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Achilles Tendinitis

ICD-10 CODE M65.879

THE CLINICAL SYNDROME

Achilles tendinitis has become more common as jogging has increased in popularity. The Achilles tendon is susceptible to the development of tendinitis both at its insertion on the calcaneus and at its narrowest part, a point approximately 5 cm above its insertion. The Achilles tendon is subjected to repetitive motion that may result in microtrauma, which heals poorly owing to the tendon's avascular nature. The appearance of Achilles tendinitis has been described as having a crab meat appearance owing to the nonlinear orientation of the tendon fibers (Fig. 126.1). Running is often the inciting factor in acute Achilles tendinitis, which frequently coexists with bursitis and thus causes additional pain and functional disability. Calcium deposition around the tendon may occur if inflammation persists, and this complication makes subsequent treatment more difficult. Continued trauma to the inflamed tendon may ultimately result in tendon rupture.

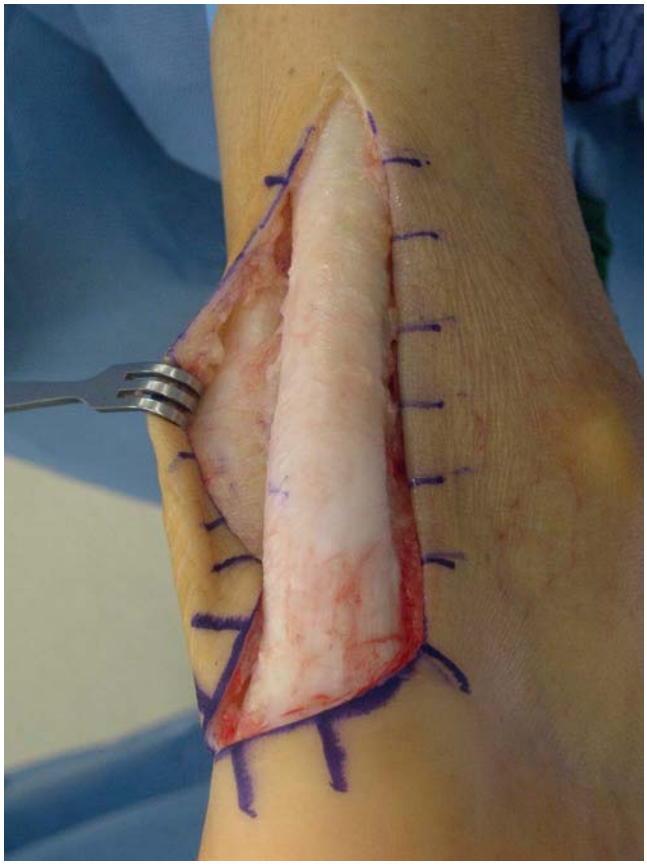

FIG 126.1 Bulbous "crabmeat" tendon without distinct orientation in the central aspect of the Achilles tendon. (From Sundararajan PP. Transosseous fixation in insertional Achilles tendonitis. *J Foot Ankle Surg.* 2012;51(6):806–812.)

SIGNS AND SYMPTOMS

The onset of Achilles tendinitis is usually acute, occurring after overuse or misuse of the ankle joint. Inciting activities include running with sudden stops and starts, such as when playing tennis. Improper stretching of the gastrocnemius and Achilles tendon before exercise has also been implicated in Achilles tendinitis, as well as in acute tendon rupture. The pain of Achilles tendinitis is constant and severe and is localized in the posterior ankle (Fig. 126.2). Significant sleep disturbance is often reported. Patients may attempt to splint the inflamed Achilles tendon by adopting a flatfooted gait to avoid plantar flexing the tendon. Pain is induced with resisted plantar flexion of the foot, and a creaking or grating sensation may be palpated when the foot is passively plantar flexed (Fig. 126.3). A chronically inflamed Achilles tendon may suddenly rupture from stress or during injection into the tendon itself.

TESTING

Plain radiographs, ultrasound imaging, and magnetic resonance imaging (MRI) are indicated in all patients who present with posterior ankle pain (Figs. 126.4 and 126.5). MRI and ultrasound imaging of the ankle are also indicated if joint instability is suspected. Radionuclide bone scanning is useful to identify stress fractures not seen on plain radiographs. Based on the patient's clinical presentation, additional testing may be warranted, including a complete blood count, erythrocyte sedimentation rate, comprehensive metabolic profile, and antinuclear antibody testing. The injection technique described later serves as both a diagnostic and a therapeutic maneuver.

DIFFERENTIAL DIAGNOSIS

Achilles tendinitis is usually easily identified on clinical grounds. However, if the bursa located between the Achilles tendon and the base of the tibia and the upper posterior calcaneus is

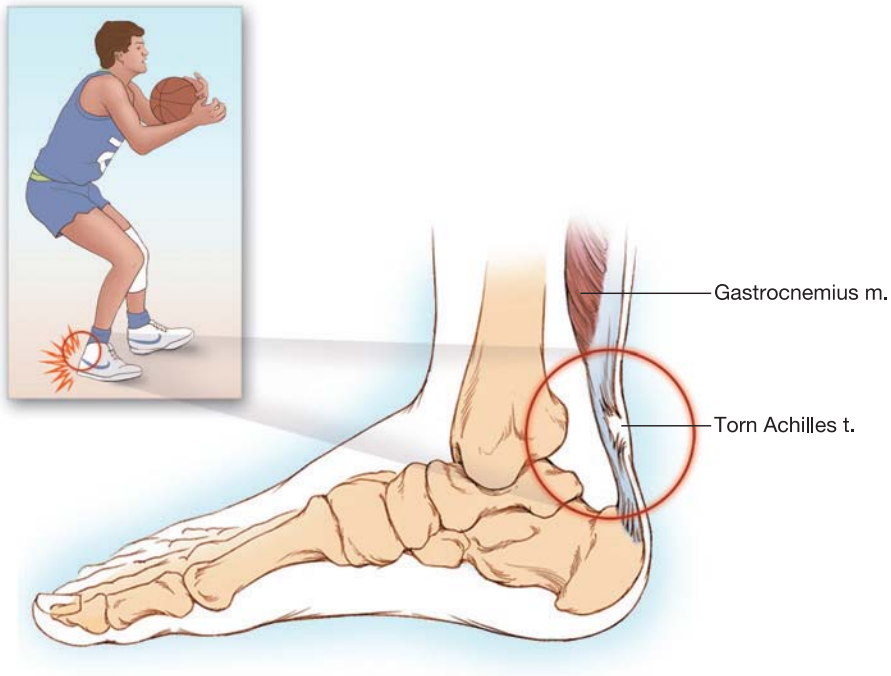

FIG 126.2 The pain of Achilles tendinitis is constant and severe and is localized to the posterior ankle.

FIG 126.3 Eliciting the creak sign for Achilles tendinitis. (From Waldman SD. *Physical diagnosis of pain: an atlas of signs and symptoms*. Philadelphia: Saunders; 2006:377.)

inflamed, coexistent bursitis may confuse the diagnosis. Stress fractures of the ankle may also mimic Achilles tendinitis.

TREATMENT

Initial treatment of the pain and functional disability associated with Achilles tendinitis includes a combination of nonsteroidal antiinflammatory drugs (NSAIDs) or cyclooxygenase-2 inhibitors and physical therapy. The local application of heat and cold may also be beneficial. Repetitive activities thought to be responsible for the development of tendinitis, such as jogging, should be avoided. For patients who do not respond to these treatment modalities, injection with local anesthetic and steroid is a reasonable next step.

Injection for Achilles tendinitis is carried out by placing the patient in the prone position with the affected foot hanging off the end of the table. The foot is gently dorsiflexed to facilitate identification of the margin of the tendon, because injection directly into the tendon should be avoided. The tender point at the tendinous insertion or at its narrowest part approximately 5 cm above the insertion is identified and marked with a sterile marker. The skin overlying this point is prepared with antiseptic solution. A sterile syringe containing 2 mL of 0.25% preservative-free bupivacaine and 40 mg methylprednisolone is attached to a 1½-inch, 25-gauge needle using strict aseptic technique. The previously marked point is palpated, and the needle is carefully advanced at this point along the tendon and through the skin and subcutaneous tissues, with care taken not to enter the substance of the tendon. The contents of the syringe are gently injected while the clinician slowly withdraws the needle. Resistance to injection should be minimal. If resistance is significant, the needle tip is probably in the substance of the Achilles tendon and should be withdrawn slightly until the injection can proceed without significant resistance. The needle is removed, and a sterile pressure dressing and ice pack are applied to the injection site.

Physical modalities, including local heat and gentle range-of-motion exercises, should be introduced several days after the patient undergoes injection. Vigorous exercises should be avoided, because they will exacerbate the patient's symptoms. Simple analgesics and NSAIDs can be used concurrently with this injection technique. Ultrasound needle guidance will improve the accuracy of needle placement and decrease the incidence of needle-related complications. The injection of platelet-rich plasma and/or stem cells

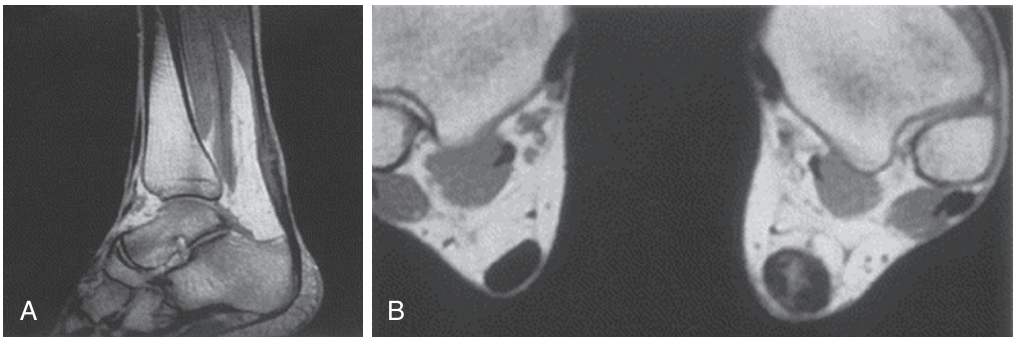

FIG 126.4 Magnetic resonance imaging of chronic, degenerative tendinosis with thickening of the tendon in the sagittal **(A)** and coronal **(B)** planes compared with the opposite Achilles tendon. (From Lesic A, Bumbasirevic M. Disorders of the Achilles tendon. *Curr Orthop*. 2004;18(1):63–75.)

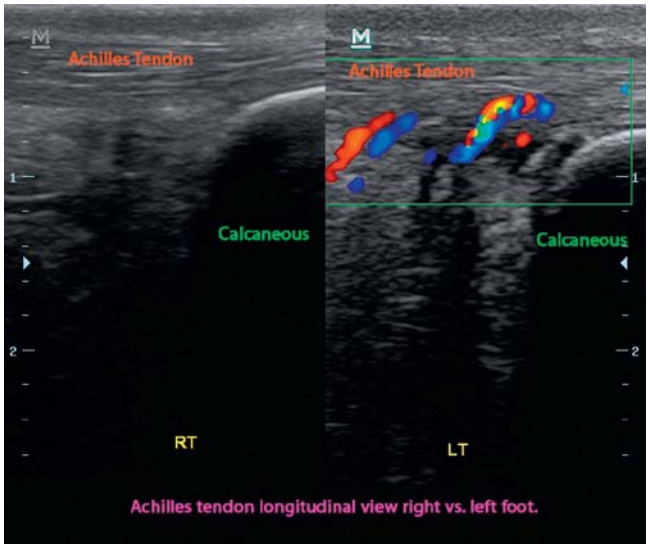

FIG 126.5 Longitudinal color Doppler image of tendinitis of the left Achilles tendon. Note the neovascularity when compared with the right.

may reduce the pain and functional disability of Achilles tendinitis.

COMPLICATIONS AND PITFALLS

Trauma to the Achilles tendon from the injection itself is an ever-present possibility. Tendons that are highly inflamed or previously damaged are subject to rupture if they are injected directly. This complication can be avoided if the clinician uses gentle technique and stops injecting immediately if significant resistance is encountered. Approximately 25% of patients complain of a transient increase in pain after injection, and patients should be warned of this possibility.

CLINICAL PEARLS

Although the Achilles tendon is the thickest and strongest tendon in the body, it is susceptible to inflammation or even rupture. It begins at the midcalf and continues downward, narrowing as it goes, to attach to the posterior calcaneus; it becomes narrowest approximately 5 cm above its calcaneal insertion. At these two points, tendinitis is most likely to develop. The injection technique described is extremely effective in treating Achilles tendinitis. Coexistent bursitis and arthritis may contribute to the patient's symptoms, thus necessitating additional treatment with more localized injection of local anesthetic and methylprednisolone.

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Achilles Tendon Rupture

ICD-10 CODE M66.369

THE CLINICAL SYNDROME

Achilles tendon rupture most often occurs following an injury after acute push-off during jumping or sprinting as the result of extreme ankle dorsiflexion. Occurring in otherwise healthy adults, it is a disease of the third to fifth decades and has a male predominance. Rupture of the Achilles tendon most often occurs in the left leg because right-handed individuals usually push off with the left leg when they jump.

The Achilles tendon is most susceptible to rupture at its narrowest part, a point approximately 5 cm above its insertion. The Achilles tendon is subjected to repetitive motion that may result in microtrauma, which heals poorly owing to the tendon's avascular nature. The repeated microtrauma leads to tendinitis and tendinopathy that may predispose the tendon to rupture. Achilles tendinitis frequently coexists with bursitis, which causes additional pain and functional disability.

In addition to traumatic rupture of the Achilles tendon, sudden, nontraumatic rupture may occur. Factors that predispose the patient to traumatic and nontraumatic rupture of the Achilles tendon include steroid use, dialysis, gout, rheumatoid arthritis, systemic lupus erythematosus, diabetes, endocrinopathies, renal transplant, hyperlipidemias, and the use of fluoroquinolones (Box 127.1).

SIGNS AND SYMPTOMS

The onset of Achilles tendon rupture is usually acute, occurring after acute push-off during jumping or sprinting as the result of extreme ankle dorsiflexion. Improper stretching of the gastrocnemius and Achilles tendon before exercise has also been implicated in the development of Achilles tendinitis and acute tendon rupture. The pain of Achilles tendon rupture is constant and severe and is localized in the posterior ankle. The patient often complains of a feeling like being kicked in the ankle. Significant ecchymosis, swelling, and hematoma are frequently present. Palpation of the ruptured Achilles tendon may reveal a lack of tendon continuity. The patient suffering from Achilles tendon rupture exhibits positive results of the toe raise and Thompson squeeze tests (Fig. 127.1). The knee flexion test can also help identify a ruptured Achilles tendon (Fig. 127.2).

BOX 127.1 Factors Associated With Rupture of the Achilles Tendon

- Steroid use
- Dialysis
- Gout
- Rheumatoid arthritis
- Systemic lupus erythematosus
- Diabetes
- Endocrinopathies
- Renal transplantation
- Hyperlipidemias
- Fluoroquinolone use

TESTING

Plain radiographs, ultrasound imaging, and magnetic resonance imaging (MRI) are indicated in all patients who present with posterior ankle pain and who are suspected of suffering from Achilles tendon rupture (Fig. 127.3). MRI of the ankle is also indicated if joint instability, bursitis, or occult tumor is suspected. Radionuclide bone scanning is useful to identify stress fractures not seen on plain radiographs. Ultrasound imaging may also help assess the integrity of the Achilles tendon (Fig. 127.4). Based on the patient's clinical presentation, additional testing may be warranted, including a complete blood count, comprehensive metabolic panel, erythrocyte sedimentation rate, and antinuclear antibody testing.

DIFFERENTIAL DIAGNOSIS

Achilles tendon rupture is usually easily identified on clinical grounds. However, if the bursa located between the Achilles tendon and the base of the tibia and the upper posterior calcaneus is inflamed, coexistent bursitis may confuse the diagnosis. Stress fractures of the ankle may also mimic the pain of Achilles tendon rupture.

TREATMENT

Initial treatment of the pain and functional disability associated with Achilles tendon rupture includes elevation, relative rest, and ice. A combination of nonsteroidal antiinflammatory drugs or cyclooxygenase-2 inhibitors and short-acting opioid analgesics, such as hydrocodone, may be necessary to manage

FIG 127.1 A, To perform the toe raise test for Achilles tendon rupture, the patient is asked to stand in a comfortable position and then to raise himself or herself on tiptoe. **B,** To perform the Thompson squeeze test for Achilles tendon rupture, the examiner grasps the calf on the patient's affected side just below the point of the calf's maximum girth and firmly squeezes the calf. Absence of plantar flexion on the affected side provides a presumptive diagnosis of rupture of the Achilles tendon. (From Waldman SD. *Physical diagnosis of pain: an atlas of signs and symptoms*. 2nd ed. Philadelphia: Saunders; 2010:344, 346.)

FIG 127.2 The knee flexion test is performed with the patient prone and ankles extending past the edge of the table. The patient is asked to actively flex the knee to 90 degrees. During this movement, the foot on the affected side falls into neutral or dorsiflexion and a rupture of the Achilles tendon can be diagnosed. (From Maffulli N, Via AG, Oliva F. Chronic Achilles tendon disorders: tendinopathy and chronic rupture. *Clin Sports Med*. 2015;34(4):607–624.)

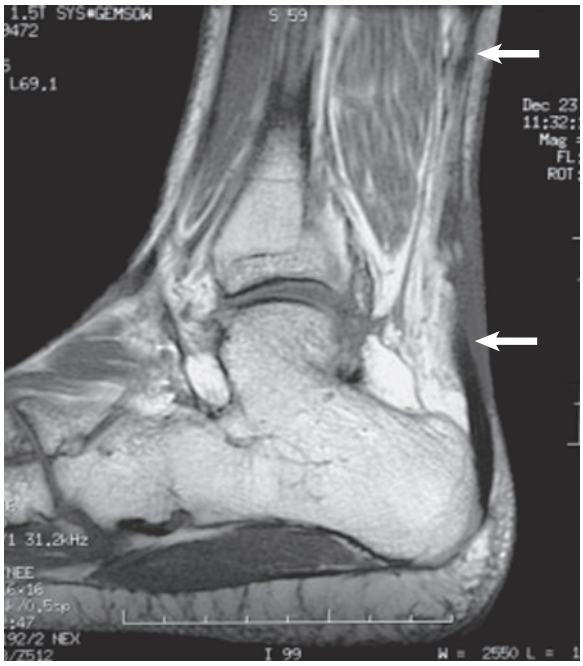

FIG 127.3 A magnetic resonance image with *arrows* pointing to the ends of the Achilles tendon ends. The area between the arrows represents the gap between the tendon ends. (From Padanilam TG. Chronic Achilles tendon ruptures. *Foot Ankle Clin.* 2009;14(4):711–728.)

the acute pain associated with this condition. Although some specialists recommend conservative therapy, most believe that surgical repair of the tendon with postoperative immobilization is the best option in otherwise healthy patients (Fig. 127.5). Clinical experience suggests that the injection of platelet-rich plasma and/or stem cells may improve tendon healing.

COMPLICATIONS AND PITFALLS

Repeat rupture of the affected Achilles tendon represents a real risk whether conservative or operative treatment is pursued. Care must be taken to avoid immobilization with casts until the acute swelling associated with tendon rupture is resolved or nerve compression and pressure ulcers may result. Gentle physical therapy during the healing phase is essential if functional ability is to be maintained.

CLINICAL PEARLS

Although the Achilles tendon is the thickest and strongest tendon in the body, it is susceptible to inflammation or even rupture. It begins at the midcalf and continues downward, narrowing as it goes, to attach to the posterior calcaneus; it becomes narrowest approximately 5 cm above its calcaneal insertion. Coexistent bursitis and arthritis may contribute to the patient's symptoms, thus necessitating additional treatment with more localized injection of local anesthetic and methylprednisolone.

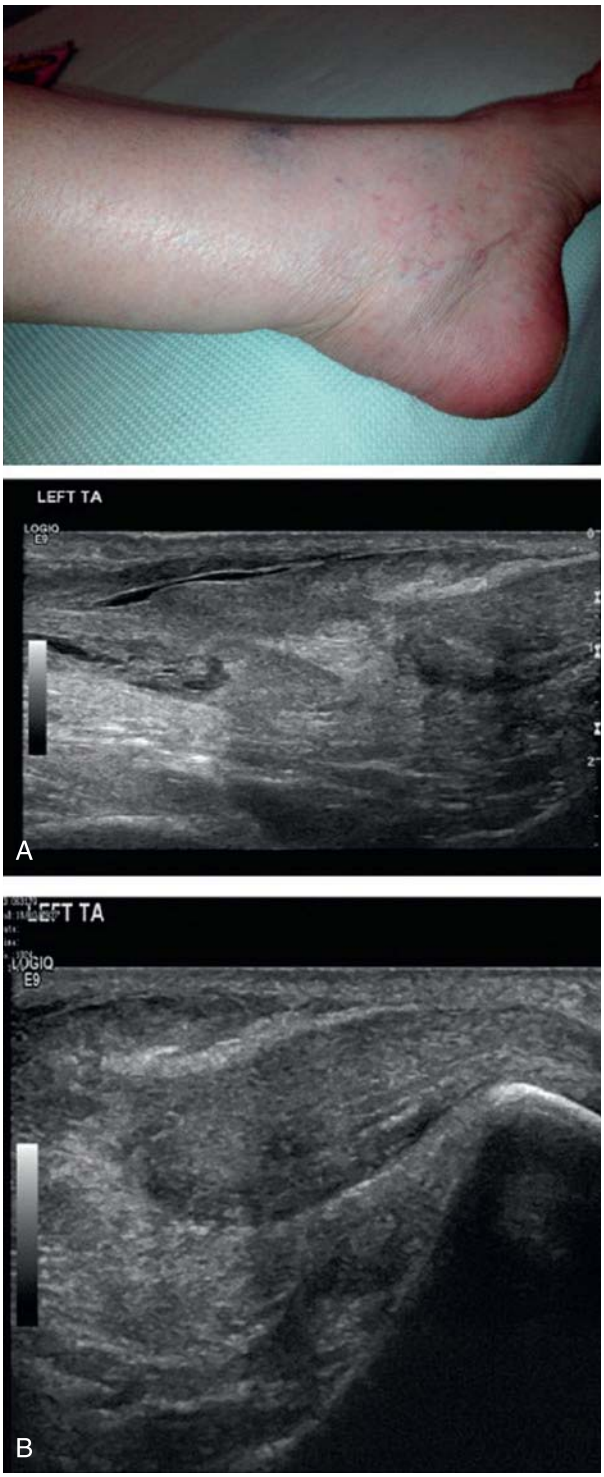

FIG 127.4 A, Photograph of ankle in patient with complete rupture of the Achilles tendon. Note the obvious defect in the tendon. **B,** Longitudinal ultrasound images demonstrating complete rupture of the Achilles tendon. (From AL-Saadi S, Michael A. Levofloxacin-induced Achilles tendinitis and tendon rupture. *Eur Geriatr Med.* 2012;3(6):380–381, Figure 1.)

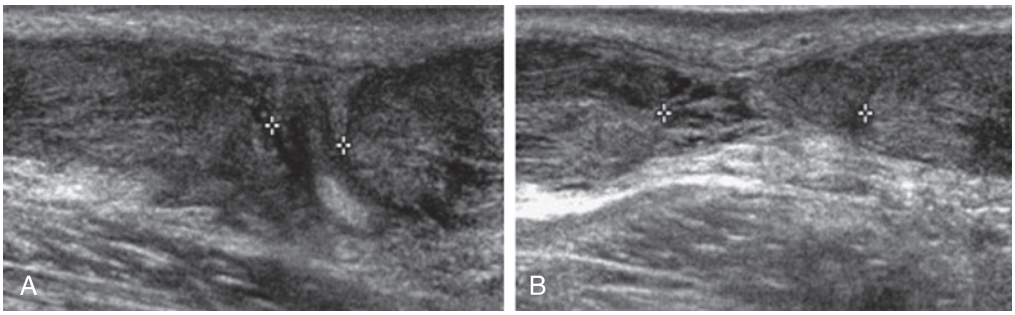

FIG 127.5 A, Longitudinal ultrasound scan of a ruptured Achilles tendon during plantar flexion shows less than 1 cm of separation between the torn tendon ends. The patient was successfully treated with casting in plantar flexion. **B,** Same patient with longitudinal scanning in dorsiflexion shows increased separation and better delineation of the complete tendon rupture. (From Fessell DP, Jacobson JA. Ultrasound of the hindfoot and midfoot. *Radiol Clin North Am.* 2008;46(6):1027–1043.)

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