

# **Foot and Ankle: Imaging of Syndesmosis, Lisfranc, and Turf Toe Injuries**

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## **Introduction**

Athletic foot and ankle injuries called “high ankle sprain”, midfoot sprain, and “turf toe” are common, but in most centers, represent less common indications for MRI than other injuries such as osteochondral lesions, osseous stress injury, or tendon tear. As a result, many radiologists see relatively few of these injuries and may struggle with the anatomy, findings in acute injury, and how MRI findings affect clinical management. In this talk I will review injuries to the distal tibiofibular syndesmosis, the Lisfranc ligament complex, and the first metatarsophalangeal (MTP) joint with emphasis on what the sports medicine physicians want to know.

## **Syndesmosis Injuries**

In contrast to typical lateral ankle sprains involving the talofibular and calcaneofibular ligaments, syndesmosis injuries in the “high” ankle involve partial or high-grade disruption of the distal anterior or posterior tibiofibular ligaments and to the interosseous membrane. High-grade injuries such as ankle fracture dislocations are usually managed with radiography and computed tomography followed by surgical reduction and fixation. Lower grade injuries may come to MRI to confirm the diagnosis and establish the imaging-based degree of injury. One must be able to identify the normal or abnormal ligaments and assess chronicity to accurately diagnose these injuries.

## **Lisfranc Ligament Injuries**

Injuries to this ligament complex at the tarsometatarsal (TMT) junction need to be treated carefully to avoid long-term mechanical foot complications and arthritis. Spanning the cuneiform-metatarsal articulations are dorsal, interosseous, and plantar ligament contributions with somewhat confusing nomenclature according to their cuneiform (“C”) or metatarsal (“M”) attachments. As with any other ligament injury, MRI can be helpful in identifying a normal ligament, edema along a ligament, or frank discontinuity in a high-grade tear. Through evaluation of the ligamentous components as well as TMT subluxation patterns and (often) subtle fractures, MRI helps corroborate findings on radiography or fluoroscopic stress examinations, and can help predict time to return to participation or need for surgical fixation.

## **Turf Toe**

A widely accepted definition of so-called “turf toe” has been elusive, but more recently the term is ascribed primarily to injuries of the “plantar plate”, a ligamentous complex intimate with the hallux sesamoids, joint capsule, and adjacent tendons. Analysis of the appearance and position of the sesamoids on various imaging modalities, and MRI visualization of the ligamentous and tendinous structures involved helps to grade injuries and assess other areas of joint damage. While most turf toe injuries are treated conservatively, the degree of injury helps predict time to healing and, in high-grade injuries, may influence surgical repair.

## Conclusions

An important characteristic of each of the injuries described is the key inter-relationship between clinical findings, evaluation of alignment and stability and imaging in determining whether or not conservative or surgical management is needed. It is therefore critical that radiologists provide accurate assessments of the multiplicity of small ligaments involved. As further clinical experience accrues and imaging techniques become more refined, it is expected that, like for many other athletic injuries, MRI will play an even more central role.

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