



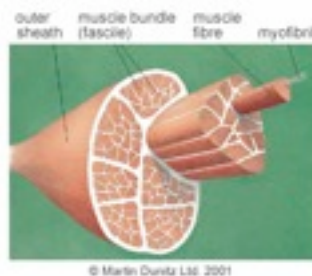
# Clinic Guide

## Muscle Strains

About a quarter of all injuries involve muscle strains. Muscles and their tendon attachments combine to form what are known as musculo-tendinous units. These musculo-tendinous units provide the force which is necessary for movement.

### How is Muscle Structured?

In order to understand how muscles are injured it is helpful to know how the muscle is made up. The muscle is surrounded by an outer sheath or covering. Inside this outer sheath are bundles of muscle fibres which are known as fascicles and are themselves surrounded by another inner sheath. If you looked at the bundles very closely you would just be able to see the individual muscle fibres. (The muscle fibres are made up of even smaller parts but a microscope is required to see them).



A muscle contracts when two of these microscopic parts link together and slide together (causing the muscle to shorten) or slide apart (causing the muscle to lengthen). If the muscle shortens, the result is movement of a joint in one direction; if it lengthens, it causes movement of a joint in the other direction. The co-ordination of this muscle activity by the brain allows us to perform complex movements such as kicking a football or running.

### How does a damaged muscle heal?

The healing process of a muscle strain begins with an inflammatory response which can last for three to five days. This is a crucial time during which rest and protection of the injured part is vital in order to

prevent any further damage. During the inflammatory reaction the body produces chemicals and cells which remove dead muscle fibres and start the repair process. The repair process consists of three stages:

1. **REGENERATION:** New muscle fibres grow from special cells within the muscle.
2. **FORMATION OF SCAR TISSUE:** There is bleeding in the gap between the torn muscle ends, and from this blood matrix, or scaffold, is formed to anchor the two ends together.
3. **MATURATION OF THE SCAR TISSUE:** The collagen fibres which make up the scar tissue become aligned along lines of external stress and are able to withstand more force

### What is a muscle strain?

A muscle strain is damage caused by over-stretching of muscle tissue.

In back muscle strains, this occurs most often when lifting is carried out without co-ordinating the back and abdominal muscles correctly.

The muscle tissue becomes overloaded and reaches a breaking point where a tear or partial tear occurs.

The person will experience pain that will persist if he or she attempts to stretch or contract the muscle.

Depending on their severity, muscle strains are categorised into Grades 1, 2 or 3:

#### Grade 1 Strain:

There is damage to individual muscle fibres (less than 5% of fibres). This is a mild strain which requires 2 to 3 weeks rest.

#### Grade 2 Strain:

There is more extensive damage, with more muscle fibres involved, but the muscle is not completely ruptured. The rest period required is usually between 3 and 6 weeks.

#### Grade 3 Strain:

This is a complete rupture of a muscle. In a sports person this will usually require surgery to repair the muscle. The rehabilitation time is around 3 months.

All muscle strains should be rested and allowed to heal. If the patient continues to repeat the causative action, the condition may worsen. If ignored, a grade one strain has the potential to become a grade two strain or even a complete rupture.

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## Common Muscle Injuries

**Back muscles** - these are injured when lifting incorrectly. The large back muscles (Erector Spinae) cause pain down the middle of the back and at the very base of the spine where their tendons attach. Small stabilising back muscles (Multifidii) may be injured by simply leaning over a table due to poor muscle balance and control. They cause acute low back pain. Side muscles, including the Obliques, Transversalis and Latissimus Dorsi are injured during twisting, swinging or pulling movements; also the opposite side may be injured when throwing.

**Neck muscles** - are usually injured due to poor muscle balance and control during a sudden movement, often after rest, or when they are cold.

**Arm muscles** including the Biceps and Triceps - usually injured when carrying or pulling too heavy a weight (or being jerked by a dog or pony!). Forearm muscles are commonly strained using hand tools eg. screwdrivers, hammers or even lifting heavy saucepans "Le Creuset Syndrome".

**Leg muscles** - Adductor and Hip Flexor (psoas, tensor fasciae latae/TFL) are commonly injured during football. Adductor muscles are put under a great deal of stress during turning activities. They are also very active during side foot passing. Hip flexors are the kicking muscles at the front of the hip which are very active during shooting and striking a ball. Quadriceps and Hamstring muscles are powerful muscles of the thigh are most active during running, kicking, jumping and sprinting.

## Treatment of Muscle Injuries

The immediate treatment consists of the 'PRICE' protocol:

Protection of the injured part from further damage, Rest, Ice, Compression and Elevation.

The aim of this protocol is to reduce bleeding within the muscle tissue. Ice therapy in the form of ice pack applications (10 minutes every half to 2 hours) should be continued for up to three days after the injury (never apply ice directly to the skin). The rehabilitation after this period involves gradually stretching the muscle to elongate the scar tissue and progressively increasing the muscle strength. Your Osteopath will use massage and neuro-muscular techniques to improve drainage, blood flow and reduce spasm as well as addressing any causative factors such as local or remote stiffness or dysfunction using mobilisation and remedial exercises.

## Reducing Your Risk of Injury

The following measures may have the effect of reducing the chances of sustaining a muscle strain:

**Warming up** is thought to decrease muscle stretch injuries because the muscle is more extensible when the tissue temperature has been increased by one or two degrees. A good warm up should last several minutes - starting gently and finishing at full pace activity. Simply starting with lighter activities and building up gradually whether it be housework, gardening, moving building blocks, preparing for playing golf, dancing or practising match activities such as sprinting and passing for rugby. Recovery after training sessions and matches can be enhanced by performing a cool down, which is thought to help muscles get rid of waste products.

**Maintaining good muscle strength and flexibility** may help prevent muscle strains. Muscle strength allows you to carry out activities in a controlled manner and decreases the unco-ordinated movements which can lead to injury. Tight muscles are associated with strains, and stretching is therefore practised to maintain muscle strength and prevent injury.

**Diet** can have an effect on muscle injuries. For instance, it has been found that if a player's diet is high in carbohydrate in the 48 hours before a match, there will be an adequate supply of the energy which is necessary for muscle contractions. However, if the muscles become short of fuel, fatigue can set in during training or matches. This fatigue can predispose a player to injury. Carbohydrate and fluids can be replenished during training and matches by taking regular sips of a sports drink. This applies to any physical activity.

