Sagittal Alignment in Fixed Bearing Total Ankle Replacements

Natalie Nielsen, MD, Austin Sanders, BA, Joseph Nguyen, MPH, Constantine Demetracopoulos, MD

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Introduction/Purpose: Placement of the talar component in total ankle replacement (TAR) is technically challenging and malposition can occur. Implant alignment can affect both contact stresses at the articulation of the prosthesis, as well as forces at the bone implant interface, and survivorship of the implant. In mobile bearing implants, postoperative pain relief and functional outcome correlates with sagittal position of the talar component. The purpose of this study is to evaluate the sagittal alignment of the talar component between two fixed bearing total ankle replacements and determine the effect of alignment on patient outcomes.

Methods: We performed a retrospective review of total ankle replacements at a single institution over a seven-year period. Seventy-one patients who underwent a fixed bearing TAR (Salto Talaris, Integra LifeSciences, and INBONE, Wright Medical) with two year minimum followup were included. Preoperative and one year postoperative radiographs were assessed to determine sagittal alignment of the talar component. The preoperative sagittal alignment was measured as the tibial-axis-to-talus ratio (T-T ratio) and the postoperative sagittal alignment was measured as the A-P offset ratio. Postoperative sagittal alignment was categorized as neutral (A-P offset ratio <0.1, N=39) or anterior (A-P offset ratio >0.1, N=32). Functional outcomes were assessed at 2 years utilizing SF12 scores and the FAOS outcome score, which has been previously validated for ankle arthritis. Differences in sagittal alignment between the two implant types and differences in postoperative outcome scores were assessed using T-tests. Interobserver reliability was assessed using intraclass correlation coefficient.

Results: Interobserver reliability for the preoperative sagittal alignment using the T-T ratio had very good agreement, while the postoperative A-P offset measurement had only fair/moderate agreement. Preoperatively, there was no difference in the T-T ratio amongst patients receiving a Salto Talaris or INBONE implant. Postoperatively, patients with a Salto Talaris implant have a greater AP offset ratio than patients with an INBONE implant (p <0.01). There was no difference in FAOS or SF12 MCS/PCS scores between postoperative neutral and anterior sagittal alignment groups.

Conclusion: Preoperative sagittal alignment can be reliably assessed using the T-T offset ratio. The A-P offset ratio is somewhat less reliable as a measure of postoperative sagittal alignment in fixed bearing implants. Patients with INBONE implants had more neutral sagittal alignment postoperatively. Differences in alignment between the two implants may relate to anterior-posterior coverage of the tibial component and the fixed bearing nature of the prostheses. Patient reported outcome scores did not differ between neutral and anterior sagittal alignment groups.

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