Costa ML, MacMillan K, et al. Randomised controlled trials of immediate weight-bearing mobilisation for rupture of the tendo Achillis. J Bone Joint Surg Br 2006:88-B:69-77.

Design: Two separate randomized clinical trials in patients with Achilles tendon rupture

Purpose of study: to assess the effects of immediate versus delayed weight bearing in patients (1) choosing to have surgery for an Achilles tendon rupture, and to assess the effects of immediate verus delayed weight bearing in patients (2) choosing not to have surgery for an Achilles tendon rupture

Population/sample size/setting:

- Both trials were done in a university setting in Cambridge, UK
- All patients had ruptured the Achilles tendon in the past 7 days, and the diagnoses were made clinically
- No exclusion criteria were described, but 4 patients who chose surgery declined to participate in the trial involving early versus delayed weight bearing
- 48 patients (40 men, 7 women, mean age 42) one gender not recorded) chose surgery
- 48 patients (32 men, 16 women, mean age 53) chose not to have surgery

Interventions:

- Of the 48 operated patients, 2 had augmented repairs for complex ruptures and 46 had open end-to-end repair under general anesthesia; all began some form of rehabilitation on the first postoperative day, but the timing of weight-bearing was different
    - Randomization was to immediate mobilization in a flexible carbon-fiber orthosis with three removable 1.5 cm heel raises (n=23) or to a traditional plaster cast immobilization (n=25)
    - Followup was done every two weeks for 8 weeks; at each visit the equinus position of the plaster in the control group was reduced, or one of the heel raises in the early weight-bearing group was removed, until both groups had a plantigrade position of the injured ankle
    - At 8 weeks, the plaster cast and the orthoses were removed for all patients
- The 48 nonoperative patients were also randomized to early weight-bearing (n=22) or delayed weight-bearing (n=26)
    - The delayed weight bearing group was placed into a below-knee gravity equinus cast and mobilized non weight-bearing
    - The early weight bearing group was fitted with the same flexible carbon-fiber orthosis as in the operated group
    - In the nonoperated group, the equinus position of the hindfoot was not changed for the first six weeks, but thereafter the position of the plaster cast and the change in the heel raises was changed every two weeks as with the

operated group, so that both the cast and the orthoses were removed at 12 weeks

Outcomes:

- The outcomes were assessed at 3 months, 6 months, and 1 year
- The primary outcome measure was the time taken to return to normal activities, as reported by the patients
    - These activities included sporting activity, stair climbing, walking, and working
    - The EuroQol questionnaire was used for general quality of life/health assessments
    - At 6 months, a blinded physiotherapist did a clinical assessment and measured calf muscle function using a dynamometer
- In the operated group, the early weight bearing group returned normal walking faster (median of 12.5 weeks) than the delayed weight bearing group (median 18 weeks)
    - Similarly, the early group returned to normal stair climbing faster (median 13 weeks) than the delayed group (median 22 weeks)
    - Times to return to work and to sport were not different in the two groups
    - Outcomes for the EuroQol and for the calf muscle function did not differ between the groups
    - Two patients in the early group had a re-rupture of the Achilles tendon, but there were also 2 major complications in the control group: one had persistent paresthesias and the other stumbled using his crutches and ruptured the contralateral Achilles tendon
- In the non-operated group, the timing of return to walking, stair climbing, work, and sport were not different between groups; for example, the median time to walking was 18 weeks for both groups
    - The secondary outcomes of EuroQol and calf function also were the same in the two groups
    - One major complication (re-rupture) occurred in the early group, and three major complications occurred in the delayed group: one re-rupture, one failure to heal the tendon resulting in a permanent tendon defect, and one fatal pulmonary embolism after two weeks of plaster immobilization

Authors' conclusions:

- In patients with surgically treated Achilles tendon ruptures, there are advantages to immediate weight-bearing mobilization
    - However, the flexible orthosis may encourage some patients to attempt to return to strenuous activity too soon, resulting in re-rupture and other complications; adherence to the rehabilitation protocol is important

- In patients with non-surgically treated tendon ruptures, immediate weight-bearing rehabilitation had no measurable advantages, but did not have any disadvantages
- Immediate weight-bearing mobilization can be recommended for both operatively and nonoperatively treated patients with Achilles tendon rupture

Comments:

- Although the group with the flexible orthosis was described as full weight-bearing, Figure 2, showing a patient with an orthosis on one foot and a cast on the other foot, appears to show the patient using crutches during the strike phase of gait on the foot with the orthosis, and it is not clear whether other patients in the immediate weight bearing group might also have had some form of support for walking
- Both surgical groups started rehabilitation on the first postoperative day, but the nature of that rehabilitation was not described; presumably the cast group had some form of rehabilitation that did not entail immediate placement of weight on the injured foot
- Even though median time to work was not statistically different in the nonoperated group, using the log-rank test for statistical significance, the median time in the immediate group was 1 week and the median time in the delayed group was 10 weeks; a clinical advantage for early weight bearing cannot be excluded
- The occurrence of the single fatal complication of pulmonary embolism in a patient immobilized in a cast is noteworthy even if it may not be attributable to the immobilization
- Presumably the lack of a description of any exclusion criteria meant that all willing patients were eligible to participate in the trial

Assessment: Adequate for some evidence that in patients undergoing surgical repair of a ruptured Achilles tendon, a rehabilitation program involving immediate weight bearing with a flexible orthosis is more efficient in returning patients to normal function than a program involving immobilization in a plaster cast. Adequate for some evidence than in nonoperatively treated Achilles tendon rupture, immediate weight bearing with a flexible orthosis presents no disadvantages for return to function in comparison to delayed weight-bearing in a plaster cast.