

Abstract Number: 18104

Ankle fusion percutaneous home run screw fixation: technical aspects and soft tissue structures at risk

Alexandre Leme Godoy-Santos¹, Sierra Phillips², Lauren Roberts³, Sameer Naranje², Ashish Shah², Cesar de Cesar Netto²

1. Instituto de Ortopedia e Traumatologia, Hospital das Clínicas, Faculdade de Medicina, Universidade de São Paulo, São Paulo, SP, Brazil.

2. University of Alabama at Birmingham, Birmingham, AL, USA.

3. Hospital for Special Surgery, New York City, USA.

ABSTRACT

Introduction: During internal fixation of ankle fusions, in addition to the standard crossed screw fixation pattern, the use of a percutaneously placed augmenting screw, directed from the posterolateral tibial metaphysis proximally across the ankle into the talar neck ("home run screw"), is a widely used technique. The placement of this screw is technically demanding, and for the majority of surgeons, multiple attempts under fluoroscopy guidance are frequently needed to achieve perfect positioning of the implant. There is a risk of injury to local neurovascular and tendinous structures.

Objective: To identify the number of attempts necessary for perfect positioning of the ankle fusion home run screw and the neurovascular and tendinous structures at risk.

Methods: Eleven fresh-frozen cadaver limbs were used. Guide wires for cannulated screw placement were percutaneously placed into the distal posterolateral aspect of the leg under fluoroscopic guidance, with the ankle held in the neutral position. Malpositioned guidewires were not removed and served as guidance for the following pins. The number of guide wires needed to achieve acceptable positioning of the implant was noted. After a layered dissection from the skin to the tibia, we evaluated neurovascular and tendinous injuries and measured the shortest distance between the closest guidewire and the soft tissue structures using a precision digital caliper.

Results: The mean number of guide wires needed to achieve an acceptable positioning of the implant was 2.34 (SD 0.81, range 2 – 4). The mean distances between the closest guide pin and soft tissue structures of interest were as follows: Achilles tendon 5.35mm (SD 2.74mm); peroneal tendons 9.65mm (SD 5.19mm); posteromedial neurovascular bundle 12.78mm (SD 7.14mm). The sural bundle was in contact with the guide pin in 5/11 specimens (45.5%) and impaled in 3/11 specimens (27.3%). In the remaining 3 specimens, the average distance from the sural nerve bundle was 3.58mm (SD 2.16mm).

Conclusion: The placement of percutaneous ankle fusion home run screws is technically demanding, requiring multiple attempts to achieve acceptable placement. We have shown that important tendinous and neurovascular structures are in close proximity to the guidewires and that the sural bundle is injured in approximately 73% of cases.

Keywords: Home run screw; Ankle arthrodesis; Sural nerve.

