

## THE EFFECT OF A REHABILITATION PROGRAM USING A TENS DEVICE FOR THE TREATMENT OF PAIN AND IMPAIRED MOBILITY OF THE WRIST AND LIMBS JOINT IN BASKETBALL PLAYERS

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**Abstract:** This paper aims to investigate the effect of a rehabilitative program using a TENS device to treat pain and impaired mobility of the wrist and limbs joint in basketball players. As for the research hypothesis, it confirms that there are statistically significant differences between the pre and post-tests and in favor of the post-test. The researchers used the experimental approach with an experimental design in one group. The curriculum consists of eight weeks, with (56) rehabilitative units, and is applied every day for the eight weeks. The time of the rehabilitative unit ranges between (15-30) minutes, of which (10) minutes are for warm-up and preparation for the performance of the rehabilitative unit. After the end of the rehabilitation curriculum, the researchers reached that The therapeutic rehabilitative approach used and based on scientific foundations helped to increase the range of motion of the affected joint. In conclusions, to emphasize the need to use (TENS) because of its positive effects in bringing about a cure for the injury. In addition to educating injured people that they undergo a rehabilitation program after injury, as it helps them to return quickly to maintain the required fitness and normal range of motion.

**Keywords:** (TENS), basketball, rehabilitative approach, Limbs Joint

### INTRODUCCIÓN

The rates of sports injuries and their pathological complications increased despite the tremendous developments that included most aspects of life, especially in the field of natural and other treatments. Many believe that this may be due to the introduction of modern technologies and methods and a change in the human lifestyle. In the field of sports, the developments in the theories and methods of sports training science, where the increased use of high stress for long periods of time, with the absence of proper rationing of pregnancy in a manner consistent with the functional state. All this led to an increase in the number of sports injuries, on the one hand, and on the other hand, the modern way of life. Changing the lifestyle has led to the emergence of the so-called diseases of civilization (or diseases of lack of movement). As well as an increase in the tendency to practice sports activities and fitness programs in a scientifically not studied way. For these reasons, the need to use modern methods and techniques in physical therapy has emerged widely among all players, old and new. This called for the development of old methods and the modification of some of them to be more appropriate and effective to comply with modern requirements and to rehabilitate the injured faster and better. After physical therapy has achieved great success in rehabilitating many injuries, diseases, and physical deformities, and in other areas

Achronic low back pain is among the top 10 causes that require primary consultation with internists, having a negative effect on productivity and the economy (Breidenbacht al, 2020). Patients' experiences with low back

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pain are not limited to pain. Pain is linked to function, with physical motions causing pain and pain causing restrictions in physical function (Fluet et al, 2020).

Several motions, such as lumbar flexion, extension, and rotation, have been identified as commonly causing low back discomfort in people with low back pain. When some actions relieve pain, anxiety arises, and the individual prefers to avoid these motions (Abouelnaga et al, 2019). Avoiding unpleasant movements of the low back spine for an extended period of time may reduce the activity of the back and abdominal muscles, resulting in a loss of strength and control, resulting in restrictions in physical performance (Macfarlane et al, 2017).

Physical exercise was advised as a probable risk factor for low back spine pain and preventative factor. High physical stresses on the back are confirmed to be detrimental. Low back pain risk factors include occupational exposure, hard work load, frequent lifts, bending, twisting and severe exercises. The detrimental effect on the back depends on individual characteristics such as fitness or feeling of health (Sonnerly-Cottet, et al, 2019). In basketball players, lower back spinal pain causes relatively frequency of complaints because to heavy loads on the lumbar spine, high pressure movement, and rotation and landings, which can lead to low back discomfort (Ehieli et al, 2017). Therapeutic exercise was proven to be one of the most effective therapies for low back pain and increased function. The numerous additional health advantages of exercise and the minimal risk of injury make it an initial therapy for mild mechanical pain in the back (García-González et al, 2018).

TENS is used to treat low back pain, the stimulation has been successful to reduce low back pain and substantial improvements have been found in individuals treated with lumbar pain with active TENS (Park et al, 2013). In low back pain (EMS), electric muscle stimulation (EMS) is a time-efficient, safe, seamless technology and an excellent training tool that reduces back pain (Dingemans et al, 2014). Ultrasound therapy (US) has been often utilized for low back pain. When an ultrasonic treatment is performed, the goal is to convey heat and energy to the body, reduce pain, and enhance the healing speed (Morsal et al, 2014).

Hence, we find one of the important treatment methods that was first introduced in 1970, and its name in detail is the percutaneous electrical

nerve stimulation unit, and its abbreviation in English (TENS). It is one of the important treatment methods used in physical therapy. It is a device that gives electric flashes through wires that are attached to the skin to reduce pain, and its sizes vary. However, there are small, portable types that operate with a small battery.

Electrical stimulation device is used for chronic and acute pain. Because of the injury, what led to the weakness of movement of one of the limbs with severe pain when trying to move it.

The importance of research lies in the effect of a rehabilitation program using a (TENS) device for treating pain and impaired mobility of the wrist joint and limbs of basketball players.

### Research problem

Basketball is characterized by its many types of competitions and exercises, which lead to multiple sports injuries as well as its legal and technical requirements. The casualty rates were also due to the training loads that required a high-intensity load and an increase in the training units. In addition to the high number of repetitions, whether in training or competition, which leads to a change in the range of motion and its course and causes injuries to the wrist joint. And the lack of interest of some coaches and players in these injuries. The researchers decided to contribute to the rehabilitation of wrist joint and limb injuries for basketball players using rehabilitative methods using the (TENS) device. For the treatment of pain and decreased mobility of the wrist joint and limbs for faster healing. And return to training and competitions in a short period of time to become more able to achieve advanced results, which is a modest scientific attempt to develop solutions to this problem. This research aim to identify the effect of a rehabilitation program using a TENS device to treat pain and impaired mobility of the wrist joint and limbs in basketball players.

### RESEARCH METHODOLOGY

#### Research hypotheses:

There are statistically significant differences between the results of the pre and post tests for the search variables and in favor of the post tests.

**Research areas:**

- The human field: players of first-class basketball clubs.
- Time Domain: 10/8 / 2019--12 / 10/2019.
- Spatial Domain: Sport Fitness Hall in Baghdad.

The researchers used the experimental method for its relevance to the nature of the research problem and its objectives, as it represents "the most sincere approach to solving many scientific problems in a practical and theoretical manner".

**Research Society and Sample**

The research community included a sample of first-class basketball clubs' players in Baghdad, as their number reached (120) players, and the research community was chosen by the deliberate method. A percentage (8.33%) of the total research community

**Means of gathering information**

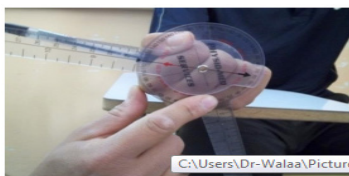
- Arab and foreign sources.
- Personal interviews.
- Tests and measurements.
- Exam registration form.

**Devices and Tools:**

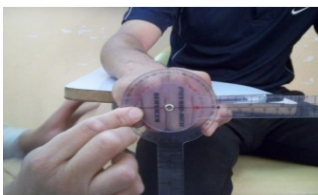
- Ruler
- pencil
- ENS device
- Adhesive tape.

**Research Tests****Variable wrist joint angle tests**

- The position of the victim: From the sitting position, the victim grips a pen and the elbow joint is at 90
- The axis of the device: the head of the joint of the third metacarpal bones, i.e. the axis of the device is with the direction of the third metacarpal bone.
- Arm movement: parallel to the pen. Movement: from the neutral position (the pen is perpendicular to the ground. The forearm rotates to the outer side (to the top, i.e. the palm of the hand is to the top) Angle rate (0- 90)

**Test The Forearm and Palm Down**

- The position of the victim: from the sitting position, the victim grasps a pen and the elbow joint is at 90
- The axis of the device: the head of the joint of the third metacarpal bones, i.e. the axis of the device is with the direction of the third metacarpal bone
- The arm is fixed: perpendicular to the ground
- Arm movement: parallel to the pen. Movement: from the neutral (natural) position, i.e. the pen is perpendicular to the ground, the forearm is rounded to the body i.e. the palm of the hand downward with the angle ratio (0- 80-85)

**Field Research Procedures**

- Exploratory Experience: The exploratory experiment was

conducted on Wednesday 7/8/2019 at the Sport Fitness Hall in Baghdad on a sample consisting of (4) players from outside the main research sample, and the exploratory experiment showed some of the things that benefited the two researchers.

**RESULTS AND DISCUSSION****Pre-Tests:**

Before starting the pre-tests, the two researchers organized the sample in terms of numbers, with the names of the players being recorded on Saturday 10/8/2019 for the members of the research sample.

**Qualifying Program Using A TENS Machine**

After reviewing many studies, research, and references related to the topic of research and reviewing the means of physical therapy and rehabilitation used in the treatment centers, a rehabilitation curriculum was prepared that aims to treat the pain and weakness of the wrist joint and limb movement of basketball players. This is to achieve a balance between them and lengthen the connected ligaments, which leads to an increase in the range of motion. The curriculum consists of eight weeks, with (56) rehabilitation units. Apply it every day for eight weeks. The time of the rehabilitative unit ranges between (15-30) minutes, of which (10) minutes are for warm-up and preparation for the performance of the rehabilitative unit.

Pads attached to the probes / electrodes are placed on the sore area. And the location of use is determined, and the device is set. Then the device transmits the electrical waves through the electrodes to the skin, where a feeling of some slight tingling and numbness begins, in what resembles the process of massage.

And gradually, the power of the device is increased until it reaches a point where you feel the strength of the current, and the device is used for a period ranging between 15-30 minutes per session.

The rehabilitative unit includes several methods and according to the order during performance, namely:

1. The use of some rehabilitative means in the equipment, as follows:

A- Using a TENS device for (15-30) minutes.

**Post Tests:**

The dimensional tests were conducted on Saturday 12/10/2019 under the same conditions as the pre-tests.

**Statistical Methods:**

The researchers used the following statistical methods to process the data obtained from the tests used in the research for the purpose of obtaining the final results ()

- Arithmetic mean.
- standard deviation.
- T-test for linked samples

It is evident from the above results that there are significant differences between the pre and post tests for the experimental group and in favor of the post test. Through this, we can see an increase in the range of motion in the wrist joint as well as movement of the limbs (fingers) in the experimental group (Table1).

The researchers attribute the reason for this to the effectiveness of the rehabilitative approach used and the various exercises in the exercise units.

This indicates that the rehabilitative approach using the TENS device has achieved the goal of reducing joint limitation and working on returning the range of motion to normal. This is what (Escortell-Mayor) confirmed, as, "The signal from TENS disrupts the pain signal that is sent from the affected area to the surrounding nerves. Thus, the brain will pay attention to the electrical signal. It does not pay attention to the pain signal. This is called the TENS gate theory - That is, the special paths of pain create a gate that opens those gates.

In addition, "the TENS signal increases the secretion of endorphins that are resistant to controlling pain in the area where electricity is supplied. This natural process by chemical mediation helps reduce pain and gives a feeling of comfort".

The injury to the wrist joint of basketball players is due to or results from the wrong habits during movement or the different positions that the player takes during training and as a result of these habits the muscular balance between the muscle groups is disturbed and the ability to maintain the correct position is lost. And confirms in this regard (in front of Hassan al-Najimi and Usama Riyadh), "The rehabilitative curricula for the wrist joint within physical therapy help to treat injuries and then develop the range of movement of the wrist joint

**Table 1.** Shows the values of the arithmetic mean, standard deviations, and the significance of the differences for the pre and post tests in the wrist joint angle variable test

Variables	Pre test		Post tests		Sub-function	Sub-function	function
	S	A	S	A			
Forearm and palm up	53.3000	2.00278	79.3000	.94868	26.00000	2.40370	.000
Forearm and palm down	59.3000	1.05935	82.2000	5.63323	22.90000	6.36745	.000

in the direction that increases its endurance." Using the full range of any joint (by extension and flexion), regardless of the reasons, affects the nature of the connective tissue of this joint, which is represented by short, strong ligaments that change some of their properties by accustoming them.

#### CONCLUSION AND RECOMMENDATION

##### Conclusion

- 1) The therapeutic rehabilitative approach used and based on scientific foundations helped increase the range of motion of the affected joint.
- 2) The use of (TENS) device had a great effect on maintaining the range of motion of the wrist joint.
- 3) Rehabilitation after the injury is very important, helping them return to their normal health condition as soon as possible and at a level close to their level before the injury.

##### Recommendation

Considering the research results, the researchers recommend the following:

- 1) Emphasize the need to use (TENS) because of its positive effects in bringing about a cure for the injury
- 2) Educate the injured that they undergo a rehabilitation program after the injury, as it helps them to return quickly to maintain the required fitness and normal range of motion.

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