**Treatment of facet joint arthropathy with hyaluronic acid**

**Summary:** The facet syndrome is a chronic pain syndrome caused by an irritation of the nociceptors in the joint capsule. Major causes are chronic overloading, intervertebral disc degenerations or osteoarthritis. In an open, prospective monocentric study, 80 consecutive outpatients aged between 36 and 89 with chronic facet joint arthropathy were treated by 3 intra-articular injections with the hyaluronic acid (HA) product *Spinevisc*®(2 ml pre-filled syringe with 20 mg hyaluronic acid, gained by fermentation)\(^{19}\) in weekly intervals. After the last injection the efficacy of the treatment was evaluated using visual analog scales (VAS) with a scaling from 0 – 10. 79 patients were able to be evaluated, for whom complete data was available after 3 injections (n = 74 pat.), or after 2 injections (n = 5 pat.). All symptoms of pain and other complaints continuously improved during the 3-week course of the treatment. The intra-articular injection treatment with hyaluronic acid seems to be an uncomplicated, clinically effective and enduring alternative to systemic or topical anti-inflammatories or antirheumatics in the treatment of the chronic facet syndrome.

**Keywords:** facet syndrome, facet joint arthropathy, hyaluronic acid, Spinevisc®

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**Introduction**

Chronic pain is one of the most common health issues in the populations of developed countries, and causes enormous costs to the economy and the insurance systems. Back pain occupies a leading position in nearly all statistics. If all productivity losses caused by back pain were totaled, the lost periods of occupational activity due to incapacity to work or early retirement in a 12-month period would add up to around 600,000 years or 10 – 15 billion euros per year. The actual treatment costs also have to be added to this.\(^{1}\) Facet joints are the cause of the back pain in approx. 15 – 20% of cases.\(^{2}\)

The term “facet syndrome” refers to a chronic pain condition caused by an irritation of the pain receptors located in the joint capsule, brought about by chronic overloads or joint incongruence resulting from degenerative disc damage or arthroses. Based on experience, the lumbar spine is the most commonly affected region. The patients complain most of all about long-term, persistent pain which is difficult to treat. From a clinical and diagnostic viewpoint, facet syndrome is difficult to define. However, painful muscle hardening and local pain on pressure or percussion over the spinous processes, as well as a movement-dependent pain in the area of the paravertebral musculature, are typical. Alongside the conventional spinal X-rays on two levels, computer tomography and magnetic resonance tomography, in particular, play a key role in the imaging procedures.

Initially, a conservative treatment is indicated in the early stages of facet joint arthropathy. This comprises various physical measures up to and including stretching on the sling table, supported by oral analgesic or anti-inflammatory administration, as applicable. The other treatment options consist of facet joint infiltration with local anesthetics and/or corticoids as well as the percutaneous thermal denervation and cryo-denervation. Intra-articular treatments using hyaluronic acid compounds have also been increasingly applied for some time. This treatment procedure is particularly successful in the early stages of gonarthrosis. The aim of the study reported here was to evaluate the promising user experiences of the intra-articular injection treatment of arthrotically changed facet joints within the scope of a prospective study.

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Methodology

This was a monocentric prospective study of outpatients carried out by an orthopedic surgeon with a high level of experience in injection treatment. The clinical and radiological diagnosis of facet joint arthropathy was the criterion for inclusion. In addition to general internal and infectious diseases, the exclusion criteria included in particular slipped disc, radicular symptoms, significant lumbar spine scoliosis, status post lumbar spine fracture and status post spine surgery. The patients were informed about the infiltration treatment, possible alternatives and how to behave following the procedure, and gave their written consent. Following strong aseptic denervation of the most significantly affected spine segment as well as the respective facet joints located above and below this using a high-percentage glucose solution, a treatment using the hyaluronic acid compound (HA) Spinevisc® (curasan AG) was administered three times at weekly intervals. The bilateral intra-articular injections to the facet joints of the 3 spinal segments were carried out under strictly sterile conditions and monitored using an X-ray image converter (Fig. 1). Spinevisc® is a medical device approved for intra-articular injection (CE 0483)19. A pre-filled syringe with 2 ml visco-elastic solution for the injection contains 20 mg sodium hyaluronate EP (HA obtained by fermentation). The mean molecular weight is 1.2–1.4 million Dalton. It is recommended to inject 1 ml Spinevisc® per facet joint.

The clinical evaluation was carried out following completion of the treatment (comprising 3 bilateral infiltration treatments of the 3 spinal sections in each case) using a score system from 1 to 6, with 1 meaning “no complaints” and 6 meaning “significant deterioration”, and by recording adverse events for all patients during the treatment and follow-up consultations. The individual pain status was collated based on the Visual Analog Scale (VAS) (using a scale from 0–10) for the criteria “pain at rest”, “pain on initial movement” and “pain during movement (walking, light cycling)” at the following points in time: before the start of treatment (T0), after denervation before the first injection (T1), before the second injection (T2), before the third injection (T3) and during a follow-up examination after the end of the treatment (T4), which was to be carried out after approx. 12 weeks. The statistical evaluation was carried out on a purely descriptive basis.

This study was carried out in accordance with Article 23b MPG [Medical Devices Act] using a CE-labeled medical device. This study did not cover any other intended purpose of the medical device, nor were any additional invasive or debilitating examinations carried out. Due to the non-invasive nature of this study, no specific treatment or application structure was stipulated; instead, reference was made to the specifications in the user information for the product.

Results

Facet joint arthropathy had been diagnosed in all patients. They were therefore referred to the orthopedic center specifically for intra-articular injection treatment. No further treatment was intended to be carried out in the orthopedic center. Instead, this was left to the treating physicians and orthopedic surgeons. The participants in the clinical trial consisted of 80 consecutive patients in the 36–89 age bracket (average age 65.4 years, median 66 years; 35 women, 45 men) with chronic facet joint syndrome (7 lumbar spine, 7 cervical spine, 2 thoracic spine). The duration of the pain was divided into 4 time intervals (see table 1 on page 6).

Nearly all the patients reported having taken oral antiphlogistics and anti-inflammatory drugs (in most cases “occa-
Clinical Efficacy Assessment (N = 79 patients)

<table>
<thead>
<tr>
<th>%</th>
<th>complaint-free</th>
<th>significant improvement</th>
<th>slight improvement</th>
<th>unchanged</th>
<th>slight deterioration</th>
<th>significant deterioration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36.7</td>
<td>49.3</td>
<td>7.6</td>
<td>3.8</td>
<td>1.3</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Since the patients had, however, been referred specifically for this treatment by their treating physicians and no further information was provided in many cases, data on the systematic administration of antiphlogistics could only be obtained sporadically. When asked, most patients specified the following medications: Diclofenac, COX-2 inhibitors, Ibuprofen. None of the patients had received topical antiphlogistics.

Clinical evaluation

It was possible to evaluate 79 patients for whom all information was provided in full on the standardized documentation forms. The HA treatment was administered at weekly intervals to 74 patients 3 times. In 5 patients, treatment was only administered twice since a sufficient improvement or absence of complaints had already occurred. One patient discontinued the treatment. A total of 1,392 injections were administered. 51 patients (63.75% of the overall study population) were receiving concomitant treatment, recorded in 61 entries (since multiple forms of treatment were applied in some patients). The most frequently reported treatments were physiotherapy (with segmental stabilization) in 47 patients (58.7%) and physical therapy in 11 patients (13.75%). Spinal surgery had been recommended to two patients in whom treatment had had limited or no success. For this reason, these two patients were not receiving any concomitant treatment. Only 2 of the patients were receiving systemic anti-inflammatory/antiphlogistics. The global effectiveness assessment (Fig. 2) was obtained based on a 6-tiered score system (from 1–6 points) after each patient’s final injection. If the “no complaints” and “significant improvement” entries are added together, almost 90% of the patients experienced a very good treatment outcome.

The individual pain status was assessed based on the above-mentioned visual analog scale at the specified points in time. In most patients, the follow-up examination after the end of the treatment (T4) did not take place at 12 weeks as planned, but between 3 and 28 weeks (median 12 weeks, average 11.5 weeks).

The pain symptoms and other complaints were reduced continuously during the 3-week treatment cycle under all criteria: pain at rest went down from 5.8 to 1.3 (see Fig. 3); pain on initial movement went down from 7.8 to 1.8; in pain during movement went down from 7.8 to 1.8 scale points (see Fig. 4). Remarkably, the treatment success lasted following completion of the 3-week treatment series in most patients.

The increase in the average values from between T4 and T3 can be explained by the fact that in 26 patients the follow-up examinations did not take place until 13–28 weeks after the last injection. This is a period of time in which, based on experience, a reduction of the therapeutic effect is to be expected. The treatment with Spinevusc® was generally very well tolerated. None of the 80 patients reported complaints that could have been related to the injections either during or after the treatment.
Discussion

Chronic or chronic recurrent lumbago can have a wide range of causes and can originate from various anatomic structures of the spine. Therefore, it is necessary to produce an exact diagnosis which combines the physical findings, the physician’s experience and instrument-based diagnostics, especially in the form of imaging procedures. Many examinations and assessments indicate a combination of facet joint complaints with cases of slipped discs, and thus ultimately a disruption of the entire movement segment and/or spinal canal stenosis.

The facet joints are merged by the upper and lower joint processes of the adjacent vertebral bodies. They are real synovial joints with a joint surface made of hyaline cartilage and a joint space which is surrounded by a fibrous capsule. The facet joints are innervated by the medial branches of the spinal nerves’ dorsal rami. Each facet joint is innervated from 2 segments. The most common definition of facet syndrome is a pain disorder originating from the small spinal joints which leads to chronic recurrent mechanical pains of the lumbar spine. The disc degeneration that increases with age causes increased strain on the facet joints. Arthropathy of the lumbar facet joints is thought to occur in 57% of adults under 30, in 82% of those in the 40–49 age bracket and in 100% of those over 60. The most common location is at the L 4/5 level. Men are affected more often than women.

Various procedures can be used to treat facet joint arthropathy. Initially, a conservative treatment is indicated.

**VAS – Rest Pain (N = 79 patients)**

![Graph of VAS – Rest Pain](image1)

**VAS – Movement Pain (N = 79 patients)**

![Graph of VAS – Movement Pain](image2)
in the early stages. This comprises various physical measures, e.g. electrotherapy, heat treatment, manual therapy, physiotherapy exercises / back exercises up to and including stretching on the sling table, supported by oral analgesic or anti-inflammatory administration, as applicable. Transcutaneous electrical nerve stimulation (TENS) and acupuncture are also used. Further therapeutic options comprise facet joint infiltrations with local anesthetic and/or corticoids as well as hyaluronic acid compounds. These must be differentiated from measures which destroy tissue such as thermal denervation and cryo-denervation, referred to as percutaneous facet denervation, in which the tissue is coagulated so as to deactivate the conduction of pain. However, the success of a percutaneous lumbar thermal facet denervation in patients with facet joint arthropathy and chronic lumbar spine complaints is still mainly restricted to the first 6 months post-operatively. Surgical procedures are applied at advanced stages and after exhaustion of the conservative treatment options. These include rhizotomy, in which multiple bilateral lumbar facet nerves are severed, interbody fusion or the insertion of interspinous implants.

The advantage of intra-articular injection with hyaluronic acid as a treatment for arthrotically changed facet joints is that it can be applied several times, at intervals or in a regimen, and does not result in any tissue damage. In numerous arthropathy studies (in particular regarding gonarthrosis), hyaluronic acid products showed a positive influence on the complaint symptoms and joint function, which generally reached at least the level of NSAR and corticoids. Hyaluronic acids are usually administered at weekly intervals in a series of 3–5 intra-articular injections. Pain reduction which lasts for several months is experienced by 65–80% of patients. More recent studies also show a “disease-modifying” effect. While the treatment of gonarthrosis using hyaluronic acid compounds is widely applied and well-proven, there are very few reports on the treatment of “smaller” joints. The results of a study on the treatment of the thumb saddle joint using an HA compound were published some years ago. They showed an improvement of the arthropathy signs and symptoms, although the follow-up investigation period only lasted for 3 months. The HA product used in the study reported here was also used with similarly good and long-lasting results in a recently published study in which the follow-up examination period, and thus the period in which the therapeutic effect was documented, lasted for 6 months.

However, the literature shows hardly any publications on the treatment of facet syndrome using HA preparations. DePalma and colleagues report on a small open pilot study with 15 patients who received 2 – and if the effect was not yet satisfactory, a 3rd – facet joint infiltration with an HA compound at 10-day intervals. Success criteria included pain on standing and walking, defined using visual analog scales, the Oswestry score, use of pain killers and general patient satisfaction, assessed after 1, 3, 6 and 12 months. Improvements (some more pronounced than others) occurred under all criteria, particularly in the use of pain killers, which reduced significantly – from the initial 80% to 33% – after 6 months. The improvements in the findings mainly lasted up to 6 months.

Fuchs et al. published a double-blind, randomized comparative study in which two groups of 30 patients with chronic non-radicular processes on the facet joints of the lumbar spine received an intra-articular facet joint infiltration either with 10 mg hyaluronic acid or 10 mg triamcinolone acetonide. Three infiltrations were administered at weekly intervals, followed by monitoring examinations 7–10, 90 and 180 days after the last infiltration. This comprised an assessment of pain intensity as well as recovery of the capacity to carry out day-to-day tasks, mental state and performance in work or sporting activities. The overall result showed a similar improvement in all output data. Corticosteroids took effect somewhat more quickly, but the effect of the hyaluronic acids lasted longer, and the HA compound is not encumbered with the potential side effects and interactions or “corticoid phobia”, which is not to be underestimated.

This study confirmed the clinical experience that, unlike a treatment with steroid compounds whose effect does not last as long even though they work quickly, hyaluronic acid can lead to a reduction in pain lasting several months. Treatment with HA may initially appear to have a weaker effect and requires the patient to undergo 3–5 injections at weekly intervals. Nevertheless, the number of intra-articular corticoid injections should be limited to 4 per year, since, in addition to their antiphlogistic effect steroids can also have a negative influence on the proteoglycan metabolism. It must also be noted that not only long-term administration of triamcinolone acetonide but even a once-off injection can trigger a clinically apparent secondary adrenocortical insufficiency.

**Conclusion**

The hyaluronic acid treatment using the Spinevisc® compound was tolerated very well by all patients and proved very effective in almost 90% of cases, especially if the degenerative complaints were not yet very pronounced – i.e. in patients who represent the traditional target group for visscosupplementation using hyaluronic acid compounds. The pain symptoms and other complaints reduced continuously during the 3-week treat-
ment cycle. However, it is particularly noteworthy that not only was treatment success achieved during this time in most study participants, but the improvement lasted after the end of the treatment in many patients – and even increased in the subsequently during the course of the post-intervention period.

**Table 1:** Overview of time interval of pain duration.

<table>
<thead>
<tr>
<th>Time interval</th>
<th>Number of patients</th>
</tr>
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<tbody>
<tr>
<td>&lt; 3 months</td>
<td>24 patients (30.0%)</td>
</tr>
<tr>
<td>3 – 6 months</td>
<td>4 patients (5.0%)</td>
</tr>
<tr>
<td>6 – 12 months</td>
<td>17 patients (21.2%)</td>
</tr>
<tr>
<td>&gt; 12 months</td>
<td>32 patients (40.0%)</td>
</tr>
<tr>
<td>not specified</td>
<td>3 patients (3.8%)</td>
</tr>
</tbody>
</table>

**Conflict of interests:** The author declares that there is no conflict of interests as defined in the directives of the International Committee of Medical Journal Editors.

**Literature**

1 | Kohlmann T, Schmidt CO. Rückenschmerzen in Deutschland – eine epidemiologische Bestandsaufnahme. Orthopäde & Rheuma 2005; 1: 38–41
4 | Eubanks JD, Lee ML, Cassinelli E, Ahn NU. Prevalence of lumbar facet arthritis and its relationship to age, sex, and race. Spine 2007; 32: 2058–2062
5 | Tuschel A. Behandlung des Facettengelenksyndroms. Iatros Orthopädie 2008; (1) 44–45
11 | Stöve J. Konservative Therapie der Arthrose. Der Orthopäde 2005; 34: 613–622
19 | Note: The product Spinevisc®, is equivalent in its hyaluronic acid matrix to the original product Curavis® mini, which was used in this study. Spinevisc® is CE marked as a medical device according to Annex II – Section II of the Council Directive 93/42/EEC of June 1993 concerning medical devices and registered under registration no. D1010200104 in report no. P18-00415-141134.
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