

## Comparison of Outcomes of Endoscopic Micro Discectomy Versus Conventional Discectomy for Lumbar Disc Diseases.

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### ABSTRACT

Introduction: Chronic lumbosacral pain is a communal and difficult clinical condition at the center of pain management. The most common surgical indication is back pain or intractable and severe functional impairment that does not respond to conservative measures. In this study we have compared the results of endoscopic d micro discectomy and conventional discectomy procedure.

Material and Methods: This is six months study was conducted in the department of neurosurgery Hayatabad Medical Complex Peshawar from 1st Feb 2025 to 1 August 2025. We included 54 patients with severe lower back pain who did not improve after long-term conservative treatment and who had level 3 disc prolapse, radiating to one or both lower limbs. Oswestry Disability Index (For Low Back Pain) was documented with questionnaire comeback and applied as a clinical tool for valuation.

Results: The average age of the 54 patients was 46 years and 75% of patients have paracentral disc protrusion. The mean endoscopic micro discectomy surgery time was 110 minutes; was longer than conventional discectomy (82 minutes). However, blood loss was very small compared to conventional discectomy. According to the ODI result, both conventional and endoscopic discectomy gave same outcomes in all classes.

Conclusion: Endoscopic micro discectomy is a new, effective and safe procedure that reduces the invasiveness of the surgical approach. The results obtained by this approach are comparable with those obtained with open discectomy to alleviate symptoms during prolonged observation, and because the tissue has minimal trauma, it is much better in early mobilization and morbidity

**Keywords:** spine, orthopedics, endoscopic discectomy, lumbar disc prolapse, disc degenerative disease

### INTRODUCTION

Chronic lumbo-sacral pain is a communal and difficult clinical entity at the center of pain management. Since the first definition of Mixter Barr in 1934, a lumbar disc herniation is one of the few abnormalities in which there is a clear link between morphological abnormality and lumbar spine pain<sup>1-2</sup>. Although pure mechanical compression has previously been seen as a source of radiculopathy, there is cumulative indication that the nerve root chemical irritation plays a significant,

perhaps the most important, role. Olmarker et al. In the experimental animal model, it has been shown that epidural administration of the autologous nucleus pulposus without the cauda equina compression leads to a substantial decrease in the nerve conduction velocity<sup>3</sup>. Autoimmune response, inflammatory reactions and microvascular changes are potential causes of this phenomenon. The most common surgical indication is back pain or intractable leg and significant functional impairment that does not respond to conservative measures<sup>4</sup>. An absolute indication for decompression of a disk herniation in wood is cauda equina syndrome and major motor weakness. The herniated disc diagnostic appearance can determine the pathology, but the choice on the operation depends mainly on the clinical course of the patients, and not on the disc herniation size or the extruded material of the disc<sup>5-6</sup>. In recent years, it has been possible to remove the protruding disk endoscopically due to advances in modern equipment, operating room equipment, fiber optic videography and miniaturization of the operating system.

In this study we have compared the results of conventional discectomy and endoscopic discectomy procedure.

## METHODOLOGY

This is six months study was conducted in the department of neurosurgery Hayatabad Medical Complex Peshawar from 1st Feb 2025 to 1 August 2025. We included 54 subjects with retractable leg or severe low back pain that did not improve after long-term conservative treatment and had disk prolapse below level 3 or both lower limbs. The patients were divided randomly into two groups: endoscopic micro discectomy or conventional discectomy. The study excluded multiple disc prolapse, spinal stenosis, traumatic disc prolapses, disc injury with spondylolisthesis and medically unsuitable patients. From all patients; written informed consent was taken. The pre-operative Oswestry disability index (for lower back pain) was documented with a response to the questionnaire. All patients were operated in general anesthesia in prone position.

### Technique of Endoscopic Micro discectomy

**1.Rear approach:** A 2 cm incision is made in the center line over a length of more than 2 cm. The small dilator or K wire is inserted down under fluoroscopic control until the bone contacts the lamella above the operated level. The K wire must be in line with the disk. Muscle dilators are inserted down the muscle, sustaining contact with the bone. An 18-mm operative canal replaced by the dilators on a hinged arm. The endoscope is attached to a tube and to a hinged arm stable with the table. Soft tissue is removed with forceps to ensure good ligament flavum exposure. Laminotomy is performed using a small osteotome/ speed burr. Dura is exposed with the help of Kerrisson runners, being careful not to damage the nerve root or dura mater. The cord is then medially displaced to find the disc removed through the rent with disc forceps.

**2.Posterior-lateral approach:** 4 cm in the midline was given. The small dilator or K wire is inserted diagonally downwards and placed transversely in the disk axis under the lateral and AP fluoroscopic control. After contact with the bone, the dilators are lowered and the procedure continues as described above. After the operation, the patient takes painkillers and antibiotics for 3 days. The patient can walk the next day after surgery. Patients were observed at periods of six weeks, three months and 6 months.

## RESULTS

We conducted the study after selecting 54 patients with 46 years average age, consisting of 30 men and 24 women. The distribution of patients by age and sex is given in the tables below.

**Table 1: Age distribution of patients**

Age group	Conventional Discectomy	Endoscopic Discectomy
<b>21-30</b>	5	2
<b>31-40</b>	10	9
<b>41-50</b>	4	10
<b>51-60</b>	4	6
<b>61-70</b>	4	0
<b>Total</b>	27	27

**Table 2: Sex distribution of patients**

Sex	Conventional Discectomy	Endoscopic Discectomy
Male	20	10
Female	7	17
<b>Total</b>	27	27

**Table 3: Distribution of patients as per type and site of disc protrusion**

Disc Prolapse		Conventional Discectomy	Endoscopic Discectomy
<b>Central</b>	Contained	6	5
	Extruded	2	0
	Sequestered	0	0
<b>Paracentral</b>	Contained	6	8
	Extruded	9	8
	Sequestered	4	6
<b>Total</b>		27	27

Subsequently, 75% of patients have paracentral disc protrusion, of which 14 (35%) belongs to the group of paracentral discs: extruded disc group which is maximum amongst all. It is obvious that most of the paracentral disc protrusions are treated endoscopically. The central disc protrusion is 20%; 17.5% of them contain discs, and 2.5% discs were extruded.

**Table 4: Distribution of patients according to level of disc protrusion**

Level of Disc	Conventional Discectomy	Endoscopic Discectomy
L1-2	0	0
L2-3	0	3
L3-4	5	0
L4-5	13	14
L5-S1	9	10
<b>Total</b>	27	27

As can be clearly seen, the maximum number of patients in both sections (n = 27) belongs to the disk protrusion group at level L4-5

**Table 5: Postoperative and intraoperative findings**

	Conventional Discectomy	Endoscopic Discectomy
Average Operative time	82 minutes	110 minutes
Average blood loss	124.5 ml	Minimal
Mean duration of hospital stay	4.8 days	2.5 days
Post-operative Visual Analogue Scaling for pain.	3.45	3.4

The above table shows that although the endoscopic procedure takes longer, blood loss and hospitalization are much smaller. The reduction of postoperative pain is almost the same in both methods ( $p < 0.05$ ).

**Table 6: Comparison of Visual Analogue Scale Score in both methods in immediate post-operative duration (48 hours)**

Method	Pre-operative VAS	Post-operative VAS
Conventional Discectomy	7.1	4.95
Endoscopic Discectomy	6.9	2.7

The above table shows that patients treated with endoscopic discectomy had a significant reduction in pain compared to patients with conventional discectomy on visual analogue scale (VAS). This actually leads to a reduction in the need for painkillers after surgery, and thus a shorter hospital stay.

**Table 7: Comparison of Preoperative and postoperative ODI score in both methods**

Method	Mean ODI (Oswestry Disability Index) Score	
	Preoperative	Postoperative
Endoscopic Discectomy	62.1	28.75
Conventional Discectomy	68.05	29.15

It was perceived that there was no substantial alteration in the postoperative ODI result in both methods from previous values.

**Table 8: Comparison of Results of Endoscopic and Open Discectomy according to ODI Score**

Results (ODI Score)	Conventional Discectomy	Endoscopic Discectomy
Excellent (0-20)	7(25.9%)	8(29.6%)
Good (21-40)	20(74.1%)	19(70.4%)
Fair (41-60)	0(0%)	0(0%)
Poor (>60)	0(0%)	0(0%)
Total	27(100%)	27(100%)

The above table compares the results of both methods according to the classification according to the ODI result. Both methods give excellent and good results in a similar fraction. We understand that our sample is very limited for accurate advice. A study with more patients is needed to make the final assessment.

## DISCUSSION

Low back pain is an important cause of morbidity among professionals and employees and is considered the main cause of absence due to illness, and therefore has economic consequences (7,8). Many forms of patient management are offered, but performance data are generally not impressive. The literature is inconsistent in reporting the location and type of disc herniation and its predictive value in the treatment of sciatica (9). In our study, most patients were 41-50 years old, while the disc was in the process of degeneration. The resistance of the disc in young patients protects it from degeneration. In patients older than 50 years, the disc has achieved some natural stability due to fibrous changes due to loss of water content. The most common disc prolapse is paracentric (75%). In the paracentral disc, patients experience greater radicular pain than central disc prolapse (10). This can be probable anatomically, because the laterally located nerve roots are more probable to

be irritated by the paracentral hernia than the central hernia, because the lateral recess is narrower than the central canal to allow relative root displacement to prevent direct compression. The paracentral disc herniation apex is much closer to the traverse and comes out of the nerve roots compared to the central herniation.

Patients treated with endoscopic discectomy have a better result in terms of a better ODI result, because it is a minimally invasive method, so it does not cause injury to the paravertebral muscle (11,12). In addition, laminotomy is not performed, as in conventional discectomy, so the spine is not unstable. It also reduces the frequency of infection. In our study, the average duration of surgery for endoscopic micro discectomy is 110 minutes and can be compared with other similar tests. Shortening of hospital stay results from the lack of epidural fibrosis and immobilization of the nerve roots, which are common after open technique (13). The epidural vein system does not change during endoscopic technique. This helps prevent venous stasis and chronic swelling of the nerve roots. Minimal surgical trauma to myo-ligament structures can facilitate rapid healing.

In addition, traumatic nerve excision does not involve additional bone removal or large skin incisions (14). The risk of complications from scars, blood loss, infection and anesthesia is significantly reduced or eliminated. All this causes less pain in the postoperative period in patients treated endoscopically, and therefore the need for postoperative analgesia is also reduced, and future radial pain was reduced, despite alleviating root pain in the operated patients. Since the paravertebral muscles are not reduced, they decrease. severely damaged (15).

## CONCLUSION

Endoscopic discectomy is a new, effective and safe procedure that reduces the invasiveness of the surgical approach. The outcomes obtained by this procedure are comparable to those obtained by the method of open discectomy to alleviate symptoms with prolonged observation and are much improved in terms of fast mobilization and low morbidity, since there is negligible tissue injury. The technique should be specialized, and the choice of open or endoscopic discectomy belongs to the surgeon only after consulting the patient and only when necessary. Although endoscopic discectomy is better than open discectomy, the steep learning curve, as well as good anatomy, and the surgeon should be ready to turn it into the opening of the surgical procedure if any complications arise.

## Authors' Contributions

**Dr Imran Khan:** Conceptualization, methodology, investigation, resources, analysis, writing.

**Dr Muhammad Ali Noman:** Conceptualization, writing, review and editing, supervision.

**Dr Rafi ullah:** Manuscript writing, drafting, review and editing, correspondence.

**Sajawal Mukhtiar:** Writing, software, data curation.

**Muhammad Iqbal:** Writing, resources.

**Zeeshan Khan:** Data curation..

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