

# THE UNUSUAL SUSPECTS

By Joseph E. Muscolino, DC

*Often-Overlooked Muscles*

Quadratus  
femoris

Sternohyoid,  
longus colli, and  
longus capitis

Flexor pollicis  
longus



## There are more than 100 muscles in the human body,

yet it is interesting to see how often the same few muscles are discussed, written about, and assessed as the causes of our clients' problems. I like to describe these muscles as the usual suspects. When a client has pain in the gluteal region, we look for it to be the piriformis. If the pain is in the anterior hip, the psoas major is first on our radar. If there is pain in the back of the neck, it must be the upper trapezius. But what about all the other muscles in the body?

I am not trying to say that the usual suspect muscles are not important. They are. Because of their unique role in movement and stabilization patterns, they probably are more important on average than any one of their neighbors; that is why they have earned the status of being the usual suspects. A usual suspect is not always the guilty party, however. Sometimes it is an unusual suspect, a lesser-known muscle, that is the underlying cause of our client's pain and dysfunction pattern.

Following are examples of some of these lesser-known unusual suspect muscles that I believe are worthy of our attention. For each muscle, we will review its attachments and actions, how to palpate and stretch it, and then discuss a brief case study of a client for whom this muscle was the key to unlocking their condition and restoring their health. An unusual suspect muscle may not often prove to be the cause of our client's condition; but when it is, our awareness and knowledge of the muscle, along with our willingness to look for and assess it, can make all the difference, not only in our client's health, but also in the success of our practice.

### LOOKING IN THE RIGHT PLACE

There is a corny but apt joke about a mother who comes home to find her 12-year-old son on his hands and knees in the dining room, seemingly searching for something. When she asks him if he lost something, he says he lost a quarter. She asks him if he lost it in the dining room, and he answers no; he lost it in the living room. A bit perplexed, she asks him why he is looking in the dining room. He responds, "The light's better in here."

This may seem like a silly story, but there is a lesson to be learned here. If we are not looking in the right place, we will never find what we are looking for. We shouldn't look just where it is easy to look, where the light is better, so to speak; rather, we also need to look in the more obscure, less well-lit places. If we only check the usual suspect muscles, we will never discover how involved and important some of the other, lesser-known, unusual suspect muscles are.

## UNUSUAL SUSPECT #1

### Palmar Interossei

#### ATTACHMENTS AND ACTIONS

The palmar interossei (PI) are a group of three intrinsic hand muscles that, as their name implies, are located between (metacarpal) bones in the palm of the hand (Image 1). Each one crosses the metacarpophalangeal (MCP) joint to attach distally onto the proximal phalanx of a finger on the side of the phalanx that is oriented toward the middle finger. For this reason, each one pulls its respective finger toward the middle finger, which is the reference line for abduction/adduction of the fingers; hence the PI adduct fingers at the MCP joints. They are named #1, #2, and #3, from radial to ulnar. PI #1 attaches from the second metacarpal to the index finger; PI #2 attaches from the fourth metacarpal to the ring finger; and PI #3 attaches from the fifth metacarpal to the little finger.

#### PALPATION ASSESSMENT

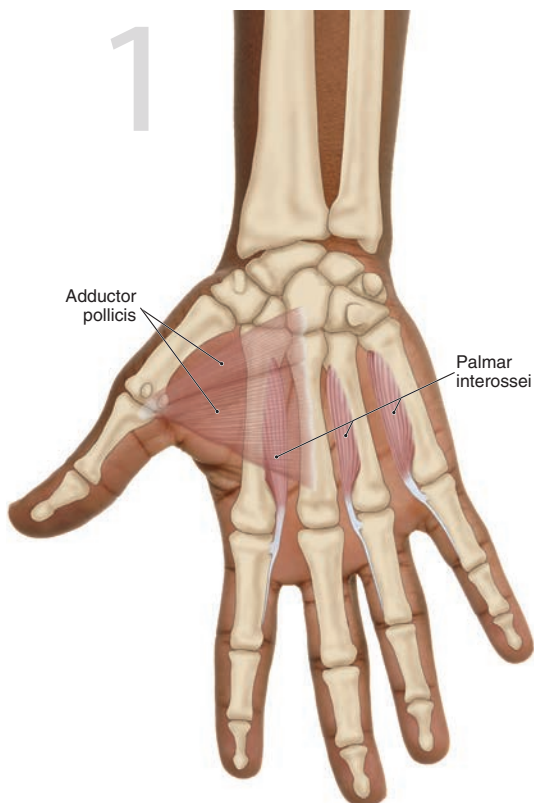
Although the PI are a bit deep, they are easy to palpate and assess. To palpate and discern PI #1, simply place your palpating finger pads between the second and third metacarpals on the palmar side, with pressure oriented toward the second metacarpal, and ask the client to adduct the index finger toward the middle finger against the resistance of a pen or marker that is placed between the two fingers. The first PI will clearly be felt to engage (Image 2). Palpate the entirety of the muscle as the client gently contracts and relaxes it. Once located, moderate to deeper pressure can be applied to work the muscle.

#### STRETCHING

The PI muscles perform adduction of their respective fingers. In addition, because they cross the MCP joints slightly anteriorly, they can also flex the fingers at the MCP joints. Therefore, to stretch the PI, the index, ring, and little fingers need to be abducted (away from the middle finger) and extended at the MCP joints (Image 3).

#### CASE STUDY: PALMAR INTEROSSEI

“Carrie” was a 30-year-old yoga instructor who developed pain in the palm of her left hand. There was no precipitating trauma; the pain began insidiously and gradually increased until she could no longer bear any weight on her hand. Poses such as downward-facing dog became impossible. Before coming to my office, Carrie consulted three health professionals—a massage therapist, a chiropractor, and an orthopedic surgeon specializing in hand surgery. The massage therapist told her that trigger points in her left shoulder were the cause of the pain. The chiropractor told her that neck joint subluxations (dysfunctions) were the cause. And the orthopedic surgeon ordered an X-ray and told her that the saddle (first carpometacarpal) joint of the thumb was too lax and surgery would be needed to stabilize the joint and alleviate the pain. Soft-tissue manipulation to the shoulder region by the massage therapist and joint manipulation (adjusting) of the neck by the chiropractor did not



Palmar (anterior) view of the right palmar interossei (PI) group. All images from *The Muscular System Manual, 4th ed.*, or *The Muscle and Bone Palpation Manual, 2nd ed.*, both by Joseph E. Muscolino, DC, courtesy of Elsevier.

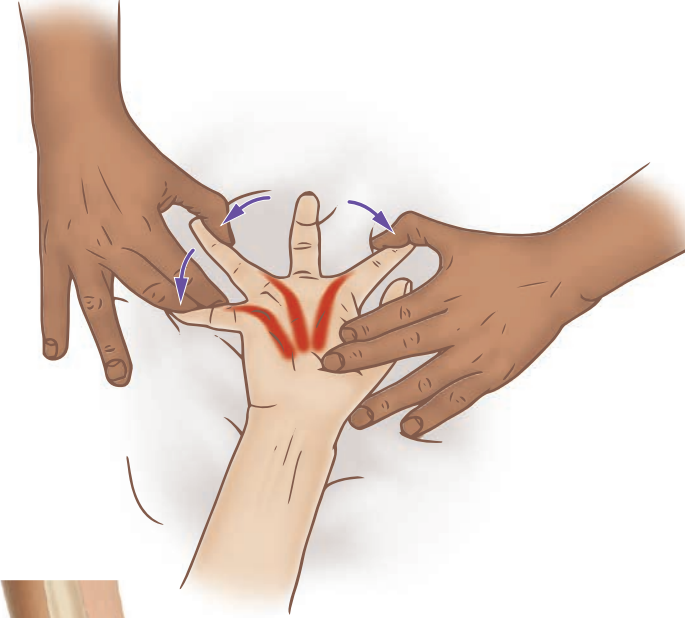


Palpation of the right first palmar interosseus.



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Stretching the right palmar interossei muscles.



help to diminish her hand pain. And Carrie opted to not have the surgery recommended by the orthopedic surgeon.

Carrie then presented to me. After I exhausted all the usual suspects, spending well over an hour on history and exam, I finally arrived at her hand, where I palpated and found a hypertonic PI #1 muscle, that, when pressed into, immediately reproduced her characteristic pain. Carrie had a spasm of her first PI muscle. No fancy referral patterns or pinched nerves were involved. She had a simple tight muscle in her hand that none of the other professionals had even tried to look for, even though it was exactly at the site of the pain that she was experiencing. Moist heat, soft-tissue manipulation, and stretching fully resolved her condition in only a few sessions. Who was the overlooked unusual suspect? The first palmar interossei muscle!

## UNUSUAL SUSPECT #2

### *Flexor Pollicis Longus*

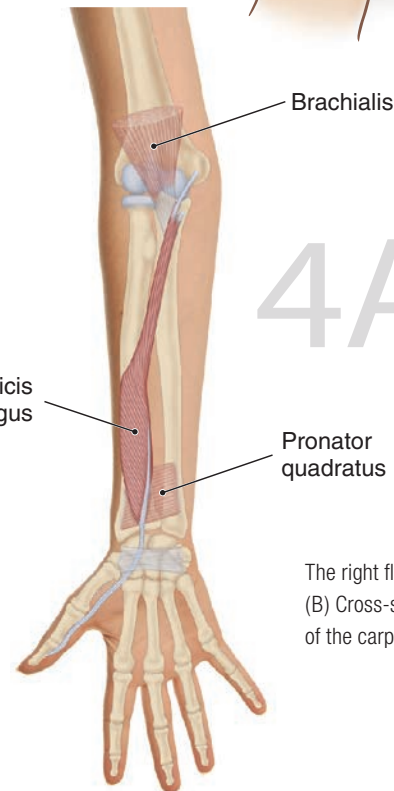
#### ATTACHMENTS AND ACTIONS

The flexor pollicis longus is a muscle of the anterior forearm and hand. Its principal attachments are from the anterior surface of the radius to the anterior surface of the distal phalanx of the thumb. It usually also has a small attachment to the medial epicondyle of the humerus (Image 4A). The flexor pollicis longus crosses the elbow, wrist, and thumb joints anteriorly; therefore, it flexes the forearm at the elbow joint, the hand at the wrist joint, and the thumb at the carpometacarpal, metacarpophalangeal, and interphalangeal joints. Because of its medial to lateral direction from proximal to distal, it can also weakly pronate the forearm at the radioulnar joints.

It is important to note that the flexor pollicis longus is one of nine tendons that travel through the carpal tunnel. The other eight tendons are the four tendons of the flexor digitorum superficialis and the four tendons of the flexor digitorum profundus (Image 4B).

#### PALPATION ASSESSMENT

Although the flexor pollicis longus is in the deep layer of the anterior forearm musculature, it is actually quite easy to palpate and assess for the majority of its course. To palpate this muscle, simply place your palpating finger pads on the radial side of the anterior, distal forearm and ask the client to flex the distal phalanx of the thumb at the interphalangeal joint. To properly discern the flexor pollicis longus from other nearby muscles of the thumb, it is important for the client to isolate this action as best as possible (Image 5, page 56). No other muscle flexes the distal phalanx of the thumb, so any muscle that contracts during this motion should be the flexor pollicis longus. Palpate as much of the muscle as possible as the client gently contracts and relaxes it. The flexor pollicis longus can usually be easily palpated and discerned proximally toward the elbow joint to about halfway up the forearm. Once located, moderate to deeper pressure can be applied to work the muscle.

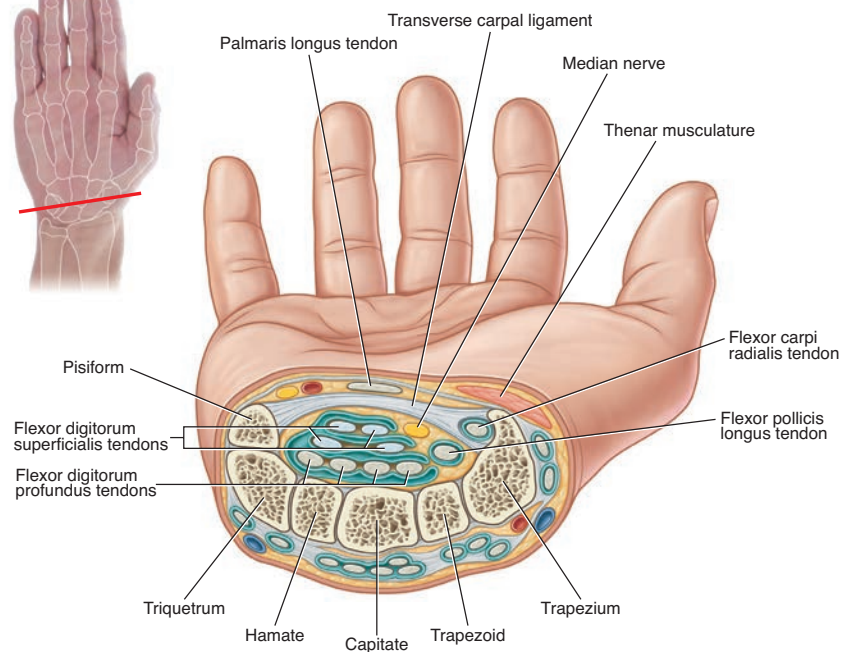


Brachialis

Flexor pollicis longus

Pronator quadratus

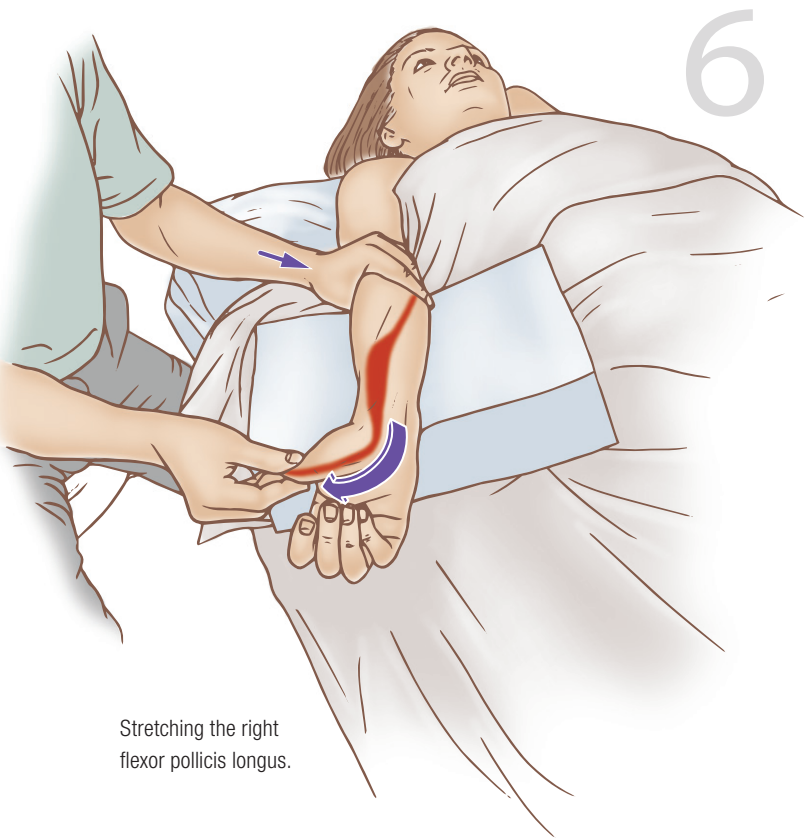
The right flexor pollicis longus. (A) Anterior view. (B) Cross-section through the wrist at the level of the carpal tunnel (proximal to distal view).



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Palpation of the right flexor pollicis longus.



Stretching the right flexor pollicis longus.

## STRETCHING

Because the flexor pollicis longus flexes the elbow, wrist, and thumb joints, it is stretched by extending the elbow, wrist, and thumb. Because of its ability to pronate the forearm, the stretch position should include full forearm supination as well (Image 6).

## CASE STUDY: FLEXOR POLLICIS LONGUS

“Julie” was a 25-year-old massage therapist who was experiencing tingling and pain into the median nerve distribution of her right hand, specifically the anterior side of the thumb and index finger. She attributed her symptoms to the physical stress of performing too many massages at work. As she continued to massage, the pain gradually increased until she consistently experienced moderate to marked pain when working. On physical examination, she tested positive for all three carpal tunnel syndrome tests—Phalen’s test, Prayer test, and Tinel’s sign at the anterior wrist—so there was no doubt she was experiencing carpal tunnel syndrome.

The question was whether rest and working on the muscles whose tendons traveled through the carpal tunnel would be sufficient for her to heal. I advised her to stop work for two to four weeks, use ice each day, take over-the-counter anti-inflammatories, and come in two times per week for soft-tissue manipulation and gentle stretching to musculature of the anterior forearm. This work was aimed primarily at the flexors digitorum superficialis and profundus, and flexor pollicis longus. However, it was work on the flexor pollicis longus that seemed to most directly reproduce her characteristic pain pattern, referring pain into the wrist and anterior hand as the work was done. More importantly, it was the flexor pollicis longus work that provided lasting relief after the therapy was done. Deep stroking massage was performed on the myofascial trigger points that were located in the belly of the muscle, and transverse friction was done to break up fascial adhesions that were binding the muscle and its tendon to adjacent tissues and impeding proper function. After the soft-tissue manipulation, stretching was performed.

Although soft-tissue work was also performed on other musculature of the right upper extremity and neck, it was the work performed on the flexor pollicis longus that proved to be most effective. After a few weeks, Julie began working again, and with continued care, as well as attention to proper body mechanics, she was able to gradually build back up to working full time, pain-free over the next few months.



## UNUSUAL SUSPECT #3

### *Quadratus Femoris*

#### ATTACHMENTS AND ACTIONS

The quadratus femoris is a muscle of the gluteal/hip joint region. It attaches from the lateral border of the ischial tuberosity to the intertrochanteric crest of the femur, between the greater and lesser trochanters (Image 7). The quadratus femoris crosses the hip joint posteriorly with a horizontal direction to its fibers; therefore, it laterally (externally) rotates the thigh at the hip joint. Indeed, along with the piriformis, it is one of the six members of the deep lateral rotator group.

#### PALPATION ASSESSMENT

Although the quadratus femoris is deep to the gluteus maximus, it is usually easily palpated and discerned from adjacent musculature. To palpate the quadratus femoris, first find the inferior aspect of the ischial tuberosity. Follow the ischial tuberosity to its lateral border by maintaining pressure against the bone as you move laterally along it. Once the

lateral border has been reached, drop immediately lateral to it and you will be on the quadratus femoris. To engage the muscle to confirm you are on it, have the client try to laterally rotate the thigh at the hip joint against your gentle to moderate resistance. This is accomplished by asking the client to try to push the (lower) leg medially against the resistance of your hand (Image 8). Palpate the entirety of the muscle as the client gently contracts and relaxes it. Once located, moderate to deeper pressure can be applied to work the muscle.

Note: The sciatic nerve usually passes superficial to the quadratus femoris immediately lateral to the ischial tuberosity. If the sciatic nerve is contacted, move your finger pads slightly lateral to avoid pressure on the nerve.

#### STRETCHING

The quadratus femoris is a lateral rotator at the hip joint, but if the thigh is first flexed to 90 degrees, it becomes a horizontal abductor so it can be stretched with horizontal adduction as seen in Image 9.

#### CASE STUDY: QUADRATUS FEMORIS

“Belinda” presented with pain in her right gluteal region that had begun the day before. She said she had been stretching her hip joint fairly vigorously when she first felt a sharp pain occur in the area. Concerned she might have injured herself, she decided to seek care immediately and presented to my office the day after the pain began. Upon palpation examination, I went for the usual suspect, the piriformis; but her piriformis was healthy and palpation of it did not reproduce any pain or discomfort. However, as I continued to palpate inferior and lateral to the piriformis, I came upon a trigger point in the quadratus femoris that, when pressed, reproduced Belinda’s characteristic pain pattern. Because Belinda came in so quickly after the onset of the problem, one session of moist heat, deep stroking massage, and stretching was sufficient to entirely resolve the trigger point and eliminate all her pain and discomfort.

7 Posterior view of the quadratus femoris bilaterally.



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Palpation of the right quadratus femoris.

Stretching the

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