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Case Reports and Series

Is It Possible to Overcompress the Syndesmosis?

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ABSTRACT

The case we present suggests that it might be possible to overcompress the syndesmosis, causing subluxation of the talus within the ankle mortise. A 26-year-old female patient had had a Weber Type C ankle fracture internally fixed with a lateral plate and syndesmosis screws. Despite the fibula appearing well reduced and computed tomography imaging showing a well-aligned fibula within the fibular notch, anteromedial subluxation of the talus was present in the ankle mortise. Examination with the patient under anesthesia revealed a stable syndesmosis fixation; however, talar malpositioning was not affected by the foot position. The syndesmosis fixation was revised sequentially. As the fixation was relaxed sequentially, the talus appeared to reduce within the ankle mortise, with restoration of the previously obliterated medial clear space. The syndesmosis was stabilized with a single 3.5-mm cortical screw in a reduced position. The patient had made a full recovery at the 12-month follow-up examination, having undergone elective syndesmosis screw removal at 12 weeks postoperatively. Several studies have suggested that it might not be possible to overcompress the syndesmosis and have even advocated the use of a lag screw technique for syndesmosis fixation. Based on the present case, we would advise a degree of caution with this approach, because it might be possible to overcompress the syndesmosis and cause significant subluxation of the tibiotalar articulation.

Ankle fractures are exceedingly common, with a reported incidence of 168.7 in 100,000 annually (1). Ankle fractures account for 9% of all fractures (2), with an estimated 10% incidence of syndesmotic disruption in all ankle fractures (3).

Currently, no consensus has been reached regarding the optimal method of stabilization, the best position of the ankle during implant placement, weightbearing restrictions, and need for, and timing of, implant removal (4). Accurate syndesmotic reduction is notoriously challenging, and malreduction is common (5). Syndesmotic compression has been discussed less frequently in the published data. However, it has been suggested that syndesmotic compression is not possible (6,7), with some investigators advocating the use of a lagged screw technique for syndesmotic stabilization (8). The present report shows the importance of syndesmotic reduction in maintaining the congruity of the ankle joint, with our findings cautioning against overcompression of the syndesmosis.

Case Report

We report the case of a 26-year-old female patient who had sustained a Weber C ankle fracture after an eversion injury in August 2016. Significant diastasis of the syndesmosis and widening of the medial clear space were present on the original radiographs (Fig. 1). A small posterior malleolus fragment was also present (Fig. 2). She was otherwise fit and well and did not have any significant medical history. She was employed in an office.

The fracture was internally fixed at another institution with a one-third semitubular plate bridging the fibula fracture. Excellent reduction of the fibula appeared to have been achieved, with complete restoration of fibula length. Application of a large clamp across the syndesmosis did not appear to have caused any changes to the ankle mortise (Fig. 3). However, the next images demonstrated insertion of 2 tricortical, fully threaded screws across the syndesmosis that resulted in significant anteromedial displacement of the talus (Fig. 4). The exact technique used to insert the syndesmosis screws was not available to us. However, we surmised that the syndesmosis had been overcompressed owing to the decreased tibiofibular clear space seen on intraoperative imaging between clamp application and screw insertion. The insertion of the distal screw, in particular, appeared to have significantly narrowed the syndesmosis at this point.

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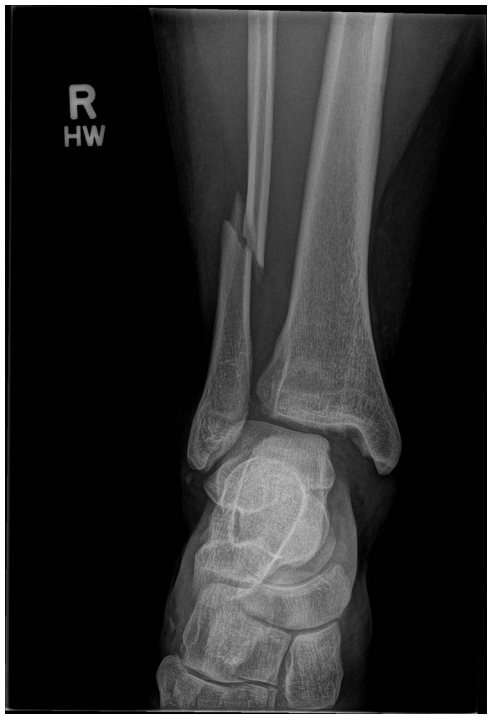

Fig. 1. Anteroposterior ankle radiograph of initial injury, with a widened medial clear space and syndesmotic diastasis clearly seen.

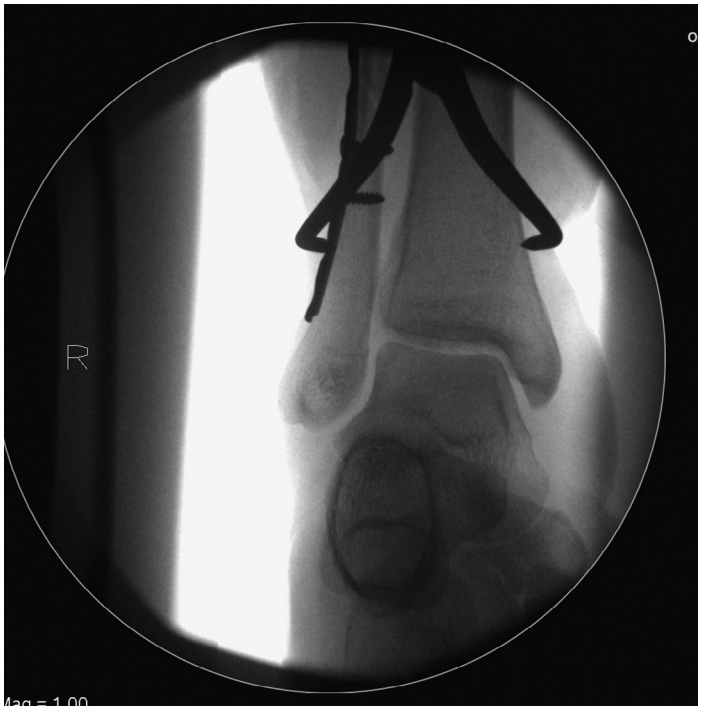

Fig. 3. Intraoperative mortise view radiograph after fibula fixation, with the fibula length restored and syndesmosis reduced and a well-reduced ankle mortise.

The position was accepted, and the patient was discharged with instructions to return for follow-up examination at the local institution (our institution). She was examined at 2 weeks postoperatively by us in the clinic. We were concerned about the talar malpositioning (Fig. 5).

The presence of fibula rotation is known to be difficult to assess on plain radiographs (5); however, there certainly did not appear to be any gross malrotation caused by the insertion of the syndesmosis screws. A computed tomography scan was performed, which did not show any significant malreduction. However, the scan did demonstrate a compressed syndesmosis with a reduced gap between the fibula and tibia, especially at the level of the distal syndesmotic screw (Fig. 6B). The screw vector also appeared to be located anteriorly to the bimalleolar axis. We hypothesized that the anterior screw vector, coupled with the overcompression, had caused the fibula to impact on the posterolateral corner of the talus, resulting in inferior and anteromedial talar displacement.

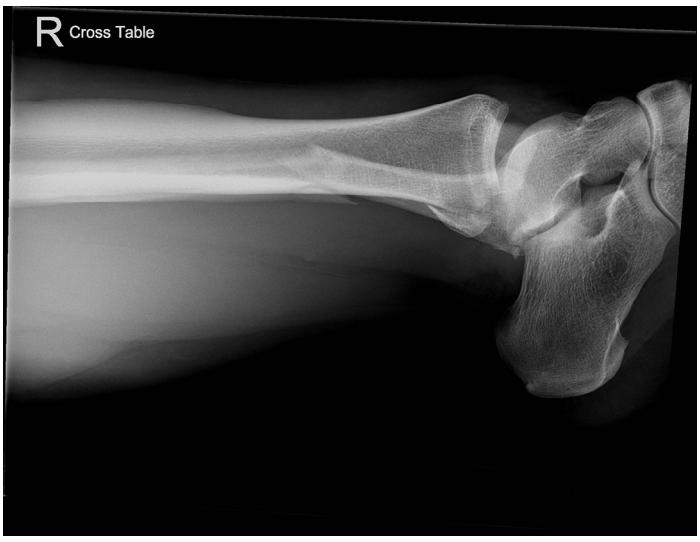

Fig. 2. Lateral ankle radiograph of initial injury showing a small posterior malleolus fragment with dorsal subluxation of the talus.

The decision was made to perform an examination with the patient under anesthesia with a view toward revising the syndesmosis fixation. The patient underwent general anesthesia, and a thigh tourniquet was applied. The original syndesmosis fixation was found to be stable, and the position of the talus was unaffected by the foot position (Fig. 7). The decision was made to progress to removal of the syndesmosis screws and revision of the fixation. On removal of the most distal screw, the position of the talus improved, with some restoration of the medial clear space and less distal subluxation (Fig. 8). Removing the remaining, more proximal, syndesmosis screw from the tibia resulted in immediate restoration of the talar position and restored the ankle mortise (Fig. 9). The proximal syndesmosis screw fixation was revised, and the postoperative radiographs show a restored and congruent ankle mortise (Fig. 10). The wound was closed with nylon suture, and a below-the-knee plaster splint was applied. The patient remained non-weightbearing for 6 weeks and was converted to partial weightbearing in a walker boot for 6 to 12 weeks postoperatively.

The patient made a full recovery and had the syndesmosis screw removed electively at 12 weeks postoperatively. She had returned to normal activities at ~6 months postoperatively. She had no restriction to the range of motion of her ankle at the 1-year follow-up examination in August 2017.