

## ARTHRODESIS OF THE NAVICULOCUNEIFORM JOINT IN THE TREATMENT OF COLLAPSED PES VALGUS DEFORMITY: The Missing Link

*Alan S. Banks, DPM*

*John A. Ruch, DPM*

In simple terms, it has been said that the goal of surgery in the repair of collapsed pes valgus deformity is to take a foot that is unmanageable and render it manageable. This description was the initial point of discussion in the course that was taught for many years by Don Green, DPM, during his tenure at the Pennsylvania College of Podiatric Medicine. This premise assumes that there are both patients with collapsed pes valgus deformity that will not respond to conservative care, but also that surgery, while successful, does not always result in a perfect foot, but one that is less symptomatic, and when necessary, adequately controlled with orthotics. Although this philosophy is still appropriate today, we continue to evaluate our patients and the results that are sustained from surgical intervention with the intent of constantly improving the alignment and function of the foot.

It is possible that no other procedure has provided the same impact on the favorable results from surgical repair of collapsed pes valgus deformity than the Evans osteotomy. The procedure almost universally has a significant positive impact in the overall alignment and function of flexible deformity, and while initially felt to have only a favorable impact in patients with transverse plane deformities, experience has shown the enhanced alignment is appreciated in all 3 cardinal planes. In many patients the tensioning that develops in the peroneus longus tendon, which accompanies the lengthening of the lateral column, also provides for improvement in the alignment and stability of the medial column. However, in many patients this alone is not sufficient to reduce forefoot varus, stabilize the hypermobile medial column, or provide reduction of deformity in patients with fixed forefoot varus. Thus, most patients undergoing pes valgus surgery also require additional medial column procedures, and historically this has involved the use of either a Cotton opening wedge osteotomy of the medial cuneiform or a Young's tendosuspension.

Both the Cotton and Young's procedures have worked well in a number of patients, and the goal of taking the uncontrollable foot and making it controllable has been

accomplished. However, when critically assessing their results, the authors have appreciated that while significant improvements have been noted, it would appear that there is still room for enhanced results in some patients. Independently, each of us noted that these two procedures would generally reduce forefoot varus in combination with an Evans osteotomy, but often failed to provide full stability to the hypermobile medial column. Patients with more significant preoperative deformity tended to demonstrate some level of persistent pronation, which in some instances was not always evident radiographically, yet noted more on clinical evaluation.

We currently believe that the key to controlling the medial column of the foot rests in the creation of sufficient stability at the naviculocuneiform joint. Studies have shown that this is the site of the greatest degree of motion in the medial column, and while realigning the first ray via tendon transfer or osteotomy provides for better function and alignment, in some patients there remains persistent instability or hypermobility at this level that limits the overall stability of the foot.

Our early impressions are that a reassessment of the role of the naviculocuneiform joint in the repair of pes valgus deformity is in order, specifically as it relates to arthrodesis at this level. Historically, the results sustained with this procedure have been somewhat equivocal. Hoke was the first to describe arthrodesis at this level for repair of symptomatic pes valgus deformity. Autogenous graft was taken from the tibia and used to replace an en bloc resection from the medial naviculocuneiform joint. Patients were casted, but no fixation was employed. This same technique was used by subsequent surgeons, and a number of problems were noted in longer term evaluations of patients. These complications primarily consisted of persistent pain, less than adequate correction of the collapsed pes valgus deformity, arthritis in adjacent joints, and nonunion.

Given the apparent long-term problems historically associated with the naviculocuneiform fusion for repair of collapsed pes valgus deformity, the reader may question why

the authors would revisit this approach. First, many of the early failures could easily be related to factors that are not consistent with the technique employed today (i.e., unfixated surgical sites). In addition, in these early studies, the use of the medial column fusion was performed as an isolated procedure for the repair of what was likely a triplane deformity, and today most surgeons would not consider an isolated procedure to be adequate. Therefore, in the repair of pediatric and adolescent pes valgus deformity, the authors use the naviculocuneiform fusion in conjunction with the Evans osteotomy. It is our opinion that by combining these two approaches that the results sustained today are far more suitable than those evident in the past. Obviously, patients with ankle equinus will require the appropriate release of the gastrocnemius or tendo Achillis.

The authors have also utilized the naviculocuneiform fusion in the management of some adults with moderate pes valgus deformity associated with tibialis posterior tendinitis when there is instability of the medial column or forefoot varus that needs to be corrected. If there is instability in the rearfoot then the medial column fusion may be combined with a subtalar joint fusion and repair of the tendon. Patients with more significant deformity or end-stage collapse are

usually treated with triple arthrodesis. However, there are some patients where the primary source for the overuse syndrome associated with tendinopathy of the tibialis posterior tendon is a hypermobile medial column with an otherwise fairly normal degree of subtalar motion. In these circumstances the tendon repair is performed with the medial column fusion. Patients with this type of deformity have tended to confirm the suspicions of the authors that the naviculocuneiform joint is the key to stability of the medial column, and in some instances, the hypermobile medial column is a primary concern in the development and persistence of a collapsed pes valgus deformity.

Use of arthrodesis at the naviculocuneiform joint offers the surgeon a valuable tool to provide a significant level of correction and stability to the medial column. To date the authors have been impressed with the degree of stability and correction that can be achieved, especially in comparison to the more traditional methods or medial column stabilization. Although the authors have not abandoned other techniques, the use of arthrodesis of the naviculocuneiform joint has been performed with greater frequency in pediatric and adult patients in the last several years.