CLINICAL REASONING AND INTERVENTION

- **Questions to Ask**
- General categories of questions may include the physician's expectations for functional recovery; tendon status, such as fraying or vascular compromise; whether the patient is medically cleared for AROM only or AROM and/or PROM; and whether the patient is medically cleared for low-load, long-duration dynamic splinting.
- **Activities of Daily Living and Occupational Role Implications**
- The functional use of the upper extremity and the patient's ability to perform in the areas of occupation are what really matter.

- **Goal Setting:**
- Express hand therapy goals or projected outcomes in terms that reflect the patient's occupational functioning. Ultimately, the number of degrees achieved in ROM is less important than whether the patient can open a door, get dressed, or return to work. One way to integrate concrete and functional outcomes is to measure the movement needed to accomplish an appropriate patient-specific functional task and incorporate that measurement into the stated goal.
- For example, if a patient wants to be able to splash water on his or her face but lacks forearm supination to do so, have the patient perform the activity with the opposite upper extremity. Measure the supination needed to perform the task. In this instance, the goal could be stated as "sufficient forearm supination (60°) for ability to wash the face."

- **Quality of Movement**
- Poor quality of movement (called dys-coordinate co-contraction) may result from co-contraction of antagonist muscles. The cause may be habit, fear of pain, guarding, or excessive effort. Poor quality of movement looks awkward and unpleasant. It is important to identify dys-coordinate co-contraction early and to work on retraining a smooth, comfortable, effective quality of motion. Pain-free occupation is the best way to promote good quality of motion.
- Oscillations are rhythmic therapeutic movements that may be helpful, but they must be pain free. Imagery, such as pretending to move the extremity through water or gelatin, may also help (Cooper, 2007). Biofeedback may aid in muscle reeducation as well.

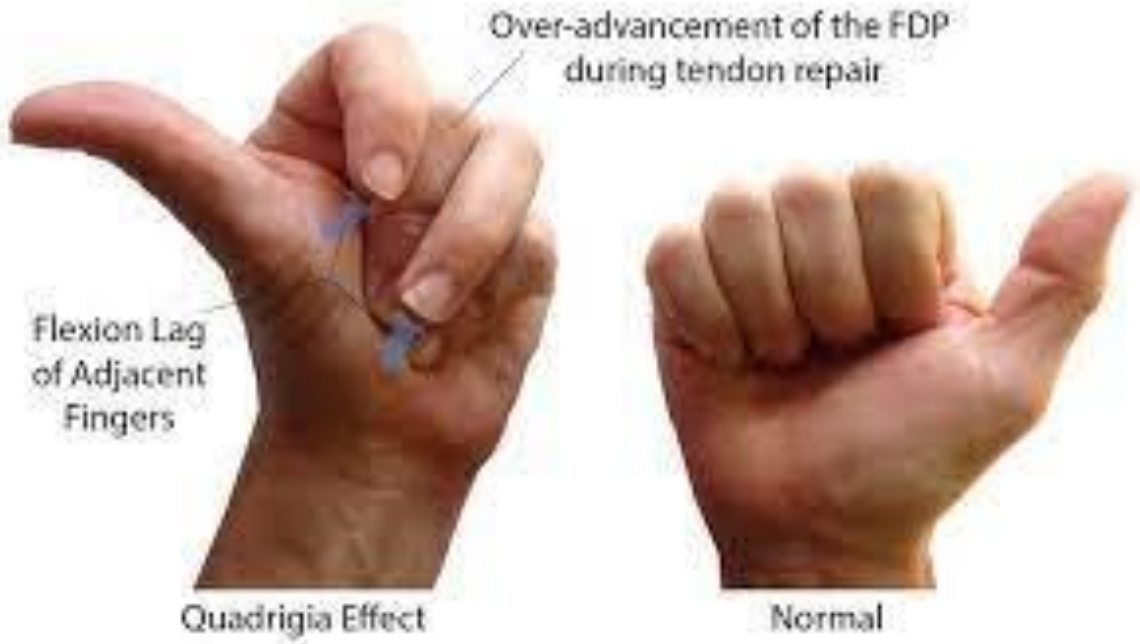
What Structures Are Restricted, and Does Passive Range of Motion Exceed Active Range of Motion?

- It is not adequate to identify a general problem, such as decreased ROM. Rather, it is important to understand and treat the specific structures causing the restriction. Limited PROM may be due to pericapsular structures, such as adhered or shortened ligaments, or actual joint limitations, such as mechanical block or adhesions.

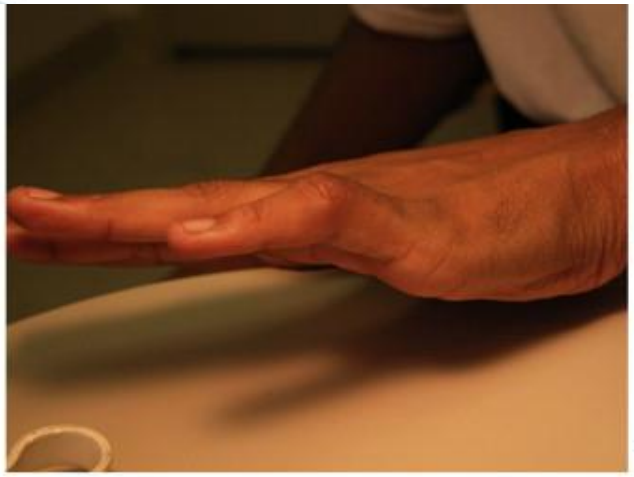
- PROM that exceeds AROM may be due to disruption of the musculotendinous unit, adhesions restricting excursion of the tendon, or weakness.
- When PROM exceeds AROM, promote active movement and function of the restricted structures with differential tendon gliding exercises, blocking exercises, place-and-hold exercises, and functional orthoses.
- When PROM equals AROM, discern whether the restriction is joint or musculotendinous or both and promote both passive and active flexibility.

- **Joint versus Musculotendinous Tightness**
- With joint tightness, the PROM of the particular joint does not change with repositioning of the joints proximal and/or distal to it. With musculotendinous tightness, the PROM of the particular joint does vary with repositioning of joints crossed by that multiarticulate structure.
- Treat joint tightness with dynamic splinting, static progressive splinting, or serial casting, followed by AROM. Treat musculotendinous tightness the same as extrinsic tightness

- **Lag versus Contracture**
- A lag is a limitation of active motion in a joint that has passive motion available. A joint contracture is a passive limitation of the joint. A patient with a PIP extensor lag cannot actively extend the PIP joint even though passive extension is available. A patient with a PIP joint flexion contracture lacks passive extension of that joint.


Over-advancement of the FDP
during tendon repair
Flexion Lag
of Adjacent
Fingers
Quadrigia Effect
Normal

- Treat lags by facilitating motion of the restricted structure with scar management, blocking exercises in mechanically advantageous positions, place-and-hold exercises, static splinting to promote normal length of the involved structure, and functional splints. Treat contractures the same as for joint tightness.
- An advantageous position to test or treat extensor lag at the PIP level is to maintain MP flexion while trying to extend actively at the PIP. An advantageous position to test or treat extensor lag at the DIP level is to maintain MP and PIP flexion while trying to extend actively at the DIP. This is contraindicated if the diagnosis is acute mallet finger.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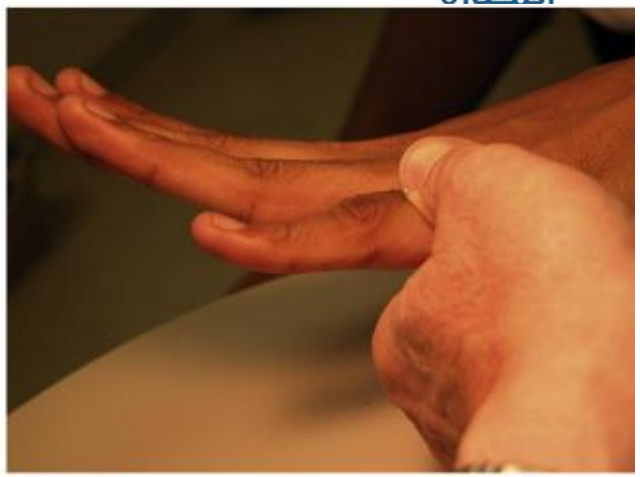
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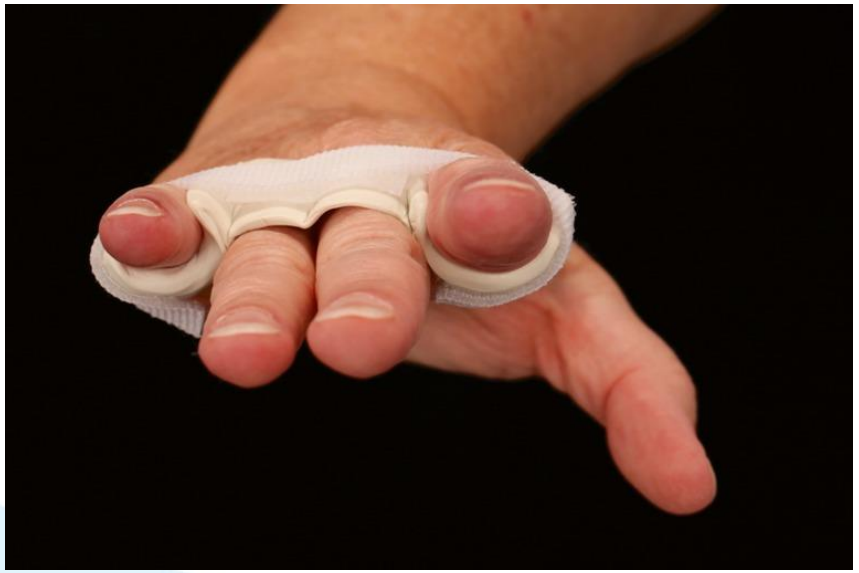


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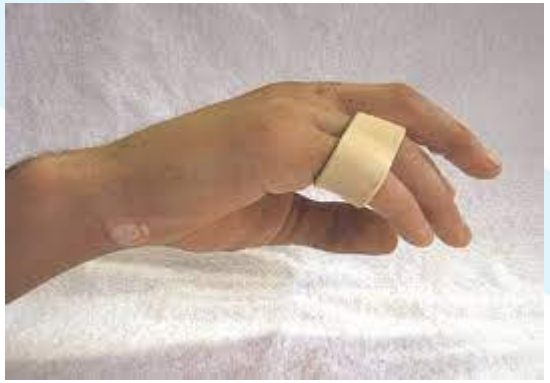

Intrinsic or Extrinsic Extensor Muscle Tightness

- Intrinsic muscles are the small muscles in the hand. Extrinsic muscles are longer musculotendinous units that originate proximal to the hand.
- Intrinsic tightness and extrinsic extensor tightness are tested by putting these muscles on stretch. This is accomplished by comparing the PROM of digital PIP and DIP flexion when the MP joint is passively extended and then passively flexed.
- With interosseous muscle tightness, passive PIP and DIP flexion is limited when the MP joint is passively extended or hyperextended. With extrinsic extensor tightness, PIP and DIP flexion is limited when the MP joint is passively flexed.

- To treat intrinsic tightness, perform PIP and DIP flexion with MP hyperextension. Functional orthotics are very helpful for isolating specific exercise to restore length to the intrinsics while performing daily activities. In other words, promote IP flexion with MPs hyperextended.
- To treat extrinsic extensor tightness, promote composite motions (that is, combined flexion motions of the wrist, MPs and IPs) with orthotics, gentle stretch, and exercise. Instruct the client that performing these exercises with the wrist in a variety of positions is helpful.

Interosseous muscle tightness.Proximal interphalangeal (PIP) and distal interphalangeal (DIP) flexion is passively limited when the metacarpophalangeal (MP) joint is passively extended or hyperextended.

Extrinsic extensor tightness.PIP and DIP flexion is passively limited when the MP joint is passively flexed.

Figure 6

A B

Clinical photographs of the intrinsic tightness test. **A,** The metacarpophalangeal (MCP) joint is held extended while the degree of proximal interphalangeal (PIP) joint motion is measured (arrow). **B,** The MCP joint is flexed, and the degree of PIP motion is again examined (arrow). With intrinsic contracture, PIP joint motion is restricted while the MCP joint is extended and is improved when the MCP joint is flexed.

- **Tightness of Extrinsic Extensors or Extrinsic Flexors**
- With extrinsic extensor tightness, there is less passive composite digital flexion available with the wrist in flexion than with the wrist in extension. In contrast, with extrinsic flexor tightness, there is less passive composite digital extension available with the wrist in extension than with the wrist in flexion. Treat extrinsic flexor or extensor tightness with place-and-hold exercises, static splinting comfortably at end range (especially useful at night), dynamic or static progressive splinting during the day, and functional splinting.

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Thank you