

Nonoperative Treatment of Intra-Articular Calcaneus Fractures is Associated With Lower Rates of Long-Term Adverse Events Compared to Operative Management

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INTRODUCTION:

The optimal management of displaced intra-articular calcaneus fractures remains controversial. While operative techniques have been well-described, few large-scale studies have compared long-term outcomes between operative versus nonoperative treatment. Conservative management carries the potential benefits of equivalent healing with less soft tissue disruption while operative management may provide superior alignment.

METHODS:

The TriNetX Research Network, including 140 million patient records, was used to identify patients with displaced intra-articular calcaneus fractures using ICD-10: S92.061, S92.062, S92.063 over the past 20 years. Patients were stratified into operative (CPT: 28415, 28420, 28406) and nonoperative (CPT: 1005454, 28400, or 28405) cohorts. Patients with concomitant lower extremity fractures or incomplete records were excluded. Propensity score matching was performed on demographics and comorbidities, resulting in 1,260 patients per group. Primary outcomes included rates of any adverse event at 90 days and post-traumatic osteoarthritis, nonunion, and malunion at 2 and 5 years. Statistical analyses included t-test, chi-squared, and odds ratios with 95% confidence intervals ($p < 0.05$).

RESULTS:

Baseline demographics and comorbidities were well-balanced between groups. At 90 days, operative treatment was associated with significantly higher rates of overall adverse events (8.5% vs. 3.6%, OR 2.51, $p < 0.001$), surgical site infections (3.3% vs. 0.8%, OR 4.20, $p < 0.001$), and wound dehiscence (4.8% vs. 1.0%, OR 5.20, $p < 0.001$), but lower emergency department utilization (11.5% vs. 21.6%, OR 0.47, $p < 0.001$). Increased complication rates persisted at 2 and 5 years, with operative patients experiencing higher rates of post-traumatic osteoarthritis (6.1% vs. 3.8%, OR 1.64, $p = 0.008$), prosthesis complications, wound dehiscence and infection, but fewer ED visits and hospital admissions. Rates of nonunion and malunion were similar across groups at all time points.

DISCUSSION AND CONCLUSION:

The present study identified differences in outcomes between operative and conservative treatment of calcaneus fractures. Nonoperative treatment was associated with lower rates of both short-term adverse events and long-term sequelae. Future studies are warranted to better guide the management of calcaneus fractures, such as patient-reported outcome measures and cost-analysis of surgical treatment.

Appendix 1. Queried complications and their respective ICD-10 diagnosis codes

ICD-10 CPT Category	ICD-10 CPT Category
Any Adverse Event	S92.061, S92.062, S92.063, S92.064, S92.065, S92.066, S92.067, S92.068, S92.069, S92.070, S92.071, S92.072, S92.073, S92.074, S92.075, S92.076, S92.077, S92.078, S92.079, S92.080, S92.081, S92.082, S92.083, S92.084, S92.085, S92.086, S92.087, S92.088, S92.089, S92.090, S92.091, S92.092, S92.093, S92.094, S92.095, S92.096, S92.097, S92.098, S92.099, S92.100, S92.101, S92.102, S92.103, S92.104, S92.105, S92.106, S92.107, S92.108, S92.109, S92.110, S92.111, S92.112, S92.113, S92.114, S92.115, S92.116, S92.117, S92.118, S92.119, S92.120, S92.121, S92.122, S92.123, S92.124, S92.125, S92.126, S92.127, S92.128, S92.129, S92.130, S92.131, S92.132, S92.133, S92.134, S92.135, S92.136, S92.137, S92.138, S92.139, S92.140, S92.141, S92.142, S92.143, S92.144, S92.145, S92.146, S92.147, S92.148, S92.149, S92.150, S92.151, S92.152, S92.153, S92.154, S92.155, S92.156, S92.157, S92.158, S92.159, S92.160, S92.161, S92.162, S92.163, S92.164, S92.165, S92.166, S92.167, S92.168, S92.169, 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