

THE EFFECT OF EXERCISES WITHIN A FACTORY HIERARCHICAL STRUCTURE IN REDUCING THE DEGREE OF PAIN IN A SAMPLE OF BACK PATIENTS

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Abstract

The purpose of this paper is to preparing exercises within a hierarchical structure to reduce the degree of pain in the lower spine among the research sample. The researchers used the experimental method with one equal experimental group with two pre and post-tests. The study sample included a group of (13) individuals who suffer from pain in the lower spine, with an average age of 22.22 ± 2.862, an average height of 170,615 ± 6.021, and an average mass of 71.692 ± 7.663. The researchers concluded that performing exercises within the hierarchical structure had a positive effect in reducing the degree of pain and increasing the strength of the supporting muscles as well as developing flexibility hip joint. The effect of exercises within a factory hierarchical structure in reducing the degree of pain in a sample of back patients was positive.

Keywords: Hierarchical structure. Back patients.

Introduction

The spine represents the main axis of the body, like the skull, the rib cage, the upper and lower extremities, and the pelvic area rest on it and on it rest large muscles that move the trunk and extremities. Lower the spine, as statistics mention that its proportion (80%) of the world's population has proposed many and varied methods of treatment Causes of pain in the lower spine "The incidence of this pain is about one person out of every six people around the world" (Lühmann, D., Kohlmann, T. und Raspe, H. (2008), There are many and varied causes for this pain, including the mechanical causes, which represent (90%) of these pains, represented by the wrong movements in sitting, walking, work, daily practices and the failure to perform sports movements (regularly) that lead to joint stiffness and weakness of the muscles supporting the spine. The spine is designed to be one of the pillars of the body on which the functions of erection, twisting and bending of the trunk are located. This requires strong muscles, tendons, ligaments, and muscular work in balance and harmony. Any defect that makes it vulnerable to the pain of different types and levels, as well as leads to the deviation of the pelvis from its natural position, which changes its angles, especially the angle Lumbar concavity of the spine, which makes the muscular system use the phenomenon of substitution and this generates strength in the muscles and weakness in the corresponding muscles, all of which generates pain of different levels and times of occurrence in the lower spine " The weakness and sagging of the abdominal muscles will allow the hips to

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move forward, which leads to a noticeable increase in the angle of the lumbar curvature, which leads to an imbalance in the muscle balance of the trunk area. If there is a difference in the muscle balance between the abdominal muscles and the back muscles, the hip will move forward, causing pain in the lower back" (Kapandji, I. (2009).

Research Objective

- Preparing exercises within a hierarchical structure to reduce the degree of pain in the lower spine among the research sample

Research methodology and field procedures

Research methodology

The researchers used the experimental method with one equal experimental group with two pre and post-tests.

Community and sample research

The study sample included a group of (13) individuals who suffer from pain in the lower spine, with an average age of 22.22 ± 2.862, an average height of 170,615 ± 6.021, and an average mass of 71.692 ± 7.663. In addition, all of them have pain in the lower spine due to (acquired mechanical) reasons distributed to several different degrees.

The two researchers took x-rays for them and presented it to specialists in this field, and the following form was distributed to determine the degree of pain and its cause as shows in the table 1 (Table 1).

The test was also used to measure the muscle strength of the muscles of the torso area using a dynamometer, where the laboratory stands on the base of the device with the legs extended straight, then the laboratory maintains the protrusion of his chest forward, then grabs the handle from both ends

Table 1: Shows the form was distributed to determine the degree of pain and its cause.

Age	Length		Weight			
pain history	day		Month		year	
time the pain occurs		morning		evening		
type of pain		intermittent		continuous		
injury type		muscular		bony		mixed
season of pain		summer		Fall		winter
Does pain occur during		warm up		the exercise		off the field
cause of pain	equipment		floor		weather	Other factors
Was the pain caused by		stress		Not enough warm up		
Do you care about healthy nutrition?		yes		no		
Do you smoke		yes		no		
Do you do strength training?		yes		no		
Do you do flexibility exercises?		yes		no		
Do you do regular medical examinations?		yes		no		
Do you suffer from psychological crises?		yes		no		

and tries to pull it up to the side of the scapula. The trunk-bending test from a standing position was also used to measure the flexibility of the trunk region in forwarding bending movements from a standing position. A measuring ruler is fixed on the edge of a table so that the middle of the measurement is at the top of the edge of the table, the other half is at the bottom of the edge and the (zero) point is at the level of the edge of the table. the table and the deviations of the degrees that lie in the upper half are (negative) which is located in the lower half (positive), then the tester takes a standing position on the edge of the table while he is barefoot so that his feet touch both sides of the scale.

The two researchers manufactured the hierarchical structure, which is a traditional structural system that relies on the use of timber in the construction of structural structures, as it forms sturdy walls and ceilings secured by large wooden pegs. If non-structural materials are used between the wooden elements of the hierarchical structure that act as load-bearing walls, the spaces between the wooden elements are filled as a filler. In many cases, these wooden elements are left exposed to the outside, for aesthetic and decorative purposes. Hierarchical log structures are often categorized by the type of foundation and walls, the manner and location of the intersection of the beams, the use of curved timbers, and structural details.

This building method has been in use for thousands of years in many parts of the world, the ancient Egyptians were the first to use this method and many of its styles have evolved historically.

The hierarchical structure can be chosen to achieve a design idea that seeks to exploit the interaction between the structures and optimize the positive energy from the rehabilitation process.

The researchers designed the pyramid into four sections, 1.5 meters high and 2 meters wide so that the patient could lie down and perform the suggested therapeutic exercises as shows in the figure 1 (Figure 1).

Preparing exercises and therapeutic unit

The researchers prepared rehabilitation exercises using a designed hierarchical structure and these exercises were presented to the specialists, and the use of these exercises for the treatment of lower spine pain was approved, and the degree of pain was measured by a special form designed for this purpose and presented to the specialists. These exercises are aimed at strengthening the muscles of the front and rear thighs, strengthening the muscles of the gluteal region, increasing their strength, elasticity, and flexibility of the hip joint, in addition to relieving the pain of the lower spine, as the "Therapeutic approaches to pain in the lower spine should aim to restore the basic qualities of the individual, which are strength and flexibility" (Cordon, C. 2001). The curriculum vocabulary was applied to the research sample by (3) units per week distributed over the days (Saturday, Monday and Wednesday). The researchers took into account an essential and very important point, which is the application of the vocabulary of one therapeutic unit for (60) minutes. The treatment unit was divided into three sections:

First: introductory section

This section included the general and private warm-up.

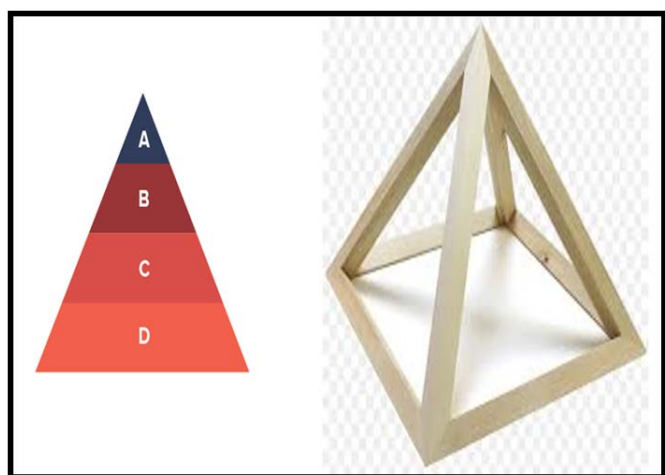


Figure 1: Shows the designed hierarchical structure with four sections.

Second: Main section

The time of this section lasted (45) minutes, and it is the section that contained the mental visualization of the hydrotherapy method. The researchers used a set of mobile and static exercises, as well as some mixed exercises that contain stability and movement within one exercise. The researchers in this section took into account the focus on the two factors Slowness and accuracy during the performance of the mental perception of performing these exercises in order for the muscle to obtain the full stretching process in order to avoid any injuries, as excessive tensile exercises reduce the chances of reducing the intensity of pain, so the principle of gradual intensity must be adopted to remove pain. During the performance of the mental visualization of the curriculum, the focus was on strengthening the muscles of the hip (the gluteus maximus and the hamstring muscles) as well as stretching the second muscles of the thigh (the rectus femoris muscles, the muscles of the iliac region) and the exercises included different positions, including (standing, lying down, prone, and long sitting and based on the four). During the main exercises, deep breathing exercises were performed, in addition to emphasizing the regulation of the inhalation and exhalation processes with the rhythm of performing the mental visualization of the curriculum.

Third: the closing section

This section took (5) minutes and included calming and relaxation exercises in order to reduce the mental effort on the nervous system resulting from the mental visualization of the curriculum.

Results and Discussion

Table 2 shows the values of the arithmetic means and standard deviations in the pre and post-tests to measure the strength of the trunk muscles in relation to the research sample. The arithmetic mean of the strength of the muscles of the trunk region in the pre-test was (48,462) with a standard deviation of (25.115). In the post-test, the arithmetic mean of the same variable was (53.230), with a standard deviation of (22.787). To verify the significance of the differences between the arithmetic means in the pre and post-tests, the T-Test was used for the correlated samples. The calculated (T) value was (8.96), while its tabular value is (2.18) at the degree of freedom (12) and the level of significance (0.05). When comparing the tabular and calculated (T) values, it was found that the calculated value is greater than the tabulated value, and this means that there is a significant difference between the pre and post-tests in measuring the strength of the back muscles of the research sample. Table 2 Also shows the value of the percentage of development, as it reached (9.83%). It is clear from the presentation of Table 2 that there is a clear difference in the values of the arithmetic circles in the post-test than in the pre-test, which led to the emergence of a significant difference in the statistical values, due to the clear development in the characteristic of muscular strength for the trunk region. The researchers attribute this result to the nature of the rehabilitation exercises used in the therapeutic curriculum, as a large part of them was mainly intended to strengthen the gluteal muscles and the muscles of the sacral region, which are among the most important muscles of the trunk, which led to this remarkable development in this characteristic, as the possibility of strength growth Muscle groups relate primarily to the efforts these groups make in daily life. This remarkable development in strength has occurred as a result of using exercises based on the gradual increase in repetitions from low repetitions and then medium repetitions until reaching semi-high repetitions, in addition to the fact that the therapeutic approach has helped reduce the variation in the muscular strength characteristic of the research sample members due to their subjection for one treatment curriculum that relied on mobile and static exercises, which had a clear impact on developing strength, and the reliance on mobile exercises was more, because strength development is done by choosing mobile exercises that are performed during the training curriculum to reach better results for developing strength. This difference reflects to us the validity of the curriculum and its suitability for each member of the sample in developing the character of muscular strength.

Flexibility is one of the important traits that must be trained and acquired. It is clear from the presentation of Table 3 and from the values of the arithmetic circles for the tribal and dimensional tests to test the flexibility of the trunk that there is a clear and significant difference in the significance of statistical differences, and the researchers attribute this development to the application of the sample members to the vocabulary of the therapeutic curriculum that contained On the regular exercises that led to the development of muscular flexibility equally, and this included the working muscles and the corresponding muscles because the muscular contraction of the specific muscle groups

Table 2: shows the values of the means, standard deviations, and the level of significance of the differences between the pre and post-tests, and the percentage of development in measuring the strength of the trunk muscles.

Variable	Post-test		Pre-test		arithmetic mean of difference	Sum arithmetic mean of difference	T value		Type sig	Percentage of development (%)
	standard deviation	Mean	standard deviation	Mean			calculated	tabular		
Trunk Muscle Strength (kg)	48.462	25.115	53.230	22.787	4.768	44.297	8.96	2.18	sig	9.83%

Table 3: shows the values of the arithmetic means, standard deviations, the level of significance of the differences between the pre and post-tests, and the percentage of development in the trunk flexibility test.

Variable	Post-test		Pre-test		arithmetic mean of difference	Sum arithmetic mean of difference	T value		Type sig	Percentage of development (%)
	standard deviation	Mean	standard deviation	Mean			calculated	tabular		
Trunk flexibility	10.923	4.746	18.385	4.610	7.46	44.949	13.917	2.18	sig	68.30%

Table 4: shows the values of the arithmetic means, standard deviations, the level of significance of the differences between the two tests, the pre and post-tests, and the percentage of development in the pain degree questionnaire test.

Variable	Post-test		Pre-test		arithmetic mean of difference	Sum arithmetic mean of difference	T value		Type sig	Percentage of development (%)
	standard deviation	Mean	standard deviation	Mean			calculated	tabular		
pain degree questionnaire	16.23	16.36	9.07	8.91	7.16	44.949	13.35	2.18	sig	44.11%

from the different human movements is accompanied by a limitation in the corresponding muscles. The lack of the corresponding muscle extensibility and the nervous system play an active role in this limitation. The therapeutic curriculum worked on developing the trait of flexibility because it contained stretching exercises that worked to develop flexibility in the muscles of the lower back and thigh muscles. The trait of flexibility has developed as a result of the organized training for it. The researchers attribute this development in flexibility also to the fact that the sample (the research sample) is not severely injured (Tables 2 and 3).

Table 4 shows the values of the arithmetic means and standard deviations in the pre and post-tests of the pain degree questionnaire. The arithmetic mean in the pre-test was (16.23), with a standard deviation of (16.36). In the post-test, the arithmetic mean of the same variable was (9.07), with a standard deviation of (8.91). To verify the significance of the differences between the arithmetic means in the pre and post-tests, the T-Test was used for the correlated samples. The calculated (T) value was (13.35) while its tabular value is (2.18) at the degree of freedom (12) and the level of significance (0.05). When comparing the tabular and calculated (T) values, it was found that the calculated value is greater than the tabulated value, and this means that there is a significant difference between the pre and post-tests in the pain degree questionnaire test (Table 4).

Table 4 also shows the value of the rate of development, as it reached (44.11%). It is clear from the presentation of Table 4 that there is a clear difference in the percentage of the degree of pain in the pre-test than in the post-test, where the percentage of the degree of pain in the post-test decreased significantly than it was in the pre-test. The researchers attribute this difference to the use of gradual exercises, which had the greatest effect in strengthening the muscles, as well as increasing their length, elasticity and flexibility of the hip joint.

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Appendix 1

Shows a questionnaire was distributed to experts and specialists to determine the questions to be answered by the injured

1.	Age	Length	Weight	
2.	Where the pain usually occurs			
3.	History of the pain			
4.	time the pain occurs	Moring	evening	night
5.	type of pain	intermittent	continuous	sharp
6.	type of pain	muscular	bony	mixed

The name of the expert or specialist

Signature

Date

Appendix 2

Shows a questionnaire was distributed to students to identify those with lower spine pain, the degree of pain and its cause

1.	Age	Length	Weight			
2.	pain history	day		Month	year	
3.	time the pain occurs	morning		evening		
4.	type of pain	intermittent		continuous		
5.	injury type	muscular		bony	mixed	mixed
6.	season of pain	summer		Fall	winter	spring
7.	Does pain occur during	warm up		the exercise	off the field	off the field
8.	cause of pain	equipment	floor	weather	Other factors	
9.	Was the pain caused by	stress		Not enough warm up		
10.	Do you care about healthy nutrition?	yes		no		
11.	Do you smoke	yes		no		
12.	Do you do strength training?	yes		no		
13.	Do you do flexibility exercises?	yes		no		
14.	Do you do regular medical examinations?	yes		no		
15.	Do you suffer from psychological crises?	yes		no		

Please kindly review the questionnaire in your hands and answer all questions. Thank you very much

Researchers

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