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WHICH HOOK EXERCISE MOST EFFECTIVELY DECREASES FINGER STIFFNESS?

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Regaining full finger flexion is the intuitive goal of all patients with finger stiffness. If passive motion is limited, many endeavor to regain passive joint flexion and then work actively on composite finger flexion, often squeezing exercise putty at end range.

Finger stiffness limiting interphalangeal (IP) joint flexion drives motion to the metacarpophalangeal (MP) joint, hyperflexing it (or hyperextending it in case of a flexion contracture of the IP joint/s). In such a circumstance, active exercise alone does not reestablish the balance of motion needed.

Blocking the MP joint in extension transmits the flexor tendon glide to the distal IP joints, mobilizing them into flexion. For this reason, exercising in the hook position is encouraged. But what is the difference between the three types of hook exercises: passive, active, and blocked active?

THE PASSIVE HOOK

What is accomplished with the passive hook exercise (passively flexing the IP joints while passively extending the MP joint)?

- Constraints other than joint tightness may provide resistance to full finger flexion. Consequently passive range of motion is not always successful in regaining full active flexion. The most common significant resistance comes from the adaptively shortened interosseous muscles (1) (muscle tightness).
- MP joint extension with concurrent proximal interphalangeal (PIP) joint flexion is the position of elongation for the interosseous muscles. See Figure 1. The DIP joint is excluded because the interosseous muscles primarily insert into the more proximal transverse and oblique fibers of the dorsal apparatus, concentrating their power more toward PIP joint extension.



Figure 1:Passive hook with DIP joint flexion stretches the interosseous muscles.

- Individuals vary in the extent to which the MP joint can be hyperextended while the PIP joint is flexed. For many, MP hyperextension is required for adequate elongation of the interosseous muscle/s.
- The passive hook only elongates the interosseous muscles. Because the origin of the lumbrical muscle is on the moving flexor digitorum profundus (FDP), elongation of the lumbrical muscle only occurs with the active hook exercise. (2)

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(continued)

Clinical recommendation:
- The passive hook should be used to elongate the interosseous muscles and should exclude the DIP joint. A slow, firm sustained stretch at end range is most effective.
- If passive flexion of the IP joints is extremely limited, wait until reasonable IP joint motion is regained before including MP joint extension/hyperextension.

THE ACTIVE HOOK

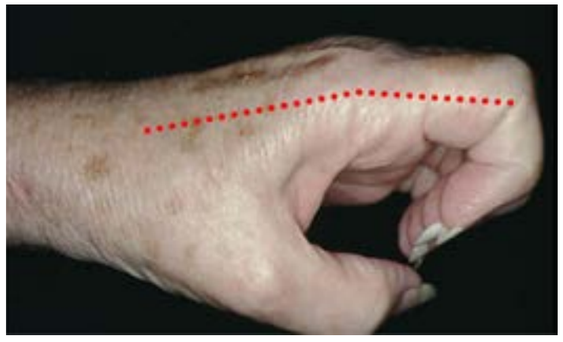


Figure 2: At first glance, this active hook appears adequate, but the inability to maintain the MP joints in full extension is apparent when the measurement lines are drawn.

When should one use the active hook exercise?
- In the presence of joint stiffness and/or interosseous muscle tightness, the MP joint cannot actively maintain full extension as the individual attempts concurrent active IP joint flexion. See Figure 2. As active IP joint flexion increases, the MP joint will also flex.
- The extensor digitorum communis (EDC) has reasonable strength to maintain the MP joint at zero degrees, but it does not have enough power to hold the MP joint hyperextended in the presence of passive restraints of IP joint stiffness or interosseous muscle tightness.
- A common active hook exercise is holding a pencil with the IP joints flexed while actively extending the MP joints. If there is resistance, the EDC cannot gain full MP joint extension/hyperextension.

Clinical recommendation:
- Use the active hook exercise to maintain the range of motion after regaining the hook position.
- If instructing a patient in the active hook exercise, use the "Touch the Dots" (3) approach to assure maximum engagement of the EDC in tandem with active IP joint flexion.

THE BLOCKED ACTIVE HOOK

Why is the blocked active hook the exercise of choice?
- The blocked active hook exercise solves the challenges found with both the passive hook and the active hook. The blocked active hook assures maximum differential glide of all the tissue layers, which is needed to reestablish normal flexion and extension.



Figure 3: Activities for improving wrist joint position sense.

- Blocking the MP joint in maximum extension (hyperextension) with active IP joint flexion assures maximum elongation of both the interosseous and the lumbrical muscles. (1,2) See Figure 3.
- Active IP joint motion stimulates the lymphatic system, reducing digital edema which in turn reduces resistance to joint motion.
- Blocked MP joint motion with active IP joint flexion reestablishes the normal pattern of finger flexion in the motor cortex by assuring the patient initiates finger flexion with the extrinsic flexors. (4)
- Blocking the MP joint in extension maximizes IP joint flexion, thus mobilizing even stiff joints with only active motion.

Clinical recommendation:
- The blocked active hook should be the first choice for exercise when full finger flexion is the end goal.
- A blocking splint/orthosis is more effective than manual blocking exercises because the positioning can be more precise and the desired exercise can be repeated over a longer period of time.

1. https://bracelab.com/clinicians-classroom/interosseous-muscle-tightness-testing/
2. https://bracelab.com/clinicians-classroom/lumbrical-muscle-tightness/
3. https://bracelab.com/clinicians-classroom/touch-the-dots/
4. *Arbuckle JD, McGrouther DA. Measurement of the arc of digital flexion and joint movement ranges. J Hand Surg [Br].1995;20B(6):836-840*

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