

# Short and Mid-Term Outcomes of Preoperative Genicular Nerve Ablation in Total Knee Replacement

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**INTRODUCTION:** Total knee arthroplasty (TKA) effectively treats end-stage osteoarthritis, but postoperative pain can delay recovery and increase opioid use. Genicular nerve radiofrequency ablation (GNRFA), initially used for chronic osteoarthritis pain, is now being explored for perioperative analgesia. This study evaluates whether preoperative GNRFA affects postoperative opioid use, 90-day medical complications, and 2-year implant-related outcomes after TKA.

**METHODS:** A retrospective cohort study using the TriNetX database identified patients undergoing primary TKA between 2004 and 2024. Patients were grouped into those receiving GNRFA within 90 days prior to TKA (TKA-GNRFA) and those who did not (TKA-only). After 1:1 propensity score matching for demographic variables, each group included 1,378 patients. Primary outcomes included 90-day opioid use and medical complications such as sepsis, myocardial infarction, pulmonary embolism, deep vein thrombosis, surgical site infection, emergency department visits, and hospital readmissions. Secondary outcomes included 2-year implant-related complications. Logistic regression was used for comparisons.

**RESULTS:** 90-day opioid use was lower in the TKA-GNRFA group (73.2% vs. 83.9%; odds ratio: 0.525,  $p < 0.001$ ). No significant differences were found in sepsis (0.7% vs. 0.7%), myocardial infarction (0.7% vs. 0.7%), pulmonary embolism (0.9% vs. 0.7%), deep vein thrombosis (0.8% vs. 0.9%), surgical site infection (0.7% vs. 0.7%), emergency visits (9.5% vs. 8.1%), or readmissions (7.0% vs. 8.2%). At 2 years, prosthetic joint infection (3.6% vs. 3.6%), aseptic loosening (1.6 vs 1.6%), and periprosthetic fracture (1.6 vs 1.6%) rates were similar. Revision TKA was lower in the GNRFA group (2.9% vs. 4.3%) but not statistically significant ( $p = 0.181$ ).

**DISCUSSION AND CONCLUSION:** Preoperative GNRFA within 90 days before TKA is associated with reduced postoperative opioid use without increasing 90-day medical and 2-year implant-related complications. These findings highlight its potential role in perioperative pain management and warrant further investigation into its impact on recovery and healthcare utilization.

**Table 1. Characteristics of Patients in the TKA-GNRFA and TKA-Only Cohorts Before and After Matching**

Characteristic	Before Matching			After Matching (90-Day Cohort)			After Matching (2-Year Cohort)		
	TKA-GNRFA	TKA-Only	p-value	TKA-GNRFA	TKA-Only	p-value	TKA-GNRFA	TKA-Only	p-value
Age (years), mean ± SD	68.3 ± 9.0	67.3 ± 9.4	<0.001	68.3 ± 9.0	68.3 ± 8.9	0.883	67.6 ± 9.0	67.7 ± 8.9	0.921
Male, n (%)	228 (16.5)	82,988 (37.1)	<0.001	228 (16.5)	228 (16.5)	1	103 (15.9)	103 (15.9)	1
Female, n (%)	461 (33.5)	131,451 (58.8)	<0.001	461 (33.5)	461 (33.5)	1	213 (33.0)	213 (33.0)	1
Hypertension, n (%)	728 (52.8)	101,469 (45.4)	<0.001	728 (52.8)	730 (53.0)	0.939	331 (51.2)	335 (51.9)	0.824
Diabetes, n (%)	256 (18.6)	37,293 (16.7)	0.061	256 (18.6)	254 (18.4)	0.922	117 (18.1)	118 (18.3)	0.943
Heart failure, n (%)	71 (5.2)	8,368 (3.7)	0.006	71 (5.2)	70 (5.1)	0.931	32 (5.0)	32 (5.0)	1
Chronic kidney disease, n (%)	120 (8.7)	14,754 (6.6)	0.002	120 (8.7)	117 (8.5)	0.838	60 (9.3)	60 (9.3)	1

**Table 2. 90-Day Medical Complications for Matched TKA-GNRFA and TKA-Only Cohorts**

Complication	Patients with Outcome (%), TKA-GNRFA	Patients with Outcome (%), TKA-Only	Risk Difference	p-value
Sepsis	0.7%	0.7%	0%	1
Myocardial Infarction	0.7%	0.7%	0%	1
Pulmonary Embolism	0.9%	0.7%	0.2%	0.53
Deep Vein Thrombosis	0.8%	0.9%	-0.10%	0.682
Surgical Site Infection	0.7%	0.7%	0%	1
Pneumonia	0.8%	1.3%	-0.50%	0.191
Urinary Tract Infection	3.0%	3.0%	0%	1
Transfusion	0.7%	0.7%	0%	1
Wound Dehiscence	0.7%	0.7%	0%	1
Hematoma	0.7%	0.7%	0%	1
Acute Kidney Failure	2.1%	1.9%	0.20%	0.683
Return to ED Readmission	9.5%	8.1%	1.40%	0.202
Opioids	73.2%	83.9%	-11%	<0.001

**Table 3. Two-Year Implant-Related Complications for Matched TKA-GNRFA and TKA-Only Cohorts**

Complication	Patients with Outcome (%), TKA-GNRFA	Patients with Outcome (%), TKA-Only	Risk Difference	p-value
Prosthetic Joint Infection	3.6%	3.6%	0%	0.983
Revision TKA	2.9%	4.3%	-1.4%	0.181
Aseptic Mechanical Loosening	1.6%	1.6%	0%	0.997
Periprosthetic Fracture	1.6%	1.6%	0%	1