

Smoking History is Associated with Increased Incidence of Reoperation for Nonunion Following Tibial Shaft Fracture: A Propensity-Matched Analysis

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Disclosures: Saqib Rehman receives royalties from Globus Medical and is a paid consultant for Globus Medical and Depuy Synthes. Saqib Rehman is also a member of the *Orthopedics Today* editorial board. None of the other authors have any competing interests to disclose.

INTRODUCTION: Cigarette smoking is widely acknowledged to impair bone healing, but the specific impact on reoperation for nonunion of operatively treated tibial shaft fracture is not well understood.

METHODS: All data were obtained from the TriNetX Research Network. Patients aged >18 years who underwent surgical fixation for tibial shaft fractures via intramedullary nailing or open reduction internal fixation between July 1, 2004, and July 1, 2024, were included. Recent history of cigarette smoking within 12 months prior to the index procedure denoted the experimental group; the control group included patients with no lifetime history of cigarette smoking. Propensity score matching was performed based on demographic characteristics and Charlson Comorbidity index (CCI). The primary outcome was revision surgery for tibial shaft fracture nonunion within one year. Secondary outcomes included surgical site infection (SSI) and delayed union encounter within 90 days and 12 months, respectively. All outcomes were assessed using risk ratios and 95% confidence intervals.

RESULTS SECTION: The analysis yielded 5,108 matched pairs. After matching, the experimental group consisted of approximately 64% male and 60% White patients. Patients with a history of smoking demonstrated a significantly higher rate of reoperation for nonunion at one year (RR 1.313; 95% CI 1.096, 1.573). Smoking was also correlated with elevated risk of superficial SSI (RR 2.885; 95% CI 1.850, 4.499) and deep SSI (RR 2.640; 95% CI 1.669, 4.176). At 12 months, smoking status was associated with increased incidence of delayed union encounter (RR 1.755; 95% CI 1.502, 2.052).

DISCUSSION: Smoking history was associated with significantly increased incidence of reoperation for nonunion and SSI following tibial shaft fracture surgery. These findings may support recommendations for smoking cessation immediately following fracture surgery to mitigate the risk of severe complications.

SIGNIFICANCE/CLINICAL RELEVANCE: Smoking increases the risk of nonunion surgery for patients with operatively treated tibial shaft fractures.

