

DOI: <https://doi.org/10.54702/xvep4y82>**The effect of Core exercises in improving the strength and flexibility of the spine for injured women with herniated discs in the vertebrae (L4, L5)**Sinan Hisham Rashid Al-Mudarres ⁽¹⁾ ✉, Saja Khalid Jassim Al-Shammari ⁽²⁾ ✉

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Received: 17/01/2024, Accepted: 25/02/2024, Published: 30/04/2024This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/). © Modern Sport**Abstract**

Movement therapy is one of the important and safe therapeutic methods because it ensures human life in all its affairs. Rehabilitation 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 medicine. Modern techniques in physical therapy have also been widely used. Prepared according to scientific principles, including Core exercises that help relieve pain with a herniated disc in the fourth and fifth vertebrae. Pre- and post-tests were conducted for strength from the forward and backward bending position using a force sensor and the flexibility of the spine for bending from the front and back. The two researchers concluded significant differences in the strength and flexibility tests of the spine. Recommending the application of Core exercises to other injuries to improve the strength and flexibility of other joints. The two researchers also recommend publishing booklets to be placed in physical therapy centers to benefit from postgraduate research.

Keywords core exercises, disc herniation, vertebrae**Introduction:**

Sports rehabilitation is the fourth leg of medicine, which has become the subject of human interest, as researchers seek to find the best and harness it in the service of humanity. 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. Rehabilitation exercises are one of the important and remarkable methods that most specialists in this field rely on because they secure human life in all its affairs. It is also considered 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 medication. It has also been widely used, based on scientific principles, exercises that simulate working muscles and relieve pain, especially lower back pain in the spine of moderate degree, namely (core) exercises, which have spread because they are natural and effective and can be used instead of surgical operations or

medications in certain cases. By organizing any body movement that leads to a therapeutic goal, it is in the form of high-intensity movements that perform movements appropriate to the nature of the injury, as it is considered effective for strengthening the lower back muscles, especially for those with a herniated disc. From here came the idea of the research and its importance in preparing rehabilitative exercises to restore flexibility. In addition, the strength of the spine to relieve lower back pain resulting from the slippage of the fourth and fifth vertebrae. It is a desire of the two researchers to provide health and scientific service in the field of sports rehabilitation to support therapists in hospitals. The problem of the research is that the lack of movement and our society's lack of sports culture in terms of women's daily commitment to exercise, as well as The technological development that has invaded the world and society in particular, which has led to muscle lethargy and weakness due to excessive sitting and long periods. All of these factors have led to a

high rate of herniated disc injuries among women, which prompted the two researchers to study this topic by preparing rehabilitation exercises to strengthen the working muscle groups surrounding the back. To help reduce pain in order to return to daily life in a normal and safe way. The research aims to prepare (Core) exercises for women with herniated discs of the L4 and L5 vertebrae. Ages (45-55) years, and to identify the effect of (Core) exercises in improving strength. In addition, the flexibility of the spine for women with a herniated disc in the L4 and L5 vertebrae, aged (45-55) years. The research assumed that there are statistically significant differences between the results of the pre- and post-tests of the experimental group in the strength and flexibility of the spine for women with herniated discs of the L4 and L5 vertebrae at the ages of (45-55) years, and in favor of the post-tests among the research sample.

Research fields:

- Human field: A sample of women with a herniated disc of the L4 and L5 vertebrae, aged (45-55) years, numbering (5) injured.
- Time field: (17/10/2022) to (4/12/2022)
- Spatial field: Al-Shifa Center for Physiotherapy / Baghdad City.

Define terms:

Core exercises: These are exercises designed to strengthen the body's core muscles, as they help

strengthen the abdominal muscles and spine and work to strengthen them, which helps prevent falls and reduce back pain, especially with age. As well as balancing and straightening the body, giving it stability and strength.

Method and procedures:

The experimental method was used for a single experimental group with a pre- and post-test to suit the nature of the research. The researcher (Ahmed) indicated, "The problem of the study requires defining the research population in this type of study in accordance with the observed phenomenon" (1). The research sample was chosen by the method intentional is a female patient with a herniated disc of the fourth and fifth lumbar vertebrae, aged (45-55) years, who visit the Al-Shifa Center for Physical Therapy for Rehabilitation. After registering them in the center's records, the researcher tested them from the community of origin, who numbered (9), and after the center's doctors with the herniated disc diagnosed them. Cartilaginous and moderate degree. (5) Injured women were chosen intentionally to represent the experimental group under study. To avoid all influences that affect the results and to obtain a single equal level for the sample in terms of variables, they must be controlled and homogeneous be made for the experimental group sample, as shown in Table (1).

Table .1 shows the homogeneity of the sample for the experimental group

Variables	Mean	Std. Deviations	Skewness
Chronological age	50.1667	0.98	0.45-
Age of injury	2.18	0.751	0.329-
Type of injury	Herniated disc of the L4 and L5 vertebrae		

Means, tools and devices used in research:

Foreign Arab sources - International Information Network - Assistant work team - NIKON video camera (1) - Kenova program to measure spinal angles - Force sensor to measure the strength of the muscles working on the spine - Dell calculator (1) - Force sensor to measure the force of the muscles working on the spine.

- Testing muscle strength using a strength sensor from a forward bending position.

- Testing muscle strength using a strength sensor from a backward bending position.
- Test the flexibility of the spine from a forward bending position.
- Test the flexibility of the spine from a backward bending position.

Exploratory experiment:

(Wajih) pointed out, "The exploratory experiment is considered a small experiment similar to the real experiment" (2)

The two researchers conducted the exploratory experiment on Monday, October 17, 2022, on (2) female patients who were not excluded in the main experiment, and its purpose was:

- Safety of devices and tools.
- Knowledge of the curriculum units in terms of rest and work.
- Addressing negative errors that appear while performing rehabilitation exercises.
- Knowing the suitability of the place to conduct rehabilitation exercises.
- Knowing the time taken when performing the rehabilitation units.
- -Knowing the efficiency of the assistant work team.

Pre-tests:

The two researchers conducted the pre-tests on Monday, October 22, 2022, at ten in the morning in the physical therapy hall at the Al-Shifa Center in Baghdad.

Rehabilitation exercises:

- The application of rehabilitation exercises began on Sunday, 10/23/2022, in the Al-Shifa Physical Therapy Hall in Baghdad.

- The two researchers implemented the curriculum for six weeks at a rate of (3) units per week (Sunday - Tuesday - Thursday), and thus the number of rehabilitation units became (18) rehabilitation units.
- The researchers were interested in ensuring that the content of each exercise was compatible with the characteristics of the sample studied and that it was flexible in implementation to facilitate its application.
- The researchers were keen to ensure that muscle work was based on the correct contractions of the working and opposing muscles in each rehabilitation exercise.
- Each rehabilitation unit took 25-30 minutes.
- The exercises were performed under the direct supervision of the physical therapist.

Post-tests:

The two researchers conducted the post-tests on Sunday, 12/4/2022, under the same conditions in which the pre-tests were conducted.

Statistical methods: The search data was processed through the Statistical Package for the Social Sciences (SPSS).

Results:

Results of muscle strength tests with the force and flexibility sensor in the pre- and post-tests of the research sample

Table .2 shows the arithmetic means, standard deviations, calculated t-values, and sig score for the pre- and post-tests for the research sample on the strength variable.

No.	Variables	Pre-test		Post-test		T value calculated	Level Sig	Type Sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
1	Testing muscle strength from the forward bend position	7,71	1,041	10,83	1,53	7,084	0,000	Sig
2	Testing muscle strength from a backward bend position	8,52	1,22	11,67	1,44	3,41	0,001	Sig

Table .3 shows the value of the arithmetic means, the standard deviations, the calculated (t) value, and the (sig) score for the pre- and post-tests for the research sample on flexibility variables

No.	Variables	Pre-test		Post-test		T value calculated	Level Sig	Type Sig
		Arithmetic	Standard	Arithmetic	Standard			

		mean	deviation	mean	deviation			
1	Testing muscle strength from the forward bend position	8,64	1,33	4,71	1,23	5,29	0,002	Sig
2	Testing muscle strength from a backward bend position	7,32	1,92	4,56	1,081	3,88	0,000	Sig

Significant when the significance value ≤ 0.05

Discussion:

Through Table (2,3), it was found that the differences are significant. The researchers attribute the appearance of significant differences in the strength and flexibility tests of the spine to the TRX exercises that were applied to the injured, to confirm these results by preparing the rehabilitative exercises to suit the specificity of the level of the injury, their age, and their chronological age, which the researchers were keen on. In applying the ranges of motion for spinal flexions in every exercise designed to improve the strength of the spine, and the difficulty of the exercise should be graduated from easy to difficult, (Montgomery) confirms that “the lumbar region represents a weak point and a motor problem due to the vitality of this region with the occurrence of large loads and weights on it and the bends.” It is natural in it and because more movement occurs in it than in other parts of the spine” (3). (Susan) believes that “moving the joint freely and within its natural range, as the ligaments, muscles and tendons influence the stability of the joint by holding the ends of the joint bones together. Strong ligaments and muscles increase From joint stability and strength” (4) Core exercises also helped improve the range of motion of the spine, as weak flexibility of the trunk, lumbar region of the spine, and trunk muscles increases the incidence of lumbar slip, and working to increase the flexibility of the spine increases pain relief in the region. This is (Shehata) pointed out: “Slow movement from the exercise until feeling slight pain as a result of the muscle referral and stability in the final position in the exercise is limited to between (5-10 seconds) to achieve muscle relaxation, as well as continuing to perform the exercise after the period of stability to increase muscle

lengthening.” And muscle tissue leads to improved flexibility” (5). In conclusion, diet helps to improve the work of vital organizations by targeting insulin resistance to reduce it, as it is one of the indicators that works to increase polycystic ovaries. About sports activities, they contribute to the regulation of the hormonal system and in this way reduce the incidence of PCOS. (6)

Conclusions:

- Applying exercises according to the principle of gradation from easy to difficult and increasing repetitions had an effective effect in improving the strength and flexibility of the spine.
- Applying the exercises on a regular basis and implementing the sample components of the required rehabilitation units led to a positive impact on the speed of recovery.

Recommendations:

- Paying attention to rehabilitative exercises aimed at strengthening the spinal muscles and restoring its flexibility.
- Publish small booklets that include rehabilitative exercises for rehabilitation units and place them in physical therapy centers to benefit from them.
- It is preferable to apply CORE exercises to other injuries that the researchers did not address.
- Holding educational courses or workshops by therapeutic sports specialists in physical therapy centers, through which they explain the extent of the overlap occurring in the medical and sports fields and how to use sports as treatment and prevention.

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Appendix (1)

A model of a rehabilitation unit

First unit

Day: Sunday

Date: 23/10/2022

The aim of the rehabilitation unit: to improve strength

No.	Exercise	Time to perform the exercise	repetitions	Rest between repetitions	Sets	Rest between Sets	total
1	From the position of lying on the floor with the hands under the back, raise the legs up and move them in a crisscross manner	sec 10	3	sec 2	3	sec 60	sec 252
2	From the lying position on the floor, raise the legs while lifting the weights and the back.	sec 10	3	sec 2	3	sec60	sec 252
3	From a high plank position with shoulders at chest width, push the foot farthest back while raising the body high	sec 10	3	sec 2	3	sec 60	sec 252
4	From the lying position on the floor, bend the knees and raise the back muscles	sec 10	3	sec 2	3	sec60	sec 252
5	From a lying position on the ground, raise the knees to a 90 degree angle and perform a bicycle movement	sec10	3	sec 2	3	sec 60	sec 252
6	From a lying position on the ground, raise the right hand while pushing the left leg forward, then repeat the effort again	sec 10	3	sec 2	3	sec60	sec 252

Total 1512 seconds

minutes 25.2

تأثير تمارين (Core) في تحسين قوة ومرونة العمود الفقري للمصابات بالانزلاق الغضروفي للفقرات (L4 , L5)

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مستخلص البحث

يعد العلاج الحركي من الوسائل العلاجية التأهيلية من الوسائل المهمة الامنة لأنها تؤمن على حياة الانسان بكافة شؤونه وتعد التمارين التأهيلية اسلوباً فعالاً وطبيعياً لا تعرض المريض الى مضاعفات على وظائف الجسم الاخرى لأنها خالية من اي دواء كيميائي ضار ، كما استخدمت تقنيات حديثة في العلاج الطبيعي بشكل واسع معد حسب اسس علمية منها تمارين (Core) التي تساعد في تخفيف الالام بالانزلاق الغضروفي للفقرة الرابعة والخامسة تم اجراء الاختبارات القبلية والبعديّة للقوة من وضع الثني للأمام والخلف بمستشعر القوة ومرونة العمود الفقري للثني من الامام وللخلف واستنتجت الباحثتان الفروق المعنوية في اختبارات القوة والمرونة للعمود الفقري وتم التوصية بتطبيق تمارين (Core) على اصابات اخرى لتحسين قوة ومرونة المفاصل الاخرى كما وتوصي الباحثتان بنشر كتيبات توضع في مراكز العلاج الطبيعي للاستفادة من بحوث الدراسات العليا.

تمارين core ، الانزلاق الغضروفي ، الفقرات

الكلمات المفتاحية