Tarsal Coalition – Can I Just Resect It? What About Deformity?

I. Introduction
A. Incidence
   1. Approx. 1% in population
   2. Autosomal dominant
B. Pathology
   1. Failure of mesenchymal segmentation
   2. Fibrous – cartilaginous – osseous spectrum
C. Differences in adults vs. peds
   1. May be asymptomatic in adults – 11/33 feet (Varner & Michelson)
   2. Peroneal spasm less common (only 2/27 adults, Varner & Michelson)
   3. Stiffer hindfoot – trends toward ossification
   4. More arthritis

II. Evaluation
A. History
   1. Onset can be with trauma (e.g ankle sprain), or can be insidious
   2. Recurrent sprains, giving way
   3. Sharp or aching pain with WB, uneven terrain
B. Exam findings
   1. Tender at sinus tarsi, calcaneocuboid joint (CN coalition) or sustentaculum (TC coalition)
   2. Stiffness of subtalar joint, transverse tarsal joint (abduction, supination)
   3. Hindfoot valgus deformity - flexible vs. rigid
   4. Subfibular impingement
   5. Ankle ligament stability
   6. Peroneal spasm uncommon in adults
C. Radiology
   1. Plain radiographs – WB AP, lateral, oblique, axial heel view
      a. CN coalition – “anteater nose” on lateral, coalition seen on oblique view
      b. TC coalition – narrowing subtalar joint, coalition on axial view
      c. Beaking / traction spur on talar neck/head ≠ TN arthritis ! (Swiontkowski, Scranton)
      d. Assess deformity – hindfoot valgus, uncovering TN joint, talo-1st metatarsal angle
   2. CT scan – coalition, assess hindfoot arthritis, rule out 2nd coalition
   3. MRI scan – bony edema, fibrous/cartilaginous coalition, arthritis, any concurrent pathology that may need to be addressed during surgery (e.g. OCD, peroneal tear)

III. Non-Operative Treatment
A. Options
   1. Rest, activity restriction
   2. NSAIDs
   3. Orthotic insoles – medial arch posting, UCBL
   4. Cast / boot brace
   5. Injection?
B. Success rates
1. Approx. 20-50% adults had relief with non-op treatment (Cohen et al, Varner & Michelson, Scranton)
2. Reasonable to attempt before surgery

IV. Operative Treatment

A. Caveats
1. Exclusively Level IV series
2. Many with mixed populations (peds & adults)
3. Often with inadequate outcome measures

B. Resection vs. Arthrodesis in Adults
1. Historically, arthrodesis was described for adults
2. Contemporary series have investigated resection as an alternative
   a. Arthritis = contraindication to resection
   b. CN coalition resection
      (1) Cohen et al, 1996
         (a) 12 patients, mean age 33 yrs (19-48), follow up 36 mos
         (b) 10/12 had relief of symptoms and ↑ROM, 2/12 failed → fusion
         (c) Worked well if no DJD
         (d) More wound complications if used EDB interposition
      (2) Scott & Tuten, 2007
         (a) 7 patients, mean age 41 yrs (31-61), follow up 56 mos
         (b) Postop AOFAS score 87 points, 7/7 satisfied, slight ↑ROM, 0% recurrence
   c. TC coalition resection
      (1) Philbin et al, 2008
         (a) 5 patients age > 18 years (+ 2 peds)
         (b) TC resection +/- medial sliding calcaneal osteotomy if heel valgus
         (c) 4/5 AOFAS score improved, one failed → ST fusion
3. Indications for arthrodesis – coalition > 50% subtalar facet, hindfoot arthritis, rigid deformity, failure of prior resection

C. Deformity Correction – even less literature to draw upon for adults
1. Pediatric literature
   a. Giannini et al, 2003
      (1) 12 patients (14 feet), age 9-18 years
      (2) Resection of TC coalition and subtalar arthroreisis to improve alignment
      (3) 85% improved pain, 93% improved ST motion
      (4) AOFAS score correlated with alignment correction
      (5) Recommended for skeletally immature patients; skeletally mature → osteotomy or fusion
   b. Mosca & Bevan, 2012
      (1) 8 patients (13 coalitions), age 10-17 years, follow up 3.7 years
         (a) Classification 9 categories (!)
         (b) Coalition <50% facet, no arthritis, < 16-21° hindfoot valgus
      (2) Lateral calcaneal lengthening osteotomy + TAL/Strayer, some had Cotton cuneiform osteotomy WITH OR WITHOUT coalition resection
(3) AOFAS 61 → 90 points – deformity correction works in rigid flatfoot like flexible foot, as important as coalition resection?

2. Adult literature attempts to draw parallels
   a. Theoretical benefits of correcting hindfoot valgus
      (1) Relieve subfibular impingement
      (2) Ankle contact stresses
      (3) Medial soft tissue strain
   b. Worse outcomes (in peds) with resection alone if heel valgus > 16° (Wilde) or > 21° (Luhmann) – although Khosbin reported good outcomes
   c. Clinical outcomes
      (1) Cain & Hyman, 1978
         (a) 13 patients, age 11-25 years (only one patient > 17 years)
         (b) Medial closing wedge calcaneal osteotomy to maintain joint motion
      (2) Lisella et al, 2011
         (a) 8 patients (5 > 18 years), mean age 26 years (13-46)
         (b) Medial slide calcaneal osteotomy, lateral column lengthening calcaneal osteotomy, +/- FDL transfer WITH coalition resection
         (c) 100% satisfied, ROM improved, improved arch height, postop AOFAS 88 points
         (d) “valgus reliably corrected”

D. My Indications
   1. Resection with Deformity Correction
      a. Younger adult, no arthritis
      b. TC coalition < 50% facet
      c. Not severely rigid
      d. Medial calcaneal slide osteotomy, TAL/gastroc, +/- Cotton osteotomy +/- Lateral column lengthening osteotomy (severe abduction)
   2. Arthrodesis
      a. Older patient, arthritis, rigid deformity, TC coalition > 50% facet
      b. Worker’s compensation case with occult coalition in setting of ankle injury/arthritis?

Bibliography


