A National Comparison of Total Ankle Replacement Versus Arthrodesis. Is There a Paradigm Shift?

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I (and/or my coauthors) have no conflicts to disclose.

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Refer to the AAOS Disclosure Program website. We have no disclosures related to this presentation.
• Total ankle replacement (TAR) and tibiotalar arthrodesis (TTA) are both utilized in the surgical management of ankle osteoarthritis.

• Surgical techniques and instrumentation have improved and indications for TAR have progressively broadened, leading to a decline in performed TTAs.

• Procedure preference can vary widely between physicians.
Purpose

• (1) To identify the change in national incidence between TAR and TTA over time.

• (2) To identify any diagnostic, preoperative, patient, or hospital variables that may lead to a greater preference in either TAR or TTA.
The National Inpatient Sample (NIS) was used for patient data between 2007 – 2013.

Procedure filter:
- Ankle arthrodesis (ICD-9 81.11)
- Total ankle replacement (ICD-9 81.56)

Exclusion criteria:
- Shared arthrodesis & replacement procedures
- Revision of joint replacement of lower extremity (ICD-9 81.59)
- Patients < 50 years of age
Methods

- Univariate analysis compared patient demographics, pre-operative comorbidities, inpatient variables, and hospital variables between success and failure groups.
- Student’s t-test compared continuous variables.
- Fisher’s exact test or Chi-square analysis compared categorical variables.
- Pre-operative comorbidities with a p-value <0.05 and prevalence >0.5% were included in a logistic regression for multivariate analysis.
Total Ankle Replacement and Tibiotalar Arthrodesis Incidence by Age Group (5 years)

- TAA
- TAR

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## Results

<table>
<thead>
<tr>
<th>Patient variables</th>
<th>Arthrodesis (TTA) N = 35,096</th>
<th>Replacement (TAR) N = 15,060</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>63.7 ± 8.95</td>
<td>65.5 ± 8.68</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sex (Female)</td>
<td>17,100 (48.9%)</td>
<td>7,520 (50.0%)</td>
<td>0.319</td>
</tr>
<tr>
<td>Total comorbidities</td>
<td>2.17 ± 1.69</td>
<td>1.55 ± 1.31</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Anemia</td>
<td>3,950 (11.3%)</td>
<td>778 (5.17%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Renal failure</td>
<td>3,110 (8.86%)</td>
<td>424 (2.82%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Length of stay</td>
<td>3.43 ± 5.68</td>
<td>2.28 ± 1.41</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Teaching hospitals</td>
<td>15,100 (58.69%)</td>
<td>4,530 (54.78%)</td>
<td>0.011</td>
</tr>
</tbody>
</table>
Temporal analysis demonstrated a significant 15% increase every 3 years in TAR performed from 2007 (14%) to 2013 (45%).
## Results

<table>
<thead>
<tr>
<th>PRIMARY Diagnosis</th>
<th>% TAR ('07)</th>
<th>% TAR ('13)</th>
<th>Increased Odds of Receiving a TAR in 2013 versus 2007</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-traumatic OA</td>
<td>9.3%</td>
<td>55.5%</td>
<td>12.14x</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Primary OA</td>
<td>25.6%</td>
<td>62.9%</td>
<td>4.93x</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>25.5%</td>
<td>51.4%</td>
<td>3.12x</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMORBID Diagnosis</th>
<th>% TAR ('07)</th>
<th>% TAR ('13)</th>
<th>Increased Odds of Receiving a TAR in 2013 versus 2007</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM + HTN + CAD</td>
<td>12.6%</td>
<td>40.3%</td>
<td>4.66x</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Conclusions

- Surgeons are performing TAR with greater frequency.
- Temporal analysis demonstrated a significant 15% increase every 3 years in TAR performed from 2007 (14%) to 2013 (45%).
- The largest change from TTA to TAR was with post-traumatic osteoarthritis.
- As technology has advanced and surgeons have become more facile with the technique, patients with specific comorbidities are undergoing TAR at a significantly higher annual incidence.
References


