Treatment modalities to support soft tissue repair

Process of soft tissue repair

- Soft tissue will prepare without intervention
- The aim of sports massage is to improve the process
- The timescale for healing of tissue will vary
- Healing time will be affected by:
  - The severity of the injury
  - The treatment provided to care for the injury

Healing phases or stages

- The acute, or inflammatory phase (48 -72 hours)
- The sub-acute, or repair phase (up to 14-21 days)
- The chronic, or remodelling phase (21 days +)

Source: Norris, C (2013) *Exercise Therapy*. London. Bloomsbury Publishing

Acute phase

- Tissues are damaged
- Tissues are reacting to the damage (muscle, connective tissue, lymphatic and blood capillaries, sensory and motor nerves)
- Bleeding, swelling, inflammation, heat, redness
- Aim to reduce any further damage
- Stop activity!

Tissue response to Injury

- Local tissues react to the damage
- Vasoconstriction - to reduce blood flow and minimise blood loss
- Reduced blood flow and oxygen to other cells causes secondary cell death.
- Platelets activated - to create a blood clot (*thrombin*) to catch debris and bacteria
- Histamine release by dying cells - to dilate the undamaged blood and lymphatic vessels and increase permeability of cell membrane
- Muscle spasm to restrict movement of the local tissues
- Lymphocytes directed to injured area to clear waste

Treatment aims

Acute phase

- Haemostasis
- Protect against further injury
- Immobilise if necessary
- Prevent excessive oedema
- Pain relief
- Reduce swelling
- Reduce muscle spasm
- Reduce bleeding
- Minimise secondary cell death

Please note:

Injuries in the ACUTE stage are **contra-indicated** and require referral.

Acute phase treatment

P

R

I

C

E

- **P**rotect
  - Referral for diagnosis
  - Support injured limb
  - First aid
- **R**est
- **I**ce
- **C**ompress
- **E**levate
- Mobilise within pain free range

Only **cold therapy** during the acute stage to limit blood flow to the area.

Sub acute phase

When healing tissues begin to form and there is no further bleeding or swelling.

- Tissue regrowth around the area
  - Collagen fibres are laid down to form scar tissue
- New lymphatic and blood vessels form
- Blood vessels - to deliver oxygen and nutrients to aid healing
- Lymphatic vessels - drainage system, to reduce oedema

Scar tissue

- Collagen fibres are orientated along lines of stress
- Haphazard, disorganised formation of fibres can lead to suboptimal repair
- Tissues must align with original tissue for optimal functioning
- Tissues have to be stressed slightly to enable this – progressive movement and exercise at the correct level (Davis's law)

Treatment aims

Sub-acute stage

- To improve proprioception and restore neurological function
- To increase ROM and flexibility
- To reduce pain
- To improve mobility and restore range of motion
- To restore strength
- To improve blood flow to damaged tissues
- To minimise scar tissue formation
- To encourage blood flow and lymphatic drainage

Formation of collagen fibres can be manipulated to optimise scar tissue formation.

Sub-acute phase treatment

- Massage – some techniques – to client tolerance
- Mobilisation techniques
- Heat
- Ice
- Gentle stretching
- Muscle Energy Techniques
- Prescribed medications (NSAIDS)

Mobilisation methods

1. Passive - the therapist physically assists the client to move injured limb

2. Active assisted - the client actively moves the affected limb with the aid of an external support/aid

3. Active - the client moves the affected limb using a non-weight bearing exercise - pain free and tolerable range

Chronic phase

- Scar tissue contracts and strengthens at injury site
- Progressive movement and exercise essential to provide stress to tissue and enable functional healing
- Graded rehabilitation specific to the damaged structure
- Tissue can be virtually healed and pain free, but is susceptible to further injury, if stress excessive (e.g. sport)

Chronic phase

Chronic phase

- To restore functional capabilities of ligaments, tendons, muscles and other tissues
- To facilitate maturation of collagen
- To reduce adhesions
- To regain and improve mobility and flexibility
- To improve proprioception
- To regain strength
- To facilitate sports specific function

Chronic phase treatments

- Massage
- Stretching techniques
- Proprioceptive neuromuscular facilitation (PNF)
- Soft tissue release (STR)
- Heat
- Progressive strength-building exercises
- Functional/sport specific rehabilitation
- Frictions (last resort – if nothing else has worked!)

Chronic phase treatments

- Static stretching
  - Active and passive
- Dynamic
  - Active
  - Ballistic
- Pre-contraction
  - MET
  - PNF, RI

Methods for developing strength

- Resisted exercises using progressive overload
- Static (isometric)
  - Good for stabilisation
  - Can be used in the early stages of healing
- Concentric
  - Shortening of muscle fibres
  - Used in the mid an late stages of rehab

Methods for developing strength

- Eccentric exercises
  - Lengthening contractions can begin when concentric contractions are pain free
  - Concentric-eccentric combinations can be integrated
- Late stage exercises need to be developed to be:
  - Functional
  - Individual
  - Sport specific

Factors influencing healing

- The severity of the injury and amount of tissue damage
- Cessation of activity, e.g. immediate stop or kept playing/training?
- Rest and recovery time allowed
- Treatment provided to assist healing
- Diet and nutrition
- Medication
- Staged recovery movement programme
- Age of client
- Health status
- Psychology and mind set