Surgical treatment of rigid cavovarus deformity in children and adolescents

Mueller, Sebastian
Dreher T., Fehre K.
University of Heidelberg
Department of Orthopedic and Trauma Surgery
Germany
Surgical treatment of rigid cavovarus deformity in children and adolescents

Mueller, Sebastian

Me and my coauthors have no potential conflicts with this presentation.
Cavovarus deformity

- 80% of the cases can be attributed to a neurologic disorder
- Charcot-Marie-Tooth disease most common cause
- Other neurological disorders possible
  - tethered cord
  - cerebral palsy
  - spinal muscular atrophy
- Treatment options should be individualized
- Bony procedure must be accompanied by soft tissue balancing
- Frequent monitoring during growth necessary
Material and methods

- 32 patients (fifty-eight feet)
- rigid cavovarus foot deformity
- Clinical and radiological examination
- X-rays in standing position a.p. and lateral (1;2;3)
Material and methods

Surgical procedures

• Chopart arthrodesis
• tibialis posterior split transfer
• dorsiflexion osteotomy of the first metatarsal
• plantar fascia release
• transfer of the extensor hallucis longus to the neck of the first metatarsal (Jones-procedure)
• tenotomy of the long toe flexors
• if necessary Achilles tendon lengthening according to Hoke
Material and methods

Radiographic evaluation

- talo-first metatarsal (Meary) angle \( TA-MT1 \)
- calcaneal-first metatarsal angle \( CA-MT1 \)
- calcaneal inclination angle \( CAI \)
- height-to-length ratio of the foot \( H:L \)
Results

• Subjects
  n=35, 56 feet

• Gender
  20 ♂, 15 ♀

• Age at surgery
  13.4y (mean) (7-18)

• Follow up
  34 months (20-54)

Severe cavovarus deformity
preop

Postop x-ray
Results

**talo-1st metatarsal angle**

<table>
<thead>
<tr>
<th></th>
<th>Preop</th>
<th>Postop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle</td>
<td>14.38</td>
<td>9.83</td>
</tr>
</tbody>
</table>

**talo-calcaneal angle**

<table>
<thead>
<tr>
<th></th>
<th>Preop</th>
<th>Postop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle</td>
<td>47.2</td>
<td>49.4</td>
</tr>
</tbody>
</table>
Results

calcaneal-1st metatarsal angle

Preop | Postop
--- | ---
116 | 128
118 | 130
120 | 132
122 | 126
124 | 128
126 | 130
128 | 132
130 | 134
132 | 136

calcaneal inclination

Preop | Postop
--- | ---
0° | 0.28°
5° | 0.285°
10° | 0.29°
15° | 0.3°
20° | 0.305°
25° | 0.31°
30° | 0.315°

height-to-length ratio

Preop | Postop
--- | ---
0.28 | 0.335
0.29 | 0.33
0.3 | 0.325
0.31 | 0.33
0.315 | 0.325
0.32 | 0.33
0.325 | 0.335
0.33 | 0.34
0.335 | 0.345
Conclusions

• Correction of the cavovarus deformity was achieved in all patients
• Careful preoperative evaluation is mandatory
• Treatment of the cavovarus foot deformities should be individualized for each patient
• Muscle balancing procedures and osteotomies are the treatment of choice
• Goal of surgical treatment is a well aligned fore- and hindfoot and balanced remained muscle power
Conclusions

• For a patient with rigid deformities, arthrodesis of talonavicular, calcaneocuboid and subtalar joint seems to be the only option.

• Difficult measurement of the radiographs in severe deformities.

• Additional tools should be used: 3D foot analysis.

