

Lumbar Facet Arthropathy

<http://emedicine.medscape.com/article/310069-treatment#d12>

Background

Low back pain (LBP) remains a common musculoskeletal complaint, with a reported lifetime incidence of 60-90%. Various structures have been incriminated as possible sources of chronic LBP, including the posterior longitudinal ligament, dorsal root ganglia, dura, annular fibers, muscles of the lumbar spine, and facet joints.^[1]

In 1911, Goldwaith first implicated the facet joints as a source of LBP. In 1933, Ghormley described the facet syndrome, and in 1941, Badgley endorsed the idea of the facets as the cause of LBP, based on pathomorphologic studies of the joint.^[2, 3] Rees in 1972 and Shealy in 1974 accepted the notion and developed techniques in which the joint allegedly could be denervated to stop pain stemming from the facet joints.^[4, 5]

In 1963, Hirsch and colleagues injected normal saline into facet joints, demonstrating that facet joints can produce LBP.^[6] Systematic studies began in 1976, when Mooney and Robertson used fluoroscopy to confirm this location of intra-articular lumbar facet joint injections of normal saline in asymptomatic volunteers.^[7] (Three years later, McCall and colleagues did the same.^[8]) These injections of normal saline caused back and lower extremity pain. In addition, Mooney and Roberts documented relief of low back and lower extremity pain in these patients after injection of local anesthetic into the provoked facet joints. A 1989 study by Marks demonstrated similar findings in patients with chronic LBP.^[9]

In 1991, Kuslich and colleagues probed facet joint capsules in patients undergoing lumbar decompression surgeries and found that pain could be induced.^[10] Many investigators developed techniques to diagnose facet joint pain using intra-articular joint blocks and medial branch nerve blocks, as well as ways to treat such pain with intra-articular steroids, surgical ablation, or radiofrequency (RF) denervation. Controversy continues regarding the true prevalence, most accurate diagnostic methods, and most efficacious treatment of symptomatic lumbar facet joints.^[11]

Related Medscape Reference topics:

[Mechanical Back Pain](#)

[Cervical Facet Syndrome](#)

[Lumbosacral Facet Syndrome](#)

[Mechanical Low Back Pain](#)

Pathophysiology

Bones of the spine articulate anteriorly by intervertebral disks and posteriorly by paired joints. The latter, formally known as zygapophyseal joints (but commonly termed facet joints), are true synovial joints, with a joint space, hyaline cartilage surfaces, a synovial membrane, and a fibrous capsule. Two medial branches of the dorsal rami innervate the facet joints. Medial branches of the lumbar dorsal rami issue from their respective intervertebral foramina, cross the superior border of the transverse process, and then run medially around the base of the facet joint before innervating the joints.

In studies, autonomic nerves and nociceptive, substance P-immunoreactive nerve fibers have been identified in the lumbar facet joint capsule and synovial folds. Douglas and colleagues identified substance P-immunoreactive nerve fibers in erosion channels that extended through the subchondral bone and calcified cartilage into the articular cartilage. Giles and Harvey identified them in the inferior recess capsule and synovial folds, whereas Ashton and coauthors found them running freely in the facet capsule stroma.^[12, 13] Grönblad and colleagues demonstrated sparsely distributed substance P-immunoreactive nerve fibers in facet joint plical tissue.^[14]

The presence of nociceptive nerve fibers in the various tissue structures of facet joints, as well as the existence of autonomic nerves there, suggests that these structures may cause pain under increased or abnormal loads.

Substance P is a well-known inflammatory mediator that may sensitize nociceptors to them and other mediators, resulting in chronic pain.

Like other joints, the facet joints consist of bone, cartilage, synovial tissue, and menisci that are rudimentary invaginations of the joint capsule. In the synovial fluid of patients with rheumatoid arthritis, osteoarthritis, or traumatic joint disease, increased levels of prostaglandins have been measured and are implicated as an important cause of pain. Prostaglandin, a known inflammatory mediator, also is released from facet joints.

A study by Netzer et al indicated that in patients with facet joint osteoarthritis associated with lumbar spinal stenosis, the subchondral bone in the osteoarthritic facet joints is characterized by the infiltration of macrophage-rich tissues into the marrow and by enhanced de novo bone formation.^[15]

Biomechanically, facet joints assume a prominent role in resisting stress, and their importance is well established. A cadaveric study by Adams and Hutton demonstrated that the facet joints resist most of the intervertebral shear force and share in resisting the intervertebral compressive force, albeit only in lordotic postures.^[16] In the rotation of the spine, the facet capsular ligaments are the spinal ligaments that undergo by far the most strain. They protect the intervertebral disks by preventing excessive movement.^[17]

Epidemiology

Frequency

United States

The prevalence of facet joint pain in the general population or in persons with acute back pain has not been investigated. The reported rate of facet joint pain for patients with chronic low back pain (LBP) ranges from 4-75%. The reported prevalence seems to be a function of the size of the sample studied and the conviction of the authors.

Three studies report the prevalence of lumbar facet joint pain among chronic LBP patients based on 100% relief of pain using less than 2 mL of intra-articular diagnostic injection. In 1988, Jackson and colleagues reported that 7.7% of 454 patients with chronic LBP had 100% relief with diagnostic injection.^[18] In 1991, Carette and coauthors reported that 11 (5.8%) of 190 patients experienced complete relief of symptoms with a single lidocaine injection.^[19] In 1994, Schwarzer and colleagues reported that 7 (4%) of 176 patients reported 100% relief.^[20, 21] This last study was the most stringent of the 3 because the authors performed a second confirmatory block with bupivacaine, documenting longer relief of pain commensurate with the longer half-life of the local anesthetic.

When less stringent criteria are used, higher prevalences of lumbar facet joint pain are reported. In 1988, Moran and colleagues reported relief in 9 (16.7%) of 45 patients using 1.5 mL of bupivacaine.^[22] Pain provocation followed by pain relief with local anesthetic was used as the diagnostic criterion. In 1992, Schwarzer and co-investigators reported relief in 9 (9.8%) of 92 patients, using a 50% reduction of pain as the criterion and employing double-block screening with lidocaine and confirmatory bupivacaine block.^[23] In a separate investigation, Schwarzer and colleagues reported a prevalence of 26 (15%) of 176 patients, using the same diagnostic criterion.^[20, 21]

In another study, Schwarzer and coauthors reported that 23 (40.3%) of 57 patients obtained pain relief of 50% or more pain with bupivacaine but experienced no relief with saline control injection.^[24] A 2004 study by Manchikanti and colleagues reported a 27% prevalence rate of lumbar facet pain, using controlled, comparative local anesthetic blocks of the dorsal medial nerves.^[25]

Higher prevalence rates are reported when control blocks are not used. In 1984, Raymond and Dumas—using a strict intracapsular technique but no control block—reported a 16% prevalence rate.^[26] In 1992, Revel and coauthors reported that 22 (55%) of 40 subjects had pain relief of 75% or more and that 17 (42.5%) of 40 patients had greater than 90% relief of their pain with a single intra-articular lidocaine injection.^[27]

As seen from these data, reports of prevalence are a function of the investigators' choice of selection criteria. Studies requiring the most stringent criteria (100% relief of symptoms after a diagnostic block) report a 4-7.7% prevalence rate of facet joint pain among chronic LBP patients. Investigations using double blocks and requiring

50% relief report prevalence rates of about 10-15%. Numerous other studies using a single diagnostic block report prevalence rates of 16-75%.

International

In a sample of 472 South Korean adults, aged 20-84 years, Ko et al found the prevalence of lumbar facet osteoarthritis, as derived through multidetector computed tomography (MDCT) scanning, to be 17.58%. The prevalence increased with age. ^[28]

See also Frequency/United States.

Mortality/Morbidity

No studies specifically address the mortality and morbidity of chronic back pain from facet joint – mediated pain. The mortality and morbidity of chronic low back pain, however, have been extensively addressed.

Race

No studies have specifically addressed the correlation between the prevalence of facet-mediated chronic low back pain and race.

Sex

No studies have specifically addressed the male-to-female prevalence ratio of chronic, facet-mediated low back pain.

Age

A higher prevalence among the older population would be expected if the etiology of facet joint–mediated back pain arose from degenerative changes of the joint, similar to the way it does in other osteoarthritic joint damage. One small study by Revel and colleagues and a larger investigation by Jackson and coauthors noted that older patients responded more commonly to diagnostic injections. ^[18, 27] The 1995 study by Schwarzer and colleagues involving 57 patients reported higher positive response rates in older patients (40%), even with the use of saline control injections. ^[24] They noted that the average age of patients was 59 years, which was higher than the average age in studies reporting much lower prevalence rates.

A 2008 report by Manchikanti et al looked at the rate of facet joint–related chronic low back pain in 424 patients, separated into 6 age groups. ^[29] According to their retrospective analysis, the prevalence ranged from 18% (in individuals aged 31-40 years) to 44% (in persons aged 51-60 years).

History

Little controversy surrounds the facet joint as a possible source of chronic low back pain (LBP). Innervation and possible inflammatory mediators of the joint have been elucidated. Pain upon provocation of the joint, relief upon anesthetization of the same joint in healthy volunteers, and chronic LBP in patients have been documented. Although initially described as a syndrome, investigators now prefer to term it facet joint pain. By definition, a syndrome is a group of signs and symptoms that occur together and characterize a particular abnormality; however, no signs or symptoms have been identified as unique to facet-mediated pain. ^[30]

A major source of frustration for clinicians has been the fact that no reliable means exist to document a clinical diagnosis of lumbar facet joint pain without the use of invasive techniques. If the true prevalence of facet joint pain was 40-75%, as initially reported, a clinical profile might not be crucial, because all chronic LBP patients would warrant investigation for this disorder. However, a prevalence of 10-15% would indicate that a clinical profile would be important in preventing the indiscriminate use of diagnostic and/or therapeutic blocks.

Biomechanical studies of the facet joint during extension and of facet capsular ligaments strained during rotation initially provided the belief that facet joint pain is worse with extension and rotation. Early studies by Helbig and Lee provided initial credence to this belief, but later studies by Revel and coauthors and by Schwarzer and colleagues did not support it.

Revel's investigation found that an increase in pain during hyperextension and extension-rotation was, in fact, less frequent in the group that responded to the facet joint injection than in the group that did not. ^[27]

The characteristics of lumbar facet joint pain include the following:

- Location of pain.
 - Lumbar facet joint pains are lateralized and can radiate below the knee. They rarely, if ever, cause axial or central back pain.
 - In their study of 26 patients selected by way of differential diagnostic blocks, Schwarzer and colleagues observed that no patients with central pain responded to diagnostic blocks of the facet joints. ^[20, 21] This study also refuted the commonly held notion that pain below the knee is unlikely to be referred from the facet joint.
- Clinical features of facet joint pain.
 - In their large 1988 study, Jackson and coauthors could not identify clinically specific facet syndromes or predict with any degree of accuracy which patients were more likely to respond to facet diagnostic blocks. ^[18] They concluded that facet syndrome is not a reliable clinical diagnosis.
 - Studies addressing the pattern of referred pain have been unable to distinguish pain from different levels. However, a generally held belief is that facet joint pain is more prevalent among the older population, is more lateralized, and is a more likely diagnosis when radiographic findings show severe facet arthritis.

Causes

The cause of most lumbar facet pain is unknown. On occasion, the lumbar facet joints are affected by systemic inflammatory arthritides, such as rheumatoid arthritis and ankylosing spondylitis. The following is a more specific look at sources of low back pain (LBP).

Microtrauma

Microtrauma of the facet joints can produce pain. Small fractures, capsular tears, splits in the articular cartilage, and hemorrhage have been documented on postmortem studies of trauma victims who had normal radiographic findings. Whether these abnormalities were painful was not recorded.

Osteoarthritis

Osteoarthritis is another cause of lumbar facet joint pain. However, not all cases of facet arthritis are painful; the radiographic changes of osteoarthritis are as common in patients with LBP as in those without it. Some studies report that severely degenerated joints are more likely to cause symptoms. In a 2008 report, multidetector computed tomography (CT) scanning in 188 individuals revealed lumbar facet osteoarthritis in 59.6% of males and 66.7% of females. ^[31] In this study population, however, the report found no association between osteoarthritis at any level of the lumbar spine and the development of LBP.

Reports indicate that the orientation of the facet joints is associated with the development of spinal osteoarthritis. In a study of 150 patients, Linov et al found that a particularly sagittal orientation of the L4 and L5 facet joints appeared to be linked to the disease. ^[32]

A study by Yoshiiwa et al indicated that ligamentum flavum hypertrophy is related to severe facet joint osteoarthritis, as well as to lumbar segmental instability and severe disk degeneration and a sagittalized facet joint orientation. ^[33]

Synovial capsule distention and inflammation

Dory attributed LBP from facet syndrome to distention and inflammation of the synovial capsule, with resultant stimulation of the nociceptive nerve endings. ^[34] Expanded synovial recesses may also compress nerve roots in the spinal canal and neural foramina, which may explain the presence of radicular pain in patients with facet syndrome. Lippitt attributed pain in facet syndrome to a combination of synovitis, segmental instability, and degenerative arthritis. ^[35]

Rheumatoid arthritis

Using magnetic resonance imaging (MRI) scans, a study by Yamada et al of 201 patients with rheumatoid arthritis found erosion of the lumbar facets and endplates in 76.6% and 70.6% of patients, respectively, with the erosion occurring at 38.7% and 33.8% of intervertebral levels, respectively. Facet and endplate erosion both occurred most commonly at the midlumbar and lower-lumbar areas. A correlation was seen between facet erosion and the presence of spondylolisthesis. ^[36]

Other

Other theories regarding the causes of LBP include meniscoid entrapment, synovial impingement, joint subluxation, chondromalacia facette, capsular and synovial inflammation, mechanical injury to the joint capsule, and the restriction of normal articular motion from soft or articular causes.

Diagnostic Considerations

These include the following:

- Sacroiliac joint syndrome
- Internal disk disruption syndrome
- Lumbar spondylosis

Differential Diagnoses

- [Achilles Tendon Injuries](#)
- [Chronic Pain Syndrome](#)
- [Coccyx Pain](#)
- [Lumbar Compression Fracture](#)
- [Lumbar Degenerative Disk Disease](#)
- [Lumbar Spondylolysis and Spondylolisthesis](#)
- [Mechanical Low Back Pain](#)
- [Overuse Injury](#)
- [Physical Medicine and Rehabilitation for Myofascial Pain](#)
- [Physical Medicine and Rehabilitation for Piriformis Syndrome](#)
- [Rehabilitation and Fibromyalgia](#)

Imaging Studies

See the list below:

- Abnormalities on plain radiographs, computed tomography (CT) scans, and magnetic resonance imaging (MRI) scans ^[37] are not specific for patients with back pain; degenerative changes are often found in asymptomatic persons. Although some clinicians may use plain radiography and CT scanning to investigate or even diagnose facet joint pain, no radiographic findings identify lumbar facet joints as the source of low back pain and referred lower extremity pain. ^[38]
- A limited number of studies have attempted to establish correlation between osteoarthritic changes and response to blocking of the joints. While some earlier studies demonstrated such a relationship, others have failed to do so. Furthermore, findings from MRI scans, CT scans, dynamic bending radiographs, and radionuclide bone scans cannot be used to reliably help predict lumbar facet joint pain.
- Schwarzer and colleagues concluded that CT scanning has no place in the diagnosis of lumbar facet joint pain. ^[39] They used the stringent criteria of 80% pain relief for the duration of bupivacaine anesthesia and negative relief with saline control injection. The investigators did not observe any correlation between CT-scan findings and response to diagnostic injections.

Procedures

See the list below:

- The use of diagnostic blocks is fundamental to a diagnosis of lumbar facet joint pain. Regardless of the symptoms, one characteristic that all patients with such pain share is the relief of pain once a local anesthetic has been injected. Fluoroscopically guided blocks of the joints constitute the only available standard to correlate with any clinical or radiographic test for facet joint pain. ^[40]
- Single diagnostic blocks are a poor standard. Those employed without the provision of controls led to a false-positive rate of 38% in a lumbar study ^[20] and a 27% false-positive rate in a cervical study, with a 32% placebo rate in still another investigation. If an investigator relied on a single, uncontrolled block, 1 of every 3 apparently positive blocks would be a false positive. A reliable diagnosis must be accompanied by observation in relation to control subjects.
- Control observation can be achieved either with saline injection around the joint while shielding the patient from view of the injections or through use of a confirmatory block. In a confirmatory block, relief achieved with the first local anesthetic is accompanied by relief provided by a second injection for a duration commensurate with the half-life of the second local anesthetic. A patient with genuine facet joint pain should experience relief with the first injection and feel no relief if injected with saline or, if injected with the confirmatory block, experience the same relief that he/she did with the first injection, but for a longer period of time.
- The use of double blocks to confirm facet pain is not without limitations. When an appropriate duration of relief with a confirmatory block was required, Lord and colleagues found in cervical studies that specificity was high (88%) but that sensitivity was low (54%) in comparison with double-blinded, randomized, placebo-controlled triple blocks. ^[41] When diagnostic criteria for the double blocks were expanded to include all

patients with reproducible relief, regardless of duration, sensitivity increased to 100% but specificity was lowered to 65%. The authors concluded that a clinician's choice of controls depends on the implications of the results. If innocuous therapy is prescribed, relief of pain, regardless of duration, with a double block may suffice. When diagnostic certainty is critical, such as in a medicolegal context or when surgical intervention is contemplated, placebo-controlled blocks are recommended.

- The use of saline around the joint for control observation also has limitations. Of the various possible combinations of responses to 2 injections, pain relief in the same patient with local anesthetic and with saline poses a dilemma. The clinician could conclude that the patient does not have facet joint pain, having falsely responded to the local anesthetic and to the saline. However, a response to the saline injection does not necessarily negate the validity of the first injection with local anesthetic; it may instead indicate that the patient responded to a placebo. The individual may have true facet pain in addition to being a placebo responder. Because of this, some clinicians often proceed with RF neurotomy in patients who obtain 80% relief with lidocaine and with saline, depending on the clinical presentation. Studies are being conducted to report outcomes based on such an approach.
- Facet diagnostic blocks can be performed intra-articularly and at the dorsal medial branches that supply the joint. The latter site is used if the joint is not accessible or as a means of avoiding the theoretical risk of needle damage to the joint. Barnsley and Bogduk found that local anesthetic blocks of the cervical medial branches are a specific test for the diagnosis of cervical facet joint pain. In their study, local anesthetic always reached the target nerve and did not affect any other diagnostically important structures.^[42] Dreyfuss and colleagues determined that, with the use of appropriate technique, lumbar medial branch blocks are target specific.^[43] The use of 0.5 mL of lidocaine adequately bathed the site of the target nerve and trivialized the spread to the dorsal root or the epidural spread to other potential pain generators.
- With well-controlled studies reporting 7-14% prevalence rates for facet joint pain, clinicians must adopt stringent criteria for diagnosing facet joint pain. In this way, they can avoid unnecessarily subjecting a large portion of patients with chronic low back pain to various treatments aimed at facet joint pain.

Rehabilitation Program

Physical Therapy

No studies have compared the efficacy of one type of physical therapy over another in the treatment of lumbar facet arthropathy. Once the diagnosis of facet joint pain has been confirmed and pain has been brought under control with appropriate treatment, experienced clinicians generally recommend physical therapy for reconditioning, as well as lumbar stabilization exercises.

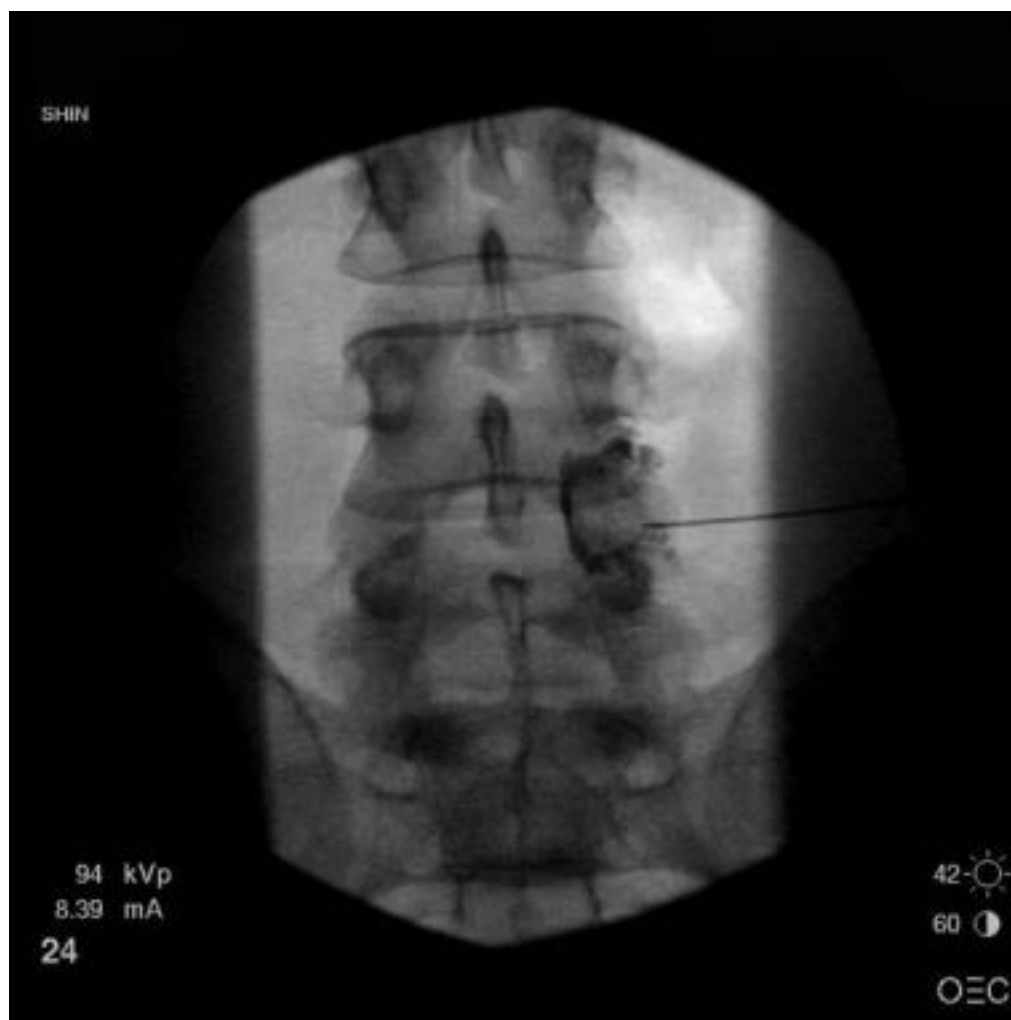
Surgical Intervention

Currently, no surgical intervention is advocated for lumbar facet joint pain.

Other Treatment

Facet joint pain is usually not considered until conservative measures for treating low back pain (LBP) have been tried without success. No current studies advocate or assess the efficacy of specific physical therapy or manipulations aimed at treating facet joint pain.

Currently, 2 treatments are available for facet joint pain. These are (1) intra-articular steroid/local anesthetic injection under fluoroscopic guidance (see images below) and (2) [radiofrequency ablation](#) to block the joint from all sensory input. Some authorities have also advocated the use of pulsed radiofrequency^[44] at a lower temperature. Prior to radiofrequency ablation, medial branch blocks or intra-articular facet injections are typically done. Medial branch blocks appear to have better prognostic outcomes than intra-articular facet injections.^[45]



Anteroposterior view of right L4-5 facet intra-articular injection with contrast.

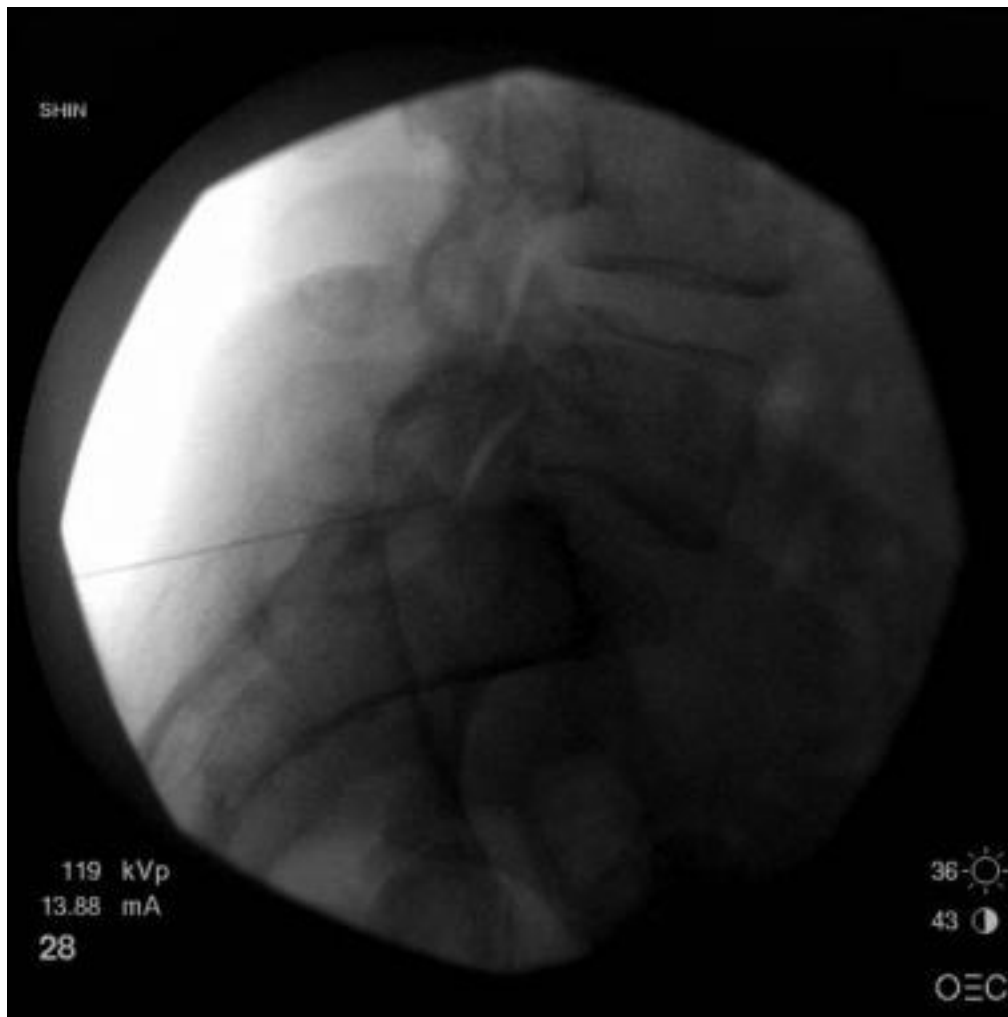
[View Media Gallery](#)



Lateral view of right

L4-5 facet intra-articular injection with contrast.

[View Media Gallery](#)



Oblique view of right

L4-5 facet intra-articular injection with contrast.

[View Media Gallery](#)

A third treatment option is surgical fusion of the joint, but no published reports describe such treatment for lumbar facet arthropathy.

In addition, a retrospective study by Nedelka et al indicated that shock-wave therapy produces better long-term results in alleviating lumbar facet joint pain than do corticosteroid injections and suggested that the treatment is almost as effective as RF neurotomy. The report, on 62 patients with unilateral chronic lumbar facet pain, also found that shock-wave treatment and RF neurotomy provided long-term improvement in the performance of daily activities. ^[46]

Details about treatment with injection or [ablation](#) are as follows.

Intra-articular facet joint injection

Numerous early studies of this procedure are not worth mentioning because of their serious flaws with diagnostic criteria, the location of injections, and the injection volumes used. A study by Lynch and Taylor was able to demonstrate that intra-articular injection was superior to extra-articular injection, but, after 6 months of follow-up, the statistical significance had disappeared. ^[47]

In 1989, Lilius and colleagues prospectively studied 109 patients with chronic LBP. They were distributed randomly into 1 of 3 groups that received injections of intra-articular cortisone/anesthetic, intra-articular saline, or pericapsular cortisone/anesthetic. Although pain relief was substantial, with 36% of patients reporting benefits that persisted for up to 3 months, no significant differences were noted between groups. These results led the authors to conclude that facet joint injection is a nonspecific method of treatment and that good results reflect the tendency of LBP to undergo spontaneous remission. Two critical flaws are noted in this study. First, the authors

did not preselect subjects with diagnostic facet joint injections. Second, the intra-articular facet joint injection volumes of up to 8 mL were excessive.

In 1991, a controlled study by Carette and coauthors randomized patients into 2 groups; one group received an intra-articular methyl prednisolone/local anesthetic mixture and the other received intra-articular saline.^[19] Patients were preselected with local anesthetic into the facet joints at L4-5 and L5-S1 and reported pain relief of greater than 50%. When the patients were tracked for 6 months, no difference in pain relief was noted between the 2 groups, with the data suggesting that intra-articular facet joint injections with corticosteroids were not effective in treating chronic LBP. This study was flawed in that only a single lidocaine injection, which is subject to false-positive readings and placebo responses, was used to determine the presence of facet joint pain. Furthermore, the assumption that saline is a true inert placebo may be flawed.

Other studies have shown that saline provides pain relief to a greater degree than would be expected from placebo. At 6-month follow-up, 46% of the steroid group and 15% of the saline group had good pain relief; however, the authors invalidated this finding because only a portion of both groups that reported pain relief at 1 month had actual pain relief at 6 months.

A study by Huang indicated that fluoroscopically guided lumbar facet joint injections employing an interlaminar approach and loss-of-resistance technique can provide a successful alternative means of injecting osteoarthritic facet joints, particularly when osteophytes and/or extreme joint curvature in the transverse plane interfere with direct posterior access to severely arthritic joints.^[48]

RF neurotomy

Five controlled studies of RF neurotomy of the dorsal medial nerve branch have reported on the effectiveness of this procedure, and 1 study has reported on the effectiveness of repeated RF neurotomy for lumbar facet pain.

In the first study, from 1994, Gallagher and colleagues reported successful outcomes at up to 6 months of follow-up in patients who were treated with RF, compared with those who underwent sham treatments.^[49] Single intra- or extra-articular diagnostic injections were used, with an inclusion criterion of good or equivocal response. Shortcomings of the study were the small number of subjects, short duration of follow-up, and poor diagnostic criteria. Differential blocks were not used.

In the second study, from 1999, van Kleef and coauthors reported that a 1-year follow-up, significant pain reduction was found in 7 of 15 patients who were treated with RF, compared with 2 of 15 patients who had undergone sham treatment.^[50] The diagnostic criterion was a single diagnostic joint injection with subsequent pain relief of 50% or more. Shortcomings of the study were the number of subjects and the fact that differential blocks were not used.

In the third study, from 2000, Dreyfuss and co-investigators reported a rate of successful outcome of 87% at 1-year follow-up in 15 patients; the individuals were treated with RF after successful differential diagnostic injections.^[51] Weaknesses of this study were the number of subjects and the lack of a control group. However, strict diagnostic criteria were used, including 80% pain relief and differential blocks with lidocaine and bupivacaine.

In the fourth study, from 2001, Leclaire and colleagues reported on 70 patients who were randomized to RF treatment versus sham treatment after single diagnostic facet injections yielded good pain relief.^[52] No differences in outcome between the groups were noted at 12 weeks of follow-up. A large patient population was used, but the diagnostic criterion was poor. Single diagnostic injections with good relief are not valid to differentiate a facet joint pain population.

In the fifth study, from 2005, van Wijk and coauthors reported on 81 patients randomized to RF treatment versus sham treatment after a single diagnostic facet joint injection yielded 50% pain relief.^[53] No differences in outcome were noted between the groups. This study was again flawed by the limitation of single diagnostic injections. Careful reading of the study shows that although the authors reported on 462 patients, after accounting for excluded patients and dropouts, 37 had negative responses to the diagnostic injection and 81 had positive responses to the diagnostic injection, yielding an unusually high prevalence of facet joint pain.

In 2004, Schofferman and Kine retroactively reported on the effectiveness of repeated RF neurotomy for lumbar facet pain. ^[54] In 20 patients who had undergone a repeat RF treatment, an 85% success rate at a mean duration of 11.6 months was achieved.

Conclusions

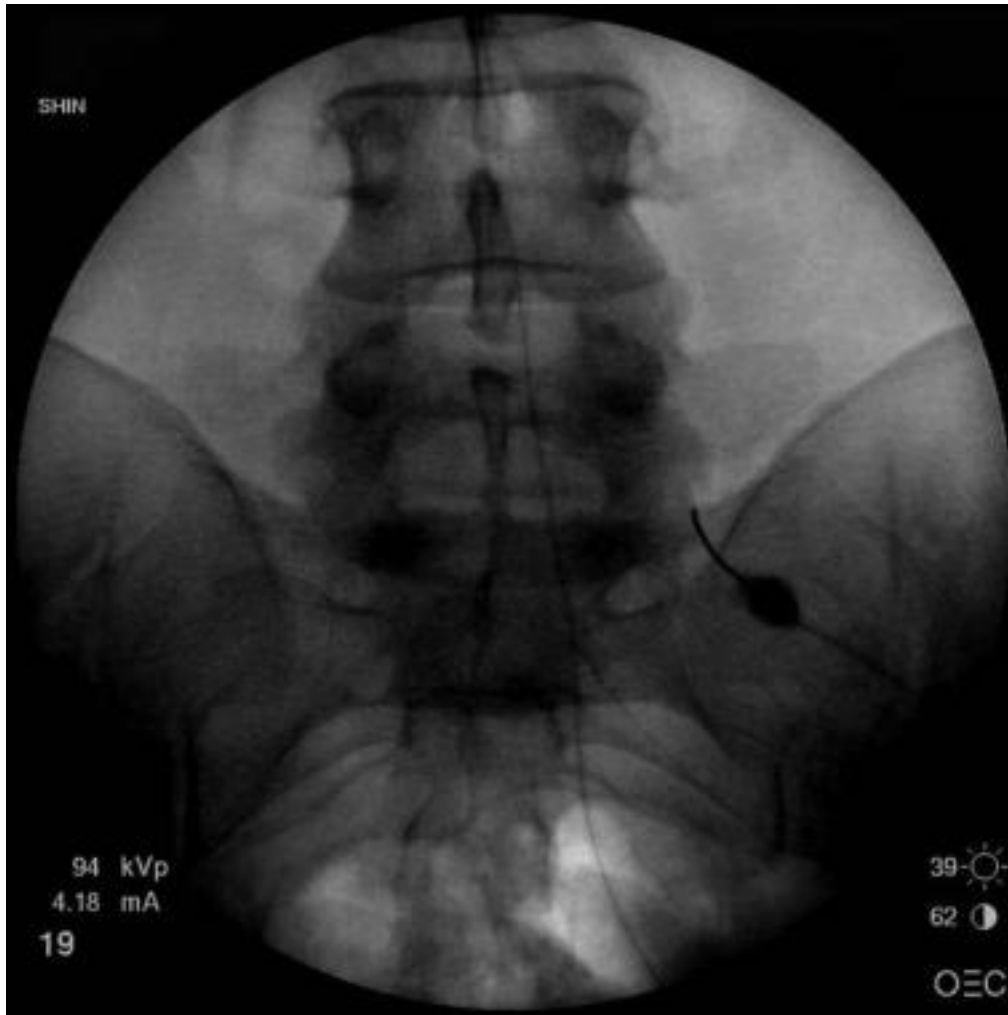
Of the first 5 studies reviewed above, 3 showed favorable outcomes, and 2 did not. Although the 2 studies that demonstrated no significant favorable outcomes utilized a larger population of patients, their use of a single diagnostic injection and their employment of a rather loose inclusion criterion of 50% pain relief or good pain relief were inadequate for differentiating a facet joint population. The study that used a strict 80% pain relief with differential block criterion did demonstrate a rather high success rate with RF treatment. However, this study lacked a control group.

RF ablation appears to be safe, with most studies reporting no associated complications. The complications that have been previously reported related to electrical faults and included cases of small superficial burns. A 2004 report by Kornick and colleagues on 616 treated lesions showed a 1% complication rate for neuritis. ^[55] The investigators reported no other complications.

In 2013, the American Society of Interventional Pain Physicians (ASIPP) released an update of their guidelines for interventional techniques in patients with chronic spinal pain. The guidelines state that evidence for the therapeutic efficacy of lumbar facet joint nerve blocks is fair to good but that there is only limited evidence for the efficacy of intra-articular lumbar injections. ^[56, 57]

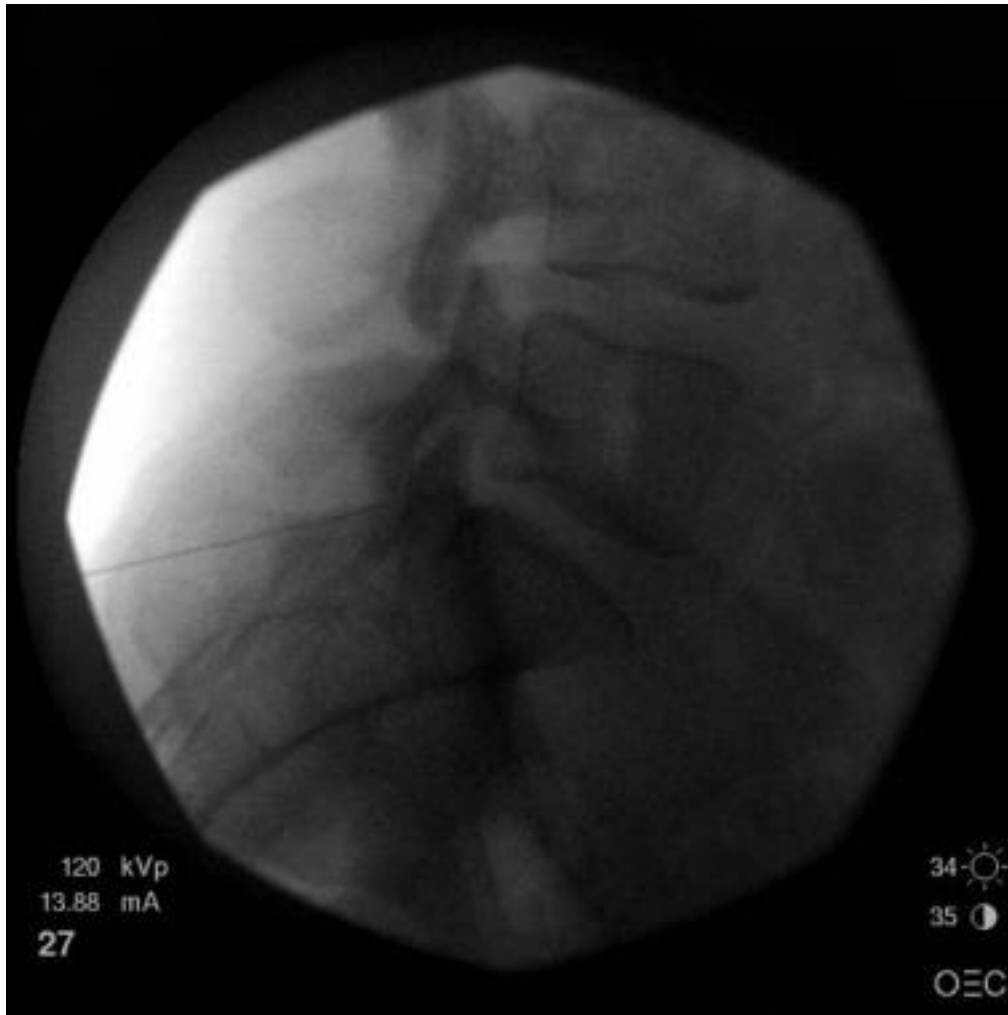
The ASIPP guidelines also state that there is good evidence for the therapeutic efficacy of RF ablation in lumbar facet joint interventions but that evidence for the efficacy of pulsed RF is limited. ^[56, 57]

A literature review by Manchikanti et al found level II evidence for long-term lumbar spine improvement with RF neurotomy and level III evidence for long-term improvement with lumbosacral intra-articular injections. ^[1]



Anteroposterior view of right L5 dorsal medial branch needle position (tip of the needle is at the neck of the sacral ala).

[View Media Gallery](#)



Lateral view of right L5 dorsal medial branch needle position (tip of the needle is at the neck of the sacral ala, just below the L5-S1 facet joint).

[View Media Gallery](#)



Anteroposterior view of right L4 dorsal medial branch needle position (tip of the needle is at the neck of the right L5 transverse process).

[View Media Gallery](#)



Lateral view of right L4 dorsal medial branch needle position (tip of the needle is at the neck of the right L5 transverse process, just below L4-5 facet joint).

[View Media Gallery](#)

1. Manchikanti L, Kaye AD, Boswell MV, et al. A Systematic Review and Best Evidence Synthesis of the Effectiveness of Therapeutic Facet Joint Interventions in Managing Chronic Spinal Pain. *Pain Physician*. 2015 Jul-Aug. 18 (4):E535-82. [\[Medline\]](#). [\[Full Text\]](#).
2. Badgley CE. The articular facet in relation to low back pain and sciatic radiation. *J Bone Joint Surg*. 1941. 23:481.
3. Ghormley RK. Low-back pain with special reference to the articular facets, with presentation of an operative procedure. *JAMA*. 1933. 101:1773-7.
4. Rees WS. Multiple bilateral subcutaneous rhizolysis of segmental nerves in the treatment of intervertebral disc syndrome. *Ann Gen Pract*. 1972. 26:126.
5. Shealy CN. Facets in back and sciatic pain. A new approach to a major pain syndrome. *Minn Med*. 1974 Mar. 57(3):199-203. [\[Medline\]](#).
6. Hirsch C, Ingelmark BE, Miller M. The anatomical basis for low back pain. Studies on the presence of sensory nerve endings in ligamentous, capsular and intervertebral disc structures in the human lumbar spine. *Acta Orthop Scand*. 1963. 33:1-17. [\[Medline\]](#).
7. Mooney V, Robertson J. The facet syndrome. *Clin Orthop Relat Res*. 1976 Mar-Apr. (115):149-56. [\[Medline\]](#).
8. McCall IW, Park WM, O'Brien JP. Induced pain referral from posterior lumbar elements in normal subjects. *Spine*. 1979 Sep-Oct. 4(5):441-6. [\[Medline\]](#).
9. Marks R. Distribution of pain provoked from lumbar facet joints and related structures during diagnostic spinal infiltration. *Pain*. 1989 Oct. 39(1):37-40. [\[Medline\]](#).
10. Kuslich SD, Ulstrom CL, Michael CJ. The tissue origin of low back pain and sciatica: a report of pain response to tissue stimulation during operations on the lumbar spine using local anesthesia. *Orthop Clin North Am*. 1991 Apr. 22(2):181-7. [\[Medline\]](#).

11. Bokov A, Isrelov A, Skorodumov A, Aleynik A, Simonov A, Mlyavykh S. An analysis of reasons for failed back surgery syndrome and partial results after different types of surgical lumbar nerve root decompression. *Pain Physician*. 2011 Nov-Dec. 14(6):545-57. [\[Medline\]](#).
12. Ashton IK, Ashton BA, Gibson SJ, et al. Morphological basis for back pain: the demonstration of nerve fibers and neuropeptides in the lumbar facet joint capsule but not in ligamentum flavum. *J Orthop Res*. 1992 Jan. 10(1):72-8. [\[Medline\]](#).
13. Giles LG, Harvey AR. Immunohistochemical demonstration of nociceptors in the capsule and synovial folds of human zygapophyseal joints. *Br J Rheumatol*. 1987 Oct. 26(5):362-4. [\[Medline\]](#).
14. Grönblad M, Korkala O, Kontinen YT, et al. Silver impregnation and immunohistochemical study of nerves in lumbar facet joint plical tissue. *Spine*. 1991 Jan. 16(1):34-8. [\[Medline\]](#).
15. Netzer C, Urech K, Hugle T, Benz RM, Geurts J, Scharen S. Characterization of subchondral bone histopathology of facet joint osteoarthritis in lumbar spinal stenosis. *J Orthop Res*. 2016 Aug. 34 (8):1475-80. [\[Medline\]](#).
16. Adams MA, Hutton WC. The effect of posture on the role of the apophysial joints in resisting intervertebral compressive forces. *J Bone Joint Surg Br*. 1980 Aug. 62(3):358-62. [\[Medline\]](#). [\[Full Text\]](#).
17. Schmidt H, Heuer F, Wilke HJ. Interaction between finite helical axes and facet joint forces under combined loading. *Spine*. 2008 Dec 1. 33(25):2741-8. [\[Medline\]](#).
18. Jackson RP, Jacobs RR, Montesano PX. 1988 Volvo award in clinical sciences. Facet joint injection in low-back pain. A prospective statistical study. *Spine*. 1988 Sep. 13(9):966-71. [\[Medline\]](#).
19. Carette S, Marcoux S, Truchon R, et al. A controlled trial of corticosteroid injections into facet joints for chronic low back pain. *N Engl J Med*. 1991 Oct 3. 325(14):1002-7. [\[Medline\]](#).
20. Schwarzer AC, Aprill CN, Derby R, et al. The false-positive rate of uncontrolled diagnostic blocks of the lumbar zygapophysial joints. *Pain*. 1994 Aug. 58(2):195-200. [\[Medline\]](#).
21. Schwarzer AC, Aprill CN, Derby R, et al. Clinical features of patients with pain stemming from the lumbar zygapophysial joints. Is the lumbar facet syndrome a clinical entity?. *Spine*. 1994 May 15. 19(10):1132-7. [\[Medline\]](#).
22. Moran R, O'Connell D, Walsh MG. The diagnostic value of facet joint injections. *Spine*. 1988 Dec. 13(12):1407-10. [\[Medline\]](#).
23. Schwarzer AC, Wang S, Laurent R, et al. The role of the zygapophysial joint in chronic low back pain [abstract]. *Aust NZ J Med*. 1992. 22:185.
24. Schwarzer AC, Wang SC, Bogduk N, et al. Prevalence and clinical features of lumbar zygapophysial joint pain: a study in an Australian population with chronic low back pain. *Ann Rheum Dis*. 1995 Feb. 54(2):100-6. [\[Medline\]](#). [\[Full Text\]](#).
25. Manchikanti L, Boswell MV, Singh V, et al. Prevalence of facet joint pain in chronic spinal pain of cervical, thoracic, and lumbar regions. *BMC Musculoskelet Disord*. 2004 May 28. 5:15. [\[Medline\]](#). [\[Full Text\]](#).
26. Raymond J, Dumas JM. Intraarticular facet block: diagnostic test or therapeutic procedure?. *Radiology*. 1984 May. 151(2):333-6. [\[Medline\]](#). [\[Full Text\]](#).
27. Revel ME, Listrat VM, Chevalier XJ, et al. Facet joint block for low back pain: identifying predictors of a good response. *Arch Phys Med Rehabil*. 1992 Sep. 73(9):824-8. [\[Medline\]](#).
28. Ko S, Vaccaro AR, Lee S, Lee J, Chang H. The prevalence of lumbar spine facet joint osteoarthritis and its association with low back pain in selected Korean populations. *Clin Orthop Surg*. 2014 Dec. 6 (4):385-91. [\[Medline\]](#). [\[Full Text\]](#).
29. Manchikanti L, Manchikanti KN, Cash KA, et al. Age-related prevalence of facet-joint involvement in chronic neck and low back pain. *Pain Physician*. 2008 Jan. 11(1):67-75. [\[Medline\]](#). [\[Full Text\]](#).
30. Varlotta GP, Lefkowitz TR, Schweitzer M, Errico TJ, Spivak J, Bendo JA, et al. The lumbar facet joint: a review of current knowledge: Part II: diagnosis and management. *Skeletal Radiol*. 2011 Feb. 40(2):149-57. [\[Medline\]](#).
31. Kalichman L, Li L, Kim DH, et al. Facet joint osteoarthritis and low back pain in the community-based population. *Spine*. 2008 Nov 1. 33(23):2560-5. [\[Medline\]](#).
32. Linov L, Klindukhov A, Li L, et al. Lumbar facet joint orientation and osteoarthritis: a cross-sectional study. *J Back Musculoskelet Rehabil*. 2013. 26(4):421-6. [\[Medline\]](#).
33. Yoshiiwa T, Miyazaki M, Notani N, Ishihara T, Kawano M, Tsumura H. Analysis of the Relationship between Ligamentum Flavum Thickening and Lumbar Segmental Instability, Disc Degeneration, and Facet Joint Osteoarthritis in Lumbar Spinal Stenosis. *Asian Spine J*. 2016 Dec. 10 (6):1132-1140. [\[Medline\]](#). [\[Full Text\]](#).
34. Dory MA. Arthrography of the lumbar facet joints. *Radiology*. 1981 Jul. 140(1):23-7. [\[Medline\]](#). [\[Full Text\]](#).
35. Lippitt AB. The facet joint and its role in spine pain. Management with facet joint injections. *Spine*. 1984 Oct. 9(7):746-50. [\[Medline\]](#).
36. Yamada K, Suzuki A, Takahashi S, et al. MRI evaluation of lumbar endplate and facet erosion in rheumatoid arthritis. *J Spinal Disord Tech*. 2014 Jun. 27(4):E128-35. [\[Medline\]](#).
37. Carrino JA, Lurie JD, Tosteson AN, et al. Lumbar spine: reliability of MR imaging findings. *Radiology*. 2009 Jan. 250(1):161-70. [\[Medline\]](#).
38. Maus T. Imaging the back pain patient. *Phys Med Rehabil Clin N Am*. 2010 Nov. 21(4):725-66. [\[Medline\]](#).
39. Schwarzer AC, Wang SC, O'Driscoll D, et al. The ability of computed tomography to identify a painful zygapophysial joint in patients with chronic low back pain. *Spine*. 1995 Apr 15. 20(8):907-12. [\[Medline\]](#).

40. Cohen SP, Hurley RW. The ability of diagnostic spinal injections to predict surgical outcomes. *Anesth Analg*. 2007 Dec. 105(6):1756-75, table of contents. [\[Medline\]](#).
41. Lord SM, Barnsley L, Wallis BJ, et al. Chronic cervical zygapophysial joint pain after whiplash. A placebo-controlled prevalence study. *Spine*. 1996 Aug 1. 21(15):1737-44; discussion 1744-5. [\[Medline\]](#).
42. Barnsley L, Bogduk N. Medial branch blocks are specific for the diagnosis of cervical zygapophyseal joint pain. *Reg Anesth*. 1993 Nov-Dec. 18(6):343-50. [\[Medline\]](#).
43. Dreyfuss P, Schwarzer AC, Lau P, et al. Specificity of lumbar medial branch and L5 dorsal ramus blocks. A computed tomography study. *Spine*. 1997 Apr 15. 22(8):895-902. [\[Medline\]](#).
44. Kroll HR, Kim D, Danic MJ, et al. A randomized, double-blind, prospective study comparing the efficacy of continuous versus pulsed radiofrequency in the treatment of lumbar facet syndrome. *J Clin Anesth*. 2008 Nov. 20(7):534-7. [\[Medline\]](#).
45. Cohen SP, Moon JY, Brummett CM, White RL, Larkin TM. Medial Branch Blocks or Intra-Articular Injections as a Prognostic Tool Before Lumbar Facet Radiofrequency Denervation: A Multicenter, Case-Control Study. *Reg Anesth Pain Med*. 2015 Jul-Aug. 40 (4):376-83. [\[Medline\]](#).
46. Nedelka T, Nedelka J, Schlenker J, et al. Mechano-transduction effect of shockwaves in the treatment of lumbar facet joint pain: comparative effectiveness evaluation of shockwave therapy, steroid injections and radiofrequency medial branch neurotomy. *Neuro Endocrinol Lett*. 2014. 35(5):393-7. [\[Medline\]](#).
47. Lynch MC, Taylor JF. Facet joint injection for low back pain. A clinical study. *J Bone Joint Surg Br*. 1986 Jan. 68(1):138-41. [\[Medline\]](#). [\[Full Text\]](#).
48. Huang AJ. Fluoroscopically guided lumbar facet joint injection using an interlaminar approach and loss of resistance technique. *Skeletal Radiol*. 2016 May. 45 (5):671-6. [\[Medline\]](#).
49. Gallagher J, Petriccione di Vadi PL, Wedley JR. Radiofrequency facet joint denervation in the treatment of low back pain: a prospective controlled double-blind study to assess its efficacy. *Pain Clin*. 1994. 7(3):193-8.
50. van Kleef M, Barendse GA, Kessels A, et al. Randomized trial of radiofrequency lumbar facet denervation for chronic low back pain. *Spine*. 1999 Sep 15. 24(18):1937-42. [\[Medline\]](#).
51. Dreyfuss P, Halbrook B, Pauza K, et al. Efficacy and validity of radiofrequency neurotomy for chronic lumbar zygapophysial joint pain. *Spine*. 2000 May 15. 25(10):1270-7. [\[Medline\]](#).
52. Leclaire R, Fortin L, Lambert R, et al. Radiofrequency facet joint denervation in the treatment of low back pain: a placebo-controlled clinical trial to assess efficacy. *Spine*. 2001 Jul 1. 26(13):1411-6; discussion 1417. [\[Medline\]](#).
53. van Wijk RM, Geurts JW, Wynne HJ, et al. Radiofrequency denervation of lumbar facet joints in the treatment of chronic low back pain: a randomized, double-blind, sham lesion-controlled trial. *Clin J Pain*. 2005 Jul-Aug. 21(4):335-44. [\[Medline\]](#).
54. Schofferman J, Kine G. Effectiveness of repeated radiofrequency neurotomy for lumbar facet pain. *Spine*. 2004 Nov 1. 29(21):2471-3. [\[Medline\]](#).
55. Kornick C, Kramarich SS, Lamer TJ, et al. Complications of lumbar facet radiofrequency denervation. *Spine*. 2004 Jun 15. 29(12):1352-4. [\[Medline\]](#).
56. Manchikanti L, Falco FJ, Singh V, et al. An update of comprehensive evidence-based guidelines for interventional techniques in chronic spinal pain. Part I: introduction and general considerations. *Pain Physician*. 2013 Apr. 16(2 Suppl):S1-48. [\[Medline\]](#).
57. Manchikanti L, Abdi S, Atluri S, et al. An update of comprehensive evidence-based guidelines for interventional techniques in chronic spinal pain. Part II: guidance and recommendations. *Pain Physician*. 2013 Apr. 16(2 Suppl):S49-283. [\[Medline\]](#).
58. Beaman DN, Graziano GP, Glover RA, et al. Substance P innervation of lumbar spine facet joints. *Spine*. 1993 Jun 15. 18(8):1044-9. [\[Medline\]](#).
59. Borenstein D. Does osteoarthritis of the lumbar spine cause chronic low back pain?. *Curr Pain Headache Rep*. 2004 Dec. 8(6):512-7. [\[Medline\]](#).
60. Eubanks JD, Lee MJ, Cassinelli E, et al. Prevalence of lumbar facet arthrosis and its relationship to age, sex, and race: an anatomic study of cadaveric specimens. *Spine*. 2007 Sep 1. 32(19):2058-62. [\[Medline\]](#).
61. Wilde VE, Ford JJ, McMeeken JM. Indicators of lumbar zygapophyseal joint pain: survey of an expert panel with the Delphi technique. *Phys Ther*. 2007 Oct. 87(10):1348-61. [\[Medline\]](#).
62. Willburger RE, Wittenberg RH. Prostaglandin release from lumbar disc and facet joint tissue. *Spine*. 1994 Sep 15. 19(18):2068-70. [\[Medline\]](#).

- **Sections Lumbar Facet Arthropathy**

- [Overview](#)

- [Background](#)
- [Pathophysiology](#)
- [Epidemiology](#)
- [Show All](#)

- [Presentation](#)

- [DDx](#)
- [Workup](#)
- [Treatment](#)
- [Medication](#)
- [Follow-up](#)
- [Media Gallery](#)
- [References](#)