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Gait Symmetry Changes Following Total Ankle Replacement

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Disclosures are in the Final AOFAS Program Book

Conflict of Interest
• Total Ankle Replacement (TAR) alternative to arthrodesis for end-stage, painful ankle OA\textsuperscript{1-5}
• Post-TAR: improved gait, no information on side to side symmetry

Purpose
• Examine changes in side-to-side gait symmetry during self-selected walking preoperatively, 1 yr and 2 yr following TAR
69 Consecutive TAR patients

- 3D Motion Capture – 120Hz
- 4 force plates – 1200Hz
- 7 Self-selected walking trials

Exclusion Criteria:
- 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
Interactions between Time and Limb

Improvement in side-to-side symmetry across time.

Temporal Measures (% Cycle)

- Stance Time
- Step Time
- Swing Time

Peak PF Moment (BW*BH)

S= Surgical  NS = Non-Surgical

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Pre-op 1 year 2 years

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• Significantly increase in dorsiflexion angles on the non-surgical side
• No differences in dorsiflexion angle across time (pre-op → 2 yr post-op)
Differences Across Time

- **Walking Speed (m/s)**
- **Weight Acceptance vGRF (BW)**
- **Propulsion vGRF (BW)**
- **Step Length (% Ht)**
- **Stride Length (%Ht)**

- Pre-op
- 1yr
- 2yr
Conclusion

- Goal of TAR: decrease pain while hopefully increasing joint ROM and improving function
- Improved/maintained gait mechanics and function 2yrs following TAR
- No difference in ankle motion across time
- Significant decrease in ankle motion on surgical compared to non-surgical side
- Improvements in stride & step length across time most likely result from increased walking speed
Conclusion

• Improvements in symmetry across time → TAR improves ankle kinetics and spatial temporal mechanics over 2 yrs

• Patients able to walk faster post-TAR and improved gait symmetry

• Patients still asymmetric in walking by 2 yrs following TAR


