The adult acquired flatfoot deformity remains one of the more controversial areas of foot and ankle reconstruction. How many times have you seen that statement in program books??? It is controversial for a reason. Algorithmic diagnostic trees fail to unroof the subtleties surrounding posterior tibial tendon dysfunction. Complex pathologic variants arise that squash technically perfect surgeries based upon a simplistic clockwise destruction of soft tissues following rupture of this exalted tendon. The clinician misses the patient’s own pre-existing anatomic variants that may have caused the disorder in the first place. Or, the same lack of recognition may lead to overcorrection and subsequent new pain and dysfunction in previously asymptomatic portions of the foot and ankle.

And so, we bring forth four experts in this field to enlighten us on the deceptions and subtleties of posterior tibial tendon dysfunction. They will, of course, review standard procedures laden in 100 page chapters on the topic. However, their real goal is to make you appreciate the limitations in current treatment algorithms, and open your eyes to treatment strategies based on sound pathologic principles. Many new ideas are coming forth, and it is their goal to make you understand not only what to do, but when to do it. If you do not walk away with new thoughts on the topic of adult acquired flatfoot, then the five of us have failed, and this becomes just another symposium on a controversial topic.

Controversy exists regarding the treatment of Stage II flexible flatfoot deformities. Recently, we have subclassified Stage II deformities into A and B sub-types, according to the amount of navicular coverage that exists around the head of the talus (Anderson, ICL, 2003). Clinically, this correlates to the severity of forefoot abduction present, in conjunction with the pes planovalgus (peri-talar lateral subluxation). Type A (mild) represents less than fifty percent of the talar head is uncovered by the navicular. When the deformity is more severe and greater than 50 % of the head is exposed, the deformity is classified as Type B. We further subclassify based on the presence of forefoot varus (c), which may involve joints of the medial column. We can therefore identify Stage II Ac and II Bc deformities. Surgical decision making is often guided by the differing deformities that are present to correct the flexible but missshapen foot, aided by an algorithm that addresses this classification system.

Once the posterior tibial tendon has become incompetent, as in Stage II, it becomes unsalvageable. A tendon transfer, often incorporating the flexor digitorum longus tendon (FDL), has been shown to be ineffective as an isolated procedure. Bony osteotomies were introduced to supplement the
soft tissue procedures in order to align the hindfoot and maintain long term correction. These bony procedures are determined preoperatively according to our classification (ie abduction, forefoot varus, 1st ray hypermobility, etc).

Lateral column lengthening (Evans procedure) is advocated in Stage IIIB disease. When worsening forefoot abstraction is present, subfibular impingement, sinus tarsi impingement, and lateral column lengthening is indicated. This procedure was first described by Evans in 1975 (used since 1959), originally used in children for congenital flatfoot. It was evaluated as a surgical option for adult flatfoot deformities by Sangeorzan in 1993 and was found to provide good radiographic correction of the forefoot abstraction. Multiple authors have since described favorable results with this technique for the acquired flexible adult flatfoot. Unless there is symptomatic DJD of the calcaneo-cuboid joint, the lengthening is performed thru the anterior calcaneus. A gastroc recession is typically added. How it actually works to correct the deformity has not been determined. Theories suggest that it “pushes” the forefoot into abduction, by “lifting” the talar head; tightening the spring ligament complex and plantar fascia, thereby increasing arch height (disputed in cadaver studies); and tightening the peroneus longus tendon which in turn plantarflexes the first ray (not seen clinically).

The major critique to this Evans lateral column lengthening is in its potential complications. Frustrating lateral column pain typically resolves over 12-18 months. Nonunion, graft collapse, and loss of correction are the most dreaded. The procedure has historically been performed in adults with tricortical iliac crest autograft. Over recent years, additional methods of fixation and graft substitutes have been proposed in attempts to avoid the complications. The use of allograft has been found to have equal union rates to iliac crest autograft without the added morbidity of autograft harvest (Dolan et al, FAI 2007). Although this study demonstrated good results at 12 weeks, there still exists the possibility of graft fragmentation during preparation and insertion, and graft collapse with loss of correction long term. This has led some authors to advocate the use of a porous metal wedge to fill the site of distraction.

Operative Technique
-Supine position, ipsilateral bump, thigh tourniquet
-Lateral based longitudinal approach (2.5 cm): peroneals/sural nerve identified and retracted inferiorly
-Osteotomy site = 1-2cm proximal to C-C joint (defined by intra-operative anatomy and fluoroscopy).
Anterior and middle facet often conjoined. Can lengthen thru the c-c joint in cases of symptomatic DJD.
-Percutaneous pin fixation of C-C joint in reduced position optional but may help to limit malalignment during distraction (varus/supination)
-Distraction applied to osteotomy to achieve talar head coverage as confirmed by using intra-operative fluoroscopy and AP foot x-ray = measure distance
-Appropriately sized trapezoidal wedge placed (iliac crest autograft vs allograft vs metal); typically 8-12 mm lateral edge
-Internal fixation to maintain position/length: staple, plate, screw, (Kimball et al, FAI 9/2000)
*Additional soft tissue and bony procedures are carried out in the appropriate sequence as pertaining to concomitant adult acquired flatfoot deformities.

Postoperative Management
-Bulky plaster splint applied, NWB for 4-6 weeks
-Weight bear in boot with arch support for additional 4 weeks, then shoe with arch support
-PT for tendon strengthening after 8 weeks

Bibliography
7. McCarvey WC, Braley WG: Bone graft in hindfoot arthrodesis: Allograft vs autograft. 1st comfas, Dublin, August 1995

**10:13 – 10:18 am**

**Posterior Tibial Tendon Reconstruction and Medial Displacement Calcaneal Osteotomy**

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*Mercy Hospital*

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**The Use of Medial Displacement Calcaneus Osteotomy (MDCO) in the Management of the Adult Flatfoot Deformity**

What does a medial displacement osteotomy of the calcaneus accomplish?
Is there a biomechanical rationale for this osteotomy?
What are the limitations of such an osteotomy?

A calcaneus osteotomy can correct heel valgus
It improves some radiographic parameters
It does not address the tendon imbalance, but can protect a tendon transfer

**History of correction of PTT rupture and adult flatfoot**

Rupture of the PTT causing flatfoot. Surgical treatment
**Mann RA, Thompson FM** *J. Bone Joint Surg. 67, 1985*
14 patients, FDL transfer, satisfactory outcome, foot remained flat

Acquired adult flat foot secondary to posterior tibial tendon pathology
**Funk DA, Cass JR, Johnson KA**. *J. Bone Joint Surg. 68, 1986*
19 patients, stage II rupture flexible flatfoot treated with FDL transfer satisfactory results, foot remained flat