15 Years Of STAR
Total Ankle Arthroplasty

Evan M Loewy, MD
Thomas H Sanders, MD
Arthur K Walling, MD
Disclosures

My co-authors and I have no conflicts of interest relevant to this presentation.
Background - The STAR

- **Design**
  - 3-part
  - Mobile bearing
  - Uncemented

- **Timeline**
  - 1998-2000: Compassionate Care Device
  - 2000-2005: FDA Trials
  - 2009: FDA approval

Photo from Mann et al, FAI 2011
Background - The Landscape

• “STAR Ankle: Long-Term Results.” Mann et al. FAI 2011
  • 84 ankles with avg. f/u 9.1yr (range 2.6-11yr); 6 ankles lost to f/u
  • 91% overall survival; 39 point improvement in AOFAS score

• “Intermediate to Long-Term Outcomes of the STAR Total Ankle Replacement: The Patient Perspective.” Nunley et al. JBJS 2012
  • 82 ankles with avg. f/u 5.1yr (range 2-9yr); 8 ankles lost to f/u
  • 93.9% overall survival; 52 point improvement in AOFAS score

• “Long-Term Follow-up of Mobile Bearing Total Ankle Arthroplasty in the US.” Jastifer and Coughlin. FAI 2015
  • 18 of 41 ankles with avg. f/u 12.6yr (range 10-14.6yr); 23 ankles lost to f/u
  • 94.4% overall survival (1 of 18); 45 point improvement in AOFAS score
Materials and Methods

• Prospective Cohort Study for FDA Approval
  – Consecutive STAR Total Ankle Arthroplasties (TAA) Performed 1999-2009
  – Single Surgeon, Single Institution

• Primary Outcomes
  – Implant Survival
    • Defined as retention of BOTH initial tibial and talar components
  – Δ AOFAS Ankle-Hindfoot Scale Scores

• Secondary Outcomes
  – Early and Late Malleolus and Glidecore Fractures
Results

- 85 TAA in 81 patients for survival analysis
  - avg. age at TAA 60 ± 12.8 yrs
  - 1 patient with bilateral ankles lost to f/u with TAA at 5 and 6 yrs postop.
  - 13 deaths with no known complications or revisions.
  - 15 failures at avg. 5.2 yrs postop.
    - 1 failure of unknown cause; converted to fusion per patient request
    - 1 BKA by outside physician; unclear why

![Failure Modes and Management Graph]

- Subsidence: 8 cases
- Coronal Plane Deformity: 5 cases
- Infection: 1 case
- Unknown: 1 case
- Ankle Fusion: 8 cases
- Revision Arthroplasty: 5 cases
- Ankle-Hindfoot Fusion: 1 case
- Below Knee Amputation: 1 case
Results - Implant Survival

92%
82%
77%

<2% revision/year
Results

- 55 TAA in 52 patients available for full analysis at avg. 11.3 yrs post op (range 5.5-16.75)
  - 34.4 point improvement in AOFAS ankle-hindfoot score at final follow up
Results - Fractures

- **8 Glidecore fractures (9%)**
  - Avg. 8.6 yr postop
  - No further complications or failures

- **5 intraop malleolus fractures (6%)**
  - ORIF at index surgery
  - No prolonged immobilization or protected weight bearing
  - 2/5 later had implant failure but appeared unrelated to the fracture

- **5 postop malleolus fractures (6%)**
  - All acute traumatic cause
  - 2 ORIF, 3 non-op
  - No further complications or failures
Conclusions

• The largest (N=85) and longest-term (>16yrs) STAR follow-up study in the U.S. to date demonstrates:
  – Maintained acceptable revision rate
  – Maintained improved outcomes scores
  – Low major complication rates
References

1. Jastifer, JR. Coughlin MJ. Long Term follow up of Mobile bearing TAA in the US. Foot and Ankle International 2015. 143-150.