

Ice to Motion: Sustained Relief from Chronic Knee Pain via Percutaneous Cryoneurolysis

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Background

Cryoneurolysis is a minimally invasive procedure that applies extremely low temperatures to peripheral sensory nerves, temporarily interrupting nerve conduction through Wallerian degeneration while preserving connective tissue and allowing for natural regeneration. It can be used as a minimally invasive approach for patients who experience chronic knee pain, particularly those with osteoarthritis. By disrupting transmission of pain signals from targeted nerves, the procedure provides effective analgesia that can last for several months after a single treatment. This mechanism allows patients to experience significant pain reduction, improved mobility, and enhanced participation in rehabilitation. Cryoneurolysis can be repeated as symptoms return, offering a long-term, non-pharmacologic approach to chronic pain management.

Methods

A comprehensive search of PubMed and reference lists was conducted through July 2025 to identify human studies evaluating cryoneurolysis for chronic knee pain. Four studies met the inclusion criteria, including two randomized controlled trials and two retrospective cohort studies, all of which reported outcomes related to pain reduction or opioid use. As this analysis relied exclusively on previously published data, institutional review board approval was not required.

Results/Evidence Table

Study (Year)	Design/ N (pts)	Population + Intervention	Key outcomes	Main findings
Radnovich et al., 2017	RCT, n=180	Knee OA; infrapatellar branch cryoneurolysis vs sham	WOMAC pain, AE	↓ Pain at days 30–150; mild AE; sustained benefit
Dasa et al., 2016	Retrospective, n=100	TKA; pre-op cryoneurolysis vs control	LOS, opioid use	LOS ≥2 days: 6% vs 67%; 45% ↓ opioids; less pain at 2–12 wks
Urban et al., 2021	Retrospective cohort, n=267	TKA; pre-op cryoneurolysis in multimodal protocol	MME, pain, LOS	51% ↓ daily MME; 22% ↓ pain; 44% shorter LOS; ↑ knee flexion
Mihalko et al., 2021	RCT, n=124	TKA; pre-op cryoneurolysis vs standard care	Opioid use, pain, function	Per-protocol: ↓ opioids (4.2 vs 5.9 mg); ↓ pain at 72h–12w; ↑ function

Discussion and Conclusions

Cryoneurolysis, which uses targeted cold to temporarily interrupt peripheral nerve conduction, has shown consistent reductions in pain, opioid use, and hospital stay across studies, with benefits lasting up to five months and no serious adverse events. Despite small sample sizes, varied protocols, and limited long-term data, targeted cryoneurolysis of genicular and infrapatellar nerves shows promise as an adjunct to multimodal analgesia for chronic knee pain. Larger standardized studies are needed to confirm long-term outcomes and ideal patient selection.

References

