

# MR Imaging of Impingement and Entrapment Syndromes of the Foot and Ankle



Edward Sellon, MBBS, MRCS, FRCR,  
Philip Robinson, MBChB, MRCP, FRCR\*

## KEYWORDS

• Ankle • Impingement • Entrapment • MR imaging • Athletic injuries

## KEY POINTS

- Impingement is a clinical syndrome of chronic pain and restricted range of movement caused by compression of abnormal bone or soft tissue within the ankle joint.
- Common sites of impingement in the ankle include posterior, posteromedial, anteromedial, anterolateral, and, less commonly, direct anterior; these often coexist and occur in conjunction with other ankle pathologies.
- The presence of synovitis, pericapsular oedema and bone marrow oedema on MR imaging support a diagnosis of impingement in the right clinical context.
- In most cases ankle impingement is managed conservatively, with arthroscopic or open debridement of the abnormal bone or soft tissue reserved for refractory cases.

## INTRODUCTION

Impingement syndromes of the ankle are a common cause of chronic pain, instability, and limited range of movement in athletes and the active population. They most commonly occur after a sprain injury or repetitive microtrauma at the extreme ranges of movement. The resultant hemorrhage, reactive synovial hyperplasia, and scarring can lead to abnormal soft tissue interposition within the joint. Developmental or acquired bony spurs or prominences also may impede the normal range of movement. It is painful soft tissue or osseous entrapment within the joint that characterises impingement. The diagnosis is largely clinical but may be supported with a range of imaging techniques. MR imaging is particularly valuable in being able to detect not only the soft tissue and

osseous abnormalities involved in these syndromes but also a wide variety of concomitant injuries and other potential causes of ankle pain that also may need to be addressed clinically. It is important to remember that although MR imaging findings help direct surgery and have a high concordance with surgical findings, subclinical asymptomatic disease is often present in athletes, and close correlation with the clinical picture is required.

This heterogenous group of pathologies is categorized according to the anatomic relation to the tibiotalar joint. Broadly speaking there are 3 main types<sup>1</sup>:

1. Anterior impingement, which can be subdivided into anterolateral, anteromedial, and purely anterior impingement.

---

The authors have nothing to disclose.

Musculoskeletal Centre X-Ray Department, Chapel Allerton Hospital, Chapeltown Road, Leeds LS7 4SA, UK

\* Corresponding author.

*E-mail address:* philip.robinson10@nhs.net

Magn Reson Imaging Clin N Am 25 (2017) 145–158

<http://dx.doi.org/10.1016/j.mric.2016.08.004>

1064-9689/17/© 2016 Elsevier Inc. All rights reserved.

2. Posterior impingement, subdivided into posterior and posteromedial impingement.
3. Extra-articular lateral hindfoot impingement, which encompasses talocalcaneal and subfibular impingement secondary to a planovalgus foot deformity.

In most cases, ankle impingement is managed conservatively, with arthroscopic or open debridement of the joint reserved for refractory cases. In this review, we describe the anatomy, pathophysiology, clinical presentation, imaging features, and treatment approach of each of ankle impingement syndrome, with a focus on the MR imaging findings.

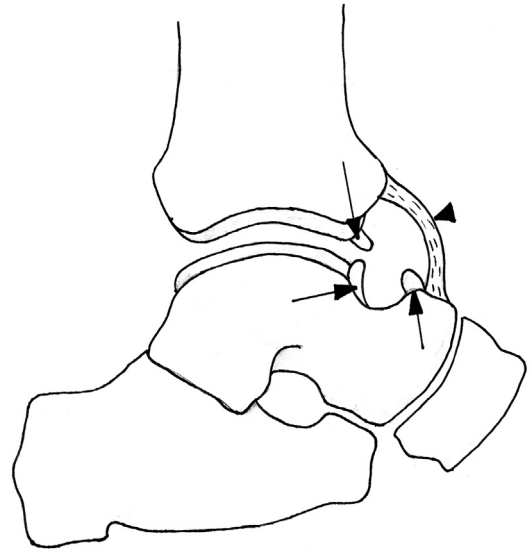
### ANTERIOR IMPINGEMENT SYNDROME

Anterior ankle impingement is a well-established and relatively common cause of chronic ankle pain, particularly in soccer players, runners, and ballet dancers, who sustain repetitive ankle dorsiflexion. Symptoms are generally progressive and relate to impingement of hypertrophied synovial scar tissue and bony spurs within the anterior ankle joint.

#### Anatomy and Pathophysiology

Ankle instability or repetitive forceful dorsiflexion can result in microtrauma to the anterior joint cartilage and deeper bone layers. Over time, attempted repair, including fibrosis and fibrocartilage proliferation, leads to the formation of bony spurs on the anterior rim of the tibia and sulcus of the talus.<sup>2</sup> These bony spurs or osteophytes can cause anterior joint space narrowing, limiting ankle dorsiflexion (**Fig. 1**).<sup>3</sup> The term osteophyte does not imply conventional osteoarthritis, rather a proliferative effect of focal premature degeneration. Like any other osteophyte, however, they may break off into the joint, forming a loose body.

Repetitive supination injuries are also known to cause osteophyte formation secondary to damage to the anterior and medial margin of the articular cartilage. Another proposed aetiological factor is direct microtrauma caused by ball striking in soccer with direct impact of the ball typically over the anteromedial tibiotalar joint, where the cartilage is covered only by thin subcutaneous fat.<sup>4</sup> Both mechanisms described occur frequently in soccer players, and it is therefore unsurprising that this population of athletes is so commonly afflicted.<sup>5</sup> Indeed, the condition was first described in European soccer players as “footballer’s ankle.”<sup>5,6</sup> The theory hypothesised at the time, however, was one of repetitive traction injury of the anterior joint capsule in extreme plantarflexion causing



**Fig. 1.** Diagrammatic representation of the anterior ankle (sagittal) with intra-articular tibiotalar spurs (arrows) and hypertrophied anterior capsular thickening (arrowhead). (Courtesy of Jenna Fielding, MBChB, MRCP, Sheffield, United Kingdom.)

anterior exostoses. This is certainly not the case in the anteromedial ankle, where cadaveric analysis has shown that the bony spurs are intra-articular, consistent with osteophyte formation.<sup>7</sup> The traction hypothesis, however, may still hold true laterally, where growth is sometimes extra-articular and may represent enthesophyte formation.<sup>7</sup>

It is important to remember that the finding of anterior bone spurs does not necessarily mean that the patient is symptomatic. Studies of asymptomatic athletes have found that a significant proportion (45%–59%) have anterior tibiotalar spurs on plain radiograph.<sup>8</sup> It is thought that the associated anterior synovial thickening and scarring, rather than the spurs alone, are responsible for producing the clinical symptoms.<sup>9</sup> Indeed, postexcision recurrence of the bony spurs is not necessarily accompanied by recurrence of symptoms.<sup>9,10</sup> Recent attention has been given to congenital anatomic variants as predisposing factors for the formation of anterior joint space spurs and soft tissue hypertrophy. A cam-type deformity of the talar dome has been described, whereby contact between a noncircular arc morphology of the dome with the anterior tibial plafond during dorsiflexion causes abnormal loading of the talar dome cartilage.<sup>3</sup> In these patients, a cavo-varus foot type is more commonly observed, and the associated external rotation of the tibia is thought to further reduce the tibiotalar joint space.<sup>3</sup> In

Download English Version:

<https://daneshyari.com/en/article/5727847>

Download Persian Version:

<https://daneshyari.com/article/5727847>

[Daneshyari.com](https://daneshyari.com)