



Current patterns of practice in spinal fusion for chronic low back pain—results from a survey at the German Spine Societies' Annual Congress 2018

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Abstract

Background There is debate regarding criteria to select patients for lumbar fusion surgery who have chronic low back pain (CLBP) and corresponding degenerative changes, but without nerve root compression or neurogenic claudication. The aim of this study was to compare patterns in current practice.

Method A total of 143 printed questionnaires containing 51 questions were distributed at the German Spine Societies' (DWG) annual congress, 6–8 December 2018.

Results We received 127 (89%) surveys (64 orthopedic surgeons and 63 neurosurgeons). Excluding the 22% who do not perform lumbar fusion for CLBP, 41.4% reported performing 1–10 lumbar fusion procedures for patients with CLBP per year, 20.2% reported 11–20, 10.1% reported 21–30 and 17.2% reported performing more than 50. A total of 44.9% of surgeons reported treating patients for at least 6–12 months conservatively before considering surgery; 65.6% considered postoperative pain reduction of 50–70% a treatment success; 32.6% of respondents believe that <50% of patients showed good outcomes after fusion in CLBP and only 15.5% believed that 70% or more showed good outcomes. Orthopedic surgeons perform more lumbar fusion surgeries than neurosurgeons ($p = 0.05$), fuse more lumbar segments than neurosurgeons ($p = 0.02$) and are more likely to suggest that their patients with CLBP cease smoking preoperatively ($p = 0.02$).

Conclusions Despite discouraging evidence in the literature, the majority of respondents still perform fusion surgery in patients with CLBP. The use of preoperative diagnostics and tests vary widely among spine surgeons.

Keywords Chronic low back pain · Lumbar · Fusion · Spondylodesis · Survey · Indication

Presentation at a conference Parts of the results were presented at the Annual Congress of the European Association of Neurosurgical Societies 2019, Dublin.

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Introduction

Unfortunately, there are only limited data to determine indications for lumbar spine fusion as well as the preoperative selection criteria for patients with chronic low back pain (CLBP) and corresponding degenerative changes but without nerve root compression or neurogenic claudication, also called “non-specific back pain” [16, 18]. There are only a few randomized studies comparing fusion surgery with nonoperative treatment in patients with lumbar back pain [2, 6–8, 11]. One randomized controlled study found better outcomes for patients treated with spinal fusion compared to standard conservative treatment, although on longer follow-up, this beneficial effect decreased [7, 8]. Other randomized controlled studies showed no benefit for patients treated surgically in comparison with cognitive behavioral based exercise therapy or an intensive rehabilitation program [2, 6]. Based on this best available evidence, recent Guidelines by The German Medical Association and by The

Table 1 Demographic data

	Overall (<i>n</i> = 127)	Neurosurgeons (<i>n</i> = 63; 49.6%)	Orthopedic surgeons (<i>n</i> = 64; 50.4%)	<i>p</i> value
University hospital	28 (22.2%)	13 (20.6%)	15 (23.4%)	0.831
Public hospital other than university	56 (44.1%)	29 (46.0%)	27 (42.2%)	0.592
Private hospital	26 (20.5%)	11 (17.7%)	15 (24.2%)	0.509
Affiliated doctor/ private practice	12 (9.4%)	8 (12.7%)	4 (6.5%)	0.363
Position				
Chairman	31 (24.4%)	15 (23.8%)	16 (25%)	0.674
Consultant	62 (48.8%)	29 (46%)	27 (42.2%)	
Board certified specialist	20 (15.7%)	11 (17.5%)	7 (10.9%)	
Resident	7 (5.5%)	3 (4.8%)	4 (6.3%)	
Other	7 (5.5%)	3 (4.8%)	4 (6.3%)	
Country				
Germany	109 (85%)	51 (79.4%)	58 (90.6%)	0.134
Austria	8 (6.5%)	4 (6.3%)	4 (6.3%)	1.000
Switzerland	9 (6.5%)	8 (11.1%)	1 (1.6%)	0.017
Other	1 (0.8%)	0	1 (1.6%)	1.000
How many years of experience in spine Surgery do you have?	14.5 ± 8.12	17.30 ± 8.12	11.86 ± 7.22	<0.001*
Currently actively involved /performing spinal surgery for CLBP	99 (78%)	49	50	1.000

p values: two-sided Fisher exact test or Wilcoxon rank sum test

National Institute for Health and Care Excellence (NICE) concluded that surgery should not be offered to patients with “non-specific” low back pain [3, 9]. The NICE guidelines, however, added the exception that surgery for nonspecific low back pain should only be performed in the context of an RCT [9]. In a review of the NICE guidelines, the author addressed the fact that the underlying randomized controlled trials had issues such as heterogeneity of surgical techniques used, the number of patients included, high numbers of cross-overs from conservative to surgical treatment, and lack of sufficient consideration of yellow flags [13]. The main problem remains to identify patients who would benefit from surgical treatment. This is because the available diagnostic tests that are commonly used for patient selection, such as provocative discography and facet joint infiltrations (FJI) all have low sensitivities and specificities. A survey among spine surgeons in the Netherlands in 2011, published prior to the publication of the aforementioned guidelines, revealed a lack of uniformity of opinion in the majority of predictive tests and prognostic factors for spinal fusion in CLBP patients [17]. In that survey, 67% of respondents performed surgery for CLBP [17]. In the USA, a study reported a 62.3% increase of the numbers of lumbar fusion procedures in 2004–2015 [10].

The aim of the present study was to examine and compare patterns found in current practice. The hypothesis was that current practice would vastly differ from the available guidelines and that there would be some significant differences among the specialties involved.

Materials and methods

Study design and setting

A total of 143 printed questionnaires containing 51 questions were distributed at the German Spine Societies’ (DWG) annual congress 6–8 December 2018.

The questionnaire consisted of questions about participant demographics, clinical, and morphological factors

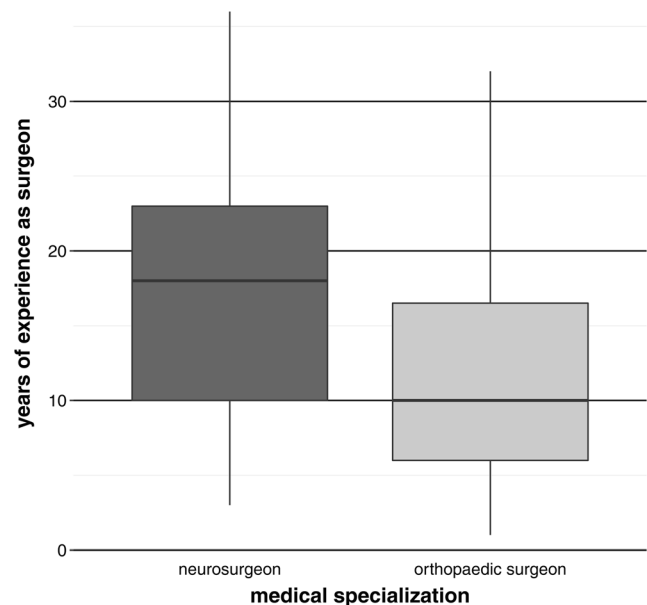


Fig. 1 Experience of respondents by subspecialty

presumably influencing indications for spinal fusion in patients with CLBP, and the surgeons' perceptions of what constitutes success in spinal surgery for CLBP (Appendix 1 as Electronic Supplementary Material). The term “non-specific lower back pain” was avoided as there are several definitions for it. Instead, the target group was described specifically as: “Patients with low back pain, degenerative changes but no spinal radicular symptoms, no spinal claudication symptoms, no deformity, no spondylolisthesis and of course no fracture,

tumor or infection.” Only complete datasets were used for analysis. The surveys were completely anonymous with respect to participants' names and institutions.

Participant-specific parameters

Participants were asked about their specialty, institution's status (university hospital; public hospital other than university, private hospital, affiliated doctor/ private practice; other) and

Table 2 Number of fusion operations performed by the participants and the importance of the clinical criteria to decide on a fusion in CLBP patients

	Overall	Neurosurgeons	Orthopedic surgeons	<i>p</i> value
No. of fusion surgeries per year				
1–10	41 (41.4%)	25 (51%)	16 (32.0%)	0.018*
11–20	20 (20.2%)	9 (18.4%)	11 (22.0%)	
21–30	10 (10.1%)	6 (12.2%)	4 (8.0%)	
31–40	9 (9.1%)	0	9 (18%)	
41–50	2 (2.0%)	1 (2%)	1 (2.0%)	
> 50	17 (17.2%)	8 (16.3%)	9 (18%)	
Maximum no. of segments fused in CLBP–patients				
1	8 (8.1%)	5 (10.4%)	3 (6.0%)	0.050*
2	32(32.3%)	19 (39.6%)	13 (26.0)	
3	15 (15.2%)	10 (20.8%)	5 (10.0%)	
4	4 (4%)	2 (4.2%)	2 (4.0%)	
No max.	39 (39.8%)	12 (20.6%)	27 (54.0%)	
Minimum age for fusion in CLBP				
Yes	44 (45.4%)	24 (49.0%)	20 (40.0%)	0.418
No	53 (54.6%)	25 (51.0%)	30 (60.0%)	
If yes where is this limit				
10–19 years	3 (5.9%)	0	3 (12.5%)	0.261
20–29 years	12 (23.5%)	7 (25%)	5 (20.8%)	
30–39 years	18 (35.3%)	12 (42.9%)	6 (25%)	
40–49 years	10 (19.6%)	4 (14.3%)	6 (25%)	
> 50 years	8 (15.7%)	4 (14.3%)	4(16.7%)	
Maximum age for fusion in CLBP				
Yes	29 (29.6%)	20 (40.8%)	9 (18.0%)	0.015*
No	69 (70.4%)	29 (59.2%)	41 (82.0%)	
If yes where is this limit?				
< 60 years	1 (3.4%)	1 (5.0%)	0	0.061
60–69 years	1 (3.4%)	1 (5.0%)	0	
70–79 years	10 (34.5%)	7 (35.0%)	3 (33.3%)	
80–89 years	10 (34.5%)	4 (20.0%)	6 (66.7%)	
> 90 years	7 (24.1%)	7 (35.0%)	0	
Is a preoperative conservative treatment necessary?				
Yes	98 (99 %)	49 (100%)	49 (98.0%)	1.000
No	1 (1%)	0	1 (1.7%)	
How long should a conservative treatment have been attempted? (months)				
0–3	4 (3.4%)	4 (6.8%)	0	0.415
3–6	35 (29.7%)	17 (28.8%)	18 (30.5%)	
6–12	53 (44.9%)	25 (42.4%)	28 (47.5%)	
12–24	15 (12.7%)	7 (11.9%)	8 (13.6%)	
> 24	10 (8.5%)	5 (8.5%)	5 (8.5%)	

p-values: two-sided Fisher exact test

location, their position, and the number of fusions they had completed.

Statistical analysis

SPSS Statistics 24 (SPSS Statistics © 2016, Chicago, Illinois, USA) was used for qualitative and quantitative analysis of the data. Respondents' data were analyzed using Fisher's exact test and nonparametric tests (Wilcoxon Rank sum/Kruskal–Wallis and median test) according to the data type and characteristics. Statistical significance was set at $p \leq 0.05$.

The present manuscript was prepared in accordance with the STROBE statement.

Results

Response rate/demographics

Of the 143 invitees, 127 (89%) surveys were returned by 64 orthopedic surgeons and 63 neurosurgeons. Of these, 28 reported working at a university hospital, 56 at a nonuniversity

Table 3 Clinical criteria to decide on a fusion in CLBP patients (continuation)

	Overall	Neurosurgeons	Orthopedic surgeons	<i>p</i> value
Is there a weight limit?				
Yes	51 (51.5%)	26 (53.1%)	25 (50%)	0.841
No	48 (48.5%)	26 (46.9%)	25 (50%)	
What is the weight limit?				
Preobesity	1 (1.7%)	1 (3.4%)	0	0.853
Obese class 1	15 (25.0%)	7 (23.4%)	8 (26.7%)	
Obese class 2	21 (35.0%)	9 (30.0%)	12 (40%)	
Obese class 3	21 (35.0%)	12 (40.0%)	9 (30%)	
No weight limit	2 (3.3%)	1 (3.4%)	1 (3.3%)	
Are you sending your CLBP patients to a nutritionist before surgery?				
Yes	58 (58.6%)	31 (63.3%)	27 (54.0%)	0.416
No	41 (41.4%)	18 (36.7%)	23 (46.0%)	
What is the maximum amount of cigarettes you permit your patients before fusion surgery?				
0/day	12 (12.2%)	4 (8.0%)	8 (16.0%)	0.706
1–10/day	12 (12.2%)	5 (5.6%)	7 (14.0%)	
11–20/day	6 (6.1%)	3 (6.1%)	3 (6.0%)	
> 21/day	13 (13.3%)	6 (12.2%)	7 (14.0%)	
So far I did not think about that	55 (56.1%)	30 (61.2%)	25 (50.0%)	
Do you request preoperative temporary smoking cessation?				
Yes	57 (57.6%)	24 (49.0%)	33 (66%)	0.023*
No	42 (42.4%)	25 (51.0%)	17 (34%)	
Duration of cessation				
2 weeks	13 (20.6%)	6 (24%)	7 (18.4%)	0.841
2–6 weeks	23 (36.5%)	10 (40%)	13 (34.2%)	
6–10 weeks	9 (14.3%)	3 (12%)	6 (15.8%)	
> 10 weeks	18 (28.6%)	6 (24%)	12 (31.6%)	
Do you order preoperative psychological assessment?				
Always	10 (10.1%)	5 (10.2%)	5 (10.0%)	0.117
Most of times	13 (13.1%)	7 (14.3%)	6 (12.0%)	
Sometimes	33 (33.3%)	17 (34.7%)	16 (32.0%)	
Rarely	33 (33.3%)	17 (34.7%)	16 (32.0%)	
Never	10 (10.1%)	3 (6.1%)	7 (14%)	
Does employment status play a role for the indication?				
Always	17 (17.2%)	8 (16.3%)	9 (18.0%)	0.117
Most of times	31 (31.3%)	17 (34.7%)	14 (28.0%)	
Sometimes	23 (23.2%)	7 (14.3%)	16 (32.0%)	
Rarely	18 (18.2%)	9 (18.4%)	9 (18.0%)	
Never	10 (10.1%)	8 (16.3%)	2 (4%)	

p-values: two-sided Fisher exact test

public hospital and 38 at a private hospital or practice. Four reported working in a private practice and at a university hospital (1), at a nonuniversity public hospital (1) or at a private hospital (2). Thirty-one were chairmen of their clinic, 62 were consultants and 20 were board-certified surgeons (Table 1). The mean experience of respondents was 14.5 ± 8.1 years. Neurosurgeons on average had more experience in spinal surgery than did orthopedic surgeons (Table 1, Fig. 1). The mean experience (and experience range) of consultant respondents was 13 ± 6.3 years (2–30 years), of chairmen respondents was 22 ± 6.9 years (9–36 years), of the board-certified specialists was 12 ± 8.7 (1–28 years.), of the resident respondents 3.4 ± 1.1 years (2–5 years.) of the “others it was 13.4 ± 4 years (10–20). The difference was statistically significant ($p < 0.01^*$).

The majority of 41 surgeons (32.3%) reported performing 1–10 lumbar fusion procedures for patients with CLBP per year; 20 reported 11–20, ten reported 21–30, and 17 reported performing more than 50. A total of 28 (22%) reported performing none (Table 2). Of those answering that they performed no fusion surgeries for CLBP, six reported doing so in the past, 11 did not, and 11 did not answer the question. Orthopedic surgeons reported doing more fusion surgeries in CLBP-patients than neurosurgeons (Table 2). Asked for if there was minimum age for fusion surgery in CLBP patients, less than half of the respondents believed there was one, with no difference between the two subspecialties (Table 2). However, 26% believed there was a maximum age for fusion surgery in CLBP patients, with more neurosurgeons (37%) stating as much than did orthopedic surgeons (16%). Almost all deemed preoperative conservative treatment necessary. The largest group of respondents (54/42.5%) deemed necessary conservative treatment trials of 6–12 months, followed by a group of 35 (27.6%) deeming necessary conservative treatment of 3–6 months before considering surgery.

Risk factors/consideration of yellow flags (Table 3)

A total of 51.5% of respondents considered that there is a weight limit for patients undergoing surgery for CLBP. This weight limit was between grade II and III obesity for the majority of respondents. More than half (58.6%) of the respondents reported sending their CLBP patients to a nutritionist. More than half (56.1%) of the respondents “did not think about” limiting the number of cigarettes, and 57 (57.6%) requested that their patients cease smoking. More orthopedic surgeons asked their CLBP patients to cease smoking preoperatively ($p < 0.05$)

Diagnostic tests

The reported use of diagnostic tests varied widely (Table 4). Cast/orthosis and discography were not commonly reported

by the respondents. The most frequently used test was the FJI, while medial branch infiltration appeared to be much less popular.

The perceived values of different tests and other factors in the preoperative setting of CLBP patients scored on a numeric ranking scale (NRS) ranging from 1 to 10 are displayed in Table 5 and Fig. 2. The items rated highest for the decision making in CLBP patients were MRI, patient history, and clinical examination. Clearly, the lowest ratings with a mean just above 2 received the diagnostic test that were also the least used ones according to Table 4 (discography and cast/orthosis). Bone scintigraphy was rated similarly low. FJI was rated much higher than medial branch single and repeat infiltrations. Neurosurgeons rated FJI significantly higher than orthopedic surgeons and orthopedic surgeons rated plain x-ray higher (Table 5).

Table 4 The use of preoperative diagnostic tests/treatments

	Overall	Neurosurgeon	Orthopedic surgeon	<i>p</i> value
Do you use immobilization in plaster casts/orthosis?				
Always	9 (9.1%)	3 (6.1%)	6 (12%)	0.755
Often	9 (9.1%)	4 (8.2%)	5 (10%)	
Sometimes	13 (13.1%)	7 (14.3%)	6 (12%)	
Rarely	11 (11.1%)	7 (14.3%)	4 (8%)	
Never	57 (57.6%)	28 (57.1%)	29 (58%)	
Do you use discography?				
Always	1 (1%)	1 (6.3%)	0	0.820
Often	9 (9.1%)	4 (6.3%)	5 (10%)	
Sometimes	6 (6.1%)	4 (11.1%)	2 (4%)	
Rarely	21 (21.2%)	11 (22.2%)	10 (20%)	
Never	62 (62.6%)	29 (49.2%)	33 (66%)	
Do you use diagnostic facet joint infiltration?				
Always	50 (50.5%)	26 (53.1%)	24 (48%)	0.104
Often	35 (35.4%)	20 (40.8%)	15 (30%)	
Sometimes	13 (13.1%)	3 (6.1%)	10 (20%)	
Rarely	1 (1%)	0	1 (2%)	
Never	0	0	0	
Do you use diagnostic medical branch infiltration?				
Always	20 (20.2%)	123 (24.5%)	8 (16%)	0.089
Often	29 (29.3%)	12 (24.56%)	17 (34%)	
Sometimes	11 (11.1%)	2 (4.1%)	9 (18%)	
Rarely	13 (13.1%)	9 (18.4%)	4 (8%)	
Never	26 (26.3%)	14 (28.6%)	12 (24%)	
Do you use diagnostic repeat medial branch Infiltration?				
Always	8 (8.8%)	5 (11.6%)	3 (6.3%)	0.272
Often	12 (13.2%)	7 (16.3%)	5 (10.4%)	
Sometimes	14 (15.4%)	3 (7%)	11 (22.9%)	
Rarely	12 (13.2%)	6 (14%)	6 (12.5%)	
Never	45 (49.5%)	22 (51.2%)	23 (47.9%)	

p-values: two-sided Fisher exact test

Table 5 Perception of the value of preoperative diagnostics/factors

	N	Mean ± SD	Mean ± SD neurosurgeons	Mean ± SD orthopedic surgeons	p value
MRI	99	9.10 ± 1.321	9.37 ± 0.906	8.84 ± 1.595	0.062
Patient history	99	9.07 ± 1.740	9.24 ± 0.947	8.90 ± 1.594	0.377
Clinical examination	99	8.94 ± 1.609	9.14 ± 1.399	8.74 ± 1.782	0.155
Clinical experience/impressions	99	8.21 ± 1.692	8.39 ± 1.618	8.04 ± 1.761	0.292
Plain x-ray flexion/extension series	99	7.47 ± 2.283	7.78 ± 2.013	7.18 ± 2.505	0.312
Facet joint infiltration	99	7.43 ± 1.895	7.90 ± 1.782	6.97 ± 1.907	0.011*
Plain x-ray	99	7.42 ± 2.095	6.94 ± 2.286	7.90 ± 1.787	0.031*
Literature	99	7.30 ± 2.012	7.39 ± 2.187	7.22 ± 1.844	0.533
Social history	99	7.19 ± 2.293	7.10 ± 2.718	7.28 ± 1.807	0.706
Being involved in Surgery oneself	97	7.19 ± 2.382	7.40 ± 2.464	6.98 ± 2.308	0.275
Courses/congresses	98	6.92 ± 2.143	7.06 ± 2.301	6.78 ± 1.993	0.412
Patients' opinion	98	5.96 ± 2.780	6.06 ± 2.996	5.86 ± 2.574	0.634
Medial branch infiltration	95	5.34 ± 3.154	5.37 ± 3.349	5.31 ± 2.994	0.922
Temporary immobilization through plaster cast/orthosis	98	2.73 ± 2.591	2.94 ± 2.846	2.54 ± 2.332	0.822
Discography	97	2.34 ± 2.345	2.36 ± 2.171	2.32 ± 2.519	0.739
Bone scintigraphy	97	2.304 ± 1.7449	2.32 ± 1.746	2.29 ± 1.762	0.926

All questions were Likert scales ranging from 1 to 10; p values from Wilcoxon rank sum test

Surgical results in CLBP patients

As seen in Table 6, distribution of the perception of what amount of pain improvement equals a good result differed between neurosurgeons and orthopedic surgeons; however,

the majority in both groups rated pain reduction between 50 and 79% as a positive result postCLBP surgery. Asked for an estimate of CLBP patients with good surgical results, just above 50% of the respondents expected 50–69% of patients to achieve good results, and almost one-third of respondents

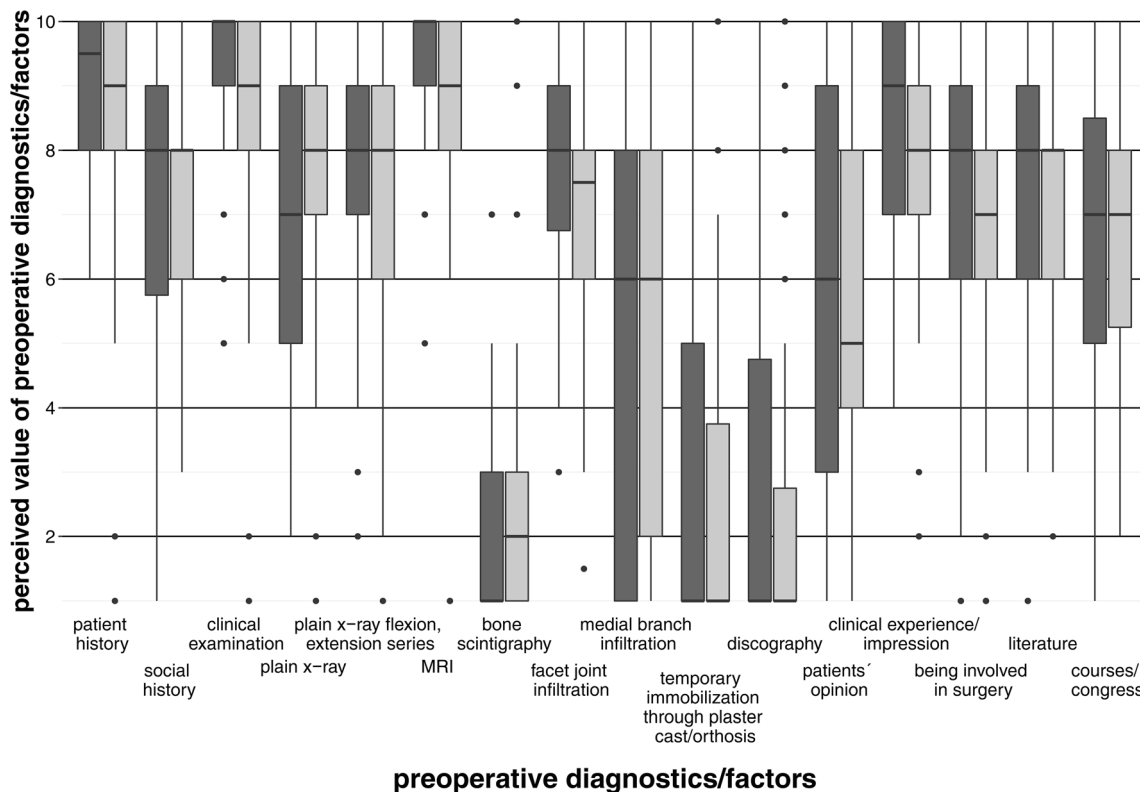


Fig. 2 Perceived value of diagnostics/factors in the decision-making for or against fusion surgery in patients with CLBP. The boxplots are illustrating the distribution of the answers from neurosurgeons (dark gray) and orthopedic surgeons (light gray)

believed that less than 50% of CLBP patients exhibited good results. The majority of respondents did not have clinical guidelines for the treatment of patients with CLBP in their institution, and about 80% believed there should be guidelines.

Type of practice

A comparison between the different types of practices of the respondents revealed no meaningful differences in numbers of surgeries or in the process of making the decision to operate CLBP Patients.

Discussion

Most respondents reported performing surgery for CLBP and some even reported doing so extensively. This was more than the 67% of respondents in a survey among spine surgeons 7 years earlier [17]. Recent interdisciplinary guidelines published more than a year before the survey suggested that no surgery should be offered for “non-specific low back” pain [3, 9]. This large percentage of surgeons performing spinal fusions for CLBP might be explained by the difficulty to define “non-specific” and also the limitations of these guidelines. Usually, abnormalities in imaging without red flags, signs of instability or nerve root compression like disc-endplate degeneration (medic signs) or facet degeneration are regarded as unspecific for lower back pain. The association of these changes in the imaging studies has already been described as weak [14]. The reasons for the discrepancy between the aforementioned guidelines and the number of surgeries performed might be due to being unfamiliar with or disagreement with these guidelines as the vast majority of respondents would wish to have a guideline for the treatment of CLBP patients. Furthermore, only a minority reported having guidelines at their institution. The perceived low success-rate of surgeries for CLBP demonstrates that many of the respondents doubted the value of surgical treatment; nevertheless, for various reasons they still performed these surgeries. Another problem is that the current national guidelines are all multidisciplinary with minor contribution of the surgical specialties involved in the surgical treatment of CLBP, and their conclusions are based on the best available, yet not very specific, conclusive or strong enough evidence [2, 6–8, 11]. It is agreed that some patients with CLBP benefit from surgical treatment; however, it is not as clear which patients these are, because the predictive value of available imaging and diagnostic tests is low [13].

While, for many of the questions in the survey, there was no uniformity in the opinions, there was agreement to the effect that conservative treatment should be attempted and for a minimum of 3–6 or 6–12 months. Orthopedic surgeons

reported fusing significantly more levels in patients with CLBP than did neurosurgeons. A survey in the Netherlands similarly found that orthopedic surgeons fused more segments; however, they also found that more surgeons advocated for conservative treatment longer than 1 year [17].

Concerning the questionnaire items about yellow flags and preoperative risk, there was no agreement/consensus among respondents. The only difference between orthopedic surgeons and neurosurgeons was that orthopedic surgeons were more likely to ask patients with CLBP to cease smoking preoperatively than were neurosurgeons. Smoking has been found to be an independent risk factor for low back pain and to be associated with worse results in spinal fusion [5, 19].

Only 23% reported sending their CLBP patients for preoperative psychosomatic/psychological assessment. A total of 60% reported sending their patients to a nutritionist. In the 2011 survey in the Netherlands, 79% reported sending their patients always or sometimes to a dietician, and 16% and 45% reported sending their patients always or sometimes for preoperative psychological screening [17]. Similarly to the current study, most believed that employment always or most of

Table 6 Distribution of perception of surgical results and guidelines for the treatment of CLBP-patients between neurosurgeons and orthopaedic surgeons

	Overall	Neurosurgeons	Orthopedic surgeons	<i>p</i> value
Postlumbar fusion surgery for CLBP, what amount of pain reduction in % would you consider a good result?				
> 30%	1 (1.0%)	1 (2.1%)	0	0.018*
30–39%	0	0	0	
40–49%	7 (7.3%)	1 (2.1%)	6 (12.5%)	
50–59%	32 (33.3%)	19 (39.6%)	13 (27.1%)	
60–69%	31 (32.3%)	11 (22.9%)	20 (41.7%)	
70–79%	21 (21.9%)	12 (25.0%)	9 (18.8%)	
> 80%	4 (4.2%)	4 (8.6%)	0 (0%)	
What is your estimate of CLBP patients that exhibit good results postsurgery?				
> 30%	4 (4.1%)	2 (4.2%)	2 (4.0%)	0.818
30–39%	16 (16.3%)	10 (20.8%)	6 (12.0%)	
40–49%	12 (12.2%)	4 (8.3%)	8 (16.0%)	
50–59%	25 (25.5%)	13 (27.1%)	12 (24.0%)	
60–69%	26 (26.5%)	13 (27.1%)	13 (26.0%)	
70–79%	12 (12.2%)	5 (10.4%)	7 (14.0%)	
> 80%	3 (3.1%)	1 (2.1%)	2 (4.0%)	
Is there a clinical guideline for the surgical treatment of CLBP patients in use where you work?				
Yes	35 (36.1%)	16 (34.0%)	19 (38.0%)	0.833
No	62 (63.9%)	31 (66.0%)	31 (62.0%)	
Should there be a clinical guideline for the surgical treatment of CLBP-patients?				
Yes	80 (80.8%)	40 (81.6%)	40 (80.0%)	1.000
No	19 (19.2%)	9 (18.4%)	10 (20.0%)	

times played an important role the process of making a decision for spinal fusion surgery in patients with CLBP [17]. There is good evidence that interventions are ineffective in returning patients back to work once they have been off work for a longer time [1].

Of all the diagnostic tests, immobilization in a cast/orthosis or provocative discography are not much used and were rated very low as an aid to make decisions for or against surgery in CLBP-patients. According to a 2011 survey by Willems et al. [17] with participants of the Dutch spine society, 32.8% of the 62 respondents reported always using immobilization through cast/orthosis and 37.7% sometimes and 40.3% agreed that it was a valuable test. In the same survey, 37.7% of the Dutch colleagues stated that provocative discography was a proven valuable test, with an importance on a scale from 0 to 10 rated a mean of 5.34 (\pm 3.09); 42.4% reported always performing the test [17]. In the Dutch survey from 2011, mainly orthopedic surgeons considered discography a valid predictor in CLBP while only 2/16 neurosurgeons did. In the current survey, we found no difference between the specialties.

FJI were also rated very high for selecting patients for CLBP surgery. It is also the diagnostic test used most often in the selection process for surgery of CLBP, although the evidence for its predictive value for surgical success remains unclear. Medial branch infiltration and even more the use of repeat medial branch infiltration are much less popular than FJI. According to a Cochrane review from 2009, steroid injections in the facet joints were not more effective than placebo injections [12]. Therapeutic efficacy appears to be better for medial nerve blocks; to date, no study has examined their predictive value for surgery in CLBP [4, 15]. Among all preoperative diagnostics, MRI was ranked highest. The correlation between degenerative disc changes in the MRI, and pain was not strong; especially when multisegment degenerative changes are found, the challenge to identify the responsible segment remains [14].

Limitations

This was a survey study, investigating the current status/opinions of/about the surgical treatment of CLBP among actively involved specialists. The response rate to the distributed questionnaires was high; however, in comparison to the number of total participants of the congress, it was much lower. The quality of results with a high mean experience and a significant number of chairmen among the respondents appeared to be high. This is the first survey of its kind that was performed after the introduction of guidelines by national medical societies in Europe recommending not to offer fusion surgery to CLBP patients.

Conclusions

We still see a high number of surgeries for CLBP despite national guidelines recommending not to offer surgery to patients with “non-specific” back pain. Respondents do not appear to believe that the majority of their CLBP patients benefit from surgery. It remains unclear which diagnostic tests help to select patients with CLBP for surgery. A majority seemed to value discography and cast immobilization as obsolete. MRI and patient history were rated highest. Orthopedic surgeons were more aggressive with respect to the maximum number of spinal levels that should be fused in patients with CLBP. The vast majority of spine surgeons who perform spinal surgery for CLBP would like a guideline but either do not know the already available ones or do not trust their conclusions. A large number of spine surgeons performing fusion surgery for CLBP suggest that there is some consensus that some subgroups might benefit from fusion surgery but also the perceived low overall benefit reflects that we do not exactly know which ones benefit most or benefit at all. Therefore, new prospective randomized controlled studies are warranted to study, which subgroups of CLBP patients really benefit from fusion surgery and what method provides best results.

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SS, DB, LW: data collection and organization

CS, DB: data analysis and statistics

DB, LW: manuscript draft

AA: manuscript revision

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval For this type of study, no official ethics approval was necessary, and formal consent is not required. The procedures used in this study adhere to the tenets of the 1964 Declaration of Helsinki and its later amendments.

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