Scar Tissue
p. 243 in Rattray

Definition: A collagen based tissue that develops as a result of the inflammatory process

Causes

- The inflammatory response that results from wound, burns, musculoskeletal trauma, inflammatory arthritides or late stages of osteoarthritis (after cartilage is destroyed)
- Prolonged immobilization of a structure
- Paralysis of a structure due to a peripheral or central nervous system lesion

Types

- Contracture is shortening of connective tissue supporting structures over or around a joint
    - A contracture should not be confused with a muscular contraction (muscle develops tension as it shortens (concentric) or lengthens (eccentric))
- Adhesion occurs when reduced motion at a joint allows cross links to form among collagen fibres, further reducing the range of motion
    - This is most evident when tissue is left in a shortened position for a prolonged period of time
- Scar Tissue Adhesion occurs with an injury or an acute inflammatory process
    - Collagen formation during tissue repair allows adhesions and contractures to form in random patterns
    - These adhesions in injured and surrounding tissue reduce range of motion
- Fibrotic Adhesions occur within ongoing chronic inflammation
    - Can cause moderate to severe restrictions in range of motion (difficult to eradicate)
- Irreversible Contracture occurs when fibrotic tissue or bone replaces muscle and connective tissue
    - There is a permanent loss of range of motion that can only be restored by surgical means
- Proud Flesh is a term that refers to the thick dermal granulation tissue that results from an abnormal healing process
    - When a wound doesn't re-epithelialize there is chronic inflammation, the resulting granulation tissue is composed and collagen and capillaries and in turn gives a raised, red structure that is susceptible to damage
- Hypertrophic Scarring is an over growth of the dermal tissue that remains within the boundaries of the wound
    - The collagen fibres are randomly organized in nodular patterns
    - These areas must be removed surgically and then replaced with skin graft
- Keloid is dermal scar tissue that extends beyond the boundaries of the original wound
    - Is thought to contain increased amounts collagen in a more random pattern that hypertrophic scars
    - May continue to grow for many years
    - Do not respond well to surgical excision as they often return
    - Steroid are commonly injected to help reduce keloid scarring

Hypertrophic and Keloid scars

- are most prominent in darker pigmented people such as those

from Asian or Black ancestry.
- 88 % of these scars are in young people under the age of 30 .
- hypertrophic scar tissue is most likely to appear on the sturnum, upper back, shoulder deltoid area, buttocks and dorsal surface of the foot.
- Keloid scars are most likely to appear from ear level to the waist and from shoulder to the elbow.

Effects of Massage on Scar Tissue

- Removal of edema is important because collagen fibres can form in the edema
- Massage has been found to soften scar tissue by freeing restrictive fibrous bands and increasing circulation
- Stretching scar tissue after treatment is essential
- Helps desensitize hypersensitive scars through tactile stimulation
- Relaxes the client and decreasing pain
- Massage performed before the collagen matures can prevent hypertrophic scarring

Contraindications

- Frictions are contraindicated if the client is taking anti-inflammatory medications
- Frictions are not recommended for proud flesh or keloid scars

TREATMENT

Assessment

- Observations
    - Edema in early stages but could persist in later stages
    - Redness and raised scar in early stages, flatter and pale with time
    - Scar tissue is avascular and has no hair or sweat glands
    - Postural dysfunction can result from presence of scar tissue, could be due to adhesions
- Palpation
    - Scar tissue and adhesions are thick hard areas
    - Could be cool to touch due to ischemia
    - Disuse atrophy may be present in affected muscles
- Testing
    - AF and PR ROM will likely reveal reduced range of motion and possible pain in joints and muscles affected
    - AR testing reveal weakness in affected muscles

Massage

- Pre-Treatment Hydrotherapy
    - Applications of heat, such as paraffin wax or hydrocollator are used with maturing scar tissue
- Positioning
    - Is for client comfort and accessibility of tissue to be treated
- Create a mobile and functional scar
    - Rigid and restricted area at the periphery of the scar are treated first
    - Techniques should create a torsion on restricted area
    - Fascial techniques are performed
    - Cross fibre frictions are used on the remaining adhesions

- All techniques are done within the client's pain tolerance
- Massage to scar is always followed by passive stretch (alignment of fibres)
- Post-Treatment Hydrotherapy
    - Cold hydrotherapy after frictions and other techniques that create prolonged hyperemia

Self Care

- Pain free movement is performed as soon as possible after injury (early stages – partial range of motion, ranges increase as healing process progresses)
- Prolonged passive stretch introduced in late sub acute
- Strengthening exercises begin in early sub acute with isometric contractions, late sub acute isotonic exercises are introduced
- Strengthening antagonist muscles will help prevent contractures from developing in agonist muscles