

What Variables Influence Final Range of Motion Following Total Ankle Arthroplasty

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Introduction/Purpose: While studies have demonstrated a predictable incremental increase in the range of motion (ROM) following total ankle arthroplasty (TAA) it remains unclear what variables affect the post-operative ROM. This study was undertaken to further investigate this question with the goal of providing guidance for patients and surgeons deciding between TAA and arthrodesis.

Methods: This is a prospective review of 223 consecutive patients who underwent primary TAA using a single prosthesis performed between 2010-2013 for painful ankle arthritis that failed conservative therapy. Weight bearing flexion and extension X-rays were obtained preoperatively and again at 1 year following surgery. The patients were compared for demographics, type of arthritis, preoperative malalignment, prior trauma, obesity, medical co-morbidities, and the effect of concurrent surgery on post operative ankle ROM.

Results: 191 patients had adequate follow-up and met all the inclusion criteria. The preoperative diagnosis, hindfoot or ankle varus or valgus, and concurrent percutaneous tendon Achilles lengthening (TAL) procedures were positive predictors of greater improvement in ankle ROM after TAA. Patients with valgus ankle malalignment had better post TAA DF, PF and total ankle range of motion compared to those in varus ($P < 0.05$). Percutaneous tendon Achilles lengthening (TAL) improved the DF, but not the PF ($P < 0.05$). Patients with primary ankle osteoarthritis ($n=105$) had the best improvement in ROM with an average gain of 3.39° in dorsiflexion (DF), 2.47° in plantar flexion (PF) and 5.84° in total ankle ROM ($P < 0.05$). An analysis of this subgroup demonstrated greater gain in ankle ROM in patients with lower preoperative ROM compared to those with higher preoperative ankle ROM ($P < 0.01$).

Conclusion: Our results indicated primary ankle OA, preoperative ankle valgus malalignment and intraoperative TAL are significant factors in predicting increased ankle ROM after TAA. Ultimately, ankle motion is a function of the extent of arthritis, fibrosis and the surrounding soft tissue envelope. While TAA restores the function of the joint, it may not adequately correct periarticular fibrosis. Early weight bearing and physical therapy may alleviate postoperative stiffness, and increase the post operative gain in ROM. Further study is underway to determine the effect of early weight bearing and initiation of physical therapy on the ROM following TAA.

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