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Rehabilitation of Intermediate Tear of the Hind Femoral Muscle, Range of Motion and Muscular Strength of the Knee Joint for Football Players in Basra Governorate

Saif Saeed Al-Sudani

(General Directorate of Education of Basra Governorate)

1989saif1989saif@gmail.com

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ABSTRACT

Its importance is highlighted in the preparation and application of a rehabilitation approach for the posterior femoral muscle tear and to know the extent of the injury on the range of motion and muscular strength of the knee joint, and as for the research problem, the researcher began to choose the injury of moderate and acute tear of the posterior femoral muscle due to the many injuries that players face in general in football fields, and for this reason, he prepared and applied a rehabilitation method that works to rehabilitate posterior femoral muscle tears, while the research aims to prepare a proposed rehabilitation method. In order to treat the tear of the posterior femoral muscle and to know the extent of the effect of the method on the range of motion and muscular strength of the knee, as for the research hypotheses, the researcher assumes that the rehabilitation method has a positive effect on the treatment of the injury under study, while the research fields are the human field are football players with posterior femoral muscle injury in Basra Governorate and at the ages of 20-30. Basra, where the experimental method was used and the sample was selected in a deliberate way, while the methodology tests included tests of range of motion and muscular strength of the knee, while the researcher concluded that there are significant differences between the results of the research tests (pre-post-post) and the application of the method led to the improvement of range of motion and muscle strength. He also recommends the need to emphasize the use of mobile and static exercises within the vocabulary of the rehabilitation curriculum

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1- Introducing the research:

1-1-Introduction and importance of research: Scientific development has included all fields of life, and the fields of sports occupied the most prominent aspect of those developments at the level of preparation, planning, organization and skill, and this development was not born of the moment, but came as a result of research and studies based on scientific foundations, and all that happens is to achieve achievement, undermine weaknesses, address them, and strengthen strengths, so one of the pillars and pillars of sports sciences is physical, skillful, planning, psychological, nutritional, and health preparation.Improving the levels of sports is manifested in the preparation at all levels, reaching the level of sports achievement must be integrated in all these aspects, maintaining the sports level requires the persistence of planning, training, nutrition, psychiatry and public health, so the athlete is exposed to any health problem, it exposes the level and achievement by relegation, from the point of view of public health and the obstacles and injuries that athletes face that may affect the level and achievement, he may be exposed Many athletes are attracted to stadium injuries, including muscle and joint injuries, and one of those injuries under study is the injury of the posterior femoral muscle and its consequent impact on the general level, achievement and disability from practicing activity, and this injury occurs as a result of tension and high pressure on the foot, or it may occur as a result of wrong movement or intervention from the competitor, and the severity of the injury and its level vary, it may be moderate or acute, and the researcher has adopted the selection of injuries of moderate and acute severity because they need a rehabilitation method to treat them. Based on this introduction, the importance of research is highlighted in developing a rehabilitation curriculum for the treatment of moderate and severe tears of the posterior femoral muscle and to find out the extent of the effect of the prepared curriculum on the range of motion and muscular strength of the knee joint for players with this injury in Basra Governorate football clubs

1-2-Research Problem: Sports injuries facing players in stadiums are almost largely as a result of competition and overlap between competitors, the intensity of competition, and the convergence of the level in numbers and planning, and injuries to joints, ligaments, tendons, and lower limbs injuries in particular have become the most frequent in stadiums, team games in general, and football in particular, and their severity varies according to the place of injury, and the level of injury changes according to the physical, skillful, health level, and age of the player, and one of these injuries is the injury of the posterior

femoral muscle, which is considered to be one of the The muscles that hold the hip and extensor of the knee (Anaam Majeed Al-Najjar, 1996, 67) confirms that the occurrence of muscle injuries is one of the most common injuries in the stadiums and occurs in 55% of the total injuries facing the players inside the stadium. This is because it is one of the most complex joints, and this in itself is considered an important factor to delve into this problem and seek to treat it, and from here the problem manifested in the need to develop a codified and integrated rehabilitation method after presenting it to the specialists and adopts the scientific and experimental method that works on the treatment of moderate and acute tears of the posterior femoral muscle and to know the extent of the possibility of this approach in affecting the range of motion of the knee joint, and therefore the problem under study was chosen because of its importance in solving the largest part of the injuries facing the player Inside the stadium and return the player to practice.

1-3- Research Objectives: The research aims to:

1- Preparing a proposed rehabilitation curriculum for the injury of moderate and severe hamstring muscle tear of football players of the posterior femoral muscle and its effect on the range of motion and muscular strength of the knee joint for football players.
2- Identifying the effect of the proposed rehabilitation method for moderate and severe injury of the posterior femoral muscle and the extent of its effect on the range of motion and muscular strength of the knee joint after its application to football players in Basra Governorate
3- Identifying the differences between the results of the pre- and post-tests of the range of motion and its muscular strength of the knee joint in the injured players.

1-4- Research Hypotheses:

1. There is a positive effect of the method prepared by the researcher in the treatment of the injury under study on the selected sample
2. The positive effect of the method prepared by the researcher on the range of motion and muscular strength of the knee joint in the injured players
3. The researcher assumes that there are significant differences between the pre- and post-tests for all the selected tests and in favor of the post-tests.

1-5- Research Areas: Human Field: Players with moderate and acute hamstring tear and participants in Basra Governorate clubs. (7) injured for the sports season (2023-2024) and (20-30) years, andtemporal domain: for the period from (1/5/2024) to (1/10/2024) and

spatial field: Basra Center for Medical Rehabilitation and Physical Therapy. and Al-Madina Center for Physical Therapy and Rehabilitation.

2- Research methodology and field procedures:

2-1- Research Methodology: Experimentation (Qasim Hassan, 1980, 96) is defined as "the deliberate and conditional change of a particular event or problem and observing the extent of the changes that occur in that problem after researching and investigating it with approved and planned procedures and interpreting it according to the accurate scientific method". Therefore, the researcher used the experimental method in order to suit the nature of the problem to be solved

2-2- The research population and its sample: The research population included the clubs of Basra Governorate for the sports season (2023-2024) and for the period of time from 1/5/2024 to 1/10/2024. The researcher also relied on selecting the sample by the deliberate method after presenting the injuries to the specialized doctor and determining the severity of the injury, and only the (7) players with the posterior femoral muscle were selected and their ages ranged from (20 to 30) years

2-3- Homogeneity of the sample: The homogeneity tables of the sample were adopted to avoid individual differences between the samples, and the arithmetic mean, standard deviation, coefficient of difference and relative difference between (age, training age, height and weight) were selected.

Table (1) shows the homogeneity of the sample for morphological measurements

Torsion coefficient	Standard deviation	Computational Averages	Units of Measurement	Variables	t
1.020	4.133	169.000	Poison	Length	1
0.000	1.32	68.000	kg	Weight	2
1.004	0.435	26	Year	Chronological age	3
2.003	0.354	6	Year	Training Age	4

2-4- Devices and tools used in the research: Weight and height measurement device, genomic device to measure the normal range of motion of the body's joints. Golds Gym Specialized Center for Injury Treatment and Rehabilitation

2-5- Means of collecting information: The researcher has intensified his capabilities in the procedures of researching this problem and has adopted personal interviews, references, and Arab and foreign sources. Questionnaire forms, doctors' and specialists' clinics.

2-6- Diagnosis of the injury: The doctors' clinics, rehabilitation centers, and physiotherapy and sports rehabilitation experts have adopted the specialization in diagnosing injuries and selecting them in research or regarding the diagnosis of the degree and severity of the injury, so it was through the specialized doctor through clinical examination and magnetic resonance imaging

2-7- Determining the normal range of motion of the knee joint: The questionnaire form was adopted to determine the normal range of motion of the knee joint and to find out the extent of the changes that suit the research problem, and after collecting the forms, the results appeared on the percentage of agreement on the range of motion, on which the effect of the rehabilitation method can be known, which is related to the rehabilitation of moderate and acute tears of the posterior femoral muscle and the treatment and rehabilitation exercises included in the curriculum for this muscle. "Bloom has pointed out as he mentions (Medhat Qasem, 2018, 53): that (75%) of the selection percentage for the required variable is the most suitable for its selection, and without this percentage, the tests for the rest of the variables are neglected."

2-8- Tests used in the research:

1- Test the range of motion of the knee joint in the case of tide (Waleed Hussein, 2002, 41): The purpose of the test is to measure the range of motion of the knee in the case of extension using a genometer device.

2- Test of the range of motion of the knee joint in the case of flexion (Essam Abdel Khaleq, 1987, 126): The purpose of the test is to measure the range of motion of the knee in the case of extension and using a genometer device.

3- Test of muscle strength of the muscles of the legs (Dabni Kamel) (Waleed Hussain, 2002, 41) :(from a standing position of 15 seconds): The test aims to measure the muscular strength of the muscles of the legs.

2.9. The two exploratory experiments:

1- The first exploratory experiment: (Talha Hossam El-Din, 1997, 76) "The exploratory experiment is the mission of overcoming the difficulties facing the researcher during the application of the adopted methodology and avoiding the shortcomings while determining the time for each test" The researcher conducted the first exploratory experiment on (Sunday) 1/6/2024, where the researcher and the assistant staff were briefed on the physiotherapy devices, how to conduct the tests and how to use the test devices, and a reconnaissance experiment was conducted on one of the research samples with a partial tear of the femoral muscle. Background The devices were worked on by the physiotherapist and the timing of each rehabilitation session was determined, as well as how to measure the range of motion of the knee joint was shown.

2- The second exploratory experiment related to the vocabulary of the proposed qualifying method: Based on what was stated within the outputs of the first exploratory experiment, the preparation of the qualifying units so that they are completely similar to the proposed units and their application to the research sample and mastering all the research procedures in terms of time and how to use the devices by the assistant staff.The researcher conducted the second exploratory experiment of the rehabilitation method, which was conducted on (Wednesday) 4/6/2024 to find out the exercises used in the rehabilitation curriculum on one of the athletes with this injury

2.10. Field Research Procedures:

2- 10-1 - Preliminary Tests: The researcher conducted the pre-tests on the research sample (7), on Sunday and Monday (10-11/6/2024) at four o'clock in the afternoon at the hall of Al-Ittihad Sports Club and the clinic of Dr. Ali Abdullah Al-Aidani, and the researcher also recorded all cardiac induction procedures and the results of the tests and worked to record all the conditions of the tests from the time, place and time of the tests to be able to create conditions similar to the pre-tests in the post-tests and tests were conducted The range of motion of the knee from bending and stretching to all the affected specimens and using a genometer device to determine the range of motion of the joints of the body after using it from the clinic of Dr. Abdullah Al-Aidani. After the members of the research sample were identified from athletes with moderate and severe tears of the posterior femoral muscle of soccer players and who are subject to the proposed rehabilitation method for the purpose of rehabilitating them to practice sports activity again.

2.10.2- The Proposed Rehabilitation Method (Main Experiment): The achievement of the desired goal of this research is manifested in the rehabilitation of those with moderate and acute hamstring muscle tear injuries of football players in the sample selected by the researcher (Qasim Hassan, 1980, 96) "The purpose of giving rehabilitation exercises is to return the injured muscle to its normal position, where it is necessary to give rehabilitation exercises that strengthen the muscles and not to use long exercises." The application of the prepared curriculum continued for (6) weeks from Thursday (14/6/2024) to Saturday (16/6/2024) with (three) units during the week and the duration of each rehabilitation unit ranges between (45-60) minutes, and the purpose of these exercises is to rehabilitate and strengthen the posterior femoral muscle as well as the working muscles of the knee joint, as well as to increase the range of motion of the knee joint and return their range of motion to the normal range.

2-10-3 - Post-tests: The researcher conducted the post-tests and the test was conducted for the period of Monday (20/8/2024), and the researcher adopted the same sequence and procedures that were conducted in the pre-tests of the injured to perform them in the post-tests. The researcher recorded the results of the measurements in all the tests related to the study of the range of motion of the knee joint and gave the researcher a brief explanation of how to conduct the test in a way that gives a real model of the normal range of motion of the knee joint

2- 11- Statistical Methods Used in the Research: The Law of Percentage. The arithmetic mean, the standard deviation, the coefficient of difference. The Law of the Rate of Development. T-test law for correlated samples.

3- Presenting, analyzing and discussing the results of the research: This section included the presentation, analysis and discussion of the results for the pre-tests and post-tests,

3-1- Presentation, analysis and discussion of the results of the knee joint range tests (flexion, extension, muscle strength):

Table (2) shows the arithmetic mean, standard deviation, standard error of the differences, the calculated (t) value and the probability value of the pre- and post-knee joint range measurement results of the affected sample.

Probability value	Calculated t-value	Standard Error	Post-testing		Pre-test		Unit of Measurement	Variables	t
			Standard deviation	Arithmetic mean	Standard deviation	Arithmetic mean			
19,03	0,00	19,66	0,75	170.28	0,89	110.85	Degree	Tide	1
28,90	0,00	13,48	0,45	19,55	1,36	13,70	Degree	Flex	2
11.53	0.002	5.966	5.192	31.83	6.524	28.16	Number	Muscular strength	3

Table (2) shows us the values of the arithmetic medians, pre- and post-standard deviations, the calculated value of (t), the significance, the value of probability, and the development ratios of the tests (tide, flexion and muscular strength) of the knee joint, while all the results of the tests appeared at the significant level and the level of significance appeared (significant) and through what was presented in the table above, and to know the significant differences between the pre-test and the post-tests, the results showed that there are significant differences with statistical significance between the pre-test and the post-test, and in favor of The researcher attributes these significant differences and the rate of development in all variables to the nature of the method used in the rehabilitation, which adopted the codified scientific and practical method and presented to the people of experience and specialization, and because of the codified qualification units it contained, and the adoption of the principle of gradation and the use of the system of static and mobile exercises. All the rehabilitation units and that this gradation came through the increase in weight and repetitions led to a state of improvement in the muscular system, as well as led to the complete effect of the nervous system and work to stimulate it through the improvement of the neuromotor signal as a result of the repetitions performed by the injured athlete, which transmits the nerve signals and the occurrence of the muscular contraction process, as well as the reflex actions, thus the characteristic strength increases gradually and this is in accordance with (Yasser Saeed, 1993, 104)."The development of the body's systems, including the nervous and muscular systems, is done through the variety of activities and exercise, as well as by raising the speed of muscle contraction, and this is done through special

structural exercises and gradually in weight and repetition, as it is consistent with (Griffith H.W.M. 1986.18) that the extent to which the muscle reaches in movement and then stability in it is the fastest way to develop the flexibility of the muscular system since it achieves the strongest and longest muscle tension, and this is in line with the development of muscular work of all joints of the body. One of them is the improvement in the range of motion of the knee joint, so that the development of strength and range of motion is done in two main ways, which are by developing the muscular strength of the various parts of the body, and the second is by increasing contraction. Jeffrey E. Falkel (1986, 141) adds that "it is possible to affect the quality of the muscle and the joint by knowing how much you can carry or the degree of endurance on it, as well as the amount of work you accomplish." The researcher believes that talking about the variables of range of motion and muscle strength is broad and cannot be summarized in this brief manner due to the overlap of muscle work and muscle strength in every activity performed by the individual, whether it is static or mobile muscular work, so the effect of the activity depends on The activity of the work of the muscle and the joint, and for this reason, the researcher relied on the static and mobile exercises of the tire on the work of the muscles and the knee joint, and due to the entry of these qualities in many sports activities, he defined them (Raysan Khraibet, 1996, 24) as (the ability of the individual to produce a certain level of muscular strength within a high motor speed, that is, it is a composite quality of strength and speed), and as the researcher believes that this development in strength characterized by speed in the post-test as one of the basic characteristics of the components of physical preparation for what they perform. It has an important role in sports activities due to the use of the proposed experimental method, which had a clear impact on the development of research results. The researcher has worked on the development of physical qualities, specifically muscle strength, in the rehabilitation method, where he focused and relied on building muscle groups to be affected by special exercises for muscle building. The researcher also lured the research into this problem, attributing this to the fact that upgrading the level of the injured player must work on psychological rehabilitation, as it is adjacent to physical rehabilitation and the means that researchers, specialists, and coaches should not overlook, and modern scientific methods and methods that are useful and useful in rehabilitation must be followed. Until the normal level of the player and the injured is reached. This is in line with the findings of a study (Wajih Mahjoub, 1988, 239) that

"the rehabilitation curriculum includes muscular strength exercises and range exercises in general for the joints of the body, as the rehabilitation is done in a regular and gradual manner that leads to various changes in the muscles such as increasing the cross-section of the muscle, increasing the size of fast fibers, increasing the size and strength of tendons and ligaments, and density of capillaries." The researcher believes that the rehabilitation program that was applied to the selected sample deliberately and worked to improve the elements of physical fitness in general and the range of motion of the knee joint, and this is confirmed by a study (Talha Hossam Al-Din, 1997, 76) that "the rehabilitation programs in general work to improve the elements of physical fitness in general for the various muscles of the body. The researcher attributes the reason for the development of physical abilities (the range of motion of the knee in the case of stretching, flexion and muscular strength) in the post-test, which is considered a basic characteristic of the components of physical preparation to the rehabilitation program applied to the use of weight training, which has played a great role in the development of physical qualities in a balanced way and a clear and significant improvement in the physical abilities of the game. The researcher also relied in his rehabilitation curriculum on the number of times resistance exercises are used in order to build muscle groups around the thigh and knee in order to strengthen their physical elements and endurance, this is confirmed by (Medhat Qasem, 35, 2018) "Exercise is considered the main axis in the treatment of injuries and the development of physical fitness elements because it aims to remove cases of dysfunction of the injured part by developing and developing muscular strength to take care of weakness in muscles, ligaments and joints and paying attention to the mechanics of body movements through performing some special exercises Fixed and mobile therapeutic exercises are also one of the means of motor rehabilitation, as it is considered the most important steps of motor therapy for the injured person, and physical exercises play an important role in maintaining the health and fitness of the injured individual and developing the distinctive strength of the injured person, as the researcher used regular exercises that are equivalent to the individual's condition and physical capabilities, and according to the scientific foundations that were determined by the specialists, and thus contributed to achieving the desired goal, which is to rehabilitate and build the back thigh muscle, increase its strength and return. This is what was agreed upon (Wajih Mahjoub, 1988, 239) "The development of strength characterized by speed is done by choosing static and mobile exercises and according

to the specialists' abilities and performed through the training method to reach better results for the development of all his physical attributes.

4. Conclusions and Recommendations:

1. The existence of significant differences in favor of post-tests in the rehabilitation of the posterior femoral muscle of the injured sample

2. The use of rehabilitation exercises in the prepared curriculum contributed to the effective restoration of the muscular strength of the hamstring muscle of the injured players.

3. The use of rehabilitation exercises in the prepared curriculum contributed to restoring the range of motion of the knee joint in record time.

4- The gradual and undulating in the giving of the exercises included in the rehabilitation units led to an increase in the strength of the muscle and an increase in its resistance to injury.

4.2 Recommendations:

1- The researcher recommends the possibility of using the method prepared to rehabilitate the injuries facing the players

2- The specialist doctor should be consulted by researchers on the type of injury and follow the medical guidelines and guidelines, as this contributes to shortening the time and effort to reach the treatment of the injury.

3. Pay attention to warming up before training units or sports competitions to avoid injury.

4. Focus on developing all the elements of physical fitness required to carry out technical performance and activity with high efficiency for the possibility of preventing players from the most common injuries or reducing the degree and severity of their occurrence

Sources

1- Ahmed Mohamed Abdel Gawad Talaba: A Proposed Rehabilitation Program for Twisted Wrists for Tennis Players, Ph.D. Thesis, Unpublished, Helwan University, 2011,

2- Ikhlas Mohamed Abdel Hafeez and Mustafa Hussein Bahi: Methods of Scientific Research and Statistical Analysis in the Educational, Psychological and Sport Fields, 2nd Edition, Al-Kitab Center for Publishing, Cairo, 2002

3- Inam Majeed Al-Najjar: A Proposed Curriculum for the Rehabilitation of Acute Spinal Injuries, Faculty of Physical Education, University of Baghdad, 1996

4- Benjamin et al.: Evaluation of the Student's Cumulative and Formative Education, 1st Edition, (Translation) by Mohamed Amin Al-Mufti et al., Cairo, Macrohill Publishing House, 1983

5- Raysan Khraibat Majid: Biochemical and Physiological Analysis in Sport Training. University of Basra, Dar Al-Hekma Press for Printing and Publishing, 1991

6- Talha Hossam El-Din: The Scientific Encyclopedia in Training, Cairo, Al-Kitab Center for Publishing, 1997.

7-Essam Abdel Khaleq: Mathematical Training-Theories-Applications, 1st Edition, Egypt, Dar Al-Ma'arif, 1987

8- Qasim Hassan Hussein and Abd Ali Nassif: The Science of Sport Training, 1st Edition, Mosul, Dar Al-Kutub for Printing and Publishing, 1980

9-Medhat Qasem: Motor Rehabilitation for Injuries, 1st Edition, Dar Al-Fikr Al-Arabi, Cairo, 2018

10- Wajih Mahjoub: Methods and Methods of Scientific Research, Mosul, Dar Al-Kitab for Printing and Publishing, 1988

11- Walid Hussein Hassan: The Effect of a Proposed Exercise Program for the Prevention of Some Ankle Joint Injuries in Football Players, Unpublished Master's Thesis, Faculty of Physical Education for Boys, Minia University, 2002

12- Yasser Saeed Shafei: Rehabilitation of the Knee Joint after Surgical Repair of Anterior Cruciate Ligament Injury, Unpublished Ph.D. Thesis, Faculty of Physical Education for Boys, Helwan University, 1993

13- Jeffrey E. Falkel. Methods of training, in sport physical therapy, Bernhardt D editon, Pub. Churchillliving stone, New York, 1986

14- Griffith H.W.M.D : sport Injuries : (U.S.A , the body press 1986

Appendices

A Model of the Proposed Rehabilitation Approach for Posterior Femoral Muscle Tear Injury

Objective of the rehabilitation units: rehabilitation of the injured muscle and restoration of normal range of motion and muscular strength of the knee and hip joints

Each week has three rehabilitation units: Rehabilitation units (1,2,3) for the first week Modules Objective: Rehabilitation of the posterior femoral muscle, restoration of the normal range of the knee and hip joint, and restoration of some physical variables affected by the injury Total time (45-60 minutes)

Comfort between groups	Rest between repetitions	Performance time × number of totals	Training Volume	Suggested Qualifying Exercises	t
1 D	30 S	30×4	4×8	From a standing position, descending with body weight (1/4 of a bunny, a half of a bunny)	1
1 D	30 S	30×4	4×8	From a sitting position, bend your knees and feet on the floor	2
1 D	30 S	30×4	4×8	Jumping on an injured foot on a trampoline machine	3
1 D	30 S	30×4	4×8	Spinning the foot on a tennis ball in all directions	4
1 D	30 S	30×4	4×8	Fingertip-mediated ball rolling	5
1 D	30 S	30×4	4×8	Moving the affected foot with pressure on a medical ball forward and backward	6
1 D	30 S	30×4	4×8	Lifting the affected foot over the barrier or barrier	7
1 D	30 S	30×4	4×8	From the sitting position on the chair bend and extend the hip joint	8
1 D	30 S	30×4	4×8	Rotate the affected foot clockwise from a sitting position in a chair	9
1 D	30 S	30×4	4×8	Rotate the affected foot counterclockwise from a sitting position in a chair	10
1 D	30 S	30×4	4×8	Climbing and descending with the injured foot on a terrace with a height of (20 cm)	11

1 D	30 S	30×4	4×8	From a sitting position, rotate the affected foot in and out	12
1 D	30 S	30×4	4×8	From a standing position, bending forward, leaning on the chair, and making a swing for the injured foot forward and slippery.	13
1 D	30 S	30×4	4×8	Static contraction exercise of the injured muscle from a standing position, holding the wall, and doing a static contraction exercise and pressing hard according to the ability of the injured person for the purpose of increasing muscle strength	14
1 D	30 S	30×4	4×8	From a sitting position and the opening of the feet, some of the chest opening and a bent extension of the knee joint	15