilities, and a skill performance evaluation form.

2.3. Research Field and Procedures

2.3.1. Determination of special motor abilities

The researchers made a study of sources relevant to the aforementioned abilities to establish the most essential unique motor abilities that are prioritized in the target skills and must be created for the research sample. As a consequence, the researchers created a questionnaire to poll the experts' and specialists' opinions in the domains of (sports training and kinetic learning), which drew a total of 8 experts and specialists by presenting them with their kinetic talents. This is because the researcher has discretion to pick the proportion that is suitable when choosing indicators. Based on the findings of the questionnaire, skills with less than a 65% score were removed. Table 1 shows the relative importance of the agreement of experts and specialists in determining the basic special motor abilities.

Table 1. The relative importance of the agreement of experts and specialists in determining the basic special motor abilities

No.	Motor abilities	Significance rate	Indication
1	Fixed balance	62,5%	×
2	Moving balance	75%	/
3	Eye and hand compatibility	87,5%	/
4	Eye and leg Compatibility	50%	×
5	Agility	100%	/
6	Flexibility	75%	/
7	Motor control	62,5%	×
8	Precision	37,5%	×

2.4. The Exploratory Experiment

The exploratory experiment is a preliminary study carried out by the researcher on a small sample aiming to choose the appropriate research tools and methods, as well as knowing the most important obstacles that they may face when carrying out the experiment to ensure accurate and reliable results that can be adopted. Therefore, the researchers conducted an exploratory experiment on Sunday (5/7/2021) at four o'clock in the afternoon with 5 players from the research sample. The exploratory experiment aims at:

- Knowing the difficulties and problems that researchers may face in their research.
- Knowing the time taken to carry out the tests and measurements.

- Determining the efficiency and accuracy of the assistant work team in the implementation of tests and measurements.
- Knowing the validity of the devices and tools, as well as their suitability to the nature of the sample.
- Ensuring the validity of the tests and the extent of the sample's interaction in carrying out the tests.
- Creating safety requirements.
- Preparing the forms for calculating the test results.

2.5. Tests

2.5.1. The moving balance test (Octagonal Shape Test)

Objective of the test: to measure the kinetic balance.

Units of measure: time by seconds.

Tools used: the device is locally manufactured and made of wood and has eight sides. A line is drawn in the middle of one of the eight sides, the height of the device (20 cm), to serve as a line for the beginning and the end.

Test description: The player stands on the edge of the tool above the starting line, then walks on the edge of the tool to make a full turn in front of him by crossing it with both feet to the starting line (end). The player then walks to make another full turn opposite the first cycle (back in the direction of the track) until it crosses the starting line with both feet. If he loses his balance and touches the ground, he must return again to the edge of the tool from the same place of fall, provided that the player performs the test while barefoot.

Calculation: The number of times the playertestee lost balance during the front and back cycles and the time he finished the two sessions are calculated. The fewer the number of equilibrium losses and the time of the two cycles, the higher the degree of moving balance for the player is indicated.

2.5.2. Throwing and receiving balls against the wall

Objective of the test: to measure the compatibility of the eyes, arms and ball.

Tools: a bouncing wall, 20 tennis balls, a throwing line 5 meters from the wall.

Method of performance: the player stands behind the throwing line and faces the wall. He throws and receives balls according to the following method:

1. Throwing five balls with the left hand and receiving them with the same hand.
2. Throwing five balls with the right hand and receiving them with the same hand.

3. Throwing five balls with the left hand and receiving them with the right hand.
4. Throwing five balls with the right hand and receiving them with the left hand.

Conditions: The ball must be thrown against the wall and received immediately before it hits the ground. No additional attempts are allowed.

Calculation: A score is calculated for each correct attempt out of the twenty prescribed throws, i.e. the total score of the test (20) marks.

2.5.3. The flexibility test

Test name: torso flexion from standing.

Objective of the test: to measure the flexibility of the trunk, posterior muscles, and thigh in forward flexing movements.

Tools used: a graduated ruler (100 cm), a table that holds the weight of the testee.

Performance description: The scale (the ruler) is attached to the edge of the table, with the middle of the ruler on the edge of the table and the other half below the edge. The player is in a standing position on the edge of the table with feet touching either side of the scale. The player bends the torso forward downward so that the fingers are in front of the scale and tries to bend the torso as far as possible, noting that the hands are in one level.

Calculation: The player is given three attempts and the best attempt is calculated.

2.5.4. Barrow slalom for agility

The purpose of the test: to measure agility

Tools: a rectangle on the ground with a length of (4.75) meters and a width of (3) meters is drew, and four legs are fixed on the ground at the four corners of the rectangle. The fifth post is fixed in the middle of the rectangle, noting that the length of the post should not be less than (30) cm. another tool is a stopwatch.

Performance method: from the high starting position, behind the starting line, and at the signal, the player starts running between the five lists until it completes the 3rd cycle.

Calculation: the time it takes to the nearest 1/100th of a second is calculated.

2.6. The Pre-test

The pre-test was carried out after completing the exploratory experiment and determining the appropriate tests for the research, for two days. On Tuesday, 27/7/2021, tests of special motor abilities were conducted. On Wednesday 7/28/2021, the researchers conducted skill tests for the research sample at Teachers Syndicate Hall, Heet District. All test requirements, tools and assistant work team have been prepared and under the direct supervision of researchers. It was explained how

to conduct the tests, display the attempts, their number, the flow of work, and ensure that the learners understand all the test conditions. After completing the pre-tests, the researchers discussed with the tested players the results of their performance and encouraged them to perform better in implementing the suggested exercises, and also to get acquainted with the results of their performance.

2.7. Research Main Experience

After noticing the most important requirements that must be available through the results of the exploratory experiment in order to develop some special motor abilities and ground skills, the researchers prepared suggested exercises for the research sample in order to achieve the research main objectives. These exercises were presented to a group of specialists in the field of sports training science. Implementation of the proposed exercises began on 1/8/2021 until 7/10/2021.

The proposed exercises are as follows:

1. The duration of using the proposed exercises was 10 weeks, where the number of training units was 30 units, an average of three units per week, on Sunday, Tuesday, and Thursday.
2. The time for using the proposed exercises reached 40 minutes from the time of the training unit, specifically in the main section of the unit.
3. The total number of exercises was 45, divided into training units.
4. The principle of individual differences has been taken into consideration as it is a basic factor in training to develop the components of the training.
5. The training methods used in the proposed exercises varied, in its main section:

- Low-intensity interval training method to develop the skill aspects.
- High-intensity interval training method for the proposed exercises to develop the special motor abilities of some floor skills in the artistic gymnastics for men.

6. Due to the nature of the research sample and the purpose of the research, the appropriate intensity and its gradation were determined from (light to moderate to above moderate, medium, above average and below maximum) with intensity ranging from 45% - 85% of the maximum intensity.

2.8. The Post-tests

After completing the main experiment, the researchers conducted post-tests for two days. On Sunday (10/10/2021), the researchers conducted motor abilities tests. On Monday (10/11/2021), the skill tests were conducted. The researchers have taken into account, as far as possible, to create the

same conditions in which the pre-tests were carried out in terms of time and place, the working staff and the tools used.

2.9. Evaluating the Performance

After performing the pre and posttests, videotaping them, we presented them to 4 assessors of experts and specialists to evaluate the performance of the movements for the pre and post-tests of the two skills. Using a special evaluation form and according to the performance evaluation for each of the targeted skills, two attempts for each skill are calculated by raising the upper and lower degrees, combining the two intermediate scores and dividing by two. Evaluation through grading the selected skills plays an important and effective role in physical education, especially the artistic gymnastics for men, as it depends on the player's performance. It is one of the important methods that depend on observation in the evaluation process of the skill. The accuracy of this method depends on the depth of the scientific ingredient and the extent of the scientific knowledge of the method of technical performance of that skill. For more accuracy in the evaluation, direct viewing was not approved, but rather through an evaluation of the performance recorded in video photography. Evaluation is conducted by observation and in slow motion.

2.10. Statistical Analysis

The researcher used the Statistical Package for the Social Sciences (SPSS) for data analysis. The arithmetic means, standard deviations and percentages of the measurements were used for the results. T-test was used to find the differences between the pre-test and post-test results.

3. RESULTS AND DISCUSSION

We begin this section by presenting and discussing the results of the pre- and post-tests of the research sample in the special motor abilities (moving balance, eye and hand compatibility, agility and black flexibility).

Table 2. The results of the pre- and post-tests for the research group in the special motor abilities

Variables	Measuring unit	Pre test		Post test		T	p
		SD	M	SD	M		
Moving balance	Second	1.19	23.22	0.78	20.57	3.73	<0.05
Eye and hand compatibility	Time	2.52	9	1.91	14	9.42	<0.05
Agility	Second	0.82	12.63	1.41	10.52	7.62	<0.05
Back flexibility	cm.	1.73	32.42	2.86	46.52	10.42	<0.05

NOTE: Tabular (T) value (1.77) at a degree of freedom (13) and a level of significance (0.05)

It can be seen from the table above that there are statistically significant differences between the results of the pre- and post-test for the special motor abilities (moving balance, eye and hand compatibility, agility and black flexibility), in favor of the post-test ($p < 0.05$). As for the ability to balance, a variety of exercises were used that helped develop the balance ability, which included developing the strength of the parts on which the body rests and that form the basis of balance, as well as developing the flexibility of the joints that are the pivot of the balanced movement. In fact, diversity in sports performance is one of the basic factors of the process of balance in physical integration, as this diversity increases the desire to train (Eras Alfonso, 2021).

This view is reinforced by previous literature, and equilibrium is highly dependent on strength, in particular the strength and flexibility in many cases of static equilibrium. The researchers attribute the difference that occurred in the compatibility ability to the effectiveness of the proposed exercises, which focused on compatibility exercises directly, which led to the development of this ability. Means and procedures for building adaptive abilities must be diverse, which is understood from the effectiveness of the harmony training for a particular stimulus. This leads to the expansion of the possibilities of learning multiple motor skills, which work to integrate the ability of coordination (López et al, 2010).

In case of insufficient amount of ability, the body is unable to launch quickly and change its direction. Moreover, the most appropriate way to develop agility is to train to perform the correct kinetic models more and more and to perform at high speeds. This leads to the development of special compatibility and is the basis of agility.

Of what was mentioned above, in addition to the association of agility with many motor abilities, especially motor compatibility, it should be considered that agility is a comprehensive expression of motor qualities (Finteel et al, 2022). As for the flexibility of the back, flexibility exercises were used during the rest periods while performing the proposed exercises. Positive and negative flexibility alternated, during rest periods, between repetitions and sets. The sample benefited from performing movements with wide ranges of movement within its exercises. The kinetic exercises have a positive effect in putting pressure on the kinetic ranges in the joints of the body. Also, the stretching exercises at the end of each training unit had an effect on obtaining the elasticity of the tense muscles during the physical effort as a result of distinguishing between the feeling of complete muscle tension and deep and complete relaxation. Hoti (2021) explains that the regularity in the individual's practice of sports activity leads to an increase in the elasticity of muscles and connective tissues. Thus, it leads to an increase in their flexibility. The researchers achieved their

first hypothesis which says that there are statistically significant differences between the results of the pre- and post-tests of the research group in the motor abilities.

Now, we present and discuss the results of the pre- and post-tests of the research sample regarding the ground skills variables (human wheel and Arabian leap).

Table 3. The results of the pre- and post-tests for the ground skills variables (human wheel and Arabian leap)

Variables	Measuring unit	Pre test		Post test		T	p
		SD	M	SD	M		
Human wheel	Degree	0,37	2,91	0,71	4,51	7,52	<0.05
Arabian Leap	Degree	0,31	2,11	0,68	4,32	6,85	<0.05

NOTE: Tabular (T) value (1.77) at a degree of freedom (13) and a level of significance (0.05)

As we can see from the table above, there are statistically significant differences between the results of the pre- and post-test for the ground skills variables (human wheel and Arabian leap), in favor of the post-test ($p < 0.05$).

The researchers attribute this significant difference appeared in the ground skills to the effectiveness of the proposed exercises, which focused on the special motor abilities that the body needs, such as moving balance, coordination and agility, especially the muscles of the arms and shoulders, as well as the flexibility of joints. This view was reinforced by López et al (2010), who stated that the success of technical exercises is related to the level of development and development of physical and motor abilities. Also, this progress that emerged was the result of the development of special motor abilities, which played an active role in improving the level of skill performance. The increase in repetitions, progression from easy to difficult, and correction of errors associated with skill performance helped this progress. Special exercises can be used to develop the correct performance of basic motor skills in gymnastics, as these exercises have a quality similar to the basic technical performance of the exercise.

Finteel et al (2022) stated that repetition of performance on gymnastics equipment will allow the gymnasts to increase the required endurance because image education and training in the activity itself is the best way to raise the level. From above, we conclude that the researchers achieved their second hypothesis, which says that there are statistically significant differences between the results of the pre- and post-tests for the research group in the ground skills.

4. CONCLUSIONS

There are significant differences in the results of the post-tests in all variables of the elements of special motor abilities and ground skills of the research sample. The use of the proposed exercises had a positive effect in developing some special motor skills, and these skills have developed significantly as expressed by the significant differences for all the pre and post-tests of the research sample. The development of motor abilities contributed to the development of the ground skills in question.

5. RECOMMENDATIONS

Based on the study results, we recommend the following:

- Emphasizing the development of motor abilities in the early stages of preparation and training, because training on them in the later stages takes a long time and hard effort for the players.
- The necessity of adopting the proposed exercises to develop special motor abilities that lead to the development of ground skills in the artistic gymnastics for men.
- The necessity of emphasizing on training the kinetic requirements for the skills of ground movements and not neglecting any of them.
- Emphasis on increasing the repetitions of exercises for motor and skill abilities to raise the level of performance.
- The necessity of performing periodic tests of the special motor abilities to determine the level of performance of the players.
- Conducting similar research on other samples of different age groups and for both sexes (males and females).

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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