

## **Factors Affecting Outcomes of Hindfoot Fusion Nails for Acute Injury: A Multicenter Study**

Eugene S. Kim<sup>1</sup>, Stephen Kottmeier<sup>2</sup>, Peter C Krause, Hassan Riaz Mir<sup>3</sup>, Robert F Ostrum<sup>4</sup>, Clay A Spittler, Timothy O White, Paul Tornetta, Jon B Carlson, Daniel J Stinner, Kenneth A Egol<sup>5</sup>, Emil Azer, Michael John Beltran<sup>6</sup>, Samir Mehta<sup>7</sup>, Krystin Hidden<sup>8</sup>

<sup>1</sup>Boston Medical Center, <sup>2</sup>University Hospital, <sup>3</sup>University of South Florida, <sup>4</sup>UNC Department of Orthopaedics, <sup>5</sup>NYU Langone Medical Center, <sup>6</sup>University of Cincinnati, <sup>7</sup>University of Pennsylvania, <sup>8</sup>Mayo Clinic

**INTRODUCTION:** We sought to review a large cohort of patients treated with hindfoot fusion nails for acute ankle and pilon fractures to evaluate the effect of joint preparation and patient factors on outcomes and complications.

**METHODS:** We performed a retrospective study of 189 patients (88M: 101F) median age 68 treated for acute ankle (134) or pilon (55; 11A, 14B, 30C) fractures at 15 centers. We evaluated the influence of joint preparation as well as patient and injury risk factors on infectious and fracture complications, weight-bearing, and return to preoperative ambulatory status.

### **RESULTS:**

Eighty-five (45%) patients had open fractures and 69 (37%) had diabetes (33 IDDM; 36 NIDDM, 54 neuropathic). In total, 37 /189 (20%) patients had debridement of cartilage (joint preparation) at the time of surgery. For the entire cohort, 93 (49%) were made WBAT after surgery; the avg time to mobilize was 19 days (0-219) and to full weight-bearing was 57 days (0-537). Only 60% (107) patients returned to their preinjury weight-bearing status and 40% (68) were independent without assistive devices. Eighteen (11%) were non-ambulatory at last follow up. Return to preinjury weight-bearing was not affected by joint preparation ( $p = 0.27$ ). Joint preparation led to higher articular fusion rates (94% vs. 30%;  $p = 0.001$ ), fewer hardware removals (24% vs. 44%,  $p = 0.037$ ), but a higher fracture nonunion rate (24% vs. 7%,  $p = 0.005$ ) than no preparation.

A total of 47 (25%) patients had infectious complications, 60 (32%) had a fracture related complication, and 64 (34%) had additional procedures. Open fractures led to higher rates of fracture nonunion (16% vs. 6%,  $p=0.039$ ) but no differences in superficial or deep infection. IDDM was associated with higher rates of superficial infection (35% vs. 13%,  $p=0.003$ ), deep infection (29% vs. 14%,  $p=0.039$ ), superficial wound breakdown (34% vs. 14%,  $p=0.009$ ), deep wound breakdown (27% vs. 8%,  $p=0.003$ ), and amputation (17% vs. 5%,  $p=0.054$ ).

**DISCUSSION AND CONCLUSION:** Hindfoot fusion nails for acute ankle and pilon injuries had high complication rates resulting in 63 (34%) patients having additional procedures. More complications occurred in IDDM patients. While 89% regained ambulation, only 60% returned to preoperative status.