

Achilles tendon ruptures—a review for primary care

The Achilles tendon is the most commonly ruptured tendon and the incidence is increasing.¹⁻³ Unfortunately, 20% to 25% of acute Achilles tendon ruptures are misdiagnosed initially.^{1,4} Diagnosis is based on history and physical examination. Use of MRI or ultrasound is not indicated unless there are equivocal physical exam findings.

Common mechanisms include pushing off with the weight-bearing foot while extending the knee; a sudden, unexpected dorsiflexion of the ankle; or violent ankle dorsiflexion of a plantar flexed foot.¹ Patients often describe feeling as if they were kicked in the back of the ankle. Some will have minimal discomfort and may be weight-bearing. They may describe a “pop” at the time of injury. Fluoroquinolone or steroid use, diabetes, or chronic renal failure can increase the risk of rupture but make small contributions to overall incidence.^{5,6}

The Thompson test is considered to be the most accurate—it is positive in 96% to 100% of acute ruptures.⁷⁻⁹ Other physical findings include a palpable tendon gap, tenderness, and possibly swelling/bruising depending on injury acuity. In the prone position with the patient’s feet off the examining table, the injured foot will hang in more dorsiflexion than the contralateral foot. The patient may be able to plantarflex and the Thompson test may result in some movement, but in both cases the injured side will be weaker and decreased compared with the uninjured side. This is due to other musculotendinous structures that pass the ankle posteriorly.

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Treatment

Treatment of Achilles tendon ruptures is currently undergoing transition. Traditional treatment involves 12 weeks of immobilization. If treated surgically, the tendon is repaired and the foot immobilized in equinus. Immobilization could be splinting followed by casting at 2 weeks, or, more recently, a cast boot with heel wedges. If treated conservatively, the foot is immobilized in equinus. Both approaches are non-weight-bearing and the foot is incrementally brought up to a neutral position over approximately 6 weeks by recasting or removing the heel. The second 6 weeks have the foot immobilized at 90 degrees. Some surgeons may opt to allow protected weight-bearing at this point. If the injury is identified and treatment started within 14 days, the primary difference between the options is higher re-rupture rates with conservative management (meta-analyses found this to be approximately 3% vs 13%)^{10,11} vs the risks of surgery. Some surgeons believe surgical repair has better functional outcomes, but this has not been conclusively demonstrated.

A multicentre study in 2010 using an accelerated functional rehabilitation protocol changed the landscape.³ It found no clinically significant differences in outcome or re-rupture rates. This protocol involved limited immobilization with early motion. The original protocol (see **Table**)³ has since been slightly modified by various surgeons. This approach is currently used by a significant number of orthopaedic surgeons in BC. Other studies have validated the results of this approach.¹²⁻¹⁵ There may be an advantage of earlier return to work with surgical intervention.¹² Surgical treatment remains the primary option

for patients in whom treatment is begun more than 14 days after injury.

Acute Achilles ruptures are most common in male weekend warriors. Diagnosis is made with history and physical examination. Treatment can be conservative or surgical, with accelerated function rehabilitation offering conservative management the advantages of surgery without the risks. The conservative approach can be used only if treatment is initiated within 14 days of injury. A patient diagnosed with acute Achilles rupture should be immediately made non-weight-bearing, immobilized in equinus, and referred to the local orthopaedic surgeon on call. This will allow all treatment options to be available to the patient and treating surgeon.

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References

1. Uquillas CA, Guss MS, Ryan DJ, et al. Everything Achilles: Knowledge update and current concepts in management. *J Bone Joint Surg Am* 2015;97:1187-1195.
2. Guss D, Smith JT, Chiodo CP. Acute Achilles tendon rupture: A critical analysis review. *JBJS Rev* 2015;3:e2.
3. Willits K, Amendola A, Bryant D, et al. Operative versus nonoperative treatment of acute Achilles tendon ruptures: A multicenter randomized trial using accelerated functional rehabilitation. *J Bone Joint Surg Am* 2010;92:2767-2775.
4. Cooper MT. Acute Achilles tendon ruptures: Does surgery offer superior results (and other confusing issues)? *Clin Sports Med* 2015;34:595-606.
5. Raikin SM, Garras DN, Krapchev PV. Achilles tendon injuries in a United States population. *Foot Ankle Int* 2013;34:475-480.
6. Sode J, Obel N, Hallas J, Lassen A. Use of fluoroquinolone and risk of Achilles ten-

- don rupture: A population-based cohort study. *Eur J Clin Pharmacol* 2007;63:499-503.
7. Thompson TC, Doherty JH. Spontaneous rupture of tendon of Achilles: A new clinical diagnostic test. *J Trauma* 1962;2:126-129.
 8. O'Brien T. The needle test for complete rupture of the Achilles tendon. *J Bone Joint Surg Am* 1984;66:1099-1101.
 9. Inglis AE, Sculco TP. Surgical repair of ruptures of the tendo Achillis. *Clin Orthop Relat Res* 1981;(156):160-169.
 10. Bhandari M, Guyatt GH, Siddiqui F, et al. Treatment of acute Achilles tendon ruptures: A systematic overview and meta-analysis. *Clin Orthop Relat Res* 2002;(400):190-200.
 11. Khan RJ, Fick D, Keogh A, et al. Treatment of acute Achilles tendon ruptures. A meta-analysis of randomized, controlled trials. *J Bone Joint Surg Am* 2005;87:2202-2210.
 12. Soroceanu A, Sidhwa F, Aarabi S, et al. Surgical versus nonsurgical treatment of acute Achilles tendon rupture: A meta-analysis of randomized trials. *J Bone Joint Surg Am* 2012;94:2136-2143.
 13. Jones MP, Khan RJ, Carey Smith RL. Surgical interventions for treating acute Achilles tendon rupture: Key findings from a recent Cochrane review. *J Bone Joint Surg Am* 2012;94:e88.
 14. Olsson N, Silbernagel KG, Eriksson BI, et al. Stable surgical repair with accelerated rehabilitation versus nonsurgical treatment for acute Achilles tendon ruptures: A randomized controlled study. *Am J Sports Med* 2013;41:2867-2876.
 15. Keating JF, Will EM. Operative versus non-operative treatment of acute rupture of tendo Achillis: A prospective randomised evaluation of functional outcome. *J Bone Joint Surg Br* 2011;93:1071-1078.

Table. Achilles tendon rupture rehabilitation protocol.

Time frame	Activity
0–2 weeks	Posterior slab/splint; non-weight-bearing with crutches: immediate post-op in surgical group, after injury in non-op group
2–4 weeks	Aircast walking boot with 2-cm heel lift* Protected weight-bearing with crutches Active plantar flexion and dorsiflexion to neutral, inversion/eversion below neutral Modalities to control swelling Incision mobilization modalities‡ Knee/hip exercises with no ankle involvement (e.g., leg lifts from sitting, prone, or side-lying position) Non-weight-bearing fitness/cardiovascular exercises (e.g., bicycling with one leg, deep-water running) Hydrotherapy (within motion and weight-bearing limitations)
4–6 weeks	Weight-bearing as tolerated** Continue 2–4 week protocol
6–8 weeks	Remove heel lift Weight-bearing as tolerated* Dorsiflexion stretching, slowly Graduated resistance exercises (open and closed kinetic chain as well as functional activities) Proprioceptive and gait retraining Modalities including ice, heat, and ultrasound, as indicated Incision mobilization† Fitness/cardiovascular exercises to include weight-bearing as tolerated (e.g., bicycling, elliptical machine, walking or running on treadmill, stair climber) Hydrotherapy
8–12 weeks	Wean off boot Return to crutches or cane as necessary and gradually wean off Continue to progress range of motion, strength, proprioception
>12 weeks	Continue to progress range of motion, strength, proprioception Retrain strength, power, endurance Increase dynamic weight-bearing exercise, include plyometric training Sport-specific retraining

* Patients were required to wear the boot while sleeping.

† Patients could remove the boot for bathing and dressing but were required to adhere to the weight-bearing restrictions according to the rehabilitation protocol.

‡ If, in the opinion of the physical therapist, scar mobilization was indicated (i.e., the scar was tight or not moving well), the physical therapist would attempt to mobilize using friction, ultrasound, or stretching (if appropriate). In many cases, heat was applied before beginning mobilization techniques.