TWIN CITIES ORTHOPEDICS

ACHILLES TENDON RUPTURE

Dr. Abigail R. Hamilton, MD

ANATOMY

The Achilles tendon is a strong tendon that connects the calf muscles to the heel. Two muscles form the calf: 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 sometimes 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.

GENERAL GUIDELINES

Non- surgical Treatment

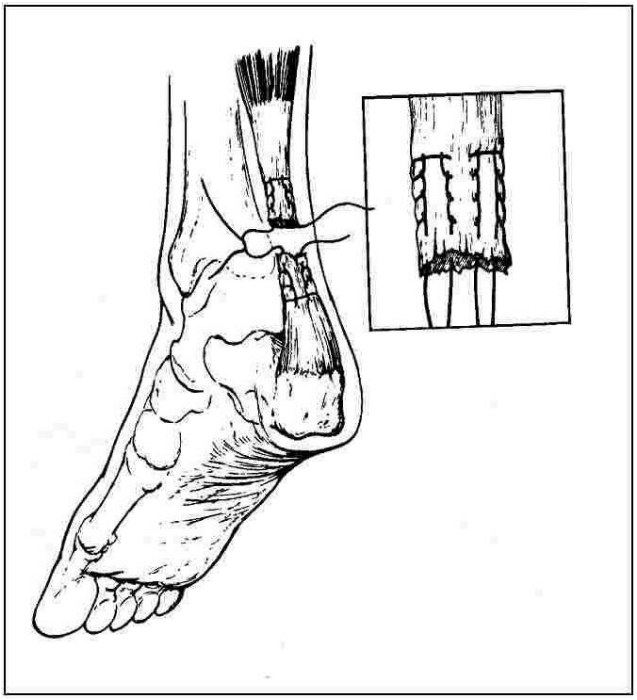
If the foot and ankle are immobilized in a cast with the toes pointing down for at least 8 weeks the torn Achilles tendon can heal. Non-surgical treatment avoids potential complications associated with surgery, such as infections and wound breakdown. However, there is a higher re-rupture rate with cast treatment, and sometimes 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 tom 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. This can be particularly problematic in patients that are diabetic.



Achilles Tendon Repair: Accelerated PT Rehabilitation Protocol

WEEK 0-2

First post-operative visit at 10-14 days for wound check for suture removal if required Treatment:
Walker brace with 3 heel pads, weight-bearing through the heel as tolerated, use of 2 crutches.
Referral to orthopedic technician for shoe heel-lift (use shoe with heel-lift on the healthy side).
Wearing the walker brace while sleeping for 6 weeks. Some patients may require casting.

Exercise program: home exercises daily wearing the walker brace

- Isometric submaximal plantar flexion (5x5 sec, once per hour)
- Toe exercises, flexion-extension (3x20 repetitions, once per hour)

AFTER 2 WEEKS

Treatment: Walker brace with 2 heel pads (take off the upper pad), full weight-bearing, use of 2 crutches if needed. Allowed to take off the walker brace for washing and aerating the foot. When the walker brace is removed, no weight-bearing or dorsal extension of the foot is allowed.
Exercise program: home exercises daily as described above (increase the intensity)
Visit to physical therapist 1- 2 times per week:

- Exercise bike wearing the walker brace
- Active range of motion (ROM) up to 15°plantar flexion without walker brace (the angle based on the heel-height)
- Active plantar flexion with lowest resistance rubber-band (ROM as above)
- Sitting heel-rise -no weight-bearing (starting position from the heel-height)
- Gait training and balance exercises with the walker brace without crutches.
- Squats (fitness ball behind the back)
- Other knee/hip-exercises with no ankle involvement

AFTER 4 WEEKS

Treatment: Walker brace with 1 heel pad (take off the upper pad), full weight-bearing
Exercise program: home exercises daily as described above (increase the intensity)

Visit to physical therapist 1-2 times per week:

- Exercise bike wearing the walker brace
- Active range of motion (ROM) up to 10°plantar flexion without walker brace
- Active plantar flexion with green rubber-band (ROM as above)
- Sitting heel-rise -with light weight (starting position from the heel-height)
- Supination- and pronation-exercises with rubber-band
- Gait training and balance exercises with the walker brace
- Squats (fitness ball behind the back)
- Other knee/hip-exercises with no ankle involvement.

AFTER 5 WEEKS

Treatment: Walker brace without heel pad, full weight-bearing
Exercise program: home exercises daily as described above (increase the intensity)
Visit to physical therapist 1-2 times per week:

- Exercise bike wearing the walker brace
- Active range of motion (ROM) up to 0° plantar flexion without walker brace
- Active plantar flexion in a cable machine (ROM as above)
- Sitting heel-rise –with weight
- Supination- and pronation--exercises in a cable machine
- Gait training and balance exercises with the walker brace
- Squats (fitness ball behind the back)
- Other knee/hip-exercises with no ankle involvement
- Leg press

AFTER 6 WEEKS

2nd Post-operative visit.
Treatment: Wean off walker brace. Use of shoes with heel-lift (bilateral) for 4 weeks, compression stocking to prevent swelling.
Exercise program: *Important that all exercises are performed slowly and carefully*
Home exercises: Active ankle exercises for ROM, ankle exercises (DE, PF, Sup, Pron) with rubber-band, balance exercises, sitting heel-rise, standing heel-rise (50% weight-bearing or less on the injured side), gait training.

Visit to physical therapist 1-2 times per week:

- Exercise bike
- Active range of motion (ROM)
- Sitting heel-rise -with weight (starting position from the shoe heel-height)

- Standing heel-rise on two legs
- Active plantar flexion in a cable machine (max 0° plantar flexion)
- Heel-rise in leg press (max 0° plantar flexion)
- Supination- and pronation -exercises in a cable machine
- Gait training
- Balance exercises
- Squats
- Step (walk slowly)
- Other knee/hip-exercises with no ankle involvement

AFTER 8 WEEKS

Treatment: Use of shoes with heel-lift until 10 weeks after surgery, compression stocking to prevent swelling.

Exercise program: *Important that all exercises are performed slowly and carefully*
Home exercises: As described above and walking 20 min per day
Visit to physical therapist 1-2 times per week:

- As described above, increase the intensity
- Sitting heel-rise -with weight (increase the load)
- Standing heel-rise on two legs - transcend gradually to one leg
- Active plantar flexion, supination and pronation in a cable machine
- Heel-rise in leg press
- Cable machine standing leg lifts
- Balance exercises (wobble-board, balance pods - weight bearing in the middle of the foot)

AFTER 13 WEEKS

3rd post-operative visit
Treatment: Use of regular shoes after 10 weeks, barefoot after 12 weeks, compression stocking to prevent swelling.

Exercise program: *Important to gradually increase the load considering the patient' s status*
Home exercise: Walking 20 min per day Visit to
physical therapist 2 times per week:

- Intensify the exercises by increasing load (as before)
- Increase the load gradually from two leg standing heel-rises to one leg standing heel-rises

both concentrically and eccentrically
- Quick rebounding heel-rises (start with two legs)
- Start with gentle jog (thick mattress, in 8's, zig-zag)
- Start with two-legged jumps and increase gradually

AFTER 14 WEEKS

Post-operative visit at 5 months

- Running outdoors, if the patient has a good technique as evaluated by the physical therapist.
- Return to sports earliest after 16 weeks (non-contact sports) and 20 weeks (contact sports)
- Possibility for the patient to be evaluated by the therapist and Dr. Hamilton at 5 months if readiness to return to sports is anticipated and clearance is needed.