Adductor Pollicis Muscle Overview

Name
Latin

Mksculus Adductor Pollicis

Etymology

Mksculus from Latin meaning little mouse (for the shape and movement of some muscles, e.g. biceps, resembling mice) equiv. to mks= mouse derived from PIE *muHs+ cle derived from -culus(var. of -ulus -ule becoming a suffix found in French loanwords or English loanwords of Latin origin, in adaptations of words borrowed directly from Latin: mus-cle, corpus-cle. Muscle in Greek. &mu;&upsilon;&sigmaf;:, too, is both mouse and muscle and its comb. form gives the medical prefix my-myo(in Greek &mu;&upsilon;&omicron;).

Adductor from Latin adducere: ad = to, and ducere = to lead. This muscle is so named because draw the part toward the medial line.

Pollicis genitive or possessive of the Latin Pollex= thumb. Pollex, in turn, derives from a verb pollere meaning to be strong. Among the fingers, Pollex is the big strong one.

Origin (Proximal tendon attachment)

Oblique head:

Bases of the second and the third metacarpals and the adjacent trapezoid and capitate bones

Transverse head: Base of the Third Carpal Bone
Insertion (by a tendon uniting with the tendons of the medial portion of the Flexor Pollicis Brevis Muscle)

Oblique head:

Proximal Phalanx of the Thumb  (ulnar side of the base)

Sesamoid bone  (present in the tendon of the adductor pollicis muscle)

Transverse head:

Proximal phalanx of the thumb  (ulnar side of the base)

Palpation of the Adductor Pollicis Muscle

Therapist seated facing the patient who is seated. "The palpating fingers placed on the anterior surface of the thumb web of the patient's hand and fingers of the support hand placed on the posterior surface of the proximal phalanx of the patient's thumb. Palpating the anterior side of the thumb web of the hand, resist the patient from adducting the thumb at the Carpo-Metacarpal Joint (saddle) joint, and feel for the contraction of the Adductor Pollicis Muscle. Once felt, palpate the entire Adductor Pollicis Muscle from the Proximal Phalanx of the Thumb to the Third Metacarpal Bone and Capitate Bone. Once the Adductor Pollicis Muscle has been located, have the patient relax it and palpate to assess its baseline tone." Joseph E. Muscolino  The Muscle and Bone Palpation Manual  Evolve Mosby

Trigger points (TrPs) examination in the Adductor Pollicis Muscle
The Trigger Points (TrPs) are hyperirritable spots with a hypersensitive palpable tight nodule located in a taut band of fibers of Adductor pollicis muscle and that when touched or pressured, produce tenderness and, rarely twitching and always jumping.

The Trigger Points Area is typically painful to compression, causing characteristic referred pain and hypersensitivity, motor dysfunction and even autonomic phenomena.

For a correct diagnosis of Myofascial Pain Syndrome is basic the detection of a taut band, the presence of spot tenderness, the presence of referred pain and reproduction of the patient's symptomatic pain (Four criteria of Gerwin for diagnosis of Myofascial Pain Syndromes)

According to Podiatrist's Guide to Trigger Points & Myofascial Pain Syndrome for a correct diagnosis is basic to detect : Regional pain complaint; Taut band palpable in an accessible muscle; Exquisite spot of tenderness in the taut band; Pain complaint or altered sensation in the expected distribution of referred pain from the tender spot; Some restricted range of motion, when measurable and in addition, in according with M.B. Yunus, at least one of the following minor criteria: Reproduction of clinical pain complaint, or altered sensation by pressure on the tender spot; Local twitch response by transverse snapping palpation of, or needle insertion into the taut band; Pain alleviation by stretching the involved muscle or injecting the tender spot in it.

The pattern of referred pain and hypersensitivity constitute the key for their identification because the Trigger Points of Adductor Pollicis Muscle produce pain locally (right where they are) as well as often referred pain to other areas

Using immune-capillary electrophoresis and capillary electro-chromatography Jay P. Shah and others have shown that biochemical milieu of selected inflammatory mediators, neuropeptides, cytokines and catecholamines like bradykinin, substance P, calcitonin gene-related peptide, tumor necrosis factor alpha, interleukin 1&beta; (IL-1&beta;), IL-6, IL-8, serotonin, and norepinephrine in subjects with active MTPs are different from subjects with latent or absent MTPs H See also Jay P. Shah MD, Jerome V. Danoff © 2008 American Congress of Rehabilitation Medicine

The cause of the problem is associated with a tender spot located lateral to the tendon of the flexor pollicis longus, possibly in the flexor pollicis brevis. To locate this TrP, the patient supinates the forearm, fully extends the MCP joint of the thumb, and then alternately flexes and extends the distal phalanx, while the examiner identifies the tendon (Fig. 39.3). To identify the tendon of the flexor pollicis longus, the examiner places a finger against the bulge of the MCP joint, pressing on the space between the flexor pollicis brevis and the adductor pollicis muscles where the tendon of the flexor pollicis longus enters the fascial sheath of the thumb (Fig. 39.2B). As the patient moves the distal phalanx back and forth, the cord of the subcutaneous tendon is located proximal to where it enters the anchoring arch of fibers at the head of the first metacarpal bone in the region of the "trigger" phenomenon. The TrP tenderness usually is located several millimetres lateral (radial) to the tendon, just proximal to the bony bulge of the MCP joint.

Trigger Points examination is performed through the dorsal approach to the web space of the thumb which is examined by pincer palpation.

Click for the common locations of Trigger points (TrPs) in the Adductor pollicis muscle

Associated Trigger Points (TrPs)
Trigger Points (TrPs) in the Abductor Pollicis Brevis Muscle

Trigger Points (TrPs) in the First Dorsal Interosseous Muscle

Trigger Points (TrPs) in the Flexor Pollicis Brevis Muscle

Trigger Points (TrPs) in the Opponens Pollicis Muscle

Activation and perpetuation of Trigger Points (TrPs) in the Adductor pollicis muscle

Prolonged pincer gripping when writing (overuse of the muscle)

Repetitive trauma to the mid-palm professions and sports that require prolonged gripping especially in bike

Traumatic lesion of the Adductor Pollicis Muscle such falling on an outstretched hand

Corrective actions

"Avoid persistent, vigorous weeding by limiting the time spent, by alternating hands in this activity,

Avoid persistent, vigorous weeding by loosening the dirt with a spading fork before pulling the weeds out

Use a soft felt-tip pen

Adductor Pollicis-stretch Exercise by placing the hands in a basin of warm water, while pressing the thumbs and index fingers of both hands against each other, to achieve full passive abduction and extension of the thumbs.

Reactivation of "weeder's thumb" can be avoided by having the patient frequently interrupt the gardening activity with the
Artisan's Finger-stretch Exercise; Travell and Simons

Trigger Points release in the Adductor Pollicis Muscle

Release Adductor Pollicis Muscle Trigger Points (TrPs) using Spray with the forearm supinated while resting on a supporting surface permitting full thumb extension and adduction: Click for technique

Release Adductor Pollicis Muscle Trigger Points (TrPs) using Trigger Point Pressure: Click for technique

Release Adductor Pollicis Muscle Trigger Points (TrPs) using gravity-assisted postisometric relaxation: Click for technique

Highlight: Application of Vapocoolant Spray or icing can precede any of these techniques

Highlight: Spray and release are followed at once by hot packs, then by active range of motion exercises

Trigger Points (TrPs) injection in Adductor Pollicis Muscle

Trigger Points (TrPs) injection is performed if tenderness, pain and restriction movement remain after non-invasive treatment by spray, release and stretching.

Accurate injection of the active Adductor Pollicis Muscle TrPs with the forearm supinated while resting on a supporting surface permitting full thumb extension and adduction, can be effective: Click for the technique by infiltrating a active TrPs in the Adductor pollicis muscle when a Trigger Point has been located by its spot tenderness in a nodule of a taut band and sometimes confirmed by eliciting an LTR, the operator's finger presses against it from the palmar side to fix it and provide guidance. As the needle is directed toward this guiding finger, it should pass to the radial side of, or perhaps penetrate, the first dorsal interosseous muscle. Following the injection, the muscle is passively stretched while release of the muscle is aided by sweeps of vapocoolant, three slow cycles of full active range of motion and followed by application of moist heat.

Arterial supply

Deep Palmar Branch of Ulnar Artery (source Ulnar Artery from Brachial Artery)
Innervation

Deep branch of the ulnar nerve from medial cord of the brachial plexus (segmental level C8-T1)

Entrapment

Ulnar Nerve Compression at the Arch of Origin of the Adductor Pollicis Muscle

“The Motor Branch Of The Ulnar Nerve can be compressed by the arch of origin of the adductor pollicis muscle. There can be a well-defined band of tissue either at the point where the nerve crosses the third metacarpal or where it penetrates the adductor muscle. In over half of the cadaver hands studied no arch was demonstrated. Clinically these patients present with obvious atrophy of the first dorsal interosseous and adductor muscle. Usually pain is not a prominent symptom. This type of ulnar nerve compression neuropathy is present in less than 1% of those ulnar neuropathies that occur at the wrist and hand.” John R. Ruder MDa and Virchel E. Wood MD

Action and Function

Adduction of the First Metacarpal Bone (50%)

Adduction of the thumb at Carpo-Metacarpal Joint (CMCJ)

Flexion of the thumb at Carpo-Metacarpal Joint (CMCJ)

Extension of the thumb at the Interphalangeal Joint (IPJ)
Symptoms with active adductor pollicis muscle trigger points (TrPs)

Aching pain along the outside of the hand at the base of the thumb distal to the wrist crease

Aching pain along the outside of the thumb

Atrophy of the First Dorsal Interosseous Muscle

Blunt mid-palmar pain without paresthesias

Difficult coordination of the thumb for fine motor activities

Inability to extend the thumb without external assistance after flexing it (trigger thumb phenomenon)

Mid-palmar pain reproduced by pressure at the base of the Third Metacarpal Bone

Pain and tenderness referred to the first Metacarpal Joint (CMCJ) DD with arthritis

Pain in the thumb web

Painful abduction of the thumb

Painful extension of the thumb

Poor ability to hold a piece of paper tightly between the thumb and the second metacarpal bone (Poor Strength of the Adductor Pollicis Muscle)

Prolonged conduction time for the Adductor Pollicis Muscle but not for other hypothenar muscles

Soreness with use of the thumb especially when gripping objects with the pincer grip

Symptoms and signs of the Syndrome of the Tendinous Arch of the Adductor Pollicis Muscle:

Thumb "locks" in flexion

Weak adduction of the thumb at Carpo-Metacarpal Joint (CMCJ) on the affected side

Weak Flexion of the thumb at Carpo-Metacarpal Joint (CMCJ) on the affected side
WeakExtension of the thumb at the Interphalangeal Joint (IPJ) on the affected side

Weakness of the Adductor Pollicis Muscle

Weakness of the Adductor Pollicis Muscle for fine motor activities

Weakness of the first dorsal interosseous muscle

Referral area \ Referred pain from myofascial trigger points (TrPs) in the adductor pollicis muscle

Pain referred to the base of the thumb on the palmar side of the hand

Pain referred to the base of the thumb on the dorsal side of the hand

Aching pain along the outside of the thumb

Aching pain along the outside of the hand at the base of the thumb distal to the wrist crease

Aching pain along the outside of the hand at the base of the thumb distal to the wrist crease

Pain referred in the palmar surface of the first Metacarpo-Phalangeal Joint (MCPJ)

Pain referred in the palmar surface of the first Metacarpo-Phalangeal Joint including the thumb

Pain referred in the palmar surface of the first Metacarpo-Phalangeal Joint including Thenar Eminence

Pain referred in the palmar surface of the first Metacarpo-Phalangeal Joint including Dorsal Web Space
Pain syndromes or Disorders involving Adductor Pollicis Muscle

Adductor Pollicis Muscle Myofascial Pain Syndrome*

Syndrome of the Tendinous Arch of the Adductor Pollicis Muscle

* "Myofascial pain syndrome is a chronic muscle pain disorder in one or more muscles or groups of muscles accompanied by local and referred pain, decreased range of motion, weakness, and often autonomic phenomena. Patients are readily recognized by their history of muscle pain and the presence of myofascial trigger points, which are specific areas of hyperirritability in a muscle that cause local and referred pain on palpation. Failure to recognize MPS often leads to over-investigation, unnecessary medical intervention, and iatrogenic harm with serious cost implications. The purpose of this review is to present clinically relevant data regarding myofascial pain syndrome and to discuss its possible role in the pathophysiology and optimal treatment of fibromyalgia syndrome". Helgard P. Meyer

Differential Diagnosis

Carpal tunnel syndrome

Cervical disc syndrome C8-T1

de Quervain’s Tenosynovitis

Metacarpal joint dysfunction

Osteoarthritis of the first Carpo-Metacarpal Joint
Osteoarthritis of the Metacarpo-Phalangeal Joint

Thoracic outlet syndrome

Pain referred from Myofascial Trigger Points (TrPs) in the Anterior Scalene Muscle

Pain referred from Myofascial Trigger Points (TrPs) in the Brachioradialis Muscle

Pain referred from Myofascial Trigger Points (TrPs) in the Brachialis Muscle

Pain referred from Myofascial Trigger Points (TrPs) in the Extensor Carpi Radialis Longus Muscle

Pain referred from Myofascial Trigger Points (TrPs) in the Opponens Pollicis Muscle

Pain referred from Myofascial Trigger Points (TrPs) in the Pronator Teres Muscle
Pain referred from Myofascial Trigger Points (TrPs) in the Subclavius Muscle

Pain referred from Myofascial Trigger Points (TrPs) in the Supinator Muscle