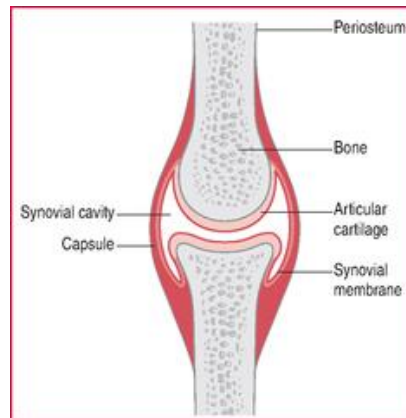


Effects of Joint Motion/mobilizations

Farjad afzal

Nutrition of articular cartilage

- Joint motion stimulates biological activity by moving synovial fluid, which brings nutrients to the avascular articular cartilage of the joint surfaces and intra-articular fibrocartilage of the menisci



Immobilizations



**Decreased flow of nutrition
to joints cartilage**



Atrophy of articular cartilage

Damaged Joint



Joint extensibility

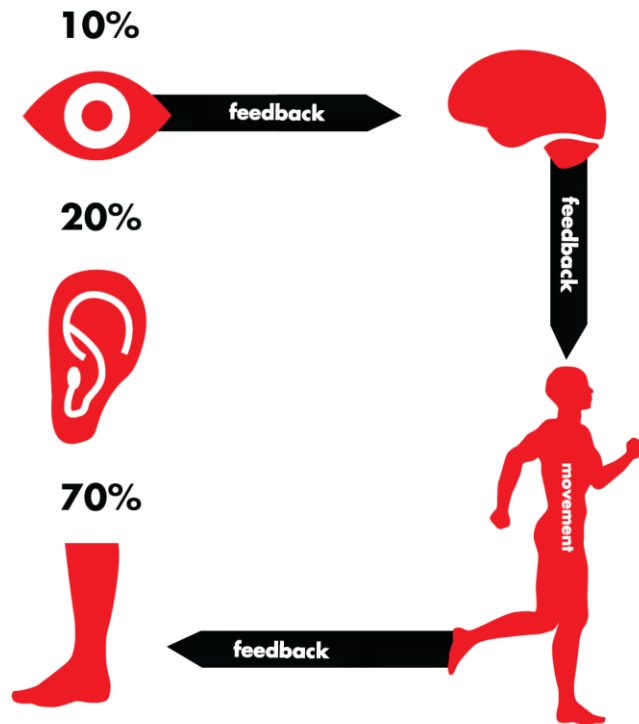
- Extensibility and tensile strength of the articular and periarticular tissues are maintained with joint motion
- With immobilization there is fibrofatty proliferation, which causes intra-articular adhesions as well as biochemical changes in tendon, ligament, and joint capsule tissue, which in turn causes joint contractures and ligamentous weakening

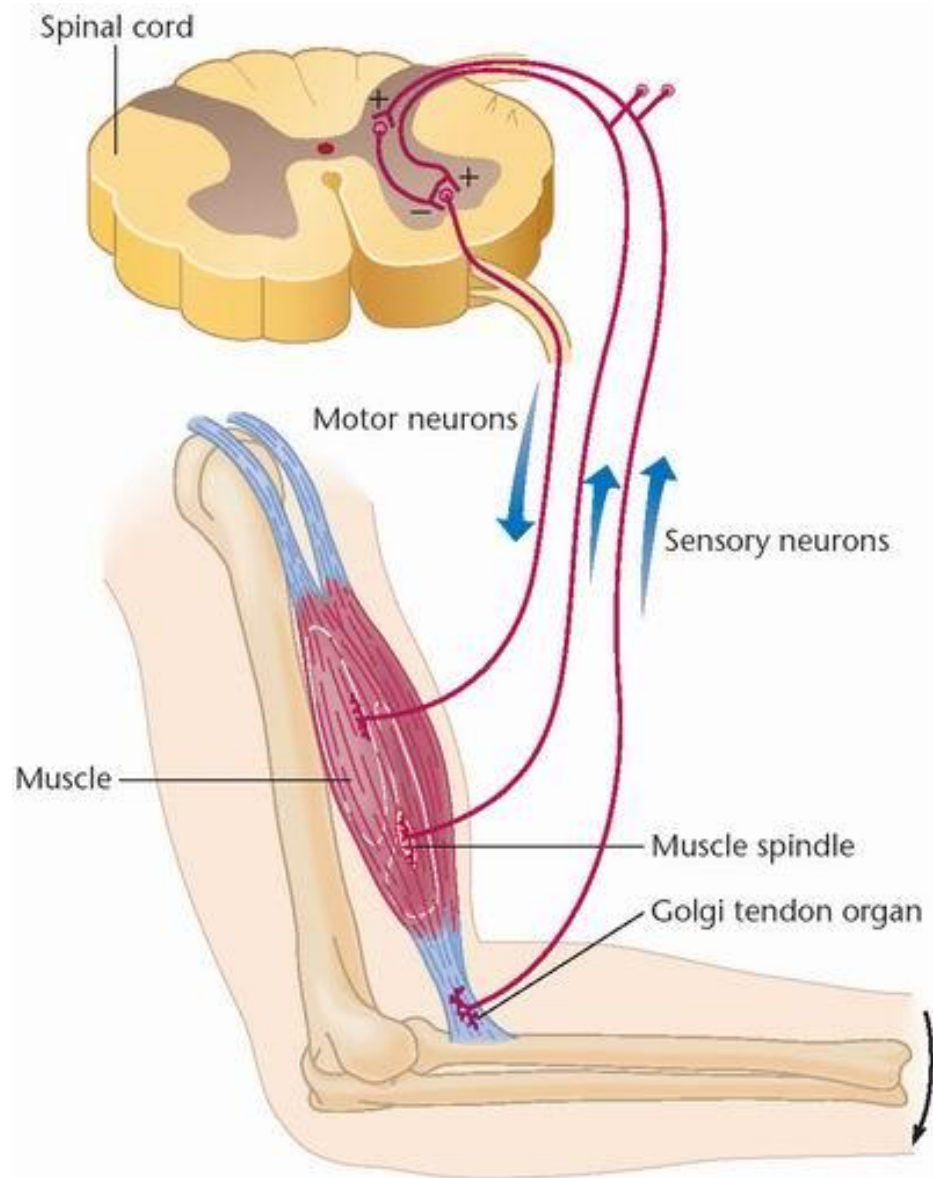
Proprioception





= Proprioception





Proprioception and awareness

- Afferent nerve impulses from joint receptors transmit information to the central nervous system and, therefore, provide awareness of position and motion.
- With injury or joint degeneration, there is a potential decrease in an important source of proprioceptive feedback that may affect an individual's balance response

- Static position and sense of speed of movement (**type I** receptors found in the superficial joint capsule).
- Change of speed of movement (**type II** receptors found in deep layers of the joint capsule and articular fat pads)
- Sense of direction of movement (type I and III receptors; **type III found in joint ligaments**).
- Regulation of muscle tone (type I, II, and III receptors).
- Nociceptive stimuli (**type IV receptors found in the fibrous capsule, ligaments, articular fat pads, periosteum, and walls of blood vessels**)

Indications of joint mobilization

- **Gentle mobilizations** may be used to treat pain and muscle guarding,
- whereas **stretching techniques** are used to treat restricted movement.

Pain, Muscle Guarding, and Spasm

- Painful joints, reflex muscle guarding, and muscle spasm can be treated with *gentle joint-play techniques to stimulate **neurophysiological and mechanical effects***



Neurophysiological Effects

- Small-amplitude oscillatory and distraction movements are used to stimulate the mechanoreceptors that may inhibit the transmission of nociceptive stimuli at the spinal cord or brain stem levels.

Mechanical Effects

- Small-amplitude distraction or gliding movements of the joint are used to cause synovial fluid motion, which is the vehicle for bringing nutrients to the avascular portions of the articular cartilage (and intra-articular fibrocartilage when present).
- Gentle joint-play techniques help maintain nutrient exchange and, thus, prevent the painful and degenerating effects of stasis when a joint is swollen or painful and cannot move through the ROM.
- When applied to treat pain, muscle guarding, or muscle spasm, these techniques should not place stretch on the reactive tissues

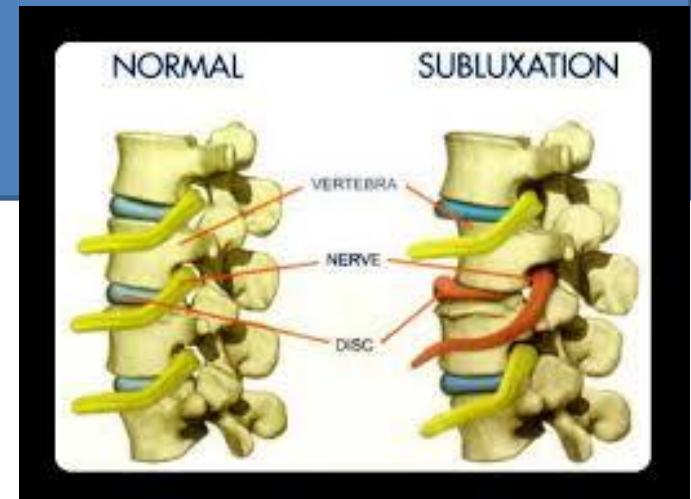
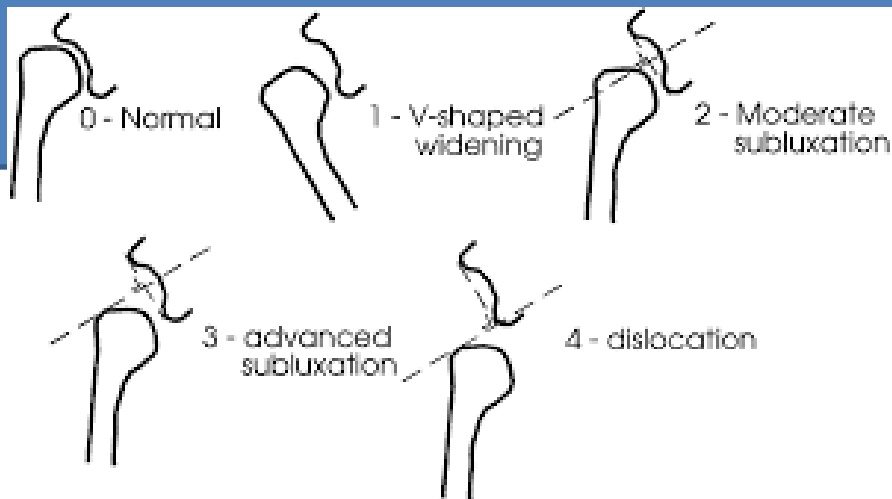
Reversible Joint Hypomobility

- Reversible joint hypomobility can be treated with *progressively vigorous joint-play stretching techniques to elongate hypomobile capsular and ligamentous connective tissue. Sustained or oscillatory stretch forces are used to distend the shortened tissue mechanically.*



Positional Faults/Subluxations

- A faulty position of one bony partner with respect to its opposing surface may result in limited motion or pain. This can occur with a traumatic injury, after periods of immobility, or with muscle imbalances



Progressive Limitation

- Diseases that progressively limit movement can be treated with joint-play techniques to maintain available motion or retard progressive mechanical restrictions. The dosage of distraction or glide is dictated by the patient's response to treatment and the state of the disease.

Functional Immobility

- When a patient cannot functionally move a joint for a period of time, the joint can be treated with nonstretch gliding or distraction techniques to maintain available joint play and prevent the degenerating and restricting effects of immobility.

Limitations of Joint Mobilization/ Manipulation Techniques

- Joint techniques cannot change the disease process of disorders such as rheumatoid arthritis or the inflammatory process of injury.
- In these cases, treatment is directed toward minimizing pain, maintaining available joint play, and reducing the effects of any mechanical limitations

- The skill of the therapist affects the outcome.
- if these techniques are used indiscriminately on patients not properly examined and screened for such maneuvers or if they are applied too vigorously for the condition, joint trauma or hypermobility may result

Contraindications and Precautions

Hypermobility

- The joints of patients with potential necrosis of the ligaments or capsule should not be mobilized with stretching techniques.
- Patients with painful hypermobile joints may benefit from gentle joint-play techniques if kept within the limits of motion. Stretching is not done.

Providing help and advice
for people with
hypermobility



Joint Effusion

- There may be joint swelling (effusion) due to trauma or disease.
- Rapid swelling of a joint usually indicates bleeding in the joint and may occur with trauma or diseases such as hemophilia.
- Medical intervention is required for aspiration of the blood to minimize its necrotizing effect on the articular cartilage.
- Slow swelling (more than 4 hours) usually indicates serous effusion (a buildup of excess synovial fluid) or edema in the joint due to mild trauma, irritation, or a disease such as arthritis

Inflammation

- Whenever inflammation is present, stretching increases pain and muscle guarding and results in greater tissue damage.
- Gentle oscillating or distraction motions may temporarily inhibit the pain response.

Conditions Requiring Special Precautions for Stretching

mobilizations may be used with *extreme care in the following conditions if the signs and the patient's response are favorable*

- Malignancy.
- Bone disease detectable on radiographs.
- Unhealed fracture. (The site of the fracture and the stabilization provided will dictate whether or not manipulative techniques can be safely applied.)
- Excessive pain. (Determine the cause of pain and modify treatment accordingly.)
- Hypermobility in associated joints. (Associated joints must be properly stabilized so the mobilization force is not transmitted to them.)
- Total joint replacements. (The mechanism of the replacement is self-limiting, and, therefore, the mobilization techniques may be inappropriate.)

- Newly formed or weakened connective tissue such as immediately after injury, surgery, or disuse or when the patient is taking certain medications such as corticosteroids. (Gentle progressive techniques within the tolerance of the tissue help align the developing fibrils, but forceful techniques are destructive.)
- Systemic connective tissue diseases such as rheumatoid arthritis, in which the disease weakens the connective tissue. (Gentle techniques may benefit restricted tissue, but forceful techniques may rupture tissue and result in instabilities.)
- Elderly individuals with weakened connective tissue and diminished circulation. (Gentle techniques within the tolerance of the tissue may be beneficial to increase mobility.)

Thanks