Genicular Nerve Radiofrequency Treatment for Knee Osteoarthritis:

A Systematic Review and Meta-Analysis

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INTRODUCTION

Genicular nerve radiofrequency (gRF) is increasingly used for chronic knee osteoarthritis (KOA) pain refractory to conservative management. RCTs evaluating conventional, cooled, pulsed, and bipolar gRF report inconsistent efficacy. This review focused specifically on image-guided gRF RCTs to provide a more consistent assessment of pain relief and functional outcomes.

MATERIALS & METHODS

RCTs comparing image-guided gRF with non-gRF interventions in adults with symptomatic KOA were included. Techniques included conventional, cooled, pulsed, and bipolar RF; controls included sham procedures, intra-articular injections, ozone therapy, oral medications, and other non-gRF treatments. Primary outcome: change in pain intensity. Secondary outcome: change in total WOMAC. Outcomes were assessed at 3, 6, and 12 months using SMDs with 95% CIs. Prespecified subgroup analyses examined whether treatment effects differed according to lesion size, use of prognostic nerve blocks, industry sponsorship, and study location. Statistical heterogeneity was assessed using the I^2.

RESULTS

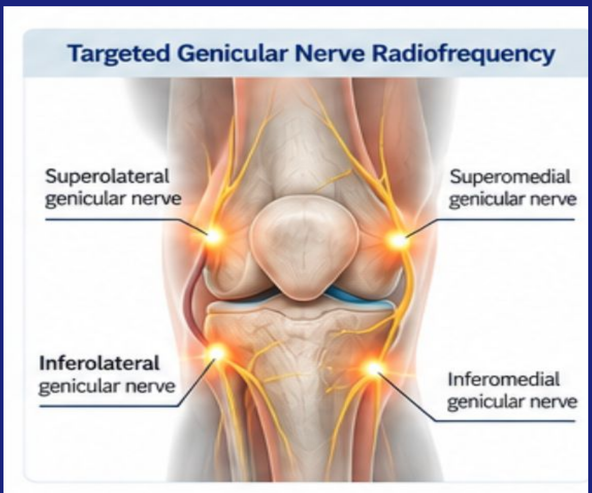
Eleven RCTs included 868 patients: 435 gRF and 433 controls. At 3 months, gRF significantly reduced pain (SMD −1.65; 95% CI −3.20 to −0.10; P=.040), with substantial heterogeneity (I^2=98%). The between-group pain difference was not maintained at 6 or 12 months. Total WOMAC did not differ significantly at 3, 6, or 12 months.

DISCUSSION

Image-guided gRF produced short-term pain reduction at 3 months, but the effect was not sustained and did not translate into significant WOMAC improvement. Substantial heterogeneity and sponsorship differences warrant cautious interpretation. Larger independent trials using standardized methods are needed to clarify patient selection and long-term clinical value.

Image-guided gRF provides
significant short-term pain reduction at 3 months in knee osteoarthritis.
The effect is **not sustained at 6 or 12 months**
and **does not improve overall WOMAC outcomes**.

11	868	−1.65	98%
RCTs Included	Patients 435 gRF + 433 control	3-month pain SMD 95% CI −3.20 to −0.10	I^2 heterogeneity



Current randomized evidence shows a short-term analgesic signal, but not durable pain relief or measurable overall functional improvement.



STUDY AT A GLANCE

Population	Adults with chronic knee osteoarthritis pain
Intervention	Image-guided genicular radiofrequency
Techniques	Conventional • cooled • pulsed • bipolar
Comparator	Non-gRF interventions
Primary outcome	Change in pain intensity
Secondary outcome	Change in total WOMAC
Follow-up	3 • 6 • 12 months

Standardized, adequately powered, independently funded RCTs are needed to define durable efficacy and optimal patient selection.

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