

The Effect of S.A.Q program on skill performance level of Yurchenko on Vault table

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Introduction and research problem:

Artistic gymnastics is considered one of the sports in which the performance level of the players (boys and girls) reached the level of imagination and this was clearly shown in the Olympics and world championships, which considered a theater in which the athletes showcase their ingenuity in showing what they have reached of new innovations in the arts motor performance. (9:7)

The S.A.Q training program is one of the modern training methods that aim to improve physical and kinetic abilities in many sports, and these exercises are practiced as a complementary system to the traditional programs with the aim of improving the speed of its various types, general physical fitness and the skill performance level. Running, agility and kinetic speed in addition to explosive kinetic patterns and developing the ability to change directions and move from acceleration to deceleration in a smooth way. (5: 23-24) (10:9-10)

Mario Jovanovic, et al. (2011) indicated that the term S.A.Q is derived from the initial letters of both speed, agility, and quickness. (16:1285)

Velmurugan & Palanisamy (2012) added that S.A.Q is a modern training system that produces integrated effects for many physical abilities within one training program. (17:432)

Gymnastics characterized by its various devices, and the vault table is one of them, and the performance level on it represents 25% of the total score of all girls' gymnastics devices. The nature of performance on the vault table differs from the other, as its performance does not consist of a movement that

includes many different skills, but it consists of a single motor skill, and therefore it is one of the most important devices that players rely on to obtain a high performance score that contributes to raising the overall score on all devices. (4:3)

Despite the variety of jumps on the vault table, there are many common technical stages between all of them in terms of the method of performance, which are the basic components of skill performance, and these technical stages are divided into (approaching - rising - first flight - anchoring and pushing with two hands - second flight - landing). (7:266) (11: 266-230)

L-Antonof confirms that, as a rule, if an error occurs in the performance of any of these stages, it will negatively affect the other stage and, consequently, the level of performance of the jump. (5:15)

The approaching stage is considered an indicator of the transitional speed, which is characterized by the horizontal speed that has an effect on the completion and execution of the jump. (12: 162)

The performance of rising also requires a starting speed, as well as a rapid push of by feet. The ability to complete the motor paths at the appropriate speed for the technical aspects of performance represented in the motor speed, which is one of the important physical abilities on the vault table. (8: 102)

In addition to the fact that the body movement in the air during the flight phases, the speed of changing its direction and positions, and winding around the various axes of rotation during the performance of jumps requires agility. As, it gives the player the ability to flow, coordination, adjusting the kinetic rhythm and a proper sense of directions and distances according to the performance requirements, as it is a basic requirement on the vault table. (8:81)

Therefore, the transitional speed, agility, and quickness are among the important physical abilities that the players must have while performing on the vault table platform. Improving these physical abilities is a decisive factor for performing jumps well. The Technical Committee for Artistic Gymnastics for Women in the Egyptian Gymnastics Federation included performing the forward jump Lateral on the hands with a quarter turn, followed by a quick back jump on mattresses with a height of 100 cm (Yurchenko) as compulsory for players under 11 years, This is a prelude to preparing the players to perform higher jumps. (1)

Yurchenko's skill was recorded by Natalia Yurchenko, in which she performs a side flip with a quarter round off in the last step of the approach

distance to land on the jump ladder facing the back of the vault table, and then rise with the feet to start the first flight to reach the pivot on the hands on the vault table, then push the table with both hands to go to the second flight in which the main part of the skill is performed in any form (spherical, curved or straight) and this may be accompanied by rotation around the longitudinal axis either half a lap for the first full lap or more, or two air revolutions around the transverse axis before landing with the feet on the surface of the earth.

The Women's Technical Committee of the Egyptian Gymnastics Federation included the Yurchenko jump with some modifications starting from under 11 years with (2.00 degrees) through the mandatory requirements of the 2021-2022 sports season for the vaulting table.

The training of young women in artistic gymnastics must be given great attention, which requires the inclusion of additional, complementary, modern programs alongside the traditional programs in gymnastics in general and on the vault table in particular to improve the physical abilities of the players in a complex way, so the players can perform simple moves that will be the basis for more difficult skills on the vault table.

So, it is necessary to conduct more research to determine the role of S.A.Q exercises in improving the skill performance level of gymnasts at different age levels. Also, the necessity of developing training programs to improve the Yurchenko skill, as these jumps are included in each of the fourth and fifth groups and it was about 39% of the total number of jumps of the vault table, which confirms the importance of these two groups on this device. (6:8) (4:6)

The Yurchenko skill was included in the Vault table by the Egyptian Gymnastics Federation, starting from under 11 years old, Yurchenko skill is one of the most important skills that players depend on in the upcoming stages, and this is because it includes both the fourth and fifth group jumps, and Choosing this skill in particular and this age group was made by the researcher to improve the players level in the rest of the upcoming stages on the vault table.

And through the researcher's work as a coach for artistic gymnastics and through reviewing references and research, she found a shortage in researches that studied the S.A.Q training programs and their relationship to skill performance level in artistic gymnastics, especially with the vault table, and also found many trainers who do not have sufficient knowledge about the nature of these training programs.

This is what prompted the researcher to develop a training program using the S.A.Q exercises to identify the impact of the performance level of the side flip skill with a quarter turn, followed by the rapid back flip (Yurchenko) on mattresses with a height of 100 cm.

Research Objective:

This research aims to improve the performance level on the vault table for players under 11 years old by developing a training program using S.A.Q exercises to identify the extent of its impact on:

- Skill Performance level of (side flip with a quarter turn, followed by a rapid back flip “Yurchenko” on mattresses of 100 cm height.)

Research hypothesizes:

- There are significant statistical differences between the pre- and post-measurement in the skill performance level for (side flip with a quarter turn, followed by the rapid back flip "Yurchenko" on mattresses with a height of 100 cm) to the post-measurement.

Research Terminology:

- **S.A.Q training programs:**
“The term S.A.Q is derived from the initial letters of Speed, Agility, and Quickness. It is an integrated training system in which transitional, kinetic, and agility exercises are alternated in the same training unit.”
(3:23) (14:495)
- **Yurchenko Skill:**
“It is a side flip with a quarter turn, followed by a fast back flip.”

Research procedures:

a. Research Methodology:

The researcher used the experimental method by designing the pre-post measurement with one experimental group, because they are the most scientific methods suitable for the nature of the research.

b. Research community:

The research community included the artistic gymnasts under 11 years old at El- Gezira Sports Club who are registered with the Egyptian Federation of Artistic Gymnastics during the sports season (2021-2022).

c. Research Sample:

The study sample was chosen in an intended way from the research community of artistic gymnasts at El- Gezira Sports Club under 11 years old, and the basic study sample was (27) players divided as:

- (16) female players as a basic sample to conduct experiments on them.
- (10) female players as an exploratory sample.
- And one player was excluded due to her injury while conducting the study.

d. The researcher chose the research sample for the following reasons:

- Yurchenko's skill is one of the compulsory jumps for gymnasts under 11 years old.
- There were some technical errors in skill.
- The skill under study has been previously learned by the gymnasts under 11 on the ground movement.

e. The homogeneity of the research sample:

The researcher performed homogeneity of the research sample in the basic variables (age - height - weight - training age). The following table also shows the statistical description of the research sample.

It is obvious from Table (1) in the annexes that the total data are moderate, not scattered and characterized by the normal distribution of the sample, where the skewness coefficient values ranged between (0.182: 0.901) and this value approaches from zero and lies in the moderation curve between (± 3), which indicates the moderation and homogeneity of the sample in the basic variables before applying the basic study.

Also, Table (2) in the annexes shows that the total data are moderate and not scattered and are characterized by the normal distribution of the sample, where the value of the skew coefficient in it is (-0.504), and this value is close to zero and is located in the moderation curve between (± 3), which indicates the moderation and homogeneity of the sample in the level of skill performance before applying the basic study.

f. The Implementation of the research:

The measurements of the research and the implementation of the training program were carried out during the sports season (2021-2022), where the training program took place from (12/2/2021 to 2/2/2022), where the exploratory studies were applied in the period from (17/11/2021 to 25/11/2021). While the basic study was applied from 2/12/2021

to 2/2/2022. [Where the pre- measurements were applied for two days 30/11/2021, and the post- measurements were applied on 2/3/2022].

The research skill measurements (pre, post) and implementation of the contents of the training program were carried out in the artistic gymnastics' hall at El- Gezira Sports Club in Cairo Governorate.

g. Data Collection Tools:**a. Tools and Devices:**

The data collection tools that fit the nature of the research have been identified, and they are:

- Forms.
- Tools.
- Devices.
- Tests.

The Forms:

The researcher designed forms to record the measurements of the research in a simplified way in order to collect and tabulate the data in preparation for its statistical processing, which were:

- Student personal data registration form annex (2).
- The names of the members of the adjudication committee registered with the Egyptian Gymnastics Federation form, annex (3).
- Skill test results annex (4).

Tools used in the research:

- Measuring tape.

- Stopwatch.
- Agility ladder.
- Jump ladders.
- Mattresses of different sizes.
- Wall bar.
- Rubbers.
- Weights.
- Divided boxes.
- Obstacles.
- Vault Table.

Devices:

- Rasta-meter to measure length in centimeters.
- A medical scale to measure weight in kilograms.

Skill performance evaluation:

The pre and post skill performance level, was evaluated in Yurchenko's skill in accordance with the International Artistic Gymnastics Law, through a quadripartite committee consisting of courts of the Egyptian Gymnastics Federation, whose names are shown in annex (3), where the value of: $D = 2$ and $E = 10$

They were 4 judges registered with the Egyptian Federation of Artistic Gymnastics, and the tests were applied inside the Artistic Gymnastics Hall at El-Gezeira Sports Club.

The performance level was evaluated by the player performing the skill in one attempt, and the score is calculated by deleting the highest and lowest score, then taking the average of the two scores to be the final score for the player.

Survey study:

The researcher conducted a pilot study on (10) players from the research community and outside the main sample, and the aim was to identify:

- The validity of the tools used.
- The suitability of the program contents to the research sample.
- The of experience the proposed exercises, physical tests.
- The Extracting scientific treatments for the tests under study.

h. Scientific treatments for the used tests:

First: The Validity of tests:

The tests used were conducted on a sample of 10 players who had the same characteristics as the main study sample. They were divided homogeneously, as there was an exceptional group consisting of (5) juniors, and another unexceptional group, "a lower performance skill level", consisting of (5) juniors.

It is obvious from Table (3) in the annexes that there are statistically significant differences between the two groups to the exceptional group, where the calculated (T) value reached between (2.320), and these values are higher than the tabulated (T) values at the level (0.05), which confirms that the tests can distinguish between levels, which indicates the validity of the tests used.

Second: The reliability of the tests:

The tests used were conducted on a sample of (10) juniors, then the procedure was repeated on the same sample after (5) days, and the same sequence and conditions were considered during the application times.

It is obvious from table (4) in the annexes that the statistical treatment of the values of the first application and the second application of the legalization group in the tests of assessing the skill performance level for some artistic gymnastics devices under study that: The value of (T) between the two applications reached between (1.353) and this value is less than the value of (T) tabulated at the level of 0.05, and this indicates that there are no significant differences between the first and second application, and the value of the correlation coefficient ranged between (0.998), and this value is higher than the value of (t) tabulated and is close to the correct one, which confirms that there is a significant correlation between the two applications and that the values of juniors in the two measurements did not change significantly, which confirms that the tests are statistically stable and can be approved as a means of assessment during the study.

The proposed Training Program:

- The Program Preparing steps:

The researcher conducted a survey study of Arab and foreign references, scientific research and internet sites to determine the exercises used in the program and to link the S.A.Q exercises with the skill under research, and a primary conception of the S.A.Q training

program was developed and a questionnaire designed to know the opinion of experts in the field of artistic gymnastics about the proposed exercises and their impact on the skill performance level of Yurchenko's skill.

- **The aim of the program:**

The programs aim to know the impact of using S.A.Q exercises on the skill performance level of Yurchenko's skill on the vault table for players under 11 years old.

- **The fundamentals on which the program was established:**

The researcher paid attention to the following points:

- a) Determining the aim of the program in line with the subject of the research and the capabilities and needs of the students.
- b) The program fits with the characteristics and requirements of the age group of the research sample.
- c) Availability of the safety and security factor during the application of the program.
- d) Graduation in the difficulty of the selected exercises.
- e) Choosing the exercises that help to improve and develop the research variables.
- f) Divide the lesson into parts (introductory - main - final).
- g) A good warm-up to prepare the muscles for working the main part.
- h) Considering the scientific bases related to the training load in terms of (intensity - rest periods - groups - repetitions).
- i) Paying attention to the timing and rhythm of performance in terms of (easiness and speed of performance).
- j) The program should be flexible so that it can be modified if necessary.

The researcher used high intensity and low intensity interval training to suit the nature of the research.

- The Timing of the program:

Table (5)

The Statement	The Schedule of the Program
Program duration	2 Months/ 8 Weeks
Number of units per week	3 Units
Number of training units during the program implementation period	24 Units for the Program
Training unit time	60 Minutes
Unit time per week	3 X 40 = 120 Minutes

The training modules of the proposed program have been divided as follows:

The Program Parts	Time	The exercises
Introductory part	15 Min.	Preparing the body organs in a gradual way to accept the training load in the main part and to prevent any injuries
The main part	40 Min.	S.A.Q Training (25 Min.) Skill Performance Training under study (15 Min.)
The final Part	5 Min.	Cooling down and relaxation exercises to restore natural state of the body and return the functional state of the body's organs to its normal level so we can avoid fatigue

Training unit example – 3rd week- Training Unit (7-8-9)

Unit Parts	Time	Training Content	Load		
			Intensity	Repetition	Rest
Warm up	15 mins.	Training number (1-2-3-4-5-6-8-15-18-19)	-	-	
			2	15-20	

Main Part	40 mins.	Training Unit (7)			
		Training number (4) Training number (12) Training number (16) Training number (18) Training number (19) Training number (20) Training number (23)	80%	6-7	30 Sec.
		Training Unit (8-9)			
		Training number (1) Training number (4) Training number (8) Training number (9) Training number (10) Training number (17) Training number (25)	80%	6-7	30 Sec,
Cool down	5 mins.	Training number (3-5-6)			

The Program implementation steps:

1- Pre- measurements:

Pre- measurements were made for the research sample in all the variables under study on 30/11/2021.

2- Implementation of the proposed program:

The S.A.Q training program was applied to the training group from 2/12/2021 to 2/2/2022 for a period of 2 months.

3- Post- measurements:

After completing the specified period for the application of the proposed program, the post- measurements of the research group were

carried out on the selected variables, according to what was followed in the pre- measurements and in the same sequence, on 03/02/2022.

Statistical treatments:

After completing all the procedures for the research, unpacking and classifying the measurements, the researcher used the appropriate statistical treatments for the nature of the research, using the statistical program (SPSS V20) to conduct the statistical operations of the search, which are as follows:

- SMA.
- Median
- Standard deviation
- Skewness Coefficient
- Flatness Coefficient
- Correlation Coefficient
- T-Tests (Paired)
- One-Way Annona Tests
- Percentages

Presentation and discussion of results:

First: Presentation of results:

There are statistically significant differences between the pre- and post-measurements in the skill performance level of (side flip with a quarter turn, followed by a rapid back flip “Yurchenko” on mattresses of 100 cm height.) to the post-measurement.

Table (6)

The significance of the differences between the pre and post measurements in the skill performance level of the artistic gymnasts

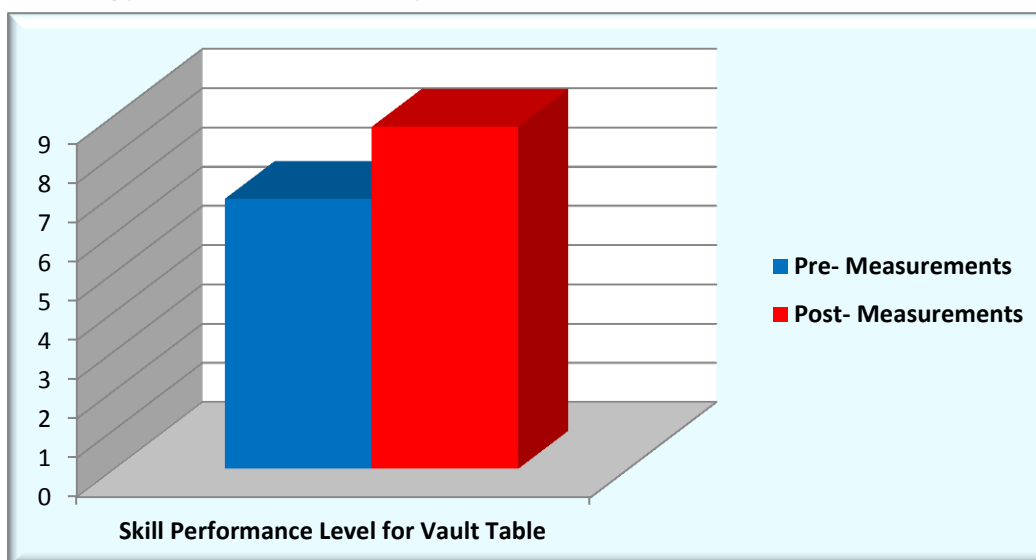
N=16

Statistical Significance/ Skill performance Assessment Rests	Measuring unit	Pre-Measurement		Post-Measurements		Differences between Arithmetic means		T-Value	Percentage of improvement%	
		X1	S1	X1	S1	X1	S1			
Skill Performance Level	Degree.	6.875	0.910	8.713	0.494	-	1.838	0.686	**10.715	26.374%

* The value of (T) tabulated is significant at the level of 0.01 = (2.602)

* The value of (T) tabulated is significant at the level of 0.05 = (1.753)

It is obvious from Table (6) that there are statistically significant differences in the value of (T) calculated between the pre and post measurements related to the skill performance level, where the value of (T) calculated reached (10.715) and these values are greater than the value of (T) tabulated at the level of (0.01) and the improvement rate was (26.37%) to the post- measurement of the artistic gymnasts under study.



Shape (8)

The differences between the arithmetic means of the Pre and Post measurements in the skill performance level for "Yurchenko" Skill

Second: Discussing the results:

Discussing the results related to the research hypothesis, which states:

“There are significant statistical differences between the pre- and post-measurement in the skill performance level for (side flip with a quarter turn, followed by the rapid back flip "Yurchenko" on mattresses with a height of 100 cm) to the post-measurement.”

When comparing the results of the pre- and post-measurements in the skill performance level under study, which is shown in Table (6), it was found that there were statistically significant differences in the value of (T) calculated between the pre- and post-measurement of the skill performance level under study, which reached (10.715) at the Level of (0.01) with an improvement rate of (26.37%) in favor of the post- measurement of the artistic gymnasts under study, where the proposed program contained a set of speed exercises, which

consisted of the ideal running performance exercises in order to improve performance of the running method and then increase the approach speed.

Also, there were exercises to improve the kinetic speed and thus lead to a strong uplift which improved performance for all stages of the jump. This was clearly shown in the jump arbitration in the dimensional measurement.

The researcher attributes this improvement to both the positive effect of S.A.Q exercises on physical abilities, which helped their development in a way that in turn led to improving the skill performance level, and also the inclusion of specific exercises within the proposed S.A.Q training program, which targeted the motor path of the skill under study. All of that, led to an improvement in the skill performance level under study due to the existence of a direct correlation between the special physical abilities and the skill performance level.

These results are in agreement with what was indicated by the studies of Mushira Ibrahim (2011), Walaa Hassboh (2011), Osama Ezz Al Rijal (2000) on the correlation of the physical abilities level with the skill level on the vault table, as the prepared physical programs lead to an improvement in the skill performance level as a result of a higher level of general and specific physical abilities.

Also, some scientific references have mentioned that S.A.Q exercises are functional exercises that simulate the same kinetic paths of the nature of the exercised sports activity, as they work on developing motor skills and improving muscle memory. As some specialized scientific references mentioned that the increase in the approach speed increases the output of the force of the feet push for the jumping ladder, and the product of the push of the hands for the vault table increases, and thus the process of continuing to perform the second flight stage is affected after the push with the hands, and the time of the push with the feet and hands decreases, and accordingly, all of these factors positively affect the skill performance level of jumpers on the vault table.

The Conclusions:

Considering the sample, aims, hypotheses, procedures and results of the research, the researcher reached the following conclusions:

The impact of the proposed program using (S.A.Q) exercises is clear and noticeable positive effect on the skill performance level of Yurchenko's skill on the vault table for players under 11 years old. And, the improvement rate was (26.37%) to the post- measurement of the artistic gymnasts under study.

The Recommendations:

Within the limits of the results and conclusions that have been reached, the researcher recommends the following:

- Publishing the training program and study results in sporting clubs in the field of artistic gymnastics to benefit from them in youth training programs.
- Using (S.A.Q) exercises to know their effect on the rest of the gymnastics equipment and on different skills.
- Develop similar programs suitable for different ages of males and females in sporting clubs in artistic gymnastics.
- Using (S.A.Q) exercises in the form of small games at the beginning of the training season.
- Using (S.A.Q) exercises in training programs for young girls as they have great impact on the level of physical abilities (speed, agility, and motor speed) and their contribution to raising the technical level of skills for artistic gymnasts.

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