ELSEVIER

Operative Techniques in

Sports Medicine

Rehabilitation and Return to Play Following Achilles Tendon Repair

Kevin C. Wang, BS, Eric J. Cotter, BS, Brian J. Cole, MD, MBA, and Johnny L. Lin, MD

Although emerging evidence has identified an expanded role for nonoperative treatment of Achilles tendon ruptures, there remains a preference to treat young, active patients operatively to reduce the risk of rerupture and improve return to play. To ensure an adequate repair while minimizing risks for wound complications, the senior authors (B.J.C. and J.L.L.) prefer a limited open technique to repair. Additionally, we recommend a brief period of immobilization and nonweight bearing which is quickly followed by an early, active rehabilitation phase to balance the functional benefits of early loading with the risk of early reinjury. Recent literature has linked patient demographic factors, such as older age and elevated body mass index, to worse postoperative symptomatic outcomes. Although higher preoperative activity levels are correlated with improved postoperative functional outcomes, these patients report reduced satisfaction, likely attributable to unmet expectations of restored function. Because of the large loads placed on the Achilles tendon during certain athletic activities, these injuries can be very difficult for explosive athletes, such as jumpers or sprinters, to effectively return from, regardless of management approach.

Oper Tech Sports Med ∎:∎∎∎-∎∎∎

KEYWORDS Achilles, Rehabilitation, return to play

Introduction

Achilles tendon ruptures are a common occurrence, with a reported incidence of 6-37 ruptures per 100,000 people.[1] Recently, with new research on rehabilitation protocols and functional bracing, nonsurgical management has emerged as a serviceable alternative to surgical repair in certain populations.[2] Despite the reported efficacy of nonsurgical treatment, there is still a general preference to treat young, athletic patients with surgery due to concerns over increased risk of rerupture, increased time to return to play (RTP), and diminished strength in nonsurgical treatment compared to surgical repair.[3] Current literature supporting these concerns suggest that, in an appropriately selected population, surgical repair of Achilles tendon rupture remains an effective treatment option, especially in young, active, or athletic individuals.[4,5]

Department of Orthopaedics, Rush University Medical Center, Chicago, IL.
Address reprint requests to Johnny L. Lin, Department of Orthopaedics, Rush University Medical Center, 1611 W Harrison St, Suite 300, Chicago, IL.
E-mail: Cole.research@rushortho.com

Surgical Rehabilitation Protocol

The senior authors (B.J.C. and J.L.L.) use a 7-phase progressive rehabilitation protocol for surgical repair of the Achilles tendon (Table). Important rehabilitation principles include early immobilization and nonweight bearing status to allow healing of the repaired tendon and the surrounding soft tissue structures. Additionally, it is important to initiate early physical therapy to provide the stressors necessary to stimulate tissue remodeling and prevent muscle atrophy and adhesion formation.[6] Achilles' injuries used to be consistently managed with prolonged ankle immobilization; however, research has shown that functional bracing with early range-of-motion (ROM) leads to high patient satisfaction and good clinical outcomes without compromising the repair.[7] An approach similar to Suchak et al[8] is recommended by the senior authors with short-duration early immobilization (typically 2 weeks) for protection of the repair, followed by early initiation of ROM and gentle weight-bearing. The rehabilitation approach to each patient may need to be modified to accommodate unique patient-specific variables and surgical history factors; however, the limitations on aggressiveness of rehabilitation are intended

http://dx.doi.org/10.1053/j.otsm.2017.07.009
1060-1872//

Table Achilles Tendon Rupture Rehabilitation

Time Period	WT Bearing	Immobilization	Therapeutic Exercise
0-2 wk	NWB	Splint—equinus	Knee Rehab; Quads; and Hamstring stretch
3-4 wk	PWB-WBAT	Boot—3 wedges	ROM: dorsiflexion/plantar flexion: Active/passive/AA
			Do not place ankle beyond neutral dorsiflexion during any exercise until week 7
			Home program: instruct patient in active ROM exercises to do between therapy visits with care in preventing ankle dorsiflexion past neutral (3 sets of 30, 3×/d)
5-6 wk	WBAT	Boot—3 wedges	ROM: inversion/eversion: active/passive/AA
		One out per week	Do not place ankle beyond neutral dorsiflexion during any exercise until week 7
			Scar massage/desensitization
7-8 wk	WBAT	Boot—1 wedge, then no wedges	Strengthening: theraband—all 4 quadrants
			ROM: advance to full range in all planes
			Stretching: GENTLE gastroc, soleus, and hamstring
9-10 wk	WBAT	No boot	Stretching: advance gastroc, soleus, and hamstring stretchingStrengthening: concentric exercises—all 4 quadrants
11-12 wk	Low-effect WB	None	Low-effect aerobic: elliptical, walking, and stairmaster
			Strengthening: eccentric exercises—all 4 quadrants
13-16 wk	High-effect WB	None	High-effect aerobic—running/jogging
			Strengthening: eccentric exercises—all 4 quadrants
4-5 mo	High-effect WB	None	Sports specific—cutting/accelerations/decelerations

NWB, nonweight bearing; PWB, passive weight-bearing; WB, weight-bearing; WBAT, weight-bearing as tolerated; WT, weight.

to protect the healing tendon. As such, although it is possible to prolong the different phases of rehabilitation if patients are not progressing quickly enough, expediting the phases may increase the risk of rerupture. When dealing with athletes specifically, many often seek to push the limits of their rehabilitation to RTP as quickly as possible. However, Achilles tendon ruptures are significant and potentially career altering injuries; the importance of a safe, progressive rehabilitation protocol cannot be understated in its utility for getting athletes back in the game.

Phase I—Protection (0-2 Weeks)

Phase I begins in the immediate postoperative period with the ankle joint splinted in equinus using a below-knee, plantar splint. The goal of this phase is to allow healing of the surgical repair construct in addition to the surrounding supportive soft tissue structures while decreasing pain and inflammation. Cryotherapy is recommended to reduce pain, inflammation, and swelling. Nonweight bearing status is recommended for the first 2 weeks after surgery. Rehabilitation may be started immediately to strengthen the muscles stabilizing the knee joint; namely the quadriceps and hamstrings, but exercises specific to the ankle joint should be avoided at this time.

Phase II—Initiation of Passive Weight-Bearing and ROM (3-6 Weeks)

The purpose of phase II is to begin ROM exercises, light weight-bearing stress on the ankle (25%-50% of total body weight) and begin lengthening the tendon through decreasing wedges. Patients are taken out of the equinus splint and placed into a walking boot with 3 wedges after 2 weeks (Fig. 1). In addition, at 5 weeks patients should decrease the number of wedges from 3-2 with the goal of being down to a single wedge at 6 weeks. It is extremely important that patients do not dorsiflex the ankle beyond neutral at any point before week 7 to avoid unwanted lengthening of the tendon, which has been associated with suboptimal outcomes.[9] At the beginning of phase II, patients may begin passive weight-bearing on the surgical leg. The goal during this phase is to achieve full weight-bearing as tolerated (WBAT). It is during this phase that ROM exercises are initiated under the direct supervision of a licensed physical therapist. Patients begin with passive ROM, but may advance as tolerated quickly to active assisted and active ROM exercises based on their comfort level. When at home, patients are encouraged to perform active ROM exercises 3 times a day for 3 sets of 30 repetitions each time working on dorsiflexion and plantar flexion at first, then advancing to include inversion and eversion beginning at 5 weeks. Ankle circles are recommended to help restore ROM. Patients may also begin scar mobilization at the site of surgical incision through gentle pressure. Again, it is extremely important to emphasize to patients not to dorsiflex past neutral during any exercise until week 7.

Phase III—Advancing ROM and Strengthening (7-8 Weeks)

The goal of this phase is to achieve full passive and active ROM while initiating strengthening and stretching movements. At 7 weeks following surgery, patients may begin gentle stretching exercises of the hamstrings. Gastrocnemius and soleus stretches are delayed, as in the senior author's experience, overstretching—rather than tightness—of the repair is the problem to be avoided. During this phase, patients are still expected to be in the boot; however, most patients should be down to 1 wedge at 7 weeks and no wedges at 8 weeks. Patients may begin strengthening exercises of the ankle in all 4 directions using a TheraBand for graduated resistance and