Gradual Closed Mobilization of Equinus Contracture with External Fixator

My disclosure is in the Final AOFAS Program Book.
I have no potential conflicts with this presentation.
Introduction

Achilles tendon lengthening is a popular procedure for equinus contracture. But...

Large correction!!!

Complications associated to neurovascular system and skin.
Ankle Mobilization with External Fixator can avoid those complications.

In this study, we assessed our treatment results and propose our treatment strategy.

Two types of mobilization procedure

Method 1: **Natural Hinge** with the Ilizarov ring fixator

Method 2: **Virtual Hinge** with the Taylor Spatial Frame
Patients and Methods

1994 - 2010

31 limbs in 25 pts (M / F = 14 / 11)

Age: mean 31 yo (11 – 64)

Etiology:

- Compartment synd. 13 limbs 10 03
- Neuropathy 08 limbs 04 04
- Sequel with DO 06 limbs 06 00
- Sequel with LLD 04 limbs 04 00

DO: distraction osteogenesis
LLD : limb-length discrepancy
Patients and Methods

Natural hinge method with Ilizarov ring fixator
—24 limbs / 1994-2010—

Nonconstrained construction in which two rings were applied to the lower leg and connected with two rods to a half-ring attached to the forefoot.

The ankle joint acted as a natural hinge.

Virtual hinge method with Taylor Spatial Frame
—7 limbs / 2004-2010—

Constrained construction in which the six TSF struts connecting the tibial ring and the foot plate attached to the forefoot and calcaneous.

Virtual hinge was configurable anywhere.
## Results

<table>
<thead>
<tr>
<th></th>
<th>NH method</th>
<th>VH method</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y.o.)</td>
<td>30.7</td>
<td>33.7</td>
<td>n.s.</td>
</tr>
<tr>
<td>Preop. Dorsal flex (deg.)</td>
<td>-22.4</td>
<td>-51.9</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>22.8</td>
<td>0</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Corrective period (days)</td>
<td>49.0</td>
<td>33.0</td>
<td>n.s.</td>
</tr>
<tr>
<td>Corrective rate (deg./day)</td>
<td>0.4</td>
<td>1.8</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Postop. Dorsal flex (deg.)</td>
<td>-3.5</td>
<td>-5.0</td>
<td>n.s.</td>
</tr>
<tr>
<td></td>
<td>27.1</td>
<td>0</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

### Dorsal flex

- **Preop.**
  - NH
  - VH

- **Postop.**
  - NH
  - VH

### Corrective rate

- **P<0.01**
  - NH
  - VH

### ROM

- **n.s.**
  - NH preop
  - NH postop
### Results

**Complications**

**NH method**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Number of Limbs</th>
<th>Percentage</th>
<th>Additional Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrence</td>
<td>3 limbs</td>
<td>12.5%</td>
<td>Re-application</td>
</tr>
<tr>
<td>Anterior subluxation</td>
<td>4 limbs</td>
<td>19.4%</td>
<td>Wire insertion</td>
</tr>
</tbody>
</table>

**VH method**

Nothing

* Gradual mobilization followed by talocrural fusion in all cases
**Equinus contracture**

**Natural Hinge method**

Indication:

- **mild** cases (less than 20 deg.)

**Virtual Hinge 法**

Indication:

- **moderate** to **severe** cases
**Limitation**

- Small retrospective study

- Talocrural fusion following mobilization was performed in seven limbs.
Using an external fixator without soft tissue release is safe and certain procedure for equinus contracture treatment.

References