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THE EFFECT OF REHABILITATION EXERCISES IN RESTORING THE EFFICIENCY OF THE ADDUCTOR MUSCLE WITH PARTIAL TEAR IN AL-SUFIA CLUB FOOTBALL PLAYERS

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Abstract:

The aim of the research is to prepare rehabilitation exercises in order to restore the efficiency of the adductor muscle with partial tears in Al-Sufia Club football players, and to identify the effect of these rehabilitation exercises in restoring the efficiency of the adductor muscle with partial tears. The researchers used the experimental method because it suits the nature of the problem. The research sample consisted of Al-Sufia Club football players who were intentionally selected, numbering four players. A single-group design with pre- and post-tests was employed. The rehabilitation exercises were applied for six weeks, with two units per week during the first and second weeks. The data were processed statistically, and the researchers concluded that the rehabilitation exercises have a positive effect in restoring the efficiency of the adductor muscle injured by partial tears. It was recommended to apply the research findings to samples of players in other sports, such as volleyball and handball, who have the same injury.

1. Definition of the Research

1.1 Introduction to the Research and Its Importance

Sports injuries have undoubtedly become a major obstacle to the progress of the athletic level of football players, thus preventing them from practicing their activities. Therefore, it was necessary to develop appropriate rehabilitation programs for each type of injury to enable the injured players to return to their specialized sports.

Sports injuries are determined by specific areas of the body, which largely dictate their impact. Most injuries among football players involve the joints, muscles, ligaments, and tendons. In recent

times, adductor muscle injuries have become more prevalent, occupying a significant place among the injuries sustained by players. These injuries have been largely overlooked by researchers. Hence, the importance of this research lies in understanding the effect of rehabilitation exercises in restoring the efficiency of the adductor muscle, particularly in cases of partial tears, among Al-Sufia Football Club players.

1.2 Research Problem

As a result of observation and experimentation, the researchers verified the presence of injuries among the club's players. In cooperation with the team coach and after consulting a specialist doctor, a number of players with muscle injuries were identified. This prompted the researchers to develop a rehabilitation program using specific exercises to restore the efficiency of the adductor muscle with partial tears in Al-Sufia Football Club players.

1.3 Research Objectives

1. To identify the effect of rehabilitation exercises in restoring the efficiency of the adductor muscle with partial tears in Al-Sufia Football Club players.

1.4 Research Hypothesis

1. There are statistically significant differences between the pre- and post-tests in the research variables, favoring the post-test.

1.5 Research Areas

1.5.1 Human Field: Al-Sufia Football Club players with partial tears of the adductor muscle.

1.5.2 Temporal Field: From December 1, 2020, to March 1, 2021.

1.5.3 Spatial Field: Al-Sufia Football Club Stadium, Physiotherapy Center, Ramadi.

2. Research Methodology and Field Procedures

3.1 Research Methodology

The researchers used the experimental method to suit the nature of the problem, employing a single-group design with pre- and post-tests.

3.2 Research Sample

The research sample included four players with first-degree partial tears of the adductor muscle from Al-Sufia Football Club, representing 80% of the original population after excluding one player with a complete tear.

3.3 Devices, Tools, and Means of Collecting Information

3-3-1 Devices used

1. Chinese-made iPhone mobile camera.

2. Dell laptop calculator.

3. Stopwatch

3-3-2 Tools used

1. Rubber balls

2. Rubber ropes.

3. Medical ball of different sizes and weights.

4. Squares.

5. Floor mat 20m long.

3-3-3 Information collection methods

1. Arab and foreign sources.

2. Internet information network.

3. Research sample information form.

4. Tests used

5. Pain level measurement form.

3-4 Tests and measurements.

First: Range of motion test:

- Test name: Range of motion test by abduction of the hip joint.[1]
- Purpose of the test: Measure the range of motion of the thigh muscle (adductor) of the injured leg (by abduction).
- Tools used: Conova program, pen, registration form, floor mat, calculator (laptop).
- Performance Description: From the supine position, the tester abducts the injured foot outward as much as possible and within the limits of pain.
- Recording: Using the Knova program, by drawing an imaginary line extending from the adductor muscle to the middle of the foot from the normal position and then abducting and measuring the external angle (45)°.

Second: Pain Level Test[2]

- Test Name: Measuring Pain Level
- Objective of the Test: Measuring the Pain Level of the Injured
- Tools Used: Pain Measurement Form, Pen, Stylus
- Performance Description: The Pain Level is Measured by the Specialist Physician. From Several Positions Appendix 1
- Recording: The Pain Level is Recorded in All Positions Mentioned in the Pain Level Measurement Form

Third: Pain Level Test[3]

- Test Name: Measuring the Strength of the Adductor Muscle
- Objective of the Test: Measuring the Strength of the Injured
- Tools Used: Dynamometer, Fixed Column at a Suitable Height,
- Performance description: The strength level of the injured is measured from a side standing position on a 1-meter-high pole fixed to the ground with a dynamometer attached to it, then a

[1] Dina Sattar Abdul Jabbar Al-Sudani; The effect of ultrasound waves and motor exercises in the rehabilitation of partial tear injury of the adductor muscle in a sample of football players: Master's thesis: (University of Baghdad, College of Physical Education and Sports Sciences for Girls, 2017) p. 35

[2] Maysoun Alwan Awda, Sakina Kamel Hamza, Sundus Salim Abdul Rahman; The effect of rehabilitation exercises in reducing knee joint pain for football players: (Iraq, University of Babylon, Journal of the College of Physical Education) p. 10.

[3] Maysoun Alwan Awda, Sakina Kamel Hamza, Sundus Salim Abdul Rahman; The previous source p. 10

tape is tied to the leg of the injured leg, then the injured person begins to pull the leg aside to measure the strength of that leg.

- Recording: The strength level is recorded once.

3-5 Exploratory research experiment:

The exploratory experiment was conducted on Sunday 12/6/2020 on (2) of the research sample players. The aim of conducting the experiment was to determine the validity of the devices and tools used in the research and to identify the validity of the tests and rehabilitation exercises in the research and to determine the tasks and duties of the assistant work team.

3-6 Pre-test:

The test was conducted on Sunday 12/13/2020 on the research sample of (4) injured players from the Sufia Football Club, Physiotherapy Center (Dr. Khalil Mahna in Ramadi).

3-7 Rehabilitation exercises (main experiment):

Rehabilitation exercises were implemented over a period of 6 weeks and were implemented in three stages

- The first stage: Physical therapy was used by the specialist doctor during the first week, and during this week, fixed exercises were given to relieve pain and continued until the third week, during which the exercises were given from fixed exercises to dynamic exercises with and without assistance.
- The second stage: Awareness of the stage in which exercises were given with light resistance aimed at increasing the activation of body parts and raising the muscle strength of the adductor muscle affected by partial tear, exercises using movements without tools and with tools and exercises using rubber bands, rubber balls and medical balls of different weights, taking into account the gradual increase in repetitions in the exercises, and the duration of this stage lasted for three weeks at a rate of three units per week (Saturday, Tuesday and Wednesday).
- The third stage: The final stage of rehabilitation exercises, which lasted one week, included exercises with the ball between the markers, stretching exercises and speed exercises.

3-8 Post-test:

The post-test was conducted on 2-2-2021. After completing the application of the rehabilitation program components, the post-tests were conducted in the same place and under the same conditions used in the pre-test.

3-9 Statistical treatments

Use the SPSS statistical package to obtain the results.

4- Display, analyze and discuss the results.

4-1 Display and analyze the results.

Table (1) shows a description of the variables under study

Table (1): Description of the Research Variables

Variables	Unit of Measurement	Sample Size	Pre-Test Mean ($\bar{X}$)	Pre-Test Std. Dev. (σ)	Post-Test Mean ($\bar{X}$)	Post-Test Std. Dev. (σ)
Range of Motion	cm	9	41.87	2.89	110.10	3.88
Pain	Degree	9	17.02	1.85	4.88	2.01

Perception						
Muscle Strength	Degree	9	20.41	3.87	40.79	2.28

Table (2): Differences in Means, Standard Deviations, Computed (t) Value, Error Rate, and Significance Between Pre-Test and Post-Test

Variables	Tests	Mean Difference	Std. Dev. Difference	Computed (t) Value	Error Rate	Significance
Range of Motion (Seated)	Pre - Post	-60.08	3.01	-30.12	0.00	Significant
Pain Perception	Pre - Post	10.00	2.00	11.01	0.00	Significant
Muscle Strength	Pre - Post	40.90	3.12	20.33	0.00	Significant

Significant when the error rate is less than 0.05.

2- Discussion of the research results

When reviewing Table (2), we find that there is a significant difference in favor of the post-test in the range of motion test, pain level, and muscle strength. The range of motion test was from a long sitting position, which confirms the noticeable improvement in it as a result of using appropriate exercises. The researchers also attribute this significant difference to the effectiveness of the rehabilitation method used for a period of (6) weeks, which contributed to increasing flexibility, i.e. the joint returning to its flexibility without any pain occurring in the research sample. This is what (Qasim Hassan Hussein) indicated that repeating the rehabilitation exercises helps develop flexibility. ([4])

This is what (Naif Mufdi Al-Jubouri) agreed with. Repeating physical exercises 3-4 times a week with four repetitions for each muscle exercise contributes to developing flexibility. ([5]) . This is also what (Qasim Hassan Hussein) agrees with, that rehabilitation exercises contribute to increasing the flexibility of the joint and relieving pain in the muscles, ligaments and tendons. ([6]) The diversity in the rehabilitation program has a great impact by using exercises in different body positions and using physical therapy methods such as rubber ropes and medical balls, which helped develop flexibility. This is what (Hussein Ali Al-Ali and Amer Fakher) stated: "These changes in the exercises within the training dose contribute to training the muscles in different physiological conditions, which undoubtedly adds a new type of physiological effects due to the difference in their condition when performing the exercise in various and regular ways." ([7]) Table (2) also shows that there is a significant difference in the post-test in the pain variable, and the researcher attributes this significant change to the ability of rehabilitation exercises to get rid of the pain resulting from the muscle injury, as all types of sports exercises contribute to getting rid of pain, and this is what (Gundiboy) confirms. Rehabilitation exercises work positively to restore the efficiency of movement to the joint and contribute significantly to restoring the range of motion and flexibility and getting rid of pain if the exercises are applied in a scientifically standardized manner. .([8])

[4] Qasim Hassan Hussein; Sports Training Science in Different Ages: (Amman, Dar Al Fikr for Printing and Publishing, 1998) p. 280.
[5] Nayef Mufdi Al Jabour; Sports, Health, Fitness and Flexibility: 1st ed.: (Amman, Arab Community Library for Publishing and Distribution) p. 225.
[6] Qasim Hassan Hussein; previously mentioned source: 1998, p. 280.
[7] Hussein Ali Al-Ali, Amer Fakher Shaghati; Strategies of Sports Training Methods and Techniques, 1st ed. (Baghdad, Al-Noor Press, 2010), pp. 196-197.
[8] Jann Dubois: Les principles de 1 entrainement (sport if Bordeaux university, France, 2002) p. 63.

These rehabilitation exercises depend on the connection between the elements of stretching and strength as specialized, complex and interconnected exercises through the many and sudden changes in the different positions that the injured person must adapt to by repeating these exercises in various forms in each training unit, and helped improve the injured person's ability to the element of strength and in different directions, pulling or pushing inward or outward, raising and lowering the result of these exercises that helped to reach new adaptations, and agrees with what was indicated by (Haider Nawar Hussein, 2012) "that the exercise or training during the training unit was found to help improve performance and it depends primarily on the type of training unit and the training task, as the exercise was designed to help improve motor performance, so the method depends on the level of the performer and on the type of movement and on other movements" ([9]) These rehabilitation exercises also require contraction force to recruit the largest number of motor units within the muscle fibers due to the resistances used for each exercise movement represented by its motor units, which increases the force resulting from the recruitment of those motor units, and this agrees with what was stated by (Talha Hussam) "Strength training affects The central nervous system and in the processes of inhibition and increasing the ability to recruit muscle fibers ([10])

5- Conclusions and recommendations

5-1 Conclusions

1. There is a positive effect of rehabilitation exercises on restoring the efficiency of the adductor muscle injured by partial tear for the research sample.

5-2 Recommendations

1. The researchers recommend applying the research terms to players of other events such as volleyball and basketball.
2. Early detection of player injuries.
3. Including rehabilitation exercises within training programs.

Arabic and foreign sources

Arabic sources:

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2. Maysoun Alwan Awda, Sakina Kamel Hamza, Sundus Salim Abdul Rahman; The effect of rehabilitation exercises in reducing knee joint pain in football players: (Iraq, University of Babylon, College of Physical Education)
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[9] Haider Nawar Hussein: The effect of some educational programs to develop some motor aspects and technical performance of the long jump for beginners aged (15-16) years, PhD thesis, College of Physical Education - University of Baghdad, 2012, p. 82.

[10] Talha Hussein Hussam Al-Din: Biomechanics, theoretical and applied foundations, 1st ed., (Cairo: Dar Al-Fikr Al-Arabi, (1993), p. 45.

6. Haider Nawar Hussein: The effect of some educational programs to develop some motor aspects and technical performance of the long jump effectiveness for beginners aged (15-16) years, PhD thesis, College of Physical Education - University of Baghdad, 2012, p. 82.
7. Talha Hussein Hussam Al-Din: Biomechanics, theoretical and applied foundations, 1st ed., (Cairo: Dar Al-Fikr Al-Arabi, (1993, p. 45.

Second: Foreign sources

1. Jann Dubois: Les principles de 1 entrainement (sport if BordeuxuniversitedBprdeuxFrance, 2002) p. 63.

Appendix (1): Pain Level Measurement Test

No.	Name	Pre-Test Pain Level (1-7)					Total	Post-Test Pain Level (1-7)					Total
		Pain at Rest	Pain on Pressure	Pain on Movement (Angle 30°)	Pain on Movement (Angle 60°)	Pain on Movement (Angle 90°)	Pain on Movement (Angle 120°)		Pain at Rest	Pain on Pressure	Pain on Movement (Angle 30°)	Pain on Movement (Angle 60°)	Pain on Movement (Angle 90°)
1													
2													
3													
4													
5													