MUSCLE IN FOCUS: ACHILLES TENDON

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The Achilles tendon is well known to runners. Most of the time it is a handy piece of anatomy that allows us to absorb load when our foot hits the ground, transmitting force generated by our calf muscles to propel us forward. Unfortunately this tendon can occasionally become painful. Those who have experienced Achilles pain will know that it can be severe enough to completely stop training. Moreover, it can linger on for months, even years, if not managed well in the early stages.

THE Achilles is the tendon that attaches the soleus (deep calf muscle) and the gastrocnemius (superficial calf muscle) to the calcaneous (heal bone). It is a thick, cylindrical, easily palpated tendon just above your heal bone. If you palpate the tendon inferiorly (towards the foot), you will notice the tendon blending into the calcaneous (heal bone) to the point where it is difficult to tell what is tendon and what is bone. If you palpate superiorly (upward) you will notice the tendon grows thick and flat as it becomes musculotendonis (the transition from tendon to muscle). Eventually the tendon disappears and the only tissue you will be palpating is the superficial calf – gastrocnemius.

The purpose of any tendon is two-fold, each having a nuance of course. The first is to transmit force developed by the contraction of the attached muscle to enable movement (the two ends of the muscle coming closer together). For the Achilles, this is when the soleus and gastrocnemius concentrically contract (when a muscle shortens via contraction). This contraction causes the heel to become closer to the back of the knee (or toe pointing), as in the exercise heal raises. There is also a mild action to bend the knee via the gastrocnemius (as the gastroc is attached above the knee). The other mechanism of a tendon is to bare load when a muscle is forced to lengthen. For the Achilles this is when the foot hits the ground when running (or walking) and the calf muscles eccentrically contract (lengthen as they contract) to soften the heal strike and control movement of the lower leg.

So what goes wrong with the Achilles?

Most runners will have experienced some sort of pain associated with their Achilles. More often than not it will be an acute episode of inflammation (swelling with inflammatory cells) that occurs due to tissue damage about the Achilles. It is usually associated with (but not limited to) a palpable nodule on the Achilles that is very sensitive and stiff initially in the morning but warms up as you become active. Hill running will be very difficult. If treated with (among other things) rest, anti-inflammatories, ice and treatment (assessment of possible causes and remedies), you will recover. If you ignore the pain, the problem can become chronic. The inflammation will disappear but the Achilles will become degenerative (the Achilles tissue will break down). This can lead to a thickening of the Achilles and the calf muscles will become very weak.

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So what causes this?

There are numerous causes for Achilles pain. Start by looking at the very obvious. Has your training load increased? Do you have very old shoes that have worn? Brand new shoes? Camber running or excessive hill running? Has your dorsiflexion range of motion decreased? Have you changed your type of training (track running, flats instead of joggers, spikes, plyometrics are all examples of what often cause acute onset Achilles pain). You can often self assess and figure out what is causing your pain. Change these immediately. If you can't identify anything obvious, then make a visit to your health practitioner.

What can you do?

For acute onset of Achilles pain, try to assess what has caused your pain and change it immediately. For the Achilles itself, ice the affected area, put a heal raise in your shoe for a few days to take the load off the Achilles, cross train and gently mobilise the Achilles *(see image 1 below)*. How to mobilise? Pincer grip (grip with forefinger and thumb) just below and just above the nodule on the Achilles, or at least the most painful portion, and bend the Achilles back and forward. Do this for a couple of minutes at a time, three to four times a day. This will often decrease the amount of pain felt when hopping and walking and promote recovery.

For chronic Achilles pain, eccentric calf exercises are the most important part of treatment *(see images 2 and 3 below)*. The concept is to put load on the Achilles (which is now devoid of inflammation and becoming degenerative) to cause a healing inflammatory response, and more healthy connective tissue will be laid down to heal the tendon. To do this, stand on a step and heal raise on both legs. Now with your body weight on the painful side, slowly allow your heal to drop below the step height, and repeat. For a hypothetical set, try three sets of six to begin with. Be prepared for the Achilles initially to become more painful. This will subside, and slowly the Achilles will become less painful and your typical signs and symptoms will decrease. By all means, please consult your health practitioner if you need direction.

To prevent Achilles pain, be careful with major changes to your training method and load. Also, do preventative exercises as suggested above, including Achilles mobilisation.

Happy running!

Image 1. Mobilising the Achilles.

Image 2. Eccentric calf exercises.

Image 3. Supported Achilles stretch.