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Transient sacroiliac joint-related pain is a common problem following lumbar decompressive surgery without instrumentation

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ABSTRACT

Objective: Patients with lumbar stenosis profit substantially from decompressive surgery. The change of body position and walking behaviour after successful surgery might lead to changed force effects on the entire spine and on the sacroiliac joint (SIJ). We analyzed the incidence of postoperative SIJ-related pain.
Methods: The authors analyzed the records of 100 consecutive patients from three institutions, who underwent decompressive surgery without instrumentation. The diagnosis of SIJ-related pain was confirmed by periarticular infiltration. The radiological changes of the sacroiliac joint were assessed in plain radiographs in both groups: patients with SIJ pain (group 1) and patients without SIJ pain (group 2) after surgery.
Results: 22 patients required medical attention due to SIJ-related pain after surgery. While the walking distance increased substantially in both groups without difference ($p = 0.150$), the analysis of overall satisfaction favoured group 2 ($p = 0.047$). Female patients suffered more from SIJ pain after surgery ($p = 0.036$). Age, severity of radiological changes or number of operated segments appeared not to trigger SIJ-related pain.
Conclusion: The adaptation of a changed body posture and gait could lead to transient overload of the SIJ and surrounding myofascial structures. The patients should be informed about this possible condition to avoid uncertainty, discontent, unnecessary diagnostics and to induce a quick, specific treatment. Non-diagnosed sacroiliac joint-related pain could be a possible, but reversible reason for the diagnosis of a "failed-back-surgery".

1. Introduction

Recurrent low back and leg pain after lumbar and lumbosacral fusion surgery are often referred to as failed back surgery syndrome [1,2]. The sacroiliac joint (SIJ) was suggested as a possible source of the persisting pain after fusion surgery [3–7]. Capsular tension, compression and shear forces, myofascial and kinetic imbalances are suspected reasons for this unfavourable condition [8].

Numerous studies have described the adjacent segment disease following fusion procedures [9,10]. The involvement of the sacrum in the fusion appears to promote the SIJ related pain more often [11,12], since the SIJ represents the adjacent joint in these cases as a possible reason. It would support the assumption that fusion surgery increases the stress on the SIJ.

Patients with lumbar stenosis suffer from a degenerative disease with a long history. These patients often adopt a bended gait and body position to stretch the ligamentum flavum and thereby increase the width of the spinal canal. These patients profit dramatically from decompressive surgery: The walking distance increases and the patients suffer from less pain [13]. Decompression of the lumbar spine leads to an increase of lordosis and change of overall sagittal balance [14]. However, even these successfully operated patients report persisting back and leg pain [15].

The change of body position and walking behaviour after successful surgery might lead to changed force effects on the entire spine and on the SIJ, since the SIJ is involved in walking and upper body movement. We tested the hypothesis that successful

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lumbar decompressive surgery without instrumentation might lead to SIJ-related pain as well.

2. Patients and methods

2.1. Patient cohort

The authors analyzed the records of 116 consecutive patients of three different institutions, who underwent microsurgical decompressive surgery without instrumentation in 2014 and completed at least a 6 months follow-up. We excluded 11 patients with documented suspicious SIJ-related pain after surgery that did not receive a SIJ infiltration under fluoroscopic guidance to confirm the diagnosis and 5 patients with documented SIJ-related pain before surgery.

We included 100 patients. All patients suffered from neurogenic claudication and were refractory to conservative treatment. A respective spinal canal stenosis could be confirmed in an MRI or a myelography in all cases.

2.2. Surgery

In all involved institutions a unilateral approach with bilateral microsurgical decompression in prone position was performed after induction of general anaesthesia [16].

After surgery, all patients were treated by the same protocol, which consisted of physical rest for 4–6 weeks and then physical therapy.

2.3. Clinical and radiological evaluation

Patients with new postoperative SIJ-related pain were analyzed as group 1, while patients without new SIJ-related pain belonged to group 2.

Follow-up examinations were performed on an outpatient basis of the involved institutions. Walking distance was evaluated before surgery and at last follow-up. The physical examination involved the POSH-test (posterior shear test) in most cases that has a high value in the diagnosis of SIJ-pain [17]. Furthermore, a compression test over the facet joints and the SIJ was performed in all cases. A suspect SIJ-related pain was confirmed and treated by a periarticular infiltration with bupivacaine and a synthetic corticosteroid (Triamcinolone) under fluoroscopic guidance in all cases [18]. A pain reduction of at least 50% was required to consider the infiltration as a success and confirm a SIJ pain. The numerical rating scale (NRS) was used to estimate the pain before and after periarticular infiltration of the SIJ. Overall clinical outcome was rated using Odom's criteria. The Oswestry Disability Score was available in only 9 cases of group 1 and 34 cases of group 2, thus we did not analyze the score due to statistical difficulties.

Radiographic examinations included preoperative MRI in most cases or myelography and plain radiography. Plain radiographs were available in 81% of cases (95% in group 1 and 77% in group 2). The modified New York criteria, originally developed for classification purposes and especially used in the diagnosis of ankylosing spondylitis, were used to classify the extent of radiological changes of the SIJ [19]: Grade 0 (normal), grade 1 (suspicious change), grade 2 (minimal changes with localized sclerosis and joint alteration), grade 3 (moderate changes with erosions and sclerosis), grade 4 (severe abnormality).

To validate the assessed data the radiological classification was performed independently by two examiners.

Table 1
Demographic data.

Variable	Group 1 ($n = 22$)	Group 2 ($n = 78$)	p-value
Age at surgery (years)	71 ± 7.8	70.9 ± 9.8	0.920
Gender			
Male (n)	6	41	
Female (n)	16*	37	

Demographic data of both groups, values given as mean and standard deviation (age and follow-up).
* p-value 0.036.

2.4. Statistical analysis

The statistical evaluation was performed using IBM SPSS Statistics 22 and involved the Mann–Whitney U-test, Pearson's Chi-square test and Kolmogorov–Smirnov test. A result with a p-value < 0.05 was considered to be significant.

3. Results

21–270 days after surgery (mean 82 days) 22 patients suffered at least once from a confirmed SIJ-related pain (group 1). The patients reported a significant pain relief after surgery and a subsequent recurrent pain that was described as worse than before, since the pain was now even existent during rests, not only during movement or long standing.

5 patients were infiltrated more than once (4 times maximum), before a persistent improvement occurred. Most of these patients stated a severe SIJ-related pain (NRS > 7 out of 10). 7 of these patients suffered only from moderate pain (1–3 out of 10 on the NRS), but received an SIJ block, nonetheless, to confirm the diagnosis and exclude a neurogenic pain.

7 patients presented themselves with new MRIs, since they feared a recurrent stenosis, a new disc prolapse or an infection that revealed regular postoperative conditions (Fig. 1).

3 patients received an SIJ block without improvement and were matched to group 2.

3.1. Demographic data

The age at surgery ranged from 45 to 87 years with a mean of 71.5 years. 47 patients were male and 53 female. Female patients suffered significantly more from transient SIJ-related pain than males and were allocated to group 1 ($p = 0.036$) (Table 1).

3.2. Surgical data and clinical outcome

The number of operated levels did not differ between the groups: 58 patients underwent single-level decompression and 42 patients received a multi-level decompression.

The walking distance improved substantially in both groups ($p < 0.001$) (Table 2) and did not differ between group 1 and group 2 ($p = 0.150$).

68% of patients of group 1 considered the surgical treatment a success (excellent or good outcome) compared to 79% of group 2. Thus, the analysis of the Odom's criteria significantly favoured group 2 ($p = 0.047$) (Table 2).

3.3. Radiological results

The comparison of the modified New York criteria revealed no differences between the groups ($p = 0.752$). The interobserver variability did not affect statistical analysis ($p = 0.395$) (see Table 3).