Naviculocuneiform Dislocations Treated With Immediate Arthrodesis: A Report of 2 Cases

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The authors report on 2 patients who sustained naviculocuneiform dislocations and intercuneiform diastasis, and who were treated with immediate arthrodesis of the midfoot complex. Injury patterns in both cases involved damage to the medial facet of the distal navicular articular surface, separation of the first and second cuneiforms, and an unstable first ray. At the 15- and 18-month follow-up, respectively, both patients attained a stable, solid fusion with maintenance of the medial longitudinal architecture. Both patients returned to their preinjury activity levels with no disability. (The Journal of Foot & Ankle Surgery 44(3):228-235, 2005)

Lisfranc fracture-dislocations are relatively uncommon, accounting for only 0.2% of all fractures (1–3). There are variations of this injury pattern that are rarely encountered and are not included in any of the older classifications systems (1, 4). Myerson et al proposed a classification system modified from Quenu and Kuss and Hardcastle et al for Lisfranc injuries that also allows for characterization of these injuries and those that extend proximal to the tarsometatarsal joint (5). One such injury pattern is an isolated medial dislocation of the first metatarsal-medial cuneiform complex (type B1), where the first metatarsal displaces medially, away from the first cuneiform. Yet, in some instances, the entire first ray (first metatarsal and medial cuneiform) is displaced through the naviculocuneiform joint. For this latter pattern to occur, the intercuneiform joint becomes unstable because the ligaments maintaining this region fail during injury (6, 7). The second through fifth tarsometatarsal joints are unaffected by either of these injury patterns.

Review of the literature uncovered a modest number of reports of midfoot injuries that included some variant of medial cuneiform-navicular dislocation (6–17). However, only 3 of these reports discussed an associated fracture of the navicular (5, 8, 12).

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The treatment of the type B1 injury when there has been acute intercuneiform diastasis or disruption has been either closed or open reduction of the joints with transarticular stabilization (6–9, 11, 12, 14–16). The follow-up in most of these cases has been very short term and the results are either mixed (7–9, 11, 13, 14) or not reported (12, 15). The only case report that included follow-up more than a year involved a complete tarsometatarsal dislocations in addition to the index injury (16) One of 2 patients had minimal symptoms at 2-and-one-half years.

Recently, Anderson and Hammit reported on a series of 9 high-level competitive football players with subtle separation of the first and second cuneiforms (18). Seven were treated with open reduction and internal fixation. Four of those 7 patients underwent a second surgery for screw removal. Two of the patients had persistent diastasis after hardware removal, and 1 additional patient fractured a screw. Two of the 9 patients (1 with persistent diastasis and 1 nonsurgical case) developed frank synovitis and early degenerative joint disease. Lastly, more than half of their patients complained of midfoot discomfort with activity.

In view of the paucity of published reports and the uncertain outcome with primary open reduction, the purpose of this article is present 2 cases of isolated unstable, complete medial column (first ray) dislocations that were treated with primary arthrodesis. It was postulated that this approach would provide stability to the disrupted medial column and provide a more durable outcome.

Case One

A 30-year-old man jammed the anterior aspect of his right foot into a fence while playing softball. He reported the hallux was in a dorsiflexed position at impact. He immediately experienced pain along the medial midfoot

FIGURE 1 Injury films for patient 1. (*A*) Oblique view of right foot showing proximal displacement of cuneiform and first metatarsal. (*B*) Anteroposterior view showing congruent first metatarsal-cuneiform joint and diastasis of the first and second cuneiform. Note impaction of distal medial articular facet of the navicular.

region of his right foot and was unable to bear weight. The patient was taken to the emergency department for evaluation. Past medical history was completely unremarkable. A secondary survey revealed no other complaints. A focused right lower extremity examination showed normal neurovascular function, marked edema with ecchymosis to the midfoot region, and no abrasions. He was able to dorsiflex and plantarflex all toes. However, the patient was unable to invert and evert the midfoot area secondary to pain. There was mild deformity with a bulge over the medial midfoot and tenderness to palpation at the medial cuneiform-navicular joint. The lesser tarsometatarsal joints appeared to be stable with minimal tenderness to palpation of the dorsal aspect of those joints.

Radiographic studies of the right foot revealed proximal-medial dislocation of the first ray at the medial cuneiform-navicular joint on the dorsoplantar and oblique projections. There were no signs of lesser tarsometatarsal injury (Fig 1).

The right foot and leg was placed in a compression splint to reduce edema. Surgical intervention was planned for later the same day. The patient was taken to the operating room and was placed under a general anesthetic. Manipulation of the foot showed marked instability of the medial column. With digital pressure on the cuneiform, and distal traction and slight adduction of the first ray, the dislocation was easily reduced. The lesser tarsometatarsal joints were stressed without any evidence of instability during an abduction thrust.

FIGURE 2 Intraoperative photograph of right foot showing intact proximal articular facet of cuneiform and the impaction fracture on the corresponding facet of the navicular (arrowhead).

The right foot and legged were prepped in the usual standard sterile fashion. A curvilinear incision was placed along the medial column. The tibialis anterior tendon was found to be intact. Gross examination of the distal navicular articular facet showed marked compression of the medial articular facet. The cartilage of the medial cuneiform was intact (Fig 2). Loose pieces of cartilage were found within the joint. Based on the instability and the damage to the articular surface, the remaining cartilage on the corresponding surfaces of the medial cuneiform and navicular and the intercuneiform joint 1-2 was meticulously debrided down to bleeding cancellous bone. The intercuneiform joint was fixated first with a single 3.5-mm cortical screw by using the lag technique. The naviculocuneiform joint was anatomically reduced and temporarily fixated with 2-mm Kirschner wires. Three 3.5-mm cortical lag screws were inserted under fluoroscopic control for fixation of the arthrodesis (Fig 3). The right foot and leg were placed in a posterior compression splint, and the patient was instructed to not bear weight on the right lower extremity.

At the 2-week postoperative visit, radiographs showed good reduction and stable internal fixation. The staples were removed, and the patient was converted to a short-leg non–weight bearing cast. At the 6-week postoperative visit, there was no tenderness to palpation along the medial column. Radiographs showed a good reduction and a solid arthrodesis at the naviculocuneiform joint, which were confirmed under fluoroscopy. The patient was progressed to weight bearing as tolerated in a fracture brace. At the 18-month follow-up, the patient had returned to his preinjury activities, without any discomfort whatsoever (Fig 4).