



## Interlaminar Endoscopic Lumbar Discectomy - Results in First 50 Patients

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### Abstract

**Introduction:** Posterior endoscopic discectomy is a time proven technique for the management of lumbar disc prolapse. Many endoscopic systems are being used for this technique. We report a study of first 50 patients operated by this endoscopic system (Destandau) in our centre. It is proved to be a safe technique and has a better learning curve.

**Materials and Methods:** A total of 50 patients suffering from lumbar disc herniation were operated from Jan 2017 to Dec 2019. Patients requiring two level surgeries and associated lumbar canal stenosis were excluded from this study. Endoscopic discectomy was done through the endospine system, using a 15 mm incision. The results were evaluated using the modified Macnab's criteria. The average follow up period was 24 months.

**Results:** 80% patients had excellent results and 20% patients had good results. None of them had fair or poor results. The complications observed were minor dural tear in two patients, nerve root injury in one patient, facet damage in one patient. 80% of patients were able to return to light work in 2 weeks time and normal physical activities in 6 weeks time.

**Conclusion:** Posterior endoscopic discectomy is a safe and proven method of treating lumbar disc herniation. It allows early mobilization of patients and return to work. The technique is proved to have a better learning curve and familiar instrumentation for the conventional spine surgeon.

**Keywords:** Endoscopic Discectomy; Endospine; Lumbar Disc Prolapse; Minimally Invasive Spine; Destandau Technique

### Introduction

Key hole surgeries have become the need of the hour in spine surgeries. The advantages of use of minimal invasive technique in the treatment of lumbar disc herniation are small incision, good visualization, magnification and illumination, short hospital stay, and quick recovery time [1]. The aim of this study is to present the results of first 50 patients operated in our center by endoscopic discectomy, using Destandau technique.

### Materials and Methods

67 patients suffering from lumbar disc herniation with radiculopathy and were operated between January 2017 and December 2019. 50 patients who met the following inclusion criteria were evaluated. The inclusion criteria were patients having lumbar disc prolapse with unilateral severe radiculopathy, with a single level lesion on MRI correlation. Patients with bilateral symptoms, more than one root involvement and cauda equina syndrome were ex-

cluded from this study. 3 patients who were converted to open surgery were also excluded from the study. All these patients had fair trial of conservative treatment and physiotherapy before surgery was advised.

There were 27 male and 23 female patients aged between 24 to 59 years. Time of onset of symptoms to surgery was between 3 months and 2 years. Levels operated upon included, L3-L4 (n = 5), L4-L5 (n = 28), and L5-S1 (n = 17). 26 Patients had radiculopathy on right side and 24 patients on left side. There were 32 extruded, 8 contained, 2 foraminal, and 8 sequestered herniations.

All patients were operated under general anaesthesia. Results were classified as excellent, good, fair and poor using modified Macnab's criteria (Table 1).

Excellent	No pain/restriction of activity and being able to do all activities
Good	Occasional pain with relief of presenting symptoms and returning to work with some modification
Fair	some improved functional capacity but still handicapped or unemployed
Poor	Having objective symptoms of root involvement or repeat surgery at the index level.

**Table 1:** Modified Macnab's criteria.

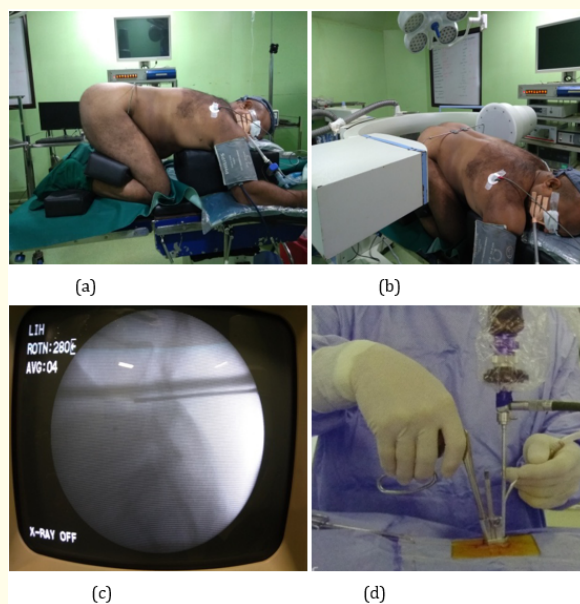
The clinical study included proper history, neurological examination, plain X-rays including dynamic views and MRI of the lumbosacral spine. Postoperative follow-up examination was carried out on the 5<sup>th</sup> day, 2 weeks, 4weeks, 3, 6, 12, 24 and 36 months.

We used the endospine system designed by Destandau. It consists of endospine tube, trocar, and working insert. The working insert has four ports. One port for the endoscope, second one for the suction, third one is the working portal, and fourth one for nerve root retractor (Figure 1).

(Figure 2) Knee chest positioning was used for the procedure, after administration of general anesthesia. Then the level was marked using the localization device under the image intensifier. A 15 mm skin incision is made 10mm from the mid line. Aponeurosis is incised; chisel is used to elevate paravertebral muscles subperiosteally.

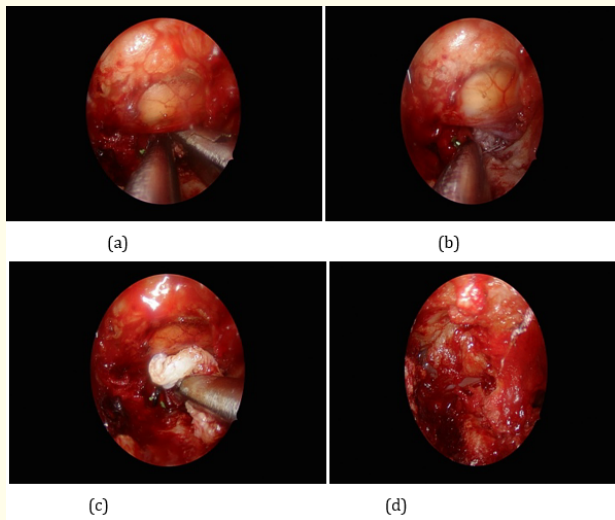


**Figure 1:** Endospine system showing the portals.



**Figure 2:** Endospine technique, a. Knee chest position. b. Localization of level by image intensifier. c. Image intensifier showing level. d. Endospine portal in place.

The Endospine tube with trocar is inserted over the interlaminar window and the trocar is removed. The working insert is then attached in the endospine tube. The video camera is then connected to the 0 degree endoscope. The endoscope and suction tube are then introduced into their respective ports as mentioned earlier. Any soft tissue obscuring the view is removed till boundaries of interlaminar window are clearly visible. This follows partial resection of inferior margin of the superior lamina followed by excision of ligamentum flavum leading to exposure of the dural sac and nerve root under endoscopic vision (Figure 3).



**Figure 3:** Endoscopic discectomy, (a). Exposure of dura and nerve root, (b). Exposure of extruded disc, (c). Removal of disc fragment, (d). Decompressed nerve root.

Once the nerve root is visualized, it is safely retracted using a nerve root retractor. The epidural veins may be coagulated if needed. Dural and nerve root retraction can be done using the cottonoid patties. Depending on local findings, discectomy is then carried out. Satisfactory nerve root decompression is then achieved, then the endospine assembly is removed. Aponeurosis is closed using 1-0 vicryl followed by subcuticular suture.

These patients were followed up on 5<sup>th</sup> day, 2 weeks, 4 weeks, 3,6,12, 24 and 36 months. The follow up period was minimum one year and maximum of 3 years. On 5<sup>th</sup> day, wound inspection was done to check for any drainage or infection. Complaints of fever, backache, or leg pain or paresthesia were enquired.

## Results

At final follow-up, all patients were relieved of the sciatic pain and were satisfied with the surgery. Average operative time was 90mins (Range, 60-120 mins). Average blood loss was 65ml (range, 40-100 ml). Based on modified Macnab's criteria 80% patients had excellent results and 20% had good result. No patients had fair or poor results in our study.

Patients who had intraoperative minor dural tears (n = 2) were post operatively observed for any dural leak. The reasons for du-

ral tears in our study were forceful retraction of dura and nerve root by nerve root retractor. This complication occurred in patients with huge herniations causing tenting of dura and nerve root at the recess. In this situation, gentle mobilization of nerve root and dura or approaching and debulking the huge disc through the axilla before proceeding with retraction of nerve root is found to be useful. These dural tears did not require any direct repair. They were managed by water tight closure of muscle, fascia and skin and bed rest for 1 week.

Nerve root injuries (n = 1) occurred while doing medical factectomy by a Kerrison rongeur causing minor laceration of nerve root. Since the nerve root was in continuity, it didn't require any repair. Despite nerve root injury, discectomy was successfully completed endoscopically.

Two patients had facet damage while doing nerve root decompression. However patients were asymptomatic post operatively. 80% of patients were able to return to sedentary work in an average time of 2 weeks.

## Discussion and Conclusion

The successful results of standard open discectomy range from 68 to 95% in different series [2,3]. Microsurgical techniques were developed in mid-1960 by Yasargil and Kravynbuhl [4,5] and these techniques revolutionized spine surgery leading to various MIS techniques with advantage over open techniques. The success of microdiscectomy also range from 85 to 98% [6,7]. Katayama, *et al.* [8]. compared the results of open and microdiscectomy and observed no difference between the surgical outcomes in both the groups but microdiscectomy gave better lighting and magnification, Microendoscopic discectomy (MED) combines standard micro surgical technique and an endoscope, to address all types of disc herniations and decompression of nerve root.

The muscular retractor system was introduced first by Faubert and Caspar [9,10]. Perez-curet and Fessler described for the first time tubeology to deal with various spinal pathologies.

In a study by Shin, *et al.* [11], cases were compared between MED and microscopic group (MD). The mean CPK-MM levels were lower for the MED group than for the MD group post operatively. The mean VAS for postoperative back pain were found lower in the MED group than in the MD group. They concluded that the MED procedure is less invasive than MD.

The 80% excellent result in our present study is comparable with other studies of Destandau [12], Perez-Cruet, Mohinder Kaushal [13], Ranjan [14] and Rohidas SM [15] and PC Dey [18]. They have reported success rate in range of 75 to over 90% in their studies.

We had minimum 24 hours hospital stay (range 24 hours- 48 hours). Average operative time was 90 minutes. Since it was early part of learning curve, the operating time was more. Average blood loss was 60ml (range 40-100 ml). Intraoperative Complication rate was 10%. There were no long term sequelae, however.

In our study, we had no discitis and 4% incidence of dural injury. Our reoperation rate was nil. Williams [16] and Caspar [17], have reported reoperation rate of 5% and 5.7% respectively in their studies.

Other complications were comparable to the similar technique by PC Dey, *et al.* [18]. Another success criteria is patient's ability to return work. 80% of our patients returned to previous employment on an average of 2 weeks, however heavy manual labour was restricted for about 2 to 3 months.

Discectomy (MED) by endospine system documented lesser tissue invasion than microdiscectomy with smaller skin incision. Least tissue invasion is established by comparing the postoperative MRI signal of paraspinal muscles, intraoperative electromyographic findings and by measuring serum level of biochemical parameters line CPK-MM.

Minimal invasive microendoscopic decompression technique has been used not only for paracentral disc herniations, but also for migrated, sequestered and foraminal disc herniation [22-24].

The endospine system (Destandau) has been an excellent method to address discogenic radiculopathy and to decompress lumbar canal. The instruments used in this technique are familiar for any spine surgeon. Also the cost involved is also less compared to other systems. Considering the early cases in this series, the excellent clinical results and low complication rate, show the technique is safe and has a better learning curve.

However difficulty in orientation with scope, availability of less space and steep learning curve, are the difficulties. The patience

and perseverance to work through narrow space is the key to learn. Our experience shows that this method has a better learning curve and familiar instrumentation for the conventional surgeon, compared to other endoscopic techniques like transforaminal route.

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