

Incision Healing and Time to Weightbearing With and Without Use of Adhesive Retention Suture Device in Total Ankle Arthroplasty

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Purpose

Total ankle arthroplasty (TAA) used in the treatment of end-stage ankle arthritis presents many challenges perioperatively¹⁻³. Among several considerations for the appropriate patient candidate, the surgeon must respect not only the soft tissue envelope of the anterior ankle for incision placement, but also the host's ability to heal the incision. Prolonged non-weightbearing status in a postoperative TAA patient can allow the incision to heal more predictably, but can put the patient at risk of scar tissue accumulation thereby leading to poorer outcomes when weightbearing. Adhesive suture retention devices (ASRDs) can assist with linear closure of surgical and traumatic wounds under tension. This retrospective comparative study evaluates the use of ASRDs on TAA patients' incision healing time and time to full weightbearing.

Methodology

50 TAA patients between 2021 and 2023 were divided equally into 2 groups: with and without ASRDs. Demographics included age, BMI, implant technique, comorbidities, complications, and adjunctive soft tissue/osseous balancing procedures. Results calculated included healing time of the incision, time to full weightbearing, and incision length (cm). Preoperative and postoperative AOFAS, FFI, and VAS scores were also recorded.

Results

	Without ARSD	With ARSD
Mean incision length (cm)	9.1	7.4
Mean time to weightbearing/incision healing (days)	37.1	19.9
Mean follow-up (months)	27.7	4.3

Surgical Technique/Postoperative Protocol

An incision is made over the anterior ankle lateral to the course of the tibialis anterior tendon (TA) and medial to the extensor hallucis longus tendon (EHL). Standard dissection and procedure technique is performed for the ankle arthroplasty system of choice. After implanting the poly and final irrigation, layered closure is performed with absorbable sutures. Skin incisions were finally closed with a combination of nylon simple interrupted and horizontal mattress sutures using adhesive retention suture devices as needed. Specifically, care was taken to properly place the ASRDs away from the anterior flexion crease of the ankle joint. The lower extremity was then dressed in standard fashion with a dry, sterile double-layer compression dressing and a well-padded AO splint with the ankle at 90 degrees. Patients were instructed to remain non-weightbearing for at least 2 weeks. Outpatient incision and swelling checks were performed at appropriate intervals within the first 4 weeks postoperatively. Incision healing and time to weightbearing were recorded on the specific postoperative day when sutures were removed, and the patient was placed into either a below-knee weightbearing cast or tall CAM walker boot.



Figure A: Intraoperative photos of left-sided TAA incisions using ASRDs for closure

Figure B: (left to right) Intraoperative photo of right-sided TAA using ASRD-assisted closure. Implant chosen was semi-constrained with a novel fixed-bearing polyethylene



Figure C: Postoperative TAA incision with ASRDs at 17 days, prior to suture removal and weightbearing

Figure D: Individual postoperative TAA incisions with ASRDs at 3 months (D1), 3.5 months (D2), and 4 months (D3)

Results

Mean follow-up for the group without ASRDs was 27.7 months, and 4.3 months in the group with ASRDs. Mean incision healing time and return to weightbearing was 37.1 days (SD 4.65, range 28-44 days) in the group without ASRDs, with average incision length 9.1 cm (SD 1.995, range 5-14 cm). Mean healing time was 19.9 days (SD 3.29, range 16-27 days), with average incision length 7.4 cm (SD 0.764, range 6-9 cm), in the group with ASRDs. This shows a statistically significant decrease ($p < 0.05$) in incision length, healing time, and return to weightbearing in the ASRD group. In addition, there were statistically significant improvements in postoperative AOFAS, VAS, and FFI scores when compared to preoperative values within either group ($p < 0.05$). There were 5 patients who developed wound complications in the group without ASRDs, compared to 2 in the group with ASRDs. All complications were related to slower wound healing. No TAAs required explantation.

Analysis & Discussion

Several factors have been extensively studied regarding correlation to wound complications in patients undergoing TAA, including BMI/obesity, peripheral vascular disease, cardiovascular disease, age, and smoking history, among others.¹⁻⁶ This data factors into why proper patient selection is crucial for TAA candidates. Previous authors cited incision offloading techniques as well as adjunct incisional wound VAC therapy to protect from dehiscence and breakdown and improve outcomes and recovery.^{7,8} This study demonstrates that the difference in expected time to full weightbearing and incision healing was statistically significant in favor of ASRD use for patients undergoing total ankle replacement, regardless of demographics.

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