Why do feet end up in valgus mal-alignment?
Valgus Mal-alignment: What Joints to Address
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Calcaneocuboid joint/Lateral column
- Theory - relatively short lateral column allows abduction of the hindfoot
  - Lengthening of the lateral column can correct
    - Abduction
    - Hindfoot Valgus
  - Lengthening of the lateral column creates secondary deformities
    - Elevated medial column (forefoot supination)
    - Increased pressure within C-C joint (Evans)
    - Possible lateral column overload
      - Cotton osteotomy in all cases?
- When is this indicated? Lack of evidence based data.
  - Million Dollar Question - What is the etiology of the flatfoot?
    - If you believe
      - Lateral column is of normal length, but subluxated.
        - Primary relegated to pediatric/adolescent flatfoot.
      - Lateral column is short
        - >30% abduction
    - No stance on the etiology
      - >50% abduction

Medial Column –NC and 1st TMT
- Assess stability of the 1st TMT joint
  - Stable - Dorsal Opening Wedge Cuneiform Osteotomy
  - Unstable - 1st TMT PF arthrodesis
- Why Correct?
  - Failure to address can result in recurrence of deformity
    - Forefoot driven HF valgus
  - Restore "tripod" of the foot
- Create plantigrade foot
- Stabilize medial column

### Etiology

<table>
<thead>
<tr>
<th>Plantigrade</th>
<th>All valgus - Foot not plantigrade</th>
<th>Forefoot varus - Foot not plantigrade</th>
<th>HF correction - Forefoot not plantigrade</th>
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### Dorsal Opening Wedge Cuneiform Osteotomy - Technique

<table>
<thead>
<tr>
<th>FF varus with elevated 1&lt;sup&gt;st&lt;/sup&gt; ray</th>
<th>Correction with osteotomy</th>
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### 1<sup>st</sup> TMT Plantarflexion Arthrodesis

<table>
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<tr>
<th>Break in lateral 1&lt;sup&gt;st&lt;/sup&gt; talometatarsal angle despite hindfoot correction</th>
<th>Restoration of lateral 1&lt;sup&gt;st&lt;/sup&gt; talometatarsal angle with PF arthrodesis of 1&lt;sup&gt;st&lt;/sup&gt; TMT</th>
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### Clinical Diagnosis
- Dorsal subluxation of 1<sup>st</sup> metatarsal out of plane of 2<sup>nd</sup>

### Radiographic Diagnosis
- **Dorsal subluxation** of the 1<sup>st</sup> metatarsal relative to medial cuneiform (white arrows)
- Plantar Gapping (inferior black line is twice that of superior)
### Naviculocuneiform in isolation or combined with 1st TMT arthrodesis

<table>
<thead>
<tr>
<th>Radiographic Diagnosis</th>
<th>Deformity will persist despite 1st TMT PF arthrodesis</th>
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<tbody>
<tr>
<td>- <strong>Plantar gapping at N-C joint</strong></td>
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<tr>
<td>- Break in Lateral 1st Talometatarsal angle occurs at N-C joint - not at T-N joint</td>
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<td>- Consider forefoot driven hindfoot valgus</td>
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<td>- Arthrodesis of N-C required to correct deformity</td>
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<td>- Additional 1st TMT PF arthrodesis required if concomitant instability</td>
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### Outcomes

(Greisberg J. et. al. *Isolated Medial Column Stabilization Improves Alignment in the Adult-acquired Flatfoot.* 2005 435:192-202.)

- Radiographic outcome only
  - 19 patients - 13 with combined N-C and 1st TMT arthrodesis
  - Significant improvement in Lateral 1st Talometatarsal angle and Talonavicular coverage
  - 2 nonunion of N-C, and 1 nonunion of 1st TMT

### Summary

- >50% abduction
  - Lateral column lengthening
  - Cotton osteotomy to decrease lateral overload
- Plantar gapping at N-C joint
  - N-C fusion
  - Spring ligament?
- 1st TMT instability
  - 1st TMT PF arthrodesis