Syndesmotic Reduction Without a Clamp and Without Opening the Joint: Cadaveric and Clinical Studies of an Innovative Elastic Wrap Reduction Tool

Daniel R. Schlatterer, DO*; Chetan S. Deshpande, MD; Aaron Morgenstein, MD*
Wellstar at Atlanta Medical Center, Atlanta, GA, United States

Purpose: Syndesmosis malreduction rates approach 50% in patients treated surgically. Furthermore, malreductions have been linked to the medial periarticular clamp (PAC) tine position. Tine positioning has numerous positioning points, which is probably part of the reduction dilemma. The purpose of this study was to determine if an elastic ankle wrap would solve the positioning limitations of the PAC by compressing the ankle uniformly. After cadaveric proof of concept testing, 4 acute fibular fractures with syndesmotic injuries were treated operatively with an elastic wrap for reduction, a quadcortical screw for fixation, and postoperative ankle CT.

Methods: A grossly unstable syndesmosis of a fresh frozen cadaveric ankle was prepared at the ankle by a direct 4-cm longitudinal incision over the anterior aspect of the syndesmosis. All ligaments were sectioned sharply with a knife including the anterior inferior tibiofibular ligament, the posterior inferior tibiofibular ligament, and the interosseous ligament for a distance of 7 cm from the ankle joint. Prior to ligament sectioning, a surgical marking pen made marks on the fibula and tibia denoting the fibula's reduced position. This served as the reference point for checking reduction. An elastic bandage was wrapped from the mid-calf to the mid-foot. Then the reduction was checked using an O-arm image intensifier. Next, pressure film was placed circumferentially around the cadaver leg, ankle, and foot. The elastic bandage was wrapped over and around the pressure film in a manner consistent with intention to reduce the syndesmosis. Finally during surgical management of a syndesmosis injury, the elastic wrap was utilized to achieve syndesmosis reduction. A postoperative CT scan confirmed anatomic reduction of the syndesmosis. No clamp was required, including the periarticular clamp.

Results: The ankle wrap was 100% successful in reducing the syndesmosis. Postoperative CT in all clinical cases demonstrated syndesmosis reduction. Syndesmosis reduction consistently resulted with the elastic wrap. The wrapping device functions in ways similar to a pelvic sheet or binder donned for hemodynamically unstable open-book pelvis injuries.

Conclusion: An elastic wrap in place of the standard PAC achieves reproducible reductions. The wrapping device appears to function in ways similar to a pelvic sheet or binder donned for open book pelvis injuries in hemodynamically unstable patients . Not since 1939 has there been a study utilizing an elastic wrap as an adjunctive for orthopaedic care . Wrapping the ankle eliminates tine positioning issues and solves a common malreduction issue.

See the meeting app for complete listing of authors' disclosure information.