Total Ankle Replacement Does Not Alter Lower Extremity Kinematics During Sit-to-Stand Movement

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Disclosures are in the Final AOFAS Program Book
Background & Purpose

• Total Ankle Replacement (TAR) is an alternative to arthrodesis for end-stage, painful ankle OA $^{1-3, 5-6}$

• Little know about patient function and sit-to-stand mechanics change following TAR$^4$

• One argument for TAR, especially with a contralateral arthrodesis, is to preserve the ability to stand up

Purpose

• Examine changes in sit-to-stand mechanics between the surgical and non-surgical limbs across time (pre-op, 1 yr and 2 yr post-TAR)
Methods

99 Consecutive TAR patients

Exclusion:
- Revision TAR
- Fusion Takedown,
- Contralateral TAR
  - Current or planned
- Use of Assistive Device
- RA

Assessment Times:
- Pre-op
- 1 year post-op
- 2 years post-op

<table>
<thead>
<tr>
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<th>Mean ± SD</th>
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<tbody>
<tr>
<td>Age (yrs)</td>
<td>62.7 ± 9.6</td>
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<tr>
<td>Height (m)</td>
<td>1.71 ± 0.1</td>
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<tr>
<td>Weight (kg)</td>
<td>85.16 ± 17.5</td>
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Methods

Three-dimensional Kinematic and Kinetics

• Motion Camera Data Collected at 120 Hz
• Force Plate Data Collected at 1200Hz
• Patients Complete 5 sit-to-stand trials as quickly as possible in standard chair
  • Feet were placed one on each force plate to measure forces and moments on both Surgical and Non-Surgical Side
Interaction between Side and Time

Vertical GRF (BW)

Pre-op 1 year 2 year

GRF-S • Hip Ext-NS
GRF-NS • Hip Ext-S
Ankle PF-S • Ankle PF-NS

Moment (Nm/kg)
Differences Across Time

No differences between S and NS
Significant differences across time (*pre-op to 2yr, + 1yr to 2 yrs)
Differences Between Surgical and Non-Surgical Sides

Sig. diff between the S and NS sides independent of time (p<0.001)
Conclusions

• Entire lower extremity demonstrated altered movement and loading patterns following TAR

• Sit-to-stand remained altered up to 2 years post-TAR

• Lack of normal ankle mobility results in altered lower extremity mechanics - compensate for missing ankle dorsiflexion

• Important to examine multiple tasks, not just walking to understand the effect of TAR on function and ADL
References


