Posterior Talar Dome Accessibility: Comparing Posteromedial Approaches

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Purpose: Posterior talar body fractures are rare injuries without a consensus surgical approach. This study evaluates the accessible area of the talar dome through two posteromedial approach intervals (posteromedial, PM; and modified posteromedial, mPM) both with and without distraction.

Methods: Ten male cadaveric legs (5 matched pairs) were included. A PM approach, between flexor hallucis longus (FHL) and tibial neurovascular bundle, and a mPM approach, between FHL and Achilles tendon, was performed on each pair. 5 mm of distraction through the tibiotalar joint was applied via an external fixator with the foot held in neutral flexion. Accessible dome surface area (DSA) was outlined by drilling with a 1.6-mm Kirschner wire with and without distraction. Specimens were explanted and analyzed by micro-CT with 3-dimensional reconstruction. Primary outcomes were total accessible DSA and sagittal plane access at predetermined intervals.

Results: The PM approach allowed access to 19.1% of the talar DSA without distraction and 33.1% of the talar dome with distraction ($P<0.001$). The mPM approach provided access to 20.4% and 35.6% of the talar DSA without and with distraction ($P<0.001$) (Fig. 1). The PM approach allowed similar access to the talar dome as did the mPM approach both with ($P = 0.39$) and without distraction ($P = 0.55$). Both approaches demonstrated similar sagittal plane access at all intervals except the lateral border of the talus, where the mPM approach provided greater access both without distraction (20.5% vs 4.38%, $P = 0.001$) and with distraction (34.3% vs 17.8%, $P = 0.02$).

Conclusion: The mPM approach provides equivalent access to the posterior talar body relative to the PM approach. The mPM interval provides the advantage of avoiding dissection of the tibial nerve or posterior tibial artery and should be utilized based on the current data. Using an external fixator for distraction can be used to improve talar dome visualization by greater than 70%.