

Soft Tissue Injuries

Soft tissue is a collective term for structures in the body excluding bone. Most commonly this would refer to muscle, tendons and ligaments. To ensure optimum healing it is important to be aware of what happens at a cellular level when an injury occurs and what can hinder or assist these processes. Healing of damaged tissues cannot be accelerated beyond the rate that nature intended but delayed or poor repair can be avoided.

This article will give an overview of what happens in the initial stages of an injury using muscle as the main example. Damaged muscles lose their 'tone' and atrophy (shrink) relatively quickly. This can be minimised or avoided with correct and timely management and/or treatment. Often it is the owner carrying out appropriate treatments for the management of inflammation in the early (acute) stage that is vital in optimising the healing process and hence achieving the best possible final outcome.

Damaged and atrophied muscles are unable to act correctly and therefore become limited in their normal movement. This affects their action as part of a group of muscles which in turn affects the stresses to the joints that this muscle group control. The stresses on this joint then become unequal and therefore the joint becomes liable to traumatic changes. These joints are then also put at a mechanical disadvantage and become more susceptible to further injury from minor insults. They are also no longer protected by strong muscles as before.

This can result in connective tissues (ligaments, tendons) in the region becoming vulnerable and if also injured will cause further pain and subsequently altered use of the part. Further muscle wasting takes place and often adhesions form due to lack of normal movement and the products of inflammation that are often left 'hanging around'. Rest and immobility only increases the problem and movement is further affected. In addition, reduced circulation will hinder recovery even further. It is easy then to see how one problem can lead to another and a downhill spiral can occur.

There are quite a few classifications of injury and some differences of terms but the aim of this article is to give a broad overview without getting bogged down with technical details. If the reader is interested in more detail, please contact me for a scientific reference list. Broadly the types of injury we are concerned with here are direct injuries, i.e. blunt trauma such as muscle bruising (contusion) or tears (lacerations) and indirect injuries which can be acute (e.g. sudden overloading of muscle/tendon units), chronic (long standing) overuse – due to repeated overload and/or friction or acute on chronic (e.g. due to a sudden rupture of a chronic lesion). There are several ways to describe the severity of an injury. One basic way is either mild (mild pain, with/without local tenderness) moderate (pain and local tenderness moderate) or severe (complete, or almost, rupture or tearing of a portion of muscle, ligament or tendon with severe pain and loss of function).

There are three stages that occur after any severity of injury, namely **inflammation, repair and remodelling**.

The damaged tissue typically consists of a mixture of dead cells, extracellular substance such as collagen and fat and leaked blood released from damaged vessels

which goes on to form a clot in around 15 minutes. Bleeding can however continue at a reducing rate for between 6-24 hours. This is accompanied by **inflammation** which is a central feature of any trauma. We hear a lot about inflammation but what exactly is it, why does it happen and what should we do about it?

The function of inflammation is to signal tissue damage and trigger local and systemic factors to start the appropriate body defences and repair processes. Inflammation is a very necessary primitive response needed for healing but it is often excessive for this function in soft tissue injuries. This excess produces increased pain, spasm, redness (if you can see the skin) and swelling which can in turn lead to delayed healing and longer term unwanted soft tissue changes such as increased scarring and adhesions. Swelling can go on increasing for several days and this needs to be decreased and controlled to optimise healing. This is why it is important to seek professional advice on how best to manage inflammation as soon as possible and to seek treatments for pain, spasm and swelling. Treatments that we may offer could typically include therapeutic ultrasound, low level laser therapy, TENS, thermo/cryotherapy, some manual treatments or even hydrotherapy/spa in some cases. Your vet may also prescribe anti-inflammatory medicines in addition to the above. This initial acute stage of inflammation can last up to around 72 hours depending on the severity of the damage.

The second or repair phase may last from around 48 hours to 6 weeks and is characterised by the body making and depositing products for repair (ie collagen) but this occurs in a random fashion. Certain cells are still busy removing debris from the injury. Collagen starts to contract (tighten) at approximately 3 to 14 weeks and up to 6 months and sometimes longer. This decreases laxity of the tissues but can cause stiffness and restriction of the area.

The last phase of remodelling can last from 3 weeks to 12 months or more. This is where the body tries to create some order to the randomly laid down repair in order for it to function more like the original tissue before it was damaged and also increase the ability of the repaired tissue to withstand stresses to the area. This is very important as levels of exercise increase.

The important thing to remember when starting early rehabilitation is that the tensile strength of the repaired tissue is quite specific to the forces imposed on it during the remodelling stage. Maximum strength will be gained in the direction of the imposed forces. The key point to note is that it is therefore necessary to duplicate specific stresses in a *controlled way* and at the *right time*. This is where the skill of the physiotherapist lies in determining the correct level and rate of rehabilitation activities. Correctly prescribed rehabilitative exercise will therefore aim to optimise the healing process at whatever stage it may be but also importantly to avoid further injury by overloading healing tissues too soon.

Should you wish to discuss any concerns that you may have in relation to the above, please feel free to contact us without obligation.