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The effect of rehabilitation exercises, especially in improving the range of motion and the degree of pain for those with partial rupture of the ankle joint ligaments

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Abstract

The importance of the research came in preparing special exercises for the case of lacerations in the ankle joint of a sample of athletes to reduce the period of interruption from training and to speed up the return to practicing the specialized activity as soon as possible by using some physical exercises to reduce the effects of injury, which ensures the recovery of the player's efficiency and physical fitness. Special exercises for the case of lacerations in the ankle joint in a sample of athletes to reduce the duration of interruption of training and speed up the return to the practice of specialized activity as soon as possible by using some physical exercises to reduce the effects of injury, which ensures the recovery of the player's efficiency and physical fitness, and the researcher used The experimental approach in the style of designing the individual station is equivalent, and the research sample included a number of patients with soft tissue injuries (muscles, ligaments) with partial tears, and their number was (8) injured from different activities and games. Ankle, a test to determine the degree of pain for the ankle joint), and the rehabilitation exercises began in the first unit on Wednesday, 19/6/2019 at three in the afternoon, and the exercises ended on Thursday, 29/7/2019, and the treatment period was (6 weeks), and the number of rehabilitation units using magnets (18 units), the researcher concluded that the accompanying rehabilitative exercises prepared by the researcher have a positive effect in improving the range of motion of the ankle joint and relieving the degree of pain, and the researcher recommends emphasizing the necessity of adopting the program Prepared by the accompanying researcher in physiotherapy centers, conducting more research and studies of

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various injuries that affect athletes individually and in their acute stages, in order to deepen the specificity of each injury and prepare its own rehabilitation programs.

Keywords: exercise, partial rupture, ankle joint

Introduction

The increasing popular interest in sports activity, especially in recent years, can rightly be said to be a revolution in human life. As a result of the large number of injuries, games require competition to rise to the highest level. Physicians specialized in rehabilitation and sports medicine must give great importance to the prevention of injuries by finding Appropriate rehabilitative exercises after the injury and work on the return and rehabilitation of the injured and a quick return to exercise and physical activity in a short period. It is known that sports injuries accompany physical and sports activity, and the rate of injuries varies among them, and despite the tremendous progress in sports and preventive medicine sciences and the intensive courses of trainers in the rehabilitation process and the informing and follow-up of many athletes of information related to this field, they make serious mistakes during Although they are subject to constantly evolving laws and regulations or to protect athletes, the number of injuries is constantly increasing, due to the pressures of sports competition. Rehabilitation and therapeutic exercises are among the sciences that fall under the umbrella of sports medicine, and people have become interested in many of its branches and departments and harnessed to serve humanity. Rehabilitative and therapeutic exercises are one of the most important sections of sports medicine. The goal of therapeutic exercises is to return the body to normal and remove the dysfunction of the affected part . Whenever this increased competition occurred injuries different when athletes are generally nervous and muscular organs, and when the exercise is a strain on the joints, ligaments, tendons, and bony vertebrae, especially the injury to the ankle joint, which is exposed to a lot of athletes as well as the result of excessive and frequent this joint use shall be The goal of rehabilitation is to quickly enable the athlete to return safely and soundly as soon as possible, and this step is more important for the athlete than for the non-athlete person, and here comes the role of the rehabilitation specialist, as he must develop a program for the condition of the injury to speed up the player's return to recovery or to his normal state as quickly as possible As soon as possible, the researcher turned to preparing special exercises for the case of lacerations of the ankle joint ligaments in a sample of athletes to reduce the period of interruption from training and to speed up the return to the practice of specialized activity as

soon as possible by using some physical exercises to reduce the effects of injury, which ensures the recovery of the player's efficiency and physical fitness. search.

The study aims to:-

- To identify the effect of special rehabilitation exercises in improving the range of motion and the degree of pain for those with partial rupture of the ankle joint ligaments

The researcher assumes that:

- There are significant differences between the pre and post tests in improving the range of motion and the degree of pain for those with partial rupture of the ankle joint ligaments.

2- Research methodology and field strength:

1.2. Research Methodology: The researcher used the experimental method in the style of designing an equivalent single station with a pre-, medial and post-test .

2.2. Research sample : The research sample included a number of patients with an ankle sprain in the calcaneofibular ligament, and their number was (8) with different activities and games, after conducting a diagnostic clinical examination of the injury by a specialist doctor. The specialized staff at Baquba Teaching Hospital after clarifying the idea of research and selecting the sample.

Table (1)

It shows the specifications of the research sample

Variables		s-	±	Mediator	torsion modulus	coefficient of difference
Height/cm		171.750	4.590	170.500	0.592	2.68
Weight / kg		71.625	2.973	71	0.703	4.15
age / year		23.250	1.669	23	0.461	7.18
Training age / year		7.625	1.505	7.500	-0.152	19.74
Pain degree / degree		4.375	0.517	4	0.644	11.82
Ankle joint range of motion	Inversion / degree	10.781	0.775	10.750	0.081	7.19
	flip out / degree	4.606	0.713	4.550	-0.109	15.48
	dorsiflexion / degree	6.718	0.725	6.950	-0.632	10.80

	plantar flexion/ degree	17,381	0.848	17.300	0.578	4.88

3.2. Equipment and tools used in the research:

Japanese video camera (Exilim) High-speed (1000) r/s with external storage unit, (1) electronic device for measuring length and mass, (1) (Chinese origin), laptop calculator (Dell), number (1) (Chinese origin), manual stopwatch type(Casio), number (4) (Chinese origin), metric tape, number (1), tape measure, length (10 m), from . company(Mark)Examination bed (medical stamens) (Chinese origin), bench for the patient to sit on, gonometer (Goinometer) to measure the range of motion of the joint .

4.2. Tests used in the research:

First: A test of the range of motion of the ankle joint. MusculoskeleletalAssessment :Jointmotion and Muscle testing)

The range of motion of the ankle joint is tested by measuring the angles of the joint using a device (Goinometer) It is a device designed to measure the angles to be measured by having different readings of this device in a way that is compatible with the nature of the sample members and the type of ankle joint injury.

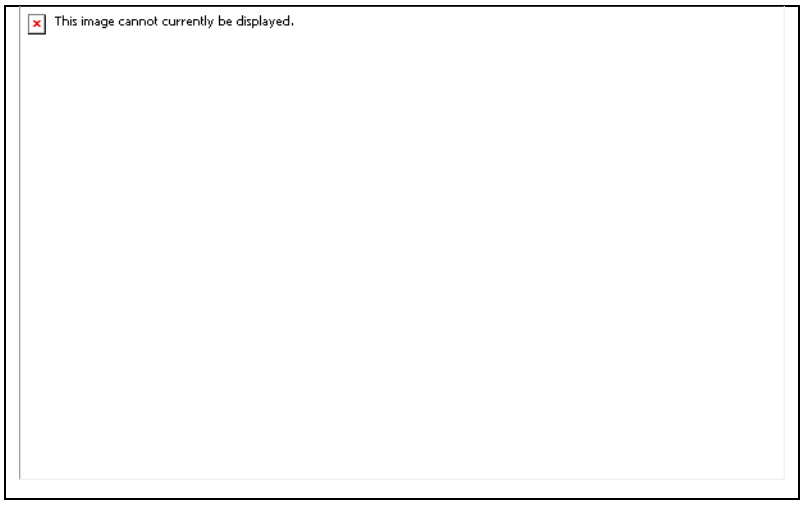

Figure (1) shows a device (Goinometer) the user.

The purpose of the test:

Measuring the angles (range of motion) of the ankle joint in different directions. Possibilities and tools:

Device(Goinometer), towel adhesive tapes placed under the knee joint.

Performance Specifications:

The affected person performs the test in different directions for the purpose of measuring the range of motion of the joint in four directions (dorsal flexion, plantar flexion, inversion and eversion out).

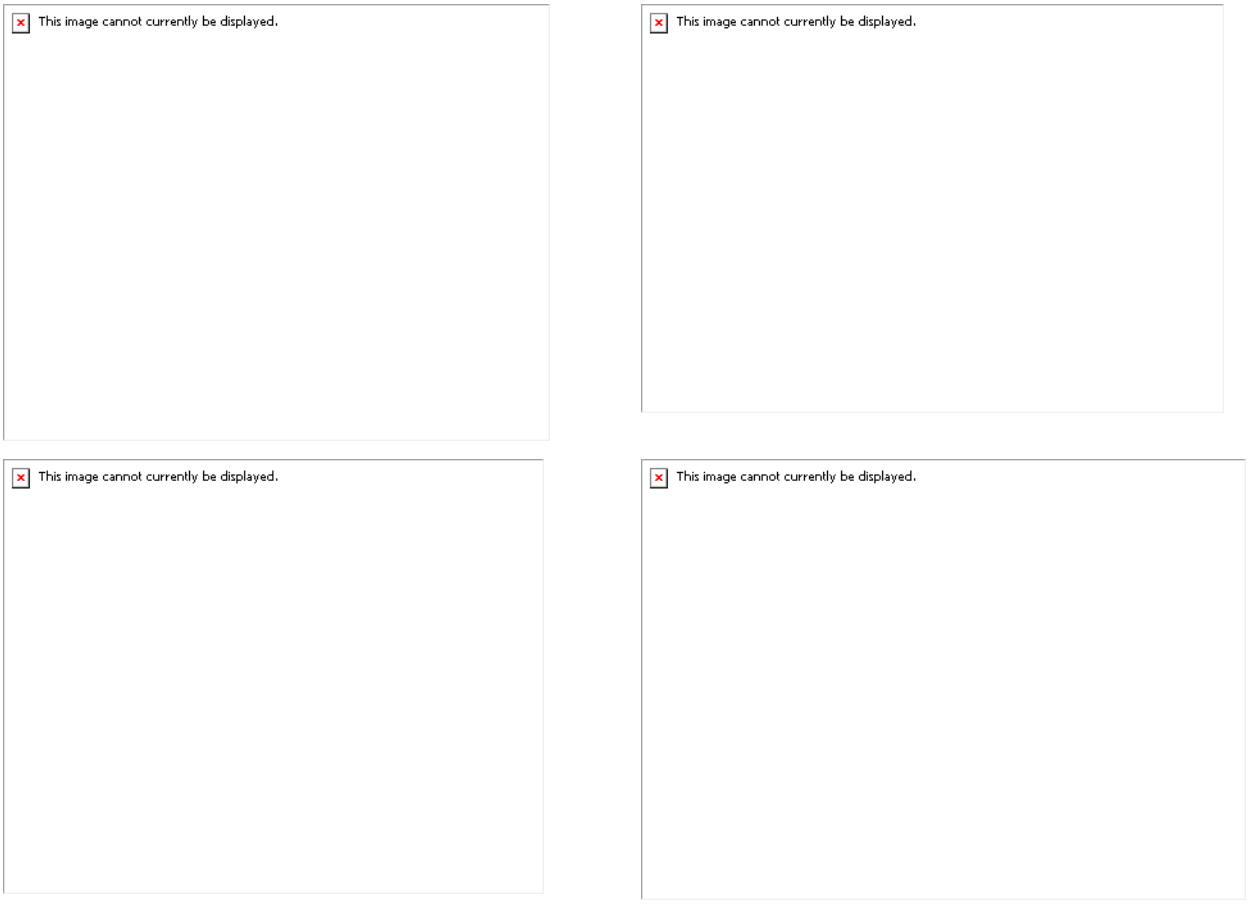

Figure (2)

Demonstrates a method for measuring dorsiflexion, plantar flexion, inversion and exversion of the ankle joint.

After that, the laboratory puts the prone and the towel under the knee joint by placing the foot on a surface of glass after installing the measuring device (Goinometer) with adhesive tapes

so that the angles of the leg with the foot are at an angle of (90°), then the patient performs the separation movement in different directions (dorsal flexion, plantar flexion, inversion and inversion outward), then the values of the angles are extracted.

Recording method: The angles are recorded in the four directions after installing the ribs of the device (Goinometer) to the maximum range of motion that the joint can reach without feeling pain.

3-4-2-2 Ankle joint pain determination test

The test was to measure the degree of pain through the form questionnaire especially designed by the researcher as it is estimated , according to the degree of pain follows :(In the case of the fact that the degree of the angle is located between the two angles mentioned below are calculated according to their proximity to one of the corners)

Pain during rest time (1-degree).

Pain when pressing on the injury area (1-degree).

Pain when dorsal flexion of the foot at an angle (15°-3°).

Pain when dorsal flexion of the foot at an angle (25°-2°).

Pain when dorsal flexion of the foot at an angle (45°-1°).

Thus, the total sum of the degree of pain is (8 degrees).

The form consists of five fields, each field includes the points listed above, and when pain occurs in each stage, a degree is recorded, and thus the highest degree of pain is (8) degrees and the lowest degree is (zero), and this means that the higher the degree, the greater the degree of pain and vice versa shown in Appendix (1)) .

6.2. Survey experiments:

1.6.1 Pilot experiments:

It was conducted at four o'clock in the afternoon on Monday, 11/6/2019, in the physiology lab in the College of Physical Education and Sports Sciences, on a sample of (2) players. The aim of this experiment was as follows:

- Knowing the suitability of the tests to the level of the research sample members.
- Ensuring the validity of the test location and its suitability for carrying out the tests.
- Identify the extent to which the sample members understand the tests used.

- Ensuring the number and efficiency of the auxiliary work team members.
- Know how long it takes to run tests and how long it takes to run each test.
- Preparing the assistant work team and introducing them to the work mechanism and distributing tasks among them.
- Knowing how to put a form to measure the degree of pain and its suitability to the injury of the research sample and present it to a group of experts and specialists in this field.
- Conducting a range of motion test for the injured ankle joint to identify the difficulties that the researcher may face, how the assistant work team works, the time taken for testing, and the tools and devices that the researcher needs.

7.2. Tribal and median tests:

The two researchers conducted the tribal tests on Sunday and Monday, 16-17/6/2019, on all members of the research sample, after completing all the research requirements, and three weeks after the start of the program, the average test was conducted for the members of the research sample.

8.2. Qualifying program:

The qualifying program prepared by the researcher and after the specialist experts confirm the prepared curriculum: the weight and height are then measured and the patient's program is registered using the patient's form, as this form is filled out by the researcher.

In order to follow the sound scientific context to reach the most accurate results to solve the research problem and in order to achieve the goals, the researcher developed a set of rehabilitation exercises for athletes with partial rupture. The researcher applied these exercises for a period of (6) weeks after two to three weeks of taking the treatment by the sample members. In developing these exercises, the researcher relied on a group of experts and specialists in the field of sports training and rehabilitation, as well as on the experience of the supervising lady, taking into account the scientific foundations in preparing these exercises in their final form for the purpose of applying them to the research sample. The researcher prepared these exercises according to the following:

Taking into account the principle of diversity in performing exercises within the rehabilitation unit so that the sample members do not feel bored.

Follow the principle of gradation from easy to difficult and from simple to complex.

Observe the principle of repetition in the exercises.

Use of auxiliary tools in training units.

The curriculum was applied in three stages, each stage consisted of (4-8) exercises.

The curriculum was implemented with three qualifying modules per week.

The curriculum is implemented in cooperation with the specialist doctor to consult him in the event of any complications that prevent the application of the curriculum.

The duration of performing the qualifying exercises is from (35-40) minutes.

The program contains exercises (fixed - mobile) whose purpose is to develop muscle strength.

One qualifying unit contains (4) exercises.

The exercises within the qualifying unit consist of a repetition of (6-12) times.

There is a gradation of iteration through the program units.

Perform some exercises using the red and blue rubber bands.

During the qualifying program, the researcher used rest between exercises and between groups.

The researcher took into account the principle of gradual increase in the training load, from easy to difficult, by using passive exercises at the beginning of the curriculum (the first week) and then gradually increasing the difficulty of the exercises in the subsequent weeks using self-resistance exercises (weight and body parts) in external resistance exercises.

The researcher took into account the diversification and change in the rehabilitation exercises used in terms of the type of exercises, their basic conditions and the tools used.

The qualifying curriculum was implemented by the assistant work team and under the direct supervision of the researcher.

The qualifying exercises for the first unit began on Wednesday, 19/6/2019 at 3:00 p.m., and the exercises ended on Thursday, 29/7/2019.

9.2. Post tests:

The researcher conducted the post-tests for the research sample on Thursday and Friday corresponding to 1-2/8/2019), after the expiry of the qualifying exercises period, and using the same method of the pre-test.

10.2. Statistical means: The researcher used the statistical bag (SSPS) to process the results.

3. Presentation, analysis and discussion of the results.

3-1 Presenting the results of the tribal, middle and dimensional tests under study.

3-1-1 Present the results of the analysis of the variance test in the degree of pain between the three tests (before, middle, and after) for the research sample.

Table (2)

The analysis of variance between the three tests (pre-medial and post-test) shows the degree of pain

Variables	**sum squares**	**degrees of freedom**	**mean squares**	**Values F calculated**	**Indication level**
Pain degree / degree	50.333	2	25.167	151	0.000*
error limit	2.333	14	0.167		

***moral**

From Table (2), we find that in the degree of pain between the three tests (pre-medial-post) it appeared that the value of (F) calculated amounting to (151) and below the level of significance (0.000), which is a significant value at the degree of freedom (14,2) and thus the differences are significant between the three tests.

In order to identify the reality of these differences between the three tests (pre-test, median, and post-test) in the preference of any of them in the degree of pain, the researcher used the law of (LSD) the least significant difference, as in Table (2).

Table (3)

It shows the value of the differences in the arithmetic means in the degree of pain and the value of the least significant difference (LSD) for the three tests (pre-intermediate-posttest)

Variables	totals	Arithmetic mean difference	Indication level	Favor
Pain degree / degree	tribal - middle	2.250	0.000*	middle
	tribal - post	3.500	0.000*	dimensional
	medial - dimensional	1.250	0.000*	dimensional

* moral

From Table (3) it was found that the values of the differences between the arithmetic means reached, respectively, (2.250), (3.500), (1.250), and we note through the differences that the post-test is the best of the tests as it has the smallest arithmetic mean in the degree of pain.

3-1-2 Presenting the results of the analysis of variance test in the range of motion of the ankle joint between the three tests (pre-, medial, and post-test) of the research sample.

Table (4) shows the analysis of variance between the three tests (before - middle - after) in the range of motion of the ankle joint.

Variables	**sum squares**	**degrees of freedom**	**mean squares**	**Values F calculated**	**Indication level**
Inversion / degree	1866.511	2	933.255	321.580	0.000*
error limit	40,629	14	2.902		
flip out / degree	275.690	2	137,845	153.897	0.000*
error limit	12,540	14	0.896		
Dorsiflexion °/	480.287	2	240.143	285,082	0.000*
error limit	11,793	14	0.842		
plantar flexion/ degree	2605.380	2	1302.690	928,056	0.000*
error limit	19.651	14	1.404		

***moral**

From Table (8), we find that in the inversion of the inward between the three tests (pre-intermediate-postural) it appeared that the value of (F) calculated amounting to (321.580) and below the level of significance (0.000), which is a significant value at the degree of freedom (14,2) and thus the differences are significant between the three tests.

In the outward reversal between the three tests (pre-medial and dimensional) it appeared that the value of (F) calculated amounting to (153.897) and below the level of significance (0.000), which is a significant value at the degree of freedom (14,2) and thus the differences are significant between the three tests.

As for the dorsal flexion between the three tests (pre-medial and posterior), it appeared that the value of (F) calculated amounting to (285.082) and below the level of significance (0.000),

which is a significant value at the degree of freedom (14,2) and thus the differences are significant between the three tests.

In the plantar flexion between the three tests (pre-, medial, and posterior), it was found that the value of (F) calculated amounting to (928.056) and below the level of significance (0.000), which is a significant value at the degree of freedom (14,2) and thus the differences are significant between the three tests.

In order to identify the reality of these differences between the three tests (pre-medial-post) in the preference of any of them in the range of motion of the ankle joint (inversion, outward turning, dorsal flexion, plantar flexion) the researcher used the law (LSDThe least significant difference.

Table (5)

It shows the value of the differences in the arithmetic means in the range of motion of the ankle joint and the value of the least significant difference (LSD) for the three tests (pre-intermediate-posttest)

Variables	**totals**	**Arithmetic mean difference**	**Indication level**	**Favor**
Inversion / degree	**tribal - middle**	-10.118	0.000*	**middle**
	tribal - post	-21.587	0.000*	**dimensional**
	medial - dimensional	-11.468	0.000*	**dimensional**
flip out / degree	**tribal - middle**	-4.306	0.000*	**middle**
	tribal - post	-8.300	0.000*	**dimensional**
	medial - dimensional	-3.993	0.000*	**dimensional**
Dorsiflexion°/	**tribal - middle**	-5.118	0.000*	**middle**
	tribal - post	-10.950	0.000*	**dimensional**
	medial - dimensional	-5.831	0.000*	**dimensional**
plantar	**tribal - middle**	-11.843	0.000*	**middle**
	tribal - post	-25.500	0.000*	**dimensional**

flexion/ degree	**medial - dimensional**	-13.656	0.000*	**dimensional**

* moral

From Table (9) it was found that the values of the differences between the arithmetic means in the inversion tests reached, respectively, (10.118), (-21.587), (-11.468), and we note through the differences that the post-test is the best of the tests because it has the largest arithmetic mean. The values of the differences between the arithmetic means of the outward reversal reached, respectively, (-4.306), (-8.300), (-3.993), and we note through the differences that the post-test is the best test as it has the largest arithmetic mean in the outward reversal. The values of the differences between the arithmetic means of dorsal flexion reached, respectively, (-5.118), (-10.950), (-5.831), and we note through the differences that the post-test is the best test as it has the largest arithmetic mean in dorsal flexion.

The values of the differences between the arithmetic means of plantar flexion reached, respectively, (-11.843), (-25,500), (-13.656), and we note through the differences that the post-test is the best test as it has the largest arithmetic mean in plantar flexion. The use of therapeutic exercises was relevant. Effective benefit in relieving pain and raising the pressure on the joint, and the use of therapeutic exercises led to an increase in blood flow to the affected area and thus the removal of waste and remnants of the injury, which relieved pressure and then reduced pain, and the researcher's follower of the rule of gradation in the training load had an effect It is evident in the non-recurrence of injuries or an increase in pain, as “the rule of gradation is a protection against internal disorders in the joints and muscle tendons, in other words, the removal of the state of rupture and muscle spasm.” (Al-Mandawi: 123:1987), and regular exercise leads to an increase in joint flexibility. Flexibility also leads to (reducing muscle pain) (Hammad: 186:1998), and increasing the efficiency of the work of ligaments and tendons that provide the joints with durability. The researcher had a great impact in this development as well that the use of therapeutic physical exercises led to a decrease in the degrees of pain and this means that the vocabulary of the curriculum was in harmony with each other greatly, which led to the treatment of injury and reduce the degree of pain. In addition, the rehabilitation exercises have an effective effect on the demise of Pain and an increase in the flexibility of joints in the body as a result of the commitment to applying the vocabulary of the rehabilitation curriculum that was developed according to sound scientific foundations. Rehabilitation and its reflection, then, on increasing

the activity of the individual in general by increasing the activity of the vital and functional organs in the body, as well as the injury in the ligaments that are responsible for movement in cooperation with the muscles. Therefore, the rehabilitative exercises have an effective effect on the cessation of pain and then increasing the flexibility of the joint that led to Increasing the range of motion of the ankle joint. (Ibrahim Salem et al.: 117:1998)

Conclusion

In light of the results obtained by the researcher researcher concluded that the exercises qualifying and accompanying prepared by the researcher positive impact on the improvement extents motor ankle joint and reduce the degree of pain, and the researcher recommends emphasizing the need for adoption of the program prepared by the researcher associated with the physical therapy centers, further Research and studies of various injuries that affect athletes individually and in their acute stages, in order to deepen the specificity of each injury and prepare its own rehabilitation programs.

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Supplement (1)

pain assessment form

	Tribal	**Middle finger**	**after me**
	Pain degree (1 - 8)	**Pain degree (1 - 8)**	**Pain degree (1 - 8)**

	The name	Pain relief	Pain when pressing on the area	Pain in moving at an angle forward			Total	Pain relief	Pain when pressing on the area	Pain in moving at an angle forward			Total	Pain relief	Pain when pressing on the area	Pain in moving at an angle forward			Tota
				15	25	45				15	25	45				15	25	45	
		1	1	3	2	1				3	2	1				3	2	1	
0																			

Supplement (2)

Ankle rehabilitation exercises

1. From a long sitting position, bend the toes (fists) and then extend the toes continuously.
2. (Sitting - pushing the foot) From a sitting position on the rug, the patient pushes his foot forward, with the resistance of the rubber cord.
3. (Standing) He moves forward on pebbles that vary in size from the largest to the smallest until he reaches walking on soft pebbles (sand) according to the person's abilities.
4. (Standing) By standing on a rubber mat (1 x 1 m), the two combs are raised alternately upwards with the heels fixed on the ground.

5. (Standing) Picking up a handkerchief from the ground from a standing position, and there is a handkerchief or a piece of cloth on the ground that holds the handkerchief with the fingers and lifts it off the ground.
6. (Ankle clenching) The player grips his injured ankle in the presence of resistance, a rubber rope made for this purpose, which connects its other side to a colleague, the person being treated, or another fixed object.
7. (Sitting with knees bent - feet on the ground) From a sitting position with the knees bent and the hands resting on the ground, he bends the wrist of the foot on the leg (raising the instep) and then presses the instep to bring the foot to the ground.
8. (Standing stable middle) From a standing position with the hands in the middle, bend the toes of the foot up and then fist them down.
9. (Standing in the middle) From a standing position with the hands in the middle, he moves the foot forward to try to touch a point on the ground, extending the foot joint down and clenching the fingers.
10. (Sitting - clenching the ankle) From a sitting position on the rug , the player grabs his injured ankle with the presence of resistance, a rubber rope made for this purpose, connecting its other side to a colleague, the person being treated, or another fixed object.
11. (Sitting - raising the fingers) From a sitting position on a chair, the injured player raises the instep to the top and then returns it to touch the ground again.
12. (Moving the ankle in all directions) From a sitting position, the player moves the ankle in all directions, right and left, then adduction and abduction.