

ACUTE INJURIES

What are acute injuries?

Well they are injuries of a traumatic onset the term acute is often used to describe a type of injury (or illness) that is of rapid onset and progression but of a limited duration. These types of injuries are usually the result of a specific impact or traumatic event to the body.

Immediately after the traumatic injury is an inflammatory reaction which is characterized by 5 distinct signs, each of which is due to a physiological response to tissue injury.

1. **Pain** (due to chemicals released by damaged cells)
2. **Swelling or Odema** (due to an influx of fluid into the damaged region)
3. **Redness** (due to vasodilatation- the widening of blood vessels)
4. **Heat** (due to an increase in blood flow to the area)
5. **Loss of function** (due to increased swelling and pain)

The main purpose of inflammation, is to bring fluid, proteins, and cells from the blood into the damaged tissues. It should be remembered that the tissues are normally bathed in a watery fluid (extracellular lymph) that lacks most of the proteins and cells that are present in blood, since the majority of proteins are too large to cross the blood vessel endothelium. Thus there have to be mechanisms that allow cells and proteins to gain access to extravascular sites where and when they are needed if damage and infection has occurred.

The main features of the inflammatory response are, therefore:

- ☒ **Vasodilation**, i.e. widening of the blood vessels to increase the blood flow to the infected area;
- ☒ **Increased vascular permeability**, which allows diffusible components to enter the site;
- ☒ **Cellular infiltration** by chemotaxis, or the directed movement of inflammatory cells through the walls of blood vessels into the site of injury;
- ☒ **Changes** in biosynthetic, metabolic, and catabolic **profiles** of many organs;
- ☒ **Activation** of cells of the immune system as well as of complex enzymatic systems of blood plasma.

Of course, the degree to which these occur is normally proportional to the severity of the injury and the extent of infection.

Inflammation can be divided into several phases.

1. The earliest, gross event of an inflammatory response is temporary vasoconstriction, i.e. narrowing of blood vessels caused by contraction of smooth muscle in the vessel walls, which can be seen as blanching (whitening) of the skin. This is followed by several phases that occur over minutes, hours and days later, outlined below.
2. The **acute vascular response** follows within seconds of the tissue injury and last for some minutes. This results from vasodilation and increased capillary permeability due to alterations in the vascular endothelium, which leads to increased blood flow (*hyperaemia*) that causes redness (*erythema*) and the entry of fluid into the tissues (*oedema*). This phase of the inflammatory response can be demonstrated by scratching the skin with a finger-nail. The "wheal and flare reaction" that occurs is composed of (a) initial blanching of the skin due to vasoconstriction, (b) the subsequent rapid appearance of a thin red line when the capillaries dilate; (c) a flush in the immediate area, generally within a minute, as the arterioles dilate; and (d) a wheal, or swollen area that appears within a few minutes as fluid leaks from the capillaries. It usually terminates after several minutes.
3. If there has been sufficient damage to the tissues, or if infection has occurred, the **acute cellular response** takes place over the next few hours. The hallmark of this phase is the appearance of granulocytes, particularly neutrophils, in the tissues. These cells first attach themselves to the endothelial cells within the blood vessels (*margination*) and then cross into the surrounding tissue (*diapedesis*). During this phase erythrocytes may also leak into the tissues and a haemorrhage can occur (e.g. a blood blister). If the vessel is damaged, fibrinogen and fibronectin are deposited at the site of injury, platelets aggregate and become activated, and the red cells stack together in what are called "rouleau" to help stop bleeding and aid clot formation. The dead and dying cells contribute to pus formation. If the damage is sufficiently severe, a **chronic cellular response** may follow over the next few days. A characteristic of this phase of inflammation is the appearance of a mononuclear cell infiltrate composed of macrophages and lymphocytes. The macrophages are involved in microbial killing, in clearing up cellular and tissue debris, and they also seem to be very important in remodelling the tissues.
4. Over the next few weeks, **resolution** may occur, meaning that the normal tissue architecture is restored. Blood clots are removed by fibrinolysis, and if it is not possible to return the tissue to its original form, *scarring* results from in-filling with fibroblasts, collagen, and new endothelial cells. Generally, by this time, any infection will have been overcome. However, if it has not been possible to destroy the infectious agents or to remove all of the products that have accumulated at the site completely, they are walled off from the surrounding tissue in *granulomatous tissue*. A **granuloma** is formed when macrophages and lymphocytes

accumulate around material that has not been eliminated, together with epitheloid cells and gigant cells (perhaps derived from macrophages) that appear later, to form a ball of cell.

Inflammation is often considered in terms of **acute inflammation** that includes all the events of the acute vascular and acute cellular response (1 and 2 above), and **chronic inflammation** that includes the events during the chronic cellular response and resolution or scarring (3 and 4).

TYPES OF INJURIES:

Knee injuries:-

Anterior cruciate ligament rupture - The ACL is a ligament deep within the knee joint which is important in stabilizing the knee. Ruptures of the ACL are not uncommon, especially in women and are often caused by a twisting force on the knee when changing direction in hockey.

Collateral ligament injuries - There are two collateral ligaments at the knee - one either side of the joint, medial and lateral. These ligament can be damaged in twisting movements and also from a blow to the other side of the knee....[medial](#) / [lateral](#)

Meniscus tears - The menisci are two rings of cartilage which sit on top of the Tibia (shin bone) within the knee joint. They provide shock absorption at the knee. They can be injured through twisting with the foot planted. There are two rings, [medial](#) and [lateral](#)

Patello-femoral knee pain - This is a generic term which covers all kinds of pain at the front of the knee. It is more prevalent in female athletes due to biomechanical differences, such as wider hips, as well as muscle imbalances.

Ankle injuries:-

Ankle sprain - An ankle sprain is one of the most common injuries sustained on a daily basis and in sport. Most commonly, the sprain is to one of the lateral ligaments, caused by the athlete 'going over on' the ankle, so the sole of the foot faces inwards. Moderate to severely sprained ankles should be x-rayed to rule out a fracture.

Ankle fractures - fractures at the ankle can occur in the same way as a sprain, which is why an x-ray should usually be sought.

Leg injuries:-

Hamstring strain - A hamstring strain is a tear to one of the three hamstring muscles, which form the back of the thigh. This most commonly occurs when sprinting or changing direction quickly.

Groin strain - The groin consists of 5 muscles situated on the inner side of the thigh. A groin strain can occur when quickly changing direction, especially if the athlete has not warmed-up thoroughly.

Quadriceps strain - The Quads are a group of 4 muscles on the front of your thigh. They can be injured in sprinting and jumping if not thoroughly warmed-up. The tear can be at the bottom, near the knee, anywhere in the middle, or right at the top, on the front of the hip.

Contusions - These are commonly caused by either impact from a player, their stick or the ball. Contusions are damage to a muscle where it is compressed against the underlying bone, causing pain, bruising and swelling.

Facial injuries:-

Fractured jaw or cheekbone - Due to the use of a hard ball and sticks being lifted too high facial fractures can occur.

Cuts, bruises and nose bleeds - Again common place due to raised balls and high sticks.

TYPES OF TREATMENT:

The R.I.C.E. Method of Acute Injury Treatment

Rest: Resting is important immediately after injury for two reasons. First, rest is vital to protect the injured muscle, tendon, ligament or other tissue from further injury. Second, your body needs to rest so it has the energy it needs to heal itself most effectively.

Ice: Use ice bags, cold packs or even a bag of frozen peas wrapped in a thin towel to provide cold to the injured area. Cold can provide short-term pain relief. It also limits swelling by reducing blood flow to the injured area. Keep in mind, though, that you should never leave ice on an injury for more than 15-20 minutes at a time. Longer exposure can damage your skin. The best rule is to apply cold compresses for 15 minutes and then leave them off for at least 20 minutes.

Compression: Compression limits swelling, which slows down healing. Some people notice pain relief from compression as well. An easy way to compress the area of the injury is to wrap an ACE bandage over it. If you feel throbbing, or if the wrap just feels too tight, remove the bandage and re-wrap the area so the bandage is a little looser.

Elevation: Elevating an injury reduces swelling. It's most effective when the injured area is raised above the level of the heart. For example, if you injure an ankle, try lying on your bed with your foot propped on one or two pillows.

Homeopathic treatments

Bryonia: For joint-type pain from injury, take a 30c dose of Bryonia every four hours for a maximum of two days. Bryonia, also known as Bryony and Wild Hops, is a member of the gourd family. The remedy Bryonia is derived from the plant's roots and has been used as a [homeopathic remedy](#) for many ailments for several hundred years, including headache and joint-type pains.

Arnica: When acute injuries involve shock and trauma, take a 30c dose of Arnica every three to four hours until symptoms subside, with a maximum of four doses a day. For minor burns and scalds, take a 30c dose of Arnica every 15 minutes, with a maximum of three doses a day. Arnica is an herb native to Europe and Siberia, but there are also many species of it that grow in the United States and Canada. In homeopathy, Arnica is often used as a remedy in first-aid situations as well as those that stem from acute injury such as sprains or strains to the joints. It works particularly well to prevent [muscle aches](#) if used both prior to, and after, sports-related activities.

Ruta: For injuries with pain related to sprains and strains, take a 6c dose of Ruta four times daily until stiffness and pain subside, with a maximum of two days. Ruta is an evergreen shrub, indigenous to the Mediterranean and parts of Asia and is also referred to as Rue and Herb of Grace.

Hypericum: For pain from cuts and grazes, take a 30c dose of Hypericum every two hours until pain diminishes, for a maximum of three days in a row. For minor eye and ear injuries, take a 30c dose of Hypericum every half hour until symptoms subside, for no more than a maximum of 10 doses. For injuries that include shooting-type pains, take a 16c dose of Hypericum every hour until pain diminishes, with a maximum of four doses a day. Hypericum, also referred to as St. John's wort, is a perennial flower native to Europe, Asia and throughout North America.

Ledum: For minor cuts and grazes, take a 6c dose of Ledum every two hours for a maximum of six doses. For acute injuries such as stings that involve both pain and swelling, take a 6c dose of Ledum every eight hours for a maximum of three days. Ledum is one of the more common homeopathic remedies suitable for many acute injuries such as cuts, grazes, puncture wounds, eye injuries and stings. An evergreen shrub, found throughout North America, Ledum is also referred to as Marsh Tea or Wild [Rosemary](#).

For Broken Bones.

Symphytum: This remedy is best known for helping broken bones rejoin and heal. It should be taken after a bone is set to ensure proper joining of the bone. (A common recommendation is to take it several times in the first few days, then once a week while the bone is healing.) It is also useful in many cases when pain persists in old, healed fractures. 30c

CALCIUM and PHOSPHORUS. The main minerals in bone are calcium and phosphorus, in the form of calcium hydroxyapatite crystals. This hydroxyapatite compound plays an important role in regulating the elastic stiffness and tensile strength of bone. The building and rebuilding of bone tissue requires adequate supplies of both calcium and phosphorus, which can be supplied from diet and bone reserves. Early research suggested that fractures can heal normally independent of dietary calcium and indeed it has been found that during the first few weeks of healing, calcium is drawn from the

skeleton for fracture healing. After that, the diet provides the calcium necessary for fracture repair. Calcium adequacy at the RDA level is important, but unusually high intakes do not appear to speed fracture healing. As calcium absorption is dependent on vitamin D, these nutrients work synergistically. Human studies, in fact, suggest that for best fracture healing both calcium and vitamin D should be obtained in optimum daily levels. Most of us consume plenty of phosphorus and often too much if the diet is high in processed foods and colas. However, the elderly, dieters, and those on low protein diets often do not consume enough phosphorus to meet the needs of new bone formation.

ZINC. Some 200 enzymes require zinc for their functioning. Many of these functions involve cell proliferation. Zinc supplementation aids in callus formation, enhances bone protein production, and thus stimulates fracture healing.

COPPER. Copper aids in the formation of bone collagen and is important to the healing process. The body's demand for both copper and zinc rises according to the severity of the trauma.

VITAMIN C: is essential for proper synthesis of the bone collagen protein matrix. It is also one of the most important antioxidants and anti-inflammatory nutrients. In severe vitamin C deficiency, collagen becomes too unstable to function properly, which results in skin lesions and fragile blood vessels with eventual bleeding from all mucous membranes. A tendency to black and blue without reason is most often a sign of sub-clinical vitamin C deficiency. Because of its essential role in bone collagen formation, adequate vitamin C is required for fracture healing. Several animal studies document this fact. For example, a small Turkish rat study showed that vitamin C supplementation accelerated the fracture healing process. A similar, yet larger, Spanish study also documented that rats with higher vitamin C blood levels developed a stronger fracture callus than did those with low blood levels.

VITAMIN D: is the primary regulator of calcium absorption and without adequate vitamin D calcium blood level drops making less calcium available for fracture healing. Studies as early as 1945 documented that low vitamin D levels led to suboptimal fracture healing and the administration of vitamin D accelerated initial fracture callus mineralization. Further, we now know that vitamin D, in conjunction with vitamin K, stimulates the transformation of fracture site stem cells to bone building osteoblasts. Overall, vitamin D is central to fracture healing and vitamin D status has been shown to be an independent predictor of functional recovery after hip fracture.

VITAMIN K: is an essential part of the biochemical processes that bind calcium to bone and it is required for proper formation of the osteocalcin bone protein. In addition, vitamin K helps conserve calcium by reducing the loss of calcium in the urine. Since 1960 it has been noted that vitamin K has a beneficial effect on fracture healing and has a real effect on all collagen tissues, especially bone tissue. Researchers have found that vitamin K is sequestered to the site of fracture resulting in markedly depressed circulating levels of vitamin K in fracture patients. The time taken for the vitamin K blood level to return to normal appears to be influenced by the severity of the fracture.

VITAMIN B6: is one of the B vitamins that has been linked to fracture healing. Animals deficient in this vitamin fracture more frequently and experience reduced fracture healing. It appears that vitamin B6 modulates the effects of vitamin K on bone through complex biochemical pathways.