Baseline RUST Score Predicts Success with Operative Treatment of Tibial Nonunion

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Purpose: Tibial nonunion is a significant cause of patient morbidity. The Radiographic Union Score for Tibial Fractures (RUST) has been demonstrated to be a reliable method to determine degree of healing of acute tibial fractures. It has been shown to correlate with patient function and predict whether patients will develop nonunion 3 months following tibia fracture. No data exist as to whether the RUST score can predict similar success in patients with established nonunion.

Methods: 103 patients who were treated by a single surgeon for a diagnosis of tibial nonunion were reviewed. All patients underwent surgical repair of a tibial nonunion and were followed at regular intervals for 12 months with physical and radiographic examination. Radiographs obtained before revision surgery were reviewed and scored using the RUST scoring system by two fellowship-trained traumatologists blinded to time to union. Differences in RUST score were averaged. Postoperative time to union was determined by clinical and radiographic measures. A Spearman rank-order correlation was run to assess the relationship between preoperative RUST score and postoperative time to union in patients with tibial nonunion. A binomial logistic regression was run to determine the effect of RUST score on the likelihood that the patient would develop a persistent nonunion.

Results: 103 patients with tibial nonunion were identified. 5 were lost to follow-up. Preoperative plain radiographs were available for 82 of the patients (84%) that had follow-up. All patients without preoperative radiographs went on to union. Two patients were not eligible to be scored by the RUST system. 74 of 80 patients with tibial nonunion went on to heal. The mean preoperative RUST score for healed patients was 7.6 (standard deviation [SD] 1.4) with a mean time to union of 7.4 months (SD 4.6). Six patients failed to heal. Mean RUST score for patients who did not heal was 6 (SD 2.2). Preoperative RUST score was a statistically significant predictor of failure to unite (P = 0.025, Exp(B) = 0.530, 95% CI [confidence interval] Exp(B) 0.305 to 0.922), demonstrating an increased RUST score is associated with a reduction in the likelihood of developing persistent nonunion. Spearman rank-order correlation showed a negative correlation between preoperative RUST score and postoperative time to union (rs = -0.244, P = 0.039).

Conclusion: A higher baseline RUST score in a tibial nonunion patient is associated with successful union ultimately. The baseline RUST score, however, demonstrated a negligible negative correlation with postoperative time to union. Preoperative RUST score may allow physicians to guide patient expectations for healing a tibial nonunion as it does an acute tibial fracture.

POSTER ABSTRACTS