 ***The effect of rehabilitation exercises for women with lumbar herniated disc after surgical intervention on increasing the strength and stretching of working muscles and increasing the range of motion***

**Vol 2 Issue 3 P1**  **Thi Qar University Journal of Physical Education Sciences**

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**Article history:**

**Accepted: 20/ 5 /2025**

**Published online: 20/6 /2025**

**Keywords**:

**Rehabilitation exercises,**

 **lumbar herniated disc,**

**lower limb physical.**

 ***ABSTRACT***

The importance of this study lies in the preparation of rehabilitation exercises, including those that rely on scientific and practical methods and research, with a special vision for the rehabilitation of injured women, allowing the injured woman to return to her normal state after surgical intervention and avoid serious complications that she may face if she does not undergo rehabilitation, remain seated, afraid of pain and move.One of the most important problems faced by women with herniated disc after surgical intervention is the success of the medical work, but then the patient's health deteriorates and the injury is aggravated due to the patient's lack of use or reliance on successful scientific mathematical rehabilitation. Therefore, the research question is based on the scarcity or scarcity of rehabilitation courses, relying on scientific methods and experience in the sports field to rehabilitate the injured after the surgical intervention, who are often far from rehabilitation. In terms of research methods, the researchers have adopted On experimental methods appropriate to the nature of the research. The research sample is a patient with intervertebral disc herniation and was cured after surgical intervention (8). After the experiment, the researchers found that rehabilitation exercises help strengthen the ligaments, tendons and muscles of the spine and improve injuries by reducing pain levels in sufferers.

**1 - 1 Introduction and the importance of research:**

The countries of the whole world are interested in the individual as an entity created by God with the best and best calendar, but this human being and in the course of his life was forcefully subjected to the modern lifestyle in which the lifestyle changed, which generated the so-called diseases of the age (diseases of lack of movement), including diseases and spinal pain that came from the fact that the muscles and ligaments associated with the spine have become in a flabby position and are not ready to withstand any high effort or endure a long work that requires the individual to continue it, which generates weakness in The spine sometimes continues until pathological complications are generated, the most important of which is a herniated disc, which causes pain, in which individuals are forced to determine movement and compulsory rest by lying at home, and if preventive treatments and rest do not work with it, individuals are forced to rely on medical surgical intervention and as a result of the initial weakness in the back muscles and its doubling due to lying at home and in the hospital, which may lead to stiffness of these muscles, so it was important to address how to prepare and develop rehabilitation exercises For individuals after the surgical intervention, the purpose of which is to restore the individual in his proper image in his work, as after the initial pain has passed, it is important to start early energizing exercises, and these exercises reduce back stiffness, some of which are designed to help return the cartilage nucleus towards the center and others to single out the superficial joints and relieve pressure on the spine.

The exercises after surgical intervention require great attention as the rehabilitation after surgical intervention is different from the rehabilitation that is not subject to surgery, the pain as a result of some movements and sitting or long lying down and the use of a large number of medicines make the injured afraid of the rehabilitation process, which requires giving her scientific vision in the selection of rehabilitation exercises, meaning that the specialist rehabilitation will work hard to convince the individual not to be afraid of movement and that staying without rehabilitation will double the injury and fail the surgical work received infected.

 Hence the importance of research in the preparation of rehabilitation exercises that include a vision for the rehabilitation of women with herniated disc after surgical intervention and according to the means and scientific exercises and the process studied enables the injured to return to the normal state after the surgical intervention and get rid of the dangerous complications that may be exposed to it if she does not undergo rehabilitation and remain sitting and afraid of pain and movement, or do not get the desired benefit and not return to the normal situation before the injury if she underwent exercises or rehabilitation curricula Random or not scientifically studied.

**1 – 2 Research problem:**

Most women are exposed to the so-called spinal injuries, which result from many reasons, including carrying heavy objects more than their ability to withstand muscles, ligaments or sprains outside the ability to bear the spine as well, as well as unforeseen injuries, which generate over the days calcifications that affect the bodies of the vertebrae, which leads to several injuries, including the woman's chronic herniated disc, whose owner is subject to surgical intervention, the research problem is based on the scarcity or lack of rehabilitation exercises that depend The scientific method and experience in the sports field to rehabilitate the injured after surgical intervention, who often stay away from rehabilitation, so the researcher decided to develop rehabilitation exercises for women with lumbar herniated disc after surgical intervention to increase the strength of the working muscles and lengthening and increase the range of motion as well as reduce the degree of pain of the spine in order to rehabilitate the injured to increase the ability to do her normal work and the possibility of movement.

**1-3 Research Objectives:**

* Preparing rehabilitation exercises for women with lumbar herniated disc after surgical intervention in increasing the strength and stretching of working muscles and increasing the range of motion
* Identify the effect of rehabilitation exercises for women with lumbar herniated disc after surgical intervention in increasing the strength and stretching of working muscles and increasing the range of motion

**1-4 Imposing Research:**

* There are statistically significant differences between the results of the pre- and post-tests in increasing the strength and stretching of working muscles and increasing the range of motion

**1.5 Research areas**

**1.5.1 Human field:** a group of women with lumbar herniated disc and undergoing medical surgical intervention at the ages of (40-45) years.

**1.5.2 Time Domain:** The study was conducted for the period from 1/9/2023 to 25/11/2023.

**1-5-3 Spatial field:** The researcher conducted this study in the rehabilitation center in Baqubah Teaching Hospital and the swimming pool of the first closed Yarmouk Forum.

**2 - 1 Research Methodology: -**

The nature of the problem and the objectives of the research are what determine the appropriate research methodology, so the researcher used the experimental approach with one group to suit the nature of the research problem.

**2 - 2 Research sample: -**

The researcher chose her research sample in a deliberate way from women with lumbar herniated disc and subject to medical surgical intervention and reviews of a number of specialist doctors who were operated under their supervision and were transferred to the rehabilitation center in Baqubah Teaching Hospital and they are non-mathematics and an average age of (40-45) years and the number (8) women.

1. **– 3 Means, devices and tools used in research: -**
* Means of collecting information (Arab and foreign sources and references, testing and measurement, data dump lists, statistical means, scientific observation)
* Tools used in the research (dynamometer to measure the strength of the muscles of the trunk and thighs Japanese made, medical scale to measure body weight Chinese-made, tie belts, ruler measuring length, whistle type (Fox) Canadian-made, exercise equipment in Baqubah Teaching Hospital Center
* Devices used in the search (digital camera type (NEKON), laptop, electronic stopwatch type (KISLO) number (2).

**2.4 Research tests used**

**2.4.1 Test of back muscle strength using a dynamometer (Hassanein; 1996: 275)**

**Purpose :** Measure the strength of the back muscles.

**Necessary instruments:** Dynammeter to measure the strength of the muscles of the back and legs.

**Performance Description:** The tester stands on the base of the device to be curved forward as much as possible with the legs remaining straight, then the tester maintains the protrusion of her chest forward, then holds the handle from both ends and tries to pull it up to the side of the scapula.

**Recording:** Recording the reading of the device in kilograms.

**2.4.2 Testing the maximum strength of the thigh muscles using a dynamometer (Hassanein; 1996: 277)**

**Its purpose :** to measure the maximum strength of the muscles of the thighs.

**Necessary instruments:** Dynammeter to measure the strength of the muscles of the back and legs.

**Performance Description: The**  feet are placed on the flat board of the dynammeter, then the tester bends her knees at an angle of (90) degrees with her head raised and her back upright, then works to hold the handle from both ends while shortening the length of the handle chain and then tries to tighten using her legs.

**Recording:** Recording the reading of the device in kilograms.

**2.4.3 Test to measure the strength of the trunk (Zayat; 2014: 68)**

**Purpose:** measurement of the stretching of the trunk muscles

**Necessary tools:** stopwatch + registration form

**Performance Description:** From the prone position, the hands are intertwined behind the head and the laboratory lifts its body (head and chest) from the ground and stabilizes in that position as an isometric resistance to the back muscles, noting that the feet are fixed on the ground by the colleague.

**Recording:** The laboratory records the time it remained stationary in that position without touching its elbows or below its lower jaw to the surface of the earth.

**2.4.4 Test of stretching the strength of the abdominal muscles and legs (Al-Zayat; 2014: 70)**

Purpose: Measure the stretching of the strength of the abdominal muscles and legs from a supine position Raise the legs in front of high and stability

**Tools:** Suitable floor, stopwatch

**Performance Description:** The tester takes a lying position on the back and then raises the legs up in front of the front with the emphasis on pointing with the fingers or forefoot forward and staying in this position.

**Recording:** The time is recorded by the second from the moment the legs are lifted until they touch the ground again.

**2.4.5 Test to measure the elasticity of the trunk and thigh (Hassanein; 1996: 346)**

**Purpose** : Measuring the flexibility of the torso and thigh in the flexion movements of the imam from a standing position.

**Necessary tools:** The scale of any (ruler) length is 50 cm, a flat table that bears the weight of the laboratory.

**Performance description:** Install the ruler on the edge of the table, as the middle of the measurement is at the top edge of the table and the other half at the bottom of the edge (the researcher used a ruler from the top to 50 cm to suit the level of injury in the sample), the point (zero) is at the level of the edge of the table, and the deviations of the degrees that are located in the upper half (negative) and that are located in the lower half (positive).

**Recording:** The distance to the point reached by the fingertips is recorded.

**2.4.6 Test of bending the torso of the Imam from a long sitting position and full extension of the legs (Ibrahim; 2001: 147)**

 **Purpose:** Measure the flexibility of the spine from a sitting position .

 **Tools and supplies:** box, ruler.

 **Performance Description:** We put the measuring box installed on it a divided ruler length (60) cm from the horizontal position in the middle of it must be (10) cm forward and be (50) cm on the surface of the box, the tester takes a long sitting position with straightness of the back with close feet and the ruler between them bends her torso in front of her finger to reach the farthest possible range and stability in the position (for two seconds), without bending the knees.

**Recording:** The distance is measured by the range she can reach with her fingertips, and each tester is given two attempts, and the best attempt (the greatest distance) is calculated for him.

**2.4.7 Test of bending the trunk behind the prone (Ibrahim; 2002: 189)**

**Purpose of the test: Test**  the range of motion behind the spine.

**How to perform:** From a prone position with the hands clasped behind the head with the lower limb fixed by a colleague, the tester slowly bends the torso back to the maximum extent of its ability and holds on for a brief period.

**Recording method:** The arbitrator measures the distance from the bottom of the chin to ground level by means of a tape measure so that the tape is in a vertical position on the ground and in front of the head of the tester during the measurement, provided that the zero in the tape measure is in contact with the ground. The individual is given two attempts and the best attempt is counted.

**2.4.8 Spineal flexibility test (Brahimi; 2007: 90)**

**Purpose:** Measure the lateral elasticity of the trunk.

**Tools:** Wall with a measuring ruler with a length of 100 cm for the sides, fixed chair, recorder, belt fixing

**Performance Description:** The tester sits on the chair and the back of the chair is adjacent to the wall and fixes the chair, and the tester's legs are fixed on the chair by the fixing belt, the tester when hearing the start signal to wrap the trunk and touch the wall from the left side with the right hand indicating the farthest possible distance and vice versa.

**Registration: The** distance to the farthest pointer is calculated with the finger of the right hand, as well as the distance indicated by the finger of the left hand, given to each tester two attempts calculated as the best.

**2 - 5 Application of the main experience: -**

**2 – 5 – 1 Pre-test: -**

The pre-tests for the research sample were conducted on Friday (1/9/2023) at the Rehabilitation Center at Baqubah Teaching Hospital, and the researcher fixed the conditions and the method of conducting the tests and the assistant work team in order to achieve the same conditions as much as possible when conducting the post-tests.

**2 - 5 - 2 Application of the main experience: -**

 The main experiment of the research sample was worked on Tuesday (5/9/2023) and completed on Friday (24/11/2023) on the sample members and by (two training units) per week, and the number of training units reached (24) units, and the time of each training unit took (35-50) minutes, and the rehabilitation exercises were designed according to the principles of training science, sports medicine, medical rehabilitation and physiotherapy.

**2 – 5 – 3 Post-test: -**

The researcher conducted the post-tests after completing the training units of (24) training units on Saturday, 11/25/2023, taking into account all circumstances, conditions and procedures for pre-tests

**2 - 6 Statistical means: -**

The researcher used the appropriate statistical means to process the resulting data through pre- and post-tests through the system ( SPSS ).

**3 - Presentation and discussion of the results: -**

**3-1Presentation of the results and analysis of the results of the tests of the pre- and post-research variables of the research sample**

**Table (1)**

Shows the values of the arithmetic means, standard deviations, the percentage of impact, the value of the arithmetic means of the differences, deviations of the differences from their arithmetic mean, the calculated and tabular value (t), and the significance of the differences between the pre- and post-tests of the research sample in the research variables

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **auditions** | **Unit of measurement** | **Pre-test** | **Post-Test** | **Q-F** | **p f** | **Calculated** | **Error rate** | **Significance of differences** |
| **Going to-** | **on** | **Going to-** | **on** |
| **Strength of the back muscles** | **kg** | **22.25** | **2.30** | **37.50** | **3.12** | **15.25** | **2.50** | **17.21** | **0.000** | **Moral** |
| **Strength of the muscles of the legs** | **kg** | **30.10** | **2.83** | **36.40** | **2.78** | **6.30** | **3.41** | **5.22** | **0.000** | **Moral** |
| **Lengthened trunk strength** | **second** | **14.50** | **2.51** | **23.25** | **3.16** | **8.75** | **2.27** | **17.43** | **0.000** | **Moral** |
| **Stretching the strength of the abdominal muscles** | **second** | **28.60** | **3.46** | **51.65** | **3.68** | **23.05** | **3.10** | **21.03** | **0.000** | **Moral** |
| **Elasticity of the trunk from standing** | **poison** | **12.53** | **2.47** | **32.47** | **3.76** | **19.94** | **3.54** | **15.93** | **0.000** | **Moral** |
| **Trunk elasticity from long sitting** | **poison** | **4.60** | **3.48** | **12.31** | **3.46** | **7.71** | **2.24** | **9.73** | **0.000** | **Moral** |
| **Range of motion behind the spine** | **poison** | **7.50** | **2.14** | **17.10** | **3.29** | **9.60** | **3.45** | **6.35** | **0.000** | **Moral** |
| **Lateral flexibility of the trunk** | **poison** | **33.40** | **3.58** | **62.60** | **3.56** | **29.20** | **4.56** | **18.11** | **0.000** | **Moral** |

**Under the significance level (0.05) and the degree of freedom n – 1 = 7**

**3 - 2 Discuss the results of the tests of the research variables between the pre- and post-tests.**

The above table shows that there are significant differences in measuring the flexibility of the trunk in all its forms, **and the researcher attributes the reasons for these differences to** the effect of rehabilitation exercises on both anatomical and physiological potential, as flexibility exercises contributed to a large extent on the ability of tendons, ligaments and muscles in maintaining the erection of the spine and its strength, and this is confirmed by ( Brain ) 2017: 388) "The muscle elongation of the muscles helps to retain the ability of the muscle to protect itself, as the ability of those muscles depends largely on the anatomical and physiological composition of the individual."

 In addition, the researcher attributes the development of flexibility in all directions to the effect of training on the abdominal muscles, especially the effect of static exercises, because "sagging in the abdominal muscles leads the spine to tilt forward due to the deposition of fat in the abdominal area, which disturbs the balance of the trunk" (Mahjoub; 1989: 33), so the use of regular exercises with the regularity of the research sample in the implementation of exercises that were characterized by high loading gradient and which allowed the linking tissues to respond to movement as "methods of development Flexibility depends on the ability to memorize and acquire the symmetry and accuracy of complex movements and secondly the ability to change motor work in accordance with the requirements of changing situations" ( Dach ; 2023: 61).

As the researcher used to achieve what mentioned free exercises and without assistance and positive stretching exercises with stability to the maximum extent reached by the injured in order to achieve balance in the impact on the other parts as well as the part on which the work revolves, as these exercises worked to increase the strength and stretching and flexibility of the working muscles and thus the ability to bear the burden on them and this is confirmed by (Ibrahim; 2014: 37) that "the use of purposeful exercise leads to muscle tension in the rest of the other parts that are not included in the exercise and thus reduce the percentage of relaxation in the body for non-working members."

 As well as the researcher attributes the development in flexibility to the difference in the way of using exercises, the water medium contributed significantly to the diversity of body movements and thus the different conditions for rehabilitation exercises and this diversity has also included the new way of using free weight training inside the swimming pool as "the diversity in the methods and methods of training and the difference in the atmosphere of training from the usual helps to raise the degrees of flexibility private and public" (Shehata; 1997: 128), and therefore has evolved flexibility for different body positions (standing, sitting, lying down and prone down) among the members of the research sample.

 **4.1 Conclusions:**

* The gradation in the use of exercises according to scientific foundations showed significant differences in the variables of the subject of study
* The gradual use of the training load and commitment of the research sample achieved positive results, as it contributed to achieving the implementation of the exercises in instilling confidence in the injured.
* The preparation of flexibility exercises contributed to maintaining the levels of the body's joints subject to work as well as achieving the desired range of motion.
* The training curriculum contributed to strengthening the ligaments, tendons and spinal muscles.
* The training curriculum contributed to improving the degree of injury by reducing the percentage of pain in achieving high morale in the post-test than in the pre-test.

**4.2 Recommendations:**

* Introducing the rehabilitation curriculum on Iraq's satellite channels to be recognized and adhered to by people with herniated discs and those undergoing surgical intervention and not to fear rehabilitation.
* Participation of companies in importing modern rehabilitation means to benefit those in charge of rehabilitation and develop their capabilities and means.
* Study the level and limits of pain when working with other samples.
* Use strength, flexibility or ability exercises without fear and depending on the degree of pain and response of the sufferer.
* Conducting similar studies on other samples.

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