www.HandLab.com
support@HandLab.com
2615 London Dr.
Raleigh, NC 27608
USA

HandLab

Complex made Simple...clinically relevant education by Judy C. Colditz, OT/L, CHT, FAOTA

November, 2012

ClinicalPearls

No. 22

LUMBRICAL MUSCLE TIGHTNESS & TESTING

LUMBRICAL MUSCLE TIGHTNESS

Even though the lumbrical muscle has longer muscle fibers (allowing more excursion) than the interosseous muscles and it lies outside a fascial compartment, the lumbrical muscle can nevertheless develop adaptive shortening. Although lumbrical muscle tightness is less common than interosseous muscle tightness, it can be the primary factor limiting full finger flexion.

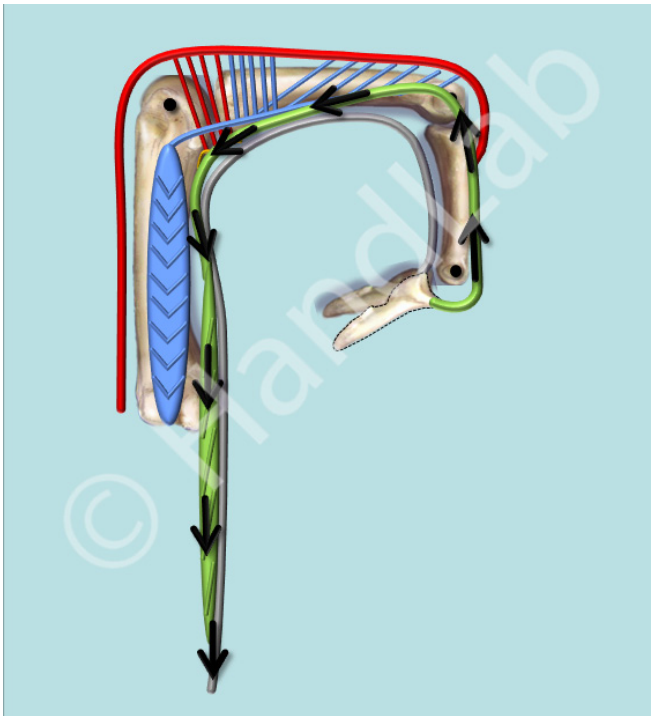
CLINICAL PRESENTATION OF LUMBRICAL MUSCLE TIGHTNESS

Patients who present with full passive flexion of the finger/s but are unable to actively achieve the same end range of flexion often demonstrate lumbrical muscle tightness. Just as with the interosseous muscles, the lumbrical muscles must elongate to allow full finger flexion. When the lumbrical muscle is unable to elongate maximally, full active DIP joint flexion is not possible. If one precisely observes active flexion at end range as the patient pulls strongly with the FDP muscle, a subtle but noticeable paradoxical extension of the DIP joint is observable. This paradoxical DIP joint extension is demonstration of lumbrical muscle tightness.

Lumbrical muscle tightness caused by adaptive shortening is not to be confused with Lumbrical-Plus Finger[1] where the FDP is lacerated or too long distal to the lumbrical origin and the only/first available connection to finger movement is via the intact lumbrical. [This is a pathological state which can be resolve only through surgical intervention.]

WHY DO I SEE PARADOXICAL DIP JOINT EXTENSION AT END RANGE FLEXION?

The lumbrical muscle arises from the flexor digitorum profundus (FDP) tendon and has a linear insertion into the lateral band on the radial side of the dorsal apparatus. During finger flexion the lumbrical muscle is elongated by a pull both proximally and distally: 1) the lumbrical origin on the FDP tendon moves proximally with the FDP tendon elongating the lumbrical muscle in this direction and 2) the finger flexes, demanding distal excursion since the lumbrical muscle insertion into the lateral band is dorsal to the axis at the PIP and DIP joints. During flexion the lateral band normally moves volarly toward the axis of rotation at the PIP joint but remains dorsal and central at the DIP joint. Therefore, during normal active finger flexion



continued...

© HandLab; 2012 all rights reserved

Disclaimer: HandLab Clinical Pearls are intended to be an informal sharing of practical clinical ideas; not formal evidence-based conclusions of fact.

www.HandLab.com
support@HandLab.com
2615 London Dr.
Raleigh, NC 27608
USA

HandLab

Complex made Simple...clinically relevant education by Judy C. Colditz, OT/L, CHT, FAOTA

November, 2012 ClinicalPearls No. 22

LUMBRICAL MUSCLE TIGHTNESS & TESTING-page 2

when the lumbrical must elongate to allow finger flexion, tension on the lumbrical insertion (lateral band) at the PIP joint is minimized by PIP joint flexion but increased by DIP joint flexion. When the lumbrical muscle has adaptively shortened, there is not enough elongation available to allow full DIP flexion. As the pull on the profundus continues it is transmitted though the lumbrical insertion to create extension at the DIP joint.

HOW DO I TEST FOR LUMBRICAL MUSCLE TIGHTNESS?

We have previously discussed that the term "Intrinsic Tightness Testing" is a misnomer (Clinical Pearl No. 20) as it describes a maneuver specifically designed to test tightness of the interosseous muscles. We have also reviewed the techniques for interosseous muscle tightness testing. (Clinical Pearl No. 21) Because the origin and insertion of the interosseous and the lumbrical muscles differ, they cannot be tested with the same test.

The test for lumbrical muscle tightness must elicit the active recruitment of the FDP: Ask the patient to fully flex the fingers and when at end range ask the patient to tuck the fingertips tighter into flexion. Observe the DIP joints as the patient pulls at end range flexion. Active flexion is required to see the DIP joint paradoxical extension. This is not a manual test but an observational one. The only question that must be satisfied for the test to be positive is: "Can paradoxical DIP extension be observed at end range of active finger flexion?" If you can answer yes, the test is positive. Because this is a subtle presentation and difficult to measure, quantifying lumbrical muscle tightness is not realistic.

Unlike other muscles with a bony origin, lumbrical muscle tightness cannot be tested with a passive maneuver. The FDP must pull proximally for maximum elongation of the lumbrical.

CAN I TEST FOR LUMBRICAL TIGHTNESS WHEN THE FINGER HAS LIMITED PASSIVE MOTION?

No, either limited passive joint motion or interosseous muscle tightness or adherence of the flexion tendon/s within zone 1 or 2 can prevent demonstration of lumbrical muscle tightness. Most commonly lumbrical tightness can only be demonstrated when joint tightness, interosseous muscle tightness and tendon glide issues have been resolved.

HOW DO I ELONGATE THE LUMBRICAL MUSCLE TO RESOLVE LUMBRICAL MUSCLE TIGHTNESS?

Although lumbrical muscle tightness limits full finger flexion, the position requiring maximum elongation of the lumbrical muscle is the active hook position (with MP joint hyperextension). Therefore, even though the limitation is full finger flexion, end range flexion is not the exercise which creates maximum lumbrical muscle elongation.

Reaching the goal of maximum lumbrical muscle elongation is complicated by the fact the extensor digitorum communis is not able to hold the MP joint in hyperextension in the presence of lumbrical muscle tightness (or interosseous tightness). As the finger flexes the tightness will pull the MP joint into a neutral position and the active hook will not be fully achieved. For this reason some external device (manual positioning or an orthosis) is needed to support the MP joint in hyperextension during active IP joint flexion.

Reference

Parkes A. The "lumbricalis plus" finger. J Bone Joint Surg 1971;53B:236.

© HandLab; 2012 all rights reserved

Disclaimer: HandLab Clinical Pearls are intended to be an informal sharing of practical clinical ideas; not formal evidence-based conclusions of fact.