GROUP23
SPORTS MEDICINE

130,147 Canada Olympic Road SW
Calgary AB, T3B 6B7
M 403.284.4040 | F 403.284.5656
Group23.ca

Optimal Tendon Loading

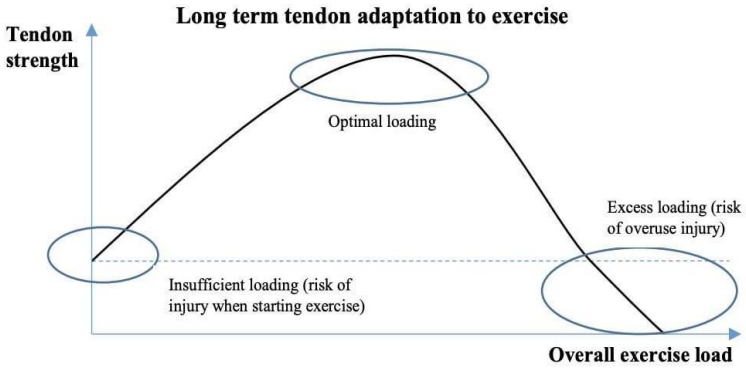
What is a tendon?
A tendon is a tough, fibrous connective tissue that connects muscles to bones. It is primarily composed of collagen, a strong protein that enables tendons to transmit the force generated by muscles to the skeleton, facilitating movement.

How do overuse injuries occur?
Overuse injuries to tendons occur when the repetitive stress or micro-trauma from activities such as exercise, typing, and texting surpasses the body's ability to repair and recover. This excessive loading can result from factors like:

- too much force applied to the tendon,
- inadequate rest periods between activities,
- or underlying conditions such as diabetes, which can affect the tendon's metabolic processes and repair capabilities.

When the cumulative damage exceeds the tendon's repair capacity, it can lead to inflammation, pain, and potentially more severe conditions like tendinosis with or without tearing.

How can exercise make my tendon stronger?
Exercise strengthens tendons through "mechanotransduction". When muscles contract forcefully, they pull on tendons, causing slight stretching. Tenocytes, tendon cells, detect this force and increase collagen and protein production in response. This adaptive process reinforces and strengthens tendons over time. Muscle and bone also strengthen through similar mechanical stimulation principles.



How and why a progressive loading program works.
Resting can alleviate pain temporarily, but it can also lead to tendon weakness. If you resume your previous activity level after rest, your tendon might not be strong enough to handle the load, causing symptoms to return. Instead, a gradual loading program that progressively strengthens the tendon is recommended. This approach helps the tendon adapt to increased demands, enabling a safer return to higher activity levels.

Eccentric Loading
To enhance tendon adaptation through exercise, focusing on eccentric loading is crucial. Eccentric strengthening involves muscle contraction where the muscle lengthens under tension. In tendon rehabilitation, this targets the controlled lengthening phase of the muscle-tendon unit. For example, eccentric strengthening exercises for the Achilles tendon might include slowly lowering your heels off a step or platform, allowing the calf muscles to lengthen under tension.

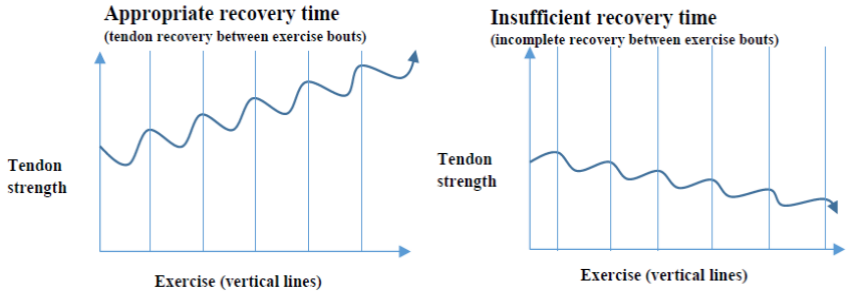
Frequently asked questions

How long does it take for the exercises to work?

- Tendons have less metabolic activity than muscles and therefore take a longer time to recover. The most important thing to remember with tendon injuries is that they take time and require consistency of exercises. The length of time it takes to recover varies depending on the severity and duration of symptoms. Most people recover within 2-3 months; however more severe/chronic injuries can take 3-6 months or longer of dedicated rehab.

How often should the tendon be loaded?

- Exercise places stress on tendons, causing micro-trauma that takes about 48 hours to recover. Performing strengthening exercises every other day allows adequate recovery to prevent cumulative damage and injury.



Should the exercises be pain free?

- During rehab, exercises may cause moderate discomfort (3-4/10), which is acceptable. Ensure exercises do not increase pain in the following days.

Does diet matter for tendon health?

- Diet can have a significant influence on tendons. Being overweight will increase the load on a tendon, increasing risk of injury. High levels of blood sugar, such as seen in diabetes, can also damage tendons. Maintaining healthy weight and consuming whole foods rich in vitamins/minerals and low in sugar, as well as avoiding highly processed and pro-inflammatory foods can aid in tendon repair

Are supplements helpful?

- Certain supplements, like whey protein containing leucine for tendon growth and high-dose fish oil for anti-inflammatory benefits, may aid in tendon health. There is some research to suggest that collagen (especially when combined with Vitamin C) supplements can aid in tendon recovery, including enhanced collagen synthesis, improved tendon properties, pain reduction, and synergistic effects with exercise.

Should I use anti-inflammatory medication?

- Anti-inflammatory drugs can hinder tissue healing and have side effects like heart disease, kidney issues, and stomach ulcers. They should generally be short-term (<2 weeks) and used under medical supervision.

Will injecting my tendon with cortico-steroid help?

- While corticosteroid injections can provide short term relief, they are not the best option for management of tendon injuries and should be used as a last resort. Cortisone can weaken the tendon making it more susceptible to tears and mask pain allowing you to use the tendon when it has not recovered. Group23 has other regenerative therapy injections that promote tendon repair and remodeling for long term improvement including platelet rich plasma (prp), prolotherapy and Sportvis.

Mason, P. (n.d.). *A guide to tendon rehabilitation*. Orthosports.com/au. https://orthosports.com.au/pdf-download/Understanding-tendon-rehabilitation-Paul-Mason.pdf