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Comparison of Pain Intensity, Fear of Movement, and Disability Before and After Lumbar Spine Surgery

Hassan Reza Mohammadi [1], Aryoobarzan Rahmatian [2], Masoud Hatefi [2] and Sohrab Sadeghi [1, *]

[1] Department of Neurosurgery, School of Medicine, Imam Hossein Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[2] School of Medicine, Ilam University of Medical Sciences, Ilam, Iran

[*] *Corresponding author*: Department of Neurosurgery, School of Medicine, Imam Hossein Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Email: sadeghisohrab09@gmail.com

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Abstract

Background: Lumbar spine surgery (LSS) is performed to manage patients with lumbar discs. These patients commonly experience pain, fear, and disability after LSS surgery.
Objectives: Considering the importance of LSS surgery and its outcomes in these patients, the purpose of the present study was to compare pain intensity, fear of movement, and disability before and after LSS.
Methods: In this descriptive and analytical research, the population under study included all patients undergoing LSS at the Imam Khomeini Hospital of Ilam City from October 2015 to October 2016. Demographic and clinical information questionnaires, pain catastrophizing scale (PCS), tampa scale for kinesiophobia (TSK), and Physical Disability Questionnaire (PDQ) were data collection tools, which were completed for the patients referring to our center and undergoing LSS according to diagnostic findings and clinical documents. The patient's condition was evaluated using the aforementioned questionnaires six months to one year after the study. The collected data were analyzed using SPSS software.
Results: The mean (SD) score of PCS before surgery was equal to 51.17 (7.53) in men and 63.84 (4.72) in women ($P = 0.004$). Nine weeks after the surgery, the PCS score was 19.36 (4.94) in men and 23.31 (6.68) in women ($P = 0.04$). There were significant decreases in all variables, including the PCS score, Brief Pain Inventory score, and PDQ score after the intervention compared to pre-intervention ($P < 0.05$).
Conclusions: Considering that LSS can effectively reduce patients' pain intensity, disability, and fear of movement, this intervention is recommended for patients who need surgery according to relevant diagnostic criteria and clinical examination findings.

Keywords: Pain, Disability, Lumbar Spine Surgery

1. Background

Musculoskeletal disorders (MSDs) are among the main causes of morbidity and disability among adults and are known as the most common and costly work-related musculoskeletal disorders (WMSDs). These disorders occur in all countries, but they are much more serious in developing countries, while developed countries have largely reduced or eliminated the risk factors of this disease during work processes. On the other hand, many work activities in developing countries are still carried out manually or traditionally (1, 2).

These types of injuries cause enormous costs for the health care system, including direct costs (such as expenses for treatment, rehabilitation, insurance, etc.) and indirect costs (disabilities, etc.) (3). Also, these types of disorders are particularly prevalent. A study by Parno et al. on the prevalence of WMSDs among 9813 Iranians reported the prevalence of back, neck, knee, and shoulder pain as 49%, 39.3%, 39.32%, and 36.9%, respectively (4).

Low back pain (LBP), a type of MSD, is divided into two groups of specific and non-specific types. Specific LBP refers to painful pathological problems in spinal structures, and its risk factors include inflammatory conditions, bone metabolic diseases, infectious agents, traumas, pain, and congenital disorders. On the other hand, non-specific LBP has no specific symptoms and comprises most cases of back pain (5, 6).

Degenerative changes in intervertebral discs start from childhood and manifest in older ages when spinal disorders are considered common disorders. The core

parts of intervertebral discs progressively lose their proteoglycans and water content, leading to an increase in the disc height and a decrease in its collagen content (7). The prevalence of LBP is considerably high in populations, and it is considered the most common cause of doctor visits after a cold (8). In a meta-analysis study on 31039 people, Azizpour et al. showed that the prevalence of LBP was 51.6% (9). Morris et al. also stated in a study in Africa that the annual Prevalence of this disease was 57%, indicating a high rate (10).

Various factors, such as drugs, surgery, and support interventions, are recommended for patients suffering from LBP (11, 12). In the case of progressive LBP, the patient will have to undergo lumbar spine surgery (LSS) to improve the condition of patients with lumbar discs (13-15). Patients frequently experience pain after LSS, so it is crucial to evaluate pain in these patients due to its high prevalence and persistent nature (16, 17), as well as the essential role of pain control in preventing disease complications (18, 19).

2. Objectives

Considering the importance of LSS and its outcomes in patients with LBP, the purpose of the present study was to compare pain intensity, fear of movement, and disability before and after LSS.

3. Methods

In this descriptive-analytical research, the study population included all patients undergoing LSS at the Imam Khomeini Hospital of Ilam City from October 2015 to October 2016. All patients were followed up preoperatively for one year after surgery, and their clinical condition was examined and recorded.

The research process started only after obtaining permission from the relevant authorities at Ilam University of Medical Sciences and the necessary approval from the institutional research ethics committee. The researchers then visited the Imam Khomeini Hospital on a daily basis and extracted the list of eligible patients. Entry criteria included undergoing LSS at the Imam Khomeini Hospital of Ilam City, not referring to other medical centers for postoperative management, and giving consent for participation by the patient or his/her family. Exclusion criteria also included the lack of consent of the patient or the patient's companion to participate in the study, the presence of additional lesions (e.g., abdominal traumas, chest traumas, chronic conditions such as pain or disability), undergoing anesthesia for any other reason, withdrawal from the study at any time during the research, and incomplete medical and clinical documents.

If the patient was found eligible for LSS according to diagnostic findings and clinical presentation, the research questionnaires were completed for him/her. The patient's condition was evaluated using the same questionnaires from six months to one year after the surgery.

A demographic and clinical information questionnaire, the pain catastrophizing scale (PCS), the tampa scale for kinesiophobia (TSK), and the physical disability questionnaire (PDQ) were used as data collection tools. Demographic information included age, gender, marital status, level of education, satisfaction with the economic status, BMI, and smoking status.

3.1. Pain Catastrophizing Scale

This tool consists of 13 statements that evaluate pain catastrophic thoughts and behaviors and includes three subscales: rumination, magnification, and helplessness. Patients are requested to answer the questions based on their clinical conditions and pain experience. The questions are scored from 0 (never) to 4 (always), and a higher score indicates higher pain catastrophizing (20, 21).

3.2. Brief Pain Inventory

This is a pain self-assessment tool evaluating pain intensity and its impact on daily life functions. The tool consists of nine questions, and the overall score ranges between 0 and 10, where a higher score means more severe pain (22).

3.3. Tampa Scale for Kinesiophobia

This 17-item scale consists of two parts: belief in injury and avoidance of activity. The score range is between 17 and 68, and a higher score indicates the patient's higher fear of movement due to the perceived pain (23).

3.4. Physical Disability Questionnaire

This tool is utilized to evaluate a person's functional status and examines a wide range of physical activities limited due to pain. The score range of this instrument is between 0 (least disability) and 24 (maximum disability) (24).

3.5. Ethical Issues

All guidelines issued by the Research Ethics Committee of Ilam University of Medical Sciences were followed, and all patient information was kept confidential.

3.6. Statistical Procedures

The data collected were analyzed using SPSS 16 software. The analyzes carried out included repeated-measures ANOVA, independent *t*-test, the ANOVA test, and descriptive statistics.

4. Results

Most of the patients (70.8%) were male, and the average age of the patients was 67.21 (14.05) years (Table 1).

Table 1. Demographic Characteristics of Patients [a]

Variables	Values
Gender	
Male	46 (70.8)
Female	19 (29.2)
Education	
Illiterate	38 (58.5)
Diploma	25 (38.5)
Academic	2 (3.1)
Marital status	
Single	42 (64.6)
Married	23 (35.4)
Economic situation	
Poor	23 (35.4)
Middle	35 (53.8)
Good	7 (10.8)
Smoking	
Yes	39 (60)
No	26 (40)
Age (y); Mean (SD)	67.21 (14.05)

[a] Values are expressed as No. (%) unless otherwise indicated.

The Mean (SD) score of the Pain Catastrophizing Scale in men before surgery was equal to 51.17 (7.53), and in women, it was equal to 63.84 (4.72) (P = 0.004), but after nine weeks after the surgery, it was equal to 19.36 (4.94) in men and 23.31 (6.68) in women (P = 0.04) (Table 2).

According to Tables 3 and 4, there was a significant decrease in all variables, including the PCS, BPI, and PDQ scores, after the intervention, compared to before the intervention (P < 0.05).

5. Discussion

Lumbar spine surgery is commonly performed in clinical practice and is considered a high-risk procedure. Patients undergoing LSS experience various complications, including physical and psychological ones (13-15). According to our results, the mean (SD) PCS score was equal to 54.87 (8.93) in our patients. In a study on 275 patients with LBP, Ogunlana et al. showed that the mean (SD) PCS scores of low (with a score less than 26) and high (with a score higher than 26) catastrophisers were equal to 6.7 (2.1) and 8 (1.5), respectively (25). It should be noted that we included only patients who needed surgery, but Ogunlana et al. investigated outpatients with LBP as well (25), which may justify the high pain score (i.e., 54) observed by them compared to our patients' scores (6.7 and 8).

Our results also revealed that the prevalence of pain and the PCS score decreased after LSS. The mean (SD) of pain intensity in our patients was equal to 54.87 (8.93) before the surgery, which decreased to 20.52 (5.74) nine weeks after LSS. The PCS score was obtained as 7.9 (1.12) before LSS and decreased to 3.09 (1.43) nine weeks after LSS. In another study on 68 patients undergoing LSS, with a mean age of 57.9 years, Coronado et al. noted that the LBP pain intensity score in these patients decreased from 2.8 in the sixth week to 2.1 in the sixth month. Also, the mean pain interference decreased from 3.3 ± 2.9 in the sixth week to 2.5 ± 2.8 in the sixth month post-surgery (13). In a study on patients undergoing spinal stenosis surgery, Hébert et al. reported that the pain intensity and disability of the patients decreased 24 months after surgery (26).

According to our results, the means (SD) of patients' disability scores decreased from 18.01 (3.12) in pre-surgery to 12.92 (3.1) in post-surgery. In the study of Yee et al., the mean (SD) score of disability was equal to 16.8 ± 17.9, 18.4 ± 17.5, and 19.7 ± 17.7 at 3, 12, and 24 months after surgery, indicating 6.8%, 5.8%, and 6% improvement, respectively (27). Likewise, pain intensity and disability decreased in the patients undergoing LSS surgery, indicating the beneficial role of this procedure in improving the condition of patients (28).

5.1. Conclusions

Considering that LSS can be effective in alleviating pain and reducing disability and fear of movement in patients with LBP, it is recommended to offer this intervention to patients who need surgical management according to relevant diagnostic criteria and clinical examinations.

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Table 2. Comparison of Pain, Fear of Movement, and Disability Before and After Surgery According to the Gender of Patients [a]

Variables and Gender	Before Surgery	Three Weeks After Surgery	Six Weeks After Surgery	Nine Weeks After Surgery
Pain (pain catastrophizing scale)				
Male	51.17 (7.53)	42.69 (11.67)	32.54 (15.91)	19.36 (4.94)
Female	63.84 (4.72)	63.89 (4.33)	49.05 (8.48)	23.31 (6.68)
Total	54.87 (8.93)	48.89 (13.99)	37.36 (15.98)	20.52 (5.74)
P	0.004, 9.12	0.000, 20.39	0.002, 10.06	0.041, 4.36
Pain (brief pain inventory)				
Male	7.47 (0.91)	6.91 (1.54)	4.15 (0.91)	2.54 (1.31)
Female	8.94 (0.91)	7.63 (1.3)	4.78 (0.97)	4.42 (0.60)
Total	7.9 (1.12)	7.12(1.5)	4.33 (0.97)	3.09 (1.43)
P	0.001, 0.06	0.08, 0.79	0.01, 0.19	0.001, 7.88
Tampa scale for kinesiophobia				
Male	56.93 (7.29)	56.04 (7.53)	46.34 (11.96)	29.84 (10.03)
Female	62.26 (5.65)	59.21 (7.26)	48.78 (8.99)	30.73 (6.93)
Total	58.49 (7.23)	56.96 (7.54)	47.06 (11.16)	30.10 (9.19)
P	0.006, 2.41	0.12, 0.03	0.42, 6.10	0.72, 1.28
Physical disability questionnaire				
Male	16.63 (2.27)	19.54 (2.64)	18.02 (2.76)	12.63 (3.26)
Female	21.36 (2.26)	22.47 (1.21)	20.0 (2.0)	13.63 (2.62)
Total	18.01(3.12)	20.4 (2.67)	18.6 (2.7)	12.92 (3.1)
P	0.001, 0.03	0.001, 10.42	0.006, 0.77	0.24, 1.27

[a] Values are expressed as Mean (SD).

Table 3. Analysis of Between-Subjects Effects for Pain, Fear, and Disability in All Groups

Source	Type III Sum of Squares	Mean Square	F	Sig.
Pain (PCS)				
Intercept	424684.862	424684.862	1158.381	0.000
Error	23463.638	366.619	-	-
Pain (BPI)				
Intercept	8198.462	8198.462	2266.153	0.000
Error	231.538	3.618	-	-
Fear				
Intercept	602982.465	602982.465	5038.773	0.000
Error	7658.785	119.669	-	-
Disability				
Intercept	79485.062	79485.062	5039.479	0.000
Error	1009.438	15.772	-	-

Table 4. Mauchly's Test of Sphericity for Pain, Fear, and Disability in All Groups

Source	Mauchly's W	Approximate Chi-Square	P Value	Epsilon		
				Greenhouse-Geisser	Huynh-Feldt	Huynh-Feldt
Pain (PCS)	0.465	48.067	0.000	0.708	0.733	0.333
Pain (BPI)	0.707	21.713	0.001	0.838	0.875	0.333
Fear	0.697	22.685	0.000	0.825	0.861	0.333
Disability	0.516	41.461	0.000	0.763	0.793	0.333

Footnotes

Authors' Contribution: Study concept and design, SS, AR, MH, and HM; Acquisition of data, SS, AR, MH, and HM; Analysis and interpretation of data, SS, AR, MH, and HM; Drafting of the manuscript, SS, AR, MH, and HM; Critical revision of the manuscript for important intellectual content, SS, AR, MH, and HM; Statistical analysis, SS, AR, MH, and HM; Administrative, technical, and material support, SS, AR, MH, and HM; Study supervision, SS, AR, MH, and HM.

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