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The effect of (TRX) exercises in improving muscle strength in terms of ranges of motion of the spine for high jumpers with low back pain, ages (25-35 years)

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Abstract
The rehabilitative natural curative methods are among the important and safe means that the world's attention has begun to turn to because it secures human life in all its affairs.
Therapeutic exercises are an effective and natural method that does not expose the patient to complications on other body functions because it is free of any harmful chemical drugs. Modern techniques have also been widely used in physical therapy, prepared according to scientific foundations, including (TRX) exercises that help relieve pain, especially lower back pain. The sample was between the ages of 25-30 years old, among the high jumpers who had herniated discs for the fourth and fifth Vertebrae. Pre and post tests were conducted for strength from the forward and backward bending position with the force sensor and the flexibility of the spine for forward and backward bending. The researcher concluded the significant differences in the strength and flexibility tests of the spine. In light of the statistically extracted results, TRX exercises should be applied to other injuries to improve strength in terms of the motor ranges of the spine for high jumpers with lower back pain. The researchers also recommend publishing booklets placed in physical therapy centers to benefit from postgraduate research.

Keywords: TRX exercises, muscle strength, motor ranges, high jumpers, people with lower back pain.

1-1 Introduction to the research and its importance

One of the best means of treatment to avoid surgical operations as much as possible is rehabilitative exercises because of their developmental and therapeutic effects on the person with herniated disc injuries, as rehabilitative exercises are considered one of the sciences that fall under the sports rehabilitation plan, which has become the subject of human interest, as he intends to search for many Its branches and divisions find the best and harness it in the service of mankind. Also, sports medicine is a group of sciences that specializes in medical tests and explains the functional, anatomical and mechanical aspects of the body's work during motor activity or prevention and treatment of injuries. Because it secures human life in all its affairs. Therapeutic exercises are an effective and natural method that does not expose the patient to any complications on other body functions because it is free of any harmful chemical medicine. Low back pain (spine) diagnosed by a specialist doctor, which is one of the health problems spread at a high rate in the world, as it has spread because it is natural and effective and can be resorted to instead of surgeries or medicines in certain cases, as it regulates any movement of the body that leads to A therapeutic goal, as it is in the form of movements with rubber ropes fixed to the wall, where it performs appropriate movements for the nature of the back and the annoying pain that limits the movement and activity of the individual in his daily life. The fourth and fifth are the desire of the researchers to provide health and practical service in the field of sports rehabilitation that supports patients in hospitals.

1-2 Research objectives

1. Preparation of rope exercises (TRX) in improving the strength of the muscles working on the spine for players with low back pain in terms of the range of motion of the spine for high jumpers with low back pain

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2. Knowing the effect of (TRX) sling exercises in improving the range of motion of the spine for players with low back pain

1-3 research hypotheses

There are statistically significant differences between the pre and post tests in the research variables of the research sample.

1-4 areas of research

1. The human domain: a sample of high jumpers with low back pain, ages (45-35).
2. Time range: the period from 10/15/2022 to 11/30/2022.
3. Spatial Domain: The International Center for Physiotherapy.

2-1 Research methodology

The researcher used the experimental method for the experimental group with a pre-post test.

2-2 Research sample

The problem of the study imposes defining the research community by the intentional method of high jumpers with lower back pain, for ages (25-35) years of male athletes who refer to the International Centers for Physiotherapy and Rehabilitation. Medium (5) patients were chosen by the intentional method.

2-3 The means, tools and devices used in the research

- Arabic sources.
- International information network.
- Assistant working group.
- Video camera.
- Keynote program to measure the angles of the spine.
- Force sensor to measure the strength of the muscles working on the spine.

2-4 Tests used in the research (1:76)

2-4-1 Muscular strength test using the force sensor from the forward bending position of the torso.
2-4-2 Muscular strength test using the force sensor from the position of bending the torso backwards.
2-4-3 Testing the flexibility of the spine from the position of bending the torso forward.
2-4-4 Testing the flexibility of the spine from the position of bending the torso backwards.

2-5 Exploratory experience

"The reconnaissance experiment is a small experiment similar to the real experience" (2:82).

The researcher conducted the exploratory experiment on 17/10/2021 on (2) of the injured who were not excluded from the main experiment, and its purpose was:

- Safety of devices and tools.
- Knowledge of curriculum units in terms of rest and work.
- Overcoming the difficulties of the researcher through her prior knowledge of the details of the research.

2-6 pre-tests

The researcher conducted the pre-tests on 19/10/2021 at ten o'clock in the morning in the physical therapy hall at the International Center for Physiotherapy in Baghdad.

2-7 Rehabilitation Curriculum

- The application of the rehabilitative curriculum began on 10/20/2021 in Al-Shifa Physiotherapy Hall in Baghdad.
- The researcher applied the curriculum for a period of six weeks, with 3 units per week, and thus the number of qualifying units became (18) units.
- The researcher cared that the content of each exercise is compatible with the characteristics of the researched sample and that it is flexible in implementation to facilitate its application.
- The researcher made sure that the muscular work is based on the correct contractions of the working and opposing muscles in each rehabilitative exercise.
- Each qualifying unit took 25-30 minutes.

2-8 Post-tests

The researcher conducted the post-tests on 5/12/2021 under the same conditions in which the pre-tests were conducted.

2-9 Statistical means

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The researchers adopted the statistical results to extract (101:3).

1- Arithmetic mean
2- Standard Deviation
3- The value of T for the corresponding samples

3- Presentation, analysis and discussion of the research results

3-1 Presentation, analysis and discussion of the results of muscle strength tests with the force sensor in the pre and post tests of the research sample.

Table (1)

Between the arithmetic mean profile, the standard deviations, and the calculated and tabulated (t) values of the pre-post tests of the muscular strength of the research sample

variants	pretest		post test		Calculated T	Tabular T	Moral Connotation
	M	**S**	**M**	**S**			
Muscular strength test from the forward bending position	**7.71**	**1.041**	**10.83**	**1.53**	**7.084**	**2.78**	**Moral**
Muscular strength test from the bent-to-slip position	**8.52**	**1.22**	**11.67**	**1.44**	**3.41**		**Moral**

Table (2)

variants	pretest		post test		Calculated T	Tabular T	Moral Connotation
	M	**S**	**M**	**S**			
Flexibility test of the spine from the position of bending the torso forward	**8.64**	**1.33**	**4.71**	**1.23**	**4.51**	**2.78**	**Moral**
Flexibility test of the spine from the position of bending the trunk back	**7.32**	**1.92**	**4.56**	**1.081**	**3.88**		**Moral**

Table (1, 2) shows the values of the arithmetic mean, standard deviations, and the calculated and tabulated (t) values between the pre and post tests of the research sample in the tests of muscular strength and the motor range of the spine for people with lower back pain in the flexion and range tests, respectively (7.08, 3.41), which is It is greater than the tabular value of (2.78), and the value of (T) calculated for the flexibility tests of the spine in the (forward bending and backward bending) position, respectively, was (4.51, 3.88), which is greater than the tabular amount of (2.78), and this means that the differences are significant. The researcher attributes the emergence of significant differences In the tests of strength and flexibility of the spine to rehabilitative exercises in a manner appropriate to the specificity of the level of injury, its age and their chronological age, which the researcher was keen to apply the ranges of motion for the exceptions of the spine in each exercise dedicated to improving the strength of the spine and that the gradient in the difficulty of the exercise is from easy to difficult and confirms (Montgomery) That “the area is affected by large loads and weights, the natural curves in it, and the occurrence of kinetic work on it more than others in the spine” (4: 26) and Susan Hill believes that “moving the joint freely and with Its natural extent, as the tension of the ligaments and muscles and their tendons on the stability of the joint through the cohesion of the end of the articular bones with each other, the strong ligaments and muscles increase the stability and strength of the joint” (5: 205).

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TRX exercises also helped in improving the range of motion of the spine, as the weakness of the flexibility of the trunk, the lumbar region of the spine, and the muscles of the trunk increase the chances of developing lower back pain, and working to increase the flexibility of the spine increases the pain relief in the lumbar region, and this is what Ahmed Ibrahim indicated. Slow movement from exercise until feeling slight pain as a result of stretching the muscles and stability in the final position in the exercise for a period limited between (5-10 seconds) achieves muscle relaxation, as well as continuing to perform the exercise after the stability period to increase the lengthening of the muscles and muscle tissues leads to an improvement in increasing flexibility. (6:11).

Conclusion

The findings of the researcher from the results of the pre and post tests of the research sample in the variables studied, the researcher concluded that exercises (TRX) contributed to improving the muscular strength of the spine from the forward and backward flexion position, and also contributed to improving the flexibility of the spine from the forward and backward flexion position, and through this it recommends The researcher publishes small booklets that include rehabilitative exercises for the rehabilitation of the spine, such as (TRX) exercises, and places them in physical therapy centers to make the most of them. She also recommends applying (TRX) exercises to other injuries.

Sources

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Supplements

Suggested exercises

1- An exercise to enhance strength and flexibility (from a standing position, the trapezoid ropes attached to the wall behind the player, so that the player pulls the ropes with both hands from behind and takes a step forward and remains stable for 10 seconds), then repeats the exercise for 20 repetitions.
2- (From a standing position, the trapezoid ropes attached to the wall behind the player, the player pulls the ropes with both hands from back to front at chest level and holds for 10 seconds) and repeats the exercise 20 times.
3- Lunge exercise for balance (from a standing position, Trax ropes attached to the wall in front of the player, the player pulls the ropes from the front while bending the right knee on the ground) and repeats 20 times, then repeats on the left knee.
4- Lunge exercise for balance (from a standing position, Trax ropes attached to the wall, while the player pulls the ropes from the front, bending the right knee up and pulling) and repeats the exercise 20 times, then repeats it on the left knee.
5- Low pull-up exercise (from a standing position with the trapezoid ropes attached to the wall in front of the player, the trapezius attached to the wall in front of the player, the player pulls the ropes from the front at chest level with the arms bent backwards) repeat the exercise 20 times.

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6- (From a standing position with trap ropes attached to the wall in front of the player, the player pulls the ropes from the front, the player pulls the ropes from the front, with the whole body leaning back with the pull) The exercise is repeated 20 times.
7- Squatting up (from a squatting position with trapezoid ropes attached to the wall in front of the player, the player pulls the ropes while getting up from the squatting position) the exercise is repeated 20 times.
8- (From a standing position with the track ropes attached to the wall from the front, the player pulls the ropes over the head with both hands) The exercise is repeated 20 times.
9- Chest stretching exercise (from a standing position with trap ropes attached to the wall behind the player, the player pulls the ropes from behind while taking a step forward) repeats the exercise 20 times.
10- Lower back stretching exercise (from a standing position with trapezoid ropes attached to the wall in front of the player, the player pulls the ropes from the front while pushing the back backwards in a sitting position and holding for 10 seconds) the exercise is repeated 20 times.