Intermediate to Long-Term Outcomes of the STAR Total Ankle Replacement: The Radiographic Parameters

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Disclosures

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  - Haytmanek: None
  - Easley: Paid consultant and part of speakers bureau for SBI
  - Adams: None
  - Nunley: Paid consultant for SBI
Purpose of Study

- Documentation of radiographic outcomes in 91 STAR total ankle replacements done by a single surgeon
  - 2 excluded since no WB films ever obtained: 1 early infection and 1 lost to F/U
  - 89 ankles included
- Consecutive series from July 1998 to April 2007
- Same cohort of patients as Nunley et al. 2012 JBJS article presenting the patient self reported outcomes
Parameters Measured

Pre /Post Op Varus/Valgus

Pre/Post Op Point Contact Ratio

Alpha

Beta

Gamma

HO Grade

Lucency

Methods

- GE Centricity Enterprise system measurements taken by a single reviewer
- Significance of changes between pre- and postoperative measurements was assessed using the paired t-test
- Accepted values from the literature were used to compare alpha (90), beta (90), and gamma (11.1-33.4, average 18.8) values
- Accepted definitions for HO grading
  - Brooker modified by Lee et al.
Results: Survivorship

- 89 consecutive ankles followed
- Mean follow up of 7.0±3.3 years (range 0.1-13.2)

Survivorship:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Without Component Revision</th>
<th>With Component Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>Fixation fracture</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Realignment or adjacent fusion</td>
<td>3</td>
<td>3.3</td>
</tr>
<tr>
<td>Poly exchange + other procedure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metallic comp revision +/- other procedure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ankle fusion, spacer, or amputation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total secondary surgery</td>
<td>4.5</td>
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</tr>
</tbody>
</table>
Results: Radiographic Outcomes

- Preoperative coronal plane malalignment: 7.0°
  - First postoperative WB film: 3.1°, final follow up: 3.9°
    - Statistically significant correction and maintenance of coronal plane abnormalities (p<0.001)
    - 74 of 89 (83%) in varus at final follow up

- Talonavicular Joint
  - 8% increase in OA or fusion

- Subtalar Joint
  - 9% increase in OA or fusion

- Alpha angle: Mean 88° (79-98°) Maintained 87° at final f/u
- Beta angle: Mean 87° (67-93°) Maintained at 87° at final f/u
- Gamma angle: 17° (9-27°) Maintained at 17° at final f/u
- Point contact ratio: 0.48 pre-operatively Corrected to: 0.51 (p<0.001)

- 8% increase in OA or fusion
HO Grade

<table>
<thead>
<tr>
<th>HO Grade</th>
<th>Frequency</th>
<th>Percent</th>
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<tr>
<td>0</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>1</td>
<td>13</td>
<td>14.6</td>
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<tr>
<td>2</td>
<td>28</td>
<td>31.5</td>
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<tr>
<td>3</td>
<td>45</td>
<td>50.6</td>
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<tr>
<td>4</td>
<td>2</td>
<td>2.2</td>
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Lucency

<table>
<thead>
<tr>
<th>Lucency Location</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>39</td>
<td>43.8</td>
</tr>
<tr>
<td>Talus</td>
<td>8</td>
<td>9.0</td>
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<tr>
<td>Tibia</td>
<td>40</td>
<td>44.9</td>
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<tr>
<td>Tibia and Talus</td>
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</tbody>
</table>

HO Location

- 71 ankles (79.8%) showed the HO to be talar sided
- 68.5% of ankles had medial sided HO

Medial tibia (11%) followed by anterior tibia (9%) most common locations
"Severe" Cohort

- 22 ankles with > 10° coronal plane deformity

- Coronal plane correction:
  - Pre op deformity: 16°
  - Final follow up: 5°
    - P<0.001

- Metallic Component Revisions:
  - Entire Cohort: 9%
  - Severe Group: 18%

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poly exchange + other</td>
<td>4</td>
<td>18.2</td>
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<tr>
<td>Metallic Comp Revision</td>
<td>2</td>
<td>9.1</td>
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<tr>
<td>Fusion/Amp</td>
<td>2</td>
<td>9.1</td>
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<tr>
<td>Total Secondary Surgery</td>
<td>8</td>
<td>36.4</td>
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References


