

## Percutaneous Spinoscopic Discectomy of Lumbar Disc Prolapse

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### Abstract

*Endoscopic spine surgery is considered as a safe and effective alternative to other types of open back surgery that often aggravate fear in patients. Majority of patients delay or even refuse an invasive procedure fearing the lengthy recovery times, potential problems with infection, anaesthesia and or scarring. The Lumbar disc prolapse has a typical issue in the present surgical standard in its treatment is a microsurgical discectomy. Percutaneous endoscopic lumbar discectomy (PELD) is a negligibly obtrusive spinal technique being done effectively for prolapsed intervertebral plate ailment. No large randomized study has been done to compare the technique to the accepted standard, open discectomy (with or without microscope), that's an indicator of how important this study is as we analyse the method, result and difficulties seen in 60 instances experienced PELD of prolapsed lumbar intervertebral disc. The study was completed at the Department of Neurosurgery in three different hospitals in Erbil, Kurdistan, Iraq, over 3 years. The Storzlens Spinoscope was utilized to perform (PELD). Thirty six patients had fabulous results, 18 patients had decent results, 4 patients had reasonable results and 2 patients had poor results. Two patients with a long dural tear obliged transformation to a standard micro-discectomy and were prohibited from result evaluation. Complications included wide dural tear and CSF leak, shallow injury contamination, discitis and repetitive disc prolapse. Spinoscopic Percutaneous-endoscopic lumbar Discectomy is a sheltered and compelling strategy towards the treatment of prolapsed lumbar intervertebral disc. Its outcomes are practically identical to standard microdiscectomy.*

**Keywords:** Prolapsed lumbar disc, prospective cohort study, outcome research, lumbar disc surgery, endoscopic, Percutaneous.

### Introduction

Percutaneous endoscopic lumbar discectomy (PELD): This term refers to an essentially intradiscal procedure indicated primarily for contained disc herniations, although some small "noncontained" fragments may be treatable. Percutaneous endoscopic lumbar discectomy (PELD) is a negligibly intrusive spine surgery method that uses an endoscope to treat herniated, projected, expelled, or degenerative circles that are a contributing component to leg and back agony. The endoscope permits the specialist to utilize a "keyhole" entry point to get to the herniated circle. Muscle and tissue are widened as opposed to being cut while getting to the plate. Shockingly, plates (disc) fall apart with age. This prompts less tissue devastation, less postoperative agony, snappier recuperation times, prior recovery, and shirking of general anesthesia. The astounding perception by means of the endoscope allows the specialist to specifically evacuate a segment of the herniated core pulposus that is adding to the patients' leg and back agony. When we are kids, the inward core in our plate is similar to a delicate gel and it is held in by the external annulus which is intense and solid. With age, the core dries out and turns out to be less supple, and annulus gets to be weak and can part or break. On the off chance that the split reaches out through the annulus, the core can crush out into the spinal trench and push on the nerves.

Disc maturing or degeneration is a steady process. A disc prolapse happens when the annulus is excessively powerless, making it impossible to keep the core prolapsing out. By and large, no particular occasion causes the prolapsed<sup>1</sup>. It can be activated by effort or harm; however a typical sound disc can't prolapse unless there is some prior shortcoming or degeneration present. At the point when the core interacts with a nerve in the spinal trench, the nerve gets to be disturbed and aroused and torment is felt along the nerve's way. The nerve is kindled by the aggravation chemicals contained in the core, and in addition the weight from the prolapse. The nerve can be harmed by the prolapse, bringing on muscle squandering, shortcoming, deadness, sticks and needles and loss of reflexes in the leg. The harmed disc additionally causes back agony. With time, the body 'mops up' the aggravation chemicals. This more often not happens in the initial six weeks, clarifying why numerous individuals begin feeling better. The prolapse in the long run recoils yet this can take from a couple of weeks to numerous months. On the off chance that the prolapse does not recoil adequately, torment cans proceed<sup>2</sup>.

Sporadically, the disc prolapse is large to the point that it squashes every one of the nerves in the spinal waterway, creating incomplete loss of motion and loss of inside and bladder control. This is known as a caudaequina disorder. It is

uncommon yet needs prompt surgery. All the more generally, long haul weight on the nerve prompts interminable agony and conceivably nerve harm. Once in a while a leg muscle quits working, creating shortcoming, for example, a foot drop, or some piece of the leg turns out to be for all time numb<sup>3</sup>. The analysis is normally made on the manifestations' premise and signs. It is suspected if there is serious leg agony and deadness or sticks and needles along the known way of one of the lumbar nerves together with muscle shortcoming, loss of reflexes, deadness and torment on extending the nerve. An output is frequently used to affirm the conclusion, particularly if the torment is not settling and surgery is considered. An MRI output is more exact however now and then a CT sweep is requested.

Most disc prolapses show signs of improvement without anyone else in the initial six weeks. Amid this time, the best approach is to maintain a strategic distance from exercises that erupt the torment (however strict bed rest is a bit much). Tablets, for example, torment executioners, hostile to inflammatory and sometimes muscle relaxants can be utilized. Infrequently, an epidural infusion of steroid or even steroid tablets can be utilized to settle the aggravation yet the impacts are interim. A physiotherapist can offer exhortation about agony alleviating strategies, approaches to oversee day by day exercises, and delicate activity to keep up back portability and wellness yet hands-on treatment has a restricted part to play. In the event that leg torment is serious and is not enhancing in the normal time span, surgery as a discectomy is considered<sup>4</sup>.

**Lumbar Discectomy:** A discectomy is an operation to uproot the bit of plate that has prolapsed into the spinal trench. It is an ordinarily performed, clear operation and is normally done as a day surgery technique. The operation's point is to expel weight from the compacted nerve and to diminish leg torment. It is effective in 90% or a greater amount of cases<sup>5</sup>. At the point when this happens the patient must be admitted to hospital upon the strategy's arrival. Patient will be given a general sedative and put on the working table face down with hips and knees twisted. The skin over low back is cleaned. A needle is set in back and an x-beam is taken to verify the right level is worked on. The compacted nerve is found and got out to reveal the disc. Now and again a little cut must be made in the outer bit of the annulus to reveal the prolapse, and at times the prolapse is currently absolutely outside the plate. The prolapse is cleared and inside of the plate is checked with the expectation of complimentary areas, which are similarly uprooted. The entire disc is not evacuated – indeed the greater part of the disc remains. At long last, some steroid and analgesic are set on the nerve to settle torment and swelling, and the skin is shut with dissolving sutures. You wake up and go home when you are feeling fine and can walk securely.

The fundamental objective of your recuperation is to restore and keep up spinal quality and adaptability and to abstain from over-burdening the disc while the gap in the annulus mends. You will see a physiotherapist before you go home, who will give you

exhortation and activities. You should rest for a few days, and after that begin expanding your movement level. Following two weeks, you can drive and begin going out ordinarily. You can come back to work following a few weeks if your work is inactive or following six to eight weeks on the off chance that it is more physical. You have to stay away from continuous bowing and truly difficult work for six weeks, and you can come back to brandish following a few months. You will see the physiotherapist at three weeks for some more activities, and again at six weeks when you return to see the specialist. After surgery, you may make them on go leg torment, particularly in the initial couple of weeks. Much of the time this settles about totally yet in the event that the nerve has been harmed by the prolapse, it may proceed. Back torment may turn into an aggravation when you continue movement, and at times it can get to be troublesome if the disc harm from the prolapse does not settle down. On the off chance that the gap in the plate does not mend, more disc may prolapse out later on, and another discectomy operation may be needed. Rarely, a genuine complexity can happen amid surgery or before long, for example, nerve harm or disease. Before choosing whether to have an operation, you have to talk about these dangers with your specialist<sup>6</sup>.

## Materials and Methods

Sixty patients with prolapsed lumbar intervertebral disc who were seen at our organization between January 2013 and August 2015 were incorporated in the study. Information was gathered tentatively. Before the surgery all patients had a trial of traditionalist treatment before surgery was advertised. This incorporated a base time of 6 weeks of non-steroidal anti-inflammatory drugs and rest.

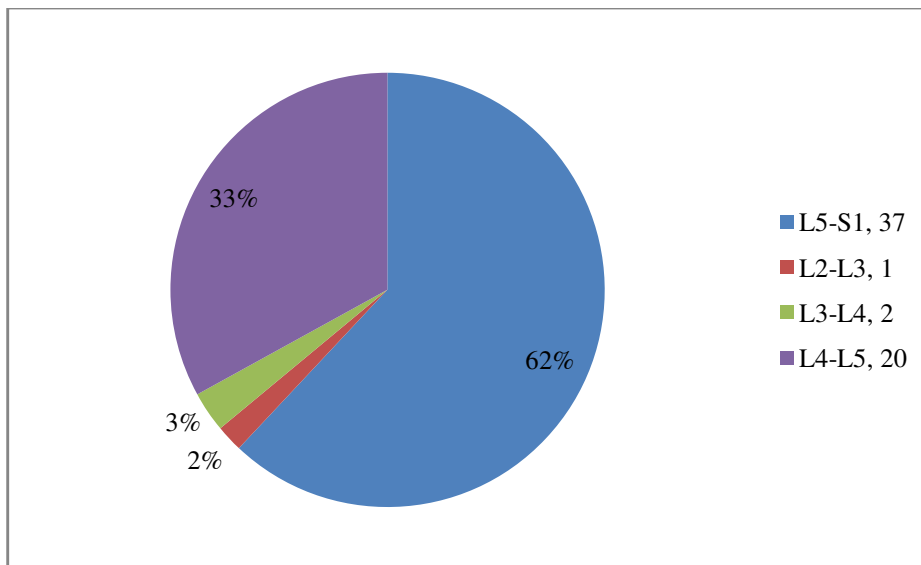
Parallel spinal canal stenosis at the included level was not a contraindication to percutaneous endoscopic lumbar discectomy (PELD). Agent procedure: Skin arrangement was finished with betadine. The Storz percutaneous spinoscopy was utilized for the methodology. i. The procedures were performed with the patients under general anesthesia in the prone position with slightly flexed hips and knees on the Wilson frame. Nerve root monitoring through free run EMG or stimulated EMG was done sometimes but not routinely. ii. Guided by the C-arm in two planes, the puncture of the intervertebral L5/S1 disc with a discography needle targeting the central part via Kambin's triangle was performed. iii. After the insertion of the needle, discography was performed. iv. A guide-wire was inserted through the needle channel into the disc, and a small stab incision was made at the entry site of the needle. v. After withdrawing the needle, a conical dilatator was slid over the guide-wire and advanced into the disc space. vi. After insertion of the working sleeve and endoscope, internal decompression of the disc was performed. vii. After the internal decompression, the working cannula was pulled out from the disc space to the foramen. The non-windowed tip of the working cannula was positioned in the cephalad and lateral direction close to the

posterior wall of the vertebra (foraminal retreat). viii. Slight rotational movements allow the identification of the migrated disc fragment and the prior displaced protruding nerve root. ix. With a clear orientation of the contents in Kambin's triangle, the prolapse can be removed. x. The working sleeve and endoscope are removed after the complete decompression and clear identification of the protruding nerve<sup>7</sup>. The nerve root and dural tube were distinguished.

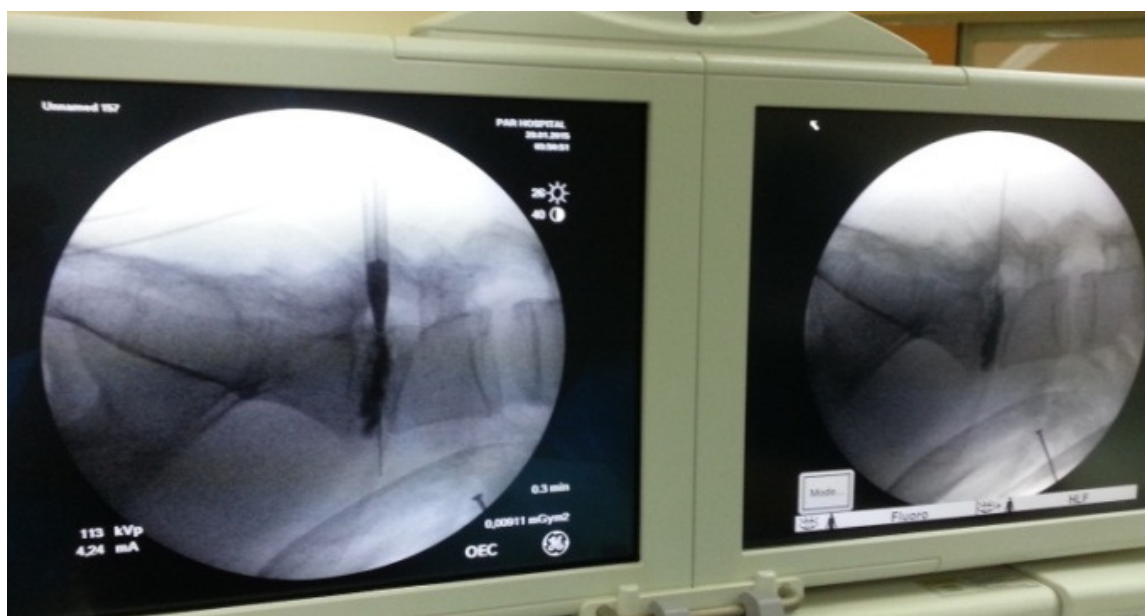
Perioperative antibiotic were given for 48 hours. Result appraisal was done utilizing the changed Macnab criteria<sup>8</sup>.

**Table-1**  
**Modified Macnab criteria to assess clinically**

Excellent: Free of pain, No restriction of mobility. Able to return to normal work and activities
Good: Occasional nonradicular pain. Relief of presenting symptoms. Able to return to modified work
Fair: Some improved functional capacity
Poor: Continued objective symptoms of root involvement. Additional operative intervention needed at the index level. Irrespective of repeat or length of post operative follow up



**Figure-1**  
**Graph for patients at disc level**



**Figure-2**  
**Discogram after pushing the trocher in side disc<sup>4</sup>**

## Results and Discussion

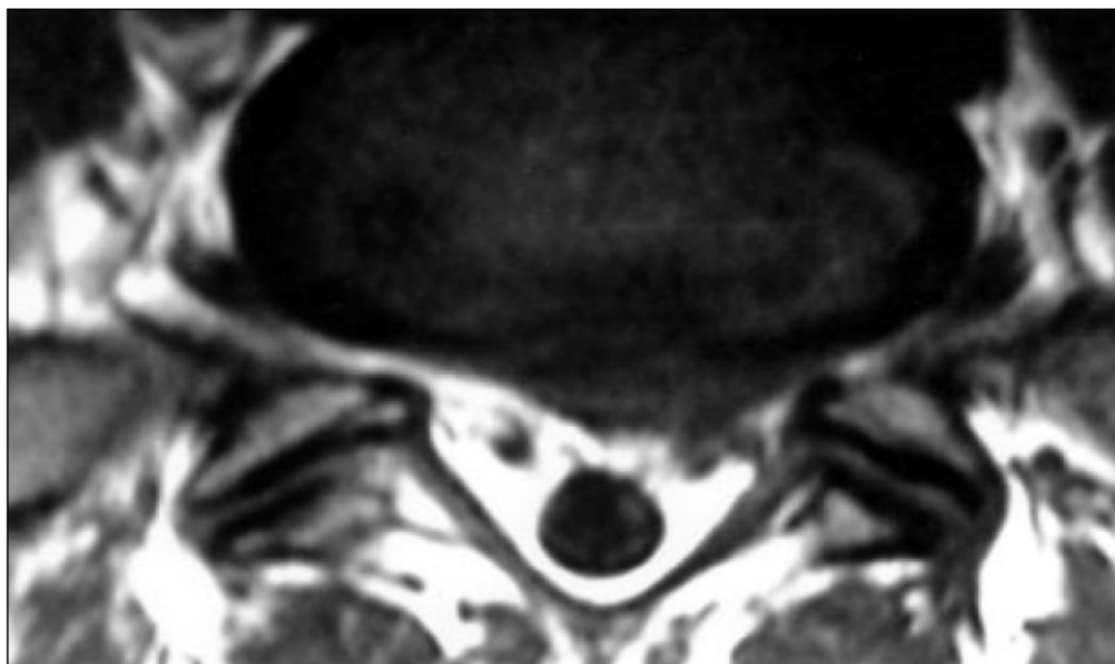
Sixty patients experienced PEL Dat our organization between January 2013 and August 2015. There were 37 guys and 23 females. The patient's age selected in between from 17 years to 73 years. All patients had aforaminal and posterolateraldisc herniation (Figure 4,5,6) and of these, L5-S1, L4-5 were the most generally included levels. The patients were ambulated inside of 6 hours of the surgery and were released inside 48 hours of the surgery. Amid the last piece of arrangement, patients were released within 24 hours after surgery. Duration of

post operative follow ranged from 2 months to 34 months with a mean follow up of 18 months. This study excludes with long dural tear with open procedure was done.

There were an aggregate of seven entanglements (6.54%). This included one instance of shallow nerve injury disease is treated by antibiotics and day by day dressings. In this study one patient have a long dural tear which obliged transformation to an open methodology while a patient with little dural tear doesn't require any medication.



**Figure-3**  
Site of spinoscope in transforaminal approach



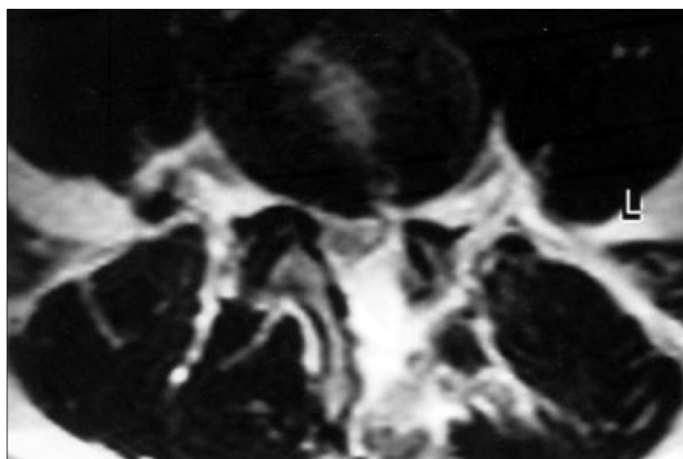
**Figure-4**  
Pre-operative axial T2 weighted MRI showing L5-S1 disc prolapsed with compression of the left S1 nerve root<sup>5</sup>





**Figure-5**

**Pre-operative T2 weighted MRI showing a L4-5 disc prolapsed with a foraminal component and associated lateral recess stenosis<sup>5</sup>**



**Figure-6**

**Post-operative MRI showing decompression of the nerve root and lateral recess of recurrent disc done by PELD as second hand surgery<sup>5</sup>**

Result evaluation was finished 60 patients utilizing the adjusted Macnab criteria. Thirty six patients had super result, 18 patients had a decent result, 4 had a reasonable result while 2 patients had a poor result. Along these lines, general achievement rate was 92.4% in our arrangement. The average operative time was 50 minutes. All procedures were done via the posterolateral approach entering Kambin's triangle. The cases done ahead of schedule in the arrangement took a more drawn out time up to 90minutes. We studied all patients with intra- and extraforaminal lumbar disc herniation at the different Lumber level with typical radicular pain. Severspinal stenosis and/or spinal in- stability were contraindications to performing PELD. The clinical findings and MRI were the main diagnostic methods. Data were abstracted from the patients' medical records, out- patient reports and mail questionnaires. A special

questionnaire was designed to cover the last follow-up, the actual pain situation, working status and co-Morbidities.

**Table-2**  
**Levels of herniated disc noted in patients included in our study (n=60)**

Sr. No.	Level	Number of patients
1.	L2-L3	1
2.	L3-L4	2
3.	L4-L5	20
4.	L5-S1	37

**Discussion:** The study accessible proof recommends that Prof. Yasargil was the first individual to present this system<sup>9</sup>. Specific Endoscopic Discectomy (PELD) is a negligibly intrusive spine surgery procedure that uses an endoscope to treat herniated, projected, expelled, or degenerative circles that are a contributing variable to leg and back torment. The endoscope permits the specialist to utilize a "keyhole" entry point to get to the herniated circle. Muscle and tissue are expanded instead of being cut while getting to the circle. This prompts less tissue pulverization, less postoperative agony, speedier recuperation times, prior restoration, and evasion of general anesthesia. The superb representation through the endoscope allows the specialist to specifically expel a bit of the herniated core pulposus that is adding to the patients' leg and back agony<sup>10</sup>. One noteworthy favorable position of endoscopic spine surgery is the evasion of hospitalization something that stresses numerous patients, especially those with youthful families, requesting lives and employments. A shorter recuperation period after a strategy diminishes the expenses connected with surgery as patients keep away from over the top doctor's facility bills. The shorter recuperation time frame likewise implies that patients are better ready to take part in physical movement to reestablish and keep up general wellbeing. The understanding's capacity to come back to the past occupation is analyzing of accomplishment surgical system<sup>13</sup>.

The money saving advantage investigation has additionally been built up in a protection driven practice. One study looking at the intraoperative electromyography (EMG) in the lower appendage in the middle of microendoscopic discectomy. On the other hand, patients in the PELD gathering obliged less postoperative absense of pain amid their remain<sup>14</sup>.

The inconveniences reported in patients experiencing PELD incorporate injury contaminations (0-0.8%), discitis (0-0.8%), dural tears (2.3-7.1%) and repetitive disc prolapse (2.6-2.9%). The confusions reported in expansive arrangement with patients experiencing microdiscectomy are likewise comparative and incorporate injury diseases (0-7.2%), discitis (0-0.8%), dural

tears (0-6.7%) and intermittent disc prolapse (3-14%)<sup>15</sup>. Absence of profundity observation and stereoscopic vision connected with an expectation to absorb information have dependably been the issues connected with endoscopic surgeries. A late study evaluating the expectation to learn and adapt for PELD by a solitary specialist, expresses that pretty nearly 30 cases are obliged to conquer the expectation to absorb information and before the agent time and inconveniences lessen. Our outcomes and conclusions depend on 60 patients who have experienced PELD for posterolateral lumbar discherniations.

## Conclusion

Percutaneous-endoscopic lumbar Discectomy is a sheltered and compelling strategy for the treatment of prolapsed lumbar intervertebral disc. Its outcomes are practically identical to standard microdiscectomy. The present signs for this system incorporate posterolateral discherniations and/or foraminal one.

## References

1. Van der Windt D. A., Simons E., Riphagen I. I., Ammendolia C., Verhagen A. P., Laslett M. and Aertgeerts B. (2010). Physical examination for lumbar radiculopathy due to disc herniation in patients with low-back pain. The Cochrane Library. Pages: <http://www.ncbi.nlm.nih.gov/pubmed/20166095>. [visited on: 20/11/2015]
2. Hahne A. J., Ford J. J. and McMeeken J. M. (2010). Conservative management of lumbar disc herniation with associated radiculopathy: a systematic review. *Spine*, 35(11), E488-E504.
3. Brötz D., Maschke E., Burkard S., Engel C., Mänz C., Ernemann U. and Weller M. (2010). Is there a role for benzodiazepines in the management of lumbar disc prolapse with acute sciatica?. *Pain*, 149(3), 470-475.
4. Dang L. and Liu Z. (2010). A review of current treatment for lumbar disc herniation in children and adolescents. *European Spine Journal*, 19(2), 205-214.
5. Benson R. T., Tavares S. P., Robertson S. C., Sharp R. and Marshall R. W (2010). Conservatively treated massive prolapsed discs: a 7-year follow-up. *Annals of the Royal College of Surgeons of England*, 92(2), 147.
6. Manchikanti L., Falco F. J., Benyamin R. M., Caraway D. L., Deer T. R., Singh V. and Hirsch J. A. (2013). An update of the systematic assessment of mechanical lumbar disc decompression with nucleoplasty. *Pain Physician*, 16(2 Suppl), SE25-54.
7. Nakagawa H., Kamimura M., Uchiyama S., Takahara K., Itsubo T. and Miyasaka T. (2003). Microendoscopic discectomy (MED) for lumbar disc prolapse. *Journal of clinical neuroscience*, 10(2), 231-235.
8. Trattng S., Stelzeneder D., Goed S., Reissegger M., Mamisch T. C., Paternostro-Sluga T. and Welsch G. H. (2010). Lumbar intervertebral disc abnormalities: comparison of quantitative T2 mapping with conventional MR at 3.0 T. *European radiology*, 20(11), 2715-2722.
9. Johansson A. C., Linton S. J., Rosenblad A., Bergkvist L. and Nilsson O. (2010). A prospective study of cognitive behavioural factors as predictors of pain, disability and quality of life one year after lumbar disc surgery. *Disability and rehabilitation*, 32(7), 521-529.
10. Schick U., Döhnert J., Richter A., König A. and Vitzthum H. (2002). Microendoscopic lumbar discectomy versus open surgery: an intraoperative EMG study. *European spine journal*, 11(1), 20-22.
11. Jhala A. and Mistry M. (2010). Endoscopic lumbar discectomy: experience of first 100 cases. *Indian journal of orthopaedics*, 44(2), 184.
12. Palmer S. (2002). Use of a tubular retractor system in microscopic lumbar discectomy: 1 year prospective results in 135 patients. *Neurosurgical focus*, 13(2), 1-4.
13. Thongtrangan I., Le H., Park J. and Kim D. H. (2004). Minimally invasive spinal surgery: a historical perspective. *Neurosurgical focus*, 16(1), 1-10.
14. Nowitzke A. M. (2005). Assessment of the learning curve for lumbar microendoscopic discectomy. *Neurosurgery*, 56(4), 755-776.
15. Sherk H.H., Vangsness C.T. and Thabit G. (2012). 3rd, Jackson R.W. Electromagnetic surgical devices in orthopaedics. Lasers and radiofrequency, *J Bone Joint Surg Am*, 84-A (4), 675-678.