The Fixed Bearing Modular Stem Total Ankle Replacement: 7 Year Outcomes

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STATEMENT OF PURPOSE

To compare preoperative patient-reported outcomes with those reported 7 years following surgery in patients that elected to undergo surgical intervention with a two-part, modular stem-fixed bearing total ankle prosthesis.

METHODOLOGY & HYPOTHESIS

Inclusion & Exclusion Criteria

Inclusion
- ≥18 years of age
- Underwent TAR with a modular stem-fixed bearing implant

Exclusion Criteria
- No preoperative data available

Outcomes
- Pain the morning visual analog scale (VAS)
- Difficulty walking 4 blocks (VAS)
- Use of an assistive device (VAS)
- Complications

Statistical Analyses
- Outcomes were compared across time using a paired samples t-test
- Statistical significance was set at the 5% level (p < 0.05)
- Data presented as mean ± standard deviation or count (%).

Hypothesis

Given the early success of this modular stem-fixed bearing implant, we hypothesized that the modular stem-fixed bearing TAR would improve patient reported outcomes.

PROCEDURE

TAR was performed with intramedullary guidance according to the manufacturer’s guidelines alone or in conjunction with tendon Achilles lengthening.

LITERATURE REVIEW

Ankle arthritis can be a significant source of pain and disability for patients. Following the exhaustion of conservative treatments, ankle arthrodesis and ankle replacement (TAR) are viable surgical solutions.

Learning from the failure of first generation implants (1-5), there has been continued evolution in implant design and refined surgical techniques. The midterm results of newer generation implants have been encouraging, demonstrating improvements in pain and function (6-8), while experiencing lower rates of revision surgery compared to previous ankle joint kinematics (9,10).

In 2005, a modular stem fixed bearing total ankle replacement was approved by the Food and Drug Administration. The modularity of the modular stem-fixed bearing implant 7 years following implantation.

RESULTS

Patient Demographics

25 patients met the inclusion criteria; 2 were lost to follow up. Three patients required revision surgery and were excluded from the outcomes analysis.

Complications

Minor Complications
- Intraoperative fracture 1 (4.3)
- Skin flap 2 (8.7)

Superficial wound 3 (12)
- Time to union 8 (32.2)

TOTAL 5 (20.8)

Major Complications
- Deep wound 2 (8.7)
- Deep infection 1 (4.3)
- Pulmonary embolism 2 (8.7)
- Ectopic bone removal 1 (4.3)
- Total autolysis 1 (4.3)

TOTAL 7 (28.0)

CLINICAL OUTCOMES

- *Statistically significant on the VAS level
- Three patients met the inclusion criteria and were excluded from the outcomes analysis

ANALYSIS & DISCUSSION

Continued advancement in prosthetic designs has made total ankle replacement a viable surgical treatment option for end-stage ankle arthritis. Early evaluation of the modular stem fixed bearing implant has demonstrated promising outcomes. This is the first study to present outcomes 7 years following implantation. Our results demonstrate significant improvements in patient reported outcomes with a low complication rate.

For the 23 patients included in the outcome analysis, there were significant improvements in pain and function, difficulty walking, and use of an assistive device. In total, there were 6 (26.1) wound complications. Two superficial wounds resolved with local wound care. The two superficial wounds resolved with local wound care. Out of the deep wounds, one had full thickness wound dehiscence with exposed tendon, which was treated with a local pedicle flap and treated without complications. The other patient developed a chronic diabetics foot ulcer, was managed with a free flap, and recovered. The ectopic bone required surgical removal. The patient was discharged with an orthotic and recovered. The ectopic bone required surgical removal. The patient was discharged with an orthotic and recovered. The ectopic bone required surgical removal. The patient was discharged with an orthotic and recovered. The ectopic bone required surgical removal. The patient was discharged with an orthotic and recovered. The ectopic bone required surgical removal. The patient was discharged with an orthotic and recovered.

The present study had several limitations, which have the potential to threaten the validity of our conclusions. A primary limitation was its retrospective design, which inherently increases the potential for bias. Additionally, our sample size was limited to 23 patients. One of the most important methodological shortcomings was the lack of a control group, limiting our comparisons within patient. Despite these limitations, we believe that these results are a promising outcome of the modular stem-fixed bearing implant 7 years following implantation.