

THE EFFECT OF THERAPEUTIC PHYSICAL EXERCISES IN THE REHABILITATION OF THE KNEE JOINT INJURED PARTIAL RUPTURE OF THE MEDIAL MENISCAL CARTILAGE FOR FOOTBALL PLAYERS

Ismael Saleem Abed^{1*}, Imad Kadhim Khlaif², Salah Mahmood Salman³

¹College of Physical Education and Sports Sciences, University of Baghdad, Iraq; ²College of Physical Education and Sports Sciences, University of Baghdad, Iraq; ³University of Baghdad/ Department of Student Activities, Iraq

Abstract

The purpose of this paper is to knowing the effect of therapeutic physical exercises in the rehabilitation of partial rupture of the medial meniscus of the knee joint, the researchers used the experimental method by designing two equal groups, where this study was conducted on (6) players (experimental group) suffering from knee joint pain, they were transferred to the Medical Rehabilitation Center, Baghdad New Baghdad, after a special referral from the treating physician. They agreed to participate in this study. The application of the program took period of (6) weeks, divided into (18) rehabilitation units, with (3) sessions per week, where the duration of the session ranged from (25-30) minutes, where the following tests were used: (flexibility test, Muscular strength test) and then the researchers used the statistical program (SPSS) to process the data. The results showed that there were statistically significant differences in the study variables in favor of the dimensional measurements after (6) weeks. The researchers concluded that the therapeutic rehabilitation exercises had a positive statistically significant effect on the injured players. Partial rupture of the medial meniscal cartilage of the knee joint, in all the variables of the study, and the researchers recommended focusing on developing all the elements of physical fitness required to implement technical performance with high efficiency by analyzing the physical needs in sports activity to protect players from the most frequent injuries or reduce the degree and severity of injury.

Keywords: Therapeutic exercises. Medial meniscus. Rehabilitation. Football.

Introduction

Many workers in the sports field, especially after the development in most sports events in the current era, agree on a clear increase in the number of sports injuries as a result of the high and continuous effort on the athlete's equipment due to an increase in training loads, an increase in the number of training units and the repetition of certain movements in these activities to reach The highest level of training to achieve high achievement, especially those movements that require medium or high intensity with high frequency and repetition during training, as well as the invalidity of some used stadiums and their floors, which leads to a strong collision between the player's body and the hard and even flexible floor, especially sports in which different movements are performed Such as running and changing direction permanently, as well as jumping movements, which include pushing and landing movements, and as a result of all these factors, it may lead to injuries, including injuries to the knee joint, as this joint is one of the most complex and most susceptible joints for athletes,

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*Corresponding Author: Ismael Saleem Abed, College of Physical Education and Sports Sciences, University of Baghdad, Iraq

Correo-e: Ismail.Abd@cope.uobaghdad.edu.iq

especially in games and events with friction. direct, so it is always exposed to various and multiple injuries, including injuries to the medial meniscus, which are D is one of the common injuries to the knee joint, as this injury occurs as a result of several cases, including sudden change of direction movements or the exposure of the knee joint to an external force when fixing during jogging, which is greater than the strength of the muscles that stabilize the foot on the ground and results in tears in these cartilages as a result Rotation of the knee joint with the foot remaining fixed on the ground, and the severity of this injury increases in the case of bending the joint itself at a certain angle, and that knee injuries are usually followed by a defect in the functions of movement, including range of motion and balance, as well as a lack of muscle strength. (Bakry, 2001,6). Both Hillard and Semple indicate knee injuries for athletes amounting to (70%) of the total body injuries. (Bakry, 2010,7). Hence the importance of research in the preparation of therapeutic exercises that included a special view of the rehabilitation of the injured with partial rupture of the meniscus, and according to the methods and scientific exercises and the studied process, the patient would be able to return to the normal state.

Research Problem

As for the research problem, the meniscal cartilage injury to the knee joint is a common and dangerous injury at the same time, especially in team games, as this injury keeps the player away from sports for a relatively long period, which causes the player to lose a lot of his physical fitness for each of these games, and the difficulty lies in the process of returning The player is not fully ready to practice physical activity, as the checks and tests that must be provided in each club may be non-existent, and it remains only to rely on the player himself in his ability to exercise and return to the atmosphere of competition. Therefore, the researchers decided to study this case and develop appropriate solutions to it by preparing exercises that take into account the specificity of the injured part and the return of the injured players to the stadiums as soon as possible.

Research objective:

- Knowing the effect of therapeutic physical exercises in the rehabilitation of the knee joint injured partial rupture of the medial meniscal cartilage for football players.

Research Methodology and Field Procedures

Research methodology

The studied variables and the nature of the problem are what determine the type of method used in the research and to reach the required results. The experimental method was chosen for its suitability to the nature of the problem to be solved. The experimental method is defined as "a research based on a scientific experiment that reveals causal relationships between variables in the light of controlling all the factors affecting the variable or dependent variables except for a factor that the researcher controls and changes for the purpose of measuring its effect on the dependent variable or variables (Al-Shouk and Al-Kubaisi 2004, 58). One of the basics of scientific research is to choose the appropriate sample, on which the study is based.

Community and sample research

The research samples included (30) patients with partial rupture of the meniscal cartilage of the knee joint, so that (16) patients were selected in an intentional manner. The experimental sample consisted of (6) individuals on whom therapeutic rehabilitation exercises were applied. The control sample consisted of (6) individuals who were given regular therapeutic exercises the exploratory sample consists of (4) individuals who were excluded from the pilot study. Moreover, for the period from 2/17/2022 to 2/4/2022 in the Medical Rehabilitation Center in Baghdad / New Baghdad.

Means, tools and devices used in the research

Due to the scientific progress that has occurred, the researchers tried to use the latest methods, means and techniques in diagnosis and the use of the latest physical therapy methods that benefit the researchers in rehabilitating the injury in question. The researchers used a set of devices and tools for the purpose of completing the content of the rehabilitation program used, namely: an electronic stopwatch, an infrared device Ultrasound vibration device, sauna boxes, jacuzzi tubs, gymnastics balls, air pressure devices, ETM electrotherapy device, rehabilitation cage, medical bed, medical bike, weights of different weights, muscle strengthening device (carrying weights with legs), rubber ropes, Sandbags, compression straps and genomics device.

Test specifications

Leg muscle strength test:

- Test objective: To measure the strength of the muscles of the legs
- Equipment: exercise room - leg strength device.
- Method of performance: The patient sits on the weight lifting machine by the legs, bending his knees in the form of a sitting position on the chair and the laboratory determines a certain weight and the patient extends the knees completely, then bends the knees and continues until he feels tired and cannot push the weight with the legs
- Recording: The laboratory records the patient's number of times the weight is pushed by the legs, noting the necessity of extending the knees to the end.

Flexibility test

- Test objective: To measure the range of motion of the knee joint.
- Equipment: genome, bed.
- Method of performance: From the position of the victim lying on the abdomen, the geometer is fixed on the knee joint from the outside of the joint, and the knee joint is bent at each angle, starting from the angle (zero) to (180) degrees. It is important in scientific research to conduct an exploratory experiment in order to obtain results It is accurate and reliable if the researchers conducted the exploratory experiment on 10/2/2022 on a group of (4) injured athletes in the New Baghdad Rehabilitation Center, Baghdad Governorate. If any, in addition to knowing the sufficient number of members of the assistant work team and training them for the test.

Pre-test:

The pre-test for the research sample was conducted on Thursday 17/2/2022. In the New Baghdad Rehabilitation Center in the center of Baghdad governorate, the researchers took into account, as much as possible, to establish the conditions related to the test (place, tools, supplies, method of implementation, auxiliary work team) for their availability in the post-final test.

Main Experience

The researchers prepared rehabilitation exercises for the injured (individuals of the research sample), taking into account the available devices, equipment, means and capabilities that help to continue work in implementing rehabilitation exercises in a way that achieves access to the normal range of motion and muscular strength or reduce the impact of injury to the injured.

As the implementation period of the curriculum was for the period from 20/2/2022 to 31/3/2022. The exercises were built as follows:

The duration of the qualifying exercises is (6) weeks, that is, (3) rehabilitation units per week, the time for performing the qualifying unit is (35-40) minutes

The duration of the exercises is (25-30) minutes, which varies from one unit to another. The time for performing the exercise is (3-5) minutes. Each exercise is performed in repetition (20-30) times

Rest between one exercise and another (30-45) seconds
 The first week
 The first unit Morning period: The class begins with using hot sandbags (the bags are heated by natural mineral water with high temperatures). The bags are placed at the knee level for 2-3 minutes. The process is repeated (2-3) times). Then he takes a class using the underwater massage (Massage sous l'eau) by relaxing on the special table and immediately followed by the hydro therapy for a period of (7-10) minutes. The actual class time as a whole (20) minutes.
 Evening period: The class begins with treatment through Infrared rays then massage with ointments. Then he takes a therapeutic exercise class inside the gym. The actual class time as a whole is (20) minutes. The second unit: the morning period: The class begins with taking a steam bath (Sauna) for a period of (10-15) minutes.

Note: Taking into account the changing features of the face - blood pressure, sugar - breathing so that the patient does not faint. Then he takes a shower. The actual class time as a whole (20) minutes. Evening period: The class begins using the electrotherapy device at the knee level. Then he takes a share of the

proposed therapeutic exercises in the gym. Then a bath with warm water (38 degrees) the actual class time as a whole (20) minutes The third unit (morning period): The class begins using a Jacuzzi for 10-15 minutes. Evening period: The session begins with the use of the pneumatic pressure therapy device on the lower extremities, which are bags worn at the level of the lower extremities to be compressed by pneumatic propulsion. Then a sport in a water basin (walking up and down to strengthen the muscles) and repeat the same units in the second week and then the third week.

Post-test for research group

After completing the qualifying exercises, a post-test of the research sample (experimental - control) was conducted on Saturday (2/4/2022) at exactly ten o'clock in the morning, taking into account the stability in the spatio-temporal conditions, means and tools for the pre-test and with the help of a team the work .

Statistical methods: The search data was processed through the Statistical Package for the Social Sciences (SPSS).

Results and Discussion

Presentation and discussion of the results: The researchers conducted tests for the research variables to rehabilitate the medial meniscal cartilage with partial rupture in a sample, and the data was processed statistically to reach the objectives and hypotheses of the research.

Presentation and analysis of the results of the pre-tests measurement of the research sample:

Measuring strength test:

Through Table 1, we found that the calculated t value 0.38 is smaller than the tabulated t value 2.23 at the significance level of 0.05 and at the degree of freedom (n 1 + 2-2) equal to 10, which indicates that there are no statistically significant differences and this indicates homogeneity the two samples are in the results (Table 1).

Measurement of flexibility test:

Through Table 2, we found that the calculated t value 0.70 is smaller than the tabular t value 2.23 at the significance level of 0.05 and at the degree of freedom equal to 10, which indicates that there are no statistically significant differences and this indicates the homogeneity of the two samples in the results (Table 2).

Presentation and analysis of the results of the pretest and posttest measurements of the research sample:

1. Strength test measurement:

The results obtained from Table 3 show that the calculated t-value of 1.94 was smaller than the tabular t-value of 2.57 at the significance level of 0.05 and the degree of freedom n-1. Not statistically significant, although there are differences between the arithmetic mean of the pre- and post-measurement, as well as in the standard deviation, but they were slight. The researchers attribute this to the subjection of the control sample to the regular rehabilitation program (Table 3).

2. Measurement of flexibility test:

When reviewing the results obtained from Table 4, it becomes clear that the calculated t-value of 1.18 was smaller than the tabular t-value of 2.57 at the significance level of 0.05 and the degree of freedom n-1. This indicates that the difference between the results of the tribal and dimensional flexibility test for the control sample, They are non-significant differences, although there are differences between the arithmetic mean of the tribal and dimensional measurement, as well as in the standard deviation, they were slight. The researchers believe that this is because the control sample undergoes a regular rehabilitation program (Table 4).

Presentation and analysis of the results of the pretest and post-test measurements of the experimental research sample

1. Strength test measurement:

From the statistically treated results in Table 5, it was found that the calculated t value 8.21 is greater than the tabular t value 2.57 at the significance level of 0.05

Table 1: Results of the pre-test of the strength test for the control and experimental sample

| Groups | Measurement | Sample | Arithmetic mean | Standard deviation | T value Calculated | Type sig |
|--------------|-------------|--------|-----------------|--------------------|--------------------|----------|
| Control | Pre | 6 | 59.50 | 9.15 | 0.38 | Non sig |
| Experimental | Post | 6 | 61.50 | 8.80 | | |

Significance level 0.05, degree of freedom n1 + n2-2, tabular t value 2.23.

Table 2: Results of the pre-measurement of the flexibility test for the control and experimental sample.

| Groups | Measurement | Sample | Arithmetic mean | Standard deviation | T value Calculated | Type sig |
|--------------|-------------|--------|-----------------|--------------------|--------------------|----------|
| Control | Pre | 6 | 124.33 | 6.25 | 70.0 | Non sig |
| Experimental | Post | 6 | 121.66 | 6.86 | | |

Significance level 0.05, degree of freedom $n_1 + n_2 - 2$, tabular t value 2.23.

Table 3: Results of the pre and post-measurement of the Strength test for the control sample.

| Groups | Measurement | Sample | Arithmetic mean | Standard deviation | T value Calculated | Type sig |
|---------------------------|-------------|--------|-----------------|--------------------|--------------------|----------|
| Strength test measurement | Pre | 6 | 59.50 | 9.15 | 94.1 | Sig |
| | Post | 6 | 61.83 | 7.38 | | |

Significance level 0.05, degree of freedom $n - 1$, tabular t-value 2.57.

Table 4: Results of the pre- and post-measurement of the flexibility test for the control sample.

| Groups | Measurement | Sample | Arithmetic mean | Standard deviation | T value Calculated | Type sig |
|------------------------------|-------------|--------|-----------------|--------------------|--------------------|----------|
| Flexibility test measurement | Pre | 6 | 124.33 | 6.25 | 1.18 | Sig |
| | Post | 6 | 126 | 5.51 | | |

Significance level 0.05, degree of freedom $n - 1$, tabular t-value 2.57.

Table 5: Results of the pre-and post-test of the strength test for the experimental sample.

| Groups | Measurement | Sample | Arithmetic mean | Standard deviation | T value Calculated | Type sig |
|---------------------------|-------------|--------|-----------------|--------------------|--------------------|----------|
| Strength test measurement | Pre | 6 | 61.50 | 8.80 | 21.8 | Sig |
| | Post | 6 | 74.16 | 10.06 | | |

Significance level 0.05, degree of freedom $n - 1$, tabular t-value 2.57.

Table 6: Results of the pre- and post-measurement tests for flexibility of the experimental sample.

| Groups | Measurement | Sample | Arithmetic mean | Standard deviation | T value Calculated | Type sig |
|------------------------------|-------------|--------|-----------------|--------------------|--------------------|----------|
| Flexibility test measurement | Pre | 6 | 121.66 | 6.86 | 39.7 | Sig |
| | Post | 6 | 159.33 | 10.63 | | |

Significance level 0.05, degree of freedom $n - 1$, tabular t-value 2.57.

Table 7: Post-measurement results of the power test for the control and experimental sample.

| Groups | Measurement | Sample | Arithmetic mean | Standard deviation | T value Calculated | Type sig |
|--------------|-------------|--------|-----------------|--------------------|--------------------|----------|
| Control | Pre | 6 | 61.83 | 7.38 | 2.41 | Sig |
| Experimental | Post | 6 | 74.16 | 10.06 | | |

Significance level 0.05, degree of freedom $n_1 + n_2 - 2$, tabular t value 2.23.

Table 8: Results of the post-measurement of flexibility test for the control and experimental sample.

| Groups | Measurement | Sample | Arithmetic mean | Standard deviation | T value Calculated | Type sig |
|--------------|-------------|--------|-----------------|--------------------|--------------------|----------|
| Control | Pre | 6 | 126 | 5.51 | 6.82 | Sig |
| Experimental | Post | 6 | 159.33 | 10.63 | | |

Significance level 0.05, degree of freedom $n_1 + n_2 - 2$, tabular t value 2.23.

and the degree of freedom n_1 , which indicates that the difference between the results of the pretest and dimensional power test of the experimental sample is significant differences. in favor of the post-test.

The researchers attribute the reason for this to the fact that the therapeutic exercises have a positive effect, as this led to a gradual increase in the strength of the muscles surrounding the knee joint (Table 5).

2. Flexibility test Measurement:

From the statistically treated results in Table 6, it was found that the calculated t-value 7.39 is greater than the tabular t-value 2.57 at the significance level 0.05 and the degree of freedom n_1 , which indicates that the difference between the results of the flexibility test and the dimensionality of the experimental sample are significant differences. In favor of the post test, and this indicates the significance of the effect, that is, the therapeutic exercises have a positive effect in measuring the range of motion of the knee joint (Table 6).

Presentation and analysis of the results of the post-test measurement of the research sample

1. Measurement of strength test:

Through Table 7, we found that the calculated t value 2.41 is greater than

the tabular t value 2.23 at the significance level of 0.05 and at the degree of freedom ($n_1 + n_2 - 2$) equal to 10, which indicates that there are statistically significant differences in the results of the post-test between the sample the experimental and control sample in favor of the experimental sample in terms of strength. This is due to the effectiveness of therapeutic rehabilitation exercises (Table 7).

2. Measurement of flexibility test:

Through Table 8, we found that the calculated t value 6.82 is greater than the tabulated t value 2.23 at the significance level of 0.05 and at the degree of freedom ($n_1 + n_2 - 2$), which indicates that there are statistically significant differences in the results of the post-test between the experimental sample and the sample. The control group was in favor of the experimental sample in terms of flexibility. Therefore, the patients enjoy in the post-test a good range of motion for the knee joint (Table 8).

The calculated t value for the two tests (strength and flexibility) is higher than the tabular t value, and from it turns out that there is a significant improvement in the performance of the downward curvature in favour of the experimental sample in terms of flexibility. Homogeneous between the control and experimental samples in the motor performance of the knee joint.

Discussing the Results

It appears from the tables (5-8) that there are significant statistically significant differences between the tribal and remote tests of the research sample and in favor of the post tests. The researchers, according to the correct scientific foundations and rules, which consists of qualifying exercises, and that this prepared exercises have a role in the improvement of the flexibility variable, this is what was confirmed by a study (Baida Razak Jawad 2017, 137). The gradual exercise and its diversity from simple to difficult and repetitions so that there is a dynamism of the muscles during the application of the rehabilitative approach, as the rehabilitative exercises helped to return the knee joint to the natural state or closer to the natural. This is what was confirmed (Talha Hossam 1977, 139). The exercise of flexibility exercises checks the property of flexibility to lengthen the muscles and ligaments together and thus works to gain range of motion. And improving flexibility can improve movements, joints, muscles, ligaments and tendons, and this is confirmed by this (Muhammad Hassan Allawi, 147, 1982) When all the joints of the body lack flexibility, it will lead to the inability to show good activity, motor performance and mastery, and consequently, the development of these physical attributes. pointer too (Magdy Mahmoud 1988,153) Flexibility plays an important role in determining the level of the patient on which most movements depend. The researcher also believes that improving flexibility in the joints and gaining muscle length leads to the production of a source of muscle strength through flexibility, and this is confirmed by this (Lceave 1996 et al., 141) Whenever there is an improvement in flexibility, muscle elongation and greater length, the muscle strength becomes at a good level of force-gaining production and this is what a reminder (Nahida Ahmed Abdel Rahim, 145, 2011) rehabilitative exercises improve and increase muscle tone and thus increase muscle strength for weak muscles.

The researchers suggest that this is also related to the effectiveness of therapeutic rehabilitation exercises and their application in good conditions and on a regular basis, and the commitment of the research sample to perform perfectly and according to the schedule prepared for that.

Conclusions and Recommendations

Conclusions

The researchers suggest that this is also related to the effectiveness of therapeutic rehabilitation exercises and their application in good conditions and on a regular basis, and the commitment of the research sample to perform perfectly and according to the schedule prepared for that.

The researchers concluded the following:

- The effectiveness of therapeutic rehabilitative exercises on the usual rehabilitative exercises in the rehabilitation of the knee joint.
- Therapeutic exercises increased the flexibility of the knee joint and strengthened the muscles surrounding it.
- The application of rehabilitative exercises had a positive effect in the early treatment of the knee joint.
- There are statistically significant differences between the pre-test and the post-test for the experimental sample in all tests in favor of the post-test.

Recommendations

The researchers recommend the following:

- Focusing on developing all the elements of physical fitness required to implement technical performance with high efficiency through

analyzing the physical needs in the sports activity practiced to protect players from the most common injuries or reduce the degree and severity of injury.

- The use of measurements for players during the stages of the season helps in the process of predicting injuries to the lower extremity and knee
- Follow-up of the medical record of each player helps to avoid the recurrence of the injury.
- Need to continue to perform kinematic exercises to prevent knee joint injuries.
- Paying attention to physical measurements and following the scientific method in training for the possibility of applying the principles of sports training and rationing training loads according to the training goal in order to avoid symptoms of overload and injuries that may occur during the training process and competitions.
- Attention to the development of muscular strength in the muscles of the thigh and legs using weights, rubber bands, iron jets and water medium, applying the principle of diversity in training without focusing on the process of strength training.
- Work on developing both the flexibility of the joints of the lower extremity and the elasticity of the muscles such as the back and front thigh muscles and the muscles of the legs, then the rest of the joints of the body, balance and compatibility so that these elements are a major part of all training units within any training program.
- The need to conduct physical and skill tests for the player before returning to the competition, bearing in mind that the decision to participate is made by the doctor or rehabilitation specialist.

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