



Endoscopic Spine: Medial Branch Nerve Transection (MBT)

Scientific Update

Lumbar facet pain, most commonly caused by facet arthropathy, accounts for 15-45% of all lower back pain.¹ An endoscopic approach to MBT can lead to relief from pain caused by facet joint arthropathy. MBT has been shown to have better long-term outcomes than the traditional treatment method of radiofrequency ablation (RFA), with the median pain-free period being twice as long for MBT compared to RFA.² Combining 4K visualization with minimally invasive techniques allows surgeons to view and treat pathology while maintaining surgical precision and reducing postoperative complications.^{3,4}

Perolat R,
Kastler A,
Nicot B,
Pellat JM,
Tahon F,
Attye A,
Heck O,
Bouabagra K,
Grand S,
Krainik A

[Facet joint syndrome: from diagnosis to interventional management.](#) *Insights Imaging.* 2018;9(5):773-789. doi:10.1007/s13244-018-0638-x

- Lumbar facet joints constitute a common source of pain, accounting for 15-45% of lower back pain
- Facet arthrosis is the most frequent form of facet pathology
- There are no effective correlations between clinical symptoms, physical examination, and degenerative spinal changes
- Diagnostic positive facet joint block / medial branch block can indicate facet joints as the source of pain

Takeaway

Facet joint syndrome, a common cause of lower back pain, presents challenges in diagnosis due to the lack of effective correlations between clinical symptoms and degenerative spinal changes. Facet joint blocks serve as a key diagnostic tool for identifying the source of pain for interventional management.

Kalichman L,
Hunter DJ

[Lumbar facet joint osteoarthritis: a review.](#) *Semin Arthritis Rheum.* 2007;37(2):69-80. doi:10.1016/j.semarthrit.2007.01.007

- The facet joints play an important role in load transmission. They provide posterior load-bearing, stabilizing motion in flexion and extension and also restricting axial movement to avoid the potential for over-rotation.
- Studies have shown improvement of function and decreases in pain may last 6 to 12 months following lumbar medial branch ablation

Takeaway

Facet joints are crucial for load transmission, providing posterior loadbearing and stabilizing flexion and extension motions and limiting excessive axial rotation. Studies show that enhancements in function and pain reduction following lumbar medial branch ablation can persist for a duration of 6 to 12 months.



Streetman D,
Fricker JG,
Garner GL,
Webb AL,
Pierzchajlo N,
Patel NA,
Howard NA,
Hardin EM,
Smith TE,
Hagley AJ,
Shalom M,
Brown NJ,
Gendreau JL

[Endoscopic rhizotomy for facetogenic back pain: a review of the history, financial considerations, patient selection criteria, and clinical outcomes.](#) *World Neurosurg.* 2023;169:36-41. doi:10.1016/j.wneu.2022.10.020

- Endoscopic rhizotomy for the treatment of lumbar facet joint pain costs approximately 4 times more than traditional RFA. This is due to the cost of training, longer intraoperative time (twice that of RFA), and special equipment and instrumentation.
- However, long-term outcomes for rhizotomy appear to be superior to those of RFA, with a median pain-free duration twice that of RFA
- Some studies have based inclusion criteria on refractory lower back pain that has been resistant to physical therapy and NSAID treatment for longer than 2 months. Other studies suggest even more rigorous nonsurgical treatment, such as the use of opioids, before operative intervention.
- Three different studies required >80% symptom relief with steroid injections for inclusion. In 2 studies, MacNab scores at 12-months post-op measured 97.8% and 96.7% of patients with “excellent” or “good” outcomes, respectively.
- One study measured a 0% “excellent” or “good” outcome MacNab score for conservative therapy, including NSAIDs and physical therapy, while the comparison intervention was RFA, which achieved a rate of 70% of patients with “excellent” or “good” outcomes

Takeaway

Endoscopic rhizotomy, though 4 times more expensive than traditional RFA for lumbar facet joint pain, exhibits superior long-term outcomes with a doubled median pain-free duration, emphasizing stringent inclusion criteria and notable success rates compared to conservative therapies.

Yeung A,
Gore S

[Endoscopically guided foraminal and dorsal rhizotomy for chronic axial back pain based on cadaver and endoscopically visualized anatomic study.](#) *Int J Spine Surg.* 2014;8:23. doi:10.14444/1023

- Retrospective, nonrandomized study of 50 patients to assess the efficacy of endoscopic rhizotomy
- At 1-year follow-up, visual analog scale (VAS) improved 6.2 to 2.5 and Oswestry Disability Index (ODI) scores improved from 48 to 28. All patients had VAS improvement that was equal to or greater than that with injection.

Takeaway

In a retrospective study of 50 patients undergoing endoscopic rhizotomy for lumbar facet joint pain, significant 1-year improvements included a decrease in scores from 6.2 to 2.5, an improvement in ODI scores from 48 to 28, and all patients experiencing VAS improvement equal to or surpassing injection-based treatments.



Starr JB,
Gold LS,
McCormick Z,
Suri P,
Friedly J

[Repeat procedures and prescription opioid use after lumbar medial branch nerve radiofrequency ablation in commercially insured patients.](#) *Spine J.* 2020;20(3):344-351. doi:10.1016/j.spinee.2019.10.005

- The median time to repeat RFA was about 1 year post-op (350-355 days)
- Found that approximately 1 in 3 patients (33.5%) who receive lumbar RFA repeat the procedure within 3 years. Nearly half (45.7%) repeat within 7 years.

Takeaway

Patients undergoing lumbar facet joint treatment with RFA have a median time of approximately 1 year for repeat procedures, with 33.5% choosing to repeat within 3 years and 45.7% within 7 years.

Meloncelli S,
Germani G,
Urti I,
Divizia M,
Rosciano M,
Puntillo F,
Paladini A,
Varrassi G

[Endoscopic radiofrequency facet joint treatment in patients with low back pain: technique and long-term results. A prospective cohort study.](#) *Ther Adv Musculoskelet Dis.* 2020;12:1759720X20958979. doi:10.1177/1759720X20958979

- 40 total patients underwent endoscopic rhizotomy to treat facet joint pain
- Mean age was 61.8 years (39-81), with mean preoperative numeric rating scale (NRS) and ODI scores of 7.18 and 57.95, respectively
- Patients whose treatment was limited to 1-2 joints had significantly better patient-reported pain scores (NRS preop 7.05, postop 1.70) than those with 3 or more joints treated (NRS preop 7.30, postop 3.59)
- Patients younger than 60 years old were found to have significantly better patient-reported postoperative pain scores (ODI preop 44.67, postop 9.78) than those ages 60 years old and older (ODI preop 68.82, postop 37.64)
- Study found no clinically significant difference in patient-reported outcomes whether the patient had been treated with percutaneous RFA prior to treatment endoscopically

Takeaway

In a study involving 40 patients undergoing endoscopic rhizotomy for facet joint pain, those treated for 1-2 joints and patients under 60 years old reported significantly better postoperative pain scores, while no clinically significant difference was found in patient-reported outcomes based on prior percutaneous RFA treatment.



Jeong SY,
Kim JS,
Choi WS,
Hur JW,
Ryu KS

[The effectiveness of endoscopic radiofrequency denervation of medial branch for treatment of chronic low back pain](#) [published correction appears in *J Korean Neurosurg Soc.* 2014 Nov;56(5):454]. *J Korean Neurosurg Soc.* 2014;56(4):338-343. doi:10.3340/jkns.2014.56.4.338

- Retrospective study of 52 consecutive patients between October 2010 and December 2013 treated with endoscopic radiofrequency denervation of the medial branch nerve of the dorsal ramus
- VAS scores for back pain improved significantly from a pre-op mean of 7.1 to a post-op mean of 2.0 at 2-year follow-up
- Korean ODI improved from pre-op mean of 26.5% to a post-op mean of 7.7% at 2-year follow-up
- 80% of patients reported being satisfied with the procedure and had no postoperative complications

Takeaway

In a retrospective study of 52 consecutive patients undergoing endoscopic radiofrequency denervation for medial branch nerve treatment between October 2010 and December 2013, significant improvements were observed in back pain VAS scores, Korean ODI, and patient satisfaction, with 80% of patients reporting satisfaction and no postoperative complications at 2-year follow-up.

Du T,
Lu G,
Li J,
Ni B,
Shu W,
Sun T,
Yang D,
Zhu H

[Pain-free survival after endoscopic rhizotomy versus radiofrequency for lumbar facet joint pain: a real-world comparison study.](#) *Pain Physician.* 2022;25(1):E87-E94.

- Both groups showed significant decreases in scores
- Endoscopic rhizotomy saw better efficacy than radiofrequency in NRS, ODI, and Global Impression of Change (GIOC) scores
- The pain-free survival curves showed that median pain-free duration was 20 months for endoscopic rhizotomy and 10 months for radiofrequency
- This study showed a mean cost of \$3964 +/- \$154.9 USD for endoscopic rhizotomy versus a mean cost of \$979.1 +/- \$99.0 USD for RFA. This statistically shows that endoscopic rhizotomy is nearly 4 times more expensive than RFA. This study also showed that had double the median pain-free duration of RFA.

Takeaway

Preventing repeat RFAs may lead to a different cost analysis for long-term care, considering that RFA is known to have a high recurrence rate within 1 year that requires repeat interventions.



Factors determining the success of radiofrequency denervation in lumbar facet joint pain: a prospective study. *Eur Spine J.* 2011;20(12):2160-2165. doi:10.1007/s00586-011-1891-6

- Prospective study of 41 patients who received radiofrequency denervation to treat lumbar facet joint pain between January 2006 and June 2008. Patients were followed until completed 1-year post-op consultation.
- Success was defined as at least 50% pain reduction at 7-21 days, 6 months, and 1 year after treatment
- Success rate 7-21 days post-op was 76% (33 of 41 patients), 32% (13 of 41) at 6 months post-op, and 22% (9 of 41) at 1 year post-op. Median success duration was 17 weeks.
- Complete pain relief of at least 1-year post-op was achieved in just 4 patients (10%)
- 22% of patients felt significant pain reduction through their 1-year postoperative follow-up

Takeaway

In a prospective study of 41 patients receiving radiofrequency denervation for lumbar facet joint pain, success rates (defined as at least 50% pain reduction) were 76% at 7-21 days postoperatively, 32% at 6 months, and 22% at 1 year, with a median success duration of 17 weeks. Only 10% of patients achieved complete pain relief lasting at least 1 year, while 22% experienced significant pain reduction throughout the 1-year follow-up.

References

1. Perolat R, Kastler A, Nicot B, Pellat JM, Tahon F, Attie A, Heck O, Boubagra K, Grand S, Krainik A. Facet joint syndrome: from diagnosis to interventional management. *Insights Imaging.* 2018;9(5):773-789. doi:10.1007/s13244-018-0638-x
2. Streetman D, Fricker JG, Garner GL, Webb AL, Pierzchajlo N, Patel NA, Howard NA, Hardin EM, Smith TE, Hagley AJ, Shalom M, Brown NJ, Gendreau JL. Endoscopic rhizotomy for facetogenic back pain: a review of the history, financial considerations, patient selection criteria, and clinical outcomes. *World Neurosurg.* 2023;169:36-41. doi:10.1016/j.wneu.2022.10.020
3. Lewandrowski KU, Ransom NA, Yeung A. Return to work and recovery time analysis after outpatient endoscopic lumbar transforaminal decompression surgery. *J Spine Surg.* 2020;6(Suppl 1):S100-S115. doi:10.21037/jss.2019.10.01
4. Sivakanthan S, Williams JR, Feroze AH, Eaton J, Pan ZJ, Boop S, McGrath LB, Harmon K, Hofstetter CP. Endoscopic spine surgery in athletes: case series and review of literature. *World Neurosurg.* 2021;145:702-707. doi:10.1016/j.wneu.2020.08.211