

Surgeon Learning Curve for the Sinus Tarsi Approach to Intra-Articular Calcaneus Fractures & Improvement with Experience

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INTRODUCTION:

Fixation of displaced intra-articular calcaneus fractures (DIACF) via the sinus tarsi approach (STA) is increasingly done. Correlation between surgeon experience and outcomes has not yet been elucidated. We aimed to analyze the relationship between surgeon experience with the STA and outcomes (reduction, complications).

METHODS:

We retrospectively reviewed 103 consecutive DIACF (AO/OTA 82C; Sanders II-IV) treated surgically using STA from 2015 to 2021. Sixty-six patients with postoperative CT scans met inclusion criteria. Surgeries were performed by two fellowship-trained orthopaedic traumatologists with 6 and 9 prior years in practice using the extensile lateral approach, respectively. Bohler, and calcaneal varus angles, and heel width were measured. CT reduction quality, graded using articular step off/gap within the posterior facet, and angulation of the tuberosity, was either Excellent (no gap, no step off, and no angulation), Good (<1mm step, <5mm gap, and/or <5° of angulation), Fair (1-3mm step, 5-10mm gap, and/or 5-15° angulation), or Poor (>3mm step, >10mm gap, and/or >15° angulation). Generalized Estimating Equations (GEE) models using nested binary and multinomial logistic regression analysis were used to evaluate outcomes by surgeon experience with the STA.

RESULTS:

Patients were primarily men (75.8%) with mean age 41 years (range 20-71 years), including 14 smokers (21.2%), 9 diabetics (13.6%), and 10 open fractures (15.2%). Sanders III fractures were most common (68.2% vs. 28.5% and 6.1% Sanders II/IV respectively). A normal Bohlers angle was achieved in most cases (84.8%, n=56). Reduction quality was predominantly Good (59.1%, n=39) or Excellent (25.8%, n=17) and was similar between surgeons (p=0.74). Complications included wound necrosis (1), superficial infection (1), deep infection (1), and symptomatic posttraumatic arthritis requiring arthrodesis (3). There was a 29.3% reduction in likelihood of surgical complication with each year in surgeon experience with the STA and an 8.9% reduction per case (p<0.001). The likelihood of achieving a Good or Excellent reduction was 1.8 and 2.3 times greater than achieving a Fair reduction, respectively, for each year increase in surgeon experience with the STA (p=0.012 and 0.007, respectively). For each successive case, there was a 1.2 times greater likelihood of achieving a Good reduction (p=0.03).

DISCUSSION AND CONCLUSION:

Surgeon experience plays a critical role in outcomes. We found that outcomes (reduction, complications) improve with each cumulative case and year of experience with the STA to treat DIACF.