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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**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

*Mann RA, Thompson FM* *J. Bone Joint Surg.* 68, 1986

19 patients, stage II rupture flexible flatfoot treated with FDL transfer satisfactory results, foot remained flat
Tendon transfer combined with calcaneal osteotomy for treatment of PTT insufficiency. A radiological investigation.

**Myerson MS, Corrigan J, Schon LC.** *Foot Ankle Int. 16, 1993*

19 patients, FDL transfer, MDCO, radiographic parameters improved
MDCO offset the inherent weakness of the FDL transfer by reducing the antagonistic deforming force of heel valgus.

The Concept of a Change in the Axis of the Calcaneus is Not New
- Gleich, Arch Klin Chir, 1893
- Koutsogiannis, J Bone Joint Surg [Br], 1971
- Garelli, Ital J Orthop Traumatol, 1986

**Biomechanics of the MDCO**
Flexible or rigid flatfoot deformity is associated with heel valgus and contracture of the Achilles or the gastrocnemius
- Plane of dorsiflexion occurs through subtalar & transverse tarsal joints
- Less dorsiflexion is through the ankle joint
Ground reaction forces potentiate the static & dynamic changes in the hindfoot
Medial shift of calcaneus leads to:
  - a medial shift of Achilles
  - ↑ inversion force of Achilles on subtalar joint

Flatfoot model, MDCO, protection of spring ligament with WB

Flatfoot model, MDCO, ↓ arch flattening effect, ↓ perpetuation of deformity
**Nyska, Parks, Chu, Myerson.** *Foot Ankle Int. 2001*. The contribution of the medial calcaneal osteotomy to the correction of flatfoot deformities.

Flatfoot model, MDCO, no ↑ Achilles length
Achilles aids inversion of forefoot **Hadfield, Snyder, Adelaar et al.**
*Foot Ankle Int. 2003*. Effects of medializing calcaneal osteotomy on Achilles tendon lengthening and plantar foot pressures.

Flatfoot model, shifts P from lateral to medial forefoot, ↑ moment around TN joint
Medial displacement calcaneal osteotomy reduces the excess forces in the medial longitudinal arch of the flat foot.

**Clinical Decision-Making**
Deformity features should be based upon a well designed classification system of the flatfoot. Posterior tibial tendon rupture. A refined classification system. **Bluman E, Myerson MS.**
*Foot Ankle Clinics. 12 (2), 2007*

Myerson, Corrigan, Thompson & Schon, Foot Ankle Int, 1993
Myerson & Corrigan, Orthopedics, 1996
Guyton, Jeng, Krieder, & Mann, Foot Ankle Int, 2001
Sammarco & Hockenbury Foot Ankle Int, 2001
Fayazi, Nguyen, & Juliano, Foot Ankle Int, 2002
Wacker, Hennessy, & Saxby, JBJS [Br], 2002
Myerson, Badekas, & Schon, Foot Ankle Int, 2004
Limitations of the MDCO

7 pairs cadaver specimens, mild and severe flatfoot model created in the severe flatfoot model, radiographic parameters not restored

The MDCO cannot correct severe forefoot abduction. It cannot correct fixed forefoot supination associated with medial column instability or deformity

Surgical reconstruction of PTT dysfunction. Prospective comparison of FDL substitution with lateral column lengthening or MDCO
- surgical reconstruction of PTT with either the LCL or MDCO
- showed comparable improvements in gait parameters
- comparable improvements in radiographic measurements

Additional Indications for Medial Displacement Calcaneal Osteotomy

Medial calcaneus osteotomy changes loading of the ankle -- useful adjunct to correct Stage IV flatfoot deformity.

Steffensmeier, Saltzman et al. The effects of medial and lateral calcaneal osteotomy on tibiotalar contact joint stresses. J Orthop Res. 1996
Deltoid ligament forces after PTT rupture. Effects of triple arthrodesis and calcaneal displacement osteotomy. Resnick, Jahss MH. Foot Ankle Int. 1995

Useful adjunct to correct valgus ankle osteoarthritis

- 14 patients, ankle valgus arthritis
- Combination of procedures
- Including medial translational osteotomy of calcaneus

Medial displacement calcaneus osteotomy (MDCO)
Technically facile, high union rate
Good biomechanical support
Long clinical track record - good evidence
Limitations: severe abduction or fixed forefoot supination
Adjunct role in Stage IV PTTD and valgus ankle arthritis