

Does Sagittal Plane Alignment and Surgical Approach Affect Pilon Fracture

Outcomes?

Trevor Gulbrandsen, MD; Andrew Polk, BS; Robert Miles Hulick, MD; Clay A. Spitler, MD; Brett D. Crist, MD

U of MO and U of Mississippi, Columbia, MO, United States

Purpose: The purpose is to evaluate the postoperative anterior distal tibial angle (ADTA) and lateral talar station (LTS) based on the surgical approach, and the effect on outcomes. Our hypothesis was that the anterolateral approach (AL) would improve the sagittal plane parameters due to the primary plate placement.

Methods: A retrospective review was performed on patients undergoing open reduction and internal fixation (ORIF) of pilon fractures at 2 academic trauma centers between September 2005 and September 2016. Inclusion criteria included AO/OTA 43 acute fractures with clinical follow-up to healing. Clinical data points included: demographics, comorbidities, AO/OTA fracture classification, surgical approach, and complications. Quality of reduction was measured using the ADTA, lateral distal tibial angle (LDTA), and LTS from radiographs.

Results: 576 pilon fractures were reviewed. Primary surgical approaches included 205 modified anteromedial (AM), 154 AL, and 217 consisted of additional/other approaches. When compared to the AL approach, the modified AM approach had decreased rates of local wound care (13.2% vs 14.9%), and unplanned reoperations (23.4% vs 27.9%). However, the modified AM approach had increased rates of superficial infection (18.1% vs 13.0%), deep infection (13.7% vs 12.3%), and amputations (4.4% vs 3.3%). There was no difference in ADTA, LDTA, or LTS between the modified AM and AL approach ($P = 0.49$, $P = 0.41$, $P = 0.85$), respectively. There was a significant difference in LDTA when comparing AM and posterolateral (PL) as well as AL and PL ($P = 0.03$, $P = 0.01$). There was no difference in ADTA or LTS with AM versus PL ($P = 0.44$, $P = 0.50$) and AL versus PL ($P = 0.27$, $P = 0.47$). 243 patients reported tobacco use, while 333 reported no tobacco use. There was a significant difference in LTS when comparing tobacco users versus non-tobacco users ($P = 0.01$). When comparing age (>65 years vs <65) there was no difference in ADTA, LDTA, or LTS ($P = 0.61$, $P = 0.80$, $P = 0.19$, respectively). There was no significant difference in ADTA, LDTA or LTS between diabetic and nondiabetic patients ($P = 0.76$, $P = 0.39$, $P = 0.43$).

Conclusion: The sagittal plane alignment does not appear to be affected by the surgical approach. Therefore, the surgical approach to pilon fractures should be based on the fracture pattern. Our study shows that the modified AM approach compared similarly to the AL approach with regard to complications, unplanned operations, and quality of reduction. Tobacco use may impact quality of reduction; however, age (>65 years) and diabetes do not appear to significantly impact the quality of reduction. This study shows that the modified AM is a safe and effective approach to complex fractures and the surgeon should consider the specific fracture pattern when choosing the specific approach.