Radiofrequency ablation of genicular nerves for knee pain

Clinical Policy ID: CCP.1335

Recent review date: 5/2026

Next review date: 9/2027

Policy contains: Diagnostic genicular nerve block; genicular nerve block; osteoarthritis; radiofrequency ablation.

First Choice VIP Care has developed clinical policies to assist with making coverage determinations. First Choice VIP Care's clinical policies are based on guidelines from established industry sources, such as the Centers for Medicare & Medicaid Services (CMS), state regulatory agencies, the American Medical Association (AMA), medical specialty professional societies, and peer-reviewed professional literature. These clinical policies along with other sources, such as plan benefits and state and federal laws and regulatory requirements, including any state- or plan-specific definition of "medically necessary," and the specific facts of the particular situation are considered by First Choice VIP Care, on a case by case basis, when making coverage determinations. In the event of conflict between this clinical policy and plan benefits and/or state or federal laws and/or regulatory requirements, the plan benefits and/or state and federal laws and/or regulatory requirements shall control. First Choice VIP Care's clinical policies are for informational purposes only and not intended as medical advice or to direct treatment. Physicians and other health care providers are solely responsible for the treatment decisions for their patients. First Choice VIP Care's clinical policies are reflective of evidence-based medicine at the time of review. As medical science evolves, First Choice VIP Care will update its clinical policies as necessary. First Choice VIP Care's clinical policies are not guarantees of payment.

Coverage policy

Radiofrequency ablation of the genicular nerve for chronic knee pain is clinically proven and may be medically necessary (Kolasinski, 2020; Hunter, 2022) in the following instances:

For individuals with osteoarthritis of the knee.

For individuals who have undergone total knee arthroplasty (knee replacement surgery).

Limitations

No limitations were identified during the writing of this policy.

Alternative covered services

Routine patient evaluation and management by a network health care provider.
Physical therapy.
Intra-articular injections.
Oral medications.

Background

The knee consists of the lower femur, upper tibia, and the patella wrapped in articular cartilage that protects, cushions, and absorbs shock as the joint bends and straightens. Time, trauma, and overuse contribute to a degeneration of these structures causing arthritic inflammation and pain. Osteoarthritis is the most common type of knee arthritis, usually develops slowly, and results in bone rubbing against bone (American Academy of Orthopaedic Surgeons, 2021a).

Pain from osteoarthritis of the knee is often effectively managed with pharmacological or non-pharmacological treatments (Jones, 2015). When conservative therapy fails, options include surgery (e.g., arthroscopy or total knee arthroplasty). Genicular nerve neurolysis is a second-line therapy on its own or as an adjunct to arthroplasty.

Genicular nerve block has traditionally been performed via local anesthetic with or without corticosteroid injection of the superolateral, superomedial, and inferomedial branches of the nerves around the knee joint. Radiofrequency ablation, also known as radiofrequency neurotomy, is a commonly used intervention to treat pain from an innervated structure. It was historically used successfully for lumbar and cervical facet joints in the spine but it has expanded to peripheral structures, as well. Radiofrequency neurotomy of the major or periarticular nerve supply or intra-articular branches innervating the knee has been proposed as a treatment for osteoarthritic knee pain (Lee, 2021).

Findings

Radiofrequency ablation of the genicular nerves is supported by professional guidelines, systematic reviews, meta-analyses, and observational evidence as an effective option for managing knee pain secondary to osteoarthritis that has not responded to conventional treatments. Across the literature, the procedure generally provides meaningful short-term to intermediate-term pain relief and compares favorably with intra-articular alternatives, although the durability of benefit and the degree of functional improvement vary across studies. Outcomes appear to be influenced by technique and patient selection, including the modality used, the number of nerves targeted, lesion size, and response to diagnostic block. Remaining uncertainties center on long-term durability, procedural standardization, and the more limited role of radiofrequency ablation in perioperative and post-arthroplasty settings.

Professional guidelines:

Professional organizations across pain medicine, rheumatology, and orthopedic surgery have reached a broadly consistent position in support of radiofrequency ablation for knee osteoarthritis, though the strength and specificity of their endorsements vary. The American Society of Pain and Neuroscience offers the strongest statement, citing Level 1, Grade A evidence with strong consensus for radiofrequency ablation in knee osteoarthritis and in pain refractory to total knee arthroplasty, and specifically recommending thermal or cooled modalities for genicular nerve ablation (Hunter, 2022). That position is also consistent with an earlier evidence-based best practice guideline from the American Society of Pain and Neuroscience, which concluded that genicular radiofrequency neurotomy may be used for osteoarthritis-related and post-surgical knee pain with an evidence grade of 2-1 B and emphasized careful attention to anatomy, diagnostic block response, and lesioning technique, particularly when targeting the superomedial, superolateral, and inferomedial genicular nerves (Lee, 2021).

The National Institute for Health and Care Excellence similarly concludes that the evidence supports short-term pain relief without major safety concerns, endorsing the procedure for individuals who have not responded to pharmacological and non-pharmacological treatment, provided it is performed by appropriately trained clinicians

(National Institute for Health and Care Excellence, 2023). The American College of Rheumatology issues a conditional recommendation, reflecting not a lack of efficacy signal but rather concern about technique heterogeneity across trials and insufficient long-term safety data (Kolasinski, 2020). The American Academy of Orthopaedic Surgeons arrives at a limited recommendation, acknowledging that denervation therapy may reduce pain and improve function, but downgrading from moderate because of quality concerns in the underlying studies (American Academy of Orthopaedic Surgeons, 2021b). Where the evidence thins is at the edges of indication: supplemental targeting of nerves beyond the three primary genicular targets carries only Level 3, Grade B evidence and moderate consensus (Hunter, 2022), underscoring that confidence in the core intervention is stronger than confidence in its extensions.

Systematic reviews

Systematic reviews of the literature converge on several central findings: radiofrequency ablation reduces knee pain reliably across a range of study populations and follow-up periods, compares favorably with intra-articular alternatives, and carries a reassuring safety profile. Across the largest and most comprehensive reviews, spanning 19 to 33 studies and more than 1,500 participants in some analyses, clinically significant pain relief is consistently observed from three months through 12 months after treatment, with success rates for achieving greater than 50% pain relief approximately three times higher in treatment groups than in control groups (Ajrawat, 2020; Orhurhu, 2019). Fluoroscopically guided genicular nerve ablation, evaluated in a dedicated review of nine studies, produced six-month success rates ranging from 49% to 74%, representing a 4.5-fold and 1.8-fold advantage over intra-articular steroid and hyaluronic acid injection, respectively (Fogarty, 2022). Satisfaction rates are high across studies, and adverse effects, where reported, are uniformly minor (Ajrawat, 2020). Newer comparative systematic reviews add useful nuance. A 2025 systematic review of randomized controlled trials and retrospective comparative studies found that both genicular nerve block and genicular nerve ablation improved pain and function in knee osteoarthritis, with ablation appearing to provide more durable benefit than diagnostic block, although superiority over therapeutic block with steroid remained inconclusive (Toubasi, 2025).

A 2026 systematic review comparing radiofrequency ablation with intra-articular steroid injection (n = 379) likewise found that steroid injection provided greater pain relief at one week and greater improvement in stiffness at three months, but radiofrequency ablation produced more sustained benefit from one month through six months, including greater pain reduction, improved function, decreased non-opioid analgesic use, and higher satisfaction, with similarly minimal adverse effects in both groups (Anombem, 2026).

The question of whether conventional, pulsed, or cooled radiofrequency ablation produces superior outcomes has not been resolved at the systematic review level. Reviews examining this question directly have found no clear advantage among approaches (Gupta, 2017), though more recent network-level syntheses have begun to distinguish among modalities with greater precision. What the systematic review literature has more consistently flagged is a broader concern about methodological quality: most studies are not randomized, procedural heterogeneity limits cross-study comparison, and long-term efficacy data remain sparse across all approaches (Bhatia, 2016; Gupta, 2017). A newer systematic review adds more granular information about durability and technique. In a 2026 systematic review of 28 studies (n = 2,218), pooled success rates for at least 50% pain reduction were 51% at six months, 43% at 12 months, and 58% at 24 months, and large lesion techniques outperformed small lesion techniques at 12 months, supporting lesion size as a plausible determinant of durability (Kanjanapanang, 2026). That review characterized the evidence for osteoarthritis as moderate when large lesion techniques are used, but found only low-quality evidence for persistent post-surgical pain, reinforcing the need to distinguish more clearly between osteoarthritis and post-arthroplasty populations (Kanjanapanang, 2026).

A dedicated review examining radiofrequency ablation in the context of total knee replacement offers a more nuanced picture. Preoperative genicular nerve ablation does not appear to significantly reduce postoperative

opioid consumption, pain, or functional outcomes in most analyses. For individuals experiencing persistent chronic pain after total knee replacement, however, conventional radiofrequency ablation with fluoroscopic guidance has demonstrated meaningful benefit, suggesting that the procedure's clearest value in the surgical population lies in managing refractory post-arthroplasty pain rather than in perioperative prophylaxis (Bahha, 2025).

Meta-analyses

Meta-analytic evidence reinforces the superiority of radiofrequency ablation over intra-articular approaches while beginning to differentiate among radiofrequency ablation modalities in ways that carry practical clinical implications. Across analyses aggregating between eight and 21 studies, genicular nerve ablation consistently outperforms intra-articular and pulsed alternatives for pain relief, with improvements detectable as early as one week and sustained through six months (Hong, 2019; Huang, 2020). The largest such analysis, comprising 21 randomized controlled trials (n = 1,818), provides the most granular technique-level evidence: conventional bipolar radiofrequency ablation produced the greatest pain reduction, with a mean difference of -5.5 and a 95% confidence interval of -6.7 to -4.3, while cooled monopolar radiofrequency ablation produced the greatest functional improvement, with a mean difference of -33 and a 95% confidence interval of -37 to -29, at six months (Kapural, 2022). Broadly, individuals respond better to cooled modalities than to conventional or pulsed modalities, and bipolar configurations outperform monopolar configurations for both conventional and pulsed approaches (Kapural, 2022).

More recent meta-analytic evidence is supportive overall but more mixed than the earlier literature suggested. A 2025 meta-analysis of 25 randomized controlled trials (n = 2,049) evaluating minimally invasive interventions targeting the genicular nerves found that radiofrequency ablation may provide moderate short-term pain relief compared with sham treatment at four and 12 weeks, but found no benefit at 24 or 48 weeks and no improvement in function at any time point; notably, the authors rated the certainty of evidence as low to very low and advised against routine use until more robust data are available (Almeida, 2025). By contrast, a systematic review with Bayesian network meta-analysis published online in late 2025, including 29 studies (n = 2,285), found that genicular nerve radiofrequency ablation was the highest-ranked treatment for chronic knee pain relief at one month, three months, six months, and 12 months compared with sham treatment, intra-articular injections, and chemical neurolysis, supporting benefit in both osteoarthritis and persistent post-surgical pain populations (Quazi, 2025).

The relationship between pain relief and functional improvement is not uniform across modalities, and this dissociation warrants attention. While pain outcomes are significant and consistent, improvements in knee joint function are more modest and less reliably observed (Hong, 2019), a pattern that may reflect the neurophysiology of the intervention as much as any limitation of study design. Complication rates are generally low, though one analysis of nine studies (n = 899) reported an overall rate of 10.2%, higher than that seen with corticosteroid or platelet-rich plasma injection; across the literature, however, these complications are not characterized as serious (Chalidis, 2023).

Other evidence

Observational data from a multi-center analysis (n = 265) provides useful insight into the factors that predict a favorable response, independent of the procedure itself. A positive outcome, defined as greater than 30% reduction in average knee pain sustained for at least three months, was observed in 61.1% of participants. Several procedural and individual-level characteristics were associated with particularly high response rates: larger electrode size, repeated lesioning, greater than 80% pain relief during the diagnostic prognostic block, absence of opioid use, absence of a coexisting psychiatric condition, lower baseline pain scores, and targeting of more than three nerves (Chen, 2021). These findings suggest that how the procedure is performed and for whom it is selected may be at least as consequential as whether it is performed at all, reinforcing the importance of deliberate selection and procedural optimization in achieving consistent outcomes.

A review of the anatomical literature on anterior and posterior knee innervation underscores a persistent gap between the clinical effectiveness of radiofrequency ablation and the precision of its anatomical rationale. Although articular branches and their nerve sources can be identified, precise fluoroscopic and ultrasound landmarks for both diagnostic blocks and ablation targets remain incompletely defined (Roberts, 2020). That individuals nonetheless achieve effective pain relief despite this anatomical ambiguity speaks to the robustness of the intervention's clinical effect, even as it points to an opportunity for greater procedural standardization.

In 2026, we added one professional guideline, four systematic reviews, one meta-analysis (Almeida, 2025; Anombem, 2026; Kanjanapanang, 2026; Lee, 2021; Quazi, 2025; Toubasi, 2025). No policy changes were warranted.

References

On April 6, 2026, we searched PubMed and the databases of the Cochrane Library, the U.K. National Health Services Centre for Reviews and Dissemination, the Agency for Healthcare Research and Quality, and the Centers for Medicare & Medicaid Services. Search terms were "genicular nerve," "nerve block," "diagnostic genicular nerve block," and "pain management." We included the best available evidence according to established evidence hierarchies (typically systematic reviews, meta-analyses, and full economic analyses, where available) and professional guidelines based on such evidence and clinical expertise.

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Policy updates

9/2017: initial review date and clinical policy effective date: 10/2017

11/2018: updated references. Policy number changed to CCP.1335.

10/2019: Policy references updated.

4/2020: Policy references updated. The policy originally addressed diagnostic nerve block and radiofrequency ablation of the genicular nerve. We added the topic of genicular nerve block for pain.

5/2021: Policy references updated.

5/2022: Policy references updated.

5/2023: Policy references updated.
5/2024: Policy references updated.
5/2025: Policy references updated.
5/2026: Policy references updated.

Related codes

Below are the most commonly submitted codes for the service(s)/item(s) subject to this policy CCP.1335 This is not an exhaustive list of codes. Providers are expected to consult the appropriate coding manuals and bill accordingly.

Code	Code description
64624	Destruction by neurolytic agent, genicular nerve branches, including imaging guidance, when performed
64454	Injection(s), anesthetic agent(s) and/or steroid; genicular nerve branches, including imaging guidance, when performed (diagnostic block)
64640	Destruction by neurolytic agent; other peripheral nerve or branch
64999	Unlisted procedure, nervous system