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Symptom descriptors and patterns in lumbar radicular pain caused by disc herniation: a 1-year longitudinal cohort study

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ABSTRACT

Objective The objective of the present study was to explore the diversity, quality, severity and distribution of symptoms in patients with radicular pain and a lumbar disc herniation.

Design Longitudinal cohort study.

Setting Hospital-based back clinic.

Participants Ninety patients referred to secondary healthcare with (a) low back-related leg pain, (b) age between 18 and 65 years and (c) MRI confirmed lumbar disc herniation at a relevant side and level.

Outcome measures Neuropathic pain symptoms were assessed using the Short-Form McGill Pain Questionnaire-2 (SF-MPQ-2) and the painDETECT Questionnaire. In a subsample classified with neuropathic pain, in-depth interviews were performed, and symptomatic areas were drawn on standardised body charts.

Results At baseline, the most frequently used painDETECT symptom descriptor was numbness sensation, reported by 94%, followed by sudden pain attacks and tingling or prickling. The mean (SD) SF-MPQ-2 score (0–10) for aching pain was 5.9 (2.8); numbness 4.3 (3.3); tingling 4.0 (3.4); burning 2.6 (3.1); pain caused by light touch 1.5 (2.6). Leg pain was rated as extremely bothersome by 73%, numbness and tingling by 38%, weakness by 24% and back pain by 17%. In the subsample (n=52), deep-lying pain and non-painful abnormal sensations were frequent, at 71% and 85%. Drawings demonstrated substantial overlap between symptoms from compromised L5 and the S1 nerve roots. Painful and non-painful symptoms improved at approximately the same rate. At the 1-year follow-up, 45% (14/31) of patients who had received disc surgery, and 34% (18/53) of those who had received conservative treatment reported no bothersome back pain, leg pain, numbness/tingling or weakness.

Conclusion Patients reported several highly bothersome symptoms, but not all are described as painful. The overall symptom profile of lumbar disc-related radicular pain differs from other neuropathic pain conditions with limited allodynia and thermal hyperalgesia. Symptomatic areas for the L5 and S1 nerve roots have a large overlap.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study had high follow-up rates and used validated questionnaires.
⇒ The subsample could be precisely classified as having neuropathic pain. The characteristics of the subsample closely resemble those of the total cohort, which ensures representativeness.
⇒ The cohort consisted of patients referred to secondary healthcare and did not include all sciatica patients in need of secondary care in the target population.
⇒ Assessments were based on the clinical reasoning of history, signs and imaging, all of which are subjective.
⇒ The study was performed at a single centre.

INTRODUCTION

Radicular pain caused by a lumbar disc herniation is commonly accompanied by sensory disturbances and paraesthesias. The symptoms are a result of a complex interplay between mechanical pressure exerted by the disc and immunological mechanisms, which cause inflammation in the nerve root or its ganglion.[1 2] A causal association is generally assumed when symptoms arise in a neuroanatomically plausible distribution according to the localisation of a herniated disc and an affected nerve root on imaging. Lumbar radicular pain can be highly disturbing and may consist of short-lasting, single episodes or be remitting or permanent over months and years.[3 4]

When disc-related radicular pain is accompanied by a loss of sensory or motor function it aligns with the definition of painful radiculopathy, which is an established neuropathic pain condition.[5] Without loss of sensory or motor function, it can be graded as 'probable neuropathic'. Despite being one of the most frequently occurring neuropathic pain conditions,[6 7] the overall symptom presentation of lumbar radicular pain is not well characterised, and the value of history questions for decision-making remains understudied.[8–10] Many studies were performed before visualisation of the disc and nerve root by CT scanning or MRI became available, or did not include imaging, which involve potentially

non-representative patient samples.[11–15] Many studies have not used validated outcome measures to assess the diversity of symptoms,[10 16–20] and few have assessed the severity of symptoms other than pain, such as abnormal sensations and numbness.[21 22] Consequently, little is known about the occurrence of typical neuropathic manifestations in lumbar radicular pain, such as hot burning, pins and needles and electrical shooting.[23 24] There is, however, some evidence that lumbar radicular pain could differ from the traditional conception of neuropathic pain.[15 25 26]

The purpose of this study was to expand the knowledge of the diversity, quality and severity of symptoms in patients with disc-related lumbar radicular pain. Specifically, we sought to examine which descriptors patients use about their symptoms, the severity and bothersomeness of the symptoms, and the distribution and patterns of symptoms over time.

METHODS

Study design

The patients included in the present study participated in a prospective observational study for patients with low back-related leg pain who were referred to a secondary healthcare back clinic at the Østfold Hospital Trust, Norway. Those considered potentially eligible were approached by the clinical staff for inclusion in the study. Follow-ups were conducted at 6 weeks and 1 year. In case of drop-out, multiple attempts at contact were made by phone and email. All patients received treatment as usual, with conservative treatment advice. The need for evaluation by a surgeon was considered on an individual basis, and the final choice of surgery was decided by the patient and surgeon.

The inclusion criteria were (a) age from 18 to 65 years, (b) low back-related leg pain and (c) MRI confirmed lumbar disc herniation at a relevant side and level, that is, a neuroanatomically plausible distribution of pain and sensory signs.[5] The exclusion criteria were cauda equina syndrome, ongoing infection, suspected malignancy, pregnancy, breastfeeding or other illness that interferes with the study's purpose, such as neuropathic pain from other causes, inflammatory disease, spinal stenosis, prior surgery at the same disc level, any lumbar fusion or poor Norwegian language skills. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline for reporting observational studies was used.[27 28]

Clinical interview and examination

Full cohort

All patients underwent a routine clinical interview and a general back-pain oriented assessment, including the testing of muscle strength, deep tendon reflexes, sensory function and neurodynamic tests. For each side, the patients reported the most distal extension of their pain (back, buttock, upper thigh, lower thigh, upper leg, lower leg or foot) and where their worst pain was currently located (back, leg or both). One side was assigned as the main pain side.

The MRIs were interpreted and described by an external radiologist (as part of the clinical routine) prior to the consultation and assessed by the treating physician and physiotherapist as part of the clinical evaluation and diagnostic procedure. The nerve roots assumed to be compromised were determined based on an overall assessment of the symptoms, clinical signs (motor, sensory, reflexes) and imaging.

In-depth subsample

To gain higher fidelity data on radicular pain characteristics, a subsample was established, that consisted of the first patients who were consecutively recruited to this study. Prior to the data collection, a sample size of 50 with complete data was pragmatically decided based on the assumption that this would provide sufficiently precise data on the diversity, quality and severity of symptoms in this population. This subsample underwent an in-depth interview and a comprehensive clinical examination. In the interview, areas with lower back or leg symptoms that the patients considered bothersome during the last week were drawn on a standardised, 17 cm high, full-body map. These symptoms did not necessarily have to be described as painful. Discomfort that could not be located in specific areas, was not included. The drawing was performed by the examiner in collaboration with the patient. Furthermore, the patients were asked whether pain was *constant* (coded as yes/no) and to elaborate on the pain *depth* (coded as superficial, deep, both or not applicable), *triggers* (coded as movements, positions, both or not applicable), *thermal quality* (coded as hot/burning, cold, both or not applicable) and any presence of *non-painful abnormal sensations* (coded as yes/no).

We used the 2016 revision of the IASP Special Interest Group on Neuropathic Pain (NeuPSIG) grading system for neuropathic pain to grade the patients with either unlikely, possible, probable or definite neuropathic pain.[5] The methodology and results of the NeuPSIG grading in this subsample were previously reported.[29]

Patient-reported outcome measures

To assess the neuropathic pain symptoms the Short-Form McGill Pain Questionnaire-2 (SF-MPQ-2)[30 31] and the painDETECT Questionnaire (PDQ)[32] were used. The SF-MPQ-2 includes 22 descriptors, rated on a 0–10 numeric rating scale. Mean scores (0–10) are given for the total and the four subconstructs consisting of three sensory; continuous, intermittent and neuropathic; and one affective. The PDQ includes one item about the presence of radiating pain (yes/no), one item where one of four descriptive pain course patterns are chosen, and seven items on sensory symptoms. The total score ranges from −1 to 38.

Pain intensity was assessed using separate numeric rating scales for leg pain and low back pain during the last week, with anchors indicating no pain (0) to the worst thinkable pain (10). At the follow-ups, the proportions of the participants who had ≥30% and ≥50% improvement in leg pain were calculated.

The bothersomeness of back pain, leg pain, numbness or tingling in the leg, and leg weakness during the last week were rated on a 0–5 numeric scale with the following categories: 0–1 not bothersome 2–3 somewhat bothersome and 4–5 extremely bothersome.

The number of bodily regions with pain was measured using the widespread pain index (score 0–19).[33] Pain-related symptom severity was measured using the symptom severity scale (score 0–12).[33]

The Hopkins Symptom Checklist-25[34] was used to assess anxiety (10 items) and depression (15 items) during the previous week. Each item has four response categories that range from not at all (1) to extremely (4). The score is calculated as the mean of the completed items.

Back pain-related disability was assessed using the Oswestry Disability Index, including 10 items of pain and daily activities with a total score range of 0–100 (low to high disability).[35 36]

Analysis

The analyses are purely descriptive, and no hypotheses were tested. The proportions are presented as percentages and are rounded to the nearest whole number. Depending on the distribution, continuous data are summarised by the mean (SD), by the median with the range and IQR or 95% CIs calculated using bias-corrected and accelerated bootstrap. The analyses were performed using the R programming language V.4.1.2 (R Foundation for Statistical Computing, Vienna, Austria). For visualising and analysing the symptom distributions and patterns specifically in the subsample, vectorisation of drawings was performed in Inkscape V.0.92.4 (The Inkscape Project, Boston, Massachusetts, USA) and Affinity Designer V.1.10.5 (Serif Europe Ltd, Nottingham, UK).

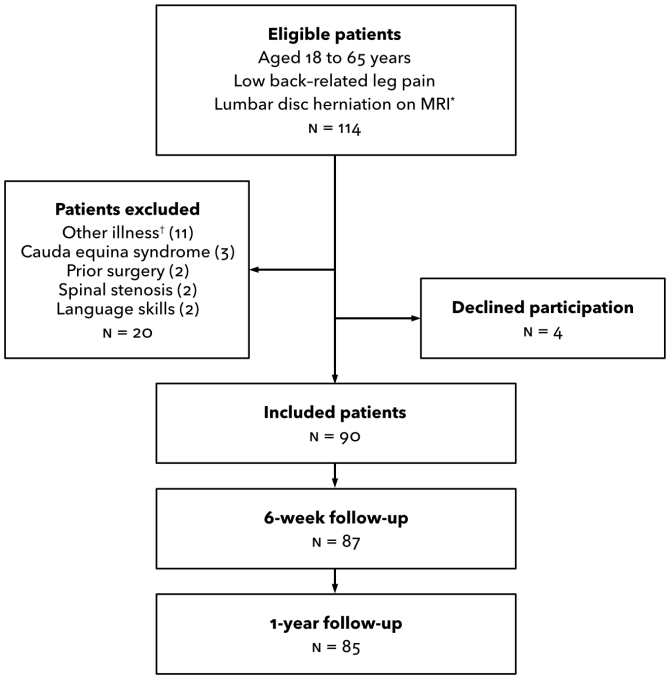

Figure 1 Study flow diagram. *Low back-related leg pain with a corresponding lumbar disc herniation at the relevant side and level as confirmed by MRI. †Any other illness that interferes with the study purpose, such as neuropathic pain from other causes.

Patient and public involvement

Neither patients nor the general public were involved in the design or analysis of the present study.

RESULTS

In total, 90 patients, 33 females and 57 males, with a mean (SD) age of 42.4 (9.5) years, were included in this study (figure 1). One patient participated in the clinical interview and examination but did not complete the questionnaires, and one patient declined sensory examination undressed.[37] Previous lower back surgery was reported by 3% (3/90).

Table 1 Patient baseline characteristics

	Full cohort N=90	In-depth subsample n=52/90
Age in years, mean (SD)	42.4 (9.5)	42.8 (8.7)
Women, % (n)	37% (33)	35% (18)
Education in years, mean (SD)*	13.6 (2.7)	13.7 (2.9)
Current smoker (daily or sometimes), % (n)	24% (22)	23% (12)
Pain duration in weeks, median (95% CI)		
Low back pain†	14 (8 to 24)	12 (5.5 to 18)
Leg pain	11 (7 to 12)	12 (9 to 16.5)
Prior lower back surgery	3% (3)	2% (1)
Level of disc herniation and compromised nerve root, % (n)‡		
L3/4 level	6% (5)	8% (4)
L3 root	1% (1)	2% (1)
L4 root	4% (4)	6% (3)
L4/5 level	37% (33)	33% (17)
L4 root	1% (1)	2% (1)
L5 root	34% (30)	27% (14)
L4 and L5 roots	2% (2)	4% (2)
L5/sacrum level	56% (50)	58% (30)
L5 root	1% (1)	2% (1)
S1 root	54% (48)	56% (29)
S1 and L5 roots	1% (1)	0% (0)
Uncertain level (L4/5 and L5/sacrum)§	2% (2)	2% (1)

*In Norway, 12 years is equivalent to a finalised upper secondary education.
†Patients without low back pain at the time of measurement were not included in the calculation.
‡The disc herniation level and the assumed compromised nerve root were based on a radiologist's written report and an evaluation by the treating physician and physiotherapist as part of the clinical evaluation.
§The symptoms could be explained by disc herniations found at both levels, that is, possibly compromising both the L5 and/or S1 root.

Table 2 Symptom descriptors and background variables

	Baseline (N=90)	6 weeks (N=87)	1 year (N=85)
Pain intensity (0–10), mean (SD)			
Leg pain	6.9 (2.0)	3.8 (3.2)	1.8 (2.4)
Low back pain	5.0 (2.9)	3.0 (2.9)	1.8 (2.3)
Leg pain improvement			
30%		60% (51/85)	87% (73/84)
50%		53% (45/85)	82% (69/84)
No leg pain		17% (15/86)	36% (32/84)
No improvement (incl. deterioration)		32% (27/85)	6% (5/84)
Location of the main pain area, % (n)			
Back	3% (3/90)	24% (20/85)	51% (43/84)
Leg	91% (82/90)	56% (48/85)	18% (15/84)
Back and leg	6% (5/90)	5% (4/85)	4% (3/84)
No pain		15% (13/85)	27% (23/84)
SF-MPQ-2 total score (0–10), mean (SD)	3.4 (1.7)	1.7 (1.8)	0.8 (1.2)
Continuous	3.9 (2.0)	2.0 (2.0)	1.1 (1.5)
Intermittent	4.0 (2.2)	2.0 (2.3)	0.8 (1.5)
Neuropathic	2.4 (1.8)	1.4 (1.7)	0.7 (1.1)
Affective	3.2 (2.5)	1.4 (2.1)	0.6 (1.3)
PDQ (–1 to 38), mean (SD)	13.3 (5.5)	8.6 (6.7)	5.6 (6.0)
Bothersomeness (rated as extremely), % (n)			
Back pain	17% (15/87)	12% 10/84	7% 6/84
Leg pain	73% (64/88)	27% 23/85	7% 6/83
Numbness and tingling	38% (33/87)	16% 14/86	5% 4/85
Weakness	24% (21/87)	12% 10/86	2% 2/84
Anxiety and depression, HSCL-25, (0–4)			
Median (IQR)	1.36 (0.48)	1.16 (0.48)	1.08 (0.28)
HSCL-25 scores ≥1.75, % (n)*	19% (17/89)	12% (10/85)	20% (17/85)
Oswestry Disability Index (0–100), mean (SD)	42.7 (16.7)	24.4 (18.4)	13.2 (14.8)
Bodily regions with pain (0–19), median (IQR)	4 (1)	3 (2)	2 (3.5)
Symptom severity scale (0–12), median (IQR)	3 (3)	1 (3)	1 (2)
Use of pain medication, % (n)			
Daily	73% (65/89)	40% (34/85)	11% (9/85)
Weekly	12% (11/89)	13% (11/85)	8% (7/85)
Monthly or no use	15% (13/89)	47% (40/85)	81% (69/85)

Patients with missing data for the relevant item were omitted from the calculations. The number of patients who received surgery during the study was 34, of which 19 had received surgery prior to the 6-week follow-up. See online supplemental file 1 for the data split by conservative versus surgical treatment.
*An average item score of ≥1.75 was found to predict help-seeking behaviour in a Norwegian epidemiological study and is used to define the cases with emotional distress.[73]
HSCL-25, Hopkins Symptom Checklist-25; PDQ, painDETECT Questionnaire; SF-MPQ-2, Short-Form McGill Pain Questionnaire-2.

The in-depth subsample consisted of 52 patients. Two of the first 50 patients who were consecutively recruited to the in-depth subsample had incomplete data. Two additional patients were therefore included. The baseline characteristics with the assumed nerve root compromise are shown in tables 1 and 2.

Symptom descriptors

At baseline, the most frequently used symptom descriptors on the PDQ was numbness sensation, which was reported by 94% (85/90), followed by sudden pain attacks and tingling or prickling (see figure 2). Burning, pain to light touch and cold or heat were reported by 61%, 37% and 33%, respectively.

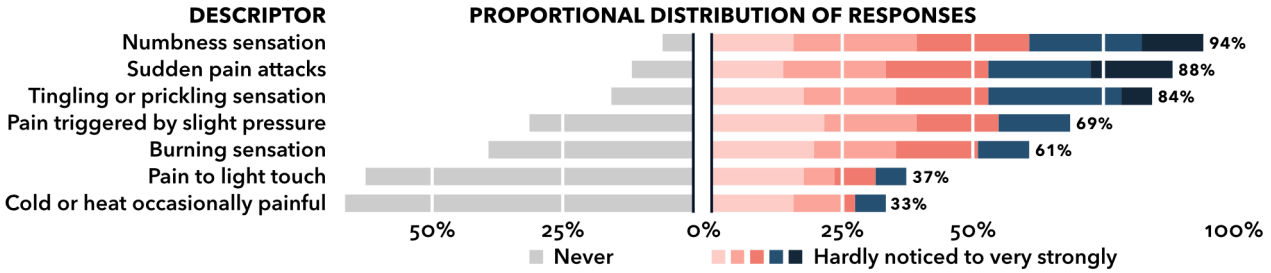

Figure 2 Proportional distribution of the painDETECT scores for the single symptom descriptors. The scores are ordered according to proportional use from highest to lowest and centred at the first score indicating the presence of a symptom. The responses on the left side (light grey) represent the proportion without the specific symptom. The responses on the right side represent the proportion with the specific symptom, which are graded from hardly noticed, slightly, moderately, strongly and very strongly.

Of the four possible pain course patterns, 41% (37) selected *persistent pain with slight fluctuations* and 33% (30) selected *persistent pain with pain attacks*.

On the SF-MPQ-2 the following pain descriptors were used by more than 80%: aching pain; tiring-exhausting sharp pain; stabbing pain; numbness; shooting pain and cramping pain (see figure 3).

Symptom severity

On the SF-MPQ-2, the mean (SD) baseline score for aching pain was 5.9 (2.8). The corresponding scores for the descriptors included in the neuropathic subconstruct were numbness 4.3 (3.3), tingling or 'pins and needles' 4.0 (3.4), hot burning 2.6 (3.1) and pain caused by light touch 1.5 (2.6). Few patients used the descriptors of cold-freezing pain and itching, and their scores were generally low.

Bothersomeness

Seventy-three per cent (64/88) of the patients reported leg pain at baseline as extremely bothersome (table 2). Numbness and tingling were rated as extremely bothersome by 38% (33/87), weakness by 24% (21/87) and back pain by 17% (15/87).

In-depth subsample interview data

Symptom characteristics

Of the 52 subsample patients, 44 (85%) reported non-painful abnormal sensations at baseline, mainly numbness and paraesthesias (table 3). Non-painful stiffness, hyperesthesia and cold, were each reported by 6%–10%. Few patients reported non-painful heat, heaviness, tightness and tiredness.

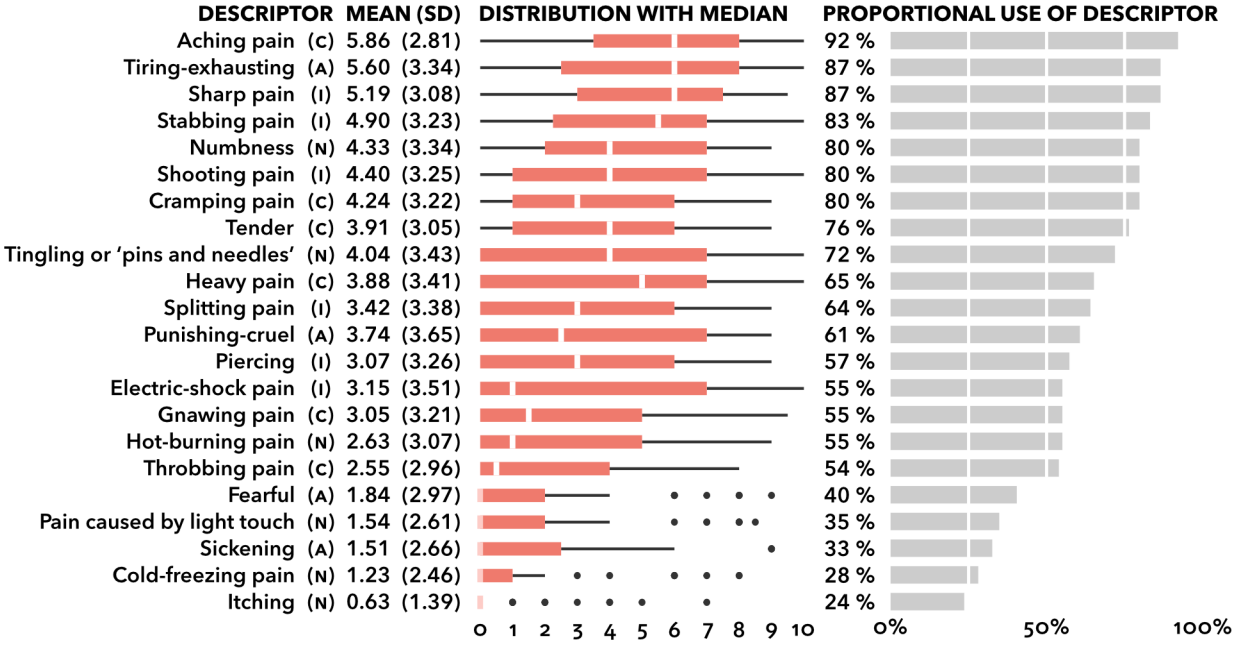

Figure 3 Statistics for the Short-Form McGill Pain Questionnaire-2 pain descriptors. The descriptors are ordered according to proportional use from highest to lowest. The box plot shows the median, IQR, largest value no further than the 1.5×IQR and outliers. The bar plot shows the proportion of subjects who used each pain descriptor. The descriptors' designated subconstructs are shown in parenthesis as follows: continuous (C); affective (A); intermittent (I); and neuropathic (N).

Table 3 Pain characteristics reported by the in-depth subsample (n=52)

Constant pain (yes), % (n)	37% (19)
Pain triggers, % (n)	
Positions	42% (22)
Movement	5% (8)
Both	37% (19)
Uncertain	6% (3)
Pain depth, n=51, % (n)	
Superficial	4% (2)
Deep	73% (37)
Both superficial and deep	24% (12)
Pain thermal quality, n=51, % (n)	
Burning	23% (12)
Cold	15% (8)
Both	6% (3)
Not applicable	54% (28)
Non-painful abnormal sensations (yes), % (n)*	85% (44)
Symptoms reported as non-painful by patients	
Numbness	60% (31)
Paraesthesia†	52% (27)
Stiffness	10% (5)
Hyperaesthesia	8% (4)
Cold	6% (3)
Heat	2% (1)
Heavyness	2% (1)
Thightness	2% (1)
Tiredness	2% (1)

*Pins and needles described as painful are not included.
†The symptoms described in terms of typical tingling, prickling or pins and needles are separated from pain sensations.

Symptom location

At baseline, 39% (35/90) reported their pain as radiating into the foot, 51% (46/90) to the calf and 10% (9/90) into the thigh or knee.

The symptomatic areas based on vectorised body drawings in the in-depth subsample are shown in figure 4. Two patients out of 52 with an assumed affected L4 root and two with an assumed affected L5 root, did not report pain above the gluteal fold. As shown in the figure, there was a substantial overlap of symptomatic areas among the patients with affected L5 or the S1 nerve roots. Few patients had assumed affected L4 (5/50) or L3 (1/50) roots.

Symptom development over time

Of the 90 included patients, 85 (94.4%) completed the 1-year follow-up (table 2). During the study, 38% (34/90) received lumbar disc surgery at a median of 7.1 weeks (IQR 7.8, range 1–26). At baseline, the patients who eventually received surgery reported more leg pain and bothersome numbness/tingling than those who received conservative treatment. Over the course of the study, the symptoms generally diminished in both groups (online supplemental file 1). At the 1-year follow-up, 45% (14/31) of surgical patients and 34% (18/53) of conservatively treated patients reported no bothersome back pain, leg pain, numbness/tingling or weakness.

From baseline to 1 year, the number of patients with a PDQ score ≥3 (moderately) for *tingling or prickling* decreased from 84% (74/89) to 15% (13/84), and for *numbness*, it decreased from 86% (76/89) to 20% (17/84). At the 1-year follow-up, the MPQ-2 and the PDQ total scores were low in both the conservatively and surgically treated patients (online supplemental file 2).

DISCUSSION

This study shows the diversity of unpleasant manifestations in disc-related lumbar radicular pain, all of which are not necessarily described as painful. For instance, numbness and tingling were found to be highly bothersome by a large proportion of the participants in the present study, which likely represents an under-reported burden in this population. Our results support the findings in a similar study in which patients rated numbness and tingling as just 25% less bothersome than leg pain.[21] Such information may easily be missed when inquiring about pain and could improve clinicians' ability to distinguish radicular pain from somatic or referred pain.

Generally, symptoms considered typically neuropathic (such as burning and pain resulting from non-painful stimulations)[24] were not prominent in the present population. Few reported pain to light touch, burning pain, painful cold or heat, cold-freezing pain or itching. Sudden pain attacks or electric shock-pain were more common but had modest intensity ratings. Murphy *et al*[38] reported similar pain characteristics, with the frequent use of descriptors such as aching and sharp. Based on the original MPQ, Ljunggren[22] found that aching pain and paraesthesias were common. The symptoms parallel the case descriptions by the giants in the field, with the two types of pain—the continuous and the acute lightning pain—and the accompanying sensory disturbances.[39–41]

As our study only included patients with radicular pain, a direct comparison with other neuropathic pain conditions is not possible. Due to a lack of detailed data in neuropathic pain studies that used the PDQ[15 26 42] or the SF-MPQ-2,[43–45] it is also difficult to compare our findings with the literature. However, our results support the notion that lumbar radicular pain has a somewhat different symptom profile, with less spontaneous sensations, allodynia and thermal hyperalgesia, than traditional neuropathic pain conditions such as postherpetic neuralgia, trigeminal neuralgia or painful diabetic peripheral neuropathy.[15 25] Interestingly, the PDQ performed poorly at detecting definite or probable neuropathic pain using the NeuPSIG grading system as a reference standard

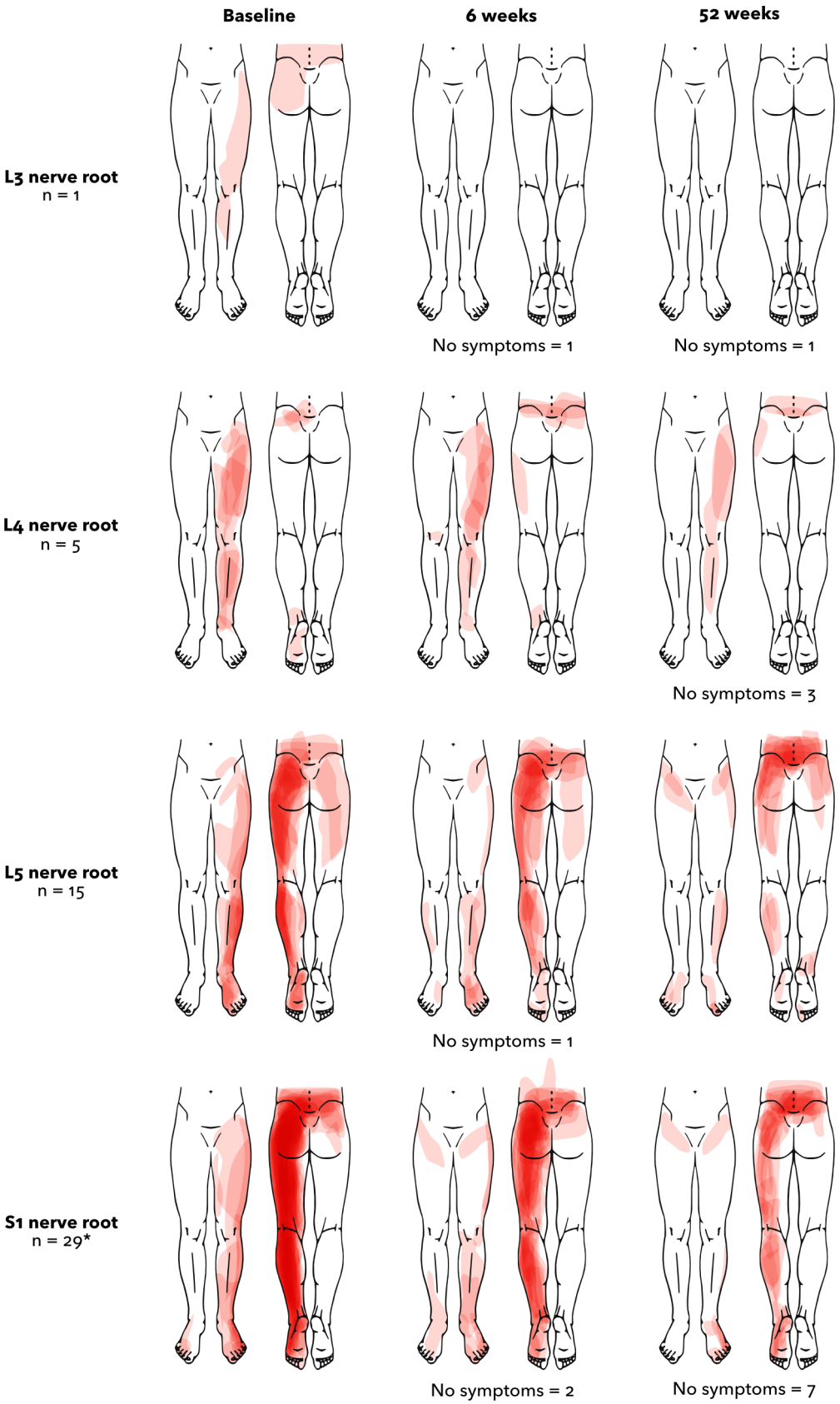

Figure 4 Symptomatic areas according to the assumed affected nerve roots in the in-depth subsample (n=50) based on a digital vectorisation of drawings on a standardised body chart layered with 50% opacity. A darker colour indicates more patients. Two out of the 52 subsample patients who assumable had more than one affected nerve root were not included. *One patient is missing from the 6-week follow-up.

in this population.[29] Additionally, the SF-MPQ-2 neuropathic subconstruct showed poor performance in this and a similar population.[30 46] It is possible that the current conception of neuropathic pain is too narrow concerning disc-related radicular pain or that the symptom descriptors themselves are not sufficiently sensitive or specific for neuropathic pain.[47–49] Further, we found a temporal shift in the main pain area, from the leg to the back, and a decreasing report of symptom bothersomeness over time. The symptom presentation may reflect the presence of a mixed pain state, influenced by both nociceptive and inflammatory mechanisms.[29] We used freehand drawing to document all lower back or leg symptoms that the patients considered bothersome. When the vectorised drawings were layered and attributed to a nerve root, a picture of substantial variation and overlap of the symptomatic areas within the L5 and S1 nerve roots appeared. Our findings indicate that radiating symptoms are less specific than the pain patterns considered prototypical for each respective nerve root,[50] and clinicians should be aware that discerning between symptoms arising from the L5 or the S1 root can be problematic. The concept of radiating pain as 'dermatomal'[51 52] is not supported by this study and others.[53–57] The term dynatome has been suggested for the distribution of symptoms that originate from an irritated nerve root.[58] Similar to the studies by Bove *et al*[59] and Ljunggren *et al*,[22 60] most patients reported their symptoms as deep-lying, which possibly reflects the innervation of muscles and bone (myotomes and sclerotomes).[61–64]

STRENGTHS AND LIMITATIONS

The strengths of this study include high follow-up rates and the use of validated questionnaires. Furthermore, the subsample could be precisely classified as having neuropathic pain. The characteristics of the subsample closely resemble those of the total cohort, which ensures representativeness.

There are several limitations. Our cohort consisted of patients referred to the clinic and did not include all sciatica patients in need of secondary care in the target population. Referred patients are likely to have more bothersome symptoms than those who are not referred. We did not map pain and non-painful symptoms separately, and thus cannot say whether the distribution between these phenomena differed. Deep-lying leg symptoms may be difficult to delineate on a one-dimensional surface map. Furthermore, the validity and reliability of freehand body mapping, the clinical interview items or the bothersomeness scale have not been established, and no reference standard exists for determining the responsible nerve root. Our assessments of nerve roots were based on the clinical reasoning of history, signs and imaging, all of which are subjective, and must be interpreted with caution. Furthermore, more than one root may have been involved, the vertebral level can be difficult to determine due to variant anatomy, and nerve root anomalies are common.[65–69] For the inclusion criteria we used 'relevant level' to restrict the inclusion to patients with a neuroanatomically plausible distribution of symptoms and signs. This was intended to limit the inclusion of patients with an asymptomatic herniation but may have hindered the inclusion of some patients with neuroanatomical variations resulting in an atypical presentation. Additionally, the sensitivity and specificity of imaging are low; disc herniations are common in patients without pain.[70–72] We did not systematically collect imaging data on nerve root compromise on MRI, such as degree of root dislocation or nerve root compression. We acknowledge that the sample size for the subsample may have been underpowered and other aspects of lumbar disc-related symptoms such as muscular weakness, autonomic disturbances and low back pain, are not covered here. Three patients (3%) had undergone back surgery prior to participation in the present study. Although neuropathic pain from other causes was an exclusion criteria, such as persistent postsurgical neuropathic pain, prior surgery may have influenced the symptom presentation. Finally, 38% (34/90) received disc surgery during the follow-up. Surgery can influence mechanisms underlying signs and symptoms.

CONCLUSION

Patients with radicular pain and lumbar disc herniation experience several highly bothersome symptoms, all of which are not necessarily described as painful; this represents an under-reported burden in this population. The findings of the present study support the notion that lumbar radicular pain has a different symptom profile than other neuropathic pain conditions with limited allodynia and thermal hyperalgesia. Vectorised body drawings of symptomatic areas suggest substantial overlap for the L5 and S1 nerve roots.

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