The Influence of the Subtalar Joint on the Development of Ankle Joint Arthritis- a Radiographic Study Using Weight Bearing CT Scans

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NO CONFLICTS TO DISCLOSE

The Influence of the Subtalar Joint on the Development of Ankle Joint Arthritis- a Radiographic Study using Weight Bearing CT Scans

Nicola Krähenbühl

My disclosure is in the Final AOFAS Mobile App.
I have no potential conflict with this presentation.
The Issue

• 60% of patients with osteoarthritis (OA) of the ankle joint present with either a varus or a valgus OA (asymmetric OA of the ankle)

• The subtalar (ST) joint may influence this wear pattern
The Idea

• Recent published, the prevalence of a flat ST joint (posterior facet) in a healthy cohort is 12%

• A flat ST joint configuration leads to a more rigid hindfoot

• A rigid hindfoot leads to a loss of compensation in the coronal plane (e.g. eversion/ inversion)

• Patients with an asymmetric OA of the ankle may have a significant higher percentage of a flat ST joint
The Aim

The purpose of this study is to

I. Determine prevalence of a flat ST joint (posterior facet) in patients suffering of an asymmetric OA of the ankle

II. Determine the reproducibility of the measurement method
Patients and Methods

- 43 Patients treated for asymmetric ankle OA
- 4 groups were performed using plain X-rays
  - Varus/valgus +/- tilt of the talus (incongruent vs. congruent)

**Figure 1:**
A) Example of a congruent valgus ankle (TAS = TTS)
B) Example of an incongruent varus ankle (TAS-TTS > 4.0°)

TAS = Angle between the tibial axis and the tibial articular surface
TTS = Angle between the tibial axis and the talus surface
Patients and Methods

- Flat vs. concave was determined using weight bearing CT scans
- The posterior facet was divided in an anterior, middle and posterior plane

Figure 2:
A) Sagittal plane used for reconstruction
B) Corresponding coronal (middle) plane with a flat ST joint
Results

- Incongruent varus ankle OA had the highest prevalence of a flat ST joint (58.3%)

**Table I: Flat vs. concave subtalar joint**

<table>
<thead>
<tr>
<th>Group</th>
<th>Configuration</th>
<th>Flat</th>
<th>Concave</th>
<th>Total</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>1</td>
<td>9</td>
<td>10</td>
<td></td>
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<tr>
<td>valgus congruent</td>
<td>%</td>
<td>10.0%</td>
<td>90.0%</td>
<td>100.0%</td>
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<td>n</td>
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<tr>
<td>valgus incongruent</td>
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<td>16.7%</td>
<td>83.3%</td>
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<tr>
<td>n</td>
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<tr>
<td>varus congruent</td>
<td>%</td>
<td>33.3%</td>
<td>66.7%</td>
<td>100.0%</td>
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<tr>
<td>n</td>
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<td></td>
</tr>
<tr>
<td>varus incongruent</td>
<td>%</td>
<td>58.3%</td>
<td>41.7%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table I: Flat vs. concave subtalar joint
Results

- No significant difference was seen between congruent and incongruent ankle OA
- The inter-observer reliability ranged from substantial to almost perfect

<table>
<thead>
<tr>
<th>flat vs. concave</th>
<th>Observer 2</th>
<th>Observer 3</th>
<th>Observer 4</th>
<th>Observer 5</th>
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<td>0.705</td>
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</table>

*Table II:* Cohen’s Kappa used for calculation
Conclusion

• A flat ST joint may increase the risk for tilting the talus in patients with asymmetric ankle OA
• A flat ST joint leads to a more rigid hindfoot and a loss of compensatory function (e.g. inversion/ eversion)
• The morphology of the ST joint might be a risk factor for the progression of ankle OA
References


• Hayashi K, Tanaka Y, Kumai T, Sugimoto K, Takakura Y. Correlation of compensatory alignment of the subtalar joint to the progression of primary osteoarthritis of the ankle. Foot Ankle Int. 2008;29(4):400-406.

