



E-ISSN: 2707-7020  
P-ISSN: 2707-7012  
JSSN 2024; 5(1): 05-08  
Received: 05-11-2023  
Accepted: 09-12-2023

Mona Hamid Jassim  
Al-Rusafa Education  
Directorate, Baghdad, Iraq

# The effect of rehabilitation exercises using assistive devices on some variables resulting from a tear injury to the ankle joint in basketball players

Mona Hamid Jassim

DOI: <https://doi.org/10.33545/27077012.2024.v5.i1a.227>

## Abstract

The study aimed to identify the effect of rehabilitation exercises on injured basketball players, and the speed of their recovery, as most therapeutic methods take a long time during the treatment period, which negatively affects the players' results. The researcher used the experimental approach to solve the research problem, while the research community has the research community was identified with advanced players with ankle sprains for Baghdad clubs participating in the Iraqi Premier Basketball League for the 2021-2022 sports season who suffer from a simple partial tear of the ankle joint ligaments. The injury to the players was confirmed by the team's therapist, in addition to the diagnosis by a specialist doctor. They numbered (10) players, and (6) players were chosen as the research sample. As for the most important conclusions and recommendations reached by the researcher:

Rehabilitation exercises using assistive devices had an effective role in improving the range of motion angles of the ankle joint.

Rehabilitation exercises using assistive devices played a major role in developing the amount of joint resistance.

- Paying attention to increasing the strength and angle of the joint because it has an effective role in improving the efficiency of the joint's work.
- Conduct a study similar to this study on different activities and age groups.

**Keywords:** Rehabilitation exercises, Ankle joint, basketball

## 1. Introduction

Scientific research and studies in the field of sports are concerned with developing and developing the various abilities, skills, traits and special knowledge that each type of different sporting activity needs to achieve the maximum sporting level. Therefore, the number of injuries and health damage resulting from them increases as a result of the pressure of training and competition, as there is tearing of the muscles and ligaments surrounding the ankle joint. In the game of basketball, this joint is one of the joints most vulnerable to injury due to complex movements and high physical friction during competition, which makes it more susceptible to injury. Rehabilitation approaches work in treating and rehabilitating sports injuries by removing cases of dysfunction of the joint or the affected part by taking care of the manifestations of weakness. In some muscles and ligaments surrounding the joint, developing and improving muscle strength, joint flexibility, degree of neuromuscular compatibility, increasing the rate of tissue healing, and speeding up the removal of blood calcifications that accumulate inside the joint capsule as a result of the injury.

### 1.1 Qualifying Exercises

The timing, harmony and consistency of medical treatment and rehabilitation is the first stage in which the injured person begins to recover from his injury. Rehabilitation begins with the beginning of the pain treatment program with the use of some auxiliary means to relieve pain such as cooling or heating applications such as electrical stimulation and infrared radiation. (Beynon) confirms that controlling Pain and swelling in the rehabilitation stage and the progress of treatment helps in the transition to the subacute stage. Among the advantages of this stage is reducing pain and swelling and increasing the range of motion of the affected joint.

**Corresponding Author:**  
Mona Hamid Jassim  
Al-Rusafa Education  
Directorate, Baghdad, Iraq

Rehabilitation approaches are most important, although the importance is not all in returning the players to the stadiums again and restoring their recovery. Athletes engage in daily activities after surgical operations as well as before the operation, and are defined as physical movement activities that contribute to shaping the body and developing its motor capabilities to achieve special therapeutic goals and duties and in accordance with specific rules that take into account scientific foundations and principles.

Rehabilitation curricula or exercises are one of the means of motor therapy and play their role in maintaining the health and fitness of the affected individual.

### 1.2 Research problem

Through the researcher's experience and field practice as a match supervisor, surveying the opinions of specialists in this field, and reviewing many studies and research, he noticed the frequent occurrence and recurrence of ankle joint injuries among basketball players, which prompts most of the injured to see doctors for the purpose of treating the injury. The researcher also noted that the program followed takes a period of time. It takes a long time to treat and rehabilitate injured athletes, in addition to the lack of modern methods for rehabilitating this injury. Therefore, the researcher decided to study this problem and develop appropriate solutions for it by preparing rehabilitative exercises using assistive devices, as the research believes that it will have an impact on the degree of pain, range of motion, and strength of the surrounding muscles. For players with ankle joint pain in basketball, so the researcher wanted to engage in this experiment.

### 1.3 Research objectives

- Preparing rehabilitation exercises using assistive devices.
- Identifying the effect of rehabilitative exercises using auxiliary means on some variables resulting from moderate ankle joint tear injury in basketball players.

### 1.4 Research hypothesis

- There is an effect of rehabilitative exercises on some variables resulting from a moderate tear injury to the ankle joint in basketball players.

### 1.5 Research areas

- **Human field:** Players applying for clubs participating in the Iraqi League for the 2021-2022 sports season.
- Time period: from 11/7/2021 until 5/10/2022.
- Spatial field: Indoor sports halls for Baghdad clubs. Specialized clinic for physical therapy and sports rehabilitation.

## 2. Research methodology and field procedures

### 2.1 Research Methodology

The research community was identified with advanced players with ankle sprains from Baghdad clubs participating in the Iraqi Basketball League for the 2021-2022 sports season, who suffer from a simple partial tear of the ankle joint ligaments, as the injury to the players was approved by the team's therapist, in addition to the diagnosis by a specialist doctor. They numbered (10) players, and a reconnaissance sample of (4) players, with a percentage of (40%), and the main experiment sample of (6) players, with a percentage of (60%), were selected from the research community. The researcher sought to extract homogeneity for the sample to search for By taking measurements (height, body mass, chronological age, training age) for each player, to ensure the avoidance of influences that may affect the desired research results, and recording them in a special form, as they found that the value of the skewness coefficient for all measurements is within the normal curve of the sample distribution.

### 2.2 Tests used in the research

1. Test to measure the degree of pain.
2. Testing the range of motion of the ankle joint.

The researcher used the tests designated for this research, which consist of the three tests mentioned above, and the computers designated for that purpose, after they were nominated by experts and specialists.

### 2.3 Exploratory experience

The experiment was conducted on 7/1/2020 on a group of (10) basketball players. The aim of conducting the exploratory experiment was to verify the devices and tools, identify the obstacles to the tests, and identify the specific time for the tests and the efficiency of the assistant work team.

### 2.4 Procedures for the main experiment

After completing the procedures that qualify the main experiment and which confirmed the validity of the tests, devices and tools used, the researcher proceeded to conduct tests on the research sample of basketball players for the 2020/2021 season.

### 2.5 Statistical methods used in the research

The researcher used the statistical package: (SPSS).

## 3. Presentation, analysis and discussion of the results

### 3.1 Presenting and analyzing the results of the pre- and post-tests for the variables under research

#### 3.1.1 Presenting the results of the pre- and post-tests for the variable degree of pain at each angle and analyzing them

**Table 1:** Shows the arithmetic means, standard deviations, and T-value calculated for the correlated samples, the significance level of the test, and the significance of the difference. It shows the results of the pre- and post-tests for the degree of pain at each angle.

Statistical features / Researched variables	Measuring unit	Pre		Post		Value (v) Calculated	Test significance level Sig	Type indication
		S	A	S	A			
Degree of pain in flexion of the foot	Degree	7.5	0.835	3.574	0.937	6.852	0.00	Moral
Degree of pain in plantar flexion	Degree	7.29	1.580	2.926	0.834	7.995	0.00	Moral
Degree of medial flexion pain	Degree	7.4	1.460	2.75	0.966	11.98	0.00	Moral
Degree of lateral flexion pain	Degree	8.27	0.908	3.027	1.091	9.759	0.00	Moral

By observing Table (1), which shows the arithmetic mean, the standard deviation, the T-value calculated for the correlated samples, the level of significance, and the significance of the difference in the pre- and post-tests, we find that the arithmetic mean for the pre-test for the degree of dorsiflexor pain was a value of (7.5) with a standard deviation of (0.835) Either the arithmetic mean of the post-test was (3.574) with a standard deviation of (0.937) and the value of (t) calculated for correlated samples was (6.852). Either the value of the significance level of the test was (0.000), which is smaller than the significance level (0.05), which indicates the differences were significant and in favor of the posttest.

While we find that the arithmetic mean of the pre-test for the degree of pain in plantar flexion was a value of (7.29) with a standard deviation of (1.580), while the arithmetic mean of the post-test was a value of (2.926) with a standard deviation of (0.834), and the value of (t) calculated for the correlated samples was (7.995) The value of the test significance level was (0.000), which is smaller than the significance level (0.05), which indicates that the differences were significant and in favor of the post-test. While we find that the arithmetic mean of the pre-test for

the degree of pain in the medial flexor of the foot was a value of (7.4) with a standard deviation of (1.460), while the arithmetic mean of the post-test was a value of (2.75) with a standard deviation of (0.966), and the value of (t) calculated for the correlated samples was (11.98) The value of the significance level of the test was (0.000), which is smaller than the significance level (0.05), which indicates that the differences were significant and in favor of the post-test.

While we find that the arithmetic mean of the degree of pain in the lateral flexion of the foot in the pre-test was (8.72) with a standard deviation of (0.908), while we find that the arithmetic mean in the post-test was (3.027) with a standard deviation of (1.091), and the value of (t) was The calculated value for the correlated samples was (9.759), while the value of the significance level of the test was (0.000), which is smaller than the significance level (0.05), which indicates that the differences were significant and in favor of the post-test.

**3.1.2 Presenting and analyzing the results of the pre- and post-tests for the range of motion variable, range of motion of the ankle joint**

**Table 2:** Shows the arithmetic means, standard deviations, T-value calculated for the correlated samples, the level of significance of the test, and the significance of the difference. The results of the pre- and post-tests for the range of motion of the ankle joint.

Statistical features Researched variables	Measuring unit	Pre		Post		Calculated Value	Significance level	Indication
		S	A	S	A			
Flex the Dorsi of the foot	Degree	7.089	2.355	16.025	1.385	21.242	0.000	Moral
Plantar flexion	Degree	12.375	2.069	22.125	2.042	25.451	0.000	Moral
Medial flexion of the foot	Degree	14.75	1.982	20.975	2.245	29.648	0.000	Moral
Lateral flexion of the foot	Degree	9.5	2.054	28.625	1.597	28.648	0.000	Moral

By observing Table (2), which shows the arithmetic mean, the standard deviation, the T-value calculated for the correlated samples, the level of significance, and the significance of the difference for the members of the research sample in the pre- and post-tests, we find that the arithmetic mean for the dorsiflexion test was a value of (7.089) with a standard deviation of (7.089). 2.355) The arithmetic mean of the post-test was (16.025) with a standard deviation of (1.385), and the value of (t) calculated for the correlated samples was (21.242), while the value of the significance level of the test was (0.000), which is smaller than the significance level (0.05), which indicates The differences were significant and in favor of the post-test, while we find that the arithmetic mean of the plantar flexion test was a value of (12.375) with a standard deviation of (2.069), while the arithmetic mean of the post-test was a value of (22.125) and a standard deviation of (2.042) and the value of (t) was The calculation for the correlated samples was (25.451), while the value of the significance level of the test was (0.000), which is smaller than the significance level (0.05), which indicates that the differences were significant and in favor of the post-test, while we find that the arithmetic mean of the pre-test for medial flexion of the foot was (14.75). With a standard deviation of (1.982), the arithmetic mean of the post-test was (20.975) and a standard deviation of (2.245). The value of (t) calculated for the correlated samples was (29.648), while the value of the significance level of the test was (0.000), which is smaller than the significance level ( 0.05), which indicates that the differences were significant and in favor of the post-test, while we find that the arithmetic mean

in the pre-test for lateral flexion of the foot was (9.5) with a standard deviation of (2.054), while we find that the arithmetic mean in the post-test was (28.625) with a standard deviation A standard value of (1.597) and the value of (t) calculated for the correlated samples was (28.648). The value of the significance level of the test was (0.000), which is smaller than the significance level (0.05), which indicates that the differences were significant and in favor of the post-test.

**Discussion of the results of the pre-and post-tests for the variables (degree of pain, angles of range of motion, joint resistance at each angle)**

It is clear from Tables (1 and 2) that there are significant differences between the values of the results of the pre-and post-tests of the individuals in the research sample in the variables (angles of range of motion, and degree of pain).

The values of the angles shown in the tables above indicate that the rehabilitation exercises prepared by the researcher using aids had a clear effect in improving the variables mentioned above, due to the presence of an increase in the ranges of motion of the angles of the ankle joint, as the members of the research sample began applying the rehabilitation exercises that included rubber bands made of strips. Multiple shapes and an unstable medical half ball to strengthen the ligaments and tendons and improve balance of the ankle joint, as the use of rubber bands and unstable medical half balls helps in strengthening the ligaments and tendons of the ankle joint and thus contributes to improving the movement and balance of the joint.

Rehabilitation exercises using assistive means achieve

several purposes, including improving joint range of motion. Samia Khalil (2010) <sup>[2]</sup> stated that exercise leads to increasing the range of motion of the joint, improves the performance of the ligaments and tendons surrounding the joint, and reduces the rates of calcifications and adhesions resulting from repeated injuries. For the joint, which leads to defining the joint.

As for the degree of pain, Table (2) showed a clear improvement, as the decrease in the degree of pain is an important indicator of recovery, as by its decrease, the injured person can perform movements and ranges of motion that are close to normal. The researcher attributes this significant improvement in the degree of pain to the methods he used for the exercises. Which was applied using aids that were built on a precise scientific basis and on a regular basis in terms of repetition and rest within one rehabilitation unit. The researcher also believes that the training methods and rehabilitative exercises have had a positive and effective effect in improving the degree of pain, and this is due to the curriculum containing specialized and comprehensive exercises and exercises. Self-paced and passive exercises, in addition to positive exercises using resistance, whether by the person himself, rubber ropes, or other means. Taking into account the gradation of loads and the type of exercises from easy to difficult and within the limits of pain, all of this leads to a reduction in calcifications and adhesions and the gradual disappearance of pain in the joint.

The improvement in the degree of pain confirms the effectiveness of the proposed rehabilitative approach using aids in increasing the strength of the ligaments and tendons, which reduces pain through a neurological effect (increasing the degree of pain intensity) and a mechanical effect (increasing the adaptation of the nerves to the tendons, ligaments and muscles) by increasing the elasticity of the nerve receptors and the chemical effect (endorphins). And the effect of blood circulation (increasing blood flow), thus reducing swelling and removing wastes resulting from vital reactions such as lactic acid, carbon dioxide, and carbon dioxide, while reducing the acidity of the tissues surrounding the affected area. Also, the researcher's following the rule of gradual rehabilitation had a clear effect in improving pain, and the rule Graduation is a preventive measure against internal disorders in the joints and muscle tendons, in other words, preventing ruptures and muscle spasms during rehabilitation.

## References

1. Osama Riyad, Imam Al-Najmi. Sports Medicine and Physical Therapy, Al-Kitab Publishing Center, Cairo; c2000.
2. Samia Khalil. Functional anatomy of athletes, Cairo, Nass Printing Company; c2012.
3. Qasim Al-Mandalawi, Mahmoud Al-Shatti. Sports training and record numbers, University of Mosul, Dar Al-Kutub for Printing and Publishing; c1987.
4. Nahed Ahmed Abdel Rahim. Rehabilitation exercises for building posture, 1st edition, Amman, Dar Al-Fikr Al-Arabi, publishers and distributors; c2011.
5. A prospective, randomized clinical investigation of the treatment of first-time ankle sprains. American Journal of Sports Medicine. <http://www.dmsystems.com>; c2012.
6. Mattacola CG. Rehabilitation of the ankle after acute

sprain or chronic instability. Journal of Athletic Training; c2002.

7. Michael Selzer. Textbook of Neural Repair and Rehabilitation, Cambridge University; c2006.