

The Effect of Functional Training To Improve the level of Performance of the Propulsion skill On the Crossbars of Different Heights

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Recently, multiple and varied training methods have appeared, which has contributed to the development of the level of performance until sports competitions have become more fierce and challenging, reaching the level of imagination, and this was clearly shown in the Olympics and recent world championships. Gymnastics is one of the most fortunate sports in exploiting modern applications to achieve the highest levels of development and progress, as gymnastics is an Olympic sport that has its priorities in the interests of the developed world. Diverse, innovative and effective for the development of special physical preparation to raise the level of technical performance of skills.

Abdel-Raouf Al-Hagrasi, Hedayat Hassanein (2018), and Essam Abdel-Khalek (2005) indicated that a well-organized, special physical preparation is the main key to raising the level of skill performance in artistic gymnastics, as skillful performance is closely related to special physical abilities, and physical preparation programs It includes the development of solutions to many problems related to the field of artistic gymnastics, especially that the mathematically developed countries raise the interest in physical preparation to the point of paramount importance.

(9:29) (12:171)

Christine Cunningham, (2000) indicates that during the past ten years, functional training has become one of the commonly used terms in the sports field, and it is used under several names such as integrative training, modular training, functional strength training, career path training and functional ability training (21: 5).)

Ron Jones (2015) adds that functional training is a modern training system consisting of integrated and multi-level movements (frontal, transverse, sagittal) and a combination of strength training, muscular ability, balance and central strength of the body that is intended (spine and

mid-body). To improve motor ability, it was therefore important that the training programs contain such exercises (25: 87).

In recent years, specialists in the field of physical fitness have increased their interest in the use of torso stability exercises in training programs for athletes, due to the tremendous impact of the stability exercises of the central part of the body on sports performance, which results in a tremendous force that works to provide maximum performance for the lower extremity and the upper extremity (27).

Khaled Ibrahim Abu Warda (2019) (8) and Bliss (2005 AD) (22) indicated that the exercises for stability and strengthening the trunk have become the main key to training programs for athletes for all levels, beginners and advanced, where the muscles of the trunk act as a bridge that connects Between the upper extremity and the lower extremity of the body, the force caused by the trunk is usually called the source of energy for the extremities, and for the initial stability of the body, this needs to prepare a healthy spine, as well as provide the athlete with a solid and basic base, which is a key to support skills of high difficulty (22:56).

The development of strength and muscular ability of the upper extremity of the body, especially the shoulder girdle, chest, arms, abdominal and back muscles, as well as the muscles of the legs is one of the basic requirements in the physical preparation of the gymnast (10: 498). The bungee is one of the tools used in functional training that targets the center of the body and the limbs using a rubber rope. It uses the reaction of the body weight according to the variables of the trainee himself. It is ideal for training on physical variables as well as for physical rehabilitation, as it provides the opportunity to fly higher and land with less A level of impaction on the ground and the arch of several forms (suspended from the middle, humerus or ankles). (28).

Research problem

Adel Shenouda, Sabah Al-Sayed and Samia Farghali (2015 AD) indicate that the device of the two bars of different heights causes dynamic movements that depend on the swings, reels, and rotations, and the alternating movements between the bars performed by the player in the form of a kinetic sentence in which she changes the grip between the bars, and several changes of directions, adding Linking skills during sentence formation (2: 76).

The performance of pronation skills on the device of the crossbars of different heights requires the thrust resulting from the muscles of the center of the body as a variable based on the success of these skills because they are responsible for the complete transfer of the force resulting from the

lower extremity through the trunk to the upper limb (the arms), and the skill of propping up is a start on the crossbars Two different heights is one of the skills of cupping, and the researchers noticed that the students were unable to perform it with a high degree of proficiency, This may be due to the lack of some physical and muscular requirements, especially when pushing for their lack of muscular ability to the center of the body and the limbs necessary to raise the body because of their critical importance to the achievement and success of that skill, and this was proven by "Mills J. D. Taunton and Mills Washington" Mills, JD , Taunton, JE, and Mills, WA "(2012) (23) that the weakness of the muscles surrounding the pelvic area and the lower back represent the most important reasons that lead to the emergence of the majority of errors with poor skill performance in many sports activities, And that the pelvic area exercises allow access to a level of performance characterized by control with the mastery of skill performance greatly, which called the researchers to try to improve the level of performance by designing a proposed training program for functional training using bungee exercises in order to develop the muscular ability of the shoulder belt, chest and arms to develop propulsion The focus and the development of the muscular ability of the center of the body to improve the speed of transfer of the acquired force from the trunk to the arms, as the reference survey and theoretical readings In addition to the recommendations of many researches, it is necessary to conduct more similar studies that dealt with the center of the body (Khaled), (Azza), (Tamer Owais), (Najla) and also that dealt with rubber ropes as one of the functional training tools for resistance training using body weight (4) (17), (16), (Sahar) and in light of the foregoing, the importance of research emerged in designing a training program for functional training using rubber ropes (Bungee) to develop the muscular ability of the center of the body and the arms and the level of performance of the skill of rising by prostrating on the device of the crossbars of different heights.

Research Aim:

This research aims to improve the skill of propping up on the device of different height beams by developing a training program using bungee exercises to know the extent of its effect on:

1. The muscular capacity represented in (the muscles of the center of the body and the agglomeration in the muscular capacity of the muscles of the abdomen, back and extremities represented in the muscular capacity of the muscles of the arms and legs).
2. Improving the level of skill performance of the skill of jumping as a start (Long Up Start) on the two crossbars of different heights.

Research hypotheses :

1. There are statistically significant differences between the tribal and remote measurements in the physical variables represented in (muscular ability of the body center and extremities) in favor of the dimensional measurement.
2. There are statistically significant differences between the pre and post measurement in the level of performance of the skill of kneeling as a start on the device of the two crossbars of different heights.

Search terms:**Functional Training:**

Micheal Boyle (2013) defines it as training that uses free weights, tensile strength, and the athlete's body weight as a resistance to developing strength during performance and the use of kinetic exercises in specialized sports. It also leads to better balance and stability of the joints in addition to compatibility (24:46).

Rubber ropes :

It is a composite component. It is a combination of muscular strength and speed. Muscle capacity is tested over short periods of time at the maximum possible speed of movement (17:183).

Bungee Bungee Ropes:

It is one of the functional training tools that targets the torso and limbs area. It is ultra-strong and flexible, using the trainee's body reaction according to his abilities. It improves and develops physical attributes and allows many different movements up and down. (procedural definition).

Search Procedures:**First: Research Methodology:**

The researchers used the experimental method using one of its designs, which is (the pre-measurement - the post-measurement) for one experimental group, due to its suitability for the application of the study.

Second: The Research Sample

Female students specializing in artistic gymnastics in physical education – Helwan university 2021-2022 were chosen in a deliberate, random way, and their number (26 students), at a rate of (50%) from the original community, was excluded:

- Two (2) female students did not commit to taking measurements.
 - A number of (12) female students were chosen at random as an exploratory sample and to conduct scientific transactions for tests on them.
- Thus, the main sample of the research became (12) students.

The researchers made homogeneity and equivalence of the research sample in controlling the variables as follows

Table (1)
The arithmetic mean, standard deviation, median, and skew coefficient of the research sample In growth variables (age - height - weight)
(n = 24)

α_3 skewness	Mediator	S standard deviation	\bar{X} SMA	measruing unit	Variables
0.22-	21	0.3.73	20.72	Year	Age
0.88-	162	4.20	162.13	Cm	Height
0.87-	09.0	7.20	09.43	Kg	Weight

* Significance at $(p) \leq (0.05)$

It is clear from Table (1) the homogeneity of the research sample in the growth variables (age - height - weight), as the data indicate that the values of the torsion coefficient of the research sample are limited to (+3), (-3), which indicates the moderation of the data in these variables.

Table (2)
The arithmetic mean, standard deviation, median, and skew coefficient of the research sample in Physical variables of muscular ability and performance level of pronation skill
(n = 24)

α_3 skewness	Mediator	S standard deviation	\bar{X} SMA	measruing unit	Variables
0.89-	18.5	1.68	18	Several	Raise the torso back from a prone position
0.86	^	1.15	8.33	Several	Attachment raises both legs high
0.83	10,5	1,19	10,83	Several	Pulling on the bar
0.61-	8	2,87	7,42	Several	Pay up from a handstand
1.64-	30	3.16	28,27	Cm	vertical jump
1.63	2.00	0.68	2.37	Degree	Sunrise

* Significance at $(p) \leq (0.05)$

Table (2) shows the arithmetic mean, standard deviation, and torsion coefficient of the research sample in the physical variables of the muscular ability of the center of the body and the extremities and the level of performance of the skill of propping up on the device of the crossbars of

different heights, and the data indicate that the values of the torsion coefficient for the research sample are limited to (+3), (-3) which indicates the moderation of the sample data in these variables, which indicates their normal distribution, which confirms the equality of the sample members.

Third: Means and tools for data collection:

1- Devices and tools used in the research:

A - tools and devices

1- Tools for growth variables:

- - Restameter device for measuring length (in cm)
- - Calibrated medical scale for measuring body weight (in kg)
- - Data collection form for each student attached

2- Instruments and devices for physical measurements

- - tape measure included

- - chalk

- stopwatch

Wall stairs

- - The device of the crossbars of different heights

3- Equipment and tools for the training program

- - wall ladder
- - Bungee Elastic Rope Device
- - Iron chains for hanging bungee cords.

Physical tests and measurements used in the research

After briefing the researchers on the various scientific references and studies related to the subject of the research and in line with the procedures and objectives of the research, it was reached to determine the tests of measuring the muscular capacity of the center of the body and the extremities, and the following tests were used:

- Raising the torso back from a prone position (10 seconds) to measure the flexor capacity of the back muscles

Hanging on the wall ladder, raising the legs high (10 seconds) to measure the muscular capacity of the abdominal muscles

- Pulling on the bar (10 seconds) to measure the muscular ability of the arms.

- Pushing higher than standing on the hands (10 seconds) to measure the muscular power of the arms and shoulders.

- Vertical jump to measure the muscular power of the muscles of the legs (1: 253,254) (Annex 1).

- Assessment of the level of skill performance of the skills in question:

The level of skill performance was evaluated by four professors in the Artistic Gymnastics Training Department at the Faculty of Physical Education, Helwan University, who hold an international arbitration certificate from the Egyptian Gymnastics Federation (attachment26), to assess the degree of performance of the skill in question. The skill was evaluated by calculating performance discounts through a form designed by the researchers (Annex 3) showing the degrees of performance discounts to assess each skill separately.

Fourth: The survey:

The researchers conducted the exploratory study on a sample of (12) students from the original research community and from outside the main research sample, on Saturday 16/10/2021. The study aimed at the following:

- Ensure the validity of the instruments and devices used in the measurement.
- Preparing a form to record data for the students in the variables under investigation and the level of skill performance.
- Identifying the validity of the selected physical tests and their suitability to the research sample.
- Ensure that the assistants are trained on how to take measurements and

record the results.

The suitability of the proposed exercises for female students and the time of the unit, and taking into account the factors of security and safety.

- Identify the difficulties that may arise during implementation and find solutions to them.

The results of the survey resulted in:

The ability of the students to carry out the exercises.

Adaptation of the training unit time to the number of exercises.

Availability and adequacy of the equipment used.

Fifth: The Training Program:

The researchers conducted the reference survey of scientific references (12), (10), (2) and related studies in Arabic (4), (11) (18) (14) (8) and foreign (24), (22) and accessed the information network (28), with the aim of designing a training program using bungee exercises for the muscles (the arms - the shoulder girdle - the abdomen - and the flexors of the thigh joint - the legs) and to identify the effect of these exercises on:

The muscular ability of the muscles of the center of the body, represented by the muscles that work to flex with the sudden tide

- The level of skill performance of the skill of jumping as a starting point on the device of the two crossbars of different heights.

• **Foundations for Developing a Training Program**

- Appropriateness of the program's training to the characteristics of physical and psychological growth, taking into account diversity and comprehensiveness in proportion to the individual differences of the study sample members

Program flexibility and adaptability

Availability of security and safety factors during the application of exercises and tests

Continuity and regularity in practicing the training program until it achieves the benefit.

Use of the load intensity ranges between 65%: 95% of the maximum intensity

The number of sets ranges from 3 to 6 sets, and repetitions range from 5 to 10 repetitions

Rest between sets: 30 seconds to 60 seconds

The training method used (low and high-intensity interval training - repetitive training)

- Gradation in program intensity from low to maximum intensity (Abdulaziz and Nariman 2020)

Taking into account the characteristics of functional training using rubber ropes in terms of

- Taking into account the timing of performance (acceleration - stabilization - deceleration)

The exercises are similar in their composition in terms of the composition of the skill performance of strength, speed, and the time course of the force, as well as the direction of muscular work from them with those movements performed.

- Start with body center exercises (abdomen and back), then arms and legs exercises

The researchers standardized the loading of the training program exercises by determining the appropriate repetition for each student from the sample through self-observation of the student during her performance of the exercise, which is the repetition after which a defect in performance begins from a technical point of view and then determine the average repetition to be the number of repetitions, where he indicated Mr. Abdel-Maksoud (1997) indicates that the technical level of the athlete must be taken into account so that the period of stimulation is sufficient to allow the

movements to be performed properly without increasing the intensity to the degree that affects the course of the movements. (6 : 124).

The researcher took into account the re-legalization of the selected exercises in the training program again after the completion of the application of both (the first stage and the second stage) of the program to ensure the stability of the level before moving to the next stage, as well as to determine the number of repetitions of performance according to the new level.

Time distribution of the training program

After reviewing many references and reference studies, the researcher reached the time distribution of the program as follows:

The duration of the program is two months, eight weeks

The number of training units is four training units per week (Saturday - Monday - Tuesday - Thursday) starting from Saturday 23/10/2021 until Thursday 12/12/2021

The number of units during the program implementation period is 32 training units.

The duration of the training unit is 60 minutes, starting from eight to nine in the morning

Training time per week is 240 minutes

The total training time for the program is 1920 minutes.

Sixth: Basic Study:

First: Tribal measurements:

Tribal measurements were made on Tuesday, 19/10/2021 for the physical variables, and on Wednesday, 20/10/2021, to measure the level of skill performance for the skills under study. Arbitration criteria for the four courts, in the gymnastics training hall at the Gezira Youth Center.

Second: Application of the program:

The proposed program was implemented in the gymnastics training hall at Al Jazeera Youth Center, for a period of (8) weeks from Saturday corresponding to October 23, 2021 to Thursday corresponding to December 16, 2021 by (4) training units per week and the time of the training unit is 60 minutes, with a total of 32 training unit.

Third: Dimensional measurement:

The dimensional measurements were carried out in the same way that the researcher did in the tribal measurements on Saturday, corresponding to

12/18/2021 for the physical variables, and on Sunday, corresponding to 19/12/2021, to measure the level of performance of the skill of starting to kneel as a start on the device of the two crossbars of different heights, in a training hall Gymnastics at the island youth center.

Statistical manipulations:

The researchers used the spss program to calculate the statistical treatments due to its suitability to the nature of the study.

Discussing the search results:

It is evident from Table (3) regarding the differences between the averages of the tribal and dimensional measurements in the level of muscular ability represented by the muscles of the center of the body that work on sudden flexion and extension (torso) {the test of raising the torso from a prone position, the test of attachment, raising the legs high}, and also the ability The muscular limbs represented in (the pull test, the push-up test, the vertical jump test) and there were statistically significant differences at the level (0.05), in all tests of muscular ability in favor of the post-measurement, where the calculated “t” value ranged (3.00-12.57). The percentages of improvement were confined between (45.8% - 73.11%).

The researchers attributed this improvement in the physical variables related to muscular ability to the effect of the proposed training program functional training using bungee rubber ropes, which the researchers took into account that the training program begins with the development of the muscles of the center of the body before the extremities, because one of the most important features of functional exercises is to focus on the center, where the muscles of the center Strong center by connecting the lower end to the upper end, This is according to Gambetta Vern (2007) (27) that the muscles of the center of the body must be trained before training the limbs because the weakness of the muscles of the center of the body will be the factor that limits the overall production of force, as the center of the body is the one that preserves and controls the positions of the body And the movements of the body are constantly changing, and this is consistent with what Ahmed Al-Hadi (2010) indicated that the optimal method of training is the one in which the motor path is similar during the performance of the same skill, as the gymnast needs exercises that focus the necessary amount in the strength of muscle contraction for proper performance, as well as The timing of its contraction, and this is also confirmed by "Tamer Owais" (2016) (7), where he concluded that exercises for the stability of the trunk increase the production of the muscular capacity of the limbs. (3 : 99).

The researchers also took into account when developing the program to be consistent with the principles, foundations and rules of interval training of high intensity, by forming a physical load and rest, according to the objectives of the research, in order to develop muscular ability and according to the foundations of the functional training program using rubber ropes (Bungee) and what it contains of integrated and multi-level movements and axes, And that all exercises must be performed with a little resistance and then progress in increasing the resistances gradually, as it was taken into account to use the same muscles working in the same direction as the muscular work and to be similar to the structure of the motor performance of the skills in question, taking into account the timing of performance (acceleration, fixation and deceleration), and this has made progress These movements are characterized by producing force and converting it into speed, which contributed to improving muscular ability. (27: 160).

The researchers also attributed the reason for the improvement in muscular ability to the good planning of the bungee program and the legalization of training loads in a scientific manner suitable for the dental and training stage of the research sample, where the researchers took into account training with gradual loads during the application of the program by training the different muscle groups, especially the muscles of the center, arms and legs in the private part. With your own physical preparation.

The results of the current study are consistent with the findings of "Tamer Owais Ali Al-Jabali" (2015) (7) that exercises for the stability of the trunk increase the production of ability and strength and have a positive effect on the lower and upper limbs of the body. It also agrees with the results of the study of Azza Rashad (21) (11) and Khaled Abu Warda (2019) (8), where they indicated the effectiveness of functional training programs using bungee ropes in improving the muscular ability of the body center and limbs and the level of skill performance. On different gymnastics equipment.

The results of the current study also agree with the results of the study of "Sahar Morsi" (2011) (14) and "Saudi Rushdie" (2016) (16), where they referred to the effectiveness of bungee training because of its positive impact on improving muscular ability. For the center of the body, arms and legs. This is what was also found in the study of "Ahmed Fayez" (2022) (4), and "Mawaddah Majdi al-Deeb" (2020) (18).

This is what verifies the validity of the first hypothesis, which states that "there are statistically significant differences between the tribal and remote

measurements in the physical variables represented in (muscular ability of the body center and extremities) in favor of the dimensional measurement. Discussing the results of the second hypothesis:

It is also clear from Table (3) regarding the differences between the averages of the tribal and dimensional measurements in the performance level of the skill of propping up as a start (Long Up Start) on the two crossbars with different heights}, that there are statistically significant differences at the level (0.05).

The researchers attributed the reason for the improvement to following the sound foundations of building a functional training program using the bungee rubber cord, where it uses the reaction of body weight according to the variables of the trainee himself, which is ideal for training on physical variables, in addition to what the researcher followed from the principles and foundations of the training program and gradation from easy to difficult and noticeable improvement. The level of muscular ability (of the muscles of the center of the body and the limbs) resulting from the application of the program through exercises whose nature of performance is similar to the nature of the formation of the skills under study has had a positive impact on the level of skillful performance of the skills under study. This is what was indicated by "Ahmed Al-Hadi" (2010) quoting Mathews that the optimal method of training is the one in which the motor path is similar, and it was confirmed by "Mohammed Ibrahim Shehata" (2011) that the gymnast needs a training method similar to the motor path of performance, meaning that it must. The method and style of muscular work during physical training should be similar to the method of muscular work during skill performance. (Ahmed al-Hadi: 99) (Muhammad Ibrahim Shehata: 50).

Adel Shenouda, Sabah Farouz, Samia Farghali (2015) also explains that artistic gymnastics is one of the sports activities that require high abilities to perform difficult skills on its various devices, and one of the most important physical elements associated with physical and skill performance in gymnastics is the muscular ability of what requires performance. The skills of push, jump and body rotation speed on the four gymnastics equipment (Adele: 9,10)

As explained by "Abdul Aziz Al-Nimr" and "Nariman Al-Khatib" (2017) that performance improves better if the training is specific to the type of activity practiced, and that it includes the most important muscles working in this activity and that it is developed with the same use in competition and at the same speed of movement. (Nariman: 45).

The results of the research of Sahar Morsi Al-Sayed Morsi (2011) using rubber ropes confirmed an improvement in muscular strength and

muscular ability and an improvement in the level of skill performance of pronation skill on two crossbars of different heights.

The results of the current study are consistent with the findings of the study of Ahmed Fayez (2022) (4), Azza (2021) (11) and Mawaddah Magdy El-Deeb (2020) (17) Khaled Ibrahim Abu Warda (2019) (8)), “Saudi Rushdi Ahmed” (2016) (15), “Jihan Ahmed Badr” (2011) (9), “Sahar Morsi Al-Sayed Ali Morsi (2011) (10), that the functional training program using the resistance rope Bungee led to The muscular ability of the center of the body, the limbs, and the skill performance in artistic gymnastics improved, and these results are also consistent with the results of “Najla Salama and Dalia Maarouf” (2019) (19).

This verifies the validity of the second hypothesis, which states that “there are statistically significant differences between the tribal and remote measurements in the level of performance of the skill of kneeling as a start on the device of the two crossbars of different heights.”

Research Conclusions

In light of the research objectives and hypotheses, the research sample and the method used on the basis of the statistical treatments that were used in data processing, and after presenting and discussing the results, the researchers reached the following conclusions:

- 1- The training program using bungee ropes as one of the functional training tools had a positive effect on the muscular ability variables represented in (muscles of the center of the body and the limbs).
- 2- The training program using bungee ropes as one of the functional training tools had a positive effect on the performance level of the skill of propping up as a start (Long Up Start) on the two crossbars of different heights.

Search Recommendations:

Based on the findings of the researchers in this study, the following recommendations are recommended:

- 1- Using bungee ropes exercises as one of the functional training tools in special physical preparation in artistic gymnastics.
- 2- Using bungee bungee training as one of the functional training tools in the special physical preparation when training the skill of jumping up.
- 3- Using bungee rope exercises as one of the functional training tools for fourth year students, specializing in artistic gymnastics.
- 4- Directing gymnastics coaches to use the new tools and means in training, and the need to pay attention to the application of various methods and

methods when planning training programs because of their positive impact on improving skill performance on various gymnastics equipment.

5- Paying attention to the use of assistive devices in training, which contribute to the development of important physical qualities in female gymnastics.

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