

Treatment of Complex Pilon Fractures: Pilot Study Comparing Primary Arthrodesis to Open Reduction and Internal Fixation

Sheridan Scott, B.S.¹, Damon Mar, Ph.D.², Dave Turkowitch, B.S.², Brent Wise, M.D.²

¹University of Kansas School of Medicine-Kansas City, Kansas City, KS

²University of Kansas School of Medicine-Kansas City, Kansas City, KS, Department of Orthopedic Surgery

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Introduction. Open Reduction and Internal Fixation (ORIF) is preferred to Primary Arthrodesis (PA) following acute pilon fractures despite high complication rates, including the need for arthrodesis as a secondary procedure. This study serves to investigate patient-reported outcomes and physical functionality in patients who underwent PA versus ORIF following an acute pilon fracture.

Methods. Fifteen patients treated for pilon fracture (12 ORIF and 3 PA) were included. PA was performed via a novel surgical technique, and the ORIF group served as the control. The Foot and Ankle Outcome Score (FAOS) and 12 Item Short Form Survey score (SF-12) assessed patient-reported outcomes. Opal sensor data recorded timed-up-and-go (TUG) time (s), manual ROM (dorsiflexion-plantarflexion and inversion-eversion; degrees from neutral position), walking cadence (steps/min), walking speed (m/s), double support (% gait cycle), stride length (m), and walking ankle ROM (dorsiflexion-plantarflexion and inversion-eversion; degrees from neutral position).

Results. Demographic data was comparable between groups for age, body mass index, and post-operative follow-up time (months). Sex significantly differed between groups ($p = 0.044$). FAOS and SF-12 scores, ankle ROM while standing, treated versus untreated ankle inversion-eversion while standing, walking ROM, spatiotemporal gait (cadence, walking speed, double support, and stride length), and TUG time were statistically similar between groups. ORIF patients exhibited significantly decreased treated versus untreated ankle dorsiflexion-plantarflexion while standing ($p = 0.007$) compared to PA patients.

Conclusions. Minimal physical functionality and no patient-reported differences exist between pilon fracture patients treated with ORIF versus PA. This pilot study serves as a basis for future investigations and improves future pilon fracture treatment recommendations.