Subtalar Distraction Two Bone-Block Arthrodesis for Calcaneal Malunion

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My disclosure is in the Final AOFAS Program Book. I have no potential conflicts with this presentation.
Late complications of Intra-articular Calcaneal Fractures

- Subtalar incongruity and arthritis
- Loss of calcaneal height
- Lateral wall expansion
- Anterior tibiotalar impingement
- Varus or valgus malalignment of the hindfoot
- Weakened Achilles lever arm

The goals of Subtalar Distraction Arthrodesis

- Restoration of heel height
- Decompression of the anterior ankle joint
- Elimination of subtalar arthrosis
- Correction of hindfoot malalignment

Purpose: to evaluate the results of Subtalar Distraction Bone-block Arthrodesis using two bone-block for subtalar arthritis after calcaneus fractures
From Jan. 2004 to Jan. 2011
19 feet of 15 patients
All cases: Calcaneal Malunion (Stephens and Sanders type 2) after Intra-articular Calcaneus Fractures

Male / Female: 14 / 1
Age: average 43.3 Y. (28 ~ 64 Y.)
Follow-up: average 37.8 M. (9 ~ 77 M.)
Interval between initial injury and definite op. (STDA): average 19.6 M. (5 ~ 45 M.) - except 1 case (30 years)

Initial treatment of Calcaneal Fracture
- Conservative treatment with casting: 6 cases
- CR/IF with axial pinning: 7 cases
- OR/IF with plate & screw & bone graft: 6 cases
Radiologic evaluation

- TCH: talo-calcaneal height (A)
- TCA: talo-calcaneal angle (B)
- TDA: talar declination angle (C)
- TFMA: talo-first metatarsal angle (D)

Operative Techniques

- Lateral Extensile Approach
- Subtalar Joint Preparation
  - Medial release
- Joint Distraction
  - lamina spreader or distractor
- Bone-Block Harvest
  - 2 bone-block from ASIS
- Fixation
  - 2 Screws fixation

Results

Union

- 18 / 19 cases
- average 5 months

AOFAS Ankle-Hindfoot Scale

- 51.6 → 80.3 point
  (Pain : 17.9 → 33.3 point)

Complications

- Non-union → Varus deformity
  : 1 case
  (Revision Op. at POD 1yr → Union)

- Persistent pain
  : 3 cases
  (but, improved than preoperative state)

- Meralgia paresthetica
  : 1 case
## Results

<table>
<thead>
<tr>
<th></th>
<th>Preop.</th>
<th>Postop.</th>
<th>Last F/U</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCH (mm)</td>
<td>68.3</td>
<td>74.2</td>
<td>72.9</td>
<td>4.6</td>
</tr>
<tr>
<td>TCA (°)</td>
<td>20.3</td>
<td>26.2</td>
<td>22.7</td>
<td>2.4</td>
</tr>
<tr>
<td>TDA (°)</td>
<td>13.1</td>
<td>20.6</td>
<td>17.4</td>
<td>4.3</td>
</tr>
<tr>
<td>TFMA (°)</td>
<td>8.1</td>
<td>3.3</td>
<td>5.3</td>
<td>2.8</td>
</tr>
</tbody>
</table>

**TCH**: talo-calcaneal height  
**TCA**: talo-calcaneal angle  
**TDA**: talar declination angle  
**TFMA**: talo-first metatarsal angle
**Discussion**

**Indications for STDA**

Myerson et al. (*JBJS Am. 1993*)
- Talo-calcaneal height loss > 8mm
- Anterior tibio-talar impingement

Marti et al. (*JBJS Br. 1999*)
- Persistent pain due to incongruent subtalar joint
- Hindfoot deformity (valgus/varus)

**Two Bone-Block**

- To match Bone-block to Articular width
  - increasing Stability of Fusion site
- To correct Varus deformity

**Height loss during follow-up period**

Myerson et al. (*JBJS Am. 1993*)
- due to absorption of the bone block

Chan et al. (*J trauma 1998*)
- one bone-block  height loss : 4.7 mm
- two bone-blocks  height loss : 1.4 mm

Our study : 1.3 mm
Our Indications of STDA

- Talo-calcaneal height loss > 8mm
- anterior tibio-talar impingement with anterior ankle pain

Promising procedure for complicated subtalar arthritis after calcaneal fractures.

Subtalar distraction arthrodesis using tricortical double bone block

However, longer follow-up will be needed.


