

## Original article

# Microsurgical resection of juxtafacet cysts without concomitant fusion—Long-term follow-up of 74 patients



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## ABSTRACT

**Object:** We report on our experience with treating juxtafacet cysts focusing on clinical outcome, rate of recurrence and secondary surgery, especially fusion.

**Methods:** This retrospective study evaluates patients who underwent surgical resection of juxtafacet cysts without concomitant fusion from 2002 to 2013 with a minimum follow-up of one year.

**Results:** Complete follow-up is available in 74 patients. Mean follow-up in all 74 patients was  $69 \pm 34$  months (range, 14–140 months). Mean ODI was 14.9%. 68 patients (91.9%) were pleased with the results and would undergo surgery again. Three patients (4.1%) underwent secondary resection because of cyst recurrence at the same site. Four patients (5.4%) needed secondary fusion.

**Conclusions:** In patients without evident clinical and radiological criteria of instability we regard surgical resection of juxtafacet cysts without concomitant fusion as adequate primary treatment due to good outcome and low incidence of secondary symptomatic instability.

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## 1. Introduction

Juxtafacet cysts (Fig. 1) include the histologically different but clinically equivalent synovial cysts and ganglion cysts [1]. They can cause lumbar pain, radicular symptoms and neurogenic claudication. The incidence is increasing due to improvements and wider availability of magnetic resonance imaging (MRI) [2,3]. The prevalence of spinal juxtafacet cysts in 303 patients suffering from back pain or radiculopathy investigated with MRI is 2.3% [4]. The most common location is the lumbar spine with 96.4% [5]. Here, L4-L5 is the most frequently affected level with 68.0%, followed by L3-L4 (14.1%) and L5-S1 (1.6%) [5]. When conservative treatment fails, some authors propose aspiration or steroid injection with distension of the juxtafacet cysts [6,7]. Because of a relevant number of treatment failures and cyst recurrences, most studies recommend surgical resection [5,8–10]. The aim of surgical resection is the decompression of nerve structures and cyst removal. However, there is no clear recommendation according to the necessity of concomitant fusion of the affected lumbar segment. Though the exact etiology of juxtafacet cysts is still unknown, an increased motion

range or instability of the affected lumbar segment is suspected [11,12]. In patients with criteria of instability (macro-instability in dynamic X-ray, typical clinical symptoms) fusion surgery is recommended [13]. However, these radiological or clinical signs for instability are not clearly defined [14]. In most cases, distinct criteria of instability are missing and solely decompression is performed. Some authors make their decision for concomitant fusion depending on the size of juxtafacet cysts, involvement of surrounding structures, degree of anterolisthesis and degeneration of the facet joints [15,16]. The rate of not addressed underlying instability in patients with only decompression of juxtafacet cysts is not known. In our retrospective, mono-center study we investigated the clinical outcome, the rate of recurrence of juxtafacet cysts and the number of patients who needed further surgery, especially secondary lumbar fusion, after surgical resection of juxtafacet cysts without concomitant fusion.

## 2. Methods

In a retrospective, mono-center study all patients who underwent surgical resection of lumbar juxtafacet cysts in our department from 2002 to 2013 with a minimum follow-up of one year were evaluated. Patients under 18 years of age and patients with preceding lumbar surgery or concomitant fusion

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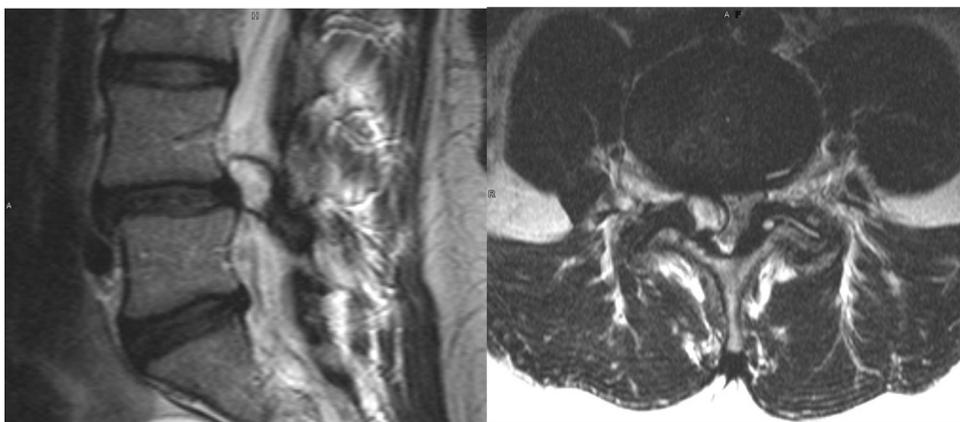


Fig. 1. Lumbar juxtafacet cyst.

**Table 1**  
Patient satisfaction index – PSI.

PSI = 1	Surgery met my expectations
PSI = 2	I did not improve as much as I had hoped but I would undergo the same operation for the same results
PSI = 3	Surgery helped but I would not undergo the same operation for the same results
PSI = 4	I am the same or worse as compared to before surgery

surgery were excluded. Questionnaires were sent in 2014. Only patients with a complete follow-up (entirely filled-up questionnaires) were included. For incomplete data patients were called to complete the questionnaires or otherwise not included in the further evaluation. Surgical technique was either standard open microsurgery or minimally invasive tubular microsurgery (METRx<sup>®</sup> MD, Medtronic Sofamor Danek, Inc., Memphis, TN, USA). The surgical method depended on the surgeon's choice. Regardless of the initial approach a partial hemilaminotomy with partial arthrectomy at the site of the cyst was performed with subsequent resection of the cyst. In all cases care was taken to preserve the integrity of 2/3 of the medial articular facet to avoid instability. In patients with spinal stenosis and bilateral complaints, a decompression of the contralateral site was achieved by undercutting, thus avoiding laminectomy. Various surgeons at different stages of their neurosurgical career (e.g. neurosurgical residents, attending neurosurgeons or neurosurgeons with sub-specialization in spine surgery) operated on the patients. The diagnosis of juxtafacet cysts was made surgically and histopathologically. Patient and surgical reports were retrospectively evaluated regarding surgery-related complications (e.g. dural tears with cerebrospinal fluid leak syndrome) and postoperative complications.

All patients were asked to complete questionnaires regarding their clinical outcome (Oswestry disability index (ODI), patient satisfaction index (PSI), numerical rating scale (NRS)) and to report on recurrence of juxtafacet cysts, further lumbar operations and secondary lumbar fusion. The PSI is a modified subitem of the North American Spine Society outcome questionnaire. It is scored as seen in Table 1.

For statistics SPSS 23.0 (SPSS, Inc., Chicago, IL) was used. Fisher's exact test, Mann-Whitney test and Spearman correlation were applied. A *p*-value < 0.05 was considered to be statistically significant. The local ethics committee approved the study. The study was registered in the German Clinical Trials Register (DRKS00006133).

**Table 2**  
Patient characteristics of 74 patients with complete follow-up.

<b>Sex</b>		
♂	n = 36	48.6%
♀	n = 38	51.4%
<b>Age at primary surgery</b>	64 ± 11 years	(range, 38–86 years)
<b>Duration of complaints</b>	8.9 ± 11.1 months	(range, 3 days–60 months)
<b>Symptoms</b>		
lumbar pain	n = 63	85.1%
neurogenic claudication	n = 23	31.1%
sensible deficits	n = 35	47.3%
motor deficits	n = 2	16.2%
<b>Level</b>		
L2-L3	n = 1	1.4%
L3-L4	n = 7	9.5%
L4-L5	n = 52	70.3%
L5-S1	n = 14	18.9%
<b>Location</b>		
left	n = 35	47.3%
right	n = 37	50.0%
bilateral	n = 2	2.7%
<b>Anterolisthesis</b>		
not present	n = 60	81.1%
Meyerding °I	n = 14	18.9%
<b>Concomitant spinal stenosis</b>	n = 26	35.1%
<b>Surgical approach</b>		
standard open microsurgery	n = 50	67.6%
minimally invasive (tubular retractor)	n = 24	32.4%

### 3. Results

In 74 patients who met our criteria a complete follow-up was available. Patient characteristics are presented in Table 2.

In 50 patients (67.6%) the approach was standard open microsurgery, in 24 patients (32.4%) minimally invasive using a tubular retractor. Applying Fisher's exact test there were no statistically significant relationships in the standard open microsurgery and the minimally invasive approach using a tubular retractor referring incidence of cyst recurrence (standard open: n = 1 (2.0%); tubular retractor: n = 2 (8.3%); *p* = 0.244) and incidence of subsequent fusion surgery (standard open: n = 3 (6.0%); tubular retractor: n = 1 (4.2%); *p* = 1.000). Regarding the outcome parameter ODI there was also no significant difference between the standard open microsurgery (Mdn = 37.37) and the tubular retractor (Mdn = 37.77; *U* = 593.50; *p* = 0.940). 94.0% (n = 37) of patients in the standard open microsurgery group and 87.5% (n = 21) in the tubular retractor group reported a satisfied PSI of 1 or 2.

Circumscribed dural tears occurred in 6 patients (8.1%, standard open microsurgery: n = 4, tubular retractor: n = 2). Sutures were applied and the incidental durotomy was additionally covered

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