Commentary

The ability of the Lauge-Hansen classification to predict ligament injury and mechanism in ankle fractures: An MRI study.

Gardner M, Demetrakopoulos D, Briggs S, Helfet D, Lorich D.


The authors attempted to identify the extent of the soft tissue injuries associated with ankle fractures using MRI and then relate that information to the predicted injury as described by the Lauge-Hansen classification.

The Lauge-Hansen classification (1950) was originally developed to determine the pathoanatomy of ankle fractures. It was performed on amputated limbs within hours of obtaining them, as a freely mobile ankle joint is necessary to place the foot in the positions to be evaluated. The foot was fixed to a platform and external stresses were applied by hand through the residual femur or proximal tibia. The limbs were then dissected.

Supination-external rotation (originally called supination-eversion by Lauge-Hansen, 1950) stage IV injuries are defined as either a medial malleolus fracture at its base or avulsion of the deltoid ligament at its insertion. Pankovich defined the various components of the deltoid ligament, which the authors do not acknowledge prior to dismissing the classification. Lauge-Hansen originally described the medial malleolus fracture as occurring at the base, where the articular surfaces of the medial malleolus and the distal tibia border meet. This is clearly not illustrated in the author’s selected image. The fracture in Figure 1 could represent only an anterior collicular fracture, as described by Pankovich, and therefore a deltoid disruption must also be present to account for the wide medial clear space and lateral talar subluxation (Tornetta 2000).

Additionally, there is no mention by the current authors as to how the diagnosis of SEII versus SEIV was made. Stress radiographs are discussed by Lauge-Hansen (1950), as well as others more recently in the literature (McConnell et al, Egol et al, and Xenos et al). These images enhance the understanding of the fracture pattern and allow application of the Lauge-Hansen classification while also giving direction to the treatment. The authors suggest using this routine tool in their conclusion; Lauge-Hansen made the same recommendation in the original article.

As mentioned by the authors, the syndesmotic injuries found on the MRI examinations are not accounted for by the Lauge-Hansen system. It is important for these injuries to be recognized and diagnosed accurately. This highlights again the importance of the stress radiographs to supplement the trauma ankle fracture images (Xenos et al). Heim et al (2002) reported their series of unstable ankle joints after rigid internal fixation, which was observed under direct vision in the operating room by pulling on the fibula. Those authors treated the residual instability with screw fixation across the syndesmosis, yielding a stable ankle joint.

Two of the unclassified fracture patterns described by the authors depict injuries that could represent pronation-abduction stage II fractures or combined mechanism fractures, which Lauge-Hansen also mentions. This leads to an obvious problem: the radiographs, as well as the MRIs, were read by a single orthopaedic traumatologist and a single musculoskeletal radiologist. It is difficult to recant a classification system that is over 50 years old based on single observer interpretations of a small number of images.
The Lauge-Hansen classification system provides a mechanistic approach to evaluation of ankle fractures. Since the time of the original publication, others have contributed to expanding examination techniques to more thoroughly identify the injury. As the knowledge base continues to expand, historically reliable methods with good clinical applications must continue to be recognized for what they actually provide. In this situation, Lauge-Hansen acts as a guide to assist in identifying ankle fracture pathology so that stable treatment plans can be implemented.

Reviewed by Judith A. Siegel, M.D.

Department of Orthopaedic Surgery
Boston University School of Medicine
Boston Medical Center; Boston, Massachusetts

References:


