International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

Recurrent Lumbar Disc Herniation: Predictors, Management Strategies, And Clinical Outcomes in A Tertiary Care Cohort

Basanta Kumar Baishya[1], Shreya Ashtosh Raina[2]

[1]Dept. of Neurosurgery, Gauhati Medical College and Hospital, Guwahati, India
[2]Dept. of Neurosurgery, Gauhati Medical College and Hospital, Guwahati, India

Corresponding Author:

Shreya Ashtosh Raina
Dept. of Neurosurgery, Gauhati Medical College and Hospital, Guwahati, India

Received: 15-04-2026
Accepted: 05-05-2026
Available online: 23-05-2026

ABSTRACT

Background: Lumbar disc herniation is a leading cause of low back pain and disability. Although surgical discectomy provides relief, recurrent lumbar disc herniation (rLDH) remains a major challenge. This study evaluates recurrence rates, associated risk factors, and management outcomes in patients undergoing primary lumbar discectomy.

Methods: A retrospective study was conducted on 100 patients with lumbar disc herniation who had undergone primary discectomy and subsequently presented with recurrence after a pain-free interval of at least six months. Clinical history, examination findings, imaging, comorbidities, lifestyle factors, and surgical details were analyzed. Patients were managed conservatively, with epidural injections, or with revision surgery.

Results: The highest incidence of recurrence was observed between 30-36 months post-surgery (38%). The most common level affected was L4-L5, followed by L5-S1. Smoking and vitamin D deficiency showed significant associations with recurrence ($p<0.05$). A statistically significant difference was noted between laminotomy and laminectomy outcomes ($p=0.04$). Most patients were managed conservatively, while 20% required reoperation.

Conclusion: Recurrent lumbar disc herniation remains a significant clinical entity, with modifiable risk factors such as smoking and vitamin D deficiency playing key roles. Laminotomy with discectomy may be preferable in reducing recurrence risk. Long-term follow-up and preventive strategies are essential to improve surgical outcomes.

Keywords*: Lumbar spine; Recurrent disc herniation; Discectomy; Risk factors; Vitamin D.*

INTRODUCTION

Lumbar disc herniation causing low back pain has many direct and indirect effects on an individual in terms of loss of productive life requiring health care intervention and adding economic burden to the family. [1]

Herniated lumbar disc is the most common specific cause of low back pain. [2]

The term disc herniation refers to the process where the annular fibres surrounding the nucleus pulposus are ruptured and there is subsequent displacement of the central mass of the disc in the intervertebral space. [3]

Surgical management of lumbar disc herniation has been practised since 1934, once Mixter and Barr discovered the link between sciatica and herniated lumbar disc [4]. A limited laminotomy followed by discectomy remains the most common approach [5]. There are many challenges of a spine surgeon after lumbar discectomy and among them re-herniation is a common challenge.

Recurrent lumbar disc herniation is defined as disc herniation at a previously operated disc level, regardless of ipsilateral or contralateral herniation, in a patient who experienced pain-free interval of at least 6 months after surgery [6].

For years surgeons have been trying to find new ways to treat lumbar disc herniation. Re-herniation after discectomy has been an emerging topic as it causes high loss of capital and poor outcome for the patient [7].

Surgeons have attempted aggressive discectomies in order to prevent re-herniation. However, it has been associated with more postoperative back pain and degeneration [8]. Minimal disc removal on the other hand or sequestrectomy of the disc has also been tried, which, on follow up, is seen to have greater re-herniation rates [9].

In our study we have tried to find the recurrence rates of lumbar disc herniation in patients who have undergone primary lumbar discectomy, and attempted to determine the factors responsible for the same.

MATERIALS AND METHODS

This retrospective study was performed on a sample size of 100 cases. Patients presenting with lumbar disc herniation, after a pain-free post operative period of at least 6 months, were included in our study. Cases were excluded because of (1) Presence of symptoms of lumbar radiculopathy within 6 months. (2) Past history of more than two lumbar disc surgeries. (3) Evidence of post-operative nerve root fibrosis on MRI.

Detailed history was taken of all the patients included in the study, with special focus on the onset of the symptoms, time of surgery and the symptom free interval. Comorbidities were recorded. Personal history regarding smoking, strenuous activity or sedentary lifestyle was also taken. Exact location of the pain, if the pain is axial or axial with pain radiating to the lower limbs. History of red flag signs like bowel and bladder problems was also taken.

A thorough general examination was done in all patients. In examination of musculoskeletal system, we palpated the paravertebral muscles to look for tenderness and spasm. Gait was also examined to look for antalgic and waddling gait.

Straight leg raising test or Lasègue's sign was done. In examination of the motor system, the power of hip muscles, quadriceps, hamstrings, EHL (extensor hallucis longus), soleus was examined along with the power of foot inversion and eversion. Deep tendon reflexes of the lower limb were examined. Sensory examination of the lower limb in dermatomal fashion was done. Patrick's test or FABER test was performed to evaluate pathology of the hip joint or the sacroiliac joint.

Routine blood investigations were performed; ESR (Erythrocyte Sedimentation Rate), CRP (C-reactive protein), RBS (random blood sugar) & serum vitamin D3 levels were checked. Magnetic Resonance Imaging was done for all patients. The treatment was tailored according to the requirements of the patient.

The treatment plan was divided into conservative management, which used pharmacological agents and exercise therapy, and interventions including epidural steroid injections (Figure 1) and revision surgery.

Fig. 1: Patient with recurrent disc protrusion managed conservatively with epidural steroid injection.

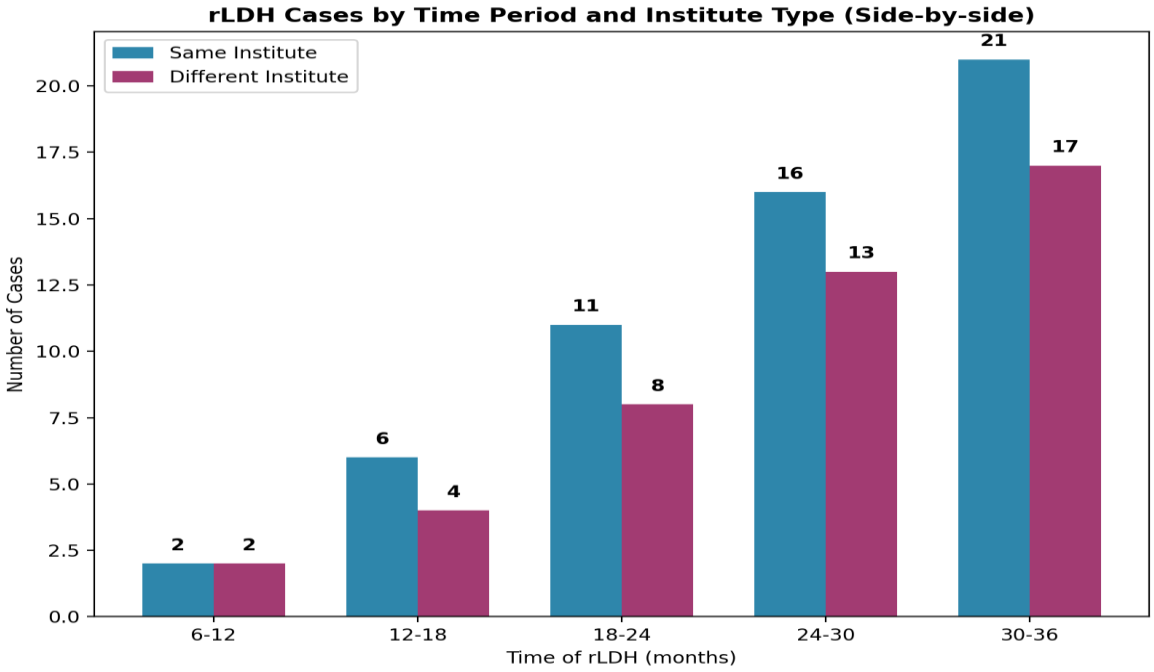
RESULTS

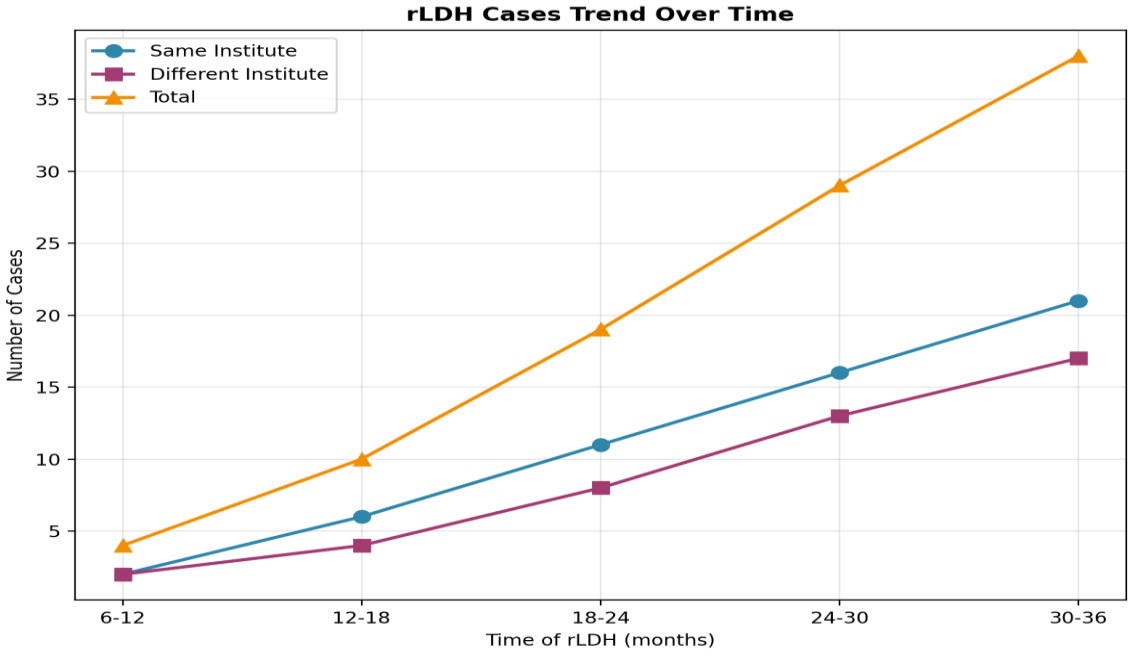
Of the total patients in our study, 44 were male and 56 females, of which, maximum number of cases were found in the age group of 40-49 years (31%) and second highest from the 30-39years (25%) age group.

Time of rLDH (in months)	1st surgery done in same institute	1st surgery done at a different institute	Total
6-12	2	2	4
12-18	6	4	10
18-24	11	8	19
24-30	16	13	29
30-36	21	17	38
Total	56	44	100

In the study, it was noted that most of the cases of recurrent lumbar disc herniation increased as the duration of follow up increased. 67% of the cases had occurred after a period of 2 years. In our study, it is observed that the rLDH steadily increased with time after surgery irrespective of venue of surgery. (Table 1)

Table 1: Distribution of recurrent lumbar disc herniation (rLDH) based on time interval since the first surgery and the location where the primary surgery was performed. Data are presented as the number of patients.





In our study all cases had recurrent lumbar disc herniation at the same level of the primary surgery (Figure 2). But few cases had disc herniation at additional level along with the primary level of disc herniation (Figure 3).

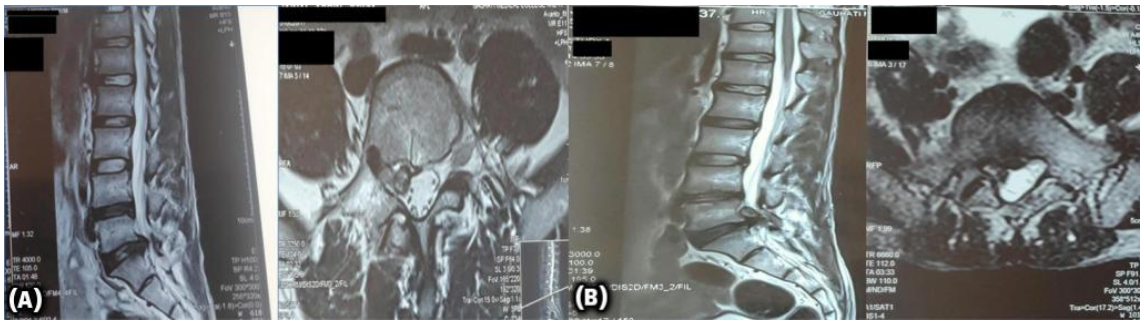


Fig. 2. (A) Magnetic Resonance Imaging (MRI) film prior to the first surgery, showing extrusion of the intervertebral disc at the L5-S1 level. (B) Follow-up MRI film at 18 months, showing recurrent extrusion of the intervertebral disc at the same level (L5-S1).

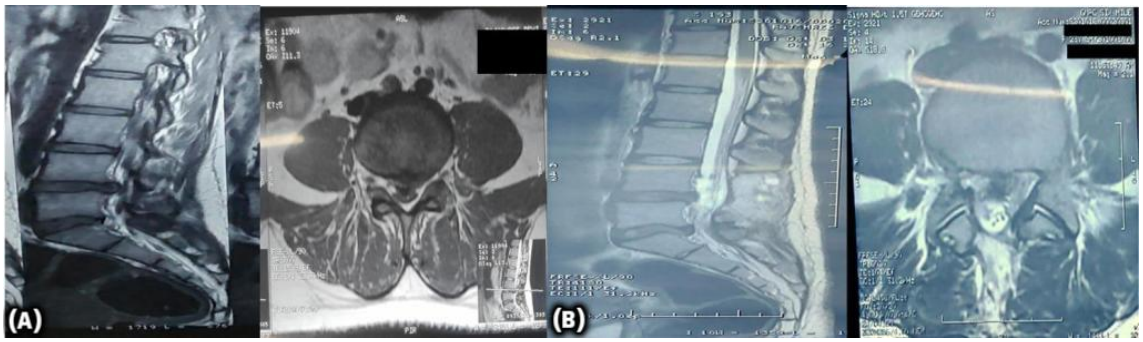
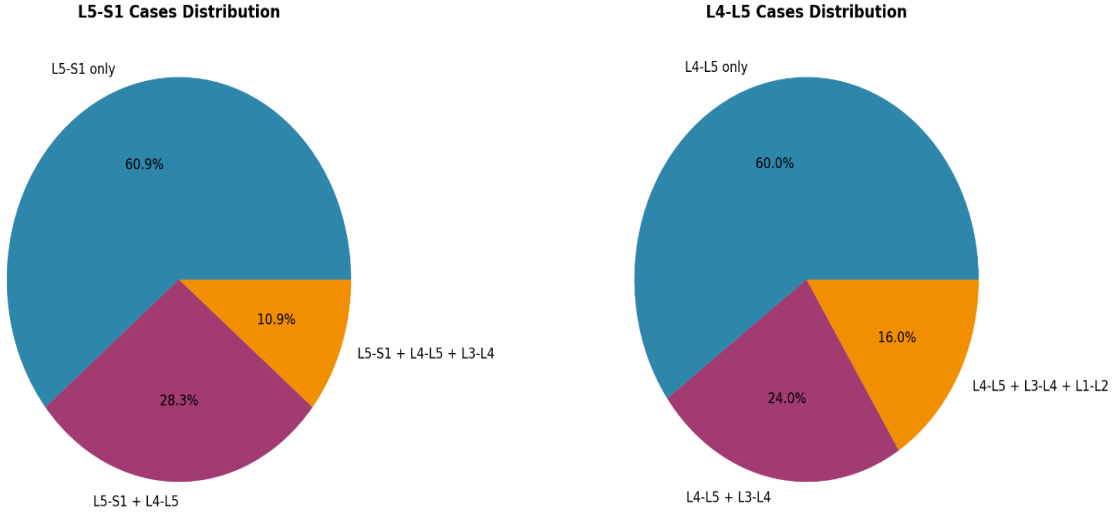


Fig. 3. (A) MRI film prior to the first surgery, showing extrusion of the disc at the L4-L5 level. (B) Follow-up MRI film at 24 months, showing recurrent extrusion of the intervertebral disc at the L4-L5 level and additional extrusion at the L5-S1 level.

Of the 46 cases of L5-S1 recurrent disc herniation 28 had single level disc herniation on L5-S1 but 18 patients had herniation at other level also. Out of them 13 were having L4-L5 along with L5-S1 and 5 had L4-L5 &L3-L4 level.



Similarly, 50 patients had recurrent disc herniation at L4-L5 level. Out of them, 30 had herniation of the disc at L4-L5 level only. 12 cases had herniation at L3-L4 and L4-L5 levels while 8 cases had herniation at L3-L4, L4-L5 and L1-L2 levels.

The most common level of recurrent disc herniation was L4-L5.
In our study 56 cases were from inside our hospital, rest 44 cases were done at other institutes. Of them 54 cases had a Laminectomy with discectomy, 31 had hemi-laminectomy with discectomy while 15 cases had laminotomy with discectomy.

In our study, 48 patients had been an active smoker or had smoked cigarettes or bidis previously in life time. Of the 48 patients 34 were males and 14 were females.
In our study, 58% of patients were found to have abnormal Vitamin D levels. 27 had insufficient levels and 31 were deficient in Vitamin D. When we compared within the young generation, we found that those with sedentary life had abnormal Vitamin D levels. Vitamin D deficiency was more common in women than in men.
Of the total 100 cases of rLDH, 71 were managed conservatively with oral analgesics, 9 underwent Transforaminal epidural steroid injection and 20 underwent a second surgery

DISCUSSION

In our study, we analyzed recurrence rates in six-month intervals. We concluded that most of the cases of recurrent herniation were found between 30-36 month interval (n=38).

We could see that number of recurrent cases increases with duration of follow up.

Morgan-Hough CV et al in their study also found that the number patients with recurrence increases after a period of 2 years [10].

Kamarul Ahsan et al, in his study of 398 cases, which were followed up for 42 months, found that 18 cases had recurrence. He found that maximum cases had recurrence in the period of 3-24 month follow up. However, the number of cases decreased after 24 months [11].

In our study, we have found a male: female ratio of 0.8:1. Based on the statistical analysis, this was not significant.
Morgan-Hough CV et al in his study also found that male gender is not a risk factor for recurrent lumbar disc herniation [10].

Similarly, Kamarul Ahsan et al found that of the 398 patients who underwent primary discectomy, 296 were male (73%), and during the follow up period 14 of the 18 cases of recurrent lumbar disc herniation were male. They also concluded that male gender was also not a risk factor for recurrent lumbar disc herniation [11].

Moliterno JA et al in his study found that of the 14 patients who developed recurrence 9 were males and 5 were females. These findings were not statistically significant [12].

Shimia M et al [13], Moliterno JA et al [12], Kim KT et al [14], Kim JM et al [15], did not find any significance between age distribution and the recurrence rate of rLDH. Jansson K et al in his study stated that when he compared the patients younger than 40 years of age & those between 40-59 years of age, risk of reoperation for recurrent lumbar disc herniation increased. However, this risk gradually decreased among patients more than 60 years [16].

With our current study, we can say that patients younger than 50 years are more likely to have a recurrent disc herniation.

Ahsan Ket al in his study found the number of recurrences at L5-S1 is 131 (33%), L4-L5 is 248 (62%) &n L3-L4 is 15 (4%) only [17]. Similarly, Acharya KN et al reported reherniation in the L4-L5 disc as 183 (70.7%), L5-S1 disc in 65 (25%) and L3-4 disc in 11 (4.2%) [18].

This phenomenon is more common at the L4-5 level, perhaps because of its increased mobility relative to other spinal motion segments.

In comparison to same level recurrent herniation and different recurrent level herniation of the disc, studies have found that same level herniation is more common than herniation at different levels.

Herron L et al in his study concluded that 9 patients had recurrence at different level and 23 patients had recurrence at the same level of surgery [19]. Similar findings were also concluded by Davis RA; 50% (n=30) of the patient had recurrence at the same level and 27% (n=16) had recurrence in different level [20].

In our study, the finding matches with the mentioned studies.
Using statistical analysis between mode of surgery and recurrent cases, we have found that when compared between laminectomy and laminotomy the difference in the outcome is statistically significant (p=0.04). This suggests that laminotomy & discectomy (in compared to laminectomy & discectomy) is better in preventing recurrent lumbar disc herniation.

However, studies have shown that in the long term follow up there is actually no difference in the outcome.

Dohrmann GJ et al in his cumulative study of research journals over the past 8 decades, which included over 39000 patients, concluded that there was no difference in the long-term follow-up in any of the operative groups, including the use of a lumbar disc prosthesis [21].

Nishant Goda et al in their comparative study between types of surgery (micro lumbar disectomy, endoscopic lumbar disectomy and laminectomy), found that microlumbar discectomy and microendoscopic discectomy have a better short-term outcome as compared to laminectomy discectomy. However, long-term results are comparable [22].
Data analysis shows that there is positive and fairly strong correlation between smoking and recurrent disc herniation (Pearson correlation coefficient R2 = 0.75).

Andersen SB et al in their study concluded a significantly higher prevalence of smokers in the rLDH group (33%vs 52%; $P < .001$). Binary logistic regression showed that, after controlling for all other factors, smoking is an independent risk factor of symptomatic rLDH [23].

Shimia M et al found that smoking habit was significantly higher in patients with recurrent LDH [13].

With statistical analysis we found that vitamin D deficiency &rLDH is very significantly higher ($p < 0.05$) than in patients with normal level of vitamin D and recurrent lumbar disc herniation.

Çalık, Yalkın et al in their study has mentioned that there is an increase in discogenic pain and hypersensitivity of neurons to pain in patients with vit-D deficiency [24].

CONCLUSION

Our study demonstrates that recurrent lumbar disc herniation (rLDH) occurs most frequently at the L4-L5 level, with the majority of cases presenting after two years of follow-up. Smoking and Vitamin D deficiency were significant risk factors. Among surgical techniques, laminotomy with discectomy appeared to reduce recurrence rates compared to laminectomy with discectomy. Larger prospective studies with longer follow-up are required to validate these findings.

REFERENCES

1. Maniadakis N, Gray A. The economic burden of back pain in the UK. Pain 2000;84:95-103.
2. Hansson E, Hansson T. The cost-utility of lumbar disc herniation surgery. Eur Spine J 2007;16:329-37.
3. Schoenfeld AJ, Weiner BK. Treatment of lumbar disc herniation: Evidence-based practice. Int J Gen Med 2010;3:209-14.
4. Mixter WJ, Barr JS. Rupture of the intervertebral disc with involvement of the spinal canal. N Engl J Med 1934;211:210–5.
5. Connolly J, McCormack F, Bolger C. Incidence of low back pain after lumbar discectomy for herniated disc. Clin OrthopRelat Res 2015;473:1988–99.
6. Kim CH, Chung CK, Jahng TA, et al. Surgical results and risk factors for recurrence of lumbar disc herniation. Korean J Spine 2012;9(3):170–5.
7. Parker SL, Grahovac G, Vukas D, Ledic D, Vilendecic M, McGirt MJ. Cost savings associated with prevention of recurrent lumbar disc herniation with a novel annular closure device: a multicenter prospective cohort study. J NeurolSurgA Cent EurNeurosurg2013;74:285–9.
8. McGirt MJ, Ambrossi GL, Datoo G, Sciubba DM, Witham TF, Wolinsky JP, et al. Recurrent disc herniation and long-term back pain after primary lumbar discectomy: review of outcomes reported for limited versus aggressive disc removal. Neurosurgery 2009;64:338-45.
9. Martens, Frederic MD; Vajkoczy, Peter MD; Jadik, Senol MD; Hegewald, Aldemar MD; Stieber, Jonathan MD; Hes, Robert MD; . Patients at the Highest Risk for Reherniation Following Lumbar Discectomy in a Multicenter Randomized Controlled Trial. JBJS Open Access 3(2):p e0037, June 28, 2018. | DOI: 10.2106/JBJS.OA.17.00037
10. Morgan-Hough CV, Jones PW, Eisenstein SM. Primary and revision lumbar discectomy: a 16-year review from one centre. J Bone Joint Surg Br 2003;85(6):871–4.
11. Kamarul Ahsan M, et al. Lumbar revision microdiscectomy in patients with recurrent lumbar disc herniation: a single-center prospective series. SurgNeurol Int. 2020;11:404.
12. Moliterno JA, Knopman J, Parikh K, et al. Results and risk factors for recurrence following single-level tubular lumbar microdiscectomy: clinical article. J Neurosurg Spine 2010;12: 680–6.
13. Shimia M, Babaei-Ghazani A, Sadat BE, et al. Risk factors of recurrent lumbar disk herniation. Asian J Neurosurg. 2013;8:93–6.
14. Kim KT, Park SW, Kim YB. Disc height and segmental motion as risk factors for recurrent lumbar disc herniation. Spine (Phila Pa 1976). 2009;34(24):2674–8.
15. Kim KT, Lee DH, Cho DC, et al. Preoperative risk factors for recurrent lumbar disc herniation in L5-S1. J Spinal Disord Tech. 2014;28:E571–7.
16. Jansson KA, Nemeth G, Granath F, et al. Surgery for herniation of a lumbar disc in Sweden between 1987 and 1999: an analysis of 27,576 operations. J Bone Joint Surg Br. 2004;86:841–7.

17. Kamarul Ahsan et al. Discectomy for primary and recurrent proplapse of lumbar intervertebral disc. J OrthopSurg (Hong Kong) 2012;20(1);7-10.
18. Acharya KN, Nathan TS, Kumar JR, Menon KV. Primary and revision lumbar discectomy : A three – years review from one center. Indian J Orthop 2008 Apr Jun;42(2);178-81.
19. Herron L. Recurrent lumbar disc herniation: results of repeat laminectomy and discectomy. J Spinal Disord1994;7:161- 6.
20. Davis RA. A long-term outcome analysis of 984 surgically treated herniated lumbar discs. J Neurosurg1994;80:415-21.
21. Dohrmann GJ, Mansour N. Long-term results of various operations for lumbar disc herniation: Analysis of over 39,000 patients. Med Princ Pract2015;24:285 90.
22. Goda N, Ranjan A, Singh A. Evaluation of the outcome of Lumbar disc surgeries: Laminectomy Discectomy, MicrolumbarDiscecetomy and Microendoscopy. Int J Sci Stud 2019;6:213-9.
23. Andersen SB, Smith EC, Støttrup C, Carreon LY, Andersen MO. Smoking Is an Independent Risk Factor of Reoperation Due to Recurrent Lumbar Disc Herniation. Global Spine J 2018;8:378-81.
24. Çalık Y, Aygün Ü. Evaluation of vitamin D levels in patients with chronic low back-leg pain. Acta OrthopTraumatol Turc2017;51:243–7.