REHABILITATION

Achilles Tendon
Rehab Procedures

by Kim D. Christensen, D.C.,
C.C.S.P., C.S.C.S., O.A.C.R.B

Most injuries of the Achilles tendon are not due to a recent acute injury; they have actually developed gradually, over a period of weeks or months. These are "overuse" or "misuse" conditions, and are caused by excessive and/or repetitive motion, often with poor biomechanics. The end result is a microtrauma injury—the body is unable to keep up with the repair and re-strengthening needs, so the tissue begins to fail and becomes symptomatic. If it is not very painful (or when the pain is eliminated by pain-killing drugs), continued stress can eventually lead to complete failure, with a resulting acute tear of the tendon.

The Achilles tendon insertion on the calcaneus is medial to the axis of the subtalar joint, making the calf muscles the most powerful supinators of the subtalar joint. Therefore, when excessive pronation occurs, eventually the tendon undergoes overuse degeneration and inflammation. Clement, et al., described how "pronation generates an obligatory internal tibial rotation, which tends to draw the Achilles tendon medially. Through slow motion, high-speed cinematography, we have seen that pronation produces a whipping action or bowstring effect in the Achilles tendon. This whipping action, when exaggerated, may contribute to microtears in the tendon, particularly in its medial aspect, and initiate an inflammatory response." These investigators believe that the control of functional overpronation with corrective orthotic devices is a necessary treatment for most patients with Achilles tendinosis.

Impaired circulation may be a contributing factor to Achilles tendon overuse injuries, especially with tendon tears. The same researchers speculate that "in individuals who overpronate, the conflicting internal and external rotatory forces imparted to the tibia by simultaneous pronation and knee extension may blanch or wring out vessels in the tendon and peritendon, causing vascular impairment and subsequent degenerative changes in the Achilles tendon." This "region of relative avascularity" extends from 2 to 6 cm above the insertion into the calcaneus, and is a common site of rupture of the Achilles tendon. This makes it especially important to ensure good blood flow during the healing of this condition.

The New Paradigm for Care

It's not surprising that abnormal biomechanics of the foot and ankle can cause problems with the largest tendon in the leg. Symptoms are usually described as diffuse pain in or around the back of the ankle (from the calf to the heel). The pain is aggravated by activity, especially uphill running or climbing stairs, and relieved somewhat by wearing higher-heeled shoes or boots. Palpation will find a tender thickening of the peritendon, and there may be crepitus during plantar and dorsiflexion. Often, a recent increase in activity levels (such as more stair-climbing) or a change in footwear is reported by the patient.

Macroscopically, overused Achilles tendon tissues examined at surgery are dull, slightly brown, and soft, in comparison to normal tendon tissue, which is white, glistening, and firm. There is a loss of collagen continuity and an increase in ground substance and cellularity, which is due to fibroblasts and myofibroblasts, and not inflammatory cells. This is the reason that anti-inflammatory strategies (such as NSAID's, drugs and corticosteroid injections) are not indicated for these conditions, and actually may interfere with tendon repair. We now know that the condition we usually have described as "tendinitis" is actually better understood as "tendinosis," and is not due to inflammation, but an underlying degeneration of collagen tissues in response to mechanical overuse. This "new paradigm" will help to guide our management of all tendon problems, and provide more effective rehabilitation for Achilles tendons.
Rehab Procedures

When an injury is acute, an initial period of relative rest is needed. Occasionally, the weakened tissues will tear through, resulting in a ruptured Achilles tendon. This may require surgical repair and a period of rest before rehabilitation can begin. During this period, though, exercise of the opposite ankle should be encouraged. Vigorous exercise of the uninvolved contralateral ankle muscles produces a neurological stimulus in the injured muscles (called the "cross-over effect"), and helps to prevent atrophy. Initial treatment should also include heel lifts to reduce the strain on the Achilles tendon, and cross-fiber friction to improve circulation. Complete return to function will then require attention to range of motion, functional strength, and orthotic support.

Range of motion. In addition to appropriate foot and ankle adjustments, stretching of the tight and shortened gastrocnemius/soleus muscle complex is a necessary part of Achilles tendon rehabilitation. Gentle stretching should be started early, putting a linear stress on the tendons and stimulating connective tissue repair. The standard is the "runner’s stretch," performed against a wall. Patients with tightness and pronation will often allow the foot to flare outward while stretching, which forces the medial arch to drop. This tendency must be carefully corrected, with the foot positioned straight ahead and the medial arch kept elevated. Even better, is to perform the stretches with corrective orthotics in place.

Functional strength. Isotonic strengthening exercises that focus on the eccentric (negative) component have been shown to improve the healing of tendons and accelerate return to sports participation. These exercises are progressed to closed-chain, loaded eccentric exercises, in order to stimulate collagen fiber reorientation and strengthening. The patient is instructed to stand on the edge of a stair, do a toe raise up, then drop the involved heel as far as possible, returning by pushing back up with the uninvolved leg.

Conclusion

Achilles tendon injuries can be successfully rehabilitated conservatively. Steroid injections and casting are seldom used these days. Once the local inflammation has been controlled, improved blood flow to the region of relative avascularity is necessary. Correct stretching and strengthening exercises can be demonstrated and monitored in the office.
REFERENCES

NUTRITION-Pg. 48
An Apple a Day Can Be a Key to the Nutritional Adjustment
by David Seaman, D.C, M.S., D.A.B.C N., F.A.C.C.
http://www.nutritionj.com/content/3/1/5
2. Seaman, D. DC. Statin drugs; a cause of muscle pain in many patients and nutritional alternatives we can offer. The American Chiropractor. 2004; 26(6)-50.

REHABILITATION-Pg. 50
Achilles Tendon Rehabilitation
by Kim D. Christensen, D.C.

ORTHOTICS-Pg. 52
Orthotic Support for All Three Arches
by John Danchik, D.C., F.I.C.C., C.C.S.P.