

Surgical Vs. Non-Surgical Treatment of PLID: A Comparative Study on Functional Outcomes

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Abstract

Background: Prolapsed Lumbar Intervertebral Disc (PLID) is a common cause of lower back pain and radiculopathy that affects daily activities and quality of life. Both surgical and non-surgical interventions are available as treatment options, but there is ongoing debate regarding their relative efficacy. This study aimed to compare the functional outcomes of surgical and nonsurgical treatments for PLID.

Methods: A comparative observational study was conducted at the Popular Hospital and Diagnostic Center, Dhaka, Bangladesh, from January 2024 to January 2025. Fifty PLID patients were included, with 25 undergoing surgery and 25 receiving nonsurgical management. Functional outcomes were assessed using the Oswestry Disability Index (ODI), Visual Analog Scale (VAS) and SF-36 scores. Complications and patient satisfaction were also assessed.

Results: Surgical patients showed greater ODI improvement (78.1 ± 5.2 vs. 54.5 ± 5.9 , $p < 0.01$) and higher VAS pain reduction (81.5 ± 4.3 vs. 62.4 ± 5.1 , $p < 0.01$). SF-36 physical function scores were better in the surgical group (83.7 ± 4.2 vs. 61.3 ± 5.6 , $p < 0.01$). Return to work and satisfaction were higher in surgical patients (84% vs. 56%), as was satisfaction (88% vs. 60%, respectively). Complications, such as recurrent disc herniation (20% vs. 8%) and persistent leg pain (28% vs. 8%), were more frequent in the non-surgical group.

Conclusion: Surgical treatment provided superior pain relief, functional recovery and patient satisfaction compared to non-surgical management. However, nonsurgical treatment is beneficial for selected patients. A multidisciplinary approach may further optimize the treatment outcomes.

Keywords: PLID, Surgery, Non-surgical treatment, Functional outcomes, Pain relief

1. INTRODUCTION

Low back pain and associated radiculopathy are major health problems caused by lumbar disc herniation, commonly referred to as prolapsed

lumbar intervertebral disc (PLID) and lead to deterioration in quality of life and work productivity of affected individuals [1]. Degeneration of the intervertebral disc causes

PLID as the nucleus pulposus herniates and compresses surrounding nerve roots. It affects the people above 30 years of age and is linked to the risk factors like obesity, sedentary life and recurrent mechanical stress on the lumbar spine [2, 3].

There is extensive debate regarding management of PLID, mainly surgical and nonsurgical methods. Typically nonsurgical treatment consists of physical therapy, pharmacologic pain management and epidural steroid injections with the endpoints of relieving symptoms and improving function outside of invasive procedures [4]. On the other hand, surgical intervention is indicated when conservative management fails to alleviate the symptoms or when there is progressive weakness or intractable pain occurring [5].

Several studies have also done a comparison between the effectiveness of surgical and non surgical methods for PLID. Conversely, study results from the Spine Patient Outcomes Research Trial (SPORT) have shown that patients who underwent surgery had significantly better pain relief and functional improvement than patients who were managed conservatively [6]. The second randomized controlled trial has demonstrated that non-surgical management is effective in 6–7 of 10 patients but surgery provides more rapid and more significant relief of symptoms particularly for severe radiculopathy [7].

Specifically physiotherapy interventions have shown promise in improving mobility in terms of core stabilization exercises and spinal decompression, and targeted rehabilitation programs [8]. An individualized physiotherapy regimen, though, is needed to mitigate PLID associated disability and reduce the risk of surgical intervention, and this was underlined in a systematic review [9]. However, patient adherence and chronicity of symptoms limit the success of conservative management; patients remain functional impaired from prolonged conservative care; recovery may be delayed [10].

Conventional discectomy, microdiscectomy and minimally invasive techniques have evolved from surgical approaches to improve patients' benefits and decrease complications. In particular, microdiscectomy has been shown to result in lower postoperative morbidity and shorter hospital stays as compared with traditional open discectomy [11]. However,

despite proved effectiveness, surgery is not without risks, such as dural tears, infection, recurrent disc herniation, and adjacent segment degeneration [12].

Symptoms are severe enough for surgical or non-surgical treatment to be chosen when the symptoms are severe enough and there are no neurological deficits. However, studies have established that surgically related treatment results in more immediate relief, with long term outcomes of pain reduction as well as functional recovery being comparable with both modalities [13]. For that reason, an improved treatment outcome for PLID patients is possible if we combine patient education, physical therapy and shared decision making, a multidisciplinary approach.

2. OBJECTIVE

The objective of this study was to evaluate the functional outcomes of surgical and non surgical treatment of PLID.

3. METHODOLOGY & MATERIALS

This comparative observational study conducted at Popular Hospital & Diagnostic Centre from January 2024 to January 2025. 50 PLID patients were included with 25 undergoing surgery and 25 receiving nonsurgical management. Functional outcomes were assessed using the Oswestry Disability Index (ODI), Visual Analog Scale (VAS) and SF-36 scores. Complications and patient satisfaction were also evaluated.

4. SELECTION CRITERIA

Inclusion Criteria

- Patients diagnosed with Prolapsed Lumbar Intervertebral Disc (PLID).
- Age between 18 to 65 years.
- Patients undergoing either surgical or non-surgical treatment.
- Symptoms persisting for at least six weeks.
- Patients willing to participate in the study.

Exclusion Criteria:

- Patients with prior lumbar spine surgery.
- Presence of malignancy, spinal infections or severe osteoporosis.
- Patients with neurological deficits requiring emergency intervention.

Data Collection: The study was conducted at Popular Hospital & Diagnostic Centre for a twelve-month period. A total of fifty PLID

patients participated in the study and they were split into two groups for surgery and non-surgical intervention. Patient assessment through both pain scores and functional status measurements took place both at study onset and during follow-up sessions. Outcomes for patients were assessed through Oswestry Disability Index (ODI) scores along with Visual Analog Scale (VAS) and SF-36 scores. Information regarding both complications and recovery patterns were documented.

Patient data collection involved structured interviews alongside physical assessments and hospital document review.

5. RESULTS

Table 1. Baseline characteristics (n=50)

Characteristics		Surgical group (n=25) N (%)	Non surgical group (n=25) N (%)
Age group (year)	18-35	5 (20.0)	6 (24.0)
	36-50	13 (52.0)	11 (44.0)
	>50	7 (28.0)	8 (32.0)
Gender	Male	16 (64.0)	15 (60.0)
	Female	9 (36.0)	10 (40.0)
Duration of symptoms (weeks)	<6	8 (32.0)	9 (36.0)
	≥6	17 (68.0)	16 (64.0)
Predominant symptoms	Radiculopathy	18 (72.0)	19 (76.0)
	Low back pain only	7 (28.0)	6 (24.0)
Comorbidities	Diabetes Mellitus	4 (16.0)	5 (20.0)
	Hypertension	6 (24.0)	7 (28.0)
	Obesity	3 (12.0)	4 (16.0)

This table includes demographic and clinical features of study participants. The majority of participants fell within the age range of 36 to 50 years and had a predominantly male distribution. The main symptom for participants became radiculopathy in 72% of those who had surgery

Statistical Analysis of Data: The statistical data analysis done by SPSS software. The independent t-test was used to analyze data from continuous variables that appeared as mean ± standard deviation. The chi-square test analyzed categorical data throughout the study. The analysis focused on functional outcomes between surgical patients and those who received non-surgical treatments by examining ODI, VAS and SF-36 scores. Post-treatment complications were also analyzed. P-value less than 0.05 considered as statistically significant.

and 76% of those who did not undergo surgery. Around one quarter (24%) of surgical patients and 28% of non-surgical patients had hypertension as their underlying medical condition.

Table 2. Comparison of Functional Outcomes at 12-Month Follow-Up (n=50)

Parameter	Surgical group (n=25)	Non surgical group (n=25)	p-value
ODI score improvement	78.1±5.2	54.5±5.9	<0.01
VAS pain score reduction	81.5±4.3	62.4±5.1	<0.01
SF-36 physical function	83.7±4.2	61.3±5.6	<0.01
SF-36 bodily pain score	79.5±4.8	56.8±6.1	<0.01
Return to work	21 (84%)	14 (56%)	0.03
Patients satisfaction	22 (88%)	15 (60%)	0.02
Physical therapy utilization	7 (28%)	16 (64%)	0.01

This table demonstrates that surgical patients achieved superior post-treatment results with better ODI scores (78.1±5.2 vs. 54.5±5.9) and VAS pain scores (81.5±4.3 vs. 62.4±5.1) when compared to non-surgical groups. Surgical patients demonstrated superior SF-36 scores

when compared to non-surgical patients because their physical function scores averaged 83.7±4.2 compared to 61.3±5.6. The satisfaction rates were higher in the surgical group at 88% while surgical patients also achieved a better return to work rate at 84% compared to their non-surgical

counterparts with respective rates of 88% and 60%. A larger proportion of non-surgical patients required physical therapy care (64% compared to 28%).

Table 3. Comparison of Complications between Surgical and Non-Surgical Groups (n=50)

Complications	Surgical group (n=25) N (%)	Non surgical group (n=25) N (%)	p-value
Wound infection	2 (8.0)	0 (0.0)	0.15
Dural tear	1 (4.0)	0 (0.0)	0.31
Recurrent disc herniation	2 (8.0)	5 (20.0)	0.22
Deep venous thrombosis	1 (4.0)	0 (0.0)	0.31
Chronic back pain	3 (12.0)	7 (28.0)	0.16
Persistent leg pain	2 (8.0)	7 (28.0)	0.06
Neurological deterioration	1 (4.0)	3 (12.0)	0.30

The table presents complications that occurred within each treatment group. Statistical data reveals recurrent disc herniation appeared in 20% of non-surgical patients and only 8% of surgical patients (p=0.02) while persistent leg pain reached 28% and 8% (p=0.02) respectively. The incidence of chronic back pain was higher among patients who did not receive surgery (12% compared to 28%). The surgical complications reported among patients consisted of wound infection which occurred in 8% of cases as well as dural tear in 4% of patients. The minimal progression of neurological conditions stayed below 4% in surgical patients and reached 12% in the non-surgical group.

6. DISCUSSION

Our study reveals that surgical intervention for the treatment of PLID delivers superior functional benefits compared to treatment approaches without surgery. The clinical findings of our study prove consistent with Peul et al. published research about patients experiencing superior pain relief and shorter recovery time following discectomy versus sustained conservative treatment [15]. Patients who underwent surgery reported superior outcomes regarding pain scores and functional abilities compared to those receiving only non-surgical treatment according to Weinstein et al. [6].

Research has demonstrated that specific patient demographics benefit from both immediately and long-term terms from non-operative treatment approaches. According to Lequin et al. the duration of supportive therapy led to similar long-term results as surgical procedures for patients with mild to moderate neurologic symptoms [16]. The research indicates both surgical intervention and conservative care work well as treatment approaches for patients who do not present critical neurological complications.

Surgical intervention leads to decreased occurrences of persistent discomfort and secondary disc protrusions among affected patients. The research by Omid-Kashani et al. indicated that patients who received microdiscectomy experienced statistically fewer reoccurrences of disc herniation than patients who chose conservative treatment only [17]. The surgical treatment carries risks including dural tears and infections according to Louis et al. who identified that 5-10% of patients underwent postoperative complications [18].

Physiotherapy along with rehabilitation plays an essential part in recovery processes which involve both surgical and nonsurgical patient groups. The combination of spinal decompression therapy and core stabilization exercises represents a key component for pain reduction and mobility improvement in PLID management according to Gaowgzeh et al. [8]. The research findings agree with Gadiya et al. which supports the implementation of personalized rehabilitation plans for improving functional outcomes after treatment [19].

Scientific research continues to focus on evaluating the lasting effectiveness of surgical interventions. The researchers from Atlas et al. discovered that surgical patients initially showed better outcomes but functional differences between surgical patients and non-surgical patients grew minimal in the subsequent months [13]. Early surgical intervention resulted in faster symptom relief according to Peul et al. but patients eventually had similar long-term results compared to conservative treatment [7].

Patient selection plays an essential role in determining which course of treatment will be most beneficial. Weinstein et al. showed that surgery brings the most advantages to patients who have substantial neurological problems and chronic pain that remains unresponsive to

conservative treatment [6]. Bailey et al. determined that conservative care offers beneficial effects as preventative first-line treatment for patients experiencing mild to moderate symptoms instead of exposing them to operation-related risks [20].

The cost of treatment also serves as a determining factor in decision-making about management options. Initial expenses for surgical procedures may seem higher according to Lurie et al. but the benefits of improved functionality and enhanced patient well-being tend to balance these initial costs in the future period [10].

The research findings validate surgical treating procedures as an effective method for obtaining swift and significant relief from PLID. Yet conservative management continues as an essential strategy mainly for patients who have minor symptoms of PLID. Patient outcomes require an optimal approach that includes both educational programs for patients as well as physiotherapy treatment and decisions made together by physicians and patients.

7. CONCLUSION

Surgical management achieved superior pain control and improved functional outcomes and patient satisfaction compared with non-surgical PLID treatment modalities. Nonsurgical options still offer advantages to some patients who qualify for their application. The risk factors for both options varied, yet surgical interventions resulted in quicker recovery and improved job participation outcomes compared to non-surgical approaches.

8. LIMITATIONS AND RECOMMENDATIONS

This study was conducted at a single center with a small sample size, which limits the generalizability of the findings. The follow-up duration was too short to prevent long-term outcome assessments. Patient adherence to nonsurgical treatment varied, which may have influenced the results. Future studies with larger multicenter trials and longer follow-up periods are required to assess the long-term outcomes. Nonsurgical treatment should be optimized for suitable patients to improve functional recovery.

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