

The Effect of some PNF Exercises on the Development of Flexibility and the Technical Performance of some Gymnastic Skills for Young Women under the Age of 14

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Introduction and research problem

Sports training is witnessing great progress in recent years, as the efforts of specialists and those interested in this field have doubled their efforts to search for the best training methods and means to develop the physical and technical level.

In addition, the game of gymnastics has witnessed a great development at the international level in recent times with the best methods and modern training methods that are based on scientific foundations. Therefore, the coaches' interest is focused on developing the physical and technical level of the players. Gymnastics is one of the distinct sports due to the skills and abilities they contain. This progress has made a tremendous amount of knowledge and scientific information that contributed to the occurrence of this development, until it reached the best levels.

Muhammad Ibrahim Shahat (2011 AD) and Hedayat Ahmad Hussein and Abdul Raaf Ahmad Al-Hajrasi (2008 AD) agree that gymnastics is one of the activities that require great effort in training him or that the different gymnastics equipment requires a set of controls and foundations, including the economy in effort by trying to reach the player to the performance of the movement smoothly and with the least muscle effort, as well as the link between the use of the final position of

the movement as the initial position of the next movement, which leads to the harmony and linking of the movements in the vowel sentences in the time specified for them (11: 78) (16:45).

Ahmad Al-Hadi Yusef (2010 AD), Ali Al-Saeed Rayhan (2006 AD), Nariman Al-Khatib, Abdul Aziz Al-Nimr, Omar and Al-Sakar (2001 AD) agree that reaching the gymnast to international levels is the result of reaching the technical performance to the highest level by examining the necessary requirements of special physical characteristics. With skills, flexibility is an important physical element in the joint reaching its maximum range of movement and the ability to move muscles and joints throughout its full range of motion, which in this way includes a compound between them. The mobility of the joint and the ability to stretch and flexibility do not improve except through healthy stretching exercises. There is no other method more important than stretching to improve flexibility, And lengthening in its simple sense "means increasing the length of the muscle away from its center."

With an equal amount of both parties, the use of stretching exercises to develop and improve flexibility is based on the fact that stretching reduces the occurrence of muscle

tension and reduces joint injury (1: 43) (10: 21) (15: 68).

Since stretching exercises are an essential part of the warm-up and special physical preparation before the main part of the unit, this is due to the fact that they have many benefits and can be identified in the following main directions:

- * It develops flexibility and other qualities in varying proportions.
- * Prevention of injuries.
- * Developing physical skills and abilities.
- * Restore healing and remove muscle pain. (24)

Joke (2000m) explains that despite the great application of stretching exercises aimed at developing flexibility, there is still little research on the impact of this development on performance, as most studies have dealt with researching ways to increase flexibility or to identify the relationship between the occurrence of Injury and flexibility, the issue of studying the effect of stretching exercises aimed at developing flexibility on performance has not received sufficient research attention (20: 411).

Nariman al-Khatib, Abd al-Aziz al-Nimer, Omar and al-Sukari (2001 CE) indicate that the extension of the facilitation of the neuromuscular sensory receptors aims to take advantage of the neurophysiological processes to achieve muscle relaxation so that the muscles can be lengthened under the best possible conditions. It helps to build a method of compatible movement as it uses several neurophysiological mechanisms such

as "mutual nervous effect and muscle relaxation, the involuntary reflex". This method requires the ability of the trainer to be well-informed and high technical know-how to avoid the risk of injury (15: 56).

Nelson (2004) believes that the PNF techniques for flexibility improve and develop motor performance, improve motor range, increase strength, and achieve high degrees of stability in the joint, and it is one of the most advanced forms of flexibility training, which includes lengthening contraction and relaxation of the target muscle group. (22: 87).

"Allen" (2006 AD) asserts that when the development of muscle lengthening is needed, it must be tailored according to the performance needs of the type of activity chosen, as it plays a remarkable role in determining the final outcome of the various forms of performance (17: 294).

Both Adel Abdul Basir (1998 AD) and Muhammad Ibrahim Shehata (2011 AD) agree that the ground movement apparatus is one of the important technical gymnastics equipment, due to the similarity of its skills with the skills that are performed on the rest of the devices as it is the basis for all movements on the different devices. The balance exhibited it (8:33) (11:56)

And through the field and practical experience of the researcher in the field of gymnastics training, and through her presence in arbitration in gymnastics tournaments, I noticed the decrease in the level of performance of some gymnastic skills, the gap (the lip)

and the gap with the switching of the two men (Lyp Hachench) and the gap with the switching of the two legs with the text of the (breaknoy) roll on The ground movement apparatus for junior gymnasts under the age of 11, and they are one of the requirements for kinetic sentences, where the total degree of the sentence is divided into gymnastic skills and aerobic skills. The difficulty of gymnastic skills ranged from difficulty B to difficulty F, as it is no less important than aerobic skills such as aerobic rotations around the longitudinal axis and around the axis Occasional and somersaults. The researcher believes that the gymnastic skills are under discussion (the ligament gap (the lib) and the gap fixation with changing the legs (it is one of the basic skills with different difficulties as a prerequisite on the two ground movements and the balance bar) and it is worth noting that the skills under discussion are among the basic requirements in other types of gymnastics such as gymnastics. Aerobic and rhythmic gymnastics, and the researcher noticed through her presence as a judge in the Republican Championship, a low grade Gymnastic skills for players under 11 years of age and not calculating the difficulty of the skill, which exposes the player to deduction of the value of the difficulty of the skill from the final degree by the referee committee (E), since the player was unable to perform the skill in the required manner according to the law and the two men were not opened within a range of 180 degrees, followed by discounts in performance By the referee committee (D), which

requires the player to perform the skill in the full range of her, so the researcher believes that a training program is developed through PNF exercises for the nerve-muscle facilitation of the sensory receptors (PNF) and to identify its effect to develop flexibility and the level of technical performance of some gymnastic skills.

The research aims to:

Identify the effect of some neuromuscular facilitation (PNF) exercises on the development of flexibility and technical performance of some gymnastic skills through the identification of:

The effect of some neuromuscular facilitation (PNF) exercises on the development of flexibility and technical performance of some gymnastic skills, the ligament gap (the lib) and the gap fixation with the switching of the legs (lib hunch) for female gymnasts under the age of 14.

Research hypotheses

1- There are statistically significant differences between the averages of the pre and post measurements of some neuromuscular facilitation (PNF) exercises on the development of flexibility in the research sample.

2- There are statistically significant differences between the averages of the pre and post measurements of some neuromuscular facilitation (PNF) exercises on the technical performance of some gymnastic skills, the gap fixation (the lib) and the gap fixation with the change of the two legs (lib hunch) for female gymnasts.

Search terms

Neuromuscular facilities

It means controlling the neuromuscular mechanism by stimulating the sensory receptors found in tendons, muscles and joints.

Search procedures

Research method: experimental method

Research areas:

Geographical area: the gymnastics hall at the Olympic Center in Cairo

Time range: from the period 11/24/2018 to 1/26/2019

The human field: The researcher chose a deliberate sample of the Egyptian national team for the second degree, consisting of 14 players enrolled in the Egyptian Gymnastics Federation during the 2018-2019 sports season. Equivalence was done and taking into account the homogeneity among the sample members. Table (1) shows the sample specifications in the variables (age - height - weight -) Level of performance of gymnastic skills)

Table (1)

The arithmetic mean, standard deviation, median, and convolution factor of the sample search in growth variables and some Gymnastic skills in question n = 14

Varaibles	Refrence	Average	mediator	deviation	torsion
Hight	Cm	145,700	142.564	3.760	0.765
Wight	Kg	40.600	41.550	3.667	0.688
Age	Year	14.123	14.000	0.388	2.342
Gap dart skill	Degree	6,25	6,89	1.674	0.675
Gap dart skill With switch feet	Degree	5.67	5.23	1.987	1.876

Table (1) shows the homogeneity of the research sample in the basic variables under investigation, where the values of the coefficient of torsion ranged between (0.675, 2.342), which are values confined to (+3), which confirms the homogeneity of the research sample in those variables.

Used tools and devices

A medical scale to measure weight in kilograms.

- A Ristameter device to measure the length in centimeters.
- A floor rug.
- Stop Watch .
- Tape measure.
- Included ruler.
- training program

The development of training programs is one of the important matters that must be carefully put into place. Therefore, it was necessary to identify the objectives of the proposed training program. The proposed program aims to identify the effect of neuromuscular facilitation (PNF) exercises in developing flexibility and technical performance of some gymnastic skills.

Steps to design the training program

- The training of neuromuscular facilitation of the most important sensory receptors for gymnasts has been determined, taking into account the foundations of the program, which are represented in the following range:

- Determining the goal of the program and the goals of each stage of preparation.

Taking into account the individual differences of female players.

- Conducting tests and standards to determine the level of the players.

Graduation in exercises from easy to difficult with increasing the training load

Note that PNF exercises begin with large muscle groups, followed by smaller muscle groups.

Pay attention to warming up before starting the implementation of the basic units.

- The use of the principle of negative comfort between the training group.

-(The method of contraction - relaxation CR) Short stretching for 6 seconds, then prolongation against resistance of the hand of the coach.

- (The RC repetition method, the recurrence of contraction) the continuous contraction of the moving muscles 5: 7 seconds until fatigue against resistance and stabilization for a maximum range of 10 seconds.

Components of the training load

- The researcher used the intensity of performing the exercises to maximize the range of motion of the joint.

- The time for rest for one man is twice as long for performance.

- Controlling the components of the training load by measuring the maximum stability time when performing the new movement range with the help of a colleague for each training of the program to prolong the fixation and relaxation for each player.

- Control the intensity and volume of stretching exercises through the time stabilization of performance for one training and the number of repetitions and groups of training.

training program

- The training unit time is 90 s divided into (15 s warm-up, 30 pnf exercises, 35 gymnastic skills exercises under discussion, 10 s conclusion).

- The number of training units per week is 4 units

- The duration of the training program is two months, (8 weeks), attached (1)

- Evaluating the level of performance of acrobatic skills (gap bounce, gap bending with changing legs) in accordance with the instructions of the Egyptian Gymnastics Federation (3).

Table (2)

Assessment of the degree of gymnastic skills

The angle between the feet	165-180	160- 140	135- 120	Less than 120
Degree	10	7	5	Zero

Basic study

- Pre-measurements were made from 11/20/2018 to 11/24/2018

Dimensional measurements were made in the period from 1/26/2019 to 1/30/2019

Flexibility tests were conducted, namely:

- Shoulders lift test from prone

- Flexibility test of the foot joint up and down

- Leg hole test

Torso bending before standing Skill performance measurements were taken

Through the courts accredited by the Egyptian Gymnastics Federation Present and discuss the results

Table (3)
Significance of differences between the averages of the pre and post criteria for flexibility tests under investigation, n = 12

Variables	Measure unit	Pre measure		Post measure		Differences between the two averages	Rate of improvement	Value (t)
		M	E	M	E			
Raise the shoulders from prone	Cm	31.87	1.98	36.65	1.23	4.78	46.34%	3.54
Bend the trunk forward from standing	Cm	12.56	2.43	16.28	3.02	3.72	38.78%	3.89
caliper standing	Cm	15.73	2.12	11.57	3.34	4.16	45.54%	3.83
Flexibility of the lower foot joint	Cm	15.38	0.84	10.51	0.95	4.87	47.97%	3.45
The flexibility of the foot joint is up	Cm	7.45	0.78	10.67	1.53	3.22	35.12%	3.37

- The tabular (t) value at the significance level (0.05) = 1.850

It is evident from Table (2) that there are statistically significant differences between the pre and post measurements in the elasticity tests under investigation, as all values of (T) are greater than their tabular value at the significance level of 0.05 and in the direction of the post measurement, and the rates of improvement ranged between (28.45, 47.97).

The researcher attributes the improvement in the range of motion of the joints under study to the effectiveness of using the methods of neuromuscular facilitation (PNF) through both the method of repeated contractions RC and the method of the method of rhythmic fixation, and this result is consistent with what was indicated by Muhammad Hassan Khattab (2006 AD) and Tawfiq Ibrahim Muhammad (2007 AD) that PNF is one of the fastest training methods to increase the range of

motion of the joints of the body for athletes (14) (4).

It also agrees with what was indicated by Talha Hussam al-Din and others (1997) and Abu Al-Ela Abdel Fattah (1997) and Brad Brad (1996) that relying on the functioning of the sensory receptors is of great importance in increasing the range of motion of the joint and improves the level of muscular compatibility, because the increase in the range Mobility using flexibility exercises that rely on sensory receptors leads to improvement in other physical abilities (7) (2) (18).

Jerzy Jerzy (2004) indicates that the use of neuromuscular facilities works to develop and improve the range of motion more and that compared to other methods of stretching and works to increase strength in addition to achieving high degrees of stability in the joint and that

the use of these methods may be useful in preventing sports injuries (19: 98).

Muhammad Ibrahim Shehata and Ahmad Fouad al-Shazly (2006 CE) mentioned that when the antagonist muscles contract a constant contraction that leads to relaxation of the muscles to be lengthened, this means that the isometric contraction was a cause of this relaxation and is accompanied by an increase in the muscle spindle response to elongation and thus increases the range of motion of the joint (12: 77).

The researcher attributes this progress to the impact of the proposed experimental program and the included exercises for neuromuscular facilities PNF, different speeds and repetitions,

which were developed on a scientific basis and took into account the application of intensity and size of loads and interval periods of rest and the principle of increasing the load during training, which in turn reflected on the level of flexibility and the scientifically planned training programs. The various settings and aspects have the greatest impact on improving the capacities of different young women.

In this way, the first hypothesis is correct, which states: "There are statistically significant differences between the averages of the pre and post measurements of some neuromuscular facilitation exercises (PNF) on the development of flexibility in the research sample."

Table (4)
The significance of the differences between the averages of the pre and post standards for the level of technical performance of some gymnastic skills under discussion. N = 12

Variables	Measure unit	Pre measure		Post measure		Differences between the two averages	Rate of improvement	Value (t)
		M	E	M	E			
Gap dart skill	Degree	6,25	1.674	8.76	3.56	2.51	28.45%	3.15
The skill and the gap with switching legs	Degree	5.67	1.987	8.65	3.23	2,98	29.50%	3.31

The tabular (t) value at the significance level (0.05) = 1.850

It is evident from Table (3) that there are statistically significant differences between the pre and post

measurements in the level of technical performance of some of the gymnastic skills under consideration, as all values

of (T) are greater than their tabular value at the significance level 0.05 and in the direction of the post measurement.

The researcher attributes this improvement to the individual subjecting the sample under study to a training program that contains the effectiveness and the use of exercises for the neuromuscular facilitation of the sensory receptor (PNF) through the methods of both the repeated contraction RC, and the method of contraction and relaxation CR, which was consistent with the nature of technical performance in terms of the motor pathway and the muscles involved. In performance, this effect was reflected in the level of technical performance of some gymnastic skills, the gap gap (the lib) and the gap fixation with the change of the two legs (lip hench) for female gymnasts.

This result is consistent with what was indicated by Talha Hussam El Din and others (1997 AD) and Ahmed Al Hadi Youssef (2010 AD) and that flexibility in the sport of gymnastics is one of the important qualities to achieve the pillars that achieve mastery, acquisition and mastery of movement performance that requires high flexibility in all joints of the body and ligaments and deficiency Flexibility leads to a hindrance in the mechanical performance of the movement (7:49) (1:22).

These results are consistent with the results of the study of Essam

Anwar Abd Al-Latif (1999), Suheir Fathi Al-Jundi (2008 CE) and Dalia Muhammad Maarouf (2011 CE) on the effectiveness of using PNF methods in improving the level of motor performance of athletes (9) (6) (5).

Julius Kasa (2005) indicates that the increase in flexibility in the joints leads to the fluidity of skills and compatibility in performance in addition to that, the measured increase helps to raise the level of agility and speed of movement and this is due to the effective effect of the nature of the training programs rated on the neuromechanics of the muscles to By creating the appropriate mechanical conditions to achieve maximum muscle contraction (21: 122).

The researcher has concluded through the previous results that the exercises of the neuromuscular facilitation of the sensory receptors (PNF) in the manner of repeated contraction (RC), which the players train during their training units, and what these exercises do in terms of a great development in the flexibility of the joints and muscles trained in them by taking advantage of all the rubber energy The store and the characteristics of the reflex nerve action centers and the inputs of the nervous system as a result of the work of the receptors for lengthening, especially for the muscles and ligaments working in the moving and special joints in the work of gap skills

(the lib, the lib chanting), as "reliance on the work of the sensory receptors represents great importance in increasing the range of motion of the joint as It increases the neuromuscular compatibility of the muscle groups working on it.

Thus, the second hypothesis is verified, which states: "There are statistically significant differences between the averages of the pre and post measurements of some neuromuscular facilitation exercises (PNF) on the technical performance of some gymnastic skills, the gap fixation (the lib) and the gap fixation with the switching of the legs (lib hunch) for female gymnasts."

Abstracts

1- Stretching exercises by the method of contraction-relaxation CR, and the method of repeated contraction RC have effectiveness on the level of technical performance of gymnastic skills.

2- PNF exercises have a positive effect better than traditional flexibility performance of joints.

3- The use of the proposed program has a positive effect on the level of technical performance of gymnastic skills.

Recommendations:

1- The necessity to use stretching exercises in the contraction-relaxation method, repeated contraction when developing the element of flexibility.

2- Conducting more studies with the aim of developing flexibility for other joints

3- Applying the program to other stages of the age

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