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A Proposed Rehabilitation Program for the Rehabilitation of an Anterior Cruciate Ligament Tear Injury

[1] Naeem Hameed Oleiwi , Mokhles Makki Ati [2]

Abstract

The research and its importance is summarized by a group of exercises chosen in a program designed to rehabilitate and strengthen the knee joint muscles and compare it with the program in place in hospitals .. The research aims to prepare a proposed program for the rehabilitation of the thigh muscles and the knee joint after the anterior cruciate ligament injury is torn, and the knee joint is one of the most common joints in the body. Exposure to athletes in particular (Samia Khalil 1990, p. 219) and to know the effect of the proposed program on the knee joint and thigh muscles after injury and rehabilitation of the front cruciate ligament. The researcher assumed that the rehabilitation program had an effect on the rehabilitation of the thigh muscles after the anterior cruciate ligament rupture. The program regains the efficiency and strength of the knee joint muscles faster than the traditional program in force in the hospital, and to suit the experimental method, the nature of the study was used by the researcher on his research sample of people with rupture of the front cruciate ligament, whose number was (6) injured, using some tools and devices in his research procedures Such as the homogeneity and equivalence of the two groups, the exploratory and main experiences, the qualifying program and the tests used in the research, and after the results C and discussing it, the researcher concluded that the proposed program worked to increase the strength of the muscle groups of the thigh and rehabilitate the anterior cruciate ligament injury in the knee joint faster than the program in force in the hospital and which was shown by the tracer tests conducted on the members of the research sample. Then the researcher recommended the necessity of using fixed exercises And movement by athletes to rehabilitate an anterior cruciate ligament rupture, as the stationary increases strength and mobility increases the magnitude of the muscles, recommending workers in the field of rehabilitation to use tracer or intermediate tests in their rehabilitation programs to see the effect of the exercises used on the injured and the improvement achieved in order to make adjustments in their programs that And found

Keywords: *Muscle strengthening, Knee joint, Movement, Anterior cruciate ligament*

1- Introduction:

Physical therapy in general, and sports exercises in particular, play an important and major role as one of the sports medicine departments in completing the treatment of injured athletes, post-injury or surgical intervention, and setting treatment programs for the injured on sound scientific foundations. One of the most common sports injuries is knee joint injuries, which are among the most common areas. The body is susceptible to injury, due to the anatomical characteristics of this joint, despite the presence of stabilizing factors surrounding it of ligaments and muscles, and one of the very serious and frequent injuries to athletes is the injury of the front cruciate ligament. The occurrence of the injury is the sudden rotation (twisting) outside the shin while moving it forward straight out of the knee range of motion and the acute stage is characterized by hemorrhage, in the socket of the knee joint and tissues adjacent to the joint and along the internal and external flat (opening) and in the area of fat bodies (Such as fat bodies and lateral ligaments) and accompanied by instability of the affected knee joint, and the knee joint is the most complex joint of the body, because its anatomical structure determines its function and it is responsible for many different movements,

[1] *General Directorate of Education in Maysan, Iraq, hu1984mu@gmail.com*
[2] *College of Physical Education and Sports Sciences, University of Maysan, Iraq.mukhalas@uomisan.edu.iq*

and the burdens of constantly being injured, which are about 70% of the injuries sustained by athletes on stadiums (Abdel-Azim Al-Awadly, 2004, p. 207). Of these, 65% are knee ligament injuries for football, baseball, basketball, ice skating and athletics events. Surgical intervention may be required to remove the remainder of the ligament and implant a substitute for it, as doctors allocate the largest percentage to the rehabilitation role, estimated at (80%), and to other procedures (20%), and through the development of a rehabilitation program that includes a set of exercises that can be divided according to a division (Lehmann, Muller) And others) to static and moving exercises (Osama Riyad 1999. p. 76)

In a program for rehabilitating the knee joint and strengthening the thigh muscles and comparing it with the traditional programs in place in hospitals that are based on treatment more than rehabilitation in the medical treatment department in Basra Teaching Hospital and not to rely on rehabilitative exercises by a large percentage and taking into account the gradation of their stresses that are likely to return The strength of the muscles working on the knee joint to its normal position, as well as the dependence of some therapists on thermal physical therapy devices, which works on the lack of experience to qualify this type of injury. Therefore, the researcher decided from this problem to design his rehabilitation program in detail scientifically with a set of exercises that work with them gradually and Accurate in his research, which aims to:

1- Preparing a program to rehabilitate the thigh muscles, knee joint for an anterior cruciate ligament rupture injury.
2- Knowing the effect of the proposed rehabilitation program on the thigh muscles of the knee joint after a torn anterior cruciate ligament injury.

Research fields

- The human field: A group of players were injured by a torn ligament in the frontal ligament (6) injured players visiting Basra Teaching Hospital.
- Field time: from 4/27/2019 to 7/25/2019
- Spatial domain: Basra Teaching Hospital - Physiotherapy Unit - Martyr Qais Center for Rehabilitation and Physiotherapy - Iron Hall in Al Ittihad Sports Club.

Procedures Search

Methodology of the B urged

And for suitability nature of the problem of research used experimental method

Sample

The research sample consisted of (6) people with a torn anterior cruciate ligament were divided into two groups for a group of officer by (3) the injured and the group Altj Rebeh (3) patients .

Devices and tools used

Astkhadd m researcher some hardware and tools in the course of the qualifying program and the user are:

1. The mobile device BIOS (Alteradmill.)
1. Medical bike (type(perocs)
2. Weighing scale.
3. Gyno meter.
4. Stopwatch ULC Tronah.
5. Rubber ropes.
6. Bags of ice.
7. Mooring data compressor of.
8. Dumbbells of different weights and wrists of different weights.

Homogeneity and parity between the research sample (two groups control and experimental)

Table (1) shows the homogeneity of the control group members

The significance	the difference	deviation	the middle	the exams	No.
Homogeneous Q	6 28,8	9 0,8	11 ,3	Quadriceps muscle	1

Homogeneous Q	1 20,0	1 0,5	1 2,5	Posterior muscles	2
Homogeneous Q	4 21,6	8 0,2	2 1,3	Connective muscles	3
Homogeneous Q	4 8.6	7 0,2	1 3,3	The lateral muscle of the thigh	4

Table (2) shows the homogeneity of the experimental group

The significance	the difference	deviation	The middle	the exams	No.
Homogeneous Q	3 17,8	1 0,5	1 2,9	The quadriceps muscle	1
Homogeneous Q	1 25,0	1 0,5	2 2,0	Back muscles	2
Homogeneous Q	3 24,7	8 0,2	6 1,1	Connective muscles	3
Homogeneous Q	1 9,1	8 0,2	6 3,1	The lateral muscles of the thigh	4

Table (3) shows the parity between the members of the research sample

The significance	S feast t Calculated	Experimental group		Control group		Tests (kg)	No.
		P	s	P	S		
8 0,8	3 0,1	1 0,5	1 2,9	9 0,8	11 ,3	The quadriceps muscle	1
8 0,2	1 1,2	1 0,5	2 2,0	1 0,5	1 2,5	Back muscles	2
1 0,5	0 0,7	8 0,2	6 1,1	8 0,2	2 1,3	Connective muscles	3
1 0,5	0 0,7	8 0,2	6 3,1	7 0,2	1 3,3	The lateral muscle of the thigh	4

* Tabular (t) value at degree of freedom (4) and level of significance (0.05) = (2.76)

2-5. The Exploratory Experience:

The exploratory experiment is considered as “a preliminary experimental study that the researcher conducts on a small sample before conducting his research with the aim of choosing research methods and tools” (The Arabic Language Academy, 1984, p. 79), so at ten in the morning on Saturday 11/5/2019, until / 16 / 5/2019, the researcher conducted an exploratory experiment on two patients with anterior cruciate ligament rupture at the Basrah Teaching Hospital to overcome the obstacles that hinder the research procedures, the functioning of the devices and tools used in the experiment, the accuracy of the tests and measurements used, and how to perform the rehabilitative exercises used in the program.

2-6 Tests used in the research:

A- The muscle strength test of the thigh:

From laying on the medical bed and in the form of a kit filled with an iron cooler that uses a set of weights, each test is performed through the gradation of weight until the sensation of pain, and the test must be applied after a week of treatment and for all muscles of the quadriceps, back muscles, connective muscles, and lateral muscles See Figure (1).

Observed data	Name of the test	No.

	Strength test of the quadriceps muscle with anterior elevation motion	1
	The strength test of the hamstring muscles with a posterior pull	2
	Strength test of the connective quadriceps inward lift	3
	Strength test of the lateral thigh muscle with a lateral lift motion	4

2-7 the Qualifying Program:

The researcher prepared a rehabilitation program with a scientific design to rehabilitate the knee joint affected by anterior cruciate ligament rupture through the development and strengthening of the working muscle group of the thigh and increasing the range.

Knee and flexibility of the muscles, improving their movement, increasing the muscular strength of the posterior thigh muscles, and achieving the basic function of the anterior cruciate ligament, using a variety of precise rehabilitative exercises to rehabilitate the torn anterior cruciate ligament injury, which is considered one of the difficult injuries due to the exposure of the thigh muscles to the definition and muscle atrophy if not directly rehabilitated And on this, the implementation of the rehabilitation program prepared and designed by the researcher began on 5/18/2019 on Saturday, where the research sample was divided into two control groups (3) injured, who underwent treatment according to the curriculum prepared in the Physiotherapy Center at Basra Teaching Hospital and another group Experimental (3) of the injured were also experimental, as they underwent the rehabilitation program prepared by the researcher for a period of (8) weeks, with (92) training units distributed into one training unit for one day and six days in the first two weeks (2 weeks) with a one-day break either The second two weeks (2 weeks) were two training units, six days a week, with a one-day break, and the remaining four (4 weeks) were Also, two training units per day, seven days a week without a break, and to determine the difference during the course of the rehabilitation program in the strength of the thigh muscles.

Figure (2) illustrates some of the exercises used in the proposed rehabilitation program

Performance time	Repetition	the exercise	No.
5D.	10times	(Strength training) From standing, walk slowly with arms forward and backward	1
10seconds per contraction	15times	From lying on the back muscle contraction fixed to the muscles of the anterior thigh of the rear) infected knee(	2
2D.	5times	From lying on the back, pull the injured foot towards the seat while the sole of the foot remains on the ground	3
2D.	5times	From lying on the ground, push the bent foot forward with slight resistance	4
5D.	3times	From standing open, arms side to side, torso bent downward	5

3- Presentation, analysis and discussion of the results:

3-1 Presentation and analysis of results:

Table (2) shows the arithmetic mean and standard deviations in the variables under study for the pre and posttests of the control and experimental group.

indication	Values t Calculated	Post test	The pretest	Variables	No.

		P	s	P	s	(Kg)		
3 0.0	9 5.3	5 1,5	35 ,10	9 0,8	11 ,3	Female officer	Quadriceps muscle	1
2 0.0	42 .18	12 ,1	12 ,16	1 0,5	1 2,9	Experimental		
5 0.0	3 4.0	2 1,0	21 ,6	1 0,5	1 2,5	Female officer	Muscle vinegar faithful	2
2 0.0	2 16.0	2 1,0	1 10.0	1 0,5	2 2,0	Experimental		
0.01	23 .8	1 1,0	12 ,5	8 0,2	2 1,3	Female officer	The muscle connective	3
0.01	87 .13	49 0	11 ,7	8 0,2	6 1,1	Experimental		
0.03	61 .5	17 ,1	75 ,6	7 0,2	1 3,3	Female officer	Lateral muscles	4
0.01	87 .13	57 ,0	22 ,9	8 0,2	6 3,1	Experimental		

*** Tabular value (t) at the degree of freedom (2) and the level of significance (50.0) = (32.4)**

Table (2) shows results of the strength test (quadriceps muscle) for the experimental group, so the arithmetic mean was (2.91) with a standard deviation of (0.51) in the pre-test, while the arithmetic mean reached (16.12) and the standard deviation (1.12). In the post-test, the value of (T) calculated between the two tests was (18.42), which is greater than (4.32), the value of (T) tabular at the level of significance (0.05).

As for the results of the (quadriceps) strength test for the control group, the arithmetic mean (3.11) and a standard deviation (0.89) were in the pre-test, while the arithmetic mean was (10.35) and the standard deviation (1.55) in the post test. The (T) value between the two tests (5,39), which is greater than (4.32), the tabular (T) value (at the level of significance (0.05).

As for the results of the (posterior muscles) strength test, the experimental group reached the arithmetic mean (2.02) with a standard deviation of (0.51) in the pre-test, while the arithmetic mean was (10.01) and the standard deviation (1.02) in the post test. , And the value of (T) computed between the two tests (16.02) which is greater than (4.32) the tabular value of (T) at the level of significance (0.05)

As for the results of the (posterior muscle strength) test for the control group, the arithmetic mean was (2.51) with a standard deviation (0.51) in the pre-test, while the arithmetic mean was (6.11) and a standard deviation (1.02) in the post test and the value was (T). The computed value between the two tests is (4.03) and it is less than (4.32) the tabular (T) value at the level of significance (0.05).

As for the results of the (connective muscle strength) test for the experimental group, the arithmetic mean was (1.16) with a standard deviation of (0.28) in the pre-test, while the arithmetic mean was (7.11) and the standard deviation (0.49) in the post test. And the value of (T) computed between the two tests (13.87) which is greater than (4.32) the tabular value of (T) at the level of significance (0.05)

The results of the (connective muscles) strength test were for the control group, where the arithmetic mean was (1.32) with a standard deviation of (0.28) in the pre-test, while the amount of the arithmetic mean was (5.12) and the standard deviation (1.01) in the post test. , And the value of (T) computed between the two tests (8,23), which is greater than (4.32), the value of (T) tabular (at the level of significance (0.05).

The results of the strength test (lateral muscles) of the experimental group came with a mean of (3.16) and a standard deviation of (0.28) in the pre-test, while the arithmetic mean was (9.22) and the standard deviation (0.57) in the post test. And the value of (T) computed between the two tests is (13.87) which is greater than (4.32) the tabular value of (T) at the level of significance (0.05)

The results of the (lateral muscle) strength test came as the arithmetic mean in the pre-test reached (3.31) with a standard deviation of (0.27) for the control group, while the arithmetic mean was (6.75) and the standard deviation (1.17) for the post test. (T) Computed between the two tests (5.61) which is greater than (4.32) the tabular value of (T) at the level of significance (0.05).

Discussing the results

To read the progress of the results, a clear progress and development in the thigh muscle lift strength (quadriceps muscle) for the members of the winching group throughout the period (8 S abjp) of the applied rehabilitation program is clear to us, which is the same period. It was easy for the control group to complete their rehabilitation, and the researcher referred that that the rehabilitation program designed for the experimental group had a clear effect on the development of the thigh muscles by stretching and tightening the posterior thigh muscles. Muscles, connective and lateral muscles, which makes the muscles work to lift the leg with more strength and durability. For members of the pilot group, you will continue to perform a variety of static and moving exercises in the prepared and stimulating rehabilitation program that harm the table more muscular, leading to an improvement in the rate of strength growth and development. This is confirmed by researcher Geoffrey Per Wafaa (1986) that the development of moral strength is chosen isometric and isotonic exercises performed during the fortified, welcome training program to reach the best results for developing the strength of the recipe. And restore the normal range of motion of the affected joint by giving exercises

Which depends on its movement on the knee and hip joints (Qasim Hassan, Abd Ali Nasif, 1987, p. 335).

(Geoffrey Falkill 1986) During the training period (8) weeks and the reason for the weak development of the control group members for the defect of the rehabilitation program in the traditional practice, the type of exercise, the number of repetitions used in the hospital, the number of meetings and details of the rehabilitation program vocabulary that led to the weak development in the mechanism of biting the strength of the muscles of the thigh members From the control group, on the contrary, we see the positive and striking change in the backward tensile strength of the thigh muscles for the members of the right control group, clearly a relative increase in their program period with a lower percentage of the experimental group. The development of posterior muscle pulling force from the thigh explanation was faster than the control group as a result of training And continuous follow-up with members of the experimental group, consistent with ten (Hunter and news 1985), the more times the weekly training increases, the greater the rate of strength growth and the rate of strength decreases faster after the end of the training phase and vice versa. (Hunter & Nosse 1985), and see that the letter g on the muscles without the other in exercises is general exercises using its members from the control group of thigh muscles and is not as effective as it should be comprehensive exercises. It loads all the muscles that act on the affected joint, as Mufti Ibrahim (2001) emphasized that the most important basis for preparing rehabilitation programs is to determine the ideal pregnancy for rehabilitative exercises and the ideal pregnancy is the specific amount of effect that occurs. On the various organs and systems of the individual when practicing civic activity, which is a physical and nervous effort or the burden on the organs and systems of the body and a reaction to physical performance. (Mufti Ibrahim, 2001, p. 63) And that the exercise of stability and movement of the overall thigh muscles with the blood researcher in his rehabilitation work, which focuses on the goal of developing these muscles and achieving improvement in their results. The experimental group There is a difference in the difference between the strength of the connective muscles in the results of the experimental group and the lateral muscle, and the rates of development among the members of the group B A AH came from performing exercises that focus on his quadriceps, back and thigh muscles and attributing the improvement in strength to the distributions of swans correctly, which helped in the development of muscles Working through Pernamj for rehabilitation and the effect of its diversity on increasing the strength of muscle groups as a result of the stress produced in the repetitions performed by the experimental group members continuously.

Show the results of tests dimensionality for two groups control and experimental variables under study

Table (3)Tests show Bo ' friendly total Tin experimental and control in the variables under study

indication	Values t Calculated	Experimental group		Control group		the exams (Kg)	No.
		P	s	P	s		
0,01	41 ,5	12 ,1	12 ,16	5 1,5	35 ,10	Quadriceps muscle	1
0,01	89 ,4	2 1,0	1 10.0	2 1,0	21 ,6	Back muscles	2
0,02	49 ,3	49 0	11 ,7	1 1,0	12 ,5	Connective muscles	3
0,02	7 3,5	57 ,0	22 ,9	17 ,1	75 ,6	Lateral thigh muscles	4

Value (t)Tabulated at the degree of freedom (4) and the level of significance(6 2,7) = (0,05)

Table (3) shows the results of the post test for strength test (quadriceps muscle) B arithmetic mean of LGA (16, 12) and gut deviation for Larry experiments (1, 12), while the center B calculation for LGA (10.3) 5 and deflection The standard (1.5 5) for the control group for testing n VS and the T value (calculated between the two groups in the

subsequent test (5, 41)) which is greater than (4, 32) the TTabular value at the significance level (0.05) came the test (muscle strength back) and the results The post test for the experimental group has an arithmetic center (10.0 1) and a standard deviation (1.0 2) for the control group and the experimental group. The same variable reached the arithmetic mean (6, 21) and the standard deviation (1.0 2) with respect to T) calculated between the two groups in the next test reached (4, 89), which is greater than (4.3 2), the value of (T Tabular) at) significance level (0.05). The strength test (the results of macrophages) came to Brother Tabard, posttest, where he reached the mean (7, 11) and standard deviation (0, experimental group, while it reached the arithmetic mean of the control group (5), 12) and the standard deviation (1, 0 1 (for the same) variable, and the value (T) was calculated between the two groups in the second test, and this was (3,49) and less to (4,32) (Tabular) at the level of significance (0.05). The results of the muscle strength test (brutal) Which was studied by the experimental group with a mean (9, 22) and a standard deviation (0.5 7), while the total arithmetic result was the mean of the control group with the same variable amount (6), 75), the standard deviation (1) (7) and the value of (T) The computed value between the two groups in the subsequent test was (3.5 7), which is less than (4.3 2) the value of (T) in the international table at the level of significance (0.05).

Discussing the results:

The commitment of the experimental group to apply the vocabulary of the rehabilitative program and the safety of supervision and follow-up for good performance and the harmony of the program's exercises, both static and moving, had a great impact on the development of the members of the experimental group in the post-test of the quadriceps muscle strength variable compared to the control group, where muscle strength increases with increasing exercise performance Physicality and decrease in the absence of moving the part, that the development of moral strength is by choosing fixed and moving exercises performed during the training program to reach good results to develop the characteristic of strength, and muscle inflation is not necessarily the title of raising the level of strength, but it can be dependent on the efficiency of the nervous system In improving muscle function. (Jeffry. Falkel 1986, P 76)

As for the strength results of the thigh muscles (the quadriceps muscle) for the group members, they were greater than for the control group, and this is evidence of the effectiveness of the proposed training program affecting the muscle responsible for lifting the thigh up. And that the ability to identify the quality of the muscle by knowing the extent of what it can carry or the degree of endurance it is, as well as the amount of work it produces (Raysan Khuraibet Majeed, 1991, p. 35) The researcher believes from the foregoing that the high percentage in the development of the members of the experimental group clearly in the strength of the femoral muscle pull was faster and greater than it is among the control group members, and this is an indication that the proposed program and its effect have the preference in the development of the thigh muscle groups due to the traction force of The program followed in the hospital, because the proposed rehabilitation program includes a variety of training exercises with gradual stress and different repetitions of muscle contractions that affect muscle strength better. Conducting regular exercises for maximum strength due to the building of more muscle fibers and enlargement of working muscle cells, and the increased pressure occurs as a positive result of the growth of ligaments, tendons and bones. ((Berne, R. & Levy.1988, p. 351. The researcher believes that the difference between the two samples used in terms of ages and different athletic levels, among them those with high or medium training, as well as the thigh muscle groups and their relationship to the angles of the affected knee joint for the purpose of Obtaining the maximum muscle contraction force possible that helps restore the muscle to its normal state before the injury is among the many reasons that affected the results of measuring the strength of the thigh muscle groups for the experimental and control groups that the remarkable development of the members of the experimental group and its evolution over the members of the group to apply the proposed program with Taking into account the cases of muscular dystrophy that may occur to the injured after the injury and from the first day of performing the training program, and people who stay in bed due to the injury can avoid muscular atrophy by contracting their muscles for seconds to match one third of the maximum strength of the muscle, and it is not required that the contraction be maximum This means that most injured athletes can train enough to prevent muscular atrophy, ensuring that the loss of muscle strength is greater when the muscle is in Stabilization due to the lack of transmission of nerve stimuli to it (Astrand, pp. 388-421, 1975).

4 - Conclusions and Recommendations:

4-1 Conclusions:

1- The proposed rehabilitation program, with a duration of (8 weeks), was more effective, more beneficial, faster, and included a number of static and moving exercises than the traditional program in force in the hospital, through which the strength of the muscle groups of the thigh developed after the injury of the anterior cruciate ligament in a good way.
2- And to know the extent of the development of strength among the members of the research sample, the tracer tests had a great impact and of great importance on the development of the force variable.
3- The best evidence for the development of muscle strength during the proposed rehabilitation program for members of the experimental group is an increase in the size of their thigh muscle.

4-2 Recommendations:

1- The researcher recommends the need to follow an accurate diagnosis of injuries, which are among the priorities of treatment and rehabilitation.
2- The researcher recommends, after an anterior cruciate ligament injury, the necessity of using static exercises that increase muscle strength and movement, which increase muscle magnitude, and be followed by athletes in rehabilitation programs for the injured.
3- The patient should be given exercises in the form of continuous contraction and relaxation of the muscles working on the affected joint without movement of the joint to get rid of the adhesion between the fibers when there is no movement.
4- The need to pay attention to and familiarity with the injuries and the rehabilitation programs, their vocabulary and their details, in order for them to work in time of need when the athletes and training workers are injured.

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