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Tips, Quips, and Pearls

"Tips, Quips, and Pearls" is a special section in The Journal of Foot & Ankle Surgery®, *which is devoted to the sharing of ideas to make the practice of foot and ankle surgery easier. We invite our readers to share ideas with us in the form of special tips regarding diagnostic or surgical procedures, new devices or modifications of devices for making a surgical procedure a little bit easier, or virtually any other "pearl" that the reader believes will assist the foot and ankle surgeon in providing better care.*

An Alternative Strategy for Treatment of Distal Tibiofibular Syndesmotic Disruption: A Technical Note

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ABSTRACT

Metal screws are the most widely used in treating syndesmotic injuries; however, failure and the rigidity of the screws can threaten the success of the treatment and increase the cost of care. We performed open reduction and internal fixation of a fibula fracture followed by fixation of the tibiofibular joint with an olive wire and one half of an external fixator. We present a review of 1 patient treated with this material. We believe this method to be a physiologic fixation system with the advantage of being safe, inexpensive, adjustable, and effective; however, further clinical investigation and comparison to other methods is needed in order to better understand it clinical utility.

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Ankle fractures are among the most common lower extremity injuries. It has been reported that ≤13% of such fractures had associated distal syndesmotic injuries (1). The distal tibiofibular syndesmosis provides important stability to the ankle during the transmission of weight when walking. Thus, anatomic reduction of the ankle mortise is a critical factor for good clinical outcomes and a lower incidence of post-traumatic arthritis.

Various syndesmotic fixation techniques have been introduced over recent decades, including transsyndesmotic screws (2), syndesmotic staples (3), bioabsorbable implants (4), and suture-button devices (5). Classically, fixation of the syndesmosis has been achieved with a metal screw, which facilitates syndesmotic ligament healing and restoration of ankle stability. However, failure and the rigidity of the screws can threaten the success of the treatment and increase the cost of care. Owing to the dynamic relationship of the distal tibiofibular joint, because the syndesmosis is not a static articulation, a more flexible implant might be more desirable. The suture-button device was such an alternative that provided similar or even better clinical results (5). However, the much greater higher cost of the suture-button devices has prevented their widespread use, especially in developing countries.

Therefore, novel strategies are warranted to best tailor the patient's treatment plan and avoid the complications from rigid screw fixation.

The present study provides such an alternative with olive wires and external fixators (OWEFs) used for syndesmotic fixation. We report the case of a patient with a durable outcome at 3 years postoperatively.

Surgical Technique

The ankle fractures and associated syndesmotic disruption were confirmed by anteroposterior and lateral radiographic views (Fig. 1) and a magnetic resonance imaging scan (Fig. 2). Next, the fracture dislocation was partially reduced in the emergency department under local anesthesia and conscious sedation, followed by plaster splint immobilization for initial management.

Open reduction and internal fixation was performed with the patient under lumbar spinal anesthesia; a tourniquet was used. A longitudinal incision about 6 cm long was made from the proximal extent of the fracture line, extending distally near the tip of the fibula. After exposure of the fracture of the fibular, the displaced fragments of bone were corrected and fixed with a locking compression plate under direct vision, and screws were inserted. However, at approximately 2 cm superior to the tibiotalar joint, a hole was left vacant for

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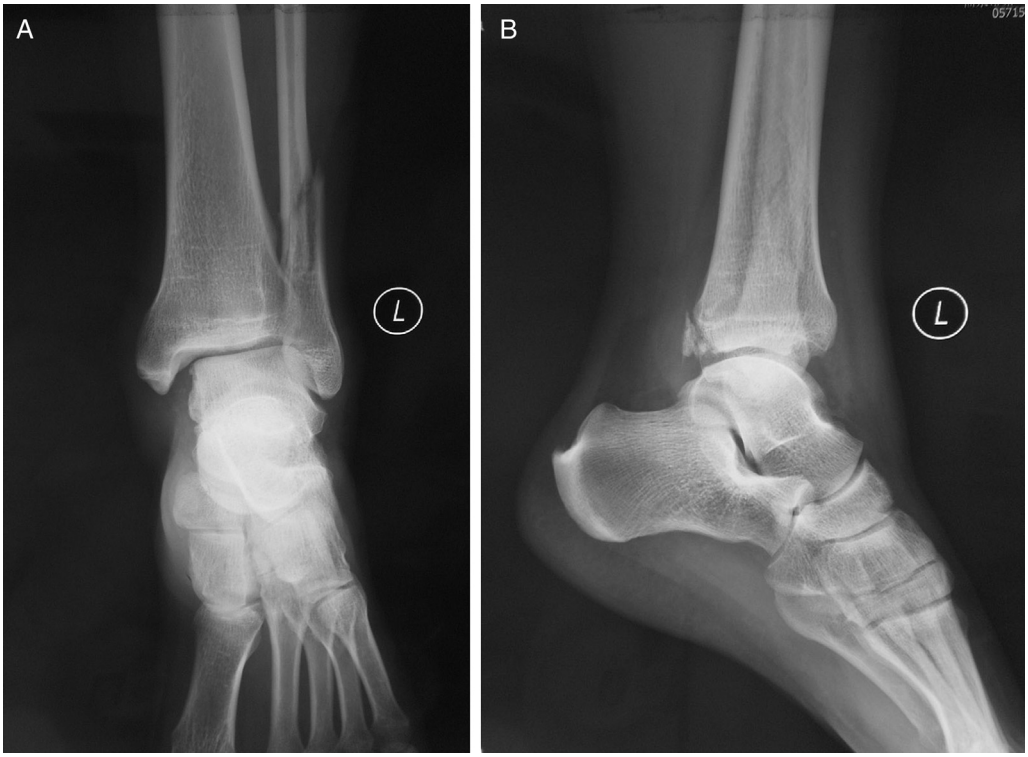

Fig. 1. (*A*) Anteroposterior and (*B*) lateral views of the right ankle revealing a fracture of the lateral malleolus and widening of the joint space.

placement of an olive wire to help fix the tibia and fibula together. After an external rotation stress test of the right ankle, which confirmed the instability of the distal tibiofibular joint, the olive wire was advanced, parallel to the joint, into the tibia, with an inclination of 30° anteriorly. Next, on the medial side, a Schanz screw was inserted manually into the shaft of the tibia. The distal tibiofibular junction was maintained anatomically with the help of a reduction clamp. Pushing the Schanz screw and pulling the olive wire from the tibial side were also of great importance in achieving reduction.

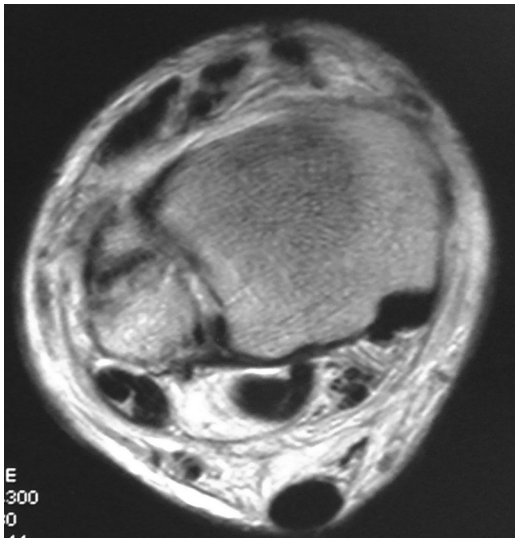

Fig. 2. Magnetic resonance imaging scan of the right ankle confirming rupture of the syndesmotic ligament.

Finally, the Schanz screw and olive wire were connected using an external fixator frame (Fig. 3).

A review of 1 patient who had undergone this procedure in our hospital in 2012 highlighted the effectiveness of this form of tibiofibular transfixation. The patient was a healthy 56-year-old male factory worker who had fallen down. He complained of severe pain with deformity of his right ankle and an inability to bear any weight on the injured extremity.

On presentation, the patient was found to have an injury to his right lateral malleolus, combined with distal tibiofibular syndesmosis instability. He also presented with ecchymosis, swelling, and tenderness along the medial and lateral parts of the involved ankle joint. Anteroposterior and lateral radiographic views of the ankle joint (Fig. 1) revealed an oblique distal fibular fracture, associated with rupture of the syndesmotic joint (Fig. 2). The patient underwent open reduction and internal fixation as described. The fracture reduction was examined on immediate intraoperative films in the coronal and sagittal planes.

The hospital course was uneventful, and he was discharged home on postoperative day 7. A plaster splint was applied postoperatively for approximately 4 weeks, with the foot kept in the neutral position. He remained non-weightbearing until 6 weeks postoperatively. At approximately 8 weeks after surgery, the olive wire was loosened enough to allow movement of the joint. Three days after loosening the wire, because the patient complained of no discomfort, the OWEF construct was removed under local anesthesia as an outpatient procedure. At approximately 2 years postoperatively, because the radiograph showed complete healing of the fracture, the internal fixation apparatus was removed (Fig. 4). Follow-up examinations were performed at 6 weeks, 8 weeks, 6 months, 2 years, and 3 years postoperatively using questionnaires to assess ankle function. These included the Olerud-Molander score (6) and a visual analog scale (from 0 to 100 mm) for function and pain through telephone or

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