

Risk Factors for Subtalar Arthrodesis Following Calcaneus ORIF

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INTRODUCTION: Subtalar arthrodesis (STA) is a known complication of calcaneus open reduction and internal fixation (ORIF), yet risk factors and timing remain unclear. Limited data exist on patient demographics and predictors associated with STA following ORIF. Our purpose was to evaluate risk factors, timing, and patient characteristics to guide risk stratification and postoperative management in patients undergoing calcaneus ORIF.

METHODS: The US Collaborative Network database (Trinetx) was queried to identify patients aged 18 and older who underwent operative treatment for calcaneus fractures between 2004 through 2023. Patients were divided into two cohorts based on whether they subsequently underwent STA. Baseline demographics and comorbidities were compared, and risk factors for STA were analyzed.

RESULTS:

11,640 patients underwent calcaneus ORIF, with 431 (3.7%) later requiring STA. 301/431 (70%) occurred within 2 years, 94/431 (22%) between 2–5 years, and 36/431 (8%) beyond 5 years. Overall, significant risk factors for STA included obesity, nicotine dependence, hypertension, psychiatric disorders, and divorced status. Black or African American race was associated with a significantly lower likelihood of undergoing STA.

DISCUSSION AND CONCLUSION: Obesity, hypertension, nicotine dependence, psychiatric disorders, and marital status are key risk factors for STA following calcaneus ORIF. Obesity, hypertension, and nicotine dependence are key modifiable risk factors associated with STA risk highlighting the need for patient-specific counseling and risk modification. In high-risk patients, primary arthrodesis may be a more appropriate surgical option to reduce the need for revision surgery. Additionally, sociodemographic differences identified (lower likelihood of STA in Black or African-Americans) bring to the forefront the importance of individualized and equitable surgical decision-making.

Table 1. Hazard Ratios for Risk Factors Associated with Subtalar Arthrodesis After Calcaneus ORIF.

Covariate	Hazard Ratio	95% Confidence Interval	p value
Age, years	0.996	(0.991, 1.002)	0.162
Sex	0.872	(0.673, 1.062)	0.078
White	1.082	(0.875, 1.339)	0.465
Black or African American*	0.789	(0.626, 0.994)	0.045
Hispanic or Latino	1.091	(0.857, 1.389)	0.485
Divorced*	1.889	(1.464, 2.439)	< 0.001
Married	0.961	(0.807, 1.143)	0.651
Acute myocardial infarction	1.456	(0.769, 2.757)	0.249
Alcohol related disorders	0.876	(0.677, 1.134)	0.315
Anemia	0.958	(0.722, 1.269)	0.763
Chronic kidney disease	0.808	(0.497, 1.313)	0.388
Chronic obstructive pulmonary disorder	0.687	(0.451, 1.047)	0.081
Congestive heart failure	0.886	(0.506, 1.551)	0.6714
Coronary artery disease	1.211	(0.869, 1.686)	0.258
Depression	1.129	(0.912, 1.486)	0.493
Diabetes mellitus	0.881	(0.663, 1.171)	0.389
Hypertension*	1.218	(1.007, 1.474)	0.042
Liver disease	0.847	(0.616, 1.164)	0.137
Nicotine dependence*	1.44	(1.218, 1.703)	<0.001
Obesity*	1.464	(1.144, 1.874)	<0.001
Opioid dependence	0.817	(0.518, 1.289)	0.385
Osteoporosis	0.59	(0.341, 1.019)	0.058
Psychosis*	1.732	(1.046, 2.868)	0.032
Vitamin D deficiency	0.956	(0.698, 1.31)	0.517

*Statistically significant with $p < 0.05$.