



Standard of Care: Achilles Tendinopathy

Case Type / Diagnosis: Achilles Tendinopathy. ICD-9: 726.71
(Diagnosis specific, impairment/ dysfunction specific)

Achilles Tendinopathy is a disease process characterized by pain in the posterior part of the heel it can be both acute and chronic in nature. A common term for this posterior heel pain is Achilles tendonitis, but this term may be misleading as it implies acute inflammation within the tendon, whereas it has been shown that other pathological processes may also be the cause of pain.¹ There are three models of tendon pain: *the degenerative model, the mechanical model and the biochemical model*. With the theory of *degenerative tendonopathy*, many authors, Nirshel, Astrom, Khan and Chazan have noted the absence of inflammation and describe areas of mucoid degeneration, neovascularization and disordered collagen fibers. With the *mechanical model*, collagen fibers are thought to be pain free when intact and painful when disrupted. However, there is not a perfect correlation between collagen damage and pain. With the *biochemical model*, the cause of pain is chemical irritation due to regional anoxia and the lack of phagocytic cells to remove noxious products of cellular activity. Overuse injury may be secondary to the activation of peritendinous nociceptors.⁵

Chazan describes a classification system for Achilles tendon disorders. *Paratenonitis* or *paritendonitis* refers to paratendon pathology without tendon involvement *Paratenonitis with Tendinosis* refers to tissue degeneration and damage. This damage may include partial rupture. With *tendinosis* degenerative changes are noted in the tendon and an inflamed paratenon. *Insertional tendonitis* can start as paratenonitis and progress to distal tendinosis.¹

The primary function of the Achilles tendon is to transmit the load of the triceps surae to the calcaneus. The soleus is the prime mover in plantar flexion of the ankle, aided by the gastrocnemius. The gastrocnemius also flexes the knee joint.¹

Tendon pathology can be a result of *intrinsic* and *extrinsic* factors.¹

- Intrinsic factors include:
- 1) Forces through the tendon; running and jumping forces have been estimated at 5000N.
 - 2) Tendon shearing forces can rupture the Achilles. The tendons twist from proximal to distal as they insert into the calcaneus, creating a shearing force.
 - 3) Overuse injury occurs with forces within the physiological range, but when repeated with poor recovery time, therefore, causing fatigue to the tendon, making it susceptible to micro tearing.
 - 4) Disuse atrophy of the soleus is common because it does not cross the knee and the muscle fibers are type one, which change rapidly with disuse.

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- 5) Sudden loading of excessive force, especially with eccentric motion, can cause damage.
- 6) Excessive pronation, either early, late or increased allow internal rotation of the tibia, thus moving the Achilles medially, creating a whipping action.
- 7) Poor flexibility to gastrocnemius and soleus increase the strain to the tendon and can result in micro tearing.
- 8) Muscle weakness of the gastrocnemius and soleus will result in micro tears and inflammation to the Achilles tendon.
- 9) Joint restriction of the talocrural or subtalar joints, pes cavus or obesity lead to decreased shock absorption or poor ability to adapt to uneven terrain.
- 10) Systemic disease, such as diabetes, lupus, gout, psoriatic arthritis and Reiter's disease are all related to weakness within the tendon structure.
- 11) Corticosteroid injections may be a cause of rupture and there is controversy with its use.

Extrinsic factors include:

- 1) Training errors
- 2) Poor footwear-too small, worn-out, poor heel counter for rear foot stability and poor shock absorption
- 3) Running on unyielding or uneven surfaces
- 4) A direct blow to the tendon can also cause rupture.

Indications for Treatment:

Increased Pain
 Impaired ROM
 Impaired Gait
 Impaired Functional mobility and/ or ADLs.
 Impaired ability to perform fitness activity/sport

Contraindications / Precautions for Treatment:

Modes of exercise should be chosen to minimize pain.
 See appropriate modalities procedures.
 Recent Cipro (Fluroquinolone) dosing⁴

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Examination:

Medical History: Review patient's medical history questionnaire and medical history reported in LMR computer system. Review any diagnostic imaging, tests, or work up listed under longitudinal medical record and centrality. Ask about possible trauma or history of fractures. Review footwear history and training schedule.

History of Present Illness: Most common complaint is of retrocalcaneal heel pain.

Social Hx: Frequently found in runners, ballet dancers, basketball players, and those involved in jumping and racquet sports.

Medications: non-steroidal anti-inflammatory medications and corticosteroids.

Examination (Physical / Cognitive / applicable tests and measures / other):

This section is intended to capture the minimum data set and identify specific circumstance(s) that might require additional tests and measures.

Pain: measured on the VAS scale; note activities that increase symptoms, decrease symptoms, and the location of symptoms. Often with push off phase of gait, running, jumping, toe raises to reach up to a high shelf and stairs.

Postural assessment:

1. Pes planus/ pes cavus
2. Calcaneal alignment varum or valgum
3. Hallux valgum/ rigidis
4. Leg length discrepancy/ pelvic rotation

Manual strength testing:

1. Manual muscle testing
2. Endurance testing

ROM:

1. Identify tight ankle muscles
2. Capsular mobility-knee, talocrural, subtalar and tarsals
3. Contractures- knee and ankle

Functional Test:

1. Lower extremity functional scale for outcome testing.
2. Functional mobility: Pain with weight bearing, prolonged standing, transfers, walking, running and stair climbing.

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Gait:

1. Biomechanical assessment of walking and running gait
2. Assistive device assessment if antalgic

Balance: assessment. See department guidelines

Proprioception: assessment. See department guidelines

Palpation:

1. Calcaneal spur
2. Achilles tendon
3. Hagland's deformity
4. Distal pulses

Differential Diagnosis (if applicable):²

1. Achilles tendon rupture
2. Achilles tendon partial tear
3. Rupture or inflammation of other tendons such as posterior tibialis, flexor hallucis longus, plantaris, or flexor digitorum longus
4. Fracture (i.e. Calcaneal stress fx)
5. Subcalcaneal bursitis-pain will be anterior to the tendon and superior to the insertion on the calcaneous
6. Haglands's deformity (prominent superior turberosity of the calcaneus)
7. Plantar fasciitis
8. Calcaneal periostitis/calcaneal apophysitis
9. Tarsal tunnel syndrome
10. Medial calcaneal nerve entrapment
11. Sural nerve entrapment- SLR with DF and inversion- Pain lateral foot alongside Achilles tendon
12. Seronegative spondyloarthropathies (i.e. Ankylosing spondylitis, Reiter's syndrome, Ulcerative colitis, Crohn's disease).
13. Compartment syndrome
14. Osteonecrosis
15. Osteoarthritis
16. Tumor- of the tendon
17. Spinal involvement/Lumbosacral radiculopathy-
18. Infection-TB

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Treatment planning involves identifying and eliminating all extrinsic factors, estimating the stage of healing, then starting a tensile loading program.²

Acute:

- 1) Protection: Unloading of the tendon with a heel lift 12-15mm or taping into plantar flexion, using assistive devices for non-weight bearing to weight bearing as tolerated gait
- 2) Modalities to control inflammation: ice, ultrasound (pulsed or phonophoresis), iontophoresis, galvanic stimulation (see protocols)
- 3) Early exercise- non-weight bearing-swimming, bike, stretches and ROM
- 4) Soft tissue mobilization
- 5) Patient education- activity modification to prevent re injury

Sub Acute:

- 1) Joint mobilization
- 2) Muscle strengthening and stretching
- 3) Proprioception exercises
- 4) Functional mobility encouraging full weight bearing
- 5) Patient education, modalities and soft tissue mobilization may continue.
- 4) Orthotic fabrication if needed

Chronic:

- 1) Ice may continue if new exercise causes acute inflammation and pain
- 2) Joint mobilization
- 3) Cross friction massage
- 4) Muscle stretching- in Subtalar joint neutral
- 5) Strengthening program with progression to eccentric program and use of a step
- 6) Resumption of sports or recreational activities

Basic Exercise Principles:

Specificity of training, maximal loading and progression of loading should be followed when developing an exercise regime. All exercises should be modified to limit and or avoid pain. It should be noted, that in the chronic phase, eccentric training and cross-friction massage might cause initial increase in pain and or irritation.²

Frequency & Duration

1-2x/wk for 4-6 weeks up to 12 weeks

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Recommendations and referrals to other providers.

1. Orthopedist
2. Orthotist
3. Rheumatologist
4. Physiatrist

Re-evaluation / assessment

Standard Time Frame

Less than or equal to 30 days.

Other Possible Triggers

A significant change in signs or symptoms.

Fall or acute trauma.

Discharge Planning

Commonly expected outcomes at discharge

Independent self- pain management.

Independent functional mobility.

Independence with home exercise program.

Return to sport or previous level of activity.

Transfer of Care (if applicable)

Pt will be referred back to physician if symptoms do not change, within the standard time frame or if all treatment options have been exhausted

Patient's discharge instructions

Continue home exercise program. If symptoms return, call clinic or physician.

References

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