

## THE EFFECT OF REHABILITATION EXERCISES FOR THE POSTERIOR LEG MUSCLES IN IMPROVING THE FUNCTIONAL EFFICIENCY OF THE ANKLE JOINT IN A SAMPLE OF INJURED PEOPLE

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### Abstract

Modern science aims to improve the levels of motor performance of the individual in general and of the sports practitioner in particular. Those who practice sports for health make strenuous efforts to reach a reliable level of physical fitness, but they are often shocked by the problem of various injuries, especially if exercise does not occur scientifically and regularly. Therefore, it has become necessary to use scientific and modern methods and the various sciences concerned with exercising, especially anatomy and sports medicine, as they have contributed to the legalization of exercising. Exercising for health, especially in the currently widespread gyms, is a common phenomenon in society. The human body is a biological tool that depends in its operation on physical and chemical principles, and physiology is the science that describes and explains the function of each organ of this complex tool. The researchers believe that practicing any physical activity once and in one method leads to the occurrence of (response), but if that activity is practiced several times and in several diverse methods, the person practicing physical activity can reach a state of (adaptation) or biological imprinting. Developing a health condition For individuals practicing physical activity, it is one of the ABCs of sports medicine. The optimal use of new, innovative, codified and scientific methods can help the practicing individual improve his health condition and meet the requirements of his daily life while avoiding the occurrence of sports injuries. Therefore, we see that many people resort to going to gyms.

The research problem is based on the researchers' observation that most fitness trainers in gyms do not focus on segmented exercises for the body's muscles (each muscle group separately) in general and for the back leg muscles in particular due to the pressure on those muscles resulting from practicing various activities during training in those areas. In gyms, the focus is mostly on the muscles of the upper limb, and the focus may also be on the anterior and posterior quadriceps muscles, which may lead to reaching a stage of stress on the motor system (nervous - muscular - skeletal), and the individual may also be injured.

### **Leg Muscles: The Muscles of the Leg (5:154)**

It is a group of muscles that cover the tibia and fibula bones and is divided into three groups: the anterior, posterior, and lateral groups.

#### **First/anterior leg muscle group-:**

They are extensor muscles and include the muscles located in the leg from the front between the tibia and fibula bones. And it consists of

1. The anterior tibialis muscle.
2. Extensor pollicis longus muscle.
3. Extensor digitorum longus muscle.
4. The third peroneal muscle.

#### **Second: The back muscle group of the leg-:**

These are the muscles that hold the foot and toes. They are located behind the leg between the tibia and fibula bones. They are divided into two groups of muscles:

1. The superficial group
2. The cavernous group

#### **Third/lateral muscle group of the leg-:**

They are extensor muscles of the foot and heel that cover the lateral surface of the fibula and consist of two muscles:

1. Peroneus longus muscle.
2. Peroneus brevis muscle.

### **Procedures**

The researchers adopted the experimental research method because it is compatible with solving the problem to be investigated. The research sample consisted of men who practice sports activity for the sake of health and who suffer from various injuries in the back leg muscles during their practice of sports activity and in an age group that ranged from (45-55 years). The researchers chose this deliberately. The age group, in order to suit their ages to the research variables, according to the researchers' point of view, on the one hand. On the other hand, the researchers noted that most of the gym-goers are the sample limited to this age group, and the number of the selected sample reached (13) who underwent the main experiment.

Given the researchers' concern for the health safety of the sample members, they were selected according to the following conditions:

1. The sample was not exposed to any variables that affect the results of the study, such as following medical or dietary diets.
2. Enjoying a good health condition. For this reason, the researcher conducted a medical examination of the study sample and verified their health status, as well as ensuring that they were not infected with the Covid-19 virus.
3. Desire to participate in this study.

### Homogeneity of the research sample

The researchers chose the single-group test method for its suitability with the research method used, and for the purpose of ensuring that the research sample is distributed normally in some variables related to the subject of the research, such as (age, height, and weight), as homogeneity in the gender variable is achieved because the sample members are all male. Therefore, the two researchers conducted the Skewness test. The researchers treated the variables (age, height, and weight) using the skewness factor method and obtained instrumental values for the research sample, which numbered (13) individuals. Note Table No. (1)

**Table No. (1) It shows the homogeneity of the sample in the variables of age, height, and weight**

Torsion coefficient	standard deviation	Mediator	Arithmetic mean	Processors Statistics
				Variables
0.71	3.43	38	38.10	(years)Age
0.47	6.02	170	170.61	(cm)Length
0.57	7.66	75	71.69	(kg)Weight

It is noted from Table (1) that the values of the skewness coefficient approached the degree (zero) and did not exceed the degree (+3). This means that the research sample was within the normal distribution in the variables (age, height, and weight), which reflects the homogeneity of the sample in those variables.

Tools, devices and methods used in research

First: the tools used in the research

#### Number of terraces (2)

##### Dumbbells (2 different weights

- ✓ Signs of different sizes (6)
- ✓ Metric measuring tape, 2 m long
- ✓ Medicine balls of different weights (4)

#### Second: Devices used in the research

- ✓ Apple electronic stopwatch (1 piece)
- ✓ Personal mobile device (HP laptop calculator) (1)
- ✓ Video + photo camera (1 sony type)

#### Data collection methods

- ✓ Arab and foreign sources and references.
- ✓ International Electronic Information Network (Internet)
- ✓ Observation and experimentation.
- ✓ Status form: The health and physical status of the sample members.
- ✓ Health and physical status form for sample members

The researchers prepared a special form to collect the information they intended to obtain from the sample members. This form contained several questions that were divided into two sections. The first

section included general information, and the second section included information about health and physical condition.

The form was presented to the pilot sample for the purpose of ensuring the validity of this form and the comprehensiveness of the questions contained therein. The pilot sample agreed on the comprehensiveness of the questions developed by the researchers.

### **Measurements and tests used in research**

#### **First/physical tests**

1. Stand jump test
2. Running test (30 meters)
3. The hop and jump test from stability
4. Step and jump test of stability
5. Mastaba jump test, height (40 cm), time (30 seconds), sprint
6. A test to measure the strength of the leg muscles using a dynamometer

Then the pre-tests were conducted on (2/19/2023) at exactly eleven o'clock in the Power House Gym. All conditions related to the tests were taken into account in terms of tools, time and place, as well as the method of implementation, in order to provide the same conditions in the post-tests as much as possible. The experimental exercises were applied as follows

#### **The researchers prepared special rehabilitation exercises in which they identified the following:**

- After the end of the acute condition associated with pain resulting from tension injuries, spasms and muscle tears, the rehabilitation approach begins.
- The rehabilitation exercises began on (2/26/2023) and included twisting and supporting exercises for the back muscles of the leg, which were codified by the researchers based on their personal experience in the field of rehabilitation approaches.
- The duration of the rehabilitation exercises is 8 weeks.
- The number of rehabilitation units per week (2)
- The total number of qualifying units is (16)
- Total rehabilitation unit time (25 minutes – 35 minutes)
- The application of the qualifying exercises was completed on (4/17/2023)
- The post-tests were conducted on April 19, 2023.

### **Results**

Presenting, analyzing and discussing the results of the tests for the pre- and post-experimental group for the physical tests:

For the purpose of verifying the research hypothesis, the two researchers analyzed the research data on physical tests to determine the pre- and post-test differences, using statistics using the t-test method for linked samples, and the results were as shown in Table No. (2)

It shows the results of the arithmetic means, standard deviations, mean differences and their deviations, the calculated (t) value, and the moral significance for the experimental group, the pre- and post-tests in the physical tests.

**Table No. (2)**

Meaning differences	Error level	value(t)	A.F	F	Posttest		Pretest		unit measuring	Skills
					A	s	A	s		
moral	0.00	13.962	0.29195	1.28900	0.06552	4.0960	0.30917	5.3850	Time	m (30)Run
moral	0.00	-37.801	0.1434	-1.71500	0.09560	2.9450	0.17192	1.2300	Mete	Jumping from standstill
moral	0.00	-15.343	0.45034	-2.18500	0.38877	4.4350	0.10801	2.2500	Mete	The step and the le of stability
moral	0.00	-24.303	0.44344	-3.40800	0.41840	6.8780	0.35917	3.4700	Mete	Two hops and a jun from stability
moral	0.00	-17.850	3.34830	-18.9000	2.82056	33.2000	2.11082	14.3000	Time	Jump on the platfo seconds (30)
moral	0.00	-17.825	3.93841	-22.2000	4.62481	41.5000	1.82878	19.3000	Newt	Measuring t strength of the l muscles dynamometer ) (device

It is clear from Table (2) that the statistical value of the physical tests and the triple jump are all significant between the pre- and post-tests in the research sample. The researchers attribute the emergence of the result to the improvement in the mechanics of muscular work, and this means the effectiveness of the rehabilitative and physical exercises that were chosen in a manner appropriate to the injury through examination. The medical doctor and the specialist's diagnosis based on the ultrasound examination. The researchers also advise introducing the treatment method using the aqueous medium because of its benefits. (Hayat Raphael 1991) believes that rehabilitative or therapeutic exercises are a selected group of physical exercises intended to correct the deviation from the normal state or treat the injury that leads to the member being unable to perform its full function and help it return to the normal state or close to it. This requires medical specialists. Athletes, physical therapists, and trainers must be familiar with therapeutic sports to restore and rehabilitate the injured part in accordance with the principles of sports injury rehabilitation (6:23)

(Osama Riad, Imam Hassan 1999) sees it as "a group of exercises with the intention of correcting or treating an injury or deviation from the normal state such that it leads to loss or disability from performing the full function of an organ with the aim of helping this organ to return to the normal state (2:27)

(Samia Khalil 2010) defines it as a group of specific sports movements for various pathological conditions whose purpose is preventive and therapeutic in order to return the body to its normal state or rehabilitate it. The effect of therapeutic programs and the selection of appropriate and effective exercises constitute a cornerstone in the success of any therapeutic program related to the mobility of the ankle joint (8:38. )

(Mervat Al-Sayyid Youssef, 1996) indicates that therapeutic exercises contribute to increasing the walking distance of any movement, and that physical therapy has a major role in treating and rehabilitating injuries, and therefore the methods by which they are treated vary (11:25)

(Mohamed Adel Rushdi 2004) points out that the therapeutic exercises are chosen in a way that is commensurate with the nature of the injury and the progression is based on scientific foundations to increase the intensity and repetition of these exercises, which are closely linked to the age stage the player is at and the method of injury, which is called the mechanics of the injury, as well as first aid, which is considered the first natural field. Step to rehabilitate injury (10:123)

(Mervat Al-Sayyid Youssef, 1996) confirms that rehabilitation is considered treatment and training for the injured person to restore functional ability in the shortest possible time by using physical therapy methods that are appropriate to the type and severity of the injury. Rehabilitation programs are also designed and are relatively simple and include three short-term goals, which are:

Pain control - maintaining and improving flexibility - returning or increasing strength) (11: 54), and (AlShammari&Alhasan 2019) also confirms that rehabilitative exercises performed with only body weight for the injured person achieve the goal of reducing joint localization and working to restore range of motion. The joint to a degree close to the normal limit, in addition to reducing the adhesions between the affected tissue or muscle tissue, especially the skeletal muscles, thus increasing its functional efficiency in re-healing (1: 21)

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