Distal tibiofibular synostosis following non-operative treatment of ankle fractures

Introduction

Synostosis of the distal tibiofibular syndesmosis is a rare complication following ankle fractures. It has been reported in a handful of studies, particularly following operative management of ankle fractures with tibiotalar dislocation, syndesmosis injury and those with significant soft tissue injuries (Marvan et al, 2016). This article presents an unusual case of a patient with a simple Weber B ankle fracture treated non-operatively who later developed symptomatic synostosis of the distal tibiofibular syndesmosis.

Figure 1. Plain anteroposterior and lateral radiographs of right ankle following an inversion injury demonstrating a Weber B ankle fracture with no talar shift.

Figure 2. Anteroposterior and lateral radiographs at 16 months post injury demonstrating distal tibiofibular synostosis.

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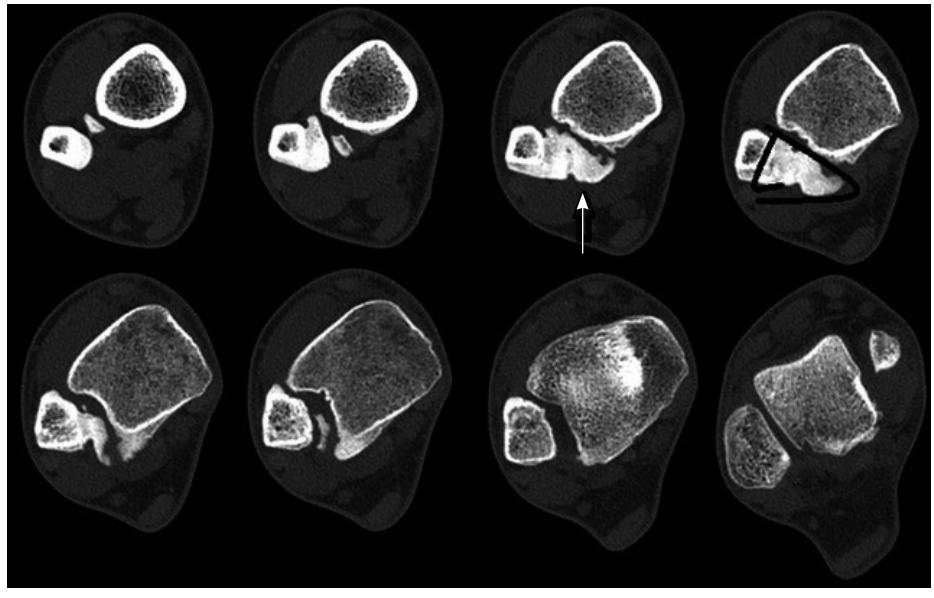
Discussion

Post-traumatic distal tibiofibular synostosis is a poorly described complication of surgically treated ankle fractures. The use of syndesmotic screw fixation and tibiotalar dislocation were found to be significant risk factors in the formation of postoperative distal synostosis following surgical fixation (Hinds et al, 2014; Marvan et al, 2016). Sequential sectioning of the syndesmotic ligaments resulted in significant reductions in resistance to both internal and external rotation as well as significant increases in fibular sagittal translation and axial rotation

Figure 3. Axial computed tomography images demonstrating distal tibiofibular joint synostosis displacing the syndesmosis (arrow).



CASE REPORT

A young fit and well man sustained an isolated, closed right ankle injury playing rugby, with no medial tenderness or neurovascular deficit. His plain radiographs (*Figure 1*) showed a Weber B ankle fracture with no talar shift or significant soft tissue swelling medially. He was treated non-operatively in a plaster cast. He regained good function with physiotherapy input, resumed full-time employment and was discharged from clinic at 3-month follow up.

He re-presented 6 months later with ankle pain and discomfort, particularly when running, and inability to fully participate in recreational sporting activities. On examination, he had some stiffness in his right ankle with painful external rotation, limited dorsiflexion and a tender lump posteriorlaterally. Plain radiographs (*Figure 2*) demonstrated a healed fibula fracture with an osseous bridge in the distal tibiofibular syndesmosis region. Subsequent computed tomography scanning (*Figure 3*) demonstrated widening of the syndesmosis and forward displacement of the fibula by a mature osseous bridge causing synostosis of the distal tibiofibular syndesmosis. He underwent an excision of the synostosis and reconstruction of his syndesmosis with a satisfactory outcome to date.

(Droog et al, 2015; Clanton et al, 2017). This may lead to changes in the ankle mechanics, increasing stresses in the tibiotalar joint and secondary degenerative changes.

The incidence of post-traumatic synostosis in ankle fractures treated non-operatively is unknown. Only a handful of case reports have been published in high performing athletes (Whiteside et al, 1978). This patient had returned to full employment and was functioning well in activities of daily living. However, he struggled to participate in sports or strenuous exercises. The initial radiographs demonstrated a seemingly straightforward Weber B ankle fracture with no talar shift which would require surgical intervention. Closer follow up with weight-bearing radiographs and meticulous radiographic evaluation may help recognize those subtle syndesmotic injuries that can be missed on initial assessment. Computed tomography is the investigation of choice to assess articular congruity and subtle syndesmotic widening or indeed, in this case, the extent of synostosis and help plan further management. **BJHM**

Clanton TO, Williams BT, Backus JD et al (2017) Biomechanical analysis of the individual ligament contributions to syndesmotic stability. *Foot Ankle Int* **38**(1): 66–75. https://doi.org/10.1177/1071100716666277

Droog R, Verhage SM, Hoogendoorn JM (2015) Incidence and clinical relevance of tibiofibular synostosis in fractures of the ankle which have been treated surgically. *Bone Joint J* **97-B**(7): 945–949. https://doi.org/10.1302/0301-620X.97B7.34460

Hinds RM, Lazaro LE, Burket JC, Lorich DG (2014) Risk factors for posttraumatic synostosis and outcomes following operative treatment of ankle fractures. *Foot Ankle Int* **35**(2): 141–147. https://doi.org/10.1177/1071100713510913

Marvan J, Dzupa V, Krbec M et al (2016) Distal tibiofibular synostosis after surgically resolved ankle fractures: An epidemiological, clinical and morphological evaluation of a patient sample. *Injury* **47**(11): 2570–2574. https://doi.org/10.1016/j.injury.2016.09.007

Whiteside LA, Reynolds FC, Ellsasser JC (1978) Tibiofibular synostosis and recurrent ankle sprains in high performance athletes. *Am J Sports Med* **6**(4): 204–208. https://doi.org/10.1177/036354657800600410

LEARNING POINTS

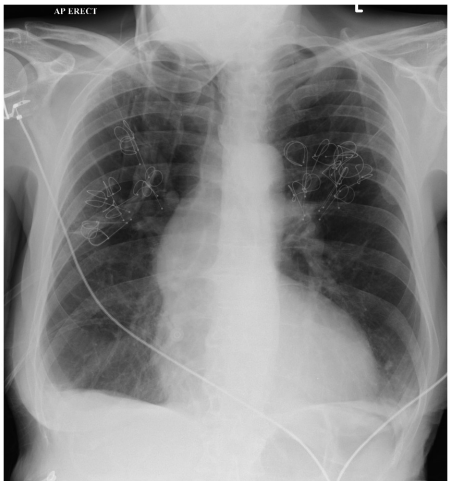
- Post-traumatic distal tibiofibular synostosis following ankle fractures treated non-operatively is a rare complication with unknown incidence.
- Careful radiographic evaluation of weight-bearing radiographs helps to detect subtle syndesmotic injuries.
- In young, high-demand athletic patients it may lead to significant limitations.
- Syndesmosis reconstruction following excision of the synostosis may improve outcomes.

Coils to aid recoil: a bronchoscopic approach to lung reduction surgery in emphysema

A 66-year-old man was admitted to hospital with shortness of breath. He had a background of advanced emphysema and severe aortic stenosis. A chest radiograph was performed showing lung reduction surgery coils (*Figure 1*).

Conventional lung volume reduction surgery has shown benefits in lung function and survival in appropriately selected patients with emphysema. Interest has developed in bronchoscopic lung volume reduction surgery as a less invasive, and potentially safer, technique in those unfit for conventional surgery. This patient had lung reduction coils inserted for severe emphysema which vastly improved his quality of life, allowing him to perform routine daily activities which had previously made him too breathless.

Figure 1. Chest radiograph showing numerous nitinol lung reduction coils in both lungs.



Endobronchial coil insertion is one of several bronchoscopic interventions to have been trialled (Shah et al, 2013). The coils are implanted into the sub-segmental airways in a procedure lasting around 30–45 minutes, under sedation or a general anaesthetic. The aim is to compress the diseased part of the lungs, reducing air flow to diseased segments, while improving the recoil of the lung and reduce gas trapping. Complications are similar to those associated with bronchoscopy and include pneumothorax, pneumonia, chronic obstructive pulmonary disease exacerbations, chest pain and haemoptysis (Slebos et al, 2012). **BJHM**

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Shah PL, Zoumot Z, Singh S et al (2013) Endobronchial coils for the treatment of severe emphysema with hyperinflation (RESET): a randomised controlled trial. *Lancet Respir Med* **1**(3): 233–240. https://doi.org/10.1016/S2213-2600(13)70047-X

Slebos DJ, Klooster K, Ernst A, Herth FJ, Kerstjens HA (2012) Bronchoscopic lung volume reduction coil treatment of patients with severe heterogeneous emphysema. *Chest* **142**(3): 574–582. https://doi.org/10.1378/chest.11-0730