International Medical Case Reports Journal

Dovepress
Taylor & Francis Group

Open Access Full Text Article

CASE REPORT

The Transverse Process Cluneal Approach (TPCA): First-in-Human Proximal Radiofrequency Ablation of the Superior Cluneal Nerve in a Patient With Clinical Features Consistent With Maigne's Syndrome — A Novel Anatomy-Based Clinical Case

Tamerlan Shokanov, Talgat Anashev, Yerdar Shaukhin

Department of Orthopedic Trauma and Pain Management, National Scientific Center of Traumatology and Orthopedics Named After N.D. Batpenov, Astana, Kazakhstan

Correspondence: Talgat Anashev, Email tamerlondon@rambler.ru

Background: Superior cluneal nerve (SCN) entrapment is an underrecognized cause of chronic low back and gluteal pain and is frequently misdiagnosed as lumbar radiculopathy or sacroiliac joint dysfunction. Radiofrequency ablation (RFA) of the SCN has been previously described only at the level of the iliac crest. No reports exist on proximal SCN ablation at the level of the lumbar transverse processes.

Objective: To describe a novel anatomy-based proximal technique for radiofrequency ablation of the superior cluneal nerve at the level of the L1–L3 transverse processes using the Transverse Process Cluneal Approach (TPCA), and to report the first-in-human clinical outcome.

Case Presentation: A 68-year-old female with chronic unilateral lumbogluteal pain refractory to conservative treatment presented with clinical features consistent with thoracolumbar junction syndrome (Maigne's syndrome). Imaging studies showed no structural pathology correlating with symptom severity. A targeted diagnostic block at the lateral border of the L1–L3 transverse processes produced >60% temporary pain relief, supporting the superior cluneal nerve as the primary pain generator (superior cluneal neuralgia). Subsequently, radiofrequency ablation was performed at the same anatomical level under fluoroscopic guidance.

Results: The procedure was well tolerated without complications. One month after RFA, pain intensity decreased from 8/10 to 0–1/10 on the visual analog scale, and the Oswestry Disability Index improved from 48% to 10%. At 3-month follow-up, sustained pain relief (VAS ≤2/10), functional improvement, and marked enhancement in quality of life (EQ-5D increase from 0.54 to 0.88) were observed.

Conclusion: Proximal radiofrequency ablation of the superior cluneal nerve at the level of the lumbar transverse processes using the TPCA technique appears to be a safe and effective minimally invasive treatment for superior cluneal neuralgia in a patient with clinical features consistent with Maigne's syndrome. This approach enables anatomically precise denervation prior to fascial penetration and may offer an alternative to distal cluneal nerve interventions. Further studies with longer follow-up are warranted to evaluate durability and reproducibility.

Keywords: superior cluneal nerve, superior cluneal neuralgia, Maigne's syndrome, thoracolumbar junction syndrome, radiofrequency ablation, chronic low back pain, minimally invasive pain intervention, anatomy-based approach

Relevance of the Issue of Chronic Lumbar-Gluteal Pain

Low back pain is one of the most prevalent complaints worldwide. According to the Global Burden of Disease Study, in 2020, approximately 619 million people suffered from low back pain, and by 2050, this figure may rise to 843 million.

https://doi.org/10.2147/IMCRJ.S590996
Received: 30 December 2025
Accepted: 19 March 2026
Published: 12 May 2026

Pain is a leading cause of restricted mobility and disability: chronic low back pain ranks among the primary causes of loss of work capacity and diminished quality of life, placing a substantial economic burden on society. Moreover, up to 90% of all cases of low back pain are classified as "nonspecific," meaning there is no clearly identifiable structural cause, which in itself underscores the challenges of diagnosis and management. Epidemiological studies indicate that cluneal nerve involvement is present in 2–12% of cases of chronic low back pain; however, this diagnosis is frequently missed (the so-called "pseudoradiculopathy").[1]

Diagnostic Challenges and Differential Diagnosis

The diagnosis of lumbar pain is complicated by the wide variety of possible etiologies and overlapping clinical presentations. Nonspecific pain implies that, in most cases, a distinct anatomical cause is not identified, necessitating that clinicians rule out a broad spectrum of conditions: intervertebral disc herniation, spinal canal stenosis, facet joint arthropathy, sacroiliitis, hip joint pathologies, and so on.[1] Moreover, conventional diagnostic modalities (X-ray, CT, MRI) frequently fail to identify pathology in cases of so-called non-specific low back pain. Specifically, in Maigne's syndrome, radiographic changes are typically absent.[2] Importantly, thoracolumbar junction syndrome (Maigne's syndrome) may clinically overlap with superior cluneal neuralgia; therefore, targeted blocks can help identify the dominant pain generator. Furthermore, numerous orthopedic and neurological syndromes (including radiculopathy, myofascial syndrome, and peripheral nerve neuropathies) elicit similar clinical complaints. As indicated in the literature, this "masking" characteristic is precisely why Maigne's syndrome is frequently underdiagnosed and erroneously attributed to lumbosacral radiculopathy or sacroiliitis.[3] Differential diagnosis may also be complicated by variability in refractoriness to standard therapy. Patients may report complaints of pain radiating to the gluteal region, thigh, or groin, which is characteristic of many other conditions.

Anatomy of the Superior Cluneal Nerves

At the level of the transverse processes of L1–L3, the superior cluneal nerves arise from the dorsal rami of the corresponding lumbar nerves and course laterally, perforating the thoracolumbar fascia in the region of the iliac crest. This positioning renders them a significant anatomical landmark for performing radiofrequency ablation of posterior lumbar structures. According to the morphological study by Iwanaga et al (2019), the formation of the superior cluneal nerves involves the dorsal branches of L1 (75%), L2 (90%), and L3 (95%), and in certain cases, L4 (45%) and L5 (10%), which substantiates their association with the upper lumbar level.[4] In the study by Gyorfi (2023), the cluneal nerves are also situated at the level of the lateral border of the transverse processes (Figure 1).[5]

A similar topographical distribution of the branches can be observed in the digital anatomical atlas (Human Anatomy Atlas 2026, Visible Body Apps LLC) (Figure 2).[6] After emerging from the fascia, they traverse the region of the iliac crest and innervate the skin of the superior third of the gluteal area, extending to the greater trochanter of the femur.[7] The most significant anatomical landmark is the osseofibrous tunnel in the iliac crest, located approximately 7–8 cm lateral to the midline.[8,9]

Maigne's Syndrome: Clinical Presentation and Diagnosis

Maigne's syndrome (thoracolumbar junction syndrome) is attributed to dysfunction/irritation at the thoracolumbar junction (typically T12–L2 and adjacent segments), leading to referred pain patterns to the lower back, iliac crest, groin, or gluteal region. Superior cluneal neuralgia, in contrast, involves the L1–L3-derived superior cluneal nerves and is often described as a peripheral entrapment neuropathy near the posterior iliac crest. Although the clinical presentations may overlap and coexist in selected patients, these entities are not synonymous and should be differentiated clinically, ideally supported by targeted diagnostic blocks.[10] The terminology of this syndrome includes several closely related terms: "thoracolumbar junction syndrome," "Maigne's facet syndrome," "cluneal neuropathy," "posterior iliac trigger," and even "pseudosciatica".[2] Clinically, Maigne's syndrome most commonly manifests as unilateral pain in the lower back and gluteal region, frequently with radiation to the thigh, groin, and inguinal areas. This "masquerading" with radicular-like symptoms (pseudoradiculopathy) accounts for why the condition is often misdiagnosed as lumbar radiculopathy.[3] The syndrome is characterized by the onset of sharp pain upon palpation of the iliac crest (the so-called "iliac crest point"), as well as by specific provocative tests

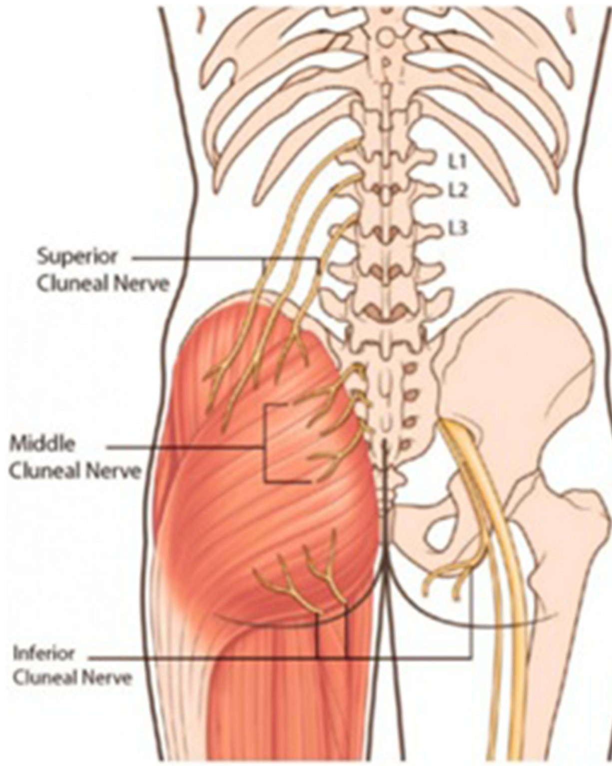

Figure 1 Superior, middle, and inferior cluneal nerves. Adapted from Abd-Elsayed & Gyorfi (2023).

(skin rolling, and exacerbation of pain with trunk extension). Increased sensitivity is frequently identified in the Th12-L2 dermatomes. According to Maigne, conventional radiographs in this syndrome often fail to demonstrate degenerative changes, thereby necessitating meticulous attention to the patient's history and clinical examination.[2,3,10]

Therapeutic Modalities and Their Limitations

The management of chronic low back pain traditionally encompasses both non-pharmacological and pharmacological strategies. In accordance with current guidelines, the foundation of treatment consists of physical rehabilitation, therapeutic exercise, psychological support, and lifestyle modification;[1] Medications (NSAIDs, analgesics, muscle relaxants) are used as secondary measures. If conservative measures are ineffective, specific interventions may include local blocks (epidural, facet, sacroiliac), nerve root neurolysis, and, when indicated, surgical procedures.

In Maigne's syndrome, various techniques have been described: ranging from local injections at the exit points of the cluneal nerves (local anesthetics and steroids) to more radical interventions—such as cluneal nerve release or facet joint denervation (percutaneous neurolysis, electrocoagulation).[2] However, many of these modalities provide only temporary relief; for instance, standard nerve blocks produce a limited duration of effect, while invasive surgeries are associated with technical challenges as well as intraoperative and postoperative risks.

Minimally Invasive Treatment Modalities: Radiofrequency Ablation

In recent years, there has been a growing interest in minimally invasive analgesic interventions, particularly in radiofrequency (RF) denervation of neural structures. Radiofrequency ablation (RFA) is widely utilized for the facet joints and the sacroiliac joint (denervation of the medial branches of the dorsal rami).[3] Until recently, the use of RFA for the superior cluneal nerves had been rarely described.

Preliminary studies demonstrate that denervation of the nociceptive nerve in clunealgia may yield a significant therapeutic effect. For example, Visnjevac et al reported a series of 46 patients in which RFA of the superior cluneal nerves led to a substantial reduction in pain: among 78% of participants, the analgesic effect persisted for an average of

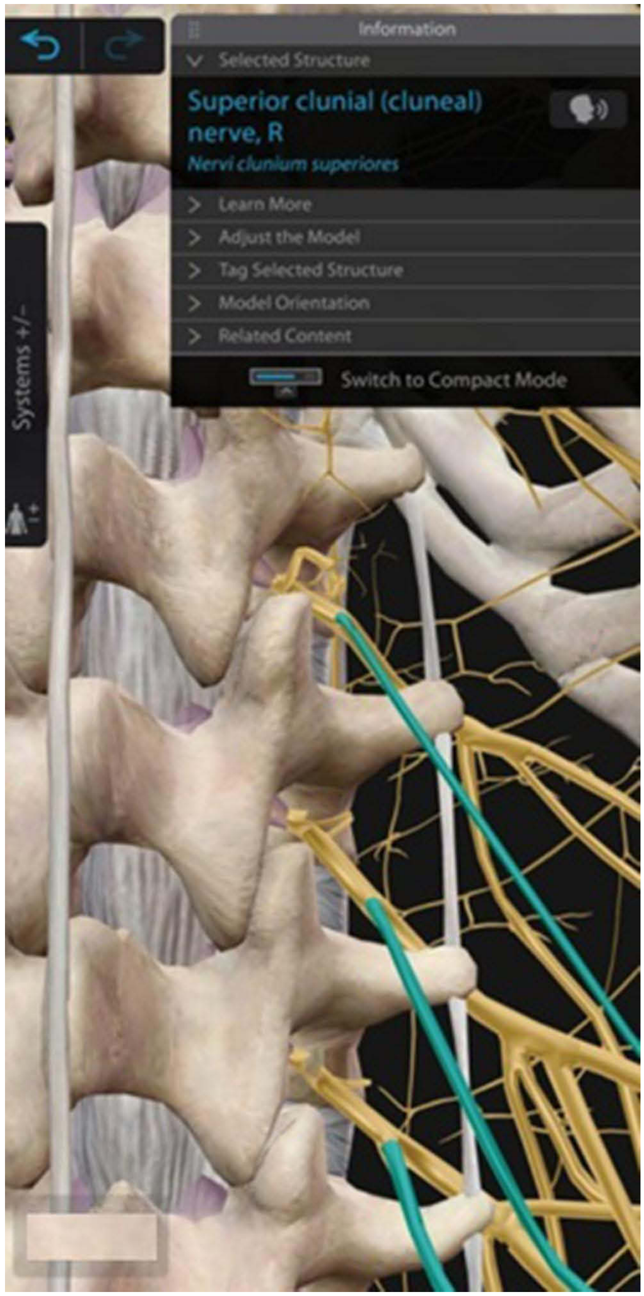

Figure 2 Topographic anatomy of the superior, middle, and inferior cluneal nerves. Adapted from Human Anatomy Atlas 2026 (Visible Body Apps LLC).[6]

approximately 3 months (mean pain reduction ≈92%).[3] Arce Gálvez et al also reported a small case series (4 patients) demonstrating 50–90% pain improvement several weeks following RFA of the superior cluneal nerves.[11] RFA is characterized by relative safety; no serious complications were reported in these studies.[3,6]

However, the radiofrequency ablation technique for the cluneal nerves has been described only at the iliac crest, with no published descriptions of RFA in the region of the transverse processes.

Justification for the Selection of Radiofrequency Ablation of the Superior Cluneal Nerves at the Level of the Transverse Processes

Although numerous publications address the anatomy and clinical significance of the superior cluneal nerves (SCN), the techniques of radiofrequency ablation (RFA) described in the available literature predominantly target the region of the iliac crest—specifically, in the projection of the osteofibrous tunnel. However, the portion of their course at the level of the L1–L3 transverse processes, where the SCN originate from the dorsal branches of the lumbar nerves and are situated in close proximity to the medial branches, remains virtually unexplored in the context of interventional procedures.

This anatomical level offers several advantages: first, it enables simultaneous targeting of both the medial branches of the dorsal rami and the cluneal nerves, thereby providing more comprehensive analgesia of the posterior lumbar region with a minimal number of access points. Second, the course of the cluneal nerves along the lateral border of the transverse processes provides a clear visual, anatomical, and sensory landmark: during sensory stimulation, patients report a characteristic sensation in the upper gluteal area, which confirms correct electrode placement.

An additional argument supporting the choice of this level is the safety and controllability of the procedure: the utilization of the bony landmarks of the transverse processes facilitates precise navigation under fluoroscopic guidance and reduces the risk of injury to neurovascular structures. Moreover, radiofrequency ablation at this anatomical location is logical, as the intervention is performed prior to the nerve's exit through the fascia, at the site of its greatest fixation and potential compression.

Accordingly, performing radiofrequency ablation of the superior cluneal nerves at the lateral border of the L1–L3 transverse processes constitutes a novel approach in the interventional treatment of chronic lumbogluteal pain, combining anatomical precision, the potential for combined denervation, and methodological simplicity. At the time of preparing this work, no studies describing radiofrequency ablation of the superior cluneal nerve at this specific level have been reported in the literature.

Clinical Case

A 68-year-old female patient with class II obesity (body mass index ~35 kg/m^2) presents with chronic lower back pain (7–8 on the VAS) and pain in the upper outer region of the right gluteal area persisting for 8 months. The pain is predominantly aching and burning in character, without radiation along the leg. The pain intensifies with physical activity—such as prolonged walking, bending, or stair climbing—and significantly limits daily functioning. At rest and following the administration of NSAIDs, only partial relief was noted. Over the course of the disease, the patient underwent conservative treatment: courses of nonsteroidal anti-inflammatory drugs and muscle relaxants, therapeutic exercise, and massage; however, there was no substantial improvement. There were no episodes of acute shooting pain or pronounced weakness in the legs, which made radicular syndrome unlikely. Nevertheless, the duration of the pain syndrome (>6 months) and the insufficient effectiveness of conservative therapy allow the pain to be classified as chronic.

Physical Examination and Imaging Modalities

Upon examination, the patient's gait is somewhat cautious; no persistent postural abnormalities have been identified. Active movements in the lumbar spine are mainly restricted during extension (due to exacerbation of pain); palpation of the paravertebral muscles does not elicit significant tenderness. The principal area of maximal pain sensitivity is localized at the junction of the lumbar and gluteal regions—at a point approximately in the upper–lateral gluteal region near the posterior iliac crest, with maximal tenderness over the lumbogluteal junction (Figure 3).

Neurological and sensory examination. Pain mapping revealed a well-demarcated area of maximal tenderness over the upper–lateral gluteal region and posterior iliac crest. Light touch and pinprick testing demonstrated focal hypersensitivity (mechanical hyperalgesia) in the painful area compared with the contralateral side, without distal sensory loss in the leg. Brush testing did not provoke allodynia. Temperature discrimination was preserved. Deep tendon reflexes (patellar and Achilles) were symmetric, and motor strength was 5/5 in all major lower-limb muscle groups. Straight-leg raise and femoral stretch tests were negative. Palpation of the lumbar paraspinal muscles, quadratus lumborum, and gluteal musculature did not identify reproducible myofascial trigger points, and there was no consistent referred pain pattern on sustained digital pressure. A thoracolumbar junction provocation maneuver and skin-rolling test over the ipsilateral T12–L2 dermatomal region reproduced the patient's typical lumbogluteal pain.

Instrumental investigations were conducted to exclude alternative causes of pain. Lumbar spine radiography demonstrated minor osteophytes and decreased intervertebral disc height at L4–L5 and L5–S1 (findings consistent with

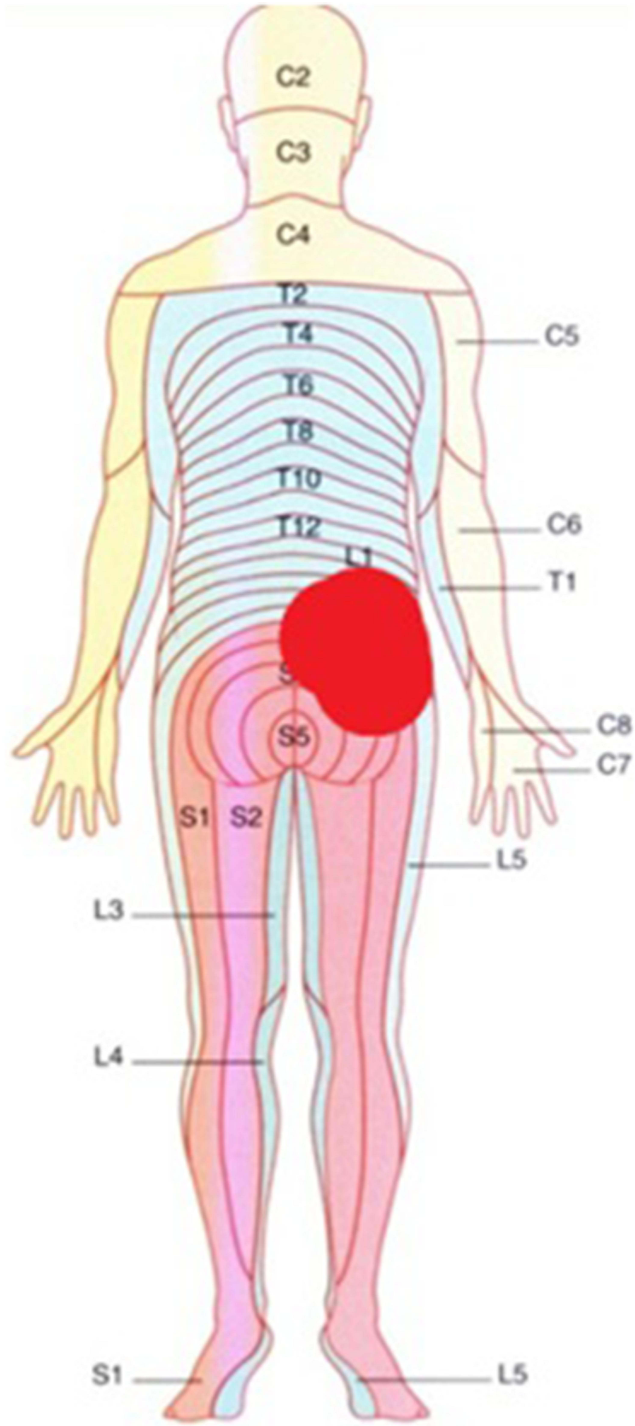

Figure 3 Area of pain in the patient.

spondyloarthrosis and spondylosis), without evidence of gross pathology. MRI of the lumbosacral spine revealed a minimal L4–L5 disc protrusion without compression of neural structures, and no evidence of spinal canal stenosis. Radiographically, the sacroiliac joints demonstrated no apparent pathology. Radiographic evaluation of both hip joints revealed signs of grade 2 coxarthrosis. Thus, none of the visualized structural findings correlated with the intensity of pain described by the patient.

Diagnostic Confirmation and Differential Diagnosis

Clinical data raised suspicion of superior cluneal nerve neuropathy (entrapment syndrome) as a potential etiology of the pain syndrome. Supporting this hypothesis in our patient were localized tenderness and a positive provocation test at the T12-L1 vertebral level (Thoracolumbar Junction Provocation Test).

Differential diagnosis was performed with facet syndrome (zygapophyseal joint arthropathy), discogenic radiculopathy, sacroiliac joint syndrome, as well as myofascial trigger point pain. Degenerative involvement of the facet joints typically manifests as localized pain during spinal extension and rotation; blockade of the medial branches of the dorsal rami (innervating the facets) is expected to yield a positive effect—in our case, a diagnostic facet joint block at the L4–L5 level was performed and, according to the patient, relief was reported to be 20–30%. Sacroiliac pain is often localized more inferiorly and medially (the Fortin sign), and may radiate to the thigh. However, the patient exhibited no tenderness upon compression of the sacroiliac joint (SIJ). Radiculopathy due to intervertebral disc pathology was excluded based on MRI findings and the absence of characteristic pain radiation below the knee or neurological deficits. Myofascial pain (for example, piriformis syndrome or trigger points in the quadratus lumborum or gluteus medius muscle) could produce similar symptoms; however, palpation of the muscles did not reveal specific trigger zones, and the primary pain focus was localized precisely to the region traversed by the cluneal nerves.

To further support the suspected diagnosis, a targeted diagnostic block of the superior cluneal nerves was performed. Under fluoroscopic guidance, at the lateral border of the transverse processes of the L1–L2–L3 vertebrae on the right, the region of the nerve course was infiltrated with 2 mL of 0.5% procaine solution. The procedure was technically performed as a single injection into the mid-lateral edge of the transverse processes. Within 10–15 minutes after the injection, the patient reported a significant reduction in her typical pain (by more than 60%). The analgesic effect persisted for approximately one day, after which the pain gradually returned to its baseline intensity. A positive, albeit temporary, response is considered a diagnostic criterion for cluneal nerve neuropathy. Thus, the findings were consistent with superior cluneal neuralgia, most likely involving the superior cluneal nerve(s) arising from the dorsal rami of L1–L3.

Description of the RFA Technique

Given the chronic nature of the pain, the lack of effect from conservative interventions, and the confirmed efficacy of the diagnostic blockade, a decision was made to perform therapeutic radiofrequency ablation (RFA) of the superior cluneal nerves. The procedure was performed in an operating room, under fluoroscopic guidance and local skin anesthesia.

The radiofrequency cannula was advanced free-hand to contact the lateral edge of the transverse process at the selected level. The position of the cannula was confirmed in the frontal projection (Figure 4a–c).

After electrode placement, sensory stimulation was performed (50 Hz, ≤0.5 V). Reproduction of characteristic upper gluteal pain was regarded as confirmation of proximity to the superior cluneal nerve. Motor stimulation (2 Hz, ≤1.2 V) was subsequently performed to exclude involvement of motor fibers.

Thermal ablation was conducted in continuous heating mode at 80–90 °C for 90 seconds.

Treatment Outcomes

The patient tolerated the procedure well. No complications were observed in the early postoperative period. In the first 1–2 days following RFA, the patient experienced mild local pain and discomfort at the intervention site, which resolved with NSAID administration. As early as one day after the procedure, the patient reported a marked reduction in her usual chronic lower back and gluteal pain. At the follow-up examination 1 month after ablation, pain was virtually absent (the patient rated the intensity as 0–1 on the VAS out of 10, compared to 8/10 prior to treatment). Function also improved markedly; according to her, she is now able to walk significantly longer distances and perform household tasks without requiring prolonged rest breaks. Discontinuation of daily analgesic medication became possible (the patient no longer requires continuous NSAIDs, using them only intermittently). The Oswestry Disability Index (ODI) at one month was 10%, whereas prior to treatment it was 48%, corresponding to an improvement from severe to mild disability.

A sustained positive effect persists 3 months after the performed RFA. The patient maintains an active lifestyle, has returned to Nordic walking 3–4 times per week, reporting only occasional discomfort in the lumbogluteal region during

 https://doi.org/10.2147/IMCRJ.S590996

Figure 4 Fluoroscopic placement of the radiofrequency cannula at the lateral border of the L1–L3 transverse processes using the Transverse Process Cluneal Approach (TPCA). (**A**) Cannula position at L1. (**B**) Cannula position at L2. (**C**) Cannula position at L3.

extremely intense physical activity. Pain on the VAS at this time does not exceed 2/10, ie., it is absent at rest and minimal with physical exertion. Functional status is nearly normal: ODI has improved to 10%, which corresponds to minimal impact of pain on daily activities. The overall EQ-5D quality of life index increased from 0.54 (pre-treatment) to 0.88 (at 3 months), reflecting significant improvement. On objective examination, palpation over the right iliac crest was almost painless, and no nerve irritation sign was elicited. The patient is satisfied with the outcome and continues follow-up with her pain physician (Table 1).

Discussion

This clinical case illustrates a minimally invasive approach to treating chronic pain related to suspected entrapment/irritation of the superior cluneal nerve(s). Cluneal neuropathy is a relatively rare and frequently underdiagnosed source of lower back and gluteal pain. Pain related to superior cluneal neuralgia frequently mimics radiculopathy or facet syndrome, leading patients to undergo numerous ineffective interventions before the true cause of their symptoms is identified. The literature documents cases in which patients with unrecognized cluneal neuralgia have undergone spinal

Table 1 Changes in Clinical Parameters Before and After RFA

Parameter	Baseline (Before RFA)	At 1 Month	At Three Months
Pain intensity (VAS, 0–10)	8/10	1/10	1/10
Oswestry Disability Index (ODI), %	48%	10%	10%
EQ-5D (quality of life index)	0,54	0,80	0,88

Notes: As demonstrated in Table 1, a marked reduction in pain and improvement in functional outcomes were observed following RFA.

surgeries, such as discectomy or stabilization, without meaningful clinical improvement. In this context, the importance of a meticulous physical examination is underscored: the presence of localized tenderness at the site of nerve emergence above the iliac crest, along with a positive response to diagnostic blockade, enables a reliable diagnosis in routine clinical practice.

Predisposing factors for superior cluneal nerve entrapment syndrome are considered to include degenerative changes of the lumbar ligamentous apparatus, fascial thickening (for instance, following trauma), kyphotic deformity of the lumbosacral junction, as well as obesity.[7,11] In this case, the patient's obesity may have contributed to excessive loading of the lumbosacral junction and increased tension of the fasciae traversed by the nerves. The absence of other evident causes of pain (such as protrusions, stenosis, or arthropathy) also prompted consideration of alternative sources of nociceptive input, among which cluneal neuropathy was identified.

Why surgical decompression was not performed. Although superior cluneal nerve (SCN) pain is often described as an entrapment neuropathy at the posterior iliac crest, surgical decompression is typically reserved for refractory cases after failure of less invasive options. In the present case, we opted for an image-guided diagnostic block followed by radiofrequency ablation as a minimally invasive, stepwise strategy that could both confirm the pain generator and provide therapeutic benefit with lower procedural morbidity. Given the clear clinical response and the absence of red flags for progressive neurologic deficit, operative decompression was deferred.

Management in case of recurrence. If pain recurs, our preferred approach would be a stepwise escalation: repeat clinical reassessment and confirmatory diagnostic block, followed by repeat radiofrequency ablation or alternative neuromodulatory techniques (eg, pulsed radiofrequency) when appropriate In patients with persistent or recurrent symptoms despite repeated minimally invasive interventions, and when clinical findings remain strongly suggestive of SCN entrapment, surgical decompression of the SCN at the posterior iliac crest would be considered in collaboration with an experienced peripheral nerve or spine surgeon.

Accordingly, radiofrequency ablation constitutes an appealing option for the management of superior cluneal nerve syndrome in conjunction with other therapies. Anesthetic nerve blocks provide only temporary relief, whereas radiofrequency denervation offers more prolonged analgesia. Moreover, the technique does not preclude subsequent rehabilitation—on the contrary, pain reduction allows patients to actively engage in therapeutic exercise, reduce body weight, and thereby mitigate predisposing factors.

In the present case, the response to a targeted SCN block and subsequent proximal RFA supports superior cluneal neuralgia as the primary treated pain generator. While the patient had clinical features compatible with thoracolumbar junction syndrome (Maigne's syndrome), a definitive diagnosis of Maigne's syndrome cannot be established from a single case, and coexistence cannot be excluded. We therefore avoid using these terms interchangeably.

Conclusions

The presented case demonstrates the clinical efficacy of radiofrequency ablation of the superior cluneal nerves in an elderly patient with chronic lumbogluteal pain resistant to conservative therapy. Within one month following RFA, there was an almost complete resolution of the pain syndrome (VAS reduction of 85–90%) and marked functional improvement (ODI decreased from 48% to 10%). This effect persisted through the 3-month follow-up, suggesting short-term durability; longer follow-up is required to assess long-term outcomes and recurrence. The patient returned to an active lifestyle without the need for ongoing analgesic therapy. Thus, percutaneous RFA of the superior cluneal nerve(s) appears to be a safe and effective modality for the treatment of peripheral neuropathic pain in the lumbopelvic region. This minimally invasive technique may be effectively employed in patients with chronic pain who do not respond to standard therapy, thereby avoiding more traumatic interventions. Ongoing follow-up with the patient will continue to assess long-term outcomes. In the event of recurrent pain, repeat procedures may be considered. Overall, this clinical experience aligns with the existing literature and demonstrates that timely diagnosis of cluneal neuralgia and subsequent RFA substantially improve patients' quality of life.

Ethics Approval

Institutional approval was not required for publication of a single clinical case report at our institution.

Consent for Publication

Written informed consent for publication of this case report and any accompanying images was obtained from the patient. The patient provided consent specifically for the publication of clinical details and images related to this case.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Ferreira ML, de Luca K, Haile LM. GBD. 2021 Low Back Pain Collaborators. Global, regional, and national burden of low back pain, 1990–2020, its attributable risk factors, and projections to 2050: a systematic analysis of the Global Burden of Disease Study 2021. *Lancet Rheumatol*. 2023;5(6):e316–e329. doi:10.1016/S2665-9913(23)00098-X
2. Singh T, Kumar P. Pelvic pain in Maigne's syndrome: a multi-segmental approach. *Bull Fac Phys Ther*. 2022;27(1):4. doi:10.1186/s43161-021-00062-8
3. Visnjevac O, Pastrak M, Ma F, Visnjevac T, Abd-Elsayed A. Radiofrequency ablation of the superior cluneal nerve: a novel minimally invasive approach adopting recent anatomic and neurosurgical data. *Pain Ther*. 2022;11(2):655–665. doi:10.1007/s40122-022-00385-x
4. Iwanaga J, Simonds E, Schumacher M, Oskouian RJ, Tubbs RS. Anatomic study of superior cluneal nerves: revisiting the contribution of lumbar spinal nerves. *World Neurosurg*. 2019;128:e12–e15. doi:10.1016/j.wneu.2019.02.159
5. Abd-Elsayed A, Gyorfi M. Chronic low back pain and cognitive function. *Pain Pract*. 2023;23(4):463–464. doi:10.1111/papr.13202
6. Visible Body Apps LLC. Human Anatomy Atlas 2026 [software]. 2026. Available from: https://www.visiblebody.com. Accessed March 6, 2026.
7. Konno T, Aota Y, Kuniya H, et al. Anatomical etiology of "pseudo-sciatica" from superior cluneal nerve entrapment: a laboratory investigation. *J Pain Res*. 2017;10:2539–2545. doi:10.2147/JPR.S142115
8. Karl HW, Helm S, Trescot AM. Superior and middle cluneal nerve entrapment: a cause of low back and radicular pain. *Pain Physician*. 2022;25(4):E503–E521.
9. Lu J, Ebraheim NA, Huntoon M, Heck BE, Yeasting RA. Anatomic considerations of superior cluneal nerve at posterior iliac crest region. *Clin Orthop Relat Res*. 1998;347:224–228. doi:10.1097/00003086-199802000-00027
10. Randhawa S, Garvin G, Roth M, Wozniak A, Miller T. Maigne syndrome: a potentially treatable yet underdiagnosed cause of low back pain: a review. *J Back Musculoskelet Rehabil*. 2022;35(1):153–159. doi:10.3233/BMR-200297
11. Arce Gálvez L, Daes Mora J, Valencia Gómez RE, et al. Superior cluneal nerves radiofrequency in the management of chronic low back pain. *Interv Pain Med*. 2024;3(3):100428. doi:10.1016/j.inpm.2024.100428