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Is there a need to modify the anatomical targets for genicular nerve ablation in prosthetic knees compared with native knees? A cadaveric study

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Abstract

Background: Joint replacement is standard of care for chronic knee osteoarthritis, but can cause persistent postsurgical pain. Radiofrequency denervation helps treat chronic knee pain, though its effectiveness is lower in patients with knee arthroplasty than in those with native knees. Our goal was to compare genicular nerve targets in native and prosthetic cadaveric knees and see if targets need modification after arthroplasty.

Methods: 10 native and 10 prosthetic knees from deceased donors underwent latex arterial injection and detailed dissection of the genicular nerves, comparing their origin, course, target points, diameter, and proximity with arterial blood vessels.

Results: Minimal differences among genicular nerve targets were observed between the two groups. The prosthetic knees had fibrotic adhesions of the infrapatellar branch of the saphenous nerve (IPBSN) due to previous surgery, potentially causing postsurgical neuromas and neuritis. The average nerve diameter at target points was smaller in prosthetic than native knees. The distance from the target point to the joint line was shorter for the superomedial genicular nerve in the prosthetic knee group (4.00±0.43 cm vs 4.53±0.75 cm, p=0.005). Nine native and eight prosthetic knees lacked an arterial branch near the target point of the superolateral genicular nerve (SLGN).

Conclusion: Prosthetic knees share comparable genicular nerve anatomic locations with native knees but exhibit smaller nerve diameters and fibrosis of the IPBSN. The absence of a nearby arterial branch to the SLGN may reduce ultrasound targeting accuracy. Anatomical differences alone, however, do not fully explain the diminished pain relief observed after radiofrequency ablation.

Keywords: CHRONIC PAIN; Lower Extremity; Pain Management; Peripheral Nerves; Radiofrequency Ablation.

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