Gravity Reduction View: A Novel Radiographic Technique for the Evaluation and Management of Weber B Fibula Fracture

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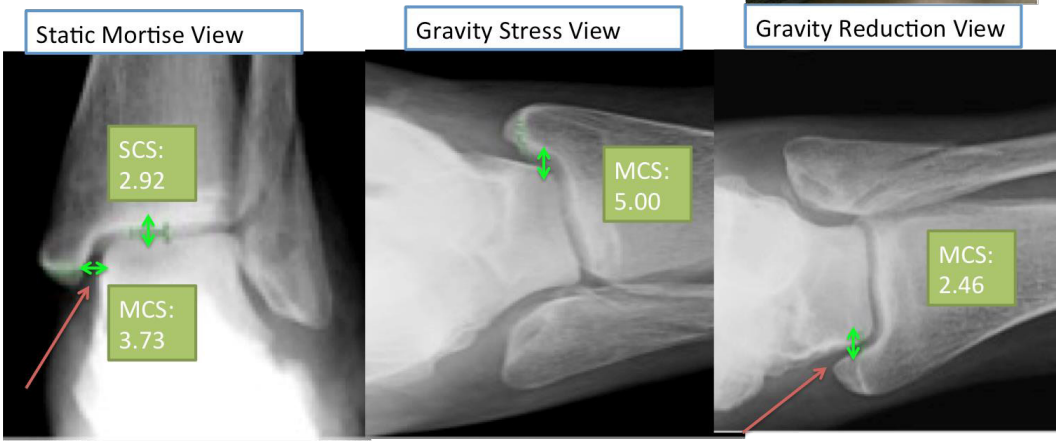
Background/Purpose: The determination of stability and ultimate need for operative stabilization of Weber B fibula fractures largely depends on the presence of a competent deltoid ligament. While various radiographic parameters and the application of manual or gravity stress have been proposed to elucidate instability, the prognostic capability of these modalities remains unclear. Given that a recent study found no difference between operative and nonoperative treatment for stress-positive Weber B ankle fractures, the value of stress views is questionable; what may be ultimately more important is the determination of anatomic positioning of the mortise. We propose a novel view, the Gravity Reduction View (GRV), which helps elucidate nonanatomic positioning and reducibility of the mortise. We also propose a treatment algorithm based on the use of the GRV.

Methods: To obtain the GRV, the patient is positioned in lateral decubitus with the injured fibula directed upward and elevated with a leg holder. The x-ray cassette is placed posterior to the heel, with the beam angled at 15° of internal rotation to obtain a mortise view. Our treatment algorithm is based upon the measurement of the medial clear space (MCS) on the GRV versus the static mortise view. If the MCS on GRV remains wide or decreases, surgery is recommended as the GRV confirms a nonanatomic mortise. If the MCS remains within normal limits on the static and GRV views, a trial of nonoperative treatment with immobilization and repeat radiographs in 1-2 weeks is undertaken. If the MCS is normal on repeat weight-bearing radiographs, the patient is treated conservatively; if increased, surgery is recommended. To further assess mortise stability, the MCS is compared to the superior clear space (SCS).

Results: 23 patients with Weber B distal fibula fractures were managed according to this treatment algorithm. The mean age was 49.1 years old (range, 18-74). Of these patients, 15 underwent operative treatment and 10 patients were initially treated nonoperatively, although 2 patients demonstrated late displacement and were treated surgically. Using this algorithm, all patients had a final MCS that was less than the SCS (final mean MCS for patients treated operatively or nonoperatively 2.85 mm vs mean SCS of 3.34), indicating effectiveness of the treatment algorithm.

Conclusion: The Gravity Reduction View is a novel radiographic view in which deltoid competency, reducibility and initial anatomic positioning of the mortise are assessed by comparing a static mortise view with the appearance of the mortise on the reduction view (GRV). We have developed a treatment algorithm based on the GRV and have found it to be predictive of mortise alignment and useful in guiding treatment.

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.



See pages 49 - 106 for financial disclosure information.