Evans Calcaneal Osteotomy: The Effect of Graft Size on Multiplanar Correction

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Purpose

To determine the effect of graft size on multiplanar correction after Evans calcaneal osteotomy (ECO) for adult-acquired flatfoot deformity.

Methodology & Hypothesis

- **Hypothesis:** We hypothesize that a significant correlation will be found between the size of the calcaneal graft and the amount of correction obtained in the hindfoot and midfoot.

- **Exclusion criteria:** Preexisting coalitions, tarsal fusions performed at the time of the osteotomy, and patients with stage II flatfoot who underwent an anterior calcaneal osteotomy or calcaneal plafond resection.

- **Retrospective medical record review:** Patients with stage II flatfoot who underwent a calcaneal osteotomy between January 2005 and January 2014 were included. The mean follow-up was 31.4 months.

- **Study population:** Forty-five feet (23 right, 22 left, 5 bilateral) were included.

- **Procedures:** The osteotomy was performed with an oscillating saw and completed medially with an osteotome.

- **Intra-operative fluoroscopic images demonstrating surgical technique**

- **Complications:** Seven complications were observed: 1 calcaneocuboid joint subluxation, 1 hardware removal due to irritation/pain, 1 hardware removal due to infection, 1 hardware removal due to pain, 1 hardware removal due to reappearance, and 1 reoperation due to infection.

- **Pre- and postoperative radiographs**

Results

- **Clinical outcomes:** 23% of patients had recurrence of flatfoot.

- **Radiographic measures:**
  - **Popes** (preoperative and postoperative)
  - **Diastases** (preoperative and postoperative)
  - **Distance (cm)**
    - Preoperative Postoperative
      - AP Meary’s calcaneal angle 16.1 ± 4.5 3.6 ± 3.1 P< 0.0001*
      - Meary’s calcaneal inclination angle 24.2 ± 4.9 6.4 ± 3.6 P< 0.0001*
      - Targeted planar calcaneal angle 12° 20°
      - 1 calcaneocuboid joint subluxation
      - 1 hardware removal due to irritation/pain

- **Patient characteristics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>35.3 (11–73)</td>
</tr>
<tr>
<td>Gender</td>
<td>24 (53) female, 21 (47) male</td>
</tr>
<tr>
<td>Side</td>
<td>22 (49) left, 23 (51) right</td>
</tr>
</tbody>
</table>

- **Analysis & Discussion**

- **Results:** A significant correlation was found between the size of the calcaneal graft and the amount of correction obtained in the hindfoot and midfoot.

- **Conclusion:** The use of a larger graft size may result in better multiplanar correction after ECO for adult-acquired flatfoot deformity.

**References**

- Meary’s calcaneal angle. An * denotes a statistically significant value.

**Table 1.** Patient characteristics

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**Table 2.** Pre- and postoperative radiographic measurements

<table>
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<th>Variable</th>
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<th>Postoperative</th>
<th>P-value</th>
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<td>AP Meary’s calcaneal angle</td>
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<td>Targeted planar calcaneal angle</td>
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**Figure 1.** Preoperative fluoroscopic image demonstrating surgical technique.

**Figure 2.** Postoperative fluoroscopic image demonstrating surgical technique.

**Figure 3.** Preoperative and postoperative radiographs showing multiplanar correction.

- **Literature Review**

- **Conclusion:** The use of a larger graft size may result in better multiplanar correction after ECO for adult-acquired flatfoot deformity.