



Effectiveness of Sliding Disc Drills on Some Physical Variables and the Level of Technical Performance of Tkatchev Skill on Horizontal Bar.

Dr / Shady Mohamad Alhenawy ⁽¹⁾

(1) Assistant Professor, Department of Sports Training - Faculty of Physical Education - Mansoura University.

Abstract

This research aims to identify the effectiveness of using sliding disc drills on some physical variables and the level of technical performance of Tkachev's skill on horizontal bar apparatus in gymnastics. The experimental approach was used using the experimental design for pre-post measurement of one group to suit the nature of the research. The research sample was chosen Intentionally from the gymnastics team players at Qassim University, and the basic research sample included (10) players, while the exploratory study was conducted on a sample of players representing the original community. From outside the main research sample, their number was (10) players who were chosen randomly with the aim of selecting the appropriate sliding disc drills and codifying their training loads. The percentage of improvement in grip strength was (16,50%), The percentage of improvement of legs muscular strength was (16.20%), the percentage of improvement of the back muscular strength was (30.80%), the percentage of improvement of the abdominal muscular endurance was (24.20%), and the percentage of the improvement of the flexibility of the hip joint was (44.20%). The percentage of improvement in the dynamic balance was (32.40%), while the percentage of improvement in the skill (TKATSHEV Piked) was (52.1%), and the percentage of improvement in the skill (TKATSHEV Stretched) was (29.7%), and the percentage of improvement in the skill (TKATSHEV Tucked) was (49.9%). The researcher recommends the use of sliding disc drills to develop physical fitness and the level of technical performance of Tkachev's skill on Horizontal Bar.

Keywords : (Sliding disc drills; Physical variables; Tkachev's skill; Horizontal bar apparatus; Gymnastics)

Introduction and Research Problem:

The technical performance of the artistic gymnast depends on the use of gymnastics devices as a means that reflects the extent of the player's physical, skill, mental and psychological capabilities, according to the performance requirements on each device. Therefore, the level of achievement of the gymnast is directly related to the extent of the physical capabilities that he possesses to enable him to perform this performance.

Artistic gymnastics competitions require a great variety of dynamic and static skills, with control of the body's positions in the air and against gravity, in addition to some skills whose performance requires strength, flexibility and balance. (Atilgan, Erkut 2013: 16)

The performance requirements on horizontal bar apparatus are characterized by continuity and diversity of skills between weights, major rotations, pronation movements, flight movements and re-hold to perform a kinetic chain that ends with landing.

(Haidar Abdel Razek et al. 2016: 224)

The artistic sentence on the horizontal bar apparatus is characterized by the skill of the great circle, which it is familiar to perform as a previous skill for most of the motor endings on the pull-up device, and whose performance is characterized by the transfer of the player's body from the maximum energy placed at the highest point of rotation to the maximum movement energy below the axis of rotation, including The motor endings are performed through a flight stage in which the player leaves the device to carry out the required motor duty and then land while maintaining balance, which requires a distinctive amount of physical attributes. (Adel Abdel-Basir 2007: 6)

Development of physical attributes is preferably compatible with the type of muscular work, in order to raise the physical level of the player to the maximum extent permitted by his abilities through the development of physical attributes, which are the basic base on which the processes of mastery and achievement levels are built. High technical performance. (Jensen & Schultz 2017: 84)

Modern technologies have invaded our daily life as well as our sports life, in order to highlight the best of the player's natural human capabilities through improving performance and developing training methods, as well as in the manufacture of equipment and auxiliary tools for training. (Mohamed Shehata 2019: 34)

Devices and auxiliary tools play an effective role in developing the level of technical performance of the player by acquiring physical fitness and general and private mobility and improving the ability to imagine the required motor duty, while adding an element of suspense and not feeling bored during training, and improving some features Psychological performance related to skill.

(Mohamed Abd al-Salam 2003: 10)

Tools and assistive devices play an important role within the training process, as they help the player to clearly realize his training goal, and help the coach to save time and effort, and increase motivation. And enthusiasm among the players.

(Amira Matar et al. 2015: 67), (Maha Al-Hagrasy et al. 2009: 21), (Kamal Abdel Hamid et al. 2011: 34)

Method of training for the development of physical qualities is preferably appropriate to the type of muscular work, in addition to the fact that the predominant

movements performed on devices and tools have a positive effect in raising the level of skill performance. (Baumgartner 2012: 54)

Developed training aids and devices with modern methods to raise the level of physical and skill performance, including the sliding disc, which is a unique technology disc, and is considered one of the fastest capacity development programs. Physical and skill, where the disc is placed under the feet or hands of the players and the movements are performed in movement groups that simulate the process of ice skating. (Gerolds et al 2015: 75) Sliding disc exercises are one of the recent trends that aim to use an auxiliary training tool to improve sports performance in various aspects, through which it is possible to develop the physical capabilities of the practiced sports activity, which contributes to the development of physical performance, which has a clear impact on Raising the technical level of the players, and the importance of these exercises lies in the fact that they are work in which one or more group of muscles of the body participate), with the aim of developing mainly strength, flexibility and balance, in addition to some other elements.

(Sayeda Abdel-Aal 2018: 119)

Sliding disc exercises are an integrated program for physical capabilities, and their performance is characterized by continuity and lack of boredom and practicing slip disc exercises on a regular basis leads to the improvement and development of capabilities such as endurance of strength, flexibility and balance, and it is considered a method New to fitness programs, with the possibility of practicing it in an individual and group form.

(Gerolds et al 2015: 76)

Through the researcher's work as an assistant professor in the department of physical education and movement sciences - Qassim University, and technically responsible for the men's artistic gymnastics team at the same university, the researcher noticed a shortcoming in the level of technical performance when performing the Tkachev skill with three different performances (piked, straight, and tucked) on horizontal bar. where the implementation of the Tkachev skill understudy depends on liberation from the bar and flying to perform the basic technical stage of the skill and then return to catch the bar again, which requires the player to exploit the energy of movement resulting from rotating around the bar to obtain the flight path and then execute The skill is understudy in a correct technical way, from here the research problem arose, where the researcher noticed a varying defect in the players' ability to perform the Tkachev skill with its different performances under research, which negatively affects the player's total score on horizontal bar apparatus.

Where the discounts for the formal errors of performance range between (0.1 - 0.3 - 0.5) of the degree according to the type of error, and the opponent may reach (1 full degree) in the event of the player losing his balance and falling during freedom from the bar and flying to perform the basic technical stage of the skill and thus his inability To return to catch the bar of the bar again, and the researcher noticed the repetition of technical mistakes of the players on the bar,

including the technical skills under research, and this became clear through the competitive evaluation positions, and the researcher assumes that this problem is due to the players' lack of some special physical abilities such as strength, flexibility and balance , due to its importance in carrying out the motor duty as required, which affects the level of technical performance of the skills of the horizontal bar apparatus understudy.

Through the researcher's follow-up to the tremendous development in the methods and methods of training, a new form of exercises using gliding discs has recently appeared, as it is an integrated program for the development of physical qualities, as its performance is characterized by enthusiasm and not feeling bored, and practicing gliding disc drills on a regular basis leads to improvement And the development of physical abilities such as strength, flexibility and balance, as it is considered a new method for fitness programs, with the possibility of exercising it individually and collectively.

By reviewing the researcher's studies related to gymnastics, the researcher noticed a dearth of training programs using sliding discs, especially on horizontal bar, which requires conducting an experimental study as an attempt to develop the level of technical performance of the players understudy on horizontal bar apparatus.

Therefore, the researcher resorted to designing and codifying a set of exercises using sliding discs, to identify their effectiveness in developing some special physical traits and the level of technical performance of Tkachev's skill with its three performances (piked, straight, and tucked) on horizontal bar apparatus, thus raising the scores of the players understudy.

Research Goals:

Identify the effectiveness of using sliding disc drills on the level of technical performance on horizontal bar apparatus in gymnastics for the research sample members, through:

- Developing the level of some physical variables for the members of the sample understudy.
- Developing the level of technical performance of Tkachev's skill on horizontal bar apparatus understudy.

Research Hypothesis:

- There are statistically significant differences between the pre and post measurements of the experimental group in the physical variables understudy in favor of the post measurement.
- There are statistically significant differences between the pre and post measurements of the experimental group in the level of technical performance of Tkachev's skill on horizontal bar apparatus understudy in favor of the post measurement.

Research Terms:

Sliding Disc

It is an auxiliary training tool, in the form of a disc made of nylon, used for the feet and hands, to develop special physical abilities such as strength, flexibility and balance, by simulating the motor performance of ice skating. (Procedural definition)

Research Procedures:

Research Methodology:

The researcher used the experimental method using the experimental design of one group and by making the two measurements (pre-post).

Spatial Domain: gymnastics hall - halls complex at Qassim University - Buraidah City - Kingdom of Saudi Arabia.

Time Domain: The exploratory study was conducted in the time period from Sunday 27/12/2020 to Friday 1/1/2021, and the tribal measurement was conducted on Saturday 2/1/2021. The basic study was carried out during the period from Sunday 3/1/2021 until Thursday 25/2/2021, and the post-measurement was conducted on Saturday 27/2/2021.

Research Sample:

The sample of the basic study was chosen intentionally from the gymnastics team players at Qassim University, and the sample included (10) players, while the exploratory study was conducted on a sample of players representing the original community and from outside the basic research sample, and their number reached (10) players who were chosen randomly with the aim of Selecting suitable sliding disc drills related to the technical skills understudy, and codify the training load of these drills.

Statistical description of sample

Table (1)
Statistical description of growth rates variables (n=10)

	Statistical data Variables	measuring unit	Mean	standard deviation	Median	Coefficient of torsion
Growth rates	1 Tall	cm	171.5	2.67	170.5	1.12
	2 Weight	Kg	69.2	1.68	69.5	- 0.53
	3 Age	Year	19.07	0.53	19	0.392
	4 Training age	Year	12.9	1.15	12	0.234

From Table (1) it is clear that the values of the torsion coefficient for each of the growth rates variables understudy ranged between (-0.53, 1.12) and these values were limited between (+3) which indicates the moderation of the values of the growth rates of the individuals in the sample understudy before experimenting.

Table (2)
Statistical description of physical variables (n = 10)

Physical Variables	Test	measuring unit	Mean	standard deviation	Median	Coefficient of torsion
muscular strength	Grip strength	Kg	46	3.46	46	0
	Legs strength	Kg	137.3	5.05	139	-1.009
	Back strength	Kg	136.8	6.26	138.5	-0.813
muscular endurance	Sit ups	number	29.3	2.05	29.5	-0.291
Flexibility	Flexion of the trunk from long sit	degree	15.4	1.57	15	0.760
Dynamic Balance	Bass Test	degree	71.3	7.86	70	0.496

From Table (2) it is clear that the values of the torsional coefficient for each of the physical variables understudy ranged between (- 1.009, 0.760) and these values were limited between (+3) which indicates the moderation of the values for the physical variables of the sample individuals understudy before experimenting.

Table (3)
Statistical description of technical performance variables (n = 10)

Technical Performance Variables	measuring unit	Mean	standard deviation	Median	Coefficient of torsion
TKATSHEV Piked	degree	6.12	0.582	6.15	-0.154
TKATSHEV Stretched	degree	6.81	0.814	6.85	-0.147
TKATSHEV Tucked	degree	6.05	0.548	5.95	0.547

From Table (3) it is clear that the values of the torsion coefficient for each of the technical performance variables understudy ranged between (-0.154, 0.547) and these values were limited between (+3) which indicates the moderation of the values of technical performance of the individuals of the sample individuals understudy before experimenting.

Means of data collection:

The researcher used the following methods to collect data:

- The means of collecting data related to physical variables.
- The means of collecting anthropometric data.
- The means of collecting technical performance level data understudy.
- The means of collecting data on the physical variables understudy:

Physical Variables Tests understudy attachment (5)

- Grip strength test (dynamometer).
- Legs muscular strength test (dynamometer).
- Back muscular strength test (dynamometer).
- Sit Ups test (45s) abdominal muscular endurance.
- The torso flexion test from long sitting to measure flexibility.
- Modified Bass Test of dynamic balance.

Anthropometric data collection methods:

The means and tools for data collection that are appropriate to the nature of the study were identified by looking at the scientific references, research, and previous studies in the field of gymnastics training and some other sports. The researcher has used the following tests, measures, and devices:

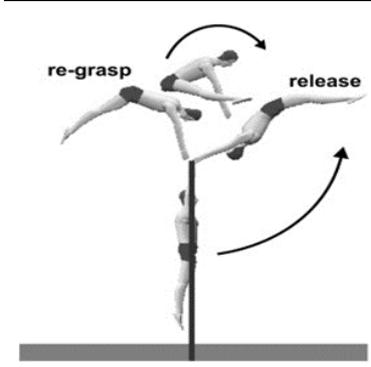
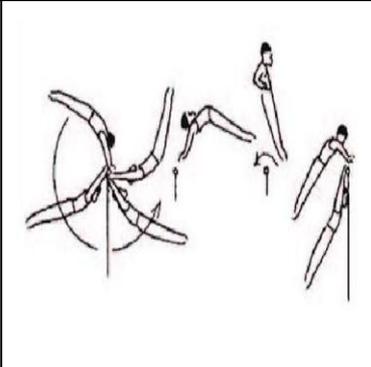
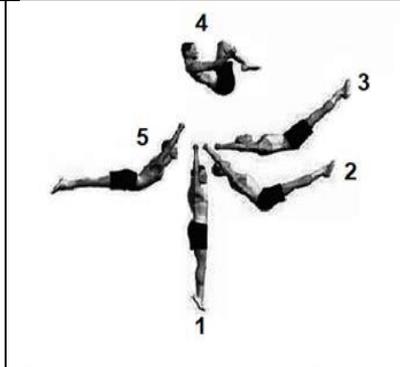
- A rest-meter device for measuring the total length of the body up to the nearest 1 cm.
- The medical scale device to measure the student's weight up to the nearest 1 kg.

Means of collecting data on the technical performance level of the skills understudy:

The technical skills understudy was filmed using the "video camera" and the videos were shown to four arbitrators accredited by the Egyptian Gymnastics Federation to evaluate the technical performance of the skills understudy, where each rule monitored a score of ten degrees for each technical skill of the high bar apparatus understudy and was deleted the highest and lowest score for a player's score is the average of the two middles.

Subjective evaluation is the type of evaluation that does not depend on the standards, levels, and criteria, but depends on the experiences of the measurers (arbitrators), and the legal evaluation is used in many of sports activities, especially gymnastics, diving, rhythmic gymnastics and water ballet, where uniform international legal conditions are established, agreed upon in advance between the arbitrators, so that the greatest degree of objectivity can be reached in assessing the degree. (Mohamed Hassanein 2015: 42), (Mohamed Khalil 2020: 9)

Table (4)
Technical skills understudy
Tkachev skill with 3 different performances

Skill 1	Skill 2	Skill 3
TKATSHEV Piked	TKATSHEV Stretched	TKATSHEV Tucked
		

Selecting the assistants:

A number of (2) assistants from the Department of Physical Education and Kinesiology were chosen to assist the researcher in applying the study procedures.

The Exploratory Study:

The researcher conducted the exploratory study in the time period from Sunday 27/12/2020 to Friday 1/1/2021, based

on a sample of players representing the original community and from outside the main research sample, and their number reached (10) players who were chosen by random method. The Post measurement on Saturday, 2/1/2021.

This study has targeted:

- Ensure the safety of the devices and tools used

- Discovering and handling difficulties while making measurements.
- Training assistants to take measurements and ensure that tests are applied according to the specified conditions
- Selecting and experimenting with sliding disc drills and their suitability for the technical skills understudy.
- Legalization of training load variables for sliding disc drills understudy.
- Conducting scientific transactions for the tests used (validity and reliability) and ensuring their suitability for the research sample.
- Adjust the best angle of shooting with the camera to facilitate the process of assessing the technical performance of the skills understudy.

The Exploratory Study resulted in:

Ensure that all of its objectives are achieved, and that the proposed exercises under consideration are appropriate for the nature of the age group, as the members of the pilot study sample performed the proposed sliding disc drills without any difficulties, which made the researcher the possibility of applying these exercises to the individuals of the basic research sample.

Scientific Transactions:

- Validity coefficient

The researcher calculated the validity coefficient using the method (honesty of differentiation), between two groups, one distinct and numbered (5) players, and the other non-distinguished number (5) players, from the same research community and from outside the basic research sample, in order to calculate the validity coefficient of the physical and technical tests understudy, as shown in Table No. (5)

*Table (5)
Differentiation validity of physical and technical tests understudy*

Physical Variables	Test	Measuring unit	distinguished group		less distinguished group		difference mediocre	T test
			Mean	Sc.D.	Mean	Sc.D.		
muscular strength	1 Grip strength	Kg	49.20	0.836	42.80	0.836	6.40	12.095*
	2 Legs strength	Kg	140.0	2.489	133.80	4.549	7.00	3.018*
	3 Back strength	Kg	140.0	5.612	127.60	8.677	12.40	2.683*
muscular endurance	4 Sit ups	number	31.00	1.00	27.60	1.14	3.40	5.013*
Flexibility	5 Flexion of the trunk from long sit	degree	16.60	1.14	14.20	0.836	2.40	3.795*
Dynamic Balance	6 Bass Test	degree	77.40	5.770	63.40	5.458	14.00	3.914*
Technical performance	7 TKATSHEV piked	degree	6.58	0.383	5.66	0.296	0.920	4.244*
	8 TKATSHEV stretched	degree	7.40	0.452	6.22	0.645	1.180	3.346*
	9 TKATSHEV tucked	degree	6.44	0.320	5.62	0.342	0.820	3.909*

Tabular T value at a significant level of 0.05 = 1.860 on one side * = significant

It is clear from Table No. (5) and by applying the "T" test to calculate the significance of the differences between two independent groups, one distinguished and the other less distinguished, that the calculated "T" value, which was limited to (2.681, 12.095), is greater than the tabular "T" value at a significant level. (0.05), which amounted to (1.860), which indicates that there are statistically significant differences between the two groups in favor of the distinguished group, which confirms the validity of the tests understudy in what they were designed to measure and

that they can differentiate between the distinguished and less -distinguished players of the same age group.

Reliability Coefficient:

The reliability coefficient was calculated using the method of applying and reapplying the test (Test - Retest), for the physical and technical tests understudy, the first application of the tests was conducted on 27/12/2020 on a sample of (10) players. While the second application took place on 1/1/2021, with an interval of five days. And calculate the correlation coefficient between them, as shown in Table (6),.

Table (6)
Reliability coefficient of physical and technical tests understudy n=10

Physical Variables		Test	Measure unit	TEST		RE-TEST		Correlation Coefficient
				Mean	Sc.D.	Mean	Sc.D.	
muscular strength	1	Grip strength	Kg	46	3.46	47.60	4.115	0.947*
	2	Legs strength	Kg	137.3	5.05	139.60	5.440	0.814*
	3	Back strength	Kg	136.8	6.26	142.80	6.762	0.782*
muscular endurance	4	Sit ups	number	29.3	2.05	30.70	2.311	0.895*
Flexibility	5	Flexion of the trunk from long sit	degree	15.4	1.57	16.66	1.897	0.933*
Dynamic Balance	6	Bass Test	degree	71.3	7.86	74.00	8.831	0.930*
Technical performance	7	TKATSHEV piked	degree	6.12	0.582	6.29	0.670	0.905*
	8	TKATSHEV stretched	degree	6.81	0.814	6.97	0.731	0.976*
	9	TKATSHEV tucked	degree	6.05	0.548	6.25	0.497	0.914*

Tabular value "r" at the level of significance 0.05 = 0.564 on one side * = significant

It is clear from Table (6) that the values of "r" of physical and technical tests understudy ranged between (0.782, 0.976), which is greater than the tabular value of "r" at the level of significance (0.05), which amounted to (0.564), which indicates the existence of a relationship a statistically significant correlation between the Test & Re-test, which confirms the reliability of the tests understudy.

Basics of design the program Suggested sliding disc drills:

The researcher applied a set of sliding disc drills attached (6) that correspond to the motor paths of the technical skills on high bar apparatus understudy. The drills are divided into:

1. sliding disc drills for arms.
2. sliding disc drills for the legs.
3. sliding disc drills for trunk and the body as a whole.

-The researcher also took into account when designing these drills, the following:

- It should contain the basic stages of the skill or some of its parts.

- Simulating the actual performance of skills in terms of strength, speed, direction of movement, and accuracy of performance.
- Codify the sliding disc drills to determine the maximum intensity for each exercise.
- Gradual exercises from easy to difficult and from simple to complex with its diversity.

-Training load variables for the suggested sliding disc drills: The researcher has codified the training load variables for the proposed fitness sliding disc drills by reviewing previous and related studies, specialized references, sports training science references and the international information network. Attachment (7)

-Rationing of training load variables:

1. Intensity:

The researcher relied on calculating pulse rates to determine the intensity of the training load Using the Carvone in equation to calculate the Target Pulse Rate (TPR)

TPR = resting pulse rate + target load intensity x (heart rate reserve)

Table (7)
Intensity Percentage

load degrees	Percentage	Pulse Rate
Medium	50: 74%	130: 150 p/m
high	75: 84%	150: 170 p/m
Maximum	85: 100 %	170: 200 p/m

2. Volume, (Repetitions – Sets):

- Repetitions

The appropriate repetition for each player was determined by self-observation of the player while performing the exercise, It is the repetition after which a defect in performance begins Then determine the average of the repetitions to be the appropriate number of repetitions,

Taking into account the skill level of the player, so that the stimulus period is sufficient to allow the movements to be performed correctly, without increasing the intensity to the degree that negatively affects the technical performance. (Alsayed Abdel-Maqsoud 2016: 183)

- Sets:

The researcher used the number of repetitions and appropriate rest time for each exercise to reach the maximum possible number of sets, after which the player could not perform the exercise correctly or did not control the speed of performance, thus we reach the maximum load for each of the exercises and thus we get the total time to perform the exercise, the number of groups suitable for the goal of each exercise (3-4 sets).

3. Rest Periods:

Determining the appropriate intermittent rest time after performance based on the pulse rate by calculating the time

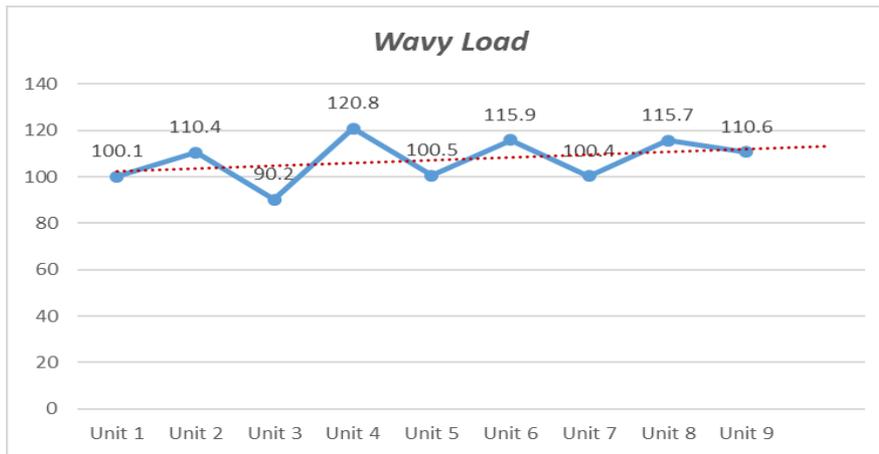
period during which the pulse rate reaches 110-120 pulse per minute. (Adel Abdul-Basir Ali 2018: 60)

Through the exploratory study, the appropriate time for the rest periods was determined, which amounted to (20-30 seconds).

Program Duration:

- The duration of the training program was (8 weeks), with 3 training units per week.
- The researcher determined the time of the training unit between (90: 120 minutes), taking into account the wavy load between the training units.

*Figure (1)
Time distribution of training units*



Training methods:

The researcher used: (Interval training, Repetitive training, Circular training technique)

Training Load Cycle:

Formation the training load cycle on the training units was chosen using the way of training load (1: 2), which means a medium load for one unit, followed by a high load in the following two units.

Basic study:

The basic study was carried out during the period from Sunday, 3/1/2021, until Thursday, 25/2/2021, and the post-measurement was conducted on Saturday, 27/2/2021, and the pre and post technical performance was photographed

at the gymnastics hall headquarters in the halls complex. Sports at Qassim University. As shown in the schedule of the application of the research attached (10).

Statistical Treatments:

The researcher used the program (Statistical Package for Social Sciences) (SPSS v25)

Using the following statistical parameters:

- SMA. Standard Deviation – Median
- Torsional coefficient – Wilcoxon test - Percentage of improvement.

Presentation and discussion of the results:

- Present the results:
- Presenting the results of the first hypothesis:

Table (8)

Significance of the differences between the pre and post measurements for the experimental group in the physical variables n = 10

Physical Variables	Test	Pre mean	Post mean	Positive ranks		Negative ranks		(Z) Value
				Mean	Sc.D.	Mean	Sc.D.	
muscular strength	1 Grip strength	46	53.60	5.5	55	0.00	0.00	-2.803*
	2 Legs strength	137.3	159.5	5.5	55	0.00	0.00	-2.309*

Physical Variables	Test	Pre mean	Post mean	Positive ranks		Negative ranks		(Z) Value
				Mean	Sc.D.	Mean	Sc.D.	
muscular endurance	3	136.8	178.9	5.5	55	0.00	0.00	-2.805*
	4	29.3	36.4	5.5	55	0.00	0.00	-2.814*
	5	15.4	22.2	5.5	55	0.00	0.00	-2.807*
Dynamic Balance	6	71.3	94.4	5.5	55	0.00	0.00	-2.803*

* Tabular value (Z) at the level of 0.05 = + 1.96

From Table (8) it is clear that the calculated value of (Z) for each of the physical variables understudy has ranged between (-2.309, -2.814) and these values are not limited to (+ 1.96) which indicates the presence of statistically significant differences. between the mean of the pre-post measurements of the experimental group in favor of the post measurement at the level of significance (0.05) in the physical variables understudy.

Figure (2)

Significance of the differences between the pre and post measurements for the experimental group in the physical variables



Table (9)

The percentage improvement of the experimental group In the physical variables understudy

Physical Variables	Test	Pre mean	Post mean	Difference between the two Means	Percentage of improvement
muscular strength	1	46	53.60	7.60	16.50%
	2	137.3	159.5	22.20	16.20%
	3	136.8	178.9	42.10	30.80%
muscular endurance	4	29.3	36.4	7.10	24.20%
Flexibility	5	15.4	22.2	6.80	44.20%
Dynamic Balance	6	71.3	94.4	23.10	32.40%

From Table (9) it is clear that the percentage of improvement of the experimental group in the physical variables understudy ranged between (16.2%, 44.2%) and the highest percentage of improvement was the Flexibility by (44.2%) and the lowest percentage of improvement was for Legs muscular strength by (16.2%) and the percentage of improvement.

Figure (3)
The percentage improvement in the physical variables understudy



Presenting the results of the second hypothesis:

Table (10)
Significance of the differences between the pre and post measurements for the experimental group in the technical performance variables n = 10

Technical Performance Variables	Test	Pre mean	Post mean	Positive ranks		Negative ranks		(Z) Value
				Mean	Sc.D.	Mean	Sc.D.	
1	TKATSHEV (piked)	6.12	9.30	5.5	55.0	0.00	0.00	-2.803*
2	TKATSHEV(stretched)	6.81	8.83	5.5	55.0	0.00	0.00	-2.825*
3	TKATSHEV (tucked)	6.05	9.07	5.5	55.0	0.00	0.00	-2.812*

* Tabular value (Z) at the level of 0.05 = + 1.96

From Table No. (10) it is clear that the calculated value of (Z) for each of the technical performance variables understudy ranged between (-2.803, -2.812) and these values are not limited to (+ 1.96), which indicates that there are statistically significant differences between the mean of the pre-post measurements of the experimental group in favor of the post measurement at the level of significance (0.05) in the technical performance variables.

Figure (4)
Significance of the differences between the pre and post measurements for the experimental group in technical performance variables

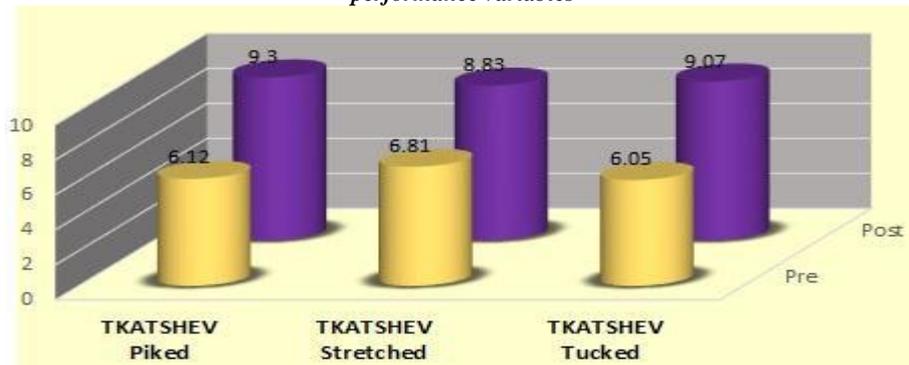
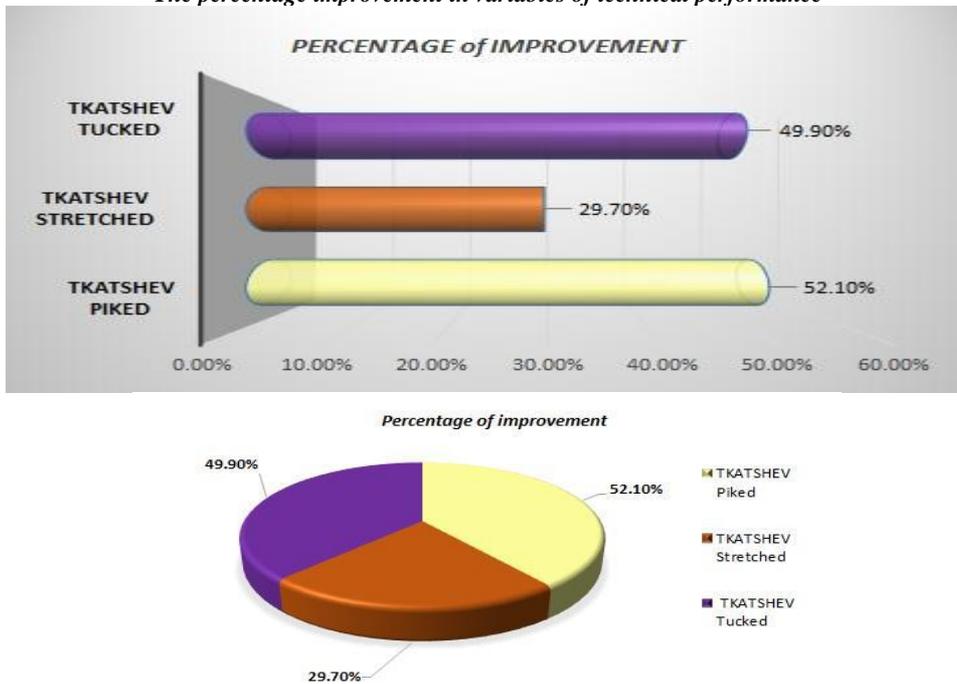


Table (11)
The percentage improvement of the experimental group In technical performance variables

Technical Performance Variables	Test	Pre mean	Post mean	Difference between the two Means	Percentage of improvement
1	TKATSHEV (piked)	6.12	9.30	3.186	52.1%
2	TKATSHEV (stretched)	6.81	8.83	2.02	29.7%
3	TKATSHEV (tucked)	6.05	9.07	3.02	49.9%

From Table (11) it is clear that the percentage of improvement of the experimental group in the variables of technical performance ranged between (29.7%, 52.1%) and the highest percentage improvement was Tkatshev piked by (52.1%) and the lowest percentage improvement was Tkatshev Stretched by (29.7%) and Tkatshev tucked ranged between them by (49.9%).

Figure (5)
The percentage improvement in variables of technical performance



Discuss the results:

• Discussing the results of the first hypothesis:

Which states, "There are statistically significant differences between the pre and post measurements of the experimental group in the physical variables understudy in favor of the post measurement."

It is clear from Table No. (8) and Figure No. (2) that there are statistically significant differences at the level (0.05) between the tribal and remote measurements of the experimental group in favor of the post measurement in the physical variables under study, where the tabular (Z) value was at the level of 0.05 = (+1.96), while the calculated (Z) value for each of the physical variables understudy ranged between (-2.814, -2.309) and that all of these values are less than (-1.96), meaning that they are not limited to between (+ 1.96), which indicates the existence of statistically significant differences between the mean The pre- and post-measurements of the experimental group in favor of the

post-measurement at the level of significance (0.05) in the variables of the physical variables under study. The researcher attributes these results to the effect of the sliding disc drills used, and the regularity of training weekly at a rate of (3) training units per week.

It is also evident from Table No. (9) and Figure No. (3) that there are statistically significant differences between the pre- and post-measurements of the experimental group in favor of the post measurement in the physical variables understudy, with an improvement rate ranging between (16.2%, 44.2%), where The average score of the grip strength test (dynamometer) in the pre-measurement was (46.00 kg), and it rose in the post-measurement and became (53.60 kg) with an improvement rate of (16.50%), while the average score of the test of muscle strength of the legs (dynamometer). was in the pre-measurement (137.30 kg), and it increased in the post-measurement and became (159.50 kg) with an improvement rate of (16.20%), and the

average scores of the back muscle strength test (dynamometer) in the premeasurement was (136.80 kg). It increased in the post measurement and became (178.90 kg), with an improvement rate of (30.80%). While the average scores of the abdominal muscular endurance test (Sit Ups test) in the pre-measurement was (29.30 recounts) and increased in the post-measurement and became (36.40 recounts) with an improvement of (24.20%), and the average scores of Thigh joint flexibility test (torso flexion test from long sitting) in the pre-measurement was (15.40 degrees) and increased in the post-measurement and became (22.20 degrees) with an improvement rate of (44.20%), and the average score of the average for dynamic balance (Bass test) in the pre measurement was (71.30 degrees), and it increased in the post measurement and became (94.40 degrees) with an improvement rate of (32.40%).

The researcher attributes the positive effect on the physical variables understudy (muscular strength, muscular endurance, flexibility, dynamic balance) to the used sliding disc drills. During the design of the exercises, the researcher took into account the diversity of muscular work trends, and the employment of physical variables in the motor paths of the technical skills understudy, which contributed to the development of fitness Physical fitness of the research sample.

These results are consistent with what was indicated by (Muhammad Shehata 2019: 25) that devices and auxiliary tools play an important role within the training process, as they help to clearly realize the goal of training and help the coach in saving time and effort, and increase motivation and enthusiasm among the players.

It also agrees with what was indicated by (Maha Al-Hagrasy, Hala Kamel 2009: 11) with (Muhammad Abdul Salam 2003: 17) that the auxiliary devices have an effective role to provide the player from the beginning with an almost clear kinetic imagination about the required technical performance, without the infiltration of boredom To the self, as well as adding the elements of suspense and enthusiasm to training on the devices and tools used, acquiring physical fitness, motor abilities, and some psychological features related to performance.

It was evident from the rates of improvement of the physical variables understudy (16.2%, 44.2%), as the researcher believes that these results are consistent with what and (Bryant et al. 2018: 1-9), (Gerolds et al. 2015: 112) indicated that sliding disc drills are an integrated program for physical characteristics as they are characterized by continuity in performance without feeling tired or bored, with a feeling of happiness and joy during performance, and practicing gliding disc drills on a regular basis leads to an improvement in physical qualities by developing strength, flexibility and balance.

The researcher also attributes these statistically significant differences between the average pre and post measurements and the percentages of improvement in the physical abilities understudy (strength, flexibility, balance) to the positive impact of sliding disc drills and their inclusion of various exercises for all muscle groups in the body, which in turn led to an improvement in the physical variables under

discussion. In this regard, (Mohamed Shehata 2019: 56), (Wajih Shamandi 2012: 38), indicate that regular sports training causes several physiological changes to the muscle, represented by an increase in the size of muscle fibers, and thus increasing the ability of the nervous system to provoke the contraction of fibers, which leads to an increase in the resulting strength. From the muscle, and muscle lengthening helped to increase the production of force, thus reducing muscle hypertrophy resulting from strength training and reducing the internal resistance in the muscle, thus increasing the strength and speed of muscle contraction.

The researcher attributed this improvement to the selection of appropriate exercises that target the main muscle groups in the body, focusing on and strengthening them during the regulated training units, and the movement during the full motor range of the joint develops flexibility, which in turn helps to increase muscular strength. In this regard, (Hassan Allawi 2012: 28), explains that the exercises in which the muscles lengthen are considered one of the effective and ideal training methods used to improve muscle strength.

The researcher indicates that the sliding disc exercises included a set of varied and continuous exercises, which in turn led to the development and development of the physical variables under discussion, and in this regard, (Walid Nabil 2005: 21) indicates that balance is one of the qualities that can be acquired by continuous training with the aim of becoming a movement Or a skill that is automated in its performance, and exercises focus on neuro stimulation to control the balance of the body.

These results are in agreement with those of (Adi Hidayat 2019: 22), (Andrew Shim et al 2019: 23), (Nanda Eriko et al. 2018: 35), (Robert SK NG et al. 2017: 36), (Susilaturochman et al. 2017: 37), (Heng Choon Meng et al. 2014: 30), that the use of training aids and aids improves scores of dynamic balance tests.

The researcher believes that the use of the sliding disc as an aid in gymnastics training led to a significant improvement in the physical variables understudy (muscular strength, flexibility, balance) and this is consistent with the consensus of the results of the studies of both (Sayeda Ali 2018: 9), (Sameh Magdy 2015: 8), that exercises using the slip disk led to an improvement in physical variables, including (strength, flexibility, balance), and they also recommended conducting more scientific studies related to slip disk exercises to identify their effectiveness in various sports activities.

Based on the foregoing results, the first hypothesis that states: "There are statistically significant differences between the pre and post measurements of the experimental group in the physical variables understudy in favor of the post measurement."

• **Discussing the results of the second hypothesis:**

Which states, "There are statistically significant differences between the pre and post measurements of the experimental group in the level of technical performance of Tkachev's skill on horizontal bar in gymnastics understudy in favor of the post measurement."

It is clear from Table No. (10) and Figure No. (4) that there are statistically significant differences at the level (0.05)

between the tribal and remote measurements of the experimental group in favor of the post-measurement in the level of technical performance of Tkachev's skill on horizontal bar apparatus understudy, where the tabular (Z) value was At the significance level of $0.05 = (+1.96)$, while the calculated value (Z) for each of the technical performance variables understudy ranged between $(-2.803, -2.812)$, and that all of these values are less than (-1.96) , meaning that they are not limited to between $(+1.96)$, which It indicates that there are statistically significant differences between the means of the pre and post measurements of the experimental group in favor of the post-measurement at the level of significance (0.05) in the technical performance variables of Tkachev's skill on horizontal bar apparatus understudy.

It is also evident from Table No. (11) and Figure No. (5) that there are statistically significant differences between the tribal and remote measurements of the experimental group in favor of the post-measurement in the level of technical performance of Tkachev's skill on horizontal bar apparatus understudy, with an improvement rate that ranged between (29.7%, 52%), The average skill score (TKATSHEV Piked) in the pre-measurement was (6.12 degrees) and became in the post-measurement (9.30 degrees), with an improvement rate of (52.1%), while the average score of (TKATSHEV Stretched) in the pre-measurement was (6.81 degrees) and became in the post-measurement (8.83 degrees) with an improvement rate of (29.7%), and the average score of (TKATSHEV Tucked) in the pre measurement was (6.05 degrees) and became in the post measurement (9.07 degrees), with an improvement rate of (49.9%).

The researcher attributed the level of improvement in the variables of the technical performance level of the skills of Tkachev skill with its three techniques on horizontal bar apparatus understudy, to the positive effect of the sliding disc drills used as shown in Annex (6). The technicality understudy, and the varied and interesting movements contained in the exercises led to increased enjoyment and lack of boredom, which clearly contributed to the development of the skill level of the research sample members. And that with different significant improvement rates, the best of which was in favor of the skill (TKATSHEV Piked), with an improvement rate that was the highest by (52.1%).

The researcher adds the improvement in the level of technical performance of Tkachev's skill with its three techniques on horizontal bar apparatus understudy to the development of physical qualities by carrying out various exercises using the sliding disc, which flow into the motor path of the technical performance variables understudy, and in this regard (Jensen Schultz 2017: 84), indicates that the development exercises Physical abilities are preferably suitable for the type of muscular work, in addition to the fact that the prevailing movements on devices and auxiliary tools have a positive impact on the level of skill performance.

These results are consistent with the results of the studies of (Jemni, M., et al. 2016: 31), (Gerolds et al 2015: 29), (Liu Hao 2012: 34), (Dave Schmitz 2013: 27), where they

unanimously agreed that standardized exercises using modern equipment and auxiliary tools for sports training work to raise physical efficiency and also develop in skill performance and noticeable and rapid improvement in the performance of different skills.

The researcher believes that the use of the sliding disc as an aid in training gymnastics skills continuously for a period of 8 weeks led to a significant improvement in the skill variables understudy (the three performances of Tkachev's skill), and this is consistent with the consensus of the results of the studies of (Jose Afonso, et al. 2020: 33), (Moshira Al-Ajmi 2016: 19), (Maan Jassim et al 2010: 10), (Eadric Bressel, et al 2007: 28), that the technical performance has developed significantly due to the application of exercises using devices and auxiliary tools, which made the players more control over the parts of the body. different activities during the motor duty, which contributed significantly to the development of performance.

Based on the foregoing results, it is clear that the proposed sliding disc drills have a positive effect on the level of technical performance of the different performances of the Tkachev skill on horizontal bar apparatus understudy, through the development of special physical attributes and employing them as requirements for skill performance.

Thus, the second hypothesis has been fulfilled, which states: "There are statistically significant differences between the pre and post measurements of the experimental group in the level of technical performance of Tkachev's skill on horizontal bar apparatus understudy in favor of the post-measurement."

Conclusions and Recommendations:

Conclusions:

Based on what the research results showed, and in light of the research goal and hypotheses, the researcher reached the following conclusions:

- The proposed sliding disc drills have a positive effectiveness on some physical variables understudy, through:
 - The percentage of improvement in the physical variables understudy ranged between (16.2%, 44.2%).
 - The average degrees of grip strength test (dynamometer) in the pre measurement was (46.00 kg) and increased in the post measurement and became (53.60 kg) with an improvement rate of (16.50%).
 - The average scores for legs muscular strength (dynamometer) in the per measurement was (137.30 kg), and in the post measurement, it increased to (159.50 kg) with an improvement rate of (16.20%).
 - The average score of the back muscular strength (dynamometer) in the pre-measurement was (136.80 kg) and increased in the post-measurement and became (178.90 kg), with an improvement rate of (30.80%).
 - The average score of abdominal muscular endurance (Sit Ups) in the pre-measurement was (29.30 recounts), and it increased in the post-measurement and became (36.40 recounts) with an improvement rate of (24.20%).
 - The average score of the thigh joint flexibility (torso flexion test from long sitting) in the pre-measurement

- was (15.40 degrees), and it increased in the post-measurement and became (22.20 degrees) with an improvement rate of (44.20%).
- The average score of dynamic balance (modified Bass test) in the pre-measurement was (71.30 degrees), and it increased in the post-measurement and became (94.40 degrees) with an improvement rate of (32.40%).
 - The proposed sliding disc drills have a positive effectiveness on the variables of the technical performance level of Tkachev's skill on horizontal bar apparatus understudy, through:
 - The percentage of improvement in the technical performance variables understudy ranged between (29.7%, 52.1%).
 - The average skill score (TKATSHEV Piked) in the pre-measurement was (6.12 degrees) and became in the post-measurement (9.30 degrees), with an improvement rate of (52.1%).
 - while the average degree of skill (TKATSHEV Stretched) in the pre-measurement was (6.81 degrees) and became in the post-measurement (8.83 degrees), with an improvement rate of (29.7%).
 - The average skill score (TKATSHEV Tucked) in the pre-measurement (6.05 degrees) became in the post-measurement (9.07 degrees), with an improvement rate of (49.9%).

Recommendations:

- In light of the results of the research results and the conclusions reached, the researcher recommends the following:
 - The application of sliding disc exercises to develop the technical performance of Tkachev's skill on horizontal bar apparatus.
 - The combination of physical and skill exercises in proportion to the motor paths of the skills to be developed with the aim of comprehensive preparation of the player, to reach the highest level of achievement.
 - Awareness of trainers of the importance and how to apply sliding disc drills, in proportion to the requirements of technical performance on each gymnastic equipment.
 - The application of sliding disc drills in the skill preparation stage and the competition period, to make the most of mastering the technical sentence on horizontal bar apparatus.
 - The application of sliding disc drills on different gymnastics equipment, and on other age groups.

References:

Arabic References:

1. **Adel Abdel-Basir Ali (2007):** A report on the artistic gymnastics teams for men and women participating in gymnastics competitions in the Ninth African Games in Algeria 15-23/7/2007, Egyptian Gymnastics Federation, Cairo. pp. 1-6.
2. **Adel Abdel-Basir Ali (2018):** Sports Training and Integration between Theory and Practice, 7th Edition, The Book Center for Publishing, Cairo.
3. **Ahmed Al-Hadi Yousef (2014):** Advanced methods of gymnastics training, Cairo.
4. **Alsayed Abdel-Maksoud (2016):** Theories of Sports Training - Basic Aspects of the Training Process, Al-Hasnaa Library, Cairo.
5. **Amira Muhammad Matar, Nadia Gharib Hammouda, Omaima Ahmed Hassanein (2015):** Artistic gymnastics and its applications in the light of scientific innovations, publishing house, Cairo.
6. **Haidar Abdul-Razek Kadhim, Laith Muhammad Hussein, Kadhim Issa Kazim (2016):** The Effect of a Suggested Training Curriculum in Developing Some Special Physical Patches and the Level of Technical Performance on the Junior Mind System, Journal of Physical Education Studies and Research, Volume 47, pp. 224-243.
7. **Kamal Abdel Hamid, Mohamed Sobhi Hassanein (2011):** Physical fitness and its components, theoretical foundations and physical numbers, 6th edition, Dar Al-Fikr Al-Arabi, Cairo.
8. **Sameh Mohamed Magdy (2015):** The effect of using sliding disc exercises on some physical abilities and harmonic abilities of the players of the national team for the fencing sword, published research, Cairo.
9. **Sayeda Ali Abdel-Aal (2018):** The effect of sliding disc exercises on some harmonic abilities and skill performance in modern innovative dance, published research, Scientific Journal of Sports Sciences, Faculty of Physical Education, Minia University.
10. **Maan Abdul Karim Jasim, Nagham Moayad Muhammad (2010):** The effect of using special exercises to develop a stable and moving balance and the level of skill performance on the balance beam, Al-Rafidain Journal for Mathematical Sciences, Volume 16, No. 54.
11. **Maha Mohamed El-Hagrasy, Hala Ahmed Kamel (2009):** The effect of ice training on improving some elements of physical fitness for volleyball and karate players, a comparative study, published research, Journal of Sports Sciences, Faculty of Physical Education, Minia University.
12. **Men's Technical Committee (2020):** International Arbitration Law for Men's Gymnastics Championships, International Gymnastics Federation.
13. **Mohamed El-Sayed Khalil (2020):** Tests and measurements in physical education. Unpublished notes, Faculty of Physical Education, Mansoura University.

14. **Mohamed Hassan Allawi (2012):** The Psychology of Training and Sports Competition, Arab Thought House, Cairo.
15. **Mohamed Hassan Allawi, Muhammad Nasr Al-Din Radwan (2017):** Motor Performance Tests, 9th edition, Dar Al-Fikr Al-Arabi, Cairo.
16. **Mohamed Ibrahim Shehata(2019) :** Contemporary Gymnastics Training, Dar Al-Fikr Al-Arabi, Cairo.
17. **Mohamed Mahmoud Abdel Salam (2003):** Technical Performance and Educational Steps for Pommel and Parallel Horse Exercises, Dar Al Maaref, Alexandria.
18. **Mohamed Sobhi Hassanein (2015):** Measurement and Evaluation in Physical Education and Sports. The first part, i12, Dar Al-Fikr Al-Arabi, Cairo.
19. **Moshira Ibrahim Al-Ajmi (2016):** The effect of exercises using mini-trampoline on the balance and level of performance of some gymnastics skills for students of the Faculty of Physical Education, Journal of Physical Education Studies and Research, No. 52.
20. **Wajih Ahmed Shamandi (2012):** preparing the karate player for the championship between theory and practice, Al-Khattab Press for Publishing, Cairo.
21. **Walid Muhammad Nabil (2005):** The relative importance of the elements of special fitness as determinants of designing a training program on some gymnastics equipment, published research, Faculty of Sports, Helwan University.

Foreign References:

22. **Adi Hidayat (2019):** Effect of agility ladder exercises on agility of participants extracurricular futsal at Bina Darma University, Journal of Physics: Conference Series, Volume 1402, Issue 5.
23. **Andrew Shim & Jennie Rose (2019):** Dynamic Balance Drills to Promote Skill Acquisition and Prevent Injuries in Children, Journal for Physical and Sport Educators, Volume 32, Issue 3, Pages 3-11.
24. **Atilgan, O. E. (2013):** effects of trampoline training on jump, leg strength, static and dynamic balance of boys. Science of gymnastics journal, 5(2), 2013.
25. **Baumgartner, T. A., & Jackson, S.J. (2012):** Measurement for evaluation and exercise science fifth edition Brown and Bench mark publishers.
26. **Bryant R. Byrd, Christina A. Buchanan, Lance C. Dalleck (2018):** The Acute Cardiovascular and Metabolic Responses to Gliding Sliding Disc Exercise in Women, International Journal of Research in Exercise Physiology, 14(1):1-9.
27. **Dave Schmitz (2013):** Functional Training pyramids. New truer high school, Kinetic Wellness Department, U.S.A.
28. **Eadric Bressel, Joshua Yonker (2007):** Comparison of Static and Dynamic Balance in Female Collegiate Soccer, Basketball, and Gymnastics Athletes, Journal of Athletic Training, 42(1), pp 42–46.
29. **Gerolds & et al (2015):** The effect of disc sliding exercises on the muscles using simple aerobic exercises compared to their effect on the muscles using weight lifting exercises", Volume5, No.1, Azusa pacific University, Department of physical therapy, California.
30. **Heng Choon Meng, Jeffrey Low Fook Lee (2014):** Effects of Agility Ladder Drills on Dynamic Balance of Children, Journal of Sports Science and Physical Education, Vol 3 No 1, Page 68-75.
31. **Jemni, M., Sands, W. A., Friemel, F., Stone, M. H., Cooke, C. B. (2016):** Any effect of gymnastics training on upper-body and lower-body aerobic and power components in national and international male gymnasts, The Journal of Strength & Conditioning Research, USA.
32. **Jensen and Shultz (2017):** Applied kinesiology the scientific study of Human performance, 2nd ed, Inc.
33. **Jose Afonso, Teoldo da Costa (2020):** The Effects of Agility Ladders on Performance: A Systematic Review, Int J Sports Med, DOI: 10.1055/a-1187-7560.
34. **Liu Hao (2012):** Physical Ability Training Based on Development of Difficulty Element Technique Chain in Aerobic Gymnastics, Journal of Wuhan Institute of Physical Education, China.
35. **Nanda Eriko, Edy Mintarto, Nining Widyah (2018):** The Influence of Ladder Drills and Jump Rope Exercise Towards Speed, Agility, And Power of Limb Muscle, Journal of Sports and Physical Education, Vol 5, Issue 1. PP 22-29.
36. **Robert S.K NG., Cheung C.W., Raymond, K. W. SUM (2017):** Effects of 6-week agility ladder drills during recess intervention on dynamic balance performance, Journal of Physical Education and Sport, 17(1), Art 46, pp.306 – 311.
37. **Susilatrochman Hendrawan, Hari Setijino, Edy Mintarto (2017):** Model Comparison Exercise Circuit Training Game and Circuit Ladder Drills to Improve Agility and Speed, Journal of Physical Health and Sport, Vol 4, No 2.

International Information Network:

38. <https://www.ekb.eg/>
39. <https://www.british-gymnastics.org/>
40. <http://www.gymdrills4profs.com/>