ACHILLES TENDON REPAIR PROTOCOL

Phase 1 – Maximum Protection Phase (0-2 weeks)

Goals for Phase 1

- Protect integrity of repair
- Minimize effusion
- ROM per guidelines
- Patient education

Precautions

- No ankle PROM/AROM

Weightbearing/Gait

- Non-weightbearing for 2 weeks
- Utilize most appropriate assistive device(s) (2WW, crutches, knee scooter, wheelchair, shower chair, etc)

Boot

- **0-8 weeks:** Walking boot to be worn at all times
- Gastrocnemius release: patient must wear the boot while sleeping

Range of Motion

- No ankle AROM/PROM
- Immobilization in post-op boot

Manual Therapy

- Manual soft tissue techniques for lower extremity musculature
- Educate and initiate desensitization techniques as needed

Strengthening

- Quadriceps, glute, and hamstring isometrics
- Hip strengthening (i.e. multi-plane OKC exercises)
- Upper body cardio and strengthening

Modalities

- Vasopneumatic compression for edema management: 2-3x per week for 20 min
- Cryotherapy: 3x per day for 20 minutes with the ankle elevated above the heart

Phase 2 – Passive/Active Range of Motion Phase (2-6 weeks)

Goals for Phase 2

- Begin Physical Therapy
- Protect integrity of repair
- Minimize swelling
- Gentle early ROM
- Scar tissue mobility

Precautions

- ROM guidelines
- No kicking in pool for 10 weeks
- Avoid twisting and pivoting for 12 weeks
- Avoidance of impact activity for 12 weeks

Weightbearing/Gait

- Slowly progress to WBAT in boot: increase weight percentage by 25% every 3-4 days as pain and swelling are controlled
- NWB when not wearing walking boot (bathing, dressing, etc.)
- Decrease level of assistive device needed as appropriate

Boot

- **0-8 weeks:** Walking boot to be worn at all times
- Gastrocnemius release: patient must wear the boot while sleeping

Range of Motion

- **2-4 weeks:** DF limited to 0° AROM; PF PROM only, not limited
- **4-6 weeks:** DF limited to 0° AROM; PF AROM to 5° knee extended, 10° knee flexed

Manual Therapy

- Scar mobilization when incisions are healed
- Manual soft tissue techniques for lower extremity musculature
- Joint mobilizations: Grade I-II talocrural joint
- Continue with desensitization as needed
- Utilize kinesiology tape application for edema reduction

Strengthening

- Stationary bike in boot
- Submaximal isometrics: inversion, eversion, DF
- Foot intrinsic strengthening (towel scrunches, marble pick-ups, great and lesser toe extension, arch lifts, etc.)
- Proximal LE strengthening (continue OKC exercises), core stabilization
- Upper body cardio and strengthening

Aquatics

- Initiate aquatic therapy program when incisions are closed (no kicking)

Modalities

- Vasopneumatic compression for edema management: 2-3x per week for 20 min
- Cryotherapy, 3x per day for 20 minutes with the ankle elevated above the heart
- Initiate blood flow restriction for proximal strengthening

Phase 3 – Progressive Stretching and Early Strengthening (6-8 weeks)

Goals for Phase 3

- Protect integrity of repair
- Gentle progression of ROM
- Gentle strengthening of ankle/calf musculature

Precautions

- No kicking in pool for 10 weeks
- Avoid twisting and pivoting for 12 weeks
- Avoidance of impact activity for 12 weeks

Weightbearing/Gait

- WBAT in boot
- Patient will have heel wedges if it was a traumatic rupture. Decrease 1 heel wedge per week.
- NWB when not wearing walking boot (bathing, dressing, etc.)

Boot

- **0-8 weeks:** Walking boot to be worn at all times, can remove for sleeping

Range of Motion

- **6-8 weeks:** DF AROM 10° knee extended, 20° knee flexed; PF no limitations

Manual Therapy

- Scar mobilization when incisions are healed
- Manual soft tissue techniques for lower extremity musculature
- Joint mobilizations: Grade I-IV talocrural joint
- Begin light gastroc/soleus stretching in non-weightbearing
- Continue with desensitization as needed
- Utilize kinesiology tape application for edema reduction

Strengthening

- Stationary bike in boot
- Submaximal isometrics: PF
- Begin resisted dorsiflexion, inversion, and eversion strengthening
- Foot intrinsic strengthening (towel scrunches, marble pick-ups, great and lesser toe extension, arch lifts, etc.)
- Proximal LE strengthening (OKC and CKC), core stabilization
- Upper body cardio and strengthening

Aquatics

- Continue aquatic therapy program (no kicking)

Modalities

- Vasopneumatic compression for edema management: 2-3x per week for 20 min
- Cryotherapy, 3x per day for 20 minutes with the ankle elevated above the heart
- Continue blood flow restriction for proximal strengthening

Phase 4 – Terminal Stretching and Progressive Strengthening (8-12 weeks)

Goals for Phase 4

- Gradually wean out of the boot over a 7–10-day period
- Normalize gait

Precautions

- No kicking in pool for 10 weeks
- Avoid twisting and pivoting for 12 weeks
- Avoidance of impact activity for 12 weeks

Weightbearing/Gait

- WBAT
- Normalize gait pattern

Boot/Brace

- Transition out of boot into ASO

Range of Motion

- Progress into full AROM: DF and PF
- Progress gastroc/soleus stretching to weightbearing

Manual Therapy

- Scar mobilization
- Ankle and foot joint mobilizations: Grade I-IV
- Continue with desensitization as needed
- Utilize kinesiology tape application for edema reduction

Strengthening

- **8-10 weeks:**
  - Cardio: stationary bike, elliptical
  - Initiate standing gastroc and soleus strengthening progression, double leg
  - Continue with LE OKC and CKC strengthening interventions (functional movements: squats, lunges)
- **10-12 weeks:**
  - Cardio: stationary bike, elliptical, treadmill, swimming
  - Progress gastrocnemius/soleus strengthening to eccentric
  - Advance ankle PF strengthening to single leg as tolerated
  - LE functional, multidirectional exercises

Neuromuscular Control

- Static to dynamic balance progression, double leg to single leg

Modalities

- Cryotherapy after activity
- Initiate blood flow restriction for specific ankle strengthening

Phase 5 – Progressive Strengthening and Return to Function (3-6 months)

Goals for Phase 5

- Return to function/sport
- Transition to work conditioning program if appropriate

Weightbearing/Gait

- WBAT

Brace

- Transition out of ASO
- May continue to need ASO for safe return to sport/activity

Range of Motion

- Full ankle AROM

Manual Therapy

- Ankle and foot joint mobilizations: Grade I-IV
- Can incorporate dry needling as needed for pain control and improving muscular restriction

Strengthening

- Continue to increase intensity with progressive resisted exercises
- Increase intensity with cardiovascular program; may begin biking outdoors
- Continue unilateral strengthening program (single leg calf raises, single leg squats, eccentric leg press, step up progression, multi-directional lunges)
- Core strengthening
- Initiate impact activities
    - **12+ weeks:** Initiate impact exercise, sub-maximal bodyweight progressing to maximal (pool, GTS, plyo-press, Alter G), sagittal plane jogging only
    - **14+ weeks:** multi-directional agility drills, cutting, pivoting, and plyometrics

Aquatics

- Begin pool running program progressing as tolerated to dry land running

Neuromuscular Control

- Advanced proprioception on unstable surfaces with perturbations and/or dual tasking, add sport specific balance tasks as able

Modalities

- Cryotherapy after activity

Return to Function Testing (6 months)

- Follow up examination with the physician for return to sport
- Return to function testing: per MD approval. Criteria: pain-free, full ROM, minimal joint effusion, 5/5 MMT strength, jump/hop testing 90% compared to uninvolved, adequate ankle control with sport and/or work specific tasks

References:

1) Amendola F, Barbasse L, Carbonaro R, Alessandri-Bonetti M, Cottone G, Riccio M, De Francesco F, Vaienti L, Serror K. The Acute Achilles Tendon Rupture: An Evidence-Based Approach from the Diagnosis to the Treatment. Medicina (Kaunas). 2022 Sep 1;58(9):1195. doi: 10.3390/medicina58091195. PMID: 36143872; PMCID: PMC9500605.
2) Bevoni, R. et al. Long term results of acute Achilles repair with triple-bundle technique and early rehabilitation protocol. Injury, Int J. Care Injured. 2014; 45:1268-1274.
3) Brumann, Mareen. Accelerated rehabilitation following Achilles tendon repair after acute rupture – Development of an evidence-based treatment protocol. Injury. 2014; 1-9.
4) Chiodo CP, Glazebrook M, Bluman EM, Cohen BE, Femino JE, Giza E, Watters WC 3rd, Goldberg MJ, Keith M, Haralson RH 3rd, Turkelson CM, Wies JL, Hitchcock K, Raymond L, Anderson S, Boyer K, Sluka P; American Academy of Orthopaedic Surgeons. American Academy of Orthopaedic Surgeons clinical practice guideline on treatment of Achilles tendon rupture. J Bone Joint Surg Am. 2010 Oct 20;92(14):2466-8. PMID: 20962199.
5) Doral, Mahmut Nedim. What is the effect of the early weight-bearing mobilization without using any support after endoscopy-assisted Achilles tendon. Knee Surg Sports Traumatol Arthrosc. 2013; 21: 1378-1384.
6) Groetelaers, Rene P.T.G.C. et al. Functional Treatment or Cast Immobilization After Minimally Invasive Repair of an Acute Achilles Tendon Rupture: Prospective Randomized Trial. Foot & Ankle International. September 2014; 35(8) 771-778.
7) Huang J, Wang C, Ma X, Wang X, Zhang C, Chen L. Rehabilitation regimen after surgical treatment of acute Achilles tendon ruptures: a systematic review with meta-analysis. Am J Sports Med. 2015 Apr;43(4):1008-16. doi: 10.1177/0363546514531014. Epub 2014 May 2. PMID: 24793572.
8) Kearney, Rebecca S. et al. A systematic review of patient-reported outcome measures used to assess Achilles tendon rupture management: What's being used and should we be using it? Br J Sports Med. 2012; 46:1102-1109.
9) King CM, Vartivarian M. Achilles Tendon Rupture Repair: Simple to Complex. Clin Podiatr Med Surg. 2023 Jan;40(1):75-96. doi: 10.1016/j.cpm.2022.07.006. Epub 2022 Oct 19. PMID: 36368849.
10) Majewski, M. et al. Postoperative rehabilitation after percutaneous Achilles tendon repair: Early functional therapy versus cast immobilization. Disability and Rehabilitation. 2008; 30(20-22):1726-1732.
11) Olsson, Nicklas, et al. Predictors of Clinical Outcomes After Acute Achilles Tendon Ruptures. The American Journal of Sports Medicine. 2014; 42(6)1448-1455.
12) Porter, Mark D. et al. Randomized controlled trial of accelerated rehabilitation versus standard protocol following surgical repair of ruptured Achilles tendon. ANZ J Surg. 2014; 1-5.
13) Suchak, Amar A. et al. Postoperative Rehabilitation Protocols for Achilles Tendon Ruptures. Clinical Orthopedics and Related Research. April 2006; 445:216-221.
14) Yow BG, Tennent DJ, Dowd TC, Loenneke JP, Owens JG. Blood Flow Restriction Training After Achilles Tendon Rupture. J Foot Ankle Surg. 2018 May-Jun;57(3):635-638. doi: 10.1053/j.jfas.2017.11.008. Epub 2018 Feb 21. PMID: 29477554.

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