

# RANGE OF MOTION EXERCISES

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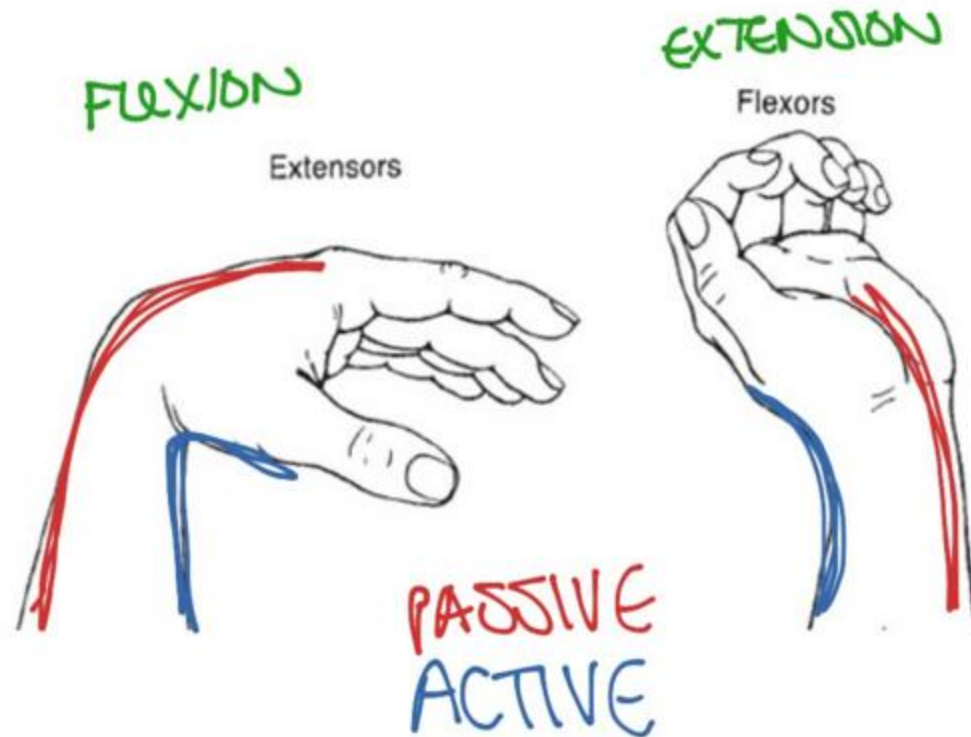
- **The full motion possible is called the range of motion (ROM).** When moving a segment through its ROM, all structures in the region are affected: muscles, joint surfaces, capsules, ligaments, fasciae, vessels, and nerves.
- ROM activities are most easily described in terms of **joint range and muscle range.**
- To describe **joint range**, terms such as flexion, extension, abduction, adduction, and rotation are used. Ranges of available joint motion are usually measured with a goniometer and recorded in degrees
- **Muscle range** is related to the functional excursion of muscles.

# Functional excursion

- Functional excursion is the distance a muscle is capable of shortening after it has been elongated to its maximum.
- In some cases the functional excursion, or range of a muscle, is directly influenced by the joint it crosses.

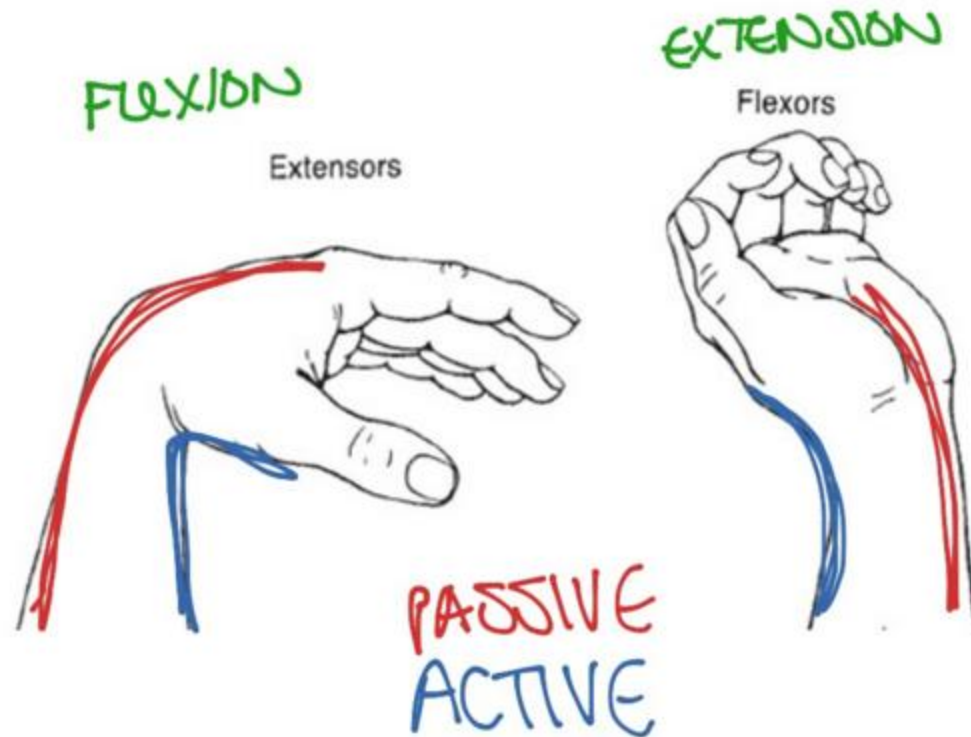
# Active insufficiency

- Maximum shortening of the muscle



# passive insufficiency

- Maximum lengthening of the muscles.



- To maintain normal ROM, the segments must be moved through their available ranges periodically,
- many **factors**, such as systemic, joint, neurological, or muscular diseases; surgical or traumatic insults; or simply inactivity or immobilization for any reason, can lead to decreased ROM

# Types of ROM Exercises

- Passive ROM
- Active ROM
- Active-Assistive ROM



# Passive ROM

- Passive ROM (PROM) is movement of a segment within the unrestricted ROM that is produced entirely by an external force; there is little to no voluntary muscle contraction.
- The external force may be from gravity, a machine, another individual, or another part of the individual's own body.
- PROM and passive stretching are not synonymous.

# Active ROM

- Active ROM (AROM) is movement of a segment within the unrestricted ROM that is produced by active contraction of the muscles crossing that joint.

# Active-Assistive ROM

- Active-assistive ROM (A-AROM) is a type of AROM in which assistance is provided manually or mechanically by an outside force because the prim mover muscles need assistance to complete the motion.

# Indications, Goals, and Limitations of ROM

# Passive ROM

## Indications for PROM

- In the region where there is acute, inflamed tissue, passive motion is beneficial; active motion would be detrimental to the healing process. Inflammation after injury or surgery usually lasts 2 to 6 days.
- When a patient is not able to or not supposed to actively move a segment(s) of the body, as when comatose, paralyzed, or on complete bed rest, movement is provided by an external source.

## Goals for PROM

The primary goal for PROM is to decrease the complications that would occur with immobilization, such as cartilage degeneration, adhesion and contracture formation, and sluggish circulation.<sup>9,20,25</sup> Specifically, the goals are to:

- Maintain joint and connective tissue mobility.
- Minimize the effects of the formation of contractures.
- Maintain mechanical elasticity of muscle.
- Assist circulation and vascular dynamics.
- Enhance synovial movement for cartilage nutrition and diffusion of materials in the joint.
- Decrease or inhibit pain.
- Assist with the healing process after injury or surgery.
- Help maintain the patient's awareness of movement.

## Other Uses for PROM

- When a therapist is examining inert structures, PROM is used to determine limitations of motion, joint stability, muscle flexibility and other soft tissue elasticity.
- When a therapist is teaching an active exercise program, PROM is used to demonstrate the desired motion.
- When a therapist is preparing a patient for stretching, PROM is often used preceding the passive stretching techniques.

## Limitations of Passive Motion

True passive, relaxed ROM may be difficult to obtain when muscle is innervated and the patient is conscious. Passive motion *does not*:

- Prevent muscle atrophy.
- Increase strength or endurance.
- Assist circulation to the extent that active, voluntary muscle contraction does.



# Active and Active-Assistive ROM

## Indications for AROM

- When a patient is able to **contract the muscles actively** and move a segment with or without assistance, AROM is used.
- When a patient has weak musculature and is unable to move a joint through the desired range (usually against gravity), **A-AROM** is used to provide enough assistance to the muscles in a carefully controlled manner so the muscle can function at its maximum level and be progressively strengthened. Once patients gain control of their ROM, they are progressed to manual or mechanical resistance exercises to improve muscle performance for a return to functional activities (see Chapter 6).
- When a segment of the body is immobilized for a period of time, AROM is used on the regions above and below the immobilized segment to maintain the areas in as normal a condition as possible and to prepare for new activities, such as walking with crutches.
- AROM can be used for aerobic conditioning programs (see Chapter 7) and is used to relieve stress from sustained postures (see Chapter 14).

## Goals for AROM

If there is no inflammation or contraindication to active motion, the same goals of PROM can be met with AROM. In addition, there are physiological benefits that result from active muscle contraction and motor learning from voluntary muscle control. Specific goals are to:

- Maintain physiological elasticity and contractility of the participating muscles.
- Provide sensory feedback from the contracting muscles.
- Provide a stimulus for bone and joint tissue integrity.
- Increase circulation and prevent thrombus formation.
- Develop coordination and motor skills for functional activities.

## Limitations of Active ROM

For strong muscles, active ROM *does not* maintain or increase strength. It also *does not* develop skill or coordination except in the movement patterns used.

# Precautions and Contraindications to ROM Exercises

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- Although both PROM and AROM are contraindicated under any circumstance when motion to a part is **disruptive to the healing process**
- complete **immobility leads to** adhesion and contracture formation, sluggish circulation, and a prolonged recovery time.
- ROM has been **contraindicated immediately** after acute tears, fractures, and surgery; but because the benefits of controlled motion have demonstrated decreased pain and an increased rate of recovery,

ROM should not be done when motion is disruptive to the healing process.

- Carefully controlled motion within the limits of pain-free motion during early phases of healing has been shown to benefit healing and early recovery.
- Signs of too much or the wrong motion include increased pain and inflammation.

ROM should not be done when patient response or the condition is life-threatening.

- PROM may be carefully initiated to major joints and AROM to ankles and feet to minimize venous stasis and thrombus formation.
- After myocardial infarction, coronary artery bypass surgery, or percutaneous transluminal coronary angioplasty, AROM of upper extremities and limited walking are usually tolerated under careful monitoring of symptoms.

Thank you