Trigger Points: Forearm and Wrist

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Some interesting facts (Ehand.com)

- One third of all acute injuries seen in emergency rooms involve the upper extremities.
- Two thirds of upper extremity injuries occur to individuals in their working years.
- The most common disabling work injuries in the United States involve the upper extremities, accounting for over one fourth of all disabling work injuries.
- One out of six disabling work injuries involve the fingers, most often due to the finger striking or being struck against a hard surface.
- One fourth of athletic injuries involve the hand and wrist.
- Children under the age of six are at the greatest risk for crushing or burning injuries of the hand.

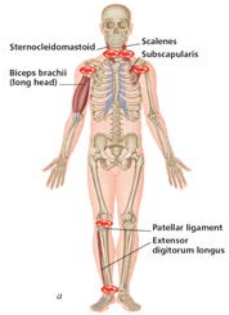
Other Factors

Context Matters

Kinematics and Linking Bio-Dynamics

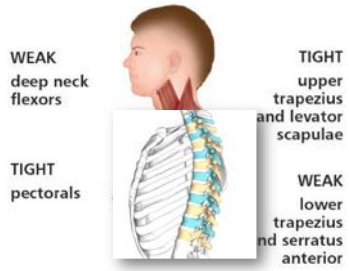
M.M. Posterior Oblique Link

Super Trigger Points



Posture and the Thoracic Spine

- "Postural abnormality represented an independent predictor of both symptomatic and asymptomatic rotator cuff tears."
- "The literature substantiates that imbalances in the glenohumeral and scapulothoracic musculature are present in patients with subacromial impingement."
- Head forward posturing and scapular protraction have both been associated with subacromial impingement (Greenfield et al. 1995, Warner et al. 1992).

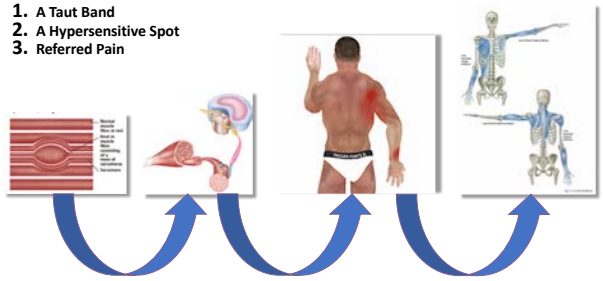


Energy Transfer

- Tennis serve (Kibler 1995)
  - Leg/Trunk 54%
  - Shoulder 21%
  - Elbow 15%
  - Wrist 10%
- Pitching (Kibler and Chandler 1995, Seroyer et al 2010, Sciascia and Cromwell 2012)
  - 24% energy decrease from hip and trunk requires a 34% increase at shoulder to deliver the same amount of force
  - Hip and trunk extension facilitates scapula retraction.
  - Hip and trunk flexion facilitates scapula protraction.

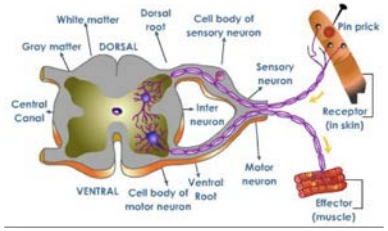
TRIGGER POINTS 101

1. A Taut Band
2. A Hypersensitive Spot
3. Referred Pain



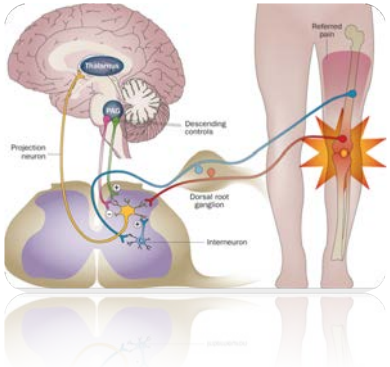
Trigger Points, Elbow and Wrist Pain

- Trigger points may play a hugely important role in activating, perpetuating and also relieving Elbow and Wrist Pain
- Peripheral and central sensitization
- Nociceptive drive
- Dorsal Horn Wind-up



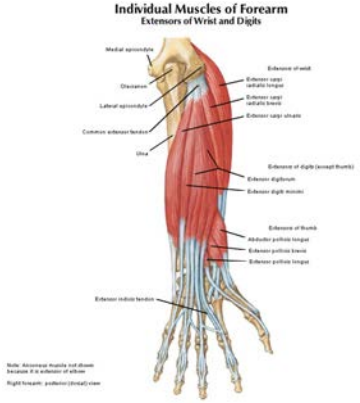
Myopathic Plexopathy/Radiculopathy

- Trigger points make host muscle short fat and inefficient
- Persistent/recalcitrant trigger points can also increase nociceptive burden - Peripheral and Central sensitization
- Can put pressure on nerves and or plexus - plexopathy
- Classic syndromes – Sceleneii, Pec Minor (brachial), lesser known – Meralgia paraesthetica, Greater Occipital Neuralgia (GON), Capral Tunnel syndrome, Pronator Teres syndrome – double crush syndrome
- Exact mechanisms are unknown but presumably pressure effects - neuropraxia



Wrist Extensors

- Brachioradialis
- ECRL
- ECRB
- Ext Digitorum
- Ext Dig Minimi
- Ext Carpi Ulnaris



Lateral Epicondylalgia/itis

- Lateral Epicondylopathy, Lateral Epicondylalgia or Tennis Elbow as it is commonly known, is estimated to affect 1% to 3% of the population.
- Epicondylitis is the term used to describe a painful condition of the outside elbow. The word epicondylitis suggests inflammation; histological analysis on the tissue fails to show any inflammatory process.
- The structure most commonly affected is the origin of the tendon of the **Extensor Carpi Radialis Brevis** and the mechanism of injury is associated with overuse and accumulated microtraumata of the hand and wrist tendons.
- **Supinator** Muscle trigger points are also worth exploring

Extensor Carpi Radialis Brevis (ECRB)

Three zones where the ECRB can become injured:

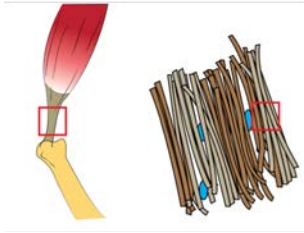
Type I Collagen

- **Tendino-Osseous** – where the tendon meets the bone
- **Musculo-Tendinous** – where the muscle meets the tendon
- **Intramuscular** – within the muscle itself

Prognosis and treatment time is very much connected to which of the zones have injury.

Over time, the body often compensates by using other muscles instead.

In the case of the Tennis Elbow - this is most often the Triceps muscle. Although a Tennis Elbow can occur as a result of a sudden injury it is usually due to a slow buildup of damage or overload of the muscle and tendon.



Symptoms

Tennis Elbow is more likely to occur in the dominant arm but it can occur in either.

Slowly and gradually over weeks and months in the elbow area.

Less common for the symptoms to occur suddenly but as a rule tendons don't react well to sudden eccentric forces.

The pain can be anything from mild discomfort to severe, and it may affect sleep.

Increases when forcibly trying to stabilize or move the wrist.

Pain is aggravated when:

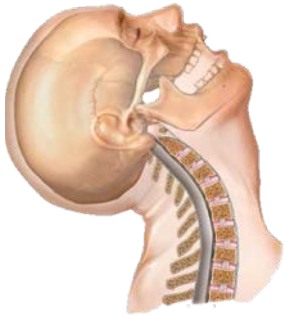
- **Shaking hands**
- **Using tools**
- **Gripping objects e.g. cutlery, pen, computer mouse**
- **Fully extending arm**
- **Turning a door knob**
- **Lifting**

Epidemiology

- 1-3% of the population
- Mainly men between the ages of 30-50
- Those who play tennis or other racquet sports on a regular basis are at a higher risk (as high as 50%) of developing this condition, however in 95% of cases it occurs in people who are not tennis players
- Anyone who participates in activities that require repetitive and vigorous use of the forearm muscle, especially while gripping
- This broadens its reach to a variety of professions: mechanics, cooks who chop, cleaners who vacuum, butchers, gardeners, assembly- line workers, bowlers and golfers

Differential Diagnosis

- Trauma (fracture)
- Radial head of the radius at the elbow joint
- Injury to the radial nerve (radial tunnel syndrome)
- Problems with the disks in the neck C5/6/7 neuropathy (cervical disk)
- De Quervain's tenosynovitis
- Osteoarthritis of thumb (trapezium)
- Dysfunction to the triangular articular cartilage disk at the wrist
- Osteoarthritis of the elbow joint
- Carpal tunnel syndrome
- Nerve entrapment in the forearm such as "posterior interosseous syndrome"



Let's ask Dr. Gerwin

Triceps and Biceps Trigger Points

Trigger Points for Treatment

- Treating trigger points with inhibition compression, deep stroking massage, spray and stretch and dry needling are all effective, used in combination, along with a home stretching program affords the best results.
- Remember also to check the function of the shoulder and the upper extremity including the **Biceps** and **Triceps** muscles.

Carpal Tunnel Syndrome (CTS)

Carpal Tunnel Syndrome (CTS) is the single most common form of entrapment neuropathy.

It involves pressure on the Median Nerve of the wrist beneath non flexible structures. Sustained, high pressure in the tunnel impedes microcirculation in the Median nerve leading to decreased action potentials, demyelination in the nerve and axonal degeneration.

Several authors have investigated the anatomical and pathophysiological features of CTS and have identified several parameters that, in combination, play a significant role in its pathophysiology.

Whilst in some cases CTS may require surgical decompression, it is well worth looking at trigger points in various muscles to help relieve or even completely fix the symptoms.

Carpal Tunnel – Fact Sheet

- CTS is more prevalent in females than in males with a frequency of 9.2% in females to 6% in men.
- The average is 40-60 years of age.
- In Europe 60% of work related injuries are attributed to CTS. In the UK the prevalence is 7-19% compared to the USA which is 5%.
- People who sit at a computer and use a keyboard for an extended periods of time are are at a higher risk, for example, typists or office clerks who deal with key entry.
- Pregnancy has a rate of 2%.
- Diabetics have a prevalence of 14% and diabetics with neuropathy have a prevalence of 30%.
- Populations at risk: Grocery line workers, packers in the meat and fish industry, musicians and mechanics.
- Hobbies such as gardening, needlework, golfing and canoeing may also cause Carpal Tunnel Syndrome.
- Smoking has also been found to contribute to Carpal Tunnel Syndrome as it limits the blood flow to the median nerve.

Carpal Tunnel - Anatomy

The Carpal Tunnel located on the palmar side of the wrist and has a function of protecting the Median Nerve

It is formed by two layers: a **deep carpal arch** and a **superficial flexor retinaculum**. The deep carpal arch forms a concave surface, which is converted into a tunnel by the overlying flexor retinaculum

Carpal Arch

- Concave on the palmar side, forming the base and sides of the carpal tunnel
- Formed laterally by the scaphoid and trapezium tubercles
- Formed medially by the hook of the hamate and the pisiform

Flexor Retinaculum

- Thick connective tissue which forms the roof of the carpal tunnel
- Turns the carpal arch into the carpal tunnel by bridging the space between the medial and lateral parts of the arch
- Originates on the lateral side and inserts on the medial side of the carpal arch
- To find where the carpal tunnel begins on

Carpal Tunnel - Symptoms

Numbness or tingling of the thumb and fingers, particularly the index and middle fingers

This sensation is often felt when holding a steering wheel, phone or newspaper

Weakness in the hands is also a common symptom of Carpal Tunnel Syndrome, leading to a tendency to drop objects. Weakness usually develops after numbness or tingling

The Symptoms of Carpal Tunnel Syndrome develop gradually but tend to worsen at night

Related to sleep position, where wrists are flexed during sleep

Patients often hang their hands off the bed or shake the hands out

Carpal Tunnel – Pre-Disposing Factors

The following health conditions can contribute to the development of Carpal Tunnel Syndrome:

- Diabetes
- Obesity
- Hypothyroidism
- Rheumatoid arthritis
- Pregnancy
- Computing and ergonomics
- Cell phones and Gaming!

Let's ask Dr. Gerwin about C.T.S.

Carpal Tunnel Trigger Points – Supinator and Palmaris Longus

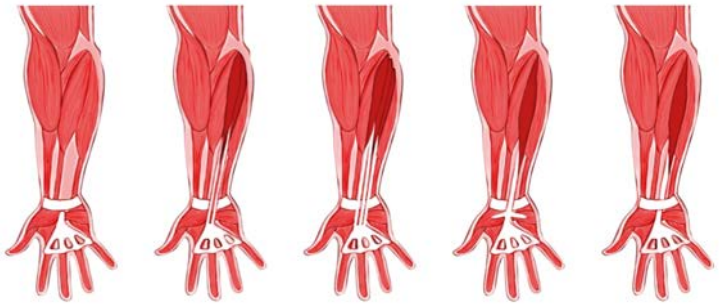
Palmaris Longus

Is it there?

The Palmaris Longus is perhaps the most important muscle to consider for trigger points in Carpal Tunnel Syndrome.

It is sometimes absent (16%) and it may also demonstrate bilateral asymmetry. The tendon of the Palmaris longus can be thick and rests above the carpal tunnel.

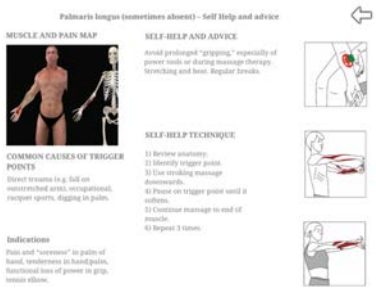
Palmaris Longus



Absent | **PLM Duplication** | **Triplication** | **Accessory Slips** | **PLM profundus**

Self Help – Triggerpoints3D

Palmaris Longus



Pronator Teres

Pronator Teres Syndrome

Median Nerve entrapment in the forearm near the elbow observed in two forms: those consisting of the **Pronator Teres Syndrome** and those of the **Anterior Interosseous Nerve** (Kiloh-Nevin).

Both syndromes are infrequently encountered, but entrapment of the anterior interosseous nerve by the deep head of the pronator teres and the flexor superficialis arch is said to be more frequently recognized.

Although many of the clinical manifestations may resemble those of involvement of the median nerve by a supracondylar process and/or Struthers' ligament, sometimes confused with CTS

Pronator Teres Syndrome II

PTS also involves a crush compression of the Median nerve but higher in the forearm. The Median nerve passes beneath Struther's ligament and the Pronator Teres muscle.

Major Signs and Symptoms of PTS

- Pain and/or numbness in the distribution of the distal median nerve
- Anterior Interosseous Syndrome: weakness of Flexor Pollicis Longus & flexor Digitorum Profundus, pain into the cubital fossa
- Pain location - Volar Forearm
- Resisted Pronation

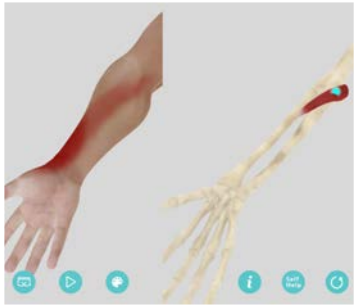
Let's ask Dr. Gerwin – The Pronator Teres

Pronator Teres and Trigger Points

Trigger Points Treatment

Treating trigger points with inhibition compression, deep stroking massage, spray and stretch and dry needling are all effective, used in combination, along with a home stretching program affords the best results.

Remember also to check the function of the neck and shoulder and to look for trigger points in the **Pronator Teres** and the **Palmaris Longus Muscle** (if the patient has one).



Refs

- Zamborsky, Radoslav & Kokavec, Milan & Simko, Lukas & Bohac, Martin. (2017). Carpal Tunnel Syndrome: Symptoms, Causes and Treatment Options. Literature Reviev. Ortopedia Traumatologia Rehabilitacja. 19. 1-8. 10.5604/15093492.1232629.