

# Efficiency of Therapeutic Exercises and Massage in Lumbar Disc Injuries: A Study in Yemen

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**Abstract:** *The purpose of this study was to find exercise and massage effects patients with lumbar disc herniation. The experimental method was found to be appropriate for this study. Twelve participants with lumbar disc herniation was chosen for this study. The program lasted in one month and was divided into (12) training units at The Golden Hands Center for Physiotherapy in Yemen, which met three days a week for an hour and a half. Massages and exercises were used to improve the flexibility of the spine, muscle strength in the spine, and pain level. We used SPSS Statistics 22.0 program for descriptive statistics for level of improvement, and T-test to determine the significance of the differences between the pre and post-measurements, as the therapeutic exercises improved spine flexibility (the strength of the muscles of the spine and legs' strength). The value of the t-test for a range of motion of the torso forward was (range of motion of the torso forward: 5.69, back torso range of motion: 11.72, right side torso range of motion: 11.49, left side torso range of motion: 3.89, back muscle strength: 3.89 and the level of pain: 6.82) were higher than value of the t-test Tabulated (2.20) at the degree of freedom (11) and  $p < 0.05$ . Two measurements as pre and post in favor of the dimensional measurement in back muscle strength, back muscles were strengthened and improvement in the flexibility of the spine in patients ( $p < 0.05$ ). Targeted therapeutic exercises was resulted in the emergence. The homogeneity of the patients in the study variables, where the skewness coefficient values were between (+3,-3). The current study was important because of experimental method and findings had a good positive effect in the treatment of lower back pain and lumbar disc.*

**Keywords:** Therapeutic exercises, massage, lumbar disc herniation, pain level.

## 1. Introduction

In literature (Kolt et al., 2003), as well as in many hospitals and treatment centers in Yemen, many patients with lumbar disc herniation has been having rehabilitation by many ways. The researchers believes that it is critical to learn the effects of therapeutic exercises and massage on patients with lumbar disc herniation. (Nelson & Kokkonen, 2007). Low back pain is a pervasive health problem worldwide and a significant cause of disability, affecting performance at work and general well-being. Though several risk factors have been identified (including occupational posture, depressive moods, obesity, body height, and age), Back pain is not a disease but a constellation of symptoms. Low back pain affects people of all ages, from children to the elderly, and is frequent for medical consultations (Katz, 2006). It is difficult to estimate the incidence of low back pain as first-ever, episodes of low back pain are already high by early adulthood, and symptoms tend to recur over time. The lifetime prevalence of nonspecific (joint) low back pain was estimated at 60% to 70% in industrialized countries (one-year prevalence 15% to 45%, adult incidence 5% per year (Rubin, 2007).

Magali (2007) conducted a study to determine the effect of massage movements and standardized therapeutic exercises in treating and rehabilitating lower back pain caused by lumbar herniated disc disease in 21 patients aged 35-50 were treated in the same study as our study, where the results showed a rapid response to recovery on the second week as a result of using the proposed method. (Magali, 2007)

Campello et al., (1996) A study aimed at identifying the role of exercise in treating low back pain. The study consisted of (5) low back pain patients, in Denmark. The researcher used

a pre-post test. The results of the study showed that exercise has a significant role in treating low back pain. The study also showed that inactivity has a very harmful effect on the body. (Campello et al., 1996)

The prevalence for children and adolescents is lower than that seen in adults but is rising prevalence increases and peaks between the ages of 35 and 55.4 As the world population ages, low back pain will increase substantially due to the deterioration of the intervertebral discs in older people Low back pain is the leading cause of activity limitation and works absence throughout much of the world, imposing a high economic burden on individuals, families, communities, industry, and governments. 2, 4 several studies have been performed in Europe to evaluate the social and economic impact of low back pain (Phillips et al., 2013).

The spine keeps the body stable and helps it carry, so there is a cartilaginous cushion between each vertebra that absorbs shocks during movement, walking, and jumping and facilitates movement between each vertebra (Vugar et al., 2015).

Annulus Fibrosis is mediated by (Nucleus pulposus), and the importance of the cartilaginous pillow is that most of the pain that affects the spine is caused by it as a result of its erosion (Degeneration), which causes a reduction in softness, ossification of the gelatinous substance, fibrosis, and shrinkage in size, or as a result of the nucleus protrusion disc (Bakhtary et al., 2005).

Lower back pain affects four out of every five people at different times in their lives and usually lasts from days to weeks. This pain may occur suddenly and quickly or develop gradually over time and cause long-term problems.

Several programs and methods are used to treat and relieve lower back pain (Ozturk et al., 2006). In earlier researchs; Joseph, L. H al., (2018) study is a total of 16 professional female elite weight lifting athletes who were training for Olympic weight lifting competition participated in the study. Malkia and Lijunggren (1996) conducted a study in the United Kingdom to determine the effect of designing a rehabilitation exercise program to relieve low back pain on a sample of people with low back pain who were chosen using an intentional method. (Burton et al., 2007). A study has shown that manual therapy can reduce the degree of lower back pain for individuals with a herniated disc more than chemotherapy within three weeks. Twomey and Taylor (2006) study determined the effectiveness of using rehabilitation exercises and manual therapy to treat lower back pain in 50 patients in Spain. They were divided into two groups: one that used manual therapy and the other that used therapeutic exercises. The use of manual therapy and therapeutic exercises has a positive and compelling effect. The present study was aimed to demonstrate low back pain can be acute, sub-acute, or chronic.

Magali et al. (2007) conducted a study, aimed at identifying the effect of massage movements and standardized therapeutic exercises in treating and rehabilitating lower back pain resulting from lumbar herniated disc disease in 21 patients, aged 35-50 who were treated in the same study as ours, where the results showed a rapid response to recovery on The second week as a result of using the proposed program through the statistically significant changes, in addition to the fact that the amount of improvement was greater and statistically significant in favor of the experimental group.

**2. Methods**

The research population consisted of 12patients who frequented the medical center and had pain in the lumbar disc of the spine, from 30 to 50 years. Measurements were taken before and after the study’s program. The patient was asked to bend the torso forward and move a goniometer device with the patient’s movement while standing up to measure their torso’s range of motion forward. The measurement is the same level after the end of the program. The Measure back torso range of motion. Measures use a goniometer while the patient is standing, and the device is set to zero degrees asked the patient bends the torso back

and moves the device with the movement of the trunk. The measurement is the same level after the end of the program. The back torso range of motion. Measures use a goniometer while the patient is standing, and the device is set to zero degrees asked the patient bends the torso back and moves the device with the movement of the trunk. The measurement is the same level after the end of the program. The measures of left side Torso range of motion, the patient was be standing, and the device is positioned at zero degrees, asked the patient to bend the left torso and move the device with the movement of the trunk, taking the degree of measurement and recording it. The measurement is the same level after the end of the program.

The strength of the back muscles was measured using a dynamometer, which requires the patient to stand with his feet and the device between his feet, holding the device with his hands while his legs are straight and his torso is bent forward by pulling the device and attempting to straighten his torso to a standing position. The level of pain was measured using a visual analog scale ranging from 1 to 10. If the pain is mild, the patient selects option no.1, and if the pain is severe, the patient selects option no.10.

Data variables were analyzed with SPSS 22.0 software program. We used descriptive statistics and t-test for results.

**3. Results**

In table 1, mean height, body weight and age of participants was shown. And also, as a antropometric measurement variables of body mass index (BMI, kg/m<sup>2</sup>) was calculated from body weight and height.

**Table 1:** Participant’s mean age and anthropometric variables (n=12)

Variables	Mean±SD
Age (year)	35.6±0.8
Body weight (kg)	70.75±2.5
Height (cm)	162.1±0.9
BMI (kg/m <sup>2</sup> )	27.04±1.2

In table 2, mean pre and post measurements for the variables of the study sample in the pre and post-test for a range of motion of the torso forward, back torso range of motion, right side torso range of motion, left side torso range of motion, back muscle strength, the level of pain was shown.

**Table 2:** The pre and post measurements of the research variables (n=12)

Variables	Before		After		Rate of improvement (%)	t	p
	$\bar{X}$	SD	$\bar{X}$	SD			
Range of motion of the torso forward	9.4	6.7	40.42	50.17	24.12	5.69	0.000*
Back torso range of motion	2.31	3.33	26.58	33.25	25.1	11.72	0.000*
Right side Torso range of motion	3.41	4.22	24.16	34.16	21.3	11.49	0.000*
Left side Torso range of motion	3.31	3.30	28.1	30.2	7.42	3.89	0.000*
Back muscle strength	37.58	37.60	74.16	76.58	3.26	3.89	0.003*
The level of pain	0.88	1.16	4.66	1.58	-66.1	6.82	0.000*

(df) = 11 The degree of freedom

\*p<0.05

**Table 3:** The difference of the (Mean) between the pre and post measurements of the research variables

Variables	Before	After	The difference of ( $\bar{X}$ )
	$\bar{X}$	$\bar{X}$	(%)
Range of motion of the torso forward	9.4	40.42	31.2
Back torso range of motion	2.31	26.58	24.27
Right side Torso range of motion	3.41	24.16	20.75
Left side Torso range of motion	3.31	28.1	24.7
Back muscle strength	37.58	74.16	36.58
The level of pain	0.88	4.66	-3.78

In table (2) and table (3), there were statistically significant differences between the two measurements pre and post in favor of the dimensional measurement in range of motion of the torso forward, back torso range of motion, right side torso range of motion, left side torso range of motion, back muscle strength, the level of pain.

The value of the t-test for a range of motion of the torso forward is (5.69). The back torso range of motion was (11.72) also, the right side torso range of motion reached the value of (11.49) and left side torso range of motion the value of (3.89). All of them were statistically significantly higher than the value of (T) tabulated (2.20) at the degree of freedom (11) ( $p < 0.05$ ). That was meant a statistical function the highest rate of improvement of the range of motion of the torso forward is (24.12). The back torso range of motion is (25.1). Also, the right side torso range of motion reached the value of (21.3), and left side torso range of motion the value of (7.42).

As shown in table (2) and table (3), there were statistically significant differences between the two measurements pre and post in favor of the dimensional measurement in the back muscle strength, whereas the value of the t-test for back muscle strength is (3.89) it is higher than the (t) tabulated (2.20) at the degree of freedom (11) and  $p < 0.05$  that is, means a statistical function and the rate of improvement for back muscle strength is (3.26)

As shown in table (2) and table (3), there were statistically significant differences between the two measurements pre and post in favor of the dimensional measurement in the level of pain, whereas the value of the t-test for back muscle strength is (6.82) it is higher than the (t) tabulated (2.20) at the degree of freedom (11). It showed us that a statistical function and the rate of improvement for back muscle strength is (-66.1)

#### 4. Discussion

In the existing literature review, we realized that studies of this kind differ in terms of their objectives, hypotheses, samples used, data collection tools, and the environments in which they were conducted. For instance, Malkia and Ljunggren (1996) conducted a study, as did Tommy and Tyler (2006) and Burton et al., (2007)

As (Joseph, L. H al., 2018) study The results showed that the CT significantly demonstrated greater effects in reducing pain perception, improving pain pressure threshold, and increasing tissue blood flow than MT, the combination therapy of massage therapy and LPST is likely to provide

more clinical benefits in terms of PI, PPT, and TBF when compared to massage as a stand-alone therapy

And the (Malkia, Ljunggren, 1996) study, The results of controlled studies with exercise programs have shown a positive effect on physical impairments and functional limitations for subjects with chronic low back pain. The outcome of exercise programs has not been so positive for disability, defined as an inability or a limitation in performance in social interactions including occupational activities.

And the (Burton et al., 2007) study was no statistically significant difference in outcome between the treatments, but manipulation produced a statistically significant greater improvement for back pain and disability in the first few weeks. Also (Twomey and Taylor, 1995) studies have demonstrated that manipulative procedures result in more rapid pain and functional relief compared with other conservative therapies. Over a longer time frame, this advantage disappears. Our study in proved the range of motion, flexibility of the back muscles, and the level of pain, and the results were positive.

The current study is similar to the previous studies in the used experimental method and the results (findings) that have a positive effect in the treatment of lower back pain and Lumbar Disc. In contrast, the environment in which this study was conducted (Yemen), as well as the size and type of patients set it apart from previous studies. In the present study we found differences between the two measurements pre and post in favor of the dimensional measurement in the range of motion of the torso forward, back torso range of motion, right side torso range of motion, left side torso range of motion, back muscle strength, the level of pain.

The researchers attribute these differences to the fact that flexibility of the joints and the joints of the lumbar vertebrae depends on the anatomical position of the joint And its safety, and the condition of the muscles working on it. In the program, the gradation in the volume and intensity of training was taken into account to suit the age of the patients and where the preparation was done before performing the exercises. This resulted in the softness of the muscles, which led to the emergence of a significant improvement in the flexibility of the spine in patients. For those who have lower back pain, and studies confirm this.

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