Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

The effect of exercises using an anti-gravity treadmill in the rehabilitation of patients with partial rupture of the medial collateral ligament in football players

Imad Kadhim Khalif [1]

[1] University of Baghdad, College of Physical Education and Sports Sciences

DOI: https://doi.org/10.37359/JOPE.V36(3)2024.2188

Article history: Received 14/ July/2024 Accepted 20/ August/2024 Available online 28/ September/2024

Abstract

The research aims to identify the effect of rehabilitation exercises and the use of the anti-gravity treadmill in rehabilitating those with partial rupture of the internal ligament in football players. The objectives of the research included preparing exercises and using the anti-gravity treadmill in rehabilitating those with partial tear of the internal ligament in football, and identifying the effect of rehabilitation exercises and Anti-gravity walking device in the rehabilitation of people with partial tear of the internal ligament of the football. The researcher assumed that there are statistically significant differences between the pre- and post-tests, in favor of the post-test for the experimental group. To achieve the research objectives, the researchers used the experimental method using (pre-post) measurement for one group. The sample was deliberately selected for players from first-class clubs in Baghdad Governorate for the 2023-2024 sports season. The research sample included (10) players with partial rupture of the internal ligament.

Conclusions and recommendations, the most important of which are: Rehabilitation exercises and the anti-gravity treadmill had a positive effect on improving the functional performance of the internal ligament. Rehabilitation exercises and the anti-gravity treadmill led to improvement in muscle strength, increased range of motion of the muscles working on the knee joint, and pain relief. Rehabilitation exercises and the use of the anti-gravity treadmill had an impact. It is clear in improving agility among members of the research sample, but the most important recommendations are: the necessity of using rehabilitative exercises and the anti-gravity treadmill by a rehabilitation and physical therapist and making use of it as much as possible to rehabilitate the injury of partial tear of the internal ligament.

Keywords: rehabilitation, internal ligament, football

1 University of Baghdad, College of Physical Education and Sports Sciences, emad.kholaif0904@cope.uobaghdad.edu.iq

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Introduction

Practicing various sporting activities has become a science with its own origins, goals, and rules that must be observed to ensure achieving the highest sporting levels, despite the scientific progress in medical sciences based on precise scientific foundations represented by studies, research, field experiments, and following modern methods of treatment and providing precautionary measures currently used in the field. athletes to reduce the incidence of injuries, whether during training or matches, but sports injuries still occur among athletes during training or sports competition due to the effort that occurs to the joints, ligaments, tendons, and muscles (Mousa & Kadhim, 2023), and given the importance of this topic, the researchers deliberately To follow the best ways, means, and therapeutic methods that are easiest to apply, most economical, and most effective without exacerbating the problem and controlling it (Jawad Kadhim, 2016), so this study was important in preparing rehabilitation exercises to strengthen and flexibility the joints and elasticity of the muscles responsible for the joint directly or indirectly. With an explanation of the impact of these exercises as an effective means to help injured people return to the playing fields and thus get rid of the pain and problems associated with them. (Kadhim, 2012)

The anti-gravity walking device is a technology that enables the injured to move in new ways and without pain to regain the ability to move and improve skill, motor and physical performance (Fadel & Kadem, 2021), as it allows the injured to move without restriction or pain to restore and build muscle strength, movement, balance and physical fitness. It also grants a high degree of intensive and early rehabilitation for those suffering from knee joint injuries. (Easa et al., 2022)

Rehabilitation programs have recently received great attention in increasing the number of research, as well as specialized scientific books that seek to benefit from the results of scientific studies and research. Many researchers and specialists in the field of sports medicine have addressed in their studies the issue of preparing rehabilitation programs according to the severity and severity of the injury. (Mahmood & Kadhim, 202)

Through the experience and work of researchers in sports rehabilitation, they noticed that many players suffer injuries that tear internal ligaments and take long periods of treatment, which affects the player's physical and skill level, in addition to the lack of scientific research on this injury, which has spread widely among players, which prompted the researcher to find solutions and a program. Preparing for this injury, then developing an intensive program to strengthen the muscles working in the knee joint and creating a physical program to return the player to the field as quickly as possible. (Kzar & Kadhim, 2020)

The researchers decided to study this problem by preparing a rehabilitation program to restore the functional efficiency of the muscles working on the knee joint after the rupture of the internal ligament for football players.

The researchers also want this study to be a starting point for other researchers to address other, more common injuries among football players.

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Search goal

The research aims to:

Identifying the effect of rehabilitation exercises on the functional stability of the knee after internal ligament rupture for football players.

Research hypotheses

There are statistically significant differences between the pre- and post-measurements in the effect of rehabilitation exercises on the functional stability of the knee after internal ligament rupture for football players in favor of the post-measurement.

-1Motor range.

-2Balance.

-3Muscular strength.

Research areas

Human field: Baghdad Governorate (First Division) football club players with partial rupture of the internal ligament of the knee joint for the 2023-2024 sports season.

Time frame: 12/23/2023 until 3/19/2024.

Spatial area: Al-Zahraa Center for the Treatment and Rehabilitation of Sports Injuries, the Lebanese Center for the Treatment and Rehabilitation of Sports Injuries.

Define terms

Anti-Gravity Treadmill: It is a device with modern technology that works using atmospheric pressure, where it is possible to apply lifting force to the body's joints in certain proportions using air, to reduce the effect of Earth's gravity on the human body, as it reduces the athlete's weight by 80%, as it helps the athlete to train and recover without pain, which Helps speed up recovery from injury

Search procedures

First: Research methodology:

The researchers used the experimental method with a single-group design to suit the nature of the research, using pre-measurement and post-measurement for one group.

Second: The research population and sample:

A deliberate sample of (10) ten players with internal ligament rupture was selected, and the research population was selected from Baghdad Governorate (first division) clubs.

Sample selection conditions:

1- Diagnosis of the injury and its degrees by a specialist doctor and via magnetic resonance imaging
2- The sample members must have the desire to participate.
3- All members of the sample suffered from a second-degree internal ligament tear.
4- The infected persons must not suffer from diseases that hinder the research.

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

5- Ensure that the sample is not subject to any other rehabilitation or treatment program.

Homogeneity of the research sample:

The researchers homogenized the research sample according to the variables of age - height - weight as shown in Table (1), measurements of the range of motion and balance of motion of the knee joint as shown in Table (2), and electromyography measurements on the muscles working on the front - back knee joint. Macrophages - calves, as shown in Table.(3)

Table (1) Homogeneity of the research sample (variables age - height - weight) (n - 10)

Variables	Unit of measurement	Arithmetic mean	The mediator	Standard deviation	Torsion coefficient
the weight	kg	74.40	74.00	7.23	0.169
height	right	173.50	173.50	6.89	0.687
the age	city	25.30	26.00	3.08	0.681
Injury	day	1.83	2	0.522	0.977

It is clear from Table (1) the arithmetic mean, standard deviation, and skewness coefficient for each of the variables of age, height, and weight among the sample members. The values of the skewness rates were limited to (1), and thus it is clear that the data are close to the moderation of the distribution and the symmetry of the moderate curve, which gives a direct indication of the absence of the data. Disadvantages of non-moderate distributions and homogeneity of the sample under study.

Table (2) Homogeneity of the research sample for measurements of range and motor balance of the knee joint (n= 10)

Measurements	Unit of measurement	Arithmetic average	The mediator	Standard deviation	The twist
Motor range	degree	133.80	133.50	9.72	0.57
Motor balance	right	54.30	54.50	6.15	0.03

Table (2) shows the arithmetic mean, standard deviation, and torsion rates for each of the measurements of the range of motion and the motor balance of the knee joint among the sample members. The values of the torsion and flattening rates were limited to (±3), and thus it is clear that the data are close to the moderation of the distribution and the symmetry of the equinox curve, which gives significance. Directly, the data is free from the defects of unequal distributions and homogeneity of the sample under study.

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Table (3) Homogeneity of the research sample for electromyography measurements on the muscles working on the knee (10) joint

Measurements	Unit of measurement	Arithmetic average	The mediator	Standard deviation	The twist
Front muscle strength	mV	0.35	0.34	0.07	0.48
Caliph muscle strength	mV	0.25	0.24	0.03	0.43
Connective muscle strength	mV	0.25	0.25	0.03	0.24
Muscle strength	mV	0.22	0.21	0.05	0.25

It is clear from Table (3) the arithmetic mean, standard deviation, and torsion rates for each of the electromyography measurements on the muscles working on the anterior-posterior knee joint - the calf connective tissue among the sample members. The values of the torsion rates were limited to (2), and this demonstrates the closeness of the data to moderation. The distribution and the symmetry of the moderate curve, which gives a direct indication that the data is free from the defects of unequal distributions and the homogeneity of the sample under study.

Third: Data collection tools:

References and scientific research

The researchers reviewed the studies and research conducted in the field of injuries and rehabilitation in colleges of physical education, scientific journals, personal interviews, and the information network (the Internet) in order to identify the most important Arab and foreign studies referred to and related to the current study.

1- Search measurements.
2- Measure the range of motion of the affected knee joint.
3- Measuring the muscle strength of the muscles working on the knee joint.
4- Measure the balance of the affected knee joint.

Fourth: Tools and devices used in the research:

The researchers used the following tools:

1- Hall and football field

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

2- electronic stopwatch type mar times.
3- Medical bicycle.
4- Weights of different weights, ranging in weight from (1-4) kilograms.
5- rubber ropes in different colors and various ranges of movement..(5)
6- medical cores, weights ranging from (3-5) kilograms
7- Orbit Track.
8- Boxes of different heights from 20 cm, 301 cm, 401 cm, 501 cm.
9- Trampoline.
10- Iron bar of different weights.
11- dumbbells of different weights
12- half ball balls.
13- Ice bags.
14- Hot compresses.
15- Compression band.
16- Balance tools.

Devices used in the research:

1- scale device to measure weight
2- Treadmill.
3- Gym equipment.
4- gynometer device.
5- Electromyography (EMG) device
6- Ultrasound.
7- Laser device.
8- Tennis device.

Fifth: Tests and measurements used in the research:

1- Anthropometric measurements:

Height measurement: A restameter was used to measure the length of each case (in centimeters).

Weight measurement: A medical scale was used to measure the weight of each case (in kilograms).

2- Physical measurements:

Measuring the range of motion of the knee joint in extension (extension):

From a sitting position, extend the arm of the genometer over the knee joint so that the first arm is on the leg from the outside and the second arm is on the thigh from the outside and so that the knee joint is the center. Each player is given three attempts, and the best attempt for each player is counted. Results of previous studies indicate that knee joint genomic measurements have validity and reliability.(12)

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Motor balance test:

The individual stood at the meeting point of three lines in the shape of the letter Y in English, consisting of a vertical line forward from the laboratory and two inclined lines behind, such that the angle between the vertical line and the inclined line was 135 degrees on both sides, and the internal angle between the two inclined lines was 90 degrees. The individual stands on one foot and extends the other foot to reach the greatest distance forward. The test is calculated by the distance the tester reaches in centimeters on average of three correct attempts. The importance of this test lies in its measurement of body balance over a wide anatomical range. It has been used in previous research and has validity and stability(5) .

3- Electrophysiological measurements:

Electromyography was performed using surface electrons on the muscles working on the knee joint (anterior - posterior - adductor - calf) as follows:

.Electromyography of the anterior thigh muscles (quadriceps through anterior lifting motion)

.Electromyography of the posterior thigh muscles through (back traction).

.Electromyography of the thigh adductor and retractor muscles through (inward lifting).

.Electromyography of the hind leg muscles (calf muscles, ankle downward flexion).

The results of previous studies indicate that electromyography using surface electrons on the muscles working on the knee joint has validity and stability(6) .

Sixth: Survey studies:

The researchers conducted the exploratory study before starting to implement the basic steps in the research experiment, on two athletes with a torn internal ligament of the knee joint from the research community and outside the basic research sample, on Saturday, 1/2/2021 AD until 2/27/2021 AD.

Objectives of the exploratory study:

Identify the suitability of tools and devices used in measurements and tests.

Learn how to perform exercises.

Experimenting with some of the exercises used during the study to determine their suitability for a sample.

Results of the survey:

Taking into account security and safety factors for the injured.

The proposed exercises are suitable for the research sample.

Seventh: Pre-measurement:

The researchers conducted pre-measurements during the time period of Wednesday, March 3, 2021 AD, the muscular strength of the muscles working on the knee joint of the

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

injured foot (anterior quadriceps muscle - posterior muscles - retractor muscle - calf muscle) and range of motion of the injured foot. Balance for the affected foot.

Eighth: Basic study:

Basic search experience:

The researchers applied the rehabilitation program to the research sample for a period of 8 consecutive weeks in the period from Saturday, 3/6/2021 AD, to 1/5/2021 AD, at a rate of 6 units per week for the group, through the application of training. He also committed to unifying the time and place of training, and the researcher took into account The following considerations when designing the proposed rehabilitation program:

The proposed program is unique.

-Taking into account the psychological state of each player during the application of the program.

The rehabilitation program begins with general warm-up exercises, then specialized exercises.

The program begins with passive exercises, then stability exercises, followed by movement exercises.

-Gradual intensity of exercise in terms of time, repetition, resistance and weights

-Rehabilitation exercises should be performed taking into account the gradation of the load according to the limits of pain.

Ninth: Dimensional measurement

After completing the application of the rehabilitation program after the rupture of the internal ligament for football players, the researchers took the post-measurement of the research sample under the same conditions in which the pre-measurements were conducted, on Monday, 5/3/2021 AD.

Tenth: Statistical treatments used:

The researchers processed the data statistically using the statistical program SPSS, using the following statistical analyses:

Arithmetic average.

The mediator.

-Standard deviation.

-Torsion coefficient.

-Probability value (P) to determine statistical significance.

Percentage improvement rate.

T-test (1) to calculate the significance of the differences

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

First: Display the results:

The researchers presented the results of the pre- and post-tests on the variables under study for the group of participating players, as shown in the tables from Table 4 to Table 7, which show a presentation of the statistical data analysis. The results of the statistical analysis of the data of the research variables demonstrated the existence of differences with various statistical significances.

Table (5) Pre- and post-measurements of the research sample by the barometric method using the paired t test. Measurements of range of motion and balance of motion of the knee joint (n 10)

variable	Pre-measurement		Dimensional measurement		value(t)	Statistical significance)p(
	Q	A	Q	A		
Motor range	133.80	9.72	180.00	2.10	16.52	0.0001
Motor balance	54.30	6.15	67.92	5.34	18.75	0.0001

Table (6) The difference between the average pre- and post-measurements and the percentage of improvement for the research sample for measurements of range of motion and motor balance of the knee joint (n 10)

variable	Pre-measurement		Dimensional measurement		The difference between the two averages	Improvement rate
	Q	A	Q	A		
Motor range	133.80	9.72	180.00	2.10	46.20	%25.67
Motor balance	54.30	6.15	67.92	5.34	13.62	%20.05

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Table (7) Pre and post measurement of the research sample using the barometric method using the paired t test. Electromyography measurements on the muscles working on the knee joint (n 10)

variable	Pre-measurement		Dimensional measurement		value(t)	Statistical significance)p(
	Q	A	Q	A		
Front muscle strength	0.35	0.065	0.69	0.10	9.37	0.0001
Back muscle strength	0.25	0.028	0.61	0.08	12.34	0.0001
Connective muscle strength	0.26	0.029	0.63	0.11	12.74	0.0001
Muscle strength	0.22	0.049	0.60	0.13	9.02	0.0001

Table (8) The difference between the average pre- and post-measurements and the percentage of improvement for the research sample for electromyography measurements on the muscles working on the knee joint (n 10)

variable	Pre-measurement		Dimensional measurement		The difference between the two averages	Improvement rate
	Q	A	Q	A		
Front muscle strength	0.35	0.065	0.69	0.10	0.34	%49.28
Back muscle strength	0.25	0.028	0.61	0.08	0.36	%59.02
Connective muscle strength	0.26	0.029	0.63	0.11	0.37	%58.73
Muscle strength	0.22	0.049	0.60	0.13	0.38	%63.33

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Second: Discussing the results:

Through the research hypotheses and based on the data that was obtained and processed, within the limits of the research sample, the researchers concluded the following:

Discussion of the results of the first hypothesis: It is clear from Table No. (5) that there are statistically significant differences between the pre- and post-measurements of the sample in favor of the post-measurement. The tabular t value is at a significant level (0.05 = 1.895). It is clear from Table (5) that the significance of the statistical differences is at a significant level (0.0001).) between the pre and post measurements of the research group in tests of variables that include range of motion and motor balance of the knee joint. The calculated T value ranged between (16.52-18.75). (Issa et al., 2024(

Moffet et al. (2006) confirm that the goal of rehabilitation is to restore the full, natural function of the knee in terms of full range of motion and muscle strength without straining the muscles working on the joint (Zghayer & Kadhim, 2014), and the physiological benefits of motor exercises improve the flexibility and elasticity of the tendons and ligaments. And the muscles, and this improvement contributes to reaching the normal range of motion or what is very close to the natural movement of the joint. Thus, the researchers have verified that there are differences between the pre- and post-measurement of the control group in the range of motion and muscle strength of the muscles working on the knee joint after the rupture of the internal ligament, which is valid for the post-measurement (Khlaif & Shenawa, 2022(

This is consistent with the studies of Amr Ahmed Khalil (2008), Muhammad Al-Najjar (2016), Mustafa Taher (2015), Tariq Muhammad Sadiq (2014), and Naseer Jamal Muhammad (2009), which indicate that using a rehabilitation program and exercises improves motor range. For athletes and non-athletes. Through the previous presentation and scientific analysis of the statistical tables, Table No. (6), it is clear that the first hypothesis has been fulfilled, which states that there are statistically significant differences between the two pre- and post-measurements in the functional efficiency of the muscles working on the knee joint after the rupture of the internal ligament for football players, in favor of the post-measurement. On the motor range. (Abed et al., 2022)

Discussion of the results of the second hypothesis: It is clear from Table (5) that there are statistically significant differences between the pre- and post-measurements of the sample in favor of the post-measurement. The tabular t-value is at a significant level (0.05=1.895). It is clear from Table (5) that the significance of the statistical differences is at a significant level (0.0001) between the pre and post measurements for the research group in tests of variables that include the motor balance of the knee joint. The calculated T value ranged between (16.52 = 18.75) (Taha & Khalif, 2022(

It is clear from Table No. (6) that the percentages of improvement between the pre- and post-measurements in the variables of knee joint balance for the sample ranged between (20.05%-25.67%). This is consistent with the studies of Muhammad Al-Najjar (2016), Hani Abdel Aleem (2012), Wael Fouad Abdel Ghani (2007), and Naseer Jamal Muhammad (2009), which indicate that the rehabilitation program and qualifying exercises improve the players 'balance, through previous presentation and scientific analysis of the tables. Statistics: It is clear that the second hypothesis, which states that there are statistically

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

significant differences between the two measurements (pre-post) in the functional efficiency of the muscles working on the knee joint after the rupture of the internal ligament for football players, is in favor of the post-measurement on balance. (Kadhim & Mousa, 2024(

Discussion of the results of the third hypothesis: It is clear from Table No. (7) for measuring the muscular strength of the muscles working on the knee joint, where it is clear that there are statistically significant differences between the pre- and post-measurements of the sample in favor of the post-measurement. The value of the tabular t is at a significance level (0.05 = 1.895). Table (7) shows the significance of the statistical differences at a significance level of 0.0001 between the pre and post measurements for the research group in tests of variables that include electromyography measurements on the muscles working on the anterior-posterior knee joint. Macrophages - calves. The calculated T value ranged between (9.02-12.74). (Kadhim & Mahmood, 2023(

It is clear from Table No. (8) that the percentages of improvement between the pre- and post-measurements in the electromyography variables on the muscles working on the knee joint for the sample ranged between (63.33%-49.28%). Escobar et al. at et Escobar (2007) indicate that the development of muscle strength takes place. By choosing the exercises that are performed during the proposed training program to achieve better results for developing muscular strength. (: (85)(Kadhim & Mousa, 2024(

Abu Al-Al Abdel Fattah and Ahmed Nasr (2003 AD) confirm that the quality of a muscle can be identified by knowing the extent of what it can carry or the degree of endurance on it, as well as the amount of work it produces((65) :)

This agrees with Gill et al., 2008 AD) that performing regular exercises for maximum strength due to the building of a greater number of muscle fibers (myofibrils) and causes hypertrophy in working muscle cells (Ibrahim et al., 2006), and the increased pressure also causes a positive result in growth. Ligaments and bones. (: (65(

This is consistent with the studies of Amr Ahmed Khalil (2008), Muhammad Esmat (2006), Mustafa Taher (2015), Tariq Muhammad Sadiq (2014), Wael Fouad Abdel-Ghani (2007), and Naseer Jamal Muhammad (2009), which indicate The rehabilitation program and rehabilitation exercises improve the muscular strength of the players. Through the previous presentation and scientific analysis of the statistical tables, it is clear that the third hypothesis, which states that there are statistically significant differences between the two measurements (pre-post) in the functional efficiency of the muscles working on the knee joint after the players 'internal ligament rupture. Football in favor of dimensional measurement on muscular strength. (Khlaif et al., 2022)

Conclusions:

In light of the goal of the research within the framework of the scientific method used and the tools and means used by the researchers to collect data and the procedures that were followed, as well as through the statistical analysis of the data, its presentation and discussion of its results.

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

The researchers were able to conclude the following:

1- The effect of the proposed rehabilitation program on improving the muscular strength of soccer players after internal ligament rupture.

2- The effect of the proposed rehabilitation program on improving the range of motion of soccer players after internal ligament rupture.

2- The effect of the proposed rehabilitation program on improving balance for soccer players after internal ligament rupture.

Recommendations:

In light of the results and data reached by the researchers and based on the conclusions, the researchers recommend

1- Taking into account the stadiums on which official matches are held, not the first-class club.
2- It is recommended to take into consideration and address the game federation not to schedule matches during the week.
3- Adopting the exercises used to correct the knee joint after an internal ligament tear.
4- It is necessary to emphasize exercises during the warm-up to avoid knee injuries.
5- Employing physical therapy methods and linking them with the rehabilitation process because it is part of the treatment program for internal ligament injury and provides high pain relief.
6- Conduct similar research by developing rehabilitation programs for the injured.

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

References

Abed, I. S., Khlaif, I. K., & Salman, S. M. (2022). The effect of therapeutic physical exercises in the rehabilitation of the knee joint injured partial rupture of the medial meniscal cartilage for football players. *Revista Iberoamericana de Psicología Del Ejercicio y El Deporte*, *17*(5), 275–278.

Abu Al-Ala Abdel Fattah (2001): Sports Training, Physiological Foundations, Dar Al-Fikr Al-Arabi, Cairo.

Adel Abu Quraish Abdel Maaboud (2001) The effect of a proposed rehabilitation program on the ankle joint injured by a sprain in players of some team games "Master's Thesis" Faculty of Physical Education for Boys, Al Haram "Helwan University.

Ahmed Helmy Saleh (2006): The Comprehensive Thought in the Science of Cupping Therapy, Madbouly Library, Cairo.

Ali Jalal El Din and Mohamed Qadri Bakri (2012): Sports injuries and rehabilitation.

Amr Ahmed Khalil (2008): The role of rehabilitation exercises in the aquatic environment in rehabilitating anterior cruciate ligament injuries after arthroscopic surgery, Master's Thesis, Faculty of Physical Education for Boys, Helwan University.

Easa, F. A. W., Shihab, G. M., & Kahdim, M. J. (2022). the Effect of Training Network Training in Two Ways, High Interval Training and Repetition To Develop Speed Endurance Adapt Heart Rate and Achieve 5000 Meters Youth. *Revista Iberoamericana de Psicología Del Ejercicio y El Deporte*, *17*(4), 239–241.

Enas Moheb (2012): The effectiveness of a proposed and complementary rehabilitation program using the Artio device to treat ankle sprain injuries in track and field athletes, PhD thesis, Faculty of Physical Education for Girls, Helwan University, Cairo.

Essam El Din Mohamed (2005): The effect of using training in the aquatic environment on some elements of physical fitness for football players, Master's Thesis, Faculty of Physical Education, Tanta University.

Ezzat Mahmoud Al Kashef (2000) Rehabilitation exercises for athletes and heart disease "Egyptian Renaissance Library" Cairo.

Fadel, G. A., & Kadem, M. J. (2021). Youth and Sports Forums' Administration and Their Relationship with Baghdad's Youth and Sport Directorates Forum Organizational Culture from Workers' Point of View. *Journal of Physical Education*, *33*(3).

Gamal Al-Marsy (2008): Physical therapy and rehabilitation.

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Gogia PP, Braatz JH, Rose SJ, Norton BJ, (1987):Reliability and validity of goniometric measurements at the knee. Phys Ther. 67(2):192-

Hani Abdel-Aleem (2012): The effect of two different programs on the muscles working on the knee joint after surgical intervention.

Hayat Ayyad Raphael (1999): Sports injuries (prevention - first aid - physical therapy), Dar Al-Maaref, Cairo.

Hesham Ahmed and Maha Hanfy (2007): The effectiveness of therapeutic exercises and medical ozone for the rehabilitation of the injured foot with a sprain for athletes, the Arab Scientific Conference.

Ibrahim, H., Jawad, M., & moyad Shihab, G. (2006). The impact of the use of patch style paper and pencil in the development of some motor skills in gymnastics. *Journal of Physical Education*, *15*(2).

International Center for Physical Therapy (2010): First Aid for Sports Injuries and Methods of Prevention and Treatment. (Egyptian Publishing House).

Issa, F. A. W., Mohaif, S. M., & Kadhim, M. J. (2024). The effect of functional strength training according to gradually increasing load in developing some physical abilities and achievement for men's 100-meter competition runners. *Journal of Physical Education*, *36*(2).

Jawad Kadhim, M. (2016). Predicting Energy Expenditure Quantity With Lactic Acid Indicator After Maximal Physical Effort For Soccer Players Aged 18 – 25 Years old. *Journal of Physical Education*, *28*(4.2), 195–207. https://doi.org/10.37359/JOPE.V28(4.2)2016.242

Kadhim, M. J. (2012). The effects of drinking water, magnetized through training on some biochemical variables in blood. *Journal of Physical Education*, *24*(1).

Kadhim, M. J., & Mahmood, H. A. (2023). The effect of special exercises for some physical, motor and electrical abilities accompanied by symmetrical electrical stimulation in the rehabilitation of the muscles of the arms of patients with simple hemiplegic cerebral palsy. *Journal of Physical Education*, *35*(3).

Kadhim, M. J., & Mousa, A. M. (2024). The use of an innovative device to improve the efficiency of the posterior quadriceps muscle of the man after the anterior cruciate ligament injury of advanced soccer players. *Journal of Physical Education (20736452)*, *36*(1)

Kaufanuri (2001) :Comparison between surgical and non - surgical treatment in the treatment of knee ligament rupture, orthopedics. _ Official website Egyptian Football Federation

Khlaif, I. K., & Shnawa, T. F. (2022). The Effect of Using Therapeutic Physical Exercises Accompanying Physical Therapy in the Rehabilitation of Lumbar Disc

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Herniation for Football Players Aged (25-25). *Revista Iberoamericana de Psicología Del Ejercicio y El Deporte*, *17*(1), 33–35.

Khlaif, I. K., Hussein, I. G., & Shnawa, T. F. (2022). The effect of a suggested rehabilitation curriculum in the treatment of partial rupture of the gluteal muscles and strengthening the working muscles of the pelvic joint in football players. *Revista Iberoamericana de Psicología Del Ejercicio y El Deporte*, *17*(5), 269–271.

Kim et al. klam (2015): Selection of activity following electrical stimulation of the ligaments and syndromic joints of the knee for humans

Kofanori (2001): A comparison between surgical and non-surgical treatment Rehabilitation in the treatment of torn knee ligaments, orthopedics.

Kzar, F. H., & Kadhim, M. J. (2020). The Effect of Increasing Rehabilitation Program Using Electric Stimulation On Rehabilitating Knee Joint Working Muscles Due to ACL Tear In Athletes. *Journal of Physical Education*, *32*(3).

Lee DK, Kim GM, Ha SM, Oh JS, (2014): Correlation of the Y-Balance Test with Lower-limb Strength of Adult Women. J Phys Ther Sci. 26: 641–643.
Mathur S, Eng JJ, MacIntyre DL, (2005) :Reliability of surface EMG during sustained contractions of the quadriceps. J Electromyogr Kinesiol. 15(1):102-10

Magdy Al Husseini Aliwa (2006): Sports injuries between prevention and treatment "Egyptian Renaissance Library" second edition.

Magdy Mahmoud and Cook: Sports injuries, Dar Al Fikr Al Arab

Maha Hanfy and others (2005): Sports Injuries and Physical Therapy. Faculty of Physical Education, Helwan University, El Haram.

Maha Hanfy Qutb, Dalia Ali Hassan Mansour, Rehab Hassan Mahmoud Ezzat (2008): Sports Injuries and Physical Therapy, Faculty of Physical Education, Helwan University, Cairo.

Mahmood, H. A., & Kadhim, M. J. (2023). Special exercises for some physical, kinetic and electrical abilities accompanied by symmetrical electrical stimulation in the rehabilitation of the muscles of the legs for patients with simple hemiplegic cerebral palsy. *Pakistan Heart Journal*, *56*(1), 580–595.

Mohamed Abdel Hamid Farag (2004): Chemistry of Muscle Injury and Physical Effort for Athletes. Dar Al-Wafaa for Dunya Printing, Cairo

Mohamed Ahmed (2004): The effect of a program of rehabilitation exercises, sports massage and focused water push to reduce lower back pain in elderly men from (65) - 70) years, Master's thesis, Faculty of Physical Education for Boys.

Mohamed Al-Najjar (2005): The effect of rehabilitation exercises on the functional stability of the knee after a tear in the external ligament, Master's thesis, Faculty

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

of Physical Education for Boys, Al-Haram, Helwan University, Cairo.

Mohamed Esmat (2006): The Effect of a Rehabilitation Exercise Program on Injury to the Internal Ligament of the Knee Joint in Some Athletes, Master's Thesis, Faculty of Physical Education, Tanta University.

Mohamed Hassan Alawi, Abu Al-Ala Abdel Fattah (2005): Physiology of Sports Training, Dar Al-Fikr Al-Arabi, Cairo.

Mohamed Jalal Al-Din (2002): Sports injuries, Al-Rashdi Library for Publishing, Cairo).

Mohamed Kadry Bakry (2012): Sports Injuries and Modern Rehabilitation, Kitab Publishing Center.

Mohamed Kadry Bakry and Suham El Sayed El Ghamry (2011): Sports Injuries and Physical Rehabilitation, Dar El Manar for Printing, Cairo.

Mohamed Qadri Bakri and Siham Al-Sayed Al-Ghamri (2009): Sports Injuries and Modern Rehabilitation, Cairo Book Center.

Mohamed Qadri Bakri, Siham Al-Ghamri (2005): Sports Injuries and Physical Rehabilitation, Dar Al-Manar for Printing and Publishing, Cairo.

Mohamed Qadri Bakri, Siham Al-Sayed Al-Ghamri (2000): Sports Injuries and Physical Rehabilitation, Helwan University, Faculty of Physical Education, Cairo.

Mousa, A. M., & Kadhim, M. J. (2023). Nmusing An Innovative Device To Improve The Efficiency Of The Anterior Quadriceps Muscle Of The Injured Knee Joint After Surgical Intervention Of The Anterior Cruciate Ligament In Advanced Soccer Players. *Semiconductor Optoelectronics*, *42*(1), 1504–1511.

Mukhtar Salem (1999): Sports Injuries, Dar El Mars Publishing, Cairo.

Mustafa Taher (2015): Study of the Effect of a Proposed Program for Rehabilitation of the Knee Joint Worker after Cartilage Removal.

Nasir Gamal Mohamed (2009): The Effect of a Program for Rehabilitation of Injuries with Anterior Collateral Ligament and Meniscus Tear after Surgical Intervention for Football Players in the Premier League, Egyptian Football Association.

Osama Mustafa Riad - Saeed Abu Al-Makarem (2000): Descriptive Anatomy in the Sports Field (First Edition, GM.S. Printing, Publishing and Distribution).

Osama Mustafa Riad (2002): Sports Medicine and Field Injuries, Dar Al-Fikr Al-Arabi, Second Edition.

Osama Riad (2003): Sports Medicine and Athletics, Dar Al-Fikr Al-Arabi.

Osama Riad (2008): Physical Therapy and Rehabilitation of First-Class Athletes, Dar Al-Fikr Al-Arabi, Cairo.

Journal of Physical Education

Volume 36 – Issue (3) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Phil Alexander (2003): Residual effects of lateral knee ligament rupture, USA

Philip Alexander (2003): The residual effects of lateral knee ligament tears, United States of America.

Piriyaprasarth P, Morris ME, (2007): Psychometric properties of measurement tools for quantifying knee joint position and movement: a systematic review. The Knee. 14(1):2-8

Plisky PJ, Gorman PP, Butler RJ, Kiesel KB, Underwood FB, Elkins B, (2009) The reliability of an instrumented device for measuring components of the star excursion balance test. N Am J Sports Phys Ther. 4(2): 92– 99

Taha, R. A., & Khalif, E. K. (2022). The Effect of Training Program Using Small–Sided Games on The Improvement of Passing and Scoring in Female Futsal Players. *Journal of Physical Education*, *34*(3).

Tareq Dhafer (2007): A proposed rehabilitation program for the ankle joint injured by sprains for athletes in the State of Kuwait, Master's thesis, Faculty of Physical Education for Boys, Helwan University.

Tareq Muhammad Sadiq (2014): The effect of a proposed exercise program on the rehabilitation of the knee joint and the muscles working on it after a tear in the anterior medial ligament without surgery.

Wael Fouad Abdel-Ghani (2010): Biomechanics of the knee joint after total knee replacement surgery as an indicator of the habit of physical motor rehabilitation.

Wevar et al. (2014): Non-surgical treatment of knee ligament injuries.

Wilson B., Robertson K., Burnham J., Yonz M., Ireland M., Noehren B., (2018): The Relationship between Hip Strength and the Y Balance Test. J Sport Rehabil. 27, 445-450

Zghayer, A. A., & Kadhim, M. J. (2014). Effect of taking soduim carbonate dissolved in water at a concentration of lactic acid ratio, in the fifth minute to rest after a maximum effort for the football players in the first division. *Journal of Physical Education*, *26*(3).