Saturday: Ankle Fracture: 12:06 – 12:08 pm

Painful Hardware Removal Following Medial Malleolar Open Reduction Internal Fixation

Presenting Author:
Bradly W. Bussewitz, DPM – Westerville, Ohio

Additional Author:
Shyler Demill, DO
Terrence M. Philbin, DO

Summary
The primary goal of this study was to determine if medial malleolus screw placement leads to posterior tibial tendon (PTT) damage when performing ORIF of the medial malleolus.

Introduction
The management of ankle fractures with open reduction and internal fixation has been a time proven method to help prevent deformity and post-traumatic arthritis, however, not without risks. The incidence of late pain due to retained hardware after open reduction and internal fixation of ankle fractures has been documented. The primary goal of this study was to determine if medial malleolus screw placement leads to posterior tibial tendon (PTT) damage when performing ORIF of the medial malleolus.

Methods
Patients that had ORIF of the medial malleolus and had subsequent repair of the posterior tibial tendon with hardware removal were identified. Inclusion criteria included patients having ORIF of the medial malleolus for fracture or osteotomy and during follow-up had pain at the PTT and medial malleolar hardware removal. Exclusion criteria included removal of hardware for reasons other than pain including: nonunion, cellulitis, osteomyelitis, and interfering hardware for another surgical procedure. A template to evaluate the lateral radiograph was created using the diagram from Dr. Femino’s original article. Zones were then established, labeled one through three as described by Femino. This was then used as an overlay on each individual’s lateral ankle radiographs to analyze the position of the medial malleolus screws. Each screw was then given a zone. Results were compared to determine any significance correlating hardware zone and PTT pain.

Results
There were 17 patients with 30 screws in the medial malleolus who met inclusion criteria. Eighteen screws were found in zone 1 (60%), eleven in zone 2 (36%) and one in zone 3 (3.3%). Assuming the most likely damage to the posterior tibial tendon occurs in zones 2 and 3 we also looked at the location of the most posterior screw. There were 17 most posterior screws, only one for each patient. Examining only the posterior most screws, four were found in zone 1 (25%), eleven were found in zone 2 (69%) and only one of the most posterior screws was found in zone 3 (6%). Therefore 12/16 (75%) of the irritating screws were found in zones 2 and 3.

Conclusion
In our case series, 40% of the total screws and 75% of the posterior most screws were located in zones 2 and 3, and therefore potentially causing risk to the posterior tibial tendon. In association with Femino’s article, where 4 of 10 (40%) of the screws in zone 2 were in direct contact with the posterior tibial tendon and that all 10 screws (100%) placed in zone 3 were in direct contact with the posterior tibial tendon, there is a high probability that medial malleolar hardware can compromise the posterior tibial tendon and can be a factor in continued pain and may lead to acquired flatfoot deformity.