Technique

Asses & Address

Achilles Tendinosis

by Whitney Lowe

In this column, orthopedic-massage specialist Whitney Lowe discusses common client conditions and hands-on techniques to address them.

Overuse injuries of the Achilles tendon are a common lower-extremity pathology, especially among active people. The term tendinitis has traditionally been used to describe these overuse tendon disorders, but that trend is changing due to recent physiological discoveries about tendon pathologies.

The Achilles tendon is the strongest tendon in the body. It attaches the gastrocnemius and soleus muscles to the calcaneus in order to generate plantar flexion movements. Because the gastrocnemius and soleus share this tendon, they are sometimes considered one muscle group called the triceps surae. They play a major role in forward or upward propulsion when they contract concentrically and in shock absorption and deceleration when they work eccentrically. This is why the tensile loads on the Achilles tendon are so high.

Massage is an effective alternative to traditional treatments, such as corticosteroid injections, which have been found to be problematic. Successful resolution of the problem comes from a thorough understanding of the physiology and pathology of these tendon disorders.

The pathology

The term tendinitis suggests an inflammatory process in the tendon because it ends in -itis. Earlier theoretical models suggested that the problem arose from fiber tearing in the tendon, which led to an inflammatory reaction. Recent investigations into the cellular process of chronic tendon pathologies indicate otherwise. These researchers found a lack of inflammatory cells present and no evidence of fiber-tearing in these conditions. Instead, the
Achilles tendon problem results from collagen degeneration within the tendon. Therefore, this pathology is more appropriately called tendinosis instead of tendinitis.

While tendinosis is the most common overuse pathology of the Achilles tendon, an inflammatory condition called peritenonitis may affect this tendon as well. A thin membrane called the paratenon, which functions to enhance gliding and protect the tendon, surrounds the Achilles tendon. However, this membrane is not the same as the synovial sheath that surrounds other tendons around the ankle. The synovial sheath reduces friction between the tendon and the binding retinacula surrounding it. There is no retinaculum binding the Achilles tendon.

Peritenonitis is an inflammatory and fibrous reaction between the tendon and the paratenon. It may occur by itself or in conjunction with tendinosis. Tendinosis is more common in the distal region of the tendon, whereas peritenonitis usually occurs proximal to the tendon insertion. It is important to address both tendinosis and peritenonitis when they occur because chronic degeneration could lead to complete tendon ruptures if left untreated.

The potential for developing tendinosis in the Achilles tendon is magnified due to variations in blood supply in different regions of the tendon. Tendinosis is more likely where the blood supply is poor and tissue regeneration is impaired. Adequate blood supply is necessary for proper healing and tissue regeneration.

Figure 1 (top) The blood supply is poorest in the distal region of the Achilles tendon. As a result, tissue regeneration in this part of the tendon is much slower. Figure 2 The retrocalcaneal bursa between the skin and the Achilles tendon may produce pain similar to that in tendinosis. The sub-tendinous bursa is not as frequently affected, but could also produce similar symptoms.
The Achilles tendon pinch test will help discriminate between Achilles tendinosis and retrocalcaneal bursitis. If grasping the tendon proximal to the retrocalcaneal bursa produces the same pain as the primary symptom complaint, it is more likely to indicate tendinosis. Consequently, the lower portion of the tendon is where degeneration occurs first due to its poor blood supply (see Figure 1).

Achilles tendinosis occurs from several factors, such as sudden changes in activity level, like starting a new running program. Since the tendon has not had the opportunity to adapt to the increased tensile load from the new activity, damage from overuse eventually occurs. Other factors that lead to this problem include inadequate stretching; training errors; rigid exercise surfaces, such as concrete; mechanical alignment problems; systemic diseases; or medications.

In addition to the above factors, another biomechanical consideration plays a role in the development of Achilles tendinosis: During normal foot motion there is a whip-like force on the tendon. This action is exaggerated if the person overpronates. Therefore it is important to look at pronation in addition to excessive loads in plantar flexion and dorsiflexion as a cause of tendinosis.

Sometimes Achilles tendinosis will develop without the stress of repetitive motion or biomechanical dysfunction. Recent discoveries have shed light on an unusual cause of this condition: The family of antibiotics called fluoroquinolones causes the same degenerative process to the collagen matrix in the tendon as repetitive overuse. They seem to have the greatest impact on tendons that are under high tensile load. Fluoroquinolones affect the Achilles tendon more than any other tendon in the body. Continued use of these antibiotics has been linked to Achilles tendon ruptures due to chronic long-term degeneration of the tendons. Brand-name examples of fluoroquinolones are Cipro, Levaquin, Floxin, Noroxin and Trovan.

**Assessment and evaluation**

Achilles tendinosis occurs in clients involved in repetitive activities or who have recently increased their activity level prior to the onset of symptoms. Generally, symptoms come on gradually. The collagen degeneration of tendinosis may be present for some time with no symptoms, so a problem may exist well before the client is aware of it. A thorough history of the client’s activities and medications will help identify the nature of this injury.

Visible enlargement of the tendon compared to the unaffected side may be apparent if tendinosis or peritenonitis are present. The size increase is due to fibrous build-up within the tendon or between the tendon and its paratenon. Nodules or a roughened surface may be palpable on the tendon along its length. While the whole tendon may be tender to palpation, the nodules are more common several centimeters proximal to the tendon insertion on the calcaneus. If peritenonitis is present, there may...
Some warmth in the tendon may be felt due to inflammatory activity. Crepitation (grinding or grating sensations) may also be felt in the tendon as it moves through its range of motion.

Depending on the severity of the tendinosis, pain may occur with active or passive dorsiflexion because the tendon is stretched. Pain may occur in active plantar flexion when there is adequate resistance to the motion, such as attempting to stand on tiptoes.

Pain is felt because the muscle contraction pulls on the damaged tendon. Pain is also common with resisted isometric contractions of plantar flexion for the same reason. Pain may also appear near the insertion of the Achilles tendon in other conditions where repetitive overuse is the cause. For example, the retrocalcaneal bursa is located near the distal Achilles tendon (see Figure 2). Repetitive compression of this bursa may produce pain very similar to that in Achilles tendinosis. Pressing on the distal Achilles tendon could cause pain with either Achilles tendinosis or retrocalcaneal bursitis. Palpation alone is not a good indicator to discriminate between these two conditions.

The Achilles tendon pinch-test is one way to distinguish bursitis from tendinosis (see Figure 3).

In this procedure, the practitioner pinches the Achilles tendon just proximal to the region where the retrocalcaneal bursa is located. If pressure reproduces pain, then retrocalcaneal bursitis is not likely to be the problem. However, keep in mind that absence of pain during the pinch-test does not necessarily mean there is no Achilles tendinosis. Remember, collagen degeneration within the tendon can exist for some time before it produces pain. Your assessment should rely on many factors from the history and physical examination that help you identify the nature of the condition and the tissues involved.

**Traditional methods of treatment**

The most important factor in treating tendinosis or peritenonitis disorders is to reduce the offending factors that caused the tendon degeneration to begin with. This requires changes in activity, training surfaces, shoes, or any other biomechanical factors that have led to the pathology. Orthotics, such as heel lifts, are sometimes used to reduce the biomechanical stress on the tendon. Ice applications appear helpful for both peritenonitis and tendinosis. If fluoroquinolones are suspected as a cause of the tendinosis they are usually changed or eliminated altogether.

Stretching is commonly used along with activity...
modification to reduce tension on the triceps surae complex. If the condition involves peritenonitis, non-steroidal anti-inflammatory drugs are sometimes used. However, if there is no peritenonitis and only the collagen degeneration of tendinosis, these medications will be of limited benefit. For many years, this condition was thought to be exclusively an inflammatory problem, and corticosteroid injections were used to treat it. However, that practice is no longer common because corticosteroids have detrimental effects on the collagen structure and frequently lead to complete tendon rupture.

**Massage approaches**

As with traditional forms of treatment, activity modification is required to get the chronic tensile forces off the affected tendon. Healing is enhanced with a variety of soft-tissue treatment approaches. Massage techniques applied to the triceps surae group, including compression-broadening techniques (see Figure 4) and deep longitudinal-stripping methods (see Figure 5), help reduce tension and decrease the tensile load on the Achilles tendon. The compression-broadening techniques are designed to enhance the muscle’s ability to broaden during its concentric actions. Stripping techniques are helpful to encourage elongation potential. Both these techniques are helpful in reducing tension in the affected muscle.

In addition to the broadening-and-lengthening techniques mentioned, static compression is helpful to address myofascial trigger points that may be in the gastrocnemius or soleus muscles. These trigger points not only perpetuate the hypertonicity in the muscles, but also may refer pain distally into the tendon, thereby mimicking tendon pathology when it is really referred trigger-point pain.

In addition to the techniques applied to the triceps surae, deep friction massage is applied directly to the affected tendon (see Figure 6) to stimulate collagen production in the damaged tendon fibers. It appears that pressure and movement are the most important factors in the application of deep friction massage. Pressure can be applied either transversely or longitudinally. Deep transverse friction may be more effective in helping break down fibrous adhesions between the tendon and the surrounding paratenon, although this has never been verified.

Since the collagen degeneration of tendinosis may be present before there are other symptoms, massage can also be used as a preventive measure. Reducing tightness in the triceps-surae group can reduce the chronic tensile loads on the tendon. Friction massage to the tendon can stimulate collagen reproduction if there is an early degree of degeneration even prior to the onset of symptoms. Keep in mind that tendon-thickening resulting from overuse is probably fibrosis in the paratenon and not acute inflammation. Therefore, massage is still beneficial.

The Achilles tendon is frequently subjected to chronic overuse. Due to the increasing popularity of massage as a means of addressing overuse injuries, it is likely that massage practitioners will have clients seeking help with this problem. While there are other beneficial options, such as shoe inserts and stretching, these may not fully address the present tissue dysfunction. As a result, a multi-disciplinary approach will achieve the best therapeutic result. Massage is a highly effective complementary method for addressing Achilles tendinosis and peritenonitis, and the better we understand this problem, the more effective our therapeutic work can be.

**References**


Whitney Lowe is the director of the Orthopedic Massage Education & Research Institute in Sisters, Oregon. He is the author of Functional Assessment in Massage Therapy and Orthopedic Massage: Theory and Technique. He researches and writes articles on using massage to address pain and injury conditions in national journals and in his bimonthly research newsletter, Orthopedic & Sports Massage Reviews.
Copyright of Massage Magazine is the property of Massage Magazine and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.