

# ELEMENTS OF FUNCTION TESTING

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# ELEMENTS OF FUNCTION TESTING

- Active and passive rotatoric movements
- Active movements

Active movements require

- patient cooperation,
  - upper and lower motor neuron integrity,
  - normal muscle and joint function.
- ❖ Active movements quickly provide a general indication of the location and type of dysfunction as well as its severity.

# PASSIVE MOVEMENT.

- ❑ The ability to see and feel passive movement is of special significance in OMT because slight alterations from normal are often the only clue to a diagnosis.
- ❑ Another objective of passive movement testing is to assess whether a range of movement is hypomobile or hypermobile.

# THERE ARE TWO GENERAL CATEGORIES OF ACTIVE AND PASSIVE ROTATORIC JOINT MOVEMENTS:

- **Standard (anatomical) movements,**
- e.g., flexion, extension, sidebending, and rotation, occur in the cardinal planes and around defined axes. They are used for measurement and to reveal asymmetries and disturbances in movement quality (for example, a painful arc).
- **Since these movements are standard and generally recognized, they facilitate communication between therapists and physicians.**

# COMBINED (FUNCTIONAL) MOVEMENTS

- e.g., coupled and noncoupled spinal movements, occur around multiple axes and in multiple planes and allow you to specifically stress various tissues and structures.
- These movements are useful in understanding and analyzing the exact mechanism of injury and reproducing the patient's chief complaint.
- **It is not unusual to perform combined movements in order to reveal subtle lesions that could be overlooked with standard movement testing alone.**

❑ **Changes in the quantity and quality of rotatoric movement** can be due to lesions within the

➤ joint

➤ surrounding soft tissue

❖ may manifest themselves in the form of a

➤ painful arc,

➤ capsular pattern,

➤ muscle shortening.

❑ Specific rotatoric bone movement is also used to test neural tension and

# PAINFUL ARC

“Pain occurring anywhere in the range of active and/or passive movement which is preceded and followed by no pain is called a painful arc”

❖ according to Cyriax.

A painful arc implies that a pain-sensitive tissue is being squeezed between hard structures.

# CAPSULAR PATTERN

- Pattern of proportional limitation of a joint involving all or most of the motions. or
- The capsular pattern manifests itself as a characteristic pattern of decreased movements at a joint.
- a joint will tend to adopt a particular proportion of limited movement when affected by inflammation of whatever cause.
- the degree varies according to the severity of the condition, but the proportion remains constant for any given joint.



# CAPSULAR PATTERN CONT....

- When expressing the capsular pattern, a series of three or four movements are listed in sequence:
  - the first movement listed is proportionally most decreased,
  - the second movement listed is next decreased, and so on.
- An example is the range in glenohumeral joint,
- **: external rotation > abduction > internal rotation**

- A capsular pattern is usually present **when the entire capsule is affected** (e.g., inflammatory arthritic conditions).
- However, limitation of movement due to capsular shortening does not necessarily follow a typical pattern.
- For example, only one part of a capsule may be shortened due to trauma, surgery, inactivity, or some other localized lesion of the capsule.
- In these cases, limitation of movement will be evident only with movements that stretch the affected part of the capsule.

# TESTING ROTATORIC MOVEMENTS

- Active spinal joint movements are repeated several times while you observe from the
  - back
  - front
  - sides
- The spinal region to be examined should be at your eye level. Observe whether a movement is smooth and if there is angularity or asymmetry, or change in the patient's symptoms or abnormal sensations, such as a painful arc.
- Spinal range of movement should change gradually from one segment to the next.

- With flexion and extension, the normal spinal curvatures in the sagittal plane should decrease and increase smoothly and in an appropriate amount.
- With sidebending a smooth arch should form.
- With spinal hypermobility a sharp bend is visible,
- whereas with spinal hypomobility a straight or flattened region is observed (often above or below a hypermobility).

- Active movement testing can be performed more specifically to help localize a lesion within a spinal region. For example,
- With painful active flexion of the cervical spine, the movement may be repeated with the upper cervical spine in extension.
- If this movement neither produces nor increases pain, the source of pain is probably in the upper cervical region.

# DIFFERENTIATING ARTICULAR AND EXTRA-ARTICULAR DYSFUNCTION

## Noncontractile Dysfunction

- Active and passive movements produce or increase symptoms and are restricted in the same direction and at the same point in the range.
- Example: Active and passive external rotation of the shoulder is painful and/or restricted at the same degree of range.
- Passive joint play movements produce or increase symptoms and are restricted.
- Resisted movements are symptom free.

# DIFFERENTIATING ARTICULAR AND EXTRA-ARTICULAR DYSFUNCTION

## Contractile Dysfunction

- Active and passive movements produce or increase symptoms and are restricted in opposite directions.
- Example: Active external rotation of the shoulder is painful and restricted as the affected muscle contracts. Passive external rotation is pain free and shows a greater range of movement.
- Passive internal rotation is painful as the affected muscle is stretched.
- Passive joint play movements are normal and symptom free.
- Resisted movements produce or increase symptoms.

# DIFFERENTIATING MUSCLE OR SOFT TISSUE SHORTENING FROM MUSCLE SPASM

## ▪ Spasm:

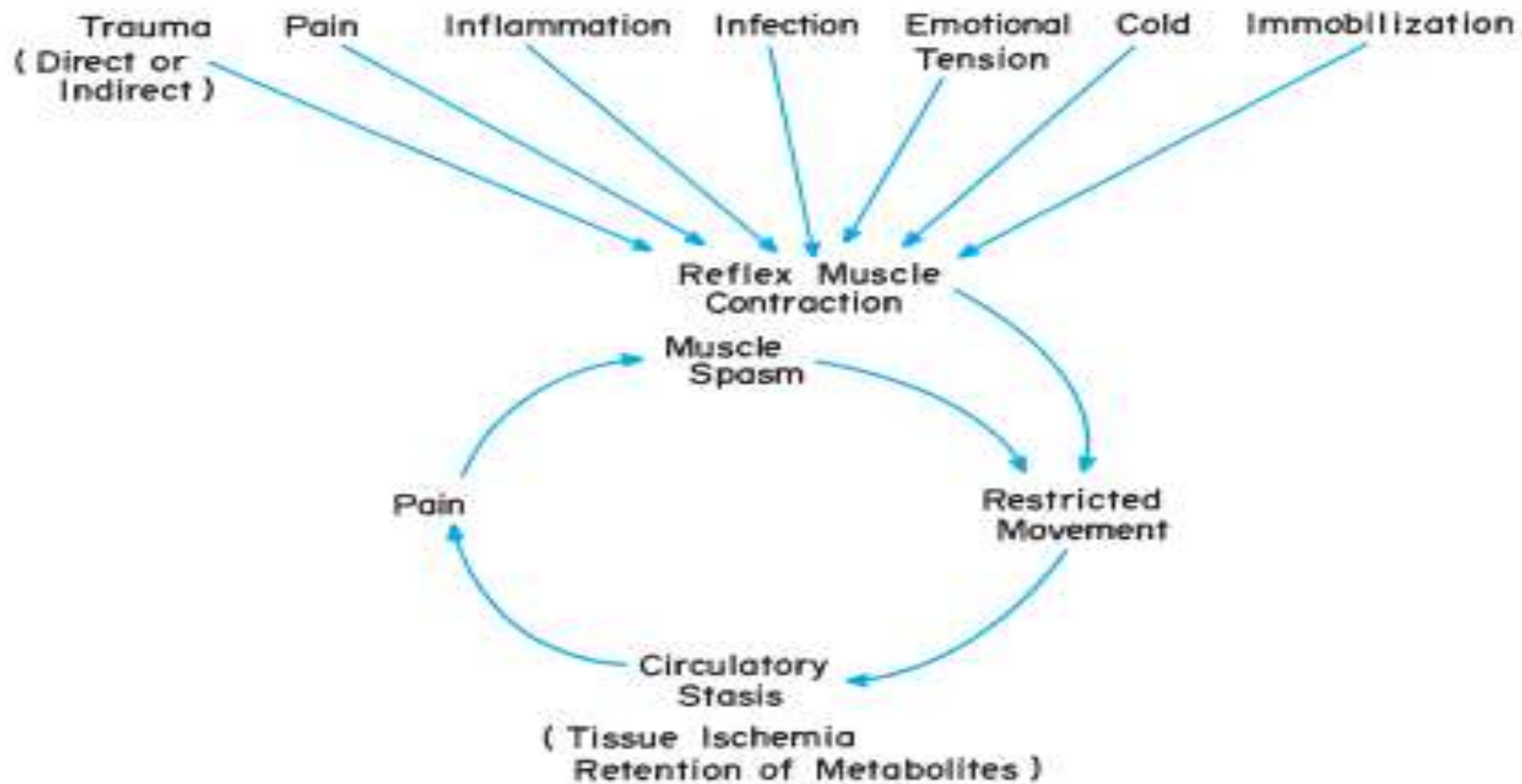
- Prolonged protective contraction of a muscle in response to the local circulatory and metabolic changes that occur when a muscle is in a continued state of contraction.
- Pain is a result of the altered circulatory and metabolic environment, so the muscle contraction becomes self-perpetuating regardless of whether the primary lesion that caused the initial guarding is still irritable.



# CAUSES

Spasm may also be a response of muscle to

- cold,
- direct trauma to muscle.
- prolonged periods of immobilization,
- emotional tension,
- viral infection,
- Inflammation



**FIGURE 10.1** Self-perpetuating cycle of muscle spasm.

# CONTRACTURE

- **Contractures:**
- Adaptive shortening of skin, fascia, muscle, or a joint capsule that prevents normal mobility or flexibility of that structure.
- e.g.; hamstrings contracture

# OTHER EXAMPLES OF SOFT TISSUE SHORTENING

- Torticollis
- Wry neck/turtle neck
- Dupuytren's contracture

# DIFFERENTIATING MUSCLE SHORTENING FROM MUSCLE SPASM

- A skilled practitioner can usually tell the difference between muscle connective tissue shortening and muscle spasm based on
  - ✓ end-feel testing.
  - *A shortened, tight muscle imparts a*
    - firmer,
    - less elastic end-feel,
  - *while muscle spasm produces a*
    - more elastic
    - less soft end-feel,
  - ❖ sometimes accompanied by increased muscle reactivity.
- Novice practitioners may make the same differentiation based on

# DIFFERENTIATING MUSCLE SHORTENING FROM MUSCLE SPASM

- Example:
- Hamstrings limit a SLR movement, PT positions the limb at the limit of available motion, and then performs a "hold-relax" muscle relaxation.
- In the relaxation period immediately following the muscle contraction, a muscle in spasm will relax sufficiently to allow some elongation and the SLR range will increase.
- A shortened muscle will not allow increased movement into the range without additional sustained stretching .