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Rehabilitation exercises supported by plasma-rich platelet injections to improve some motor functions of people with knee roughness

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ABSTRACT

The research aimed to: Preparation of rehabilitation exercises supported by the search of platelets rich in plasma for people with knee roughness. Identify the effect of rehabilitation exercises supported by plasma injection in improving some motor functions of people with knee stiffness.

While the researcher assumed that there are statistically significant differences between the pre- and post-tests in improving some motor functions for people with knee roughness and in favor of the post-test.

Representing the community and the research sample who attend physiotherapy centers at Alo Osti Teaching Hospital and who have been diagnosed by the specialist doctor that they suffer from roughness in the knee joint after taking diagnostic radiology, and the research methodology was represented by the experimental approach with two experimental and control groups and with pre- and post-tests, and plasma-rich platelet injections were given by the treating doctor after drawing blood from the injured and then separating the blood components from the plasma and then injecting plasma in the form of two doses Every 15 days dose . And then start the rehabilitation exercises prepared by the researcher has been gradual giving exercises

Based on the tests that were conducted, the researcher concluded that the rehabilitation exercises prepared by the researcher had a clear positive impact on the research sample in improving some motor functions of the injured knee joint.

The use of platelet-rich plasma injections had a clear effect on the recovery of the affected knee joint.

The researcher recommends: - The use of platelet-rich plasma injections to treat other injuries as it is one of the modern techniques in treatment.

The use of rehabilitation exercises prepared by the researcher in the treatment of other injuries because the exercises have been prepared according to a scientific and thoughtful approach.

1-1 Introduction to the research and its importance: -

Sports rehabilitation is part of the recovery process and return to optimal performance after an injury to athletes or ordinary people, as it includes a set of medical procedures and therapeutic exercises designed to restore strength, range of motion and balance, which helps reduce the risk of future injury.

The knee joint is one of the important joints that reflect the engineering of the human body and is the cornerstone of the movement of the body, as it connects the femur and the leg bone in addition to the patellar bone (knee soap) and this joint is characterized by a complex composition that allows it to withstand body weight and facilitate daily movements such as walking, running, climbing stairs and other daily activities.

To keep pace with the development in sports sciences, sports rehabilitation relied on advanced techniques, namely physiotherapy, corrective exercise, electrical stimulation therapy and laser therapy, as well as platelet-rich plasma technology.

Therefore, the importance of keeping pacewith modern trends in sports medicine and various specialties has emerged to rely on medical means in treatment and rehabilitation away from pharmaceutical and chemical treatments, whose negative complications may be reflected in the rehabilitation process, so injection of platelet-rich plasma is one of the medical means that can be used in the treatment of knee roughness.

1.2 Research problem

Through the researcher's access to Arab and foreign sources and references, as well as field visits to physical therapy and sports rehabilitation centers, and to consider medical rehabilitation as an essential and important part of recovery after injuries and surgeries for its effective contribution to the restoration of movement and vital functions of muscles and joints.

Recently, platelet-rich plasma technology has emerged as one of the modern and effective treatments in the treatment of injuries due to its ability to accelerate tissue healing, so the researcher saw a search for a new and effective way in addition to rehabilitation exercises to treat knee roughness injury.

This technique is considered a safe technique, as well as it helps to relieve pain, and it is much better than injection with albumin materials

1-3 Research Objectives:

- Preparation of assisted rehabilitation exercises for plasma-rich platelet research for people with knee roughness

- Identify the effect of rehabilitation exercises supported by plasma injection in improving some motor functions of people with knee roughness.

1-4 Imposing Research: -

The researcher assumed that:-

- There are statistically significant differences between the pre- and post-tests in improving some motor functions of people with knee roughness and in favor of the post-test.

1.5 Research areas

1.5.1 Human field: - A sample of people with knee roughness and the number of (10) injured.

1.5.2Spatial area: Physiotherapy Center at Al-Wasiti Hospital.

1.5.3 Time Range: - For the period from 24/6/2024 to 27/12/2024.

2- Research Methodology and Field Procedures:

2-1 Research methodology: - The choice of the approach must be appropriate with the problem of research to be studied, which is the intellectual steps taken by the researcher to solve a specific problem, the research methodology is "that intellectual organization overlapping in the scientific study or is the intellectual steps taken by the researcher to solve a particular problem) so the researcher used the experimental approach to its suitability in achieving the objectives of the research and the design of the experimental group with pre- and post-tests

2-2 Research community and sample: -

One of the obligatory and necessary things is to choose a sample that accurately represents the community of origin" The sample was selected from the female patients with knee osteoarthritis visiting Al-Wasiti Hospital and numbering (10) injured and aged (35-40) years and who suffer from pain in the knee joint.

X-ray was diagnosed after taking x-rays.

2--3 Devices, tools and means used in research: -

Arab and foreign sources and references

- Observation and experimentation
- Tests & Measurements
- International Information Network (Internet)
- Da Inometer (to measure the strength of the knee joint)
- Genometer (Digital Angle Measurement Rate)
- Computer type (Lenova)

2-4Field Research Procedures :

After reviewing the Arab and foreign sources and references and previous studies, then determining the tests of muscle strength, flexibility and pain relief.

2.4.1 Tests used in research:

- Badawi Shabib, H. Muscular strength: Fixed Strength Test for Leg Muscles 2023
- Test name: Test of the constant strength of the muscles of the legs.
- Purpose of the test: Measurement of the static strength of the material and extensor muscles of the legs.
- Unit of measurement: kilogram (kg).
- Necessary tools: dynamometer.
- How to perform: The test is carried out after the laboratory wears the back belt according to the following steps:
- The tester grasps the tension shaft with both hands, with the palms of the hands downwards in a position in front of the meeting point of the femur and pelvis, and this position is observed after the belt is installed and during tension.
- The tester stands on the base of the device and the knees are bent and the greatest possible tension occurs by straightening the knees, and the length of the chain must be fixed in line with the length of the laboratory.
- Before the tightening procedure, it should be noted that the arms, back and head are erect and the chest up.
  Registration:Each laboratory was given two attempts to score the best.

2-4-2 test range of motion of the knee joint (right and left): (Wajih Mahjoub: 93)

- Test name: Range of motion test of the knee joint (right and left).
- Purpose of the test: to measure the range of motion of the knee.

- Unit of measurement: centimeter (cm).
- Necessary tools: Junior Meter.
- Performance method: The flexion angles of the joint are taken at the tide and full flexion, noting that the tester does not reach the pain stage during the knee flexion process, as follows:
- The laboratory takes the prone position on the abdomen and the legs are outstretched.
- The tester fixes the gynometer by placing a precise and stable center on the knee joint on the lateral side (lateral ganglion of the end of the femur below).
- The fixed arm of the gynometer is placed on the thigh straightness.
- As for the moving arm, it is fixed on the straightness of the leg.
- The tester then bends the knee and the arm accompanying the leg moves to give a certain reading, as the reading represents the range of motion of the knee joint.

Recording: Recording is made to the nearest 0.5 ° angle

2-4-3 pain degree test (Ahmed Samir: 80)

It is a scale is a digital ruler that contains five pictures of faces that express pain and its intensity, and each expression has a degree and expresses the degree of pain and starts from (0-10) and the number 10 is the presence of severe pain and zero indicates the absence of pain.

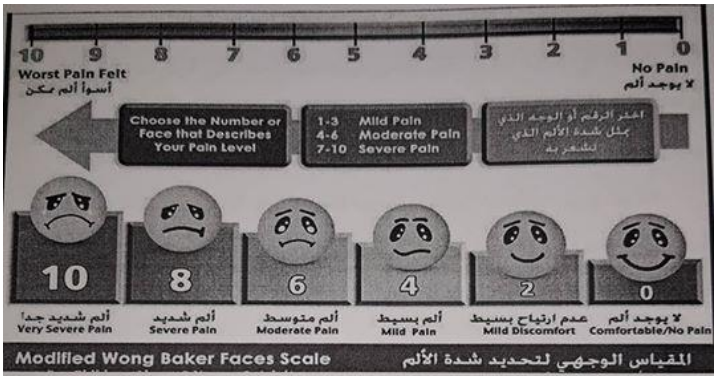

Figure (1)

Digital ruler measures pain

Exploratory Experience:

The researcher deliberately conducted it on a sample of (4) injured people who are among the research sample, and that was on Sunday, 24/6/2024, to find out the most important obstacles that the researcher may encounter, as well as to know the

appropriateness of the exercises prepared with the research sample and the extent of their acceptance of them, and this was under the supervision of the physiotherapy unit specialist at Yarmouk Teaching Hospital.

2.6 Pre-tests:

The researcher deliberately did not conduct pre-tests on the research sample on Monday, 1/7/2024 at Alo Osti Teaching Hospital, at exactly ten o'clock in the morning and under the supervision of medical staff.

2-7 Exercises used in research:

The researcher prepared a rehabilitation approach using rehabilitation exercises. The application of the curriculum began on Tuesday, 2/7/2024 and ended on Friday, 13/9/2024, and lasted for a period of (12) weeks, with (3) units per week (Saturday, Monday, Wednesday) and a time of (20) minutes per qualifying unit. The technique was performed by the doctor specialized in the number of drawing samples of blood from the injured and separating its components in the face of the centrifuge by the medical team, and after two hours of the withdrawal and separation of the blood components, then the technique was implemented by the doctor in two doses, the first dose was on Tuesday, 2/7/2024, and then the second dose was given after 15 on Wednesday 17/7/2024

. The following points must be taken into account when conducting the blood draw as follows:

Taking the consent of those injured in the blood draw.

Withdrawal and laboratory analysis are performed by a specialized medical staff

Ensure that none of the infected people are infected with blood diseases.

The amount of blood drawn from the blood of the injured person was determined according to the opinion of the specialist doctor.

Then the exercises prepared by the researcher are applied:

1. Lie on your back with knees bent and hip raised and lowered slowly
2. Standing,leaning on the wall with one arm, then bending the knee joint of the right leg , pulling the metatarsals with the hand and holding (30s) (repeating the exercise on the left side).
3. Front support : flexion and extension of the legs in succession.

4. Lie on the back with the arms intertwined behind the head with the leg bent and stretched Touch the elbow of the opposite arm of the leg bent successively once right and once left.
5. Forward stabbing position with raising and lowering the knee joint of the hind leg perform the same exercise with the other leg with an inhale while lifting and exhaling in the lower.
6. Lie down, bend the legs and then stretch the legs with the arms raised high to the maximum extent you can reach with a slowly inhale and subtract when returning to the initial position.
7. Lateral leaning on the elbow of the hand and bending the knee (90 ^{AH}) Raising and lowering the hip with each inhale lift and each exhale lower. The exercise is performed on both sides .
8. Procumbing, bending the legs of the knee joint at an angle of 90 degrees with the vertical line and touching at the metatarsals, raising and lowering the legs at the same time inhale with lift and exhale with lowering.
9. Lie down and place the palms under the hip, raise and lower the legs very slowly, inhale when lifting and exhale when lowering.
10. Lying down, the legs bend with the bilateral extension of the legs raising the arms high to the maximum extent they can reach with an inhale and a subtraction slowly when returning to the initial position .
11. Lie on the back with the head and shoulders raised with the legs slightly raised Bend the leg while pulling it with the arms successively once right and once left.
12. Sitting open, legs bent outwards and then pulling the metatarsals with their hands towards the chest.
13. Procumbing ,The right arm is raised with the left leg raised, the raise and lowering are done sequentially.
14. Lie down, raise the head and shoulders off the floor , legs raised at an angle of 45 degrees , bend the leg with arms pulled towards the chest once the right leg and once the left.
15. Squatting with the feet off the floor, knees bent and adjacent, hands intertwined around the legs, and stability in balance position on the pelvis (30 s).
16. Standing: Bending and extending the legs of the knee joint slowly, inhaling when flexing and exhaling at the tide.

2 - 8 post-tests:

After completing the exercises, the post-tests were conducted on Sunday, 16/9/2024, taking into account the temporal and spatial conditions.

2.9 Statistical Methods:

The statistical bag was used that suits the objectives of the research: -

Arithmetic mean, standard deviation, T for asymmetric samples.

3 Presentation and discussion of test results:

3-1 Presentation and discussion of the results of strength and flexibility tests.

Table (1)

Shows arithmetic means, standard deviations, and the value of (T)

Significance of differences	SIG error level	Calculated value (t)	Post-tests		Pre-tests		Unit of measurement	Variables	
			on	Going to	on	Going to			
Moral	0.001	11,031	8,672	80,1	5,618	61,7	kg	Strength of the muscles of the legs	
Moral	0.005	7,011	6,896	31	11,980	59,9	poison	fold	Range of motion of the left leg
Moral	0,000	8,452	11,518	167	19,259	134,6		extend	
Moral	0.002	8,192	5,91	29,6	9,652	59,5	poison	fold	Right leg range of motion
Moral	0,001	4,985	9,666	169,1	21,088	133,5		extend	

D below the significance level ≤ 0.05 and below 9 degrees of freedom

From Table No. (1) we note that there are significant differences between the pre- and post-tests and in favor of the post-and the researcher attributes the reason for the development of the strength of the muscles of the legs to the use of rehabilitation exercises supported by platelet technology rich in plasma had a positive impact in improving the muscular strength of those with knee joint roughness being one of the therapeutic and medical means used by doctors as a treatment in the recovery from injury. Inside the joint as well as it helps in the healing of muscles, tendons and cartilage.(HadeelTalib Mohammed.)

In the test of the range of motion of the joints of the knees, significant differences appeared in favor of the post-test, as the range of motion evolved significantly after the joint was specific and stiff, it became more flexible and easy to move, and the pain disappeared during movement, and that is due to the rehabilitation exercises

prepared by the researcher and the use of platelets rich in plasma were directly affected in the motor joints, ligaments and muscles, as most of the stomach exercises are stretching exercises performed slowly and steadily and work to reach the joints to their maximum range of motion (flexibility exercises are a series of stretching exercises that can be done in a small area of land). Al-Moussawi, S. Q.

Here, the researcher agrees with what he said (Osama Riad) that rehabilitation exercises "are one of the important components of physical therapy that greatly help to restore the physical fitness of the injured such as restoring strength, neuromuscular compatibility, endurance, flexibility and restoring the efficiency of his general fitness in life " (Osama Riad 200, 21).0

Fadel Kamel and Amer Fakher also affirmed, "Muscular strength is the main element of physical fitness and health, and it has great value in developing skills, helping to stabilize joints, facing emergencies in life, reducing the likelihood of injury, and reducing joint pain" (mentioned, Shaghati, 2008, 74).

3.2 Presentation and discussion of the results of pain degree tests

Shows arithmetic means, standard deviations, and the value of (T) for the degree of pain variable

Significance of differences	SIG error level	Calculated value (t)	Post-tests		Pre-tests		Unit of measurement	Variables
			on	Going to	on	Going to		
Moral	0,000	13,416	1,577	7,6	1,577	3,6	degree	Degree of pain

From Table No. (2) we note that there are significant differences between the pre- and post-tests and in favor of the post-and the researcher attributes the reason for this to the rehabilitation exercises prepared and supported by platelet-rich plasma and this corresponds to (Bahaa El-Din Salama: 37) "The stretching and flexibility exercises make the individual feel comfortable and relieve the pain suffered by the individual" and this is consistent with what was mentioned by "Nariman Al-Khatib" as the reduction of pain, work stress and motor injuries lies in strength and stereotypical exercises, so the focus of training is in order to strengthen and improve

the flexibility of areas Prone to injury, especially the knee and lower back area, so that the pain that results from injury to those areas can be avoided."

Huda Badawi adds that the continuation of the rehabilitation curriculum and exercises that have been prepared according to a well-studied scientific approach, taking into account the degree of injury, had a clear impact in alleviating pain by continuing the exercises on those exercises and thus enables the muscular strength and range of motion of the joint to reflect clearly on reducing the degree of pain.A muscle strength test is the ability or tension that a muscle or muscle group can produce against resistance at its maximum voluntary contraction. Alyaa Ali, & SuhadQassim. (2022)The variation in the use of exercises and repetitions that characterized them for exercises as well as their identification in a consistent and balanced manner while giving full importance and sufficient time in choosing the appropriate exercises. And contain rehabilitation exercises on some resistances using weights or without weights replaced us researchers in the sandy medium as an alternative to resistors work to strengthen the joint and increase its strength and flexibility) Al-Nedawy , 2022)

4 Conclusions and recommendations

4.1 The most important conclusions were:

1- Rehabilitation exercises supported by platelet-rich plasma are very effective in developing the strength of the muscles of the legs and the range of motion of the knee joints.

2. PRP rehabilitation exercises are very effective in - thus relieving pain in the knee joint

3- The study proved that the use of platelet-rich plasma technology is an effective treatment method as it is from the blood of the infected and natural at the same time

4.2 The most important recommendations were:

1- The need to diagnose the injury by the doctor before starting work.

2- The need to use rehabilitation exercises supported by platelet-rich plasma for people with pain or knee joint roughness, including a great benefit to the injured.

3- Conducting studies and research on platelet-rich plasma technology on various injuries to produce positive results that benefit rehabilitation and physiotherapy centers.

4- The need for physiotherapy centers to adopt such studies and apply them to patients with such injuries.

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