

Stages of Tissue Healing Results of Macrotrauma:

Rapid Swelling, Acute Pain, Muscle Spasm, Loss of Motion, Loss of Function

Stage 1: Active swelling; 0-72 hours: *Inflammation due to release of chemical mediators *Edema restricts motion, ↑ pain, fibrosis *Restriction of motion due to pain, spasm, edema. 1. Pain Spasm reflex (Nocifensive): pain causes reflex muscle spasm *Causes of pain: ischemia, chemical mediators, acidosis, noxious mechanical deformation *Ice: vasoconstrictor, analgesic, anesthetic, muscle relaxer, lowers metabolic rate of cells

Stage 1 Goal: ↓ pain, ↓ swelling. Care: 1. Rest & support. 2. Ice to ↓ swelling, pain & spasm. 3. Adjust when safe.

Stage 2: Passive congestion; 3 days-3weeks: *Restoration of vascular integrity, but previously escaped inflammatory exudate remains in tissue spaces. *Role of Motion vs Immobility: 1. Immobility prolongs edema, ↑ risk of fibrosis, contractures, adhesions. 2. Mobility ↑ removal of edema, improves nutrition to discs & articular cartilage & influx of oxygenated blood, normalizes proprioception. *Facet cartilage nutrition: Adjustments distract joints, lower infra-articular pressure, resulting in an influx of synovial fluid. Adjustments also restore motion which acts like an articular pump stimulating the circulation of synovial fluid. *Disc nutrition: adjustments stimulate fluid flows (pressure dependent exchanges of fluid, nutrients & wastes).

Stage 2 Goal: Remove fluid ↑ motion ↓ pain. Care: 1. Adjust & soft tissue work. 2. Motion exercises.

Stage 3: Repair Day 5 to 3-6 wks: *Deposition of Scar Tissue. *Effects of Immobility: stress deprivation, ↑ scar tissue deposition, that is haphazard & random, progressive shortening of scar tissue, chronic stiffness, ↑ likelihood of degeneration. *Effects of Motion: Wolfs Law of soft tissue: tensile stress stimulation improves alignment of connective tissue to support normal joint architecture.

Stage 3 Goal: Restore normal motion & sensation, promote healing & ↓ pain. Care: Adjust, soft tissue work & motion exercises.

Stage 4: Remodeling: begins at 3-6 wks, usually takes 3-14 wks but may last up to 1 yr with severe injury. A. Body attempts to re-align scar tissue along directions of stress. B. Body attempts to restore crimp (regular undulations in connective tissue) which permits it to elongate & recover its original length.

Stage 4 Goal: Improve & maintain normal motion/flexibility, restore & maintain function, ↓ chronic pain, ↓ risk of re-injury & degeneration. Care: Adjust, soft tissue work & motion exercises. Malik Slosberg, DC

Goals of Care:

1. Pain Relief
2. Promotion of Full Healing
3. Restoration of full function
4. Reduction of the risk of re-injury
5. Prevention of accelerated degeneration.

These goals involve 3 separate time frames: 1. How long does it take for pain relief? 2. How long does it take for tissues to heal? 3. How long does it take to restore function?