

Physical Therapy Guideline for Achilles Rupture Repair

For the Clinician: The intent of this protocol is to provide the clinician with a guideline of the post-operative rehabilitation for the patients who undergo an Achilles Rupture Repair. It is not intended to be a substitute for clinical decision making regarding the progression of a patient's post-operative course based on their examination/findings, individual progress, and/or the presence of post-operative complications. If a clinician requires assistance in the progression of a post-operative patient, they should consult with the referring surgeon.

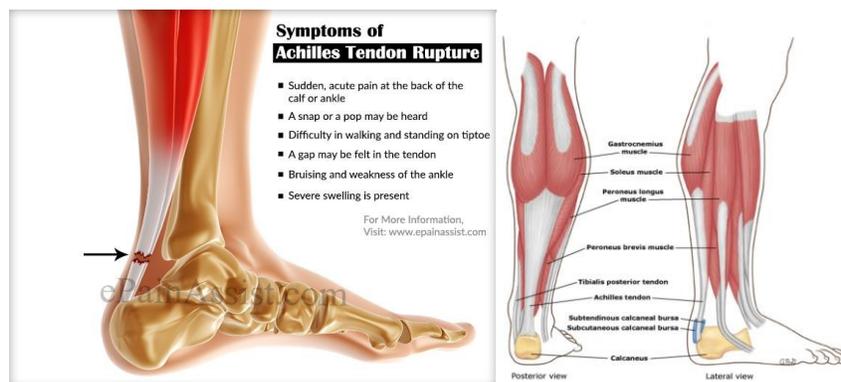
For the Patient: The timeframes for expected outcomes contained within this guideline may vary from patient to patient based on individual differences, surgical techniques, surgeon's preference, additional procedures performed, and/or complications. Compliance with all the recommendations provided by your physician and physical therapist as well as your active participation in all parts of the rehabilitation process, are essential to optimizing the success of this procedure.

Introduction:

The Achilles tendon connects the calf muscle, composed of the gastrocnemius and soleus muscle, to the heel bone. It has the largest cross-sectional area of any tendon in the body, providing approximately 60% of the lower leg push off strength. For this reason, when the Achilles tendon is ruptured, there is a drastic loss of strength and difficulty with activities such as walking and running.

Achilles tendon ruptures commonly occur in active and or athletic individuals between the age of 30-50, though other age groups also can be affected, and often occur while performing activities that require rapid acceleration or change in direction. Potential contributors can be high participation in explosive sports, calf and ankle stiffness or pre-existing tendinitis. Certain antibiotics (fluoroquinolones) can also contribute, though this is much less common.

Clinically patients will often present with sudden pain, inability to fully bear weight on the affected leg, and weakness in the affected ankle. On exam of the ankle a profound gap in the tendon, often approximately 2-4cm above the heel bone, may be present. The Thompson test, which is typically positive with an acute Achilles rupture, is a clinical test performed while affected patients lie on their stomachs. The calf muscle is squeezed and, if there is a rupture of the Achilles tendon, the foot will not plantarflex (push downwards). This is the most sensitive clinical exam finding for diagnosing a rupture.



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Treatment:

Acute Achilles tendon ruptures can be treated both with and without surgery, each with its own risks and benefits. Historically the tradeoffs were between a much higher rate of re-rupture of the tendon with nonoperative management (approximately 1 in 7 patients) versus the risk of wound complication with surgery. More recent literature suggests that patients undergoing nonoperative management can effectively decrease with their re-rupture rate with a more proactive functional rehabilitation protocol. Some studies suggest that this rate may now be similar among operative and non-operative patients (3-4%), but others still underscore a somewhat higher re-rupture rate with non-operative management. The benefit of surgery may be higher long-term calf strength, though even this is debated in various studies.

Non-operative Treatment:

Non-operative management with functional rehabilitation protocols typically includes a brief, two-week period of immobilization of the foot in a pointed (plantarflexed) position in a splint, followed by a transition to an Achilles boot with multiple wedges keeping the foot pointing downwards. Progressively, gentle motion is allowed with progressive weight bearing, though different providers and protocols vary in how quickly they allow both weight bearing and elevation of the toes upwards. The goal is to allow the tendon to heal and gradually pull the calf downwards, all the while limiting any stretching of the healing tendon itself.

Operative Treatment:

Surgical treatment of the Achilles tendon typically involved making an incision, opening up the skin and identifying both ends of the torn tendon. Once identified, the two ends are approximated and sutured together to restore continuity of the tendon. Patients are similarly placed in a splint and subsequently an Achilles boot with heel lifts with progressive advancement of weight bearing and motion. Again, protocols vary among providers but, similar to nonoperative management, the goal is to allow the tendon to heal and gradually pull the calf downwards, while limiting stretching of the healing tendon itself.

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Phase	Restrictions and Precautions	Physical Therapy Treatment	Goals
Pre-operative		<ul style="list-style-type: none"> -Instruct with use of assistive device based on gait assessment, non-weight bearing (NWB) on affected side 	<ul style="list-style-type: none"> -Demonstrate safe ambulation with assistive device NWB -Able to maintain NWB with transfers and stairs
Stage 1 0-2 weeks	<ul style="list-style-type: none"> -Non-weight-bearing (NWB) in splint at all times 	<ul style="list-style-type: none"> -Edema management -Gait training and safety (emphasize precautions with weight bearing) -Education/modifications for ADLs 	<ul style="list-style-type: none"> -Manage swelling -Demonstrate safe ambulation with assistive device NWB -Able to maintain NWB with transfers and stairs -Perform activities of daily living (ADLs) in a modified independent manner or with minimal assistance
Stage 2 2-4 weeks	<ul style="list-style-type: none"> -Non-weight bearing (NWB) with assistive device in Achilles boot or controlled ankle motion (CAM) boot with three (1 inch) heel wedges -No active or passive dorsiflexion (DF) past 5 degrees below neutral 	<ul style="list-style-type: none"> -Exercises and hands-on techniques (by the PT) for foot and ankle range of motion into plantar flexion (PF), dorsiflexion (DF) to 5 degrees below neutral only, inversion/eversion performed in no more than 5 degrees below neutral dorsiflexion -Modalities and patient education to control swelling -Once incision healed, scar mobilization/massage -Open chain strengthening for core, hips, knees (maintain precautions) in boot -NWB fitness/cardiovascular exercises (i.e. bicycle with one leg) 	<ul style="list-style-type: none"> -Manage swelling -Increase range of motion of foot and ankle while maintaining DF precautions -Minimize the loss of strength in the core, hips, and knees -Independence with home exercise program to be performed daily

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Stage 3 4-8 weeks	<p>-Begin partial progressive weight bearing with assistive device and Achilles boot with three (1 inch) heel wedges; slowly increase weight bearing by 25-50 lbs every week until full weight bearing through the involved limb</p> <p>-As dorsiflexion ROM improves, progress to only two (1 inch) heel wedges when able to get heel down in boot comfortably with partial progressive weight bearing (usually by post-op week 6)</p> <p>-Utilize “Even Up” shoe leveler to be placed on shoe of uninvolved side to level shoe with boot height (unless pre-existing balance deficits)</p> <p>-No active or passive dorsiflexion past neutral (0 degrees) until 6 weeks post-op</p>	<p>-Continue ankle A/PROM exercises and hands-on techniques. At 4 weeks, progress to DF to neutral (0 degrees). At 6 weeks, may allow DF past neutral.</p> <p>-NWB stretching of proximal lower extremity muscles (not calf)</p> <p>-Foot/ankle strengthening exercises – maintain precautions</p> <p>-Joint mobilization techniques by the PT to restore motion of the foot and ankle</p> <p>-Gait training to ensure safety and to normalize pattern with assistive device and “Even Up”</p> <p>-Activity progression per PT guidance</p> <p>-Fitness/cardiovascular – progress to stationary bike or Nu-step with both legs (in boot)</p>	<p>-Full range of motion foot and ankle in all planes (except DF must remain below neutral until 6 weeks post-op)</p> <p>-Restore proximal strength/control of the core, hip and knee where applicable</p> <p>-Full weight bearing in Achilles boot with two (inch heel wedges) without assistive device by post-op week 8</p>
Stage 4 8-12 weeks	<p>-At 8-10 weeks: Remove one heel wedge from the boot so that there is only one wedge remaining in boot.</p> <p>-At 10-12 weeks: Remove final heel wedge from the boot.</p> <p>-Continue to wear the boot with wedge(s) until 12 weeks post-operatively for community ambulation</p> <p>-No weight bearing stretching of gastrocnemius or soleus to avoid overlengthening of the tendon</p> <p>-May begin stationary bike in sneaker with heel lift – no outdoor cycling</p>	<p>-Gait training to wean off the assistive devices and normalize gait in the boot</p> <p>-Functional activities, closed kinetic chain exercises in boot with heel lifts and “Even Up” once WBAT in boot without assistive device</p> <p>-At 8-10 weeks: Begin weight shifting in sneaker with heel lift (1 cm) supervised in clinic and as part of home exercise program (<i>may still be ambulating with boot in the community</i>)</p> <p>-Progress to bilateral weight bearing and single leg exercises in sneaker with heel lift (1 cm) supervised in clinic and as part of home exercise program (<i>may still be ambulating with boot in the community</i>)</p>	<p>-Full DF active range of motion</p> <p>-Full strength of lower extremity muscles (except calf)</p> <p>-Gradually return to regular functional activities (except sports and weight bearing fitness activities) if ROM, strength, and gait goals have been met</p> <p>-Improved gait pattern on all surfaces in boot without heel wedges without assistive device</p>

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Stage 5 12-14 weeks	<ul style="list-style-type: none"> -If not yet out of boot for community ambulation, wean out of the boot to a sneaker with heel lift (1 cm) -Once gait normalized, wean remaining heel lift from sneaker per patient tolerance -Avoid high impact/pivoting – no running -No weight bearing stretching of gastrocnemius or soleus 	<ul style="list-style-type: none"> -Once single leg closed chain activities are mastered in sneaker, progress to varying surfaces -Fitness/Cardiovascular exercises to include the addition of the following as tolerated: e.g. elliptical, walking on treadmill, Stairmaster -Advance functional training to include sports specific movement patterns 	<ul style="list-style-type: none"> -Normalize gait pattern in sneakers with one heel lift (1 cm) -Full strength and motor control of bilateral lower extremities -Good balance and proprioception of bilateral lower extremities -Gradual return to minimal or low impact sports (cycling, rowing, swimming, Stairmaster, elliptical)
Stage 6 14-24+ weeks	<ul style="list-style-type: none"> -No running or pivoting until 6 months post-operative/non-operative 	<ul style="list-style-type: none"> -Begin bilateral plyometric progression and progress to unilateral plyometrics -Sport specific training and conditioning (progress to high impact if applicable as tolerated once cleared by surgeon) 	<ul style="list-style-type: none"> -Ambulating with normal gait pattern in sneakers without heel lift -Gradual return to activities with multi-planar movements on uneven outdoor surfaces (hiking) -At 6 months: Gradual return to high impact sports that include jogging, running, and jumping once cleared by surgeon and lower extremity functional testing for return to sports is at least 90% of the uninvolved side

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If you have any questions or concerns related to the content of these rehabilitation guidelines, please contact:

MGH Physical and Occupational Therapy Services (Mass General Waltham)

781-487-3800

Website: <http://www.massgeneral.org/physical-therapy/>

MGH Orthopedics Foot and Ankle

617-724-9338

Website: <http://www.massgeneral.org/ortho-foot-ankle/>

References:

Chiodo, Christopher P., MD et al. "American Academy of Orthopedic Surgeons Clinical Practice Guideline on Treatment of Achilles Tendon Rupture." *JBS*. Volume 92, Issue 14 October 2010: 2466-2468.

Post-Operative/Non-Operative Achilles Rupture Protocol - Dr. Christopher DiGiovanni, MD

Achilles Tendon Rupture Rehabilitation Protocol - Dr. Daniel Guss, MD, MBA

www.Footeducation.com

www.massgeneral.org/ortho-foot-ankle/conditions-treatments/achilles-tendon

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