Tibiofibular Synostosis following Syndesmosis Fixation: A case report

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Distal tibiofibular synostosis is an uncommon complication following fixation of an ankle fracture. A synostosis is an abnormal formation of bone or osseous union of bone forming a joint. We present a case of tibiofibular synostosis following the use of Arthrex® TightRope™ Technique for syndesmosis fixation.

Keywords: Tight Rope technique, tibiofibular synostosis, syndesmosis.

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Ankle fractures are the most common fracture sustained by young adults in the United Kingdom.¹ Of these fractures, 10% will have a syndesmotic injury.² The most common fractures associated with syndesmotic injury, are Weber C type fractures, Weber B type fractures and fractures of the proximal fibular (Maisonneuve). The syndesmotic injury usually occurs due to an external rotation force applied to the foot relative to the tibia.³

Not all syndesmotic injuries require fixation. Boden, et al.,⁴ recommended that stable fibular fractures did not require syndesmotic fixation if the medial malleolus had undergone rigid fixation. The same research team later combined this cadaveric data with a prospective clinical trial and recommended that syndesmotic fixation was only indicated for fibular fractures within 4.5cm of the ankle joint with a deltoid ligament tear.⁵

Of those fractures that do require fixation, accurate reduction of the syndesmosis is associated with the best functional outcome. If the deep deltoid ligament is stable then the ankle fracture is stable and the talus is unlikely to shift. 'High ankle sprains' causing pain due to disruption of the syndesmosis may also need stabilization.

There are many methods for fixation of the syndesmosis including screw fixation, absorbable screw fixation, and suture button syndesmosis fixation, which has come into vogue due to its proposed earlier rehabilitation and earlier return to work.⁶ It also alleviates the need for a second operation to remove metal fixation. This is a relatively new fixation method with no documented adverse cases reported in the literature. We present a case of tibiofibular synostosis as a complication of suture button syndesmosis fixation.

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Figure 1 Preoperative radiographs showing tri-malleolar ankle fracture with syndesmosis.

Case Report

A 25 year-old gentleman attended our department following a pronation-external rotation injury of his right ankle. He sustained this injury while walking on uneven ground with his dog. He had a past medical history of colitis and epilepsy, and was prescribed Tegretol 600mg BD. He was currently unemployed, a casual smoker and a social drinker. On examination, the ankle was notably deformed, and was tender both medially and laterally.

Figure 2 Postoperative radiographs showing tri-malleolar ankle fracture fixation with placement of Arthrex® TightRope™ Syndesmosis technique. Early callus formation and bone bridging is seen on radiograph at 6 weeks.

Radiographs revealed a displaced trimalleolar fracture of his right ankle, with talar shift and syndesmotom diastasis. (Fig. 1) The fracture was reduced and placed in a below knee posterior splint and the patient was admitted with ice and elevation. The ankle was too swollen and surgery was postponed for 8 days following the injury.

The fibular was fixated during the operation with a lag screw and semitubular plate, and the medial malleolus with two lag screws. The Cotton test was performed under radiographic guidance, confirming syndesmotom instability. A tightrope was placed as described by the Arthrex® TightRope™ syndesmosis fixation surgical technique guide (Arthrex® Inc, Naples, Florida). The patient remained in a plaster cast for 6 weeks, non-weightbearing and mobilized successfully. A radiograph taken at 6 weeks showed some signs of callus formation between the tibia and fibular. (Fig. 2) At 12 weeks the patient had regained full range of motion and was therefore discharged.

Figure 3 A year after surgery, there is a large, bone synostosis in the region of the tightrope placement.

A year later the patient returned complaining of anterior ankle pain while weight bearing. Range of motion of the ankle was relatively well preserved. A radiograph taken at this time showed bony union between the distal tibia and fibula accounting for the patient's symptoms. (Fig. 3)

Discussion

Distal tibiofibular synostosis is an uncommon complication following ankle fracture fixation occurring in approximately 6% (Weber B 2%, Weber C 12%) of cases.⁷ Most show some signs of callus formation by 3 months, with synostosis occurring by 1 year. Böstman reported an increase in the incidence of synostosis with the use of absorbable suture fixation⁸, however Albbbers, et al.,⁷ did not find a difference with suture fixation as compared to screw fixation. A recent report on the use of Arthrex tightrope in 25 cases reported no episodes of tibiofibular synostosis with a mean follow up of 10 months.⁹

Tibiofibular synostosis can be a source of ankle pain, with patients usually complaining of pain while running.¹⁰ This is thought to be caused by the loss of normal downward and lateral motion of the fibular. It is impossible to confirm the true cause of the synostosis, be it the injury, surgery or methods used.

On review of the radiographs, 6 weeks postoperative, incomplete reduction of the syndesmosis is likely. Heterotopic ossification is already present at this stage indicating that this has occurred during immobilization and not due to subtle movements from the suture fixation technique. Synostosis is a rare complication and proves an interesting case for further management.

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