SOFT TISSUE INJURIES

Assessment and Treatment Principles

1. MUSCLE FATIGUE

Due to overstimulation or overuse of a muscle/group of muscles. The strength of contraction becomes progressively weaker.

e.g. exercise produces by-products

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Lactic acid, $C0^2$ H^20 overproduction

↓

muscles less efficient

↓

fatigue dysfunction

↓

PAIN

e.g. postural muscles

Long periods of immobility e.g. sedentary job etc.

↓

fatigue of postural muscles

↓

muscles less efficient

↓

postural imbalances

↓

lesions and further somatic

2.MUSCLE CRAMP

Involuntary muscle spasm, sustained and painful.

CAUSES:

- Can be associated with intense heat and dehydration
- Irregular physical activities: - sudden demand → brain fails and contracts all
- Accumulation of lactic acid
- Cold- spasm to counteract cold, but overreacts (e.g. swimming)
- Muscle fatigue
- Anything that impairs circulation - socks/shoes, etc.
- Sodium, potassium, magnesium deficiency/poor diet

TREATMENT:

- Massage - petrissage and effleurage
- Reciprocal Inhibition (RI) on antagonist
- Applying heat

PREVENTION:

- Regular physical activities
- Good basic training and adequate warm-up

3. ADHESIONS

Where the fascia between muscle bundles/ groups of muscles has become stuck together. E. g. very common between the 2 heads of the Gastrocnemius muscles.

TREATMENT:

- Massage: striping between muscles to find and treat adhesions, Neuromuscular Technique) (NMT)

- Muscle Energy Technique MET - Post-isometric Relaxation (PIR)
- Soft Tissue Release (STR)

4. MUSCLE SPASM

Involuntary sudden muscle contraction, when motor units, that normally fire muscle fibres alternately, suddenly all fire together.

CLONIC - alternate contraction/relaxation
TONIC – sustained

When muscle is in spasm, it uses increased nutrients and oxygen to sustain contraction. This produces increased waste products and leads to ischemia, as intramuscular blood supply is compressed.

These cause TISSUE DAMAGE
↓
PAIN
↓
FURTHER SPASM
↓
INFLAMMATION
↓
FIBROTIC TISSUE

CAUSES:
• Usually a protective mechanism in response to trauma / tissue damage.

TREATMENT:
- Massage - petrissage and effleurage; Muscle Energy Technique (MET)
- Heat (where no inflammation)

5. MUSCLE STRAIN (TEAR/ RUPTURE)

The most common injury. Most strains are minor and often ignored by the sportsperson. Their untreated repair can result in areas of scarring where muscle fibres have lost their elastic and contractile ability, which will impair function of that muscle.

GRADE I (MILD / PARTIAL)

- A contusion in which there is tearing of a small number (<5%) of muscle fibres with the fascia remaining intact
- Bleeding is minimal
- Pain and spasm is localised
- Muscle function is normal, but endurance may be reduced
- No loss of strength / no restriction of movement
- Active / passive movement is painful

GRADE II (MODERATE/ PARTIAL RUPTURE)

- Results from more severe trauma
- A larger number (>5%) of muscle fibres are injured, and injury occurs over a greater area
- A definite palpable mass is evident with this injury, and pain on palpation and upon any attempt to contract the muscle is considerable
- Intra-/inter-muscular haematoma
- Function of the muscle is impaired, with contractility and extensibility being greatly reduced

GRADE III (COMPLETE/ TOTAL RUPTURE)

- A complete rupture
- The muscle ends contract and a definite gap is apparent
- A snapping sound may be heard at the time of injury
- Bleeding and swelling are considerable
- Active contraction of the muscle is not possible!
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CAUSES:

- Direct trauma (compression rupture)
- Indirect trauma (distraction rupture) - overstretching, overloading, shearing
- Overuse strain (repetitive stress)

SIGNS/SYMPTOMS:

- Immediate pain upon injury - sharp
- Later - attempt to contract muscle is painful; passive stretch of muscle may be painful
- Partial rupture - small lump and adjacent gap in tissues may be palpable
- Total rupture - large lump will be palpable
- Local pain and swelling (due to haematoma)
- Bruising may appear after 24 hours

TEST FOR MUSCLE STRAIN:

1. Load muscle (isometric contraction). Do this carefully, by degrees.
2. Passive stretch.

Always do both, testing for pain in injured part of the muscle.

VISUAL:

- Look for oedema
- Look for dip in muscle

PALPATORY:

- Feel for heat
- Feel for dip in muscle
- Feel for lump

TREATMENT:

ACUTE

- RICE (Rest, Ice, Compression, Elevation),
- only extremely gentle effleurage and Manual Lymphatic Drainage (MLD) to help drain inflammation.

POST ACUTE

When no longer any signs of inflammation!

- Massage :start with effleurage, gentle kneading and petrissage, build up massage to deeper work to flatten fibres, reduce/prevent adhesions, etc.
- Finish with ice pack to avoid further inflammation.
- Stretching the muscle passively while the ice pack is on, and use small isometric contractions to reduce fluid.
- Heat can be useful.
- If the rest of the muscle group is in spasm, use Reciprocal Inhibition (RI) to relax.

Keep treating for 6 weeks after an injury, as adhesions will prevent muscle from functioning normally. Muscle can take 4-5 weeks to heal.

6. TENDON STRAIN (TEAR/RUPTURE)

Tearing of some (partial rupture) or all (complete rupture) of the fibres of a tendon.

CAUSES:

Partial:

- Insufficient warm-up (fibres not ready for tension of sporting activity to be applied)
- Tendon / muscle already in a fully contracted position when force is applied.
- External blow / force
- Weakness of the tendon compared to the muscle (degenerative changes occur in tendons after the age of 35)

Complete:

- High impact on hard surfaces (e.g. tennis)
- Degeneration of tendon (aging))

SIGNS/SYMPTOMS:

Partial:

- Immediate pain upon injury or a certain movement (depending on severity)
- Localised pain, bruising and swelling over affected area
- A lump may be felt along the tendon at injured site

Complete:

- A sudden "snap" followed by intense pain
- Pain may reduce quickly, due to lack of function
- No functional movement possible
- Swelling and bruising

7. TENDINOPATHY (degeneration)/TENDINITIS / TENOVAGINITIS

Inflammation of the tendon (tendinitis) or of its sheath (tenovaginitis).

CAUSES:

- Friction (e.g. from footwear)
- Repetitive movements or repetitive loading
- A tight muscle causing friction of tendon against retinaculum, other tendons or bone
- Degeneration over time (wear and tear)

TEST FOR TENDON INJURY:

- Palpate
- Painful when used
- Distinguish between tendon itself and tendon sheath injury
- Thompson's test for total tear

TREATMENT:

ACUTE

RICE (Rest, Ice, Compression, Elevation)

POST ACUTE / CHRONIC

- Deep Tissue Frictions to area
- Ice afterwards to avoid any further micro-inflammation and scarring

Tendons can take 6-8 weeks to heal fully depending on degree of injury.

8. LIGAMENT SPRAIN (TEAR/RUPTURE)

Trauma to a joint that causes a partial or complete tear anywhere along a ligament.

SIGNS/SYMPTOMS - will depend on degree of tear

- Immediate pain upon injury
- Often considerable swelling and bruising
- Pain on passive movement of the joint

TEST FOR LIGAMENT TEAR:

- Take joint through range of movement – PASSIVELY
- This will elicit pain in the injured ligament (muscle not being used ⟶ cannot be muscle)
- Joint may be unstable

TREATMENT:

ACUTE

- RICE (Rest, Ice, Compression, Elevation)
- Support, stabilise or immobilise joint (strapping) for 2 weeks.
- Meanwhile, treat 3 days to a week after injury with ice pack and effleurage (to bring blood to area). Continue this treatment twice a week for 2 weeks.
- 5th treatment= week 3. Ice pack, massage and passive stretching, and advise exercises.
- Cohesive bandage to allow more movement.

It can take 12 weeks for full healing of a ligament.

POST ACUTE

After 6-8 weeks, and/or when no inflammation/heat is present, still support with cohesive bandaging

Switching from ice packs to contrast bathing (flushing) once every day for 10 minutes (end with cold). Brings blood supply to a poorly supplied area to help healing process.

9. BURSITIS

Bursitis is inflammation of a bursa, caused by friction or compression, leading to irritation. Can also be caused by trauma to surrounding structures causing bleeding into the bursa.

SIGNS/SYMPTOMS:

- Very local pain over area of bursa
- Palpate for pain and heat
- Look for oedema
- May be impingement

TREATMENT:

ACUTE

Ice and rest

POST ACUTE

Massage around area. DTF to break down scar tissue

10. NERVES

May be torn as part of strain or dislocation, or pressure from muscle spasm or muscle tightness may be impinging on nerve (e.g. piriformis ⟶ sciatic symptoms), or may be irritated between the bones at a joint.

Symptoms: numbness, altered sensation, pins and needles, sharp or shooting pain.