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Treatment of a Neglected Syndesmotic Injury Using a Unique Method of Reduction

Christopher E. Gross, MD [1], George B. Holmes Jr., MD [2]

[1] Department of Orthopaedics, Medical University of South Carolina, Charleston, SC
[2] Department of Orthopaedic Surgery, Rush University Medical Center, Chicago, IL

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ABSTRACT

Syndesmotic injuries are challenging in diagnosis and management as delays in treating the injury lead to poorer functional outcomes. In this case report, we discuss management of an untreated Maisonneuve fracture. To our knowledge, our technique of using a composite braided suture with internal buttons fixed from the talus to the medial malleolus to supplement our syndesmotic repair has not previously been described.

Syndesmotic injuries present a challenge in diagnosis and method of management. The tibiofibular syndesmosis is of critical importance in maintaining the stability of the ankle mortise; thus, anatomic restoration is vital to ensure good long-term outcomes of the affected patients (1). Furthermore, delayed presentation of a syndesmotic injury results in a unique predicament for the treating surgeon because no standards of care have been accepted. In the present report, we describe the case of a delayed diagnosis of a proximal fibula fracture (Maisonneuve fracture) that led to an untreated syndesmotic disruption. Although several methods to fix such an injury exist (2), to our knowledge, our technique of using a composite braided suture with internal buttons (Mini TightRope®, Arthrex, Inc., Naples, FL) fixed from the talus to the medial malleolus to supplement our syndesmotic repair has not yet been described. We obtained the patient's informed written consent for print and electronic publication of the case report.

Case Report

The patient was a 21-year-old athletic male with no significant medical or surgical history. He had initially presented with a 3-month history of right ankle pain. He had experienced an inversion injury while slipping on ice. The patient had been seen in a local emergency room and diagnosed with an ankle sprain after ankle films had failed to reveal any bony pathologic features. He was given an air-stirrup ankle brace (AirCast™, Vista, CA) and was allowed to be weightbearing as tolerated for 5 weeks. The patient had persistent ankle pain and instability and saw an orthopedist 11 weeks after his injury. He was diagnosed with a Maisonneuve fracture and was given a controlled ankle motion boot and again allowed to weightbear as tolerated.

He presented to the office of the senior author (G.B.H.) for a second opinion. On examination, the patient had pain over the medial malleolus and proximal fibula. His dorsiflexion was significantly limited. The patient also had pain with resisted inversion and eversion of the hindfoot. He was neurovascularly intact. His radiographs confirmed a proximal fibula fracture, along with ankle diastasis, with widening of the medial joint space (Fig. 1). The treatment recommendation consisted of open reduction and internal fixation of the syndesmotic injury.

At surgery, the initial closed reduction was unsuccessful in achieving an anatomic reduction of the syndesmosis. This was followed by a curvilinear incision over the anterior medial aspect of the medial gutter of the ankle. The intraoperative findings demonstrated that a portion of the deltoid ligament was lodged between the medial talus and the medial malleolus. After removing this portion of the deltoid ligament and confirming that no tissue remained interposed in the medial gutter, the reduction of the medial joint space remained inadequate without the use of the reduction forceps positioned across the lateral talus to the medial aspect of the medial malleolus. After successful reduction of the medial joint space,

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Conflict of Interest: George B. Holmes is the inventor of the Mini TightRope® device. In conjunction with the development of the Mini TightRope®, George B. Holmes has a royalty and consulting agreement with the manufacturer, Arthrex, Inc. (Naples, FL) but holds no stock, titles, or office with the company.

Address correspondence to: George B. Holmes, Jr., MD, Department of Orthopaedic Surgery, Rush University Medical Center, 1611 West Harrison Street, Suite 300, Chicago, IL 60612.

E-mail address: Gholmes@rushortho.com (G.B. Holmes).

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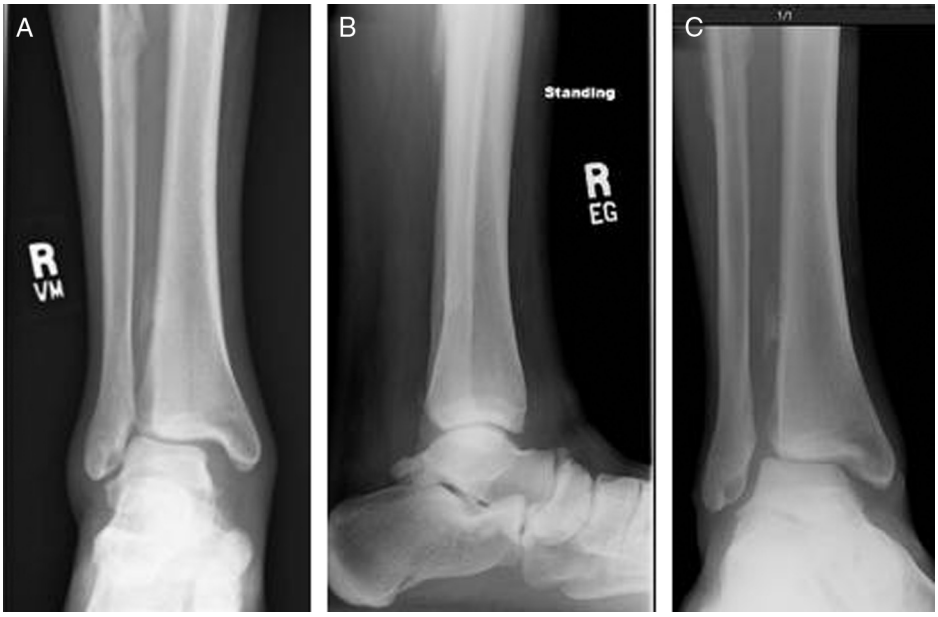

Fig. 1. Anteroposterior radiograph of (*A*) ankle and (*B*) lateral and (*C*) mortise view, demonstrating a proximal fibula fracture, ankle diastasis with widening of the medial joint space, and loss of overlap of the tibia and fibula.

2 ultra-high-molecular-weight polyethylene (UHMWPE) braided suture–attached internal buttons (TightRope®, Arthrex, Naples, FL) were secured from the fibula to the tibia in a standard fashion to maintain the reduced syndesmosis approximately 5 cm proximal to the joint. However, this only allowed for the maintenance of 50% of the reduction of the syndesmosis. We made an attempt to maintain the closure of the medial space with suture anchors, but these were also insufficient to maintain the reduction. Based on manipulation, palpation, and direct inspection, we were certain that soft tissue interposition (tendon, ligament, cartilage) was not preventing maintenance of the reduction.

This was followed by placement of a smaller version (1.1 mm) of the UHMWPE braided suture–attached internal buttons (Mini TightRope®, Arthrex). Two separate drill holes were made through the talus and medial malleolus, respectively. The initial guidewire was started at the lateral process of talus and directed proximally and medially so that it would not exit on the medial talar dome. The drill exited the medial aspect of the talus opposite the medial border of the medial malleolus. A second guidewire was drilled in line with the first guidewire but through the medial malleolus. The UHMWPE braided suture–attached internal buttons were inserted from the lateral talus to the medial malleolus in line with the previously placed drill holes (Fig. 2). The reduction was then accomplished and maintained by tying the UHMWPE braided suture over the lateral button (Fig. 3). This was followed by suture repair of the deltoid ligament using 2-0 Vicryl suture. With the ankle held in a neutral position, it was placed into a well-padded, below-the-knee, non-weightbearing splint with medial and lateral plaster splints. One week later, the patient was placed into a non-weightbearing short leg cast for another 7 weeks.

The patient did well in the initial postoperative period. Because the orientation of the lateral talar to medial malleolus UHMWPE braided suture–attached internal buttons was not in the same orientation as the normal axis for dorsiflexion and plantar flexion around the talus, the patient's ankle was held in a neutral position for 8 weeks postoperatively. With this foreknowledge, we anticipated that the patient would experience some discomfort and limitation of dorsiflexion and plantar flexion with the initiation of physical therapy. Therefore, at

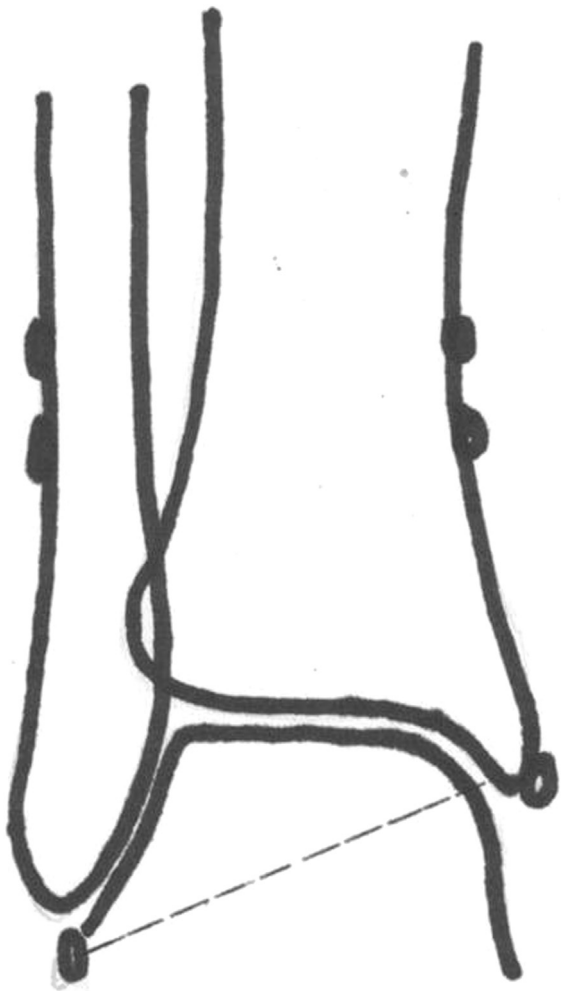

Fig. 2. Schematic of anteroposterior ankle and placement of internal buttons and suture.