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Technical Note

Ankle gravity stress view in the seated position: A technical tip

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ABSTRACT

The ankle gravity stress view (GSV) is often utilized to elucidate instability in patients with an apparent, isolated lateral malleolus fracture. While this has been demonstrated to have advantages over the manual external rotation stress test, positioning in the lateral decubitus position can be difficult, uncomfortable and time-intensive. We report a simple and safe technique that allows one to obtain a gravity stress view of the ankle with the patient seated.

Introduction

Diagnosis of mortise instability in the apparent isolated lateral malleolus fracture can be challenging and often relies on stress radiography. Michelson, et al. first reported the utility of gravity stress testing to find mortise instability in a cadaveric study in which 8 cadavers underwent fibular osteotomy with deep deltoid transection [1]. When gravity stress was applied with the specimens mounted horizontally, lateral talar translation and tilt were noted. Three clinical series of supination external rotation ankle fractures have all separately demonstrated the effectiveness of manual external rotation stress testing (MERST) to elucidate deltoid injury and instability of the mortise [2–4]. Gill, et al. demonstrated equivalence of the GSV as compared to MERST in a cohort of 25 patients in which both radiographic tests were performed [5]. Other similar studies have confirmed Gill's findings and advocated that the GSV was better tolerated by the patient and resulted in less radiation exposure to the physician [6,7]. Finally, the GSV can be performed without direct physician supervision, thus freeing the physician to continue seeing patients uninterrupted.

While the GSV is commonly utilized, it traditionally requires the patient to assume the lateral decubitus position for imaging of the ankle. This can be difficult and uncomfortable for the patient and may be unsafe in particular situations. Furthermore, transferring the patient back and forth to obtain this positioning is time-intensive for the radiology technician and disruptive to clinic throughput.

Therefore, we describe a simple technique that allows acquisition of the GSV of the ankle while the patient remains seated. The technique involves minimal patient movement and is simple for the staff to position appropriately.

Technique

The patient is seated on either a stable office chair with arms for safety or in a wheelchair. The affected limb is then placed on a padded stool with the foot extended past the edge of the stool. The patient is instructed to maintain the ankle in a comfortable resting position. They are then encouraged to externally rotate at the ipsilateral hip (Fig. 1). If needed, a small bump can be placed underneath the contralateral hip to further increase external rotation of the affected limb at the hip. The ankle and foot should be approximately 15° internally rotated relative to the plane of the floor once the leg has been appropriately positioned. The leg should be held straight with the ankle at the level of the chair seat. This places the ankle in an optimal angle for obtaining a mortise view (Fig. 2). The radiograph is then obtained in standard fashion (Fig. 3).

Discussion

The authors report a simple, safe and time-efficient technique for more easily obtaining the GSV to assess ankle mortise instability. Although use of the GSV requires less time investment by staff and avoids radiation exposure to the orthopedic surgeon compared to MERST, patient positioning can still be problematic. Historically, the GSV has required that the patient assume the lateral decubitus position with a support under the ankle and the affected extremity hanging off the x-ray table [8–10] (Fig. 3). This positioning can be difficult for patients due to pain, lower extremity trauma, cognitive impairment, increased BMI, as well as other concomitant injuries and comorbidities.

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Fig. 1. Patient positioning for seated gravity stress view. Hip is externally rotated and the ankle is positioned 15° internal rotation relative to the floor at the level of the chair seat.

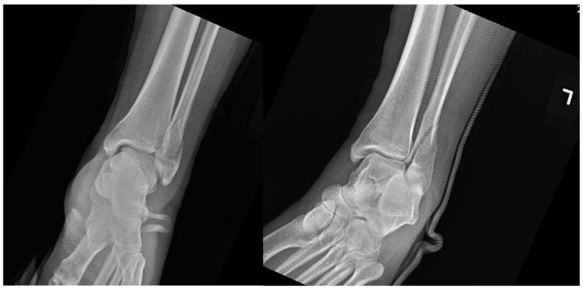

Fig. 2. An AP (left) and Mortise (right) view of the ankle.

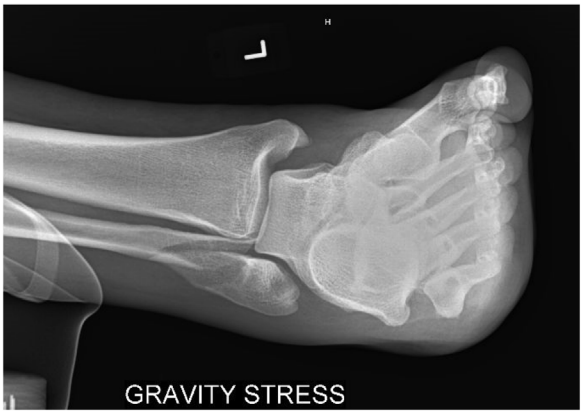

Fig. 3. Gravity stress view showing lateral subluxation of the talus and medial clear space widening.

Obtaining the GSV in the seated position offers several advantages. First, the patient either remains in the same wheelchair they were brought into clinic with or is placed in a seated position, which is more time-efficient than transferring the patient to the radiology table and avoids the potential danger of patients falling or being injured during transfer. Second, external rotation of the hip is safe and generally well-tolerated in isolated leg injuries. Third, it has been our experience that this positioning more reliably places the ankle in approximately 15° of internal rotation to obtain the optimal mortise view and assess mortise symmetry. Finally, patient comfort is increased as this technique obviates the need to transfer the patient or place their hip directly on a rigid radiology table.

Conclusion

We report a simple, safe and time-efficient technique that allows orthopedic surgeons to obtain a gravity stress view of the ankle with the patient seated.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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