Original Article

An assessment of the variation in the practice of lumbar discectomy and its role in axial back pain

ABSTRACT

Background: Lumbar discectomy is performed for symptomatic lumbar disc herniation and is one of the most widely performed spinal surgical procedures worldwide in a variety of ways. This survey aimed at providing an overview/perspective of different practice patterns and the impact of lumbar discectomy on axial back pain with or without sciatica.

Methods: An online survey was performed using the application "Google Forms." The link to the questionnaire was distributed to neurosurgeons through personal E-mail and social media platforms.

Results: We received 333 responses. The largest percentage of responses across five continents was from Asia (66.97%, $n = 223$). The mean age of the respondents was 40.08 ± 10.5 years. A total of 66 respondents (20%) had a spine practice of 7%–90%, and 28 respondents had a spine practice of 90%–100% (8.4%). The number of respondents who practiced microscopic discectomy using a tubular retractor ($n = 143$ respondents, 42.9%) was nearly equal to the number of respondents who practiced open discectomy ($n = 142$ respondents, 42.6%). An almost equal proportion of respondents believed discectomy does not help in relieving axial back pain. Only 20.4% ($n = 68$) of respondents recommend bed rest for a longer duration postoperatively.

Conclusions: Our survey revealed that only 22.2% of spine surgeons recommended discectomy in patients with radiological disc herniation with axial back pain alone and preferred a minimally invasive method of discectomy. Almost half of them believed discectomy to be ineffective for axial low back pain and only a few recommended prolonged bed rest postoperatively.

Keywords: Back pain, discectomy, herniation, lumbar, survey

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Submitted: 04-May-23 **Accepted:** 28-Jul-23
Published: 18-Sep-23

INTRODUCTION

Lumbar discectomy is performed for symptomatic lumbar disc herniation and is one of the most widely performed spinal surgical procedures worldwide. Like all other surgical procedures, lumbar discectomy has evolved over time with various technological advancements in medicine. Currently, the various types of discectomies commonly performed by surgeons include open discectomy, microdiscectomy,

Access this article online	
	Quick Response Code
Website: www.jcvjs.com	
DOI: 10.4103/jcvjs.jcvjs_46_23	

How to cite this article: Mishra S, Garg K, Chaurasia B, Budihal BR, Deora H, Tandon V, *et al.* An assessment of the variation in the practice of lumbar discectomy and its role in axial back pain. J Craniovert Jun Spine 2023;14:259-67.

minimally invasive discectomy, and endoscopic discectomy. Microdiscectomy is considered the standard surgical technique for lumbar disc herniation. Microdiscectomy refers to the standard hemilaminotomy, medial facetectomy, and discectomy enhanced by the coaxial illumination and magnification of the operating microscope using a small incision. Minimally invasive discectomy techniques such as microtubular discectomy (MTD), microendoscopic discectomy (MED), percutaneous laser disk decompression, and percutaneous endoscopic lumbar discectomy (PELD) are thought to decrease tissue trauma, blood loss, subsequent hospital stay and early resumption of work.[1,2] The clinical outcomes may vary among the different techniques and depend primarily on the surgeon's experience and the surgical learning curve.[3]

Lumbar disc herniation most commonly presents with radiculopathy. However, many patients have associated axial low back pain (LBP) as well. Some individuals with axial back pain may experience pain in the buttocks; however, the pain does not travel below the gluteal folds in comparison to radicular pain. Lumbar discectomy is believed to be beneficial in relieving radicular pain and is believed to have a minimal impact on axial back pain.[4-8] Lumbar fusion has arguably been recommended in the past for patients with back pain.[9,10] However, some recent studies have suggested that lumbar decompression might positively impact axial back pain as well.[11] We assessed the type of lumbar discectomy practiced by spinal surgeons and studied the general trends. This study aimed to understand the views and practices of spine surgeons worldwide about the impact of lumbar discectomy on axial back pain *per se*.

METHODS

Study design

Institutional review board was not necessary for this study at our institution. An online survey was performed using the application "Google Forms." The link to the questionnaire was distributed to neurosurgeons through personal E-mail and social media platforms such as WhatsApp. The survey was published on October 22, 2021. Repeated reminders were sent multiple times over the next 2 months to get responses. The form was kept anonymous, so that the respondents' names, E-mail addresses, and affiliations were not collected, so that the participants could freely express their opinions, minimizing compilation bias. The survey was circulated to around 1200 neurosurgeons [response rate using personalized E-mails or WhatsApp messages by one of the authors (BC)]. The contact details of the neurosurgeons who were sent the link were taken from neurosurgery cocktail.

Questionnaire content

Basic demographic details such as country of residence, city of work, age, years of experience as a certified surgeon, and the type of setup they worked in private or public hospitals/institutes were asked primarily. The questionnaire also included the expertise of the respondents in spinal surgeries, the proportion of spinal surgeries in their practice, and the type of lumbar discectomy commonly practiced. The focus of the survey was to assess the opinion of the respondents on the role of discectomy in relieving axial back pain. Supplementary sheet 1 depicts all the questions that were a part of the survey.

Questionnaire validation

Four independent neurosurgeons working at other centers, not involved in the study design, performed a face validation and content validation of the survey questionnaire. The validating neurosurgeons rated the relevance of each question individually on a scale of 1–4. Using the validation feedback, we calculated the item content validity index and Scale-level content validity index Avg, both of which met a satisfactory value of 1.[12] Furthermore, any other feedback related to the questionnaire was taken, and necessary changes were made.

Statistical analysis

The statistical analysis of the data was performed using R language (R Foundation for Statistical Computing, Vienna, Austria).[9] Nonparametric data are expressed as percentages (numbers) and analyzed using the Chi-square test, wherever relevant. ANOVA was used to analyze the parametric data, wherever relevant. A $P < 0.05$ was considered statistically significant.

RESULTS

Demography of the respondents

We received 333 responses with a response rate of 27.8% (333 out of 1200). The largest percentage of responses across five continents were from Asia (66.97%, $n = 223$) [Figure 1], and Turkey as a country (29.43%, $n = 98$). Based on the human development index (HDI) class, the distribution of respondents was very high HDI countries (50.15%, $n = 167$); medium HDI countries (28.83%, $n = 96$); high HDI countries (19.82, $n = 66$); and low HDI countries (1.2%, $n = 4$).

The mean age of respondents was 40.08 ± 10.5 years. The average age of the respondents whose spinal surgeries practice constituted 90%–100% of all their practice (48.8 ± 10 years) was higher than the other groups ($P = 0.014$). Similarly, the mean age of the respondents who were practicing in the private sector nonteaching hospitals (48.1 ± 10.6 years) was more as compared to other groups ($P < 0.0001$).

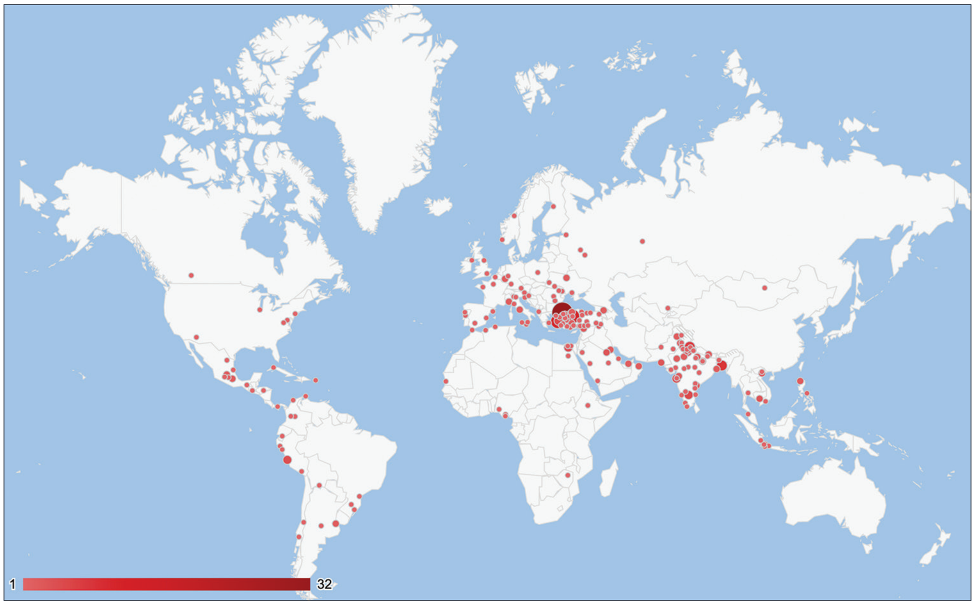

Figure 1: A map chart showing the continent-wise distribution of the respondents

Most respondents worked in academic teaching hospitals (33.93%, $n = 113$); followed by private nonteaching hospitals (24.32%, $n = 81$), public teaching hospitals (20.72%, 69%), and public nonteaching hospitals (9.91%, $n = 37$). The percentage of respondents having multiple affiliations was 11.11% ($n = 37$).

The respondents were divided into five groups based on their experience in neurosurgery [Figure 2]. The majority (26.73%, $n = 89$) of respondents had 11–20 years of experience postresidency, who mostly practiced in Asia (29.15%, $n = 65$) and Europe (28%, 14), followed by those having 0–5 years of experience [Table 1].

Neurosurgeons were the highest (68.17%, $n = 227$) among the survey respondents and practiced predominantly in Asia (70.48%, $n = 160$). Neurosurgeons specialized in spine surgery comprised 14.41% ($n = 48$) of the respondents [Table 1].

Continent-wise distribution

The maximum number of responses from Africa came from academic teaching hospitals (72.2%), whereas in Europe came from public sector teaching hospitals (31.91%) [Table 1]. Surgeons in private nonteaching hospitals (35%) responded the most in North America, while surgeons with multiple affiliations responded the most in South America. The difference in the setup was statistically significant among the different continents but no statistically significant difference in the mean age and experience of the respondents from different continents. Table 1 shows the continent-wise distribution of the various variables studied.

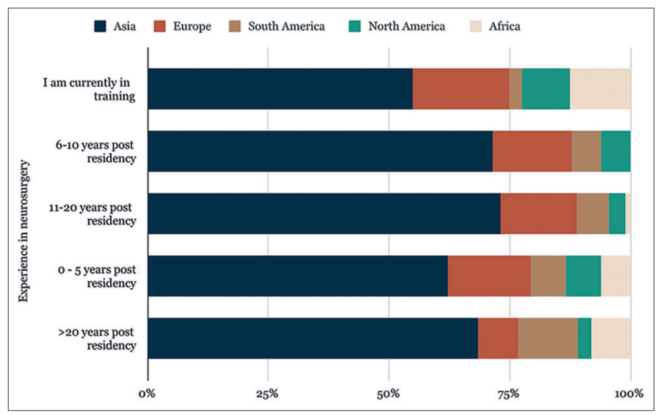

Figure 2: A bar diagram showing the percentage of respondents' experience in neurosurgery

Most of the respondents had a neurosurgical background ($n = 310$, 93.1%) including neurosurgeons ($n = 227$, 68.17%) followed by neurosurgeons specialized in spine surgery ($n = 48$, 14.4%) and neurosurgery residents ($n = 35$, 10.5%). The majority of respondents were neurosurgeons, neurosurgeons specialized in spine surgery and residents belonged to South America (75%), North America (25%), and Africa, respectively [Table 1]. The difference in the specialty was found to be statistically significant among the different continents.

Spine practice

A total of 65 respondents (20%) had spine practice as 75%–90% of their total practice, and 28 respondents had spine practice as 90%–100% (8.4%) [Figure 3]. The proportion of respondents who practiced spine surgery was 90%–100% and 75% of their overall practice had more than 20 years' and 11–20 years'

Table 1: Continent-wise variation in years of experience, surgical specialties, set up and types of discectomies practiced by the respondents

	Africa (*n*=18)	Asia (*n*=224)	Europe (*n*=47)	North America (*n*=20)	South America (*n*=24)	Total (*n*=333)	*P*
Years of experience							
I am currently in training	5 (27.78)	22 (9.82)	8 (17.02)	4 (20.00)	1 (4.17)	40 (12.01)	0.0946
0–5 years after finishing residency training	6 (33.33)	51 (22.77)	12 (25.53)	7 (35.00)	6 (25.00)	82 (24.62)	
6–10 years after finishing residency training	0	36 (16.07)	7 (14.89)	3 (15.00)	3 (12.50)	49 (14.71)	
11–20 years after finishing residency training	1 (5.56)	65 (29.15)	14 (28)	4 (20.00)	5 (20.83)	89 (26.73)	
>20 years after finishing residency training	6 (33.33)	50 (22.32)	6 (12.77)	2 (10.00)	9 (37.50)	73 (21.92)	
Surgical specialties of respondents							
Neurosurgeons	9 (50.00)	162 (72.32)	27 (57.45)	11 (55.00)	18 (75.00)	227 (68.17)	0.0160
Neurosurgeons specialized in spine	1 (5.56)	29 (12.95)	8 (17.02)	5 (25.00)	5 (20.83)	48 (14.41)	
Neurosurgery resident	5 (27.78)	19 (8.48)	8 (17.02)	3 (15.00)	0	35 (10.51)	
Orthopedic surgeon	1 (5.56)	4 (1.79)	0	0	0	5 (1.5)	
Orthopedic surgeon specialized in spine	2 (11.11)	6 (2.68)	2 (4.26)	1 (5.00)	0	11 (3.3)	
Other	0	4 (1.79)	2 (4.26)	0	0	6 (1.8)	
Specialized spine surgeon practicing only spine surgery	0	0	0	0	1 (4.17)	1 (0.3)	
Setup							
Academic teaching hospital	13 (72.22)	73 (32.59)	18 (38.30)	7 (35.00)	2 (8.33)	113 (33.93)	<0.0001
Multiple affiliations	1 (5.56)	23 (10.27)	2 (4.26)	1 (5.00)	10 (41.67)	37 (11.11)	
Public nonteaching hospital	1 (5.56)	25 (11.16)	6 (12.77)	0	1 (4.17)	33 (9.91)	
Public teaching hospital	3 (16.67)	41 (18.30)	15 (31.91)	5 (25.00)	5 (20.83)	69 (20.72)	
Private nonteaching hospital	0	62 (27.68)	6 (12.77)	7 (35.00)	6 (25.00)	81 (24.32)	
Types of discectomies practiced							
Endoscopic discectomy	1 (5.56)	13 (5.80)	2 (4.26)	1 (5.00)	2 (8.33)	19 (5.71)	0.0002
Miscellaneous	3 (16.67)	13 (5.80)	3 (6.38)	7 (35.00)	3 (12.50)	29 (8.71)	
Open discectomy	14 (77.78)	92 (41.07)	20 (42.55)	5 (25.00)	11 (45.83)	142 (42.64)	
Microscopic discectomy using tubular retractor	0	106 (47.32)	22 (46.81)	7 (35.00)	8 (33.33)	143 (42.94)	

experience after their residency. The majority of respondents who were doing more than 75% of spinal cases out of their overall practice were working in public nonteaching hospitals (45.45%) followed by respondents with multiple affiliations (35.14%).

Type of lumbar discectomy

The number of respondents who practiced microscopic discectomy using a tubular retractor (42.9%, $n = 143$) and those who practiced open discectomy (42.6%, $n = 142$) was nearly equal [Figure 4]. Open discectomy was the most common type of discectomy practiced in Africa (77.8%) and South America (45.8%). Microscopic discectomy using tubular retractors was the most common mode of practice in Asia (47.3%) and Europe (46.8%). Endoscopic discectomy was practiced by only 5.7% ($n = 19$) of the respondents in our survey. The difference in the type of discectomy practiced among the different continents was statistically significant [$P < 0.01$, Table 1]. The mean age of the respondents who practiced endoscopic discectomy was less than the other groups ($P = 0.044$).

The proportion of respondents doing endoscopic discectomy and microscopic discectomy was maximum among those working in private nonteaching hospitals (8.6%) and public nonteaching hospitals (60.4%), respectively [Table 2]. Open discectomy was most practiced by the respondents in academic practice (50%).

Microscopic discectomy using tubular retractors was the most common mode of discectomy for respondents with more than 20 years (50.68%) and 11–20 years (58.43%) experience postresidency. Open discectomy was the most common method of discectomy practiced by the respondents with 0–5 years (46.3%) and 6–10 years of experience (44.9%). These differences were statistically significant [$P = 0.0003$, Table 2].

Neurosurgeons specialized in spine surgery would most likely (62.5%) do microscopic discectomy using tubular retractors as compared to other groups ($P < 0.0001$). The proportion of the respondents practicing endoscopic discectomy or microscopic discectomy using tubular retractors increased as the proportion of spine cases increased out of their practice [$P = 0.017$, Table 2].

When asked about their preferred method of discectomy in the future, 176 (52.9%) respondents chose endoscopic discectomy while 104 (31.2%) preferred microscopic

Table 2: Variation of respondent's setup, practice patterns and future preference with types of discectomies

	Endoscopic discectomy	Microscopic discectomy using tubular retractor	Miscellaneous	Open discectomy	*P*
Setup					
Academic teaching hospital (*n*=113)	6 (5.31)	50 (44.25)	6 (5.31)	51 (45.13)	0.0055
Multiple affiliations (*n*=37)	3 (8.11)	12 (32.43)	8 (21.62)	14 (37.84)	
Private nonteaching hospital (*n*=81)	7 (8.64)	40 (49.38)	9 (11.11)	25 (30.86)	
Public nonteaching hospital (*n*=33)	0	20 (60.61)	1 (3.03)	12 (36.36)	
Public teaching hospital (*n*=69)	3 (4.35)	21 (30.43)	5 (7.25)	40 (57.97)	
Total (*n*=333)	19 (5.71)	143 (42.94)	29 (8.71)	142 (42.64)	
Percentage of spine practice					
<25% (*n*=49)	1 (2.04)	15 (30.61)	4 (8.16)	29 (59.18)	0.0172
25%–50% (*n*=104)	8 (7.69)	34 (32.69)	10 (9.62)	52 (50.00)	
50%–75% (*n*=87)	5 (5.75)	39 (44.83)	7 (8.05)	36 (41.38)	
75%–90% (*n*=65)	2 (3.08)	40 (61.54)	5 (7.69)	18 (27.69)	
90%–100% (*n*=28)	3 (10.71)	15 (53.57)	3 (10.71)	7 (25.00)	
Total (*n*=333)	19 (5.71)	143 (42.94)	29 (8.71)	142 (42.64)	
Respondents would practice in future according to experience					
>20 years after finishing residency training (*n*=73)	31 (42.47)	29 (39.73)	6 (8.22)	7 (9.59)	0.2146
11–20 years after finishing residency training (*n*=89)	43 (48.31)	34 (38.20)	8 (8.99)	4 (4.49)	
6–10 years after finishing residency training (*n*=49)	26 (53.06)	14 (28.57)	5 (10.20)	4 (8.16)	
0–5 years after finishing residency training (*n*=82)	52 (63.41)	15 (18.29)	9 (10.98)	6 (7.32)	
Currently in training (*n*=40)	24 (60.00)	12 (30.00)	1 (2.50)	3 (7.50)	
Total (*n*=333)	176 (52.85)	104 (31.23)	29 (8.71)	24 (7.21)	

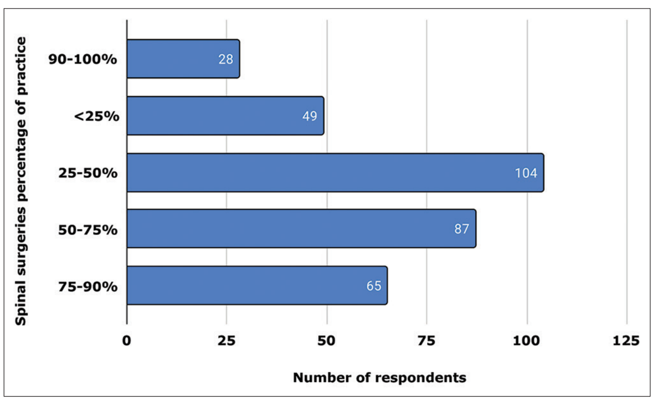

Figure 3: A bar diagram showing the number of respondents with their spine surgery practice measured in percentage

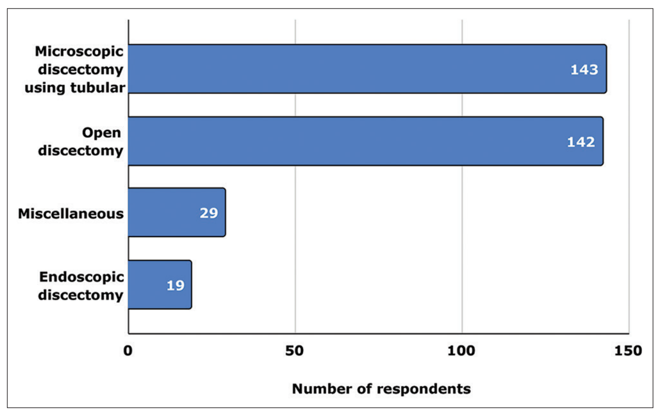

Figure 4: A bar diagram showing the number of respondents with their preferred method of discectomy

discectomy using tubular retractors. The continent-based differences were not significant for this comparison. Respondents with orthopedic backgrounds were more likely (>60%) to think that endoscopic discectomy is the future as compared to those with neurosurgical backgrounds, though the difference was not statistically significant.

Regarding the most common discectomy technique the respondents would practice in the future, respondents from all the experience groups credited endoscopic discectomy ($P = 0.0003$). However, this varied from 42% among respondents with more than 20 years of experience to 63.4% among respondents with 0–5 years of experience [Table 2].

Role of discectomy in axial back pain

About 48.6% ($n = 162$) of respondents believed that discectomy might help in relieving back pain. About 35.6% of respondents with more than 20 years of experience thought that discectomy helps in relieving back pain while nearly half of the respondents in the other experience groups thought the same [$P = 0.0148$, Table 3]. However, only 22.2% ($n = 74$) of the respondents recommended discectomy in patients with radiological disc herniation with axial back pain alone. Differences based on the continent or respondents' experience were not statistically significant. Only 8.8% ($n = 29$) of the respondents thought that spinal fusion is necessary to relieve axial back pain in patients with disc herniation and most of them worked in public teaching hospitals.

Table 3: Variation of respondent's practice patterns according to experience

	>20 years after finishing residency training (*n*=73)	11–20 years after finishing residency training (*n*=89)	6–10 years after finishing residency training (*n*=82)	0–5 years after finishing residency training (*n*=40)	I am currently in training (*n*=333)	Total	*P*
Spine practice							
<25%	10 (13.70)	11 (12.36)	6 (12.24)	14 (17.07)	8 (20.00)	49 (14.71)	0.0021
25%–50%	24 (32.88)	22 (24.72)	11 (22.45)	26 (31.71)	21 (52.50)	104 (31.23)	
50%–75%	13 (17.81)	22 (24.72)	15 (30.61)	28 (34.15)	9 (22.50)	87 (26.13)	
75%–90%	15 (20.55)	24 (26.97)	15 (30.61)	10 (12.20)	1 (2.50)	65 (19.52)	
90%–100%	11 (15.07)	10 (11.24)	2 (4.08)	4 (4.88)	1 (2.50)	28 (8.41)	
Respondents believe discectomy relieves low back pain							
Yes	26 (35.62)	43 (48.31)	25 (51.02)	40 (48.78)	28 (70.00)	162	0.0148
No	47 (64.38)	46 (51.69)	24 (48.98)	42 (51.22)	12 (30.00)	171	
Respondents recommend discectomy for low back pain							
Yes	14 (19.18)	18 (20.22)	12 (24.49)	16 (19.51)	14 (35.00)	74	0.3009
No	59 (80.82)	71 (79.78)	37 (75.51)	66 (80.49)	26 (65.00)	262	
Respondents advise lumbar brace after discectomy							
Yes	31 (43.66)	18 (20.22)	23 (47.92)	27 (32.93)	17 (42.50)	116	0.0037
No	40 (56.34)	71 (79.78)	25 (52.08)	55 (67.07)	23 (57.50)	214	
Respondents recommend fusion for back pain							
Yes	5 (6.85)	8 (8.99)	4 (8.16)	6 (7.32)	6 (15.00)	29	0.6383
No	68 (93.15)	81 (91.01)	45 (91.84)	76 (92.68)	34 (85.00)	304	
Respondents advise bed rest after discectomy							
Yes	10 (13.89)	22 (25.00)	12 (24.49)	13 (15.85)	11 (27.50)	68	0.2160
No	62 (86.11)	66 (75.00)	37 (75.51)	69 (84.15)	29 (72.50)	265	

Practices after discectomy

A small but significant minority of 20.4% ($n = 68$) respondents expressed that they recommend bed rest for longer duration to patients who undergo discectomy for back pain compared to those who undergo it for lumbar radiculopathy. Differences based on the continent or respondents' experience differences were not statistically significant. About a third (34.8%, $n = 116$) of respondents routinely recommend a lumbar brace following discectomy while the majority (64.2%, $n = 214$) of responders refrained from such practices. Over 40% of respondents with 6–10 years' experience and more than 20 years' experience advised using a lumbar brace following discectomy compared to a lesser proportion of respondents in the other experience groups [$P = 0.0037$, Table 3].

Among the respondents who would recommend postoperative bed rest or lumbar brace were mainly from academic teaching hospitals followed closely by private nonteaching hospitals. The difference was, however, not statistically significant.

DISCUSSION

Lumbar discectomy is considered the standard procedure for patients with lumbar disc herniation. With technological advancements, several other less-invasive surgical techniques are now available. The different surgical options for lumbar disc herniation include open discectomy, microdiscectomy, MED, and PELD. The first open laminectomy and discectomy for lumbar disc herniation was performed by Mixter and Barr in 1934.[13] It was later refined to microdiscectomy after the introduction of the microscope in spine surgery by Yasargil and Casper in 1977.[14] In 1997, Foley and Smith described the first MED as a minimally invasive approach using advanced optics.[14] Discectomy for symptomatic lumbar disk herniation (LDH) is a frequently performed surgery by both neurosurgeons and orthopedic spine surgeons, with a considerable variation in the techniques of discectomies performed per surgeon. Due to the paucity of studies, the best surgical option for patients with lumbar disc herniation is still a subject of debate.[15] The first objective of this survey was to provide a global overview of spine surgeons' preferred surgical techniques of lumbar disc herniation and to highlight regional differences. The second aim of this survey was to assess the views and practices of spinal surgeons worldwide about the impact of lumbar discectomy on axial back pain. Few studies have attempted to study country-specific perceptions of spinal surgeons but, to the best of our knowledge, this is the first study of its kind which compares the types of lumbar discectomy done by spine surgeons and assesses their opinion regarding the role of discectomy on axial back pain.[3,16,17]

Our results showed a statistically significant difference in the choice of surgical technique based on the number of years in practice. Respondents with a longer practice duration chose microscopic discectomy using tubular retractors (MTD) over open discectomy. MTD was the commonest mode of lumbar discectomy for the respondents with more than 20 years (50.68%) and 11–20 years (58.43%) experience postresidency. Open discectomy was the commonest method of discectomy practiced by the respondents with 0–5 years (46.3%) and 6–10 years' experience (44.9%). This contrasts with the findings by Chen *et al*., who found no significant difference in the choice of surgical procedure based on clinical experience.[3] Microdiscectomy offers a better orientation of the surgical field in comparison to other minimally invasive discectomy procedures, especially for surgeons in the earlier parts of their careers, and has a smaller surgical learning curve.[18,19] Thus, once the surgeons gain experience, they shift to minimally invasive techniques like MTD. Endoscopic surgery is a relatively advanced technique; thus, proficiency development may need more time.

The present study also assessed the geographical variations in the procedures performed for LDH. The socio-cultural preferences and geographical location of surgeons impact their decision-making regarding the surgical management of LDH. Their region's availability of resources and practice cultures has been reported to influence the planning and surgical management of spinal pathologies.[20-22] In the present study, the proportion of respondents who worked in academic teaching hospitals was the maximum among the respondents from Africa (72.2%). In comparison, the proportion of respondents working in public sector teaching hospitals was the maximum among the respondents from Europe (31.91%). North America had the highest proportion of respondents from private nonteaching hospitals (35%), while the respondents from South America had the highest proportion of multiple affiliations. The surgical techniques or choices show considerable variation in different practice settings among different surgeons. This difference could be due to the involvement of financial incentives, accessibility to resources, and the cost-benefit ratio of services in the private sector.

In the present survey, most of the respondents were neurosurgeons ($n = 311$, 93.4%) followed by neurosurgeons specializing in spine surgery ($n = 43$, 12.9%) and orthopedic surgeons. The survey by Irwin *et al*., involving 22 orthopedics and 8 neurosurgeons, to evaluate the impact of age, specialty, and geographical location of the surgeon on their surgical decision-making, found statistically significant differences based on age and specialty of the surgeon.[23] Contrary to this study, Mroz *et al*., failed to demonstrate any significant differences between neurosurgeons and orthopedic surgeons in the management of LDH.[24]

Microdiscectomy is considered the reference surgical procedure for symptomatic LDH. Although tubular discectomy is thought to cause less tissue trauma and faster recovery, there is no clinically significant difference in the main clinical outcomes.[25] However, in their randomized control trial, Overdevest reported that 77% of patients allocated to open discectomy had complete or near-complete resolution of symptoms compared with 74% of patients allocated to tubular discectomy ($P = 0.79$). They also found the reoperation rate to be 18% in the tubular discectomy group and 13% in the open discectomy group ($P = 0.29$).[25] The number of respondents who practiced microscopic discectomy using a tubular retractor was nearly equal to the number of respondents who practiced open discectomy in this survey.

The second important part of this survey was assessing the respondents' views on the impact of lumbar discectomy on axial back pain. Ko and Kwon reported that most patients showed both statistical and clinical improvement in LBP following discectomy in the first 3 months postoperatively.[26] Hanley and Shapiro reported relief from LBP after discectomy in 86% of the patients at 3 years follow-up.[4] Weber reported that 89% of the patients had relief from LBP in a 4-year follow-up.[6] Parker *et al*. reported that LBP was constant or improved in 97% of the patients at 3 months postoperatively.[5] A study of 40 patients with LBP by Toyone *et al*., demonstrated rapid improvement in axial LBP after discectomy.[27] Contrary to the available literature, our results showed that an almost equal proportion (48.6%) of respondents reported that discectomy might relieve axial back pain regardless of sciatica.

In terms of postoperative immobilization or activity restrictions, only 20% of respondents recommend prolonged bed rest for patients who undergo discectomy for axial back pain compared to those who undergo it for lumbar radiculopathy. Almost 80% of respondents did not have any such preference for prolonged bed rest in patients with axial back pain. Arts *et al*. reported that most surgeons restricted work resumption for 8–12 weeks.[1] Postoperative activity restrictions may not be necessary for most patients, as there is a lack of evidence that early return to activity is harmful.[28,29]

Limitations of this study

There are several potential limitations of this study. This study represents a survey of only a small fraction of neurosurgeons and orthopedic spine surgeons currently practicing worldwide, thereby limiting the generalizability of the results. Furthermore, it is inevitable that some extent of reporting and recall bias would have occurred as this survey is a cross-sectional study. Moreover, there is always a risk of selection bias as the respondents working in the same professional organization or the same region may have similar practices. Another bias may be related to the low response rate of the practicing spine surgeons in our survey (27.8%, 333/1200) which leads to the existence of nonresponse bias due to the inability to evaluate the results of the nonrespondents' data. The study design can also have some degree of experimenters' bias because of the uneven responses from the respondents despite the even distribution of the questionnaire. In addition, there is a general understanding of the terms "academic," "public," or "private" practice, but there are no clear-cut definitions for the same. All the disadvantages are chiefly because of the survey design.

CONCLUSIONS

This survey is an attempt to represent the variation in surgical decision-making amongst spinal surgeons, both neurosurgeons and orthopedic surgeons, involved in spine practice based on their practice setting, geographical location, availability of resources, and expertise level. It depicts the diversity and discrepancy regarding the common practice patterns in the management of LDH. It was observed that the practice setting and experience of the operating surgeons were the main factors influencing the decision-making process. Identifying the existing discrepancies will assist in the development of international guidelines and protocols to minimize practice variations and offer optimal treatment to patients in different situations.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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