Pes Planus and Distal Fibular Stress Fractures
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Introduction/Purpose: Fibular stress fractures accounts for 4.6% to 21% of all stress fractures. There have been isolated reports of distal third fibular stress fractures within 4-7cm of the tip of the lateral malleolus in young and athletic patients related to overuse injuries. We examine a case series of middle aged female patients with planovalgus foot deformities and associated hindfoot valgus who presented with distal third fibular stress fractures. We propose that this type of distal fibular stress fracture is a result of increased stress loading of the distal fibula at the superior margin of tibio-fibular interosseous ligaments.

Methods: From October 2015 through September 2016, we evaluated six patients (six cases) who presented to Baylor College of Medicine foot and ankle specialty clinic. These patients were found to have distal fibular stress fractures. Detailed initial history was documented. The diagnosis of distal fibular stress fracture was confirmed with both clinical examination and radiographic evidence among all patients. Additionally, all patients were found to have planovalgus deformity with associated hindfoot valgus. Radiographic measurements were taken in all patients, including lateral talo-calcaneal angle, Meary’s angle, calcaneal inclination angle, and AP tibio-talar angle. Distance of distal fibular stress fracture location to tip of lateral malleolus, as well as the distance between medial cuneiform and 5th metatarsal were measured. Single independent observer performed all measurements.

Results: Among the six patients in the study, all were female, with average age of 58 years (45-64). Four patients carried the diagnosis of osteopenia and/or osteoporosis from DEXA scan. There is no evidence of association with tobacco use or alcohol use. The mean radiographic distance between location of stress fracture to tip of lateral malleolus is 5.8cm (4.2cm-7cm). There was evidence of pes planus from Meary’s angle, which averaged 6.7° (3°-11°) convex downward, and measurement of calcaneal inclination angle averaged 19° (13°-30°). Furthermore, measurement of tibio-talar angle averaged 1.7° valgus alignment consistent with chronic hindfoot valgus deformity. While all patients were treated successfully with immobilization, one patient underwent medial calcaneal osteotomy to correct the hindfoot valgus after recurrent fracture.

Conclusion: It is hypothesized that increased stress loading of the fibula due to lateralization of the load axis contributes to this condition. The apex of this stress culminates in the lateral aspect of the fibula above the distal tibio-fibular ligament complex and results in a characteristic valgus fracture of the fibula. The increased stress from deformity results in the fracture rather than increased load from exercise or other repetitive stress. The significance of this proposition is that recognition of this type of fracture should lead the clinician to address the underlying planovalgus deformity in the treatment of this fracture type.