Total Ankle Replacement in Asian Perspectives: A Systematic Review of Intermediate-term Outcome and Failure Rate

Chayanin Angthong¹
Sukanis Chumchuen¹
Anuwat Khadsongkram¹

¹Orthopaedic Surgery, Thammasat University, Pathum Thani, Thailand
Differences in clinical outcomes following different techniques for arthroscopic bone marrow stimulation of osteochondral lesions of talus: drilling versus microfracture

*Chayanin Angthong, M.D.*

My disclosure is in the Final AOFAS Program Book. I have no potential conflicts with this presentation.
Total ankle replacement (TAR) has been introduced to Asia since around 1975.*
Eun et al showed that HINTEGRA® might have some incompatibilities with Korean ankle size.**
Little is known about their overall outcomes and track records in Asian population, especially from the designs from Western patient's anatomy

Aims of this study
1. To provide cumulative data of intermediate-term outcome of TAR in the literature from whole Asia
2. To provide a whole picture of survival rate, implant failure rate and causes.

Methods (1)

- **Design**: Systematic review
- **Key words**: total, ankle, replacement, arthroplasty
- **Timing**: Jan 1990-Feb 2012 (PubMed, Google Scholar)
- **Data collection**:
  1. Each eligible study was independently evaluated using the Coleman Methodology Score*
  2. Collected the data by **two reviewers** and a final consensus decision
  3. Intermediate-term outcomes: **survival and failure rates** (analysis of metaanalytic pooling of results across studies)

*Zhao et al. International Orthopaedics 2011
Methods (2)

- **Inclusion criteria:**
  1. Showed *outcome and failure rate* for TAR
  2. Number: at least 20 patients with *currently used* TAR prosthesis
  3. Mean follow-up of at least **two** years
  4. Study in *Asian* population: first-corresponding authors or direct contact

- **Exclusion criteria:** *kinship study* to counting study population more than once; no defined indication of TAR
Generals: From 1,640 papers → Seven qualified studies were eligible with 321 implants

- 112 HINTEGRA®
- 104 TNK
- 35 STAR
- 13 ND-Bioceram
- 57 implants with not-reported type

*Only one article compared outcomes of TAR (20 cases) with the ankle arthrodesis (17 cases)

→ favored TAR in terms of markedly higher postoperative clinical scores for ranges-of-motion and ADLs.

Mean follow-up: 5.2±1.7 years

*Shinomiya et al. Mod Rheumatol 2003
<table>
<thead>
<tr>
<th>Study</th>
<th>Prosthesis</th>
<th>Number of Ankle Joints</th>
<th>Age (years)*</th>
<th>Causes of Ankle Arthritis</th>
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<th>Other</th>
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</thead>
<tbody>
<tr>
<td>Liao X et al 2008</td>
<td>STAR</td>
<td>35</td>
<td>50.5 (27-68)</td>
<td>Post-traumatic</td>
<td>12</td>
<td>8</td>
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<tr>
<td>Nishikawa M et al 2004</td>
<td>TNK</td>
<td>27</td>
<td>60 (36-75)</td>
<td></td>
<td>-</td>
<td>27 (RA)</td>
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<td>Takakura Y et al 2004</td>
<td>TNK</td>
<td>70</td>
<td>64.3 (41-87)</td>
<td>36 (51%)</td>
<td>-</td>
<td>31 (44%: RA)</td>
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<tr>
<td>Shinomiya F et al 2003</td>
<td>TNK/ND</td>
<td>Ankle fusion (AF)</td>
<td>7</td>
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<td>-</td>
<td>20 (TAR: RA)</td>
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<td>Shinomiya F et al 2003</td>
<td>TNK</td>
<td></td>
<td>13</td>
<td></td>
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<td>17 (fusion: RA)</td>
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<td>Shinomiya F et al 2003</td>
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<td>17 (fusion: RA)</td>
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<td>Kim BS et al 2009</td>
<td>Hintegra</td>
<td>- varus(^b) ≥ 10</td>
<td>45</td>
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<td>Kim BS et al 2009</td>
<td>Hintegra</td>
<td>- neutral(^b)</td>
<td>23</td>
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<td>Bai LB 2010</td>
<td>Hintegra</td>
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<td>22</td>
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<tr>
<td>Mao BY et al 2011</td>
<td>N/A(^a)</td>
<td>57</td>
<td>54.7 (28-68)</td>
<td></td>
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<tr>
<td><strong>Total</strong></td>
<td>TAR</td>
<td>321</td>
<td>58.7±2.33</td>
<td></td>
<td>35±12.7</td>
<td>17.5±6.4</td>
</tr>
</tbody>
</table>
Our Asian study 2012 (yellow highlighted) vs Gougoulias et al 2010 (1105 TARs)*

- Pooled mean follow-up: **Same (5.2 years)**
- Failure rate: **4.93% vs 9.8%** at mean follow-up time
- Survivorship: **77% at 14.1 yrs** vs 92% at 12 yrs
- Radiolucency: **27.3% vs 34.5%**
- Subsidence-migration rate: **17.5% vs 17.8%**
- Complication rates: **3.12% vs 2.3-7.4%**

*Gougoulias systematic review: STAR, Agility, HINTEGRA®, TNK, Salto

*Gougoulias et al. Clin Orthop Relat Res 2010
Conclusion

Currently used TAR prosthesis achieved acceptable results in terms of intermediate-term outcome in Asia.

Pooled failure rate in Asia was lower than previous studies which mostly performed in non-Asian population with almost comparable periods of mean follow-up.

Comparative studies between TAR and ankle arthrodesis are still lacking. Quality of current studies were somewhat inadequate.

Further well-methodological studies are necessary to clarify the intermediate to long-term benefit of TAR comparing with ankle arthrodesis in Asian population.

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References


