CHAPTER **28**

UPDATED TREATMENT OF LATERAL ANKLE INSTABILITY

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INTRODUCTION

Chronic and acute ankle instability or injury continues as a common diagnosis among patients seen by foot and ankle specialists. Advancements in diagnosis, conservative treatment options, and surgical management have recently been made. A review of the techniques beneficial to specialists who treat this condition, as well as treatment algorithms will be discussed. This update is intended to review recent diagnostic and treatment options and therefore will not discuss many commonly utilized and established techniques, as their usage is accepted and well validated in the literature.

DIAGNOSIS OF ANKLE INJURY

Anterior talofibular ligament (ATFL) or calcaneofibular ligament (CFL) injury represents the most likely cause of injury to the ankle. Concomitant injury is likely in patients with long-term ankle pain who have not sought treatment. Common diagnostic measures of lateral ankle instability (LAI) or chronic ankle instability (CAI) include radiographic evaluation (talar tilt and anterior drawer stress views), manipulation under anesthesia (MUA), ultrasound, or magnetic resonance imaging (MRI). The reliability of stress radiographs has been of questionable validity, even though it represents substantial cost savings in comparison to other diagnostic modalities. Previously, abnormal values of talar tilt in CFL injuries have been reported between 4 and 23 degrees (1, 2). Abnormal values of anterior drawer in ATFL injuries have been reported between 3 and 10 mm (3-5).

A recent study attempted to refine ankle motion under stress fluoroscopy by using a large adult population with no prior injury to define normal ranges for both talar tilt and anterior drawer stress radiographs. Results of this study show an average talar tilt of 4.2 degrees and an average anterior drawer of 2.2 mm. These data support the conclusion that injury to the lateral ankle ligaments may be present even with much lower stress radiograph results than previously expected and helps validate the use of this simple, cost-effective diagnostic measure (6).

Osseous ankle configuration has recently been shown as an intrinsic risk factor for CAI. Measurements were developed utilizing lateral and frontal ankle radiographs that evaluated talar curvature among other criteria. Significant differences were noted in patients diagnosed with CAI when compared to healthy patients. CAI patients were characterized by an anteriorly displaced talus (to tibia) and a deeper frontal curvature of the talus (7).

A definitive link between LAI and osteoarthritis of the ankle has been studied with in vivo cartilage using 3-D MRI and fluoroscopy in patients with unilateral LAI. Peak cartilage strain and cartilage strain location were recorded. Significant increases in peak strain were observed on the LAI side, with significant difference in strain location (anteromedial translation in LAI side). As long believed, chronic LAI is likely to contribute to the development of ankle arthritis due to altered cartilage strain (8).

Chondral injury, loose body, synovitis, scar tissue, impingement, ossicle, and peroneal tendon disease represent other diagnostic criteria worthy of evaluation, even if the lateral ankle ligament is of primary concern. For example, Kim et al examined patients diagnosed with LAI for peroneal tendinopathy. A large portion of these patients undergoing modified Brostrom repair were also found to have peroneal tear (41%), low-lying muscle belly (32%), tendinitis (18%), dislocation (9%), or peroneus quartus (5%) (9).

Another study examined the value of MRI in lesion detection for ankle instability. Discrepancies were noted between radiologist and orthopedic surgeon interpretation of MRI. In 127 surgical cases, an attending orthopedic surgeon had higher sensitivity (47-89%) for detecting abnormalities than the radiologist (39-57%). This information proves the necessity of the surgeon to review the films prior to treatment decisions and may lend support to operate in light of inconclusive or negative MRI, due to the surprisingly low sensitivity of MRI in detecting much of the pathology present in diseased ankles (10).

Of future interest, postural control deficits have been studied in patients with CAI utilizing the most advanced techniques available. These testing criteria have shown that increased pressure is observed at the anterolateral aspect of the foot compared to an uninjured control group. The authors conclude that CAI patients may adopt a more dorsiflexed position to stabilize their ankle, thus limiting available motion distally (11). Later, the ability to evaluate postural deficits may provide unique insight for preoperative planning and postoperative evaluation.

CONSERVATIVE TREATMENT OPTIONS

Current conservative treatment options including bracing, immobilization, anti-inflammatory medication, corticosteroid injection, physical therapy, rest, and ice remain the mainstays of treatment and are successful for the majority of patients. One conservative measure of increasing popularity now has multiple recent studies to support its use. Balance training has been supported to improve sensorimotor function in patients with CAI over a six week period (12). Additionally, functional rehabilitation in patients with CAI was recently evaluated by meta-analysis and showed significant benefit in ankle stability and function (13).

A major benefit of this rehabilitation program is that it is quite simple to perform. Instructions can be given to your patient in the office, without the need to visit a formal physical therapy center. Multiple techniques are available according to the preference of the treating physician, ranging from one-legged stance for set intervals to utilizing rehabilitation wobble balls.

SURGICAL TREATMENT OPTIONS

The use of arthroscopy or periarticular endoscopy in CAI or LAI is generally accepted as beneficial but refinement in terms of specific indications and effectiveness is necessary. Ankle arthroscopy before planned lateral ligament reconstruction will aid in assessing for additional damage with minimal added surgical time or morbidity. As discussed above, O'Neill et al showed a large portion of intraarticular or periarticular pathology may be missed with testing modalities such as MRI. Surgically amenable lesions (chondral lesions, loose bodies, synovitis, impingements, ossicles, and peroneal tendinopathy) can be addressed, quite possibly enhancing patient outcomes (14).

As an example, the role of arthroscopic debridement in functional CAI was evaluated. A total of 77 patients underwent this operation with 77% exhibiting scar formation necessitating the debridement. Most commonly this was observed at the anterolateral ankle (58%). This information correlates well with many recent biomechanical studies, including the Pope et al study previously discussed. Over 72% of patients improved with arthroscopic intervention. Failure of arthroscopic surgery could be due to mechanical instability (diagnosed by stress radiograph or manipulation under anesthesia) and would likely require ligament reconstruction. Evaluation of mechanical instability before arthroscopy is critical (15).

As mentioned above, the effect of concomitant pathology must be accurately examined to maximize patient outcomes. Preoperative imaging or intraoperative arthroscopy are beneficial, but it may be necessary to adjust surgical planning based on additional findings. Chondral lesions, loose bodies, and peroneal tendinopathy are well researched and appropriate corrections may be made if pathology is discovered intraoperatively. However, a recent study has evaluated presence and size of ossicles at the distal tip of the lateral malleolus in terms of postoperative patient outcomes, an area previously unstudied. In this study, 74 ankles undergoing modified Brostrom repair for LAI were separated into ossicle and nonossicle groups. A subgroup was also created using small (<10 mm) and large (>10 mm) ossicles. Both ossicle and nonossicle groups improved on stress radiographs and in functional score testing. However, functional scoring was significantly lower in the ossicle group at last followup when compared to the nonossicle group. Presence of osteochondral lesion of the talus was significantly higher in the ossicle group. The large ossicle subgroup showed improvement in varus stability but not anterior displacement of the talus after reconstruction. With the ossicle group showing inferior results, it may be necessary to supplement a ligament repair procedure by fusing the large (>10 mm) ossicle to the fibular tip removing the small ossicle, or utilizing another ligament reconstruction technique (16).

Modifications of the Chrisman-Snook and Brostrom procedures (among many others) remain successful in correction of LAI. The recent literature reports an overall procedure satisfaction of nearly 85%. Pertinent risks with these procedures include a mild decrease in ankle dorsiflexion (2 degrees), risk of peroneal tendon scarring (9%), and re-operation (13%). Return to sports is achieved in about 80% of patients at a mean of six months (17). Stress radiograph evaluation or MUA is crucial to properly define patients who may benefit from these reconstruction techniques.

Additionally, many surgical companies have produced effective systems for lateral ankle ligament repair with grafting (tendon allograft, commercial graft) techniques. These systems allow surgeons to quickly insert anchors and tendon passers to place the graft effectively. At this time, case studies and anecdotal evidence are supporting their use. Future studies are needed to examine true success rates and complications.

CONCLUSION

The above review was intended to provide information on techniques with recent (since 2010), credible research for treating lateral ankle instability. Many conservative and surgical treatments have not been discussed in this update, not due to a lack of benefit from the technique, but because there has been no change in the literature or the validity has been well established already.

Many of the new diagnostic measures including a lower threshold on stress radiographs, osseous ankle radiographic anatomy, 3-D MRI, in vivo cartilage peak pressure, and postural control will allow increased diagnostic precision and hopefully increase patient satisfaction.

A common treatment algorithm among foot and ankle specialists includes radiographic evaluation with stress images at patient presentation. Short term anti-inflammatory medication, gel, or injection may be appropriate dependent on the severity of symptoms. Bracing or immobilization, physical therapy (balance training), ice, and rest may also benefit the patient. Any of the above mentioned modalities may be implemented as necessary over the initial treatment period. Advanced imaging may be necessary (MRI) if no improvement is gained following conservative treatment.

Ankle arthroscopy may be appropriate for certain patients, otherwise definitive ligament reconstruction may be necessary. Functional LAI has literature support to be treated first with arthroscopy while mechanical LAI should be treated with ligament reconstruction and possible diagnostic arthroscopy. Good success and patient satisfaction has been reported with both surgical techniques.

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