



Original Article

Developing muscle work in the pelvic girdle area to prevent connective muscle injury for the shooting leg of football players

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Abstract

This research aims to design a program of preventive exercises in the pelvic girdle area to prevent injury to the connective muscle and muscle strain in football players. The researchers used the experimental method to suit the study's nature and purpose. The research community was represented in the research sample, which was chosen intentionally from the 6th of October Club players. Sports - "junior players born in 2007" team for the sports season (2023/2024). The sample size reached (20) players, and (5) junior players of the same age group and the same team were used as an exploratory sample. The results showed that the rehabilitation program that has been proposed with preventive goals contributed to improving the variables under study as follows (range of motion - increased muscular strength of muscles - increased muscular endurance of muscles).

Keywords: *Preventive exercises, sports injury*

Introduction

The sporting level has taken a major step forward in the current century, and this has been reflected in the breaking of many records day after day, which was considered impossible to break, and a dream that entertains those working in the sports field. The credit for this tremendous development is due to the great scientific progress and methods and means of training. Various methods aim to bring the individual to the optimal level in light of his abilities and aptitudes. (Rashid Amer & Ibrahim Gharib, 2005)

Sports injuries are one of the basic obstacles that prevent achieving the expected dynamic development to the heroic level of satisfaction, which always grows to growth through the process of phased development of sports training codified in a scientific manner, which leads to difficulty in achieving the goals of sports training. (Mohammad. Bakri, 2009 ; Bashkerov F.V,1981)



Many statistics also show that sports injuries are constantly increasing due to the large number of people practicing sports at various levels and due to the strength and intensity of competition violence and the tension associated with it. Practical experiences have also shown that the athlete does not only need treatment and physical rehabilitation, but also needs a training program for prevention and reduction. Injuries so that it can reduce the incidence of injury . (Allawi, M, Hassan ,1998)

Samia Khalil (2008) indicates that 90% of sports injuries are muscular, because muscles are the main tool for executing the requirements of physical performance and a major component of the human locomotor system . (Samia , Khalil ,2008)

Connective muscle injury is a common phenomenon among many athletes, and occurs as a result of a high increase in physical effort or as a result of a severe blow or sudden movement of the player. Football and hockey players are exposed to tearing of the connective muscles of the thighs more than other sports practitioners, because these games It relies on strong and strong foundations.(Osama Riyad ,1999)

The connective muscle works to join the thigh muscles, and the results of some studies have shown that among the muscles most susceptible to injury in athletes are the connective muscles, as the rates of injury to them ranged according to the opinions of scientists between (11% : %44) . (Bahaa El-Din Ibrahim, Salama, 1990 ; Ayed Melhem, et.al,1999)

Football is considered a sport characterized by physical contact, which may go beyond the stages of collision and friction, whether with the opponent or with training tools. Accordingly, the motor performance requirements of football players impose a large physical and functional burden that is proportional to the amount of physical, technical and tactical effort. Therefore, it becomes clear that it is necessary to achieve maximum muscle strength in the least possible time.

Therefore, “Magdy Al-Hasani Eliwa” (1997) explains that the goal of injury prevention must occupy the first place for any official when preparing and training players. If the means of sports security and injury prevention coincide with the physical, psychological, mental, and skill preparation of the players, they will be able to achieve record numbers and compete against each other. Challenges in the safest and fastest way. (Magdy, Al-Husseini ,1997)

According to what “Talha Hussam El-Din et al” (1997) (36) pointed out, a strong muscle has a greater degree of endurance when compared to a weaker muscle when it works at a small percentage of its maximum contractile limit to perform a specific task . (Talha Hossam El-Din, and others,1997)

Based on the above and through the field experience of the authors on the academic, scientific and practical side in the field of sports injuries and rehabilitation, the authors decided to design a program of preventive exercises in the pelvic girdle area to reduce the injury of the connective muscle to muscle tear in football players .



work in the pelvic girdle area to prevent connective muscle injury For the shooting leg of football players .

Materials and Method

The study used the experimental method, using an experimental design for measurement (pre-post) for one experimental group to suit the nature of the research and its objectives.

Participants

The participants was chosen deliberately from the players of (6th of October Sports Club) the “junior team born in 2007” for the sports season (2023 /2024). The sample size reached (20) players, and the researcher adopted specific criteria for including players in the program under study, represented in: The following:-

The participants are football players registered in the “Junior League, born in 2007” for the sports season (2023 /2024) in the Egyptian Football Association in the Giza Football Region and the player must not be injured or involved in another rehabilitation program.

Table 1. Homogeneity of the participant group (N =25)

Variables	Measurement Unit	Mean	The Median	Standard Deviation	Skewness Coefficient
Height	cm	166.25	168.50	5.31	1.27
Weight	kg	59.35	61.50	4.94	1.30
the age	age	16.70	17.00	0.47	1.91
Training age	age	4.53	0.57	4.50	0.15

It is clear from Table (1) that the skewness coefficients in all the variables under study were limited to (-3, +3), which means the distribution of the research population and sample in the previous variables is moderate, and thus the research population and sample fall under the normal curve and its moderate distribution.

Collecting Data

The authors searched the related studies to the current topic, in order to identify the most important variables, as well as to know the most appropriate physical, functional and motor tests and the devices were used through which the data collection for the research can be evaluated. The authors identified a set of tests and devices used to collect the required data, where this set were evaluated by experts through a questionnaire from 1/9/2023 to 3/9/2023.



Tools and devices

- a. Rest meter device: to measure length.
- b. Weight Balance device: to measure weight.
- c. Tensometer: To measure the muscle strength of the back and leg muscles.
- d. Goniometer: to measure range of motion.
- e- Treadmill and Aromeater

Procedures

Measurements

Measuring muscle strength

- 1- Anterior thigh muscles (contraction)
- 2- Posterior thigh muscle strength (extension)
- 3- Thigh adductor muscle strength (adduction)
- 4- Hip abductor muscle strength (abduction)

Measuring the range of motion of the hip joint

- 1- Hip adduction test
- 2- Hip abduction test

The range of motion of the thigh joint : (elasticity of the connective muscles) is measured by a genometer during The process of external abduction of the hip joint so that the injured person is in a tal l sitting position with his back supported by the wall so that the back is A right angle with the thigh, specifying a line bisecting the body to the body on the ground, and the fulcrum of the device is the bisecting line, then it rises (346)

The person abducts the hip joint outward, and when the injured person reaches the maximum abduction point from the bisector line, the degree is taken

-The indicator indicates this while repeating this measurement three successive attempts and taking the average between them.

Calculation method: The attempt is repeated 3 times and the average of the sum of these three attempts is taken

Pilot Study

The pilot study were carried out on (5) players who met the basic sample specifications, on (28/8/2023), to ensure the safety of the measurement tools, and the accuracy of the assistants' implementation of what was required to be done during the main study procedures. In addition, the suitability of the content of the proposed program for the individuals.



Pre-tests

Pre-tests were conducted for the all participants at the 6th of October Sports Club between 1-3/9/2023. These measurements included tests of flexibility and range of motion, as well as strength tests for the muscles of the shooting thigh joint.

The proposed preventive program

The basic study was carried out from (4/9/2023) to (16/10/2023) at the 6th of October Sports Club by applying the proposed preventiv program

Table 2. Time frame for the proposed prentive program

Time duration	content
6 weeks	The time duration of the proposed preventive program
3 units	Number of units per week
45 minutes	Time of each unit

Post-tests

Final measurement was done on 16/10/2023 .

Statistical treatments

The statistical program (Spss) was used to perform the following statistical treatments

- Arithmetic mean
- Standard deviation
- Rate of change (percentage change).
- Median
- Skewness
- T-test

Results

According to the study objective and its question, the authors discussed the results based on what the measurements showed, their differences, and their statistical significance presented in Table (3), where the results indicate that there are statistically significant differences between the pre- and post-measurements of the research group in the variables under study and in favor of the post-measurement, as the value of “t” The calculated value is greater than the tabular “T” value in all variables under study. Table (3) shows the rate of change (improvement) between the pre- and post-measurements and in favor of the post-measurement in the variables under study.



Table 3. The significance of the differences between the pre- and post-measurements and tests of the studied variables (N =20)

Variables	Pre-measurement		Post measurement		The difference between the two averages	"T" Test	Rate of change (%)
	mean	SD	mean	SD			
Measuring muscle strength :- (kg)							
Anterior thigh muscles (contraction)	4.93	0.94	6.35	1.63	1.42	4.68*	28.80 %
Posterior thigh muscle strength (extension)	4.85	0.69	6.00	1.43	1.15	4.19*	23.71 %
Thigh adductor muscle strength (adduction)	4.20	0.55	5.15	0.94	0.95	1.17*	22.61 %
Hip abductor muscle strength (abduction)	4.36	0.24	5.35	0.92	0.99	1.23*	22.70 %
Measuring the motion range of the hip:- (Degree)							
Hip adduction test	46.34	1.31	67.66	1.96	21.32	30.11*	46.01 %
Hip abduction test	25.25	2.95	37.33	3.51	12.08	19.19*	47.84 %

Discussion

The researcher attributes the clear improvement of the research sample in the post-measurement study variables related to the efficiency of the pelvic region as a result of the positivity of the preventive program under study, including the good selection of exercises that were characterized by diversity and specialization within the training units, and the selection of diversity among a group of dynamic and static exercises, which is of a kind in nature. Muscle work between fixed and moving muscle work, which led to this noticeable improvement in the level of the measurements under study.

Both Talha Hossam El-Din et al. (1997), “Ahmed, Arafa” (2014) mention that rehabilitation sports training has a positive role, especially in restoring the motor efficiency of the joints and the level of muscle groups to their normal state. Where movement and force, this requires high technology and standardized scientific calculations. (Talha Hossam El-Din, and others,1997 ; Ahmed, A, Amer, 2014)

The results of the study by “Ahmed Arafa Ibrahim” (2014) also show (4) that there is a direct correlation between strengthening the muscles and achieving the normal range of motion



of the joints. As the range of motion of the joints increases, the muscular strength of the muscles working around this joint increases. Therefore, designing a rehabilitation exercise program based on muscular strength and flexibility are considered among the most important physical elements. The stronger the muscles are and move in a full range of motion, the more effective the contractions will be, and the less susceptible to injury. (Ahmed, A, Ibrahim, 2014)

Accordingly, the results agrees with both “Adel Abdel Basir” (1999) and “Shaima Hassan Al-Sawaf” (2012) that the relationship between developing flexibility and strength must be taken into account because there is a connection between stretching exercises and muscular strength exercises to ensure muscle work. Avoid developing only one side . (Adel, Abdel Basir ,1999 ; Shaima ,H, AlSayed , 2012)

Kristy Browland (2005) also points out the importance of this type of exercise in which the time course of the muscle force produced by the muscle groups working during training is similar to its time course during the performance of the skill, and in situations that constitute the final form of the movement as a whole . (Kristy, Browland ; 2005)

The results agreed with what was indicated by the study of “Mahmoud Fathi” (2018) regarding the results of improvement in muscle strength due to the attention of the proposed preventive program under research from the beginning of its application to doing passive stretching and assisting the muscles within the limits of their ability, in order to work on preparing the muscles and improving flexibility, before starting implementation. And perform strength exercises . (Mahmoud , Fathi ;2018)

Based on the above and what the results of the study under study have shown, the researcher agrees with what was stated by Hisham gomaa (2011), quoting Bimd, that the pelvic joint, as a fulcrum for the movements carried out by the body, plays an important role in maintaining the body’s balance and thus helping with stability and balance. Therefore, the stronger the muscles are and move in a full range of motion, the more effective the contractions will be, and the less susceptible to injury . (Hisham, Jumaa ,2011)

The above confirms the hypothesis of the study, which states :-

“ There are statistically significant differences between the results of pre- and post-measurements in the motor and functional efficiency of the pelvic girdle area as a method of preventing connective muscle injury For the shooting leg of football players “

Conclusion

According to the study objective, participants, and results, the authors conclude the following:



1- The proposed preventive program under research has a positive effect in improving the motor and functional efficiency of the pelvic girdle area as a method of preventing connective muscle injury in soccer players.

2- There is a direct correlation between strengthening the muscles working on the pelvic joint and achieving the normal range of motion for the joint. As the range of motion of the joints increases, the muscular strength of the muscles working around this joint increases.

3- The proposed preventive program was designed to match the selected motor performances, based on the pattern of motor performance and the group of working muscles, as well as the type of muscle work between the joints of the directed foot and the joints of the torso during the skill performance under study, which contributes to reducing the incidence of injury to the pelvic girdle area.

Recommendation

Based on the current study and the results obtained, the researcher recommends the following:

1- It is necessary to pay attention to the principle of comprehensive and balanced development in muscular strength from the early stages of practice

2- Conducting further studies related to designing preventive training programs for the pelvic area to prevent different types of sports injuries in all football playing centers.

3- Considering the integration of physical and motor elements (muscular strength - muscular endurance - range of motion - neuromuscular compatibility) during the design of training and preventive programs, without prejudice to the training of any physical element.

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