

ACHILLES TENDON RUPTURE

ANATOMY

The **Achilles tendon** is a strong tendon that connects the calf muscles to the heel. The calf is formed by two muscles: the underlying **soleus muscle** and the thick outer **gastrocnemius muscle**. When they contract, they pull on the Achilles tendon causing your foot to point down (plantar flexion) and helping you raise up on your toes. This powerful muscle group helps when you sprint, jump, or climb.

With aging and overuse, the Achilles tendon is subject to **degeneration** within the substance of the tendon. The term degeneration means that wear and tear occurs in the tendon over time and leads to a weakening of the tendon. Degeneration in a tendon usually shows up as a loss of the normal arrangement of the fibers of the tendon. Tendons are made up of strands of a material called **collagen** (think of a tendon as similar to a nylon rope with the strands of collagen being the nylon strands). Some of the individual strands of the tendon become jumbled due to the degeneration, other fibers break, and the tendon loses strength. The healing process in the tendon can cause the tendon to become thickened as scar tissue tries to repair the tendon. This process can continue to the extent that a **nodule** forms within the tendon. This condition is called **tendinosis**. The area of tendinosis in the tendon is weaker than normal tendon and is usually painful.

Spontaneous rupture of the Achilles tendon can occur in patients in their third to fifth decade. Rupture is more common in men than women and most injuries occur during sporting activities. The most common mechanism of injury is pushing off forcefully such as in tennis, squash, racquetball and basketball.

When the Achilles tendon ruptures, the person often hears a "pop" or "snap" at the time of injury and feels a sudden pain in the region of the Achilles tendon. However, the pain subsides quickly. There is weakness when trying to stand on tip-toes. A defect or gap in the Achilles tendon can usually be felt.

DIAGNOSTIC IMAGING

X-rays are useful to rule out fractures, but are of limited value to diagnose Achilles tendon ruptures. Although MRI will show the ruptured tendon, it is usually not necessary to obtain an MRI because the diagnosis is obvious to examination.



TREATMENT OPTIONS

Non- surgical Treatment

If the foot and ankle are immobilized in a cast with the toes pointing down for at least 8 weeks the torn Achilles tendon can heal. Non-surgical treatment avoids potential complications associated with surgery, such as infections and wound breakdown. However, there is a higher re-rupture rate with cast treatment, there is less pushing-off strength and less endurance when compared to tendons that have been surgically repaired.

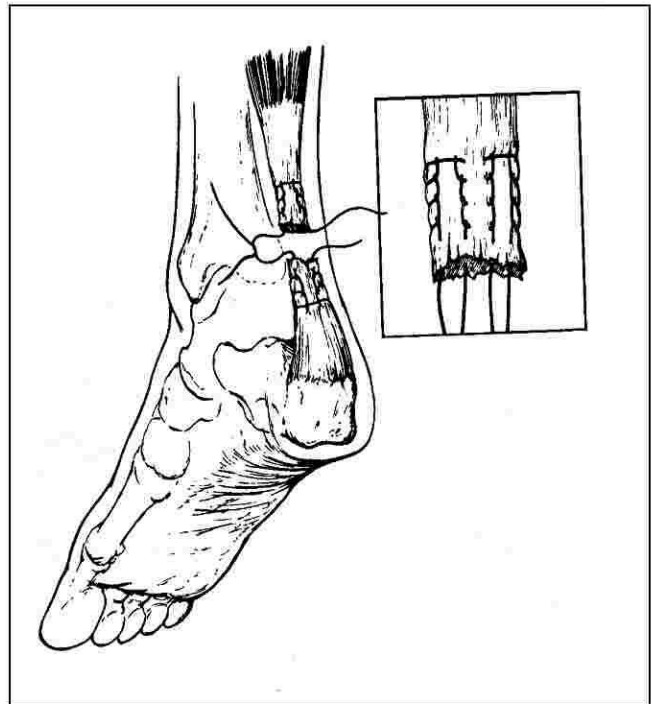
Surgical Treatment

Surgical repair of Achilles tendon ruptures consists of sewing together the torn ends. Sometimes, if the injury is chronic or the tissue is poor, local tissue such as tendon grafts or fascia can be used to reinforce the repair.

A major advantage of early repair is that early range of motion out of cast can be allowed.

Surgical repair of the Achilles tendon offers a lower re-rupture rate (0-4%), a greater chance of returning to sports, greater strength, and more endurance. However wound complications such as wound breakdown or infection can occur and can be very serious.

Post operative rehabilitation consists of a cast for two weeks, then a removable cast-boot for about 12 weeks after surgery. It usually takes six months after surgery before sports activities can be resumed.



ACHILLES TENDON REPAIR SURGERY REHABILITATION PROTOCOL

PREOPERATIVE INSTRUCTIONS

Here are guidelines that will help you in preparing for surgery to repair your Achilles tendon:

WITHIN ONE MONTH BEFORE SURGERY:

The doctor will see you in the office. The doctor or his associate will do a preoperative history and physical examination and complete the necessary paperwork. He will write preoperative hospital orders and order laboratory tests. These tests usually include a complete blood count (and also electrocardiogram for patients over 40 years old.)

SEVERAL DAYS BEFORE SURGERY:

Wash the leg and ankle several times a day to get it as clean as you can. This decreases the risk of infection. Be careful not to get any scratches, cuts, sunburn, poison ivy, etc. The skin has to be in very good shape to prevent problems. You do not need to shave the leg.

THE DAY BEFORE SURGERY:

Please contact the doctor's office to get the exact time you should report to the hospital for surgery. You can have nothing to eat or drink after midnight on the evening before surgery. It is very important to have a completely empty stomach prior to surgery for anesthesia safety reasons. If you have to take medication, you can take the medication with a sip of water early in the morning prior to surgery (but later tell the anesthesiologist you have done so).

THE DAY OF SURGERY:

Surgery is performed in the Wang building at MGH and at the Orthopedic Ambulatory Surgery Center at Mass General West in Waltham.

- For surgery at MGH main campus in Boston: Report directly to the **Surgical Day Care Unit** on the third floor of the **Wang Ambulatory Care Building** at Massachusetts General Hospital two hours prior to surgery.
- For surgery at the surgery center at MGH West in Waltham: Report directly to the **Ambulatory Surgery Center** on the second floor of Mass General West.

ACHILLES TENDON REPAIR SURGERY POST OPERATIVE INSTRUCTIONS

PHASE ONE: The first week after surgery

SURGERY:

After anesthesia has been given, your leg will be cleaned and sterile drapes will be placed. A small incision will be made over the Achilles tendon. The ruptured tendon is identified and exposed. The ruptured ends of the tendon are brought together with sutures to achieve a secure repair. Sometimes a small tendon in the leg is also used to reinforce the Achilles tendon repair. The skin is closed with sutures and the foot is immobilized in a cast.

AFTER SURGERY:

You will be given a prescription for **pain medication** to take home with you (usually Percocet, Vicadin, or Tylenol with codeine). The pain medication has a tendency to make you constipated and occasionally can cause nausea.

In addition to this medication you should take one aspirin a day to help prevent blood clots (phlebitis).

CAST/CRUTCHES

You will go home with a cast on your leg and foot. As much as possible, keep your foot elevated higher than your heart and move the toes up and down often to help control swelling. Use the crutches when you walk, but do not bear weight on your operated leg.

OFFICE VISIT

Please make an appointment to see the doctor in the office one week after surgery. At that time your cast and sutures will be examined. The doctor will give you further instructions at that time.

ACHILLES TENDON REPAIR SURGERY REHABILITATION PROTOCOL

PHASE TWO: Weeks 4 through 8 after surgery

Goals

1. Protect the repaired tendon
2. Decrease swelling
3. Start early gentle range of motion exercises
4. Begin weight bearing with the cast-boot when walking

ACTIVITIES

1. Achilles Boot (brace)

You will be fitted with a removable ankle brace that has rubber wedges under the heel to elevate your heel. This keeps your foot in a toe-down position. You can bear full weight on the operated leg as long as you are wearing the brace and feel pressure on your heel when you walk. Your weight should be borne through the heel and not the toes. You can remove the brace to shower or bathe and to move the foot and ankle.

2. Crutches

You can discontinue using the crutches over the next one to two weeks. Progress from using two crutches to using one crutch on the side opposite your surgery. If you feel comfortable doing so, you can progress to walking with only the support of the brace if you are pain free and you are bearing weight through your heel.

3. Swelling

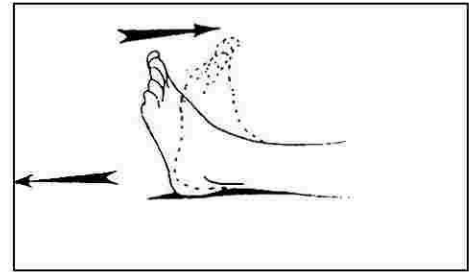
As often as you can, elevate your leg higher than your heart to control swelling in your foot and leg. If the foot and toes are swollen, you must elevate for longer periods of time. Use elastic stockings to lessen leg swelling.

4. Exercises

You may do exercises for your upper body and uninvolved leg. Exercises can be done for the operated leg as directed in the following section. When doing the ankle motion exercises with the brace removed, move the ankle and foot gently to avoid excessive stress at the surgery site. Gentle motion can promote healing, but aggressive motion can disrupt the surgical repair.

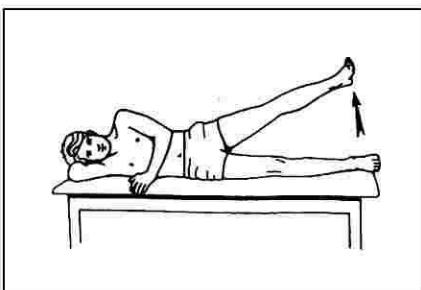
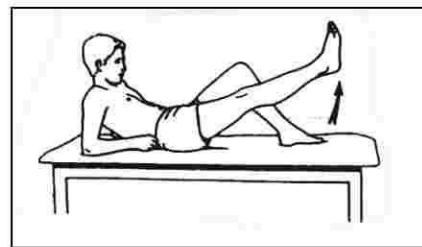
Exercise Program

Ankle flexion-extension - Remove the brace.
Gently move the foot in an up and down motion. Do not try to force motion through pain, but move the foot up and down through the range of motion that is pain free. Repeat 20 times, three times a day.



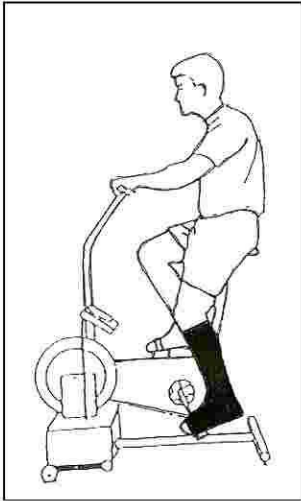
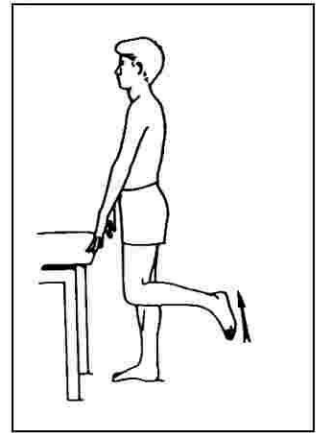
Ankle circles - Remove the brace.
Move the foot so that you are making a circular motion. Make 10 circles to the left and 10 circles to the right, three times a day.

Straight leg lift - **With the brace on**, tighten the quadriceps muscles so that the knee is flat, straight and fully extended.
Try to raise the entire leg up off the floor or bed. If you are able to do so keeping the knee straight, raise the leg to about 45 degrees, pause one second and then lower slowly.
Repeat 20 times, twice a day.



Hip Abduction - **With the brace on**, lie on your unoperated side. Keeping the knee fully extended, raise the operated limb upward to a 45 degree angle as illustrated. Hold one second, then lower slowly.
Repeat 20 times, twice a day

Standing Hamstring curl - With the brace on, stand facing a table which you will use for balance and support. While standing on the unoperated leg bend the knee of the operated side and raise the heel toward the buttock. Hold this flexed position for one second. Slowly lower the foot back to the floor. Keep the thighs aligned as illustrated. Repeat 20 times.



Stationary Cycle - With the brace on, you may ride a stationary bicycle for 10 to 20 minutes a day if you wish.

Office Visit

Please make an appointment to see your doctor eight weeks after surgery. Please call **617-726-7500** if you have questions.

ACHILLES TENDON REPAIR SURGERY REHABILITATION PROTOCOL

PHASE THREE: Weeks 8 through 12 after surgery

Goals

1. Protect the repaired tendon
2. Decrease swelling
3. Start strengthening exercises
4. Continue full weight bearing using the brace when walking

ACTIVITIES

1. Achilles boot (brace)

Continue to wear the brace, but the heel lift that keeps your foot in a toe-down position can be lowered. You can bear full weight on the operated leg as long as you are wearing the brace. You should feel that your weight is being borne through the heel and not the toes. You can remove the cast-boot to shower or bathe and to practice range of motion exercises.

2. Swelling

If the leg is swollen, continue to elevate your leg higher than your heart. Use elastic stockings to lessen swelling

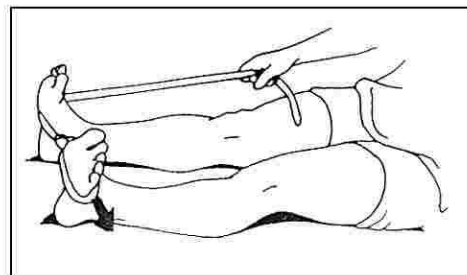
3. Exercises

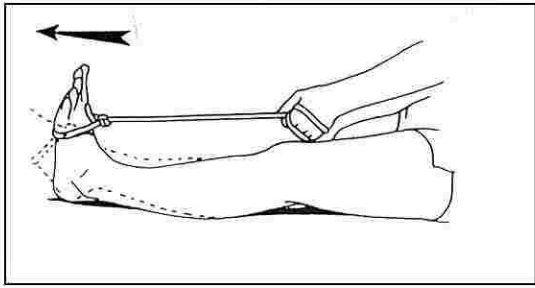
You may do exercises for your upper body and uninvolved leg. Continue to do the exercises outlined in earlier phases on a daily basis. All exercises should be done without pain or excessive stretch at the surgery site. The following Theraband exercises can be added, once a day, as instructed by your doctor or the physical therapist.

Theraband Exercise Program (start using yellow theraband and progress to red in 2 weeks)

Ankle Eversion

With tubing anchored around uninvolved foot, slowly turn injured foot outward. Repeat 30 times.



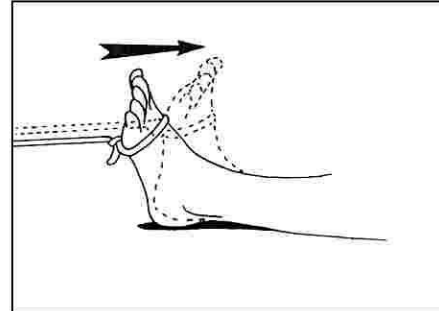
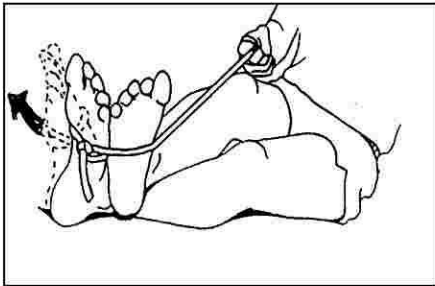


Ankle Plantar Flexion

With tubing around foot, press foot down. Repeat 30 times. This is the most important of the exercises.

Ankle Dorsiflexion

With tubing anchored on solid object, pull foot toward you knee. Repeat 30 times.



Ankle Inversion

Cross legs with the operated foot underneath. With tubing anchored around uninvolved foot, slowly turn injured foot inward. Repeat 30 times.

Office Visit

Please make an appointment to see your doctor in 6 weeks (about twelve weeks after surgery). Please call 617-726-7500 if you have questions.

ACHILLES TENDON REPAIR SURGERY REHABILITATION PROTOCOL

PHASE FOUR: Weeks 12 through 24 after surgery

Goals

1. Protect the repaired tendon
2. Add strengthening exercises
3. Use a heel lift when walking
4. Begin walking normally

ACTIVITIES

1. Discontinue Achilles Boot (brace)

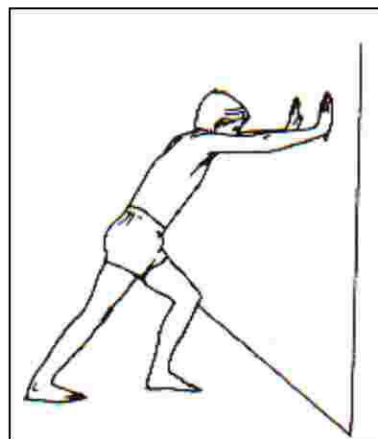
Insert one of the rubber wedges from inside the brace into your shoe to elevate the heel. After using the heel lift in your shoe for approximately one month, you may remove the lift from your shoe if you are walking normally (without a limp).

2. Exercises

You may do exercises for your upper body and uninvolved leg. The theraband exercises should be done every other day. You can progress to red theraband for one month, then progress to blue theraband after that. The exercises from Phase One can be done every other day and ankle weights can be added to increase resistance. The following exercises can be added, every other day, as instructed by your doctor or the physical therapist.

Calf Stretch

Keeping the rear (injured) leg straight, with the heel and foot flat on the floor, lean into wall until a stretch is felt in the calf. **Do not** stretch excessively. Hold 15 to 20 seconds. Repeat 3 to 5 times.





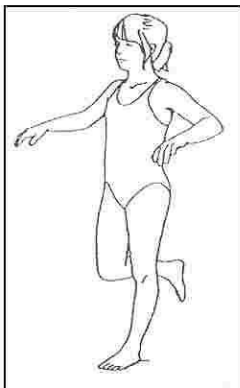
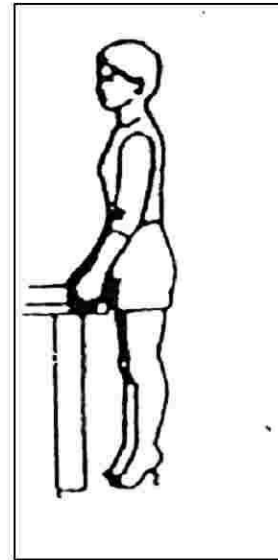
Dorsiflexion Stretch

Standing with both knees bent and the injured foot forward, gently lean forward, bending the injured knee over the ankle while keeping the heel and foot flat on the floor. This stretch will be felt in the ankle close to the heel or in the front of the ankle. Do not over-stretch! Hold 15 to 20 seconds, Repeat 3 to 5 times.

Toe Raises

Stand facing a table, holding the table for support and balance. Keep the knees extended straight. While holding the knees fully straight, raise up on 'tip-toes' while maintaining the knees in full extension. Hold for one second, then lower slowly to the starting position. Repeat 20 to 30 times. After one month, you can raise up on *both* legs, and lower down on only the *operated* side.

At five or six months after surgery, build strength so that you can raise up *and* down on just the injured leg. See the Achilles Toe Raising Progression on the next page.



Single -Leg Balancing

Attempt to balance on the operated leg while holding the unoperated foot in the air. When you can balance easily, you can attempt to balance with eyes closed, or while someone throws you a ball. Practice this exercise for 5 minutes.

Office Visit

Please make an appointment to see your doctor in 3 months (6 months after surgery). Call MGH Sports Physical Therapy at 617-726-7500 if you have questions regarding the exercise program.

Toe Raising Progression for Achilles Tendon Repair

Phase 1

Frequency: Daily
Times per Day: 3
Repetitions: 20
Technique: Up and down on both legs together
Duration: 2-4 weeks

Phase 2

Frequency: 5 days a week, 2 days on, one day off
Times per Day: 1-2
Repetitions and Technique: Up and down on both legs together, 10 times
Up on both legs and down on the affected leg, 10 times
Up and down on both legs together, 10 times
Duration: 2 weeks

Phase 3

Frequency: 5 days a week, 2 days on, one day off
Times per Day: 1-2
Repetitions and Technique: Up and down on both legs together, 10 times
Up on both legs and down on the affected leg, 10 times, 2 sets
Up and down on both legs together, 10 times
Duration: 2 weeks

Phase 4

Frequency: 5 days a week, 2 days on, one day off
Times per Day: 1
Repetitions and Technique: Up and down on both legs together, 10 times
Up on both legs and down on the affected leg, 10 times
Up and down the affected leg only, 10 times
Up and down on both legs together, 10 times
Duration: 2 weeks

Phase 5

Frequency: 4 days a week, 2 days on, 2 days off
Times per Day: 1
Repetitions and Technique: Up and down on both legs together, 10 times
Up on both legs and down on the affected leg, 10 times
Up and down the affected leg only, 10 times, 2 sets
Up and down on both legs together, 10 times
Duration: 2 weeks

Phase 6

Frequency: 3-4 days a week, 1 day on, one day off
Times per Day: 1
Repetitions and Technique: Up and down on both legs together, 10 times
Up on both legs and down on the affected leg, 10 times
Up and down the affected leg only, 10 times, 3 sets
Up and down on both legs together, 10 times
Duration: 1 month

Phase 7

Gradual Return to sports activity

Rehabilitation after Achilles Tendon Repair Surgery

Post-op Phase	Weight bearing status	Passive ROM and Active ROM	Strength training	Return to running and sports	Recommended Restrictions
Phase One The first week after surgery	NWB Crutches	Foot and ankle casted Active ROM exercises toes knee and hip Elevate leg	Isometric Quad and knee extension, active knee flexion	None	Avoid excessive walking and standing
Phase Two Four to eight weeks after surgery	Achilles boot with heel lifts Progressive WBAT with crutches weaning to FWB and Boot	Active ROM ankle and foot Straight leg lifts Stationary bike with boot	OK for uninvolved lower limb and upper body	None	No forceful stretching Ambulate with brace on
Phase Three Eight to Twelve weeks after surgery	FWB with Boot Weaning heel lift as tolerated per MD	Active ankle and foot ROM	Initiate theraband strengthening for ankle and foot	None	No forceful stretching Ambulate with brace on
Phase Four Twelve weeks after surgery onward	FWB Wean brace or progress to shoe with heel lift(s)	Begin active calf stretching Begin toe raise progression	Weight training machines	Gradual walking if no limp. Walk jog 5 to 6 months post-op Run /agility /jump training 6 to 8 months post-op Return to sports 9 to 12 months post-op	Avoid high forces on calf and Achilles tendon