Sports Soft Tissue Injury

by

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What is Soft Tissue?

- Skin
- Ligaments – connects bones at joints
- Tendons – attaches muscle to bone
- Fascia – dense connective tissue
- Skeletal Muscle – usually attached to bone and moves parts of the skeleton
- So, tissue that has not hardened into bone and cartilage
What are the Type of Injuries?

- Sprain ligaments are commonly caused by indirect impact, over-stretching (twisting)
- Muscle strains – pulling action, over stretching, rupture or direct trauma / overuse. Includes tendons
- Contusions (bruise) – direct blow
- Intramuscular hematoma is confined to the muscle compartment which fills up with blood. Is more painful and restrictive of ROM
- Intermuscular hematoma is when the blood escapes through the fascia and so becomes distributed, thus bruising will be evident
Skeletal Muscle

Structure of a Skeletal Muscle

Bone  Perimysium  Blood vessel  Muscle fiber  Nucleus  Nucleus

Tendon  Epimysium  Endomysium  Fascicle  Sarcomere  Striations

Myofibril  Sarcolema  Sarcoplasm  Striations  Filament(s)
Sliding Filament Theory

- Muscle cell ‘fibre’ includes myofibrils which consist of 2 types of protein called thick and thin filaments.
- Thick filaments are formed with myosin protein, while thin filaments with actin protein. Both form the main contractile elements of muscle and as a unit is called a sacromere.
- The length of sacromere is determined by the sliding nature of the thick and thin filaments which overlap.
Muscle

- Arranged to correlate with the power needed
- Grouped in orientation of their fibres – parallel / oblique or pinnate / spiral
- The agonist or prime mover (muscle) brings about movement
- At the same time the antagonist relaxes
Soft Tissue Healing from Injury

- Repairing damaged tissue
- Replaced by granulation tissue, which matures to form scar type tissue
- Phases overlap
- Bleeding / inflammatory / proliferation / remodelling phases
Bleeding Phase

• Bleeding time to stop will vary with the nature of both the injury and tissue
• Short lived 6 – 8 hours (acute stage)
• Reduces up to 24hrs
• Muscles will bleed longer than other structures i.e. ligaments
Inflammatory Phase

- Essential component of tissue repair
- Rapid onset - first few hours
- Quickly increases to maximum 2 – 3 days
- Gradually resolves over next few weeks
- Largely beneficial
- Over response can cause problems
Proliferation Phase

• Generation of the repair material
• Production of scar tissue (collagen material), needs to be laid down in an orientated way
• Rapid onset 24 – 48 hours
• Peaks 2 – 3 weeks / bulk scar tissue
• Final products several months
• Repair tissue is different. Fibres shorter, inelastic and different elasticity, increases risk of recurrence of rupture


Remodelling Phase

- Greatly overlooked phase
- Results in organised / functional scar tissue
- Starts as early as 2 weeks
- Continues for months to a year
- With maturity, the collagen becomes more orientated in line with local stress
Proliferation / Remodelling Phase – Important in Successful Healing

- Collagen fibres need to be orientated to provide tensile strength in the right direction.
- Using normal stresses via movement, collagen can be laid down this way.
- If not, collagen fibres are laid in haphazard and thus weakened pattern is caused.
- With maturity, the collagen becomes even more orientated in line with stress.
What Does This Mean for Treatment?

- Excessive bleeding should be discouraged

- Inflammation is normal and essential, though when acute and continues, can cause problems. A question re- NSAID’S use

- Early gradual mobilisation (active rest) orientates scar tissue in the line of stress, similar to normal tissue plus early movement helps breaks down adhesions

- Unhelpful adhesions / scar tissue will need direct intervention – Sports massage techniques

- Remodelling is helped by gradual return to full physical stress - rehabilitation programme
Overuse Syndrome / Sports

• Muscular system develops to the way it is used
• Individuals have unique pattern of imbalances
• Bundles of muscle fibres react fractionally in a different way, causing small areas to be under slightly greater pressure than surrounding areas
• A few fibres are damaged at microscopic level
• Causes secondary muscle tension to the surrounding tissue

OVERUSE SYNDROME BEGINS
Overuse Syndrome

- Same as normal tissue response of bleeding / inflammation and formation of scar tissue, yet at a microscopic level
- Secondary muscle micro-tension may cause soreness but no real pain and activity continues as inflammatory response is small
- Moderate activity is helpful at this stage yet further continuous stress prevents recovery
- Adjacent fibres work harder due to micro tissue damage, which is less contractual and stretchy
- More micro trauma / scar tissue occurs so less elasticity and the circle continues
Overuse Syndrome

You are full into overuse syndrome

• As small parts of muscle deteriorate, imbalance in the muscle and the group occurs
• 1 muscle problem then effects different muscle systems. May still be unnoticed!
• Tendon tension increases and may tear (acute)
• Biomechanical faults develop, causing more problems elsewhere in the musculoskeletal system
How to Treat / Stop Overuse Syndrome

- Effective and efficient training, includes correct biomechanics. Be prepared to adapt
- Have rest days (please), vary training
- Use soft tissue massage (STM) techniques to identify and treat problems before any symptoms are recognised
- STM to intervene in soft tissue problem i.e. adhesions / scar tissue

FIND THE CAUSE
Soft Tissue Injury Approach

- Facilitate / promote normal tissue repair
- Immobilization and early mobilization
- Enhance sequence of events
- Promote normality
- Appropriate therapy to influence the process in a positive way
- Intervene if needed i.e. adhesions / infection / overuse syndrome
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