Academy of PHYSICAL MEDICINE

Broadcast Summary

Mid-Back Pain

With Simeon Niel Asher

First broadcast on 4th March 2015

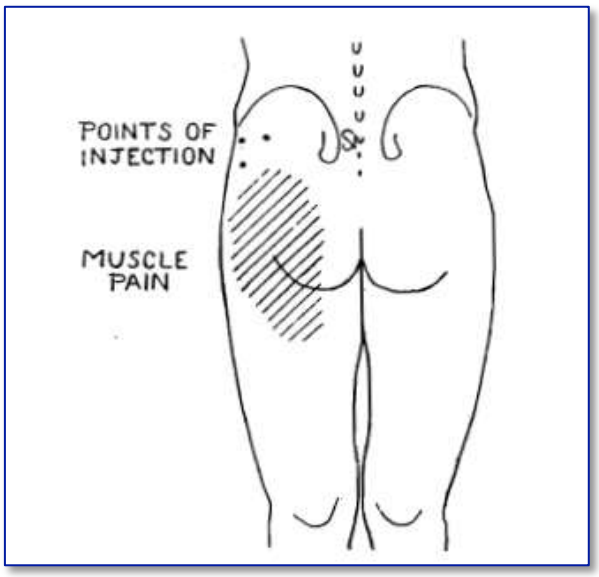
Note: This document contains some material not covered in the broadcast discussion

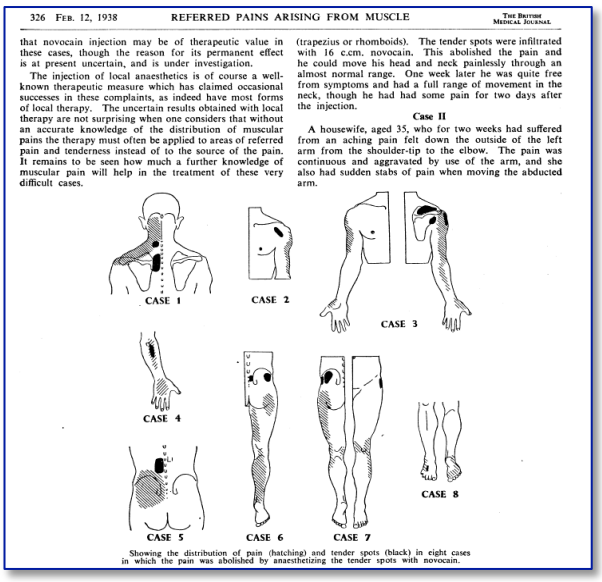
Simeon Niel Asher

- Studying TPs since 2nd year as a student at BSO
- Needling TPs last 5 years
- Has seen great results, and developed the technique further
- Feels TPs should be taught as part of core curriculum

Trigger Point History

- Andrew Taylor-Still – 1828-1917 – Founded 'Osteopathy'
- Stanley Leif – 1892-1963
- Hans Kraus (1941) – Spray and Stretch
- Dr. Raymond Nimmo – 1904-86 – Chiropractor
- Sir William Gowers (UK) – introduced the term 'fibrositis' for a common, but idiopathic, localized form of muscular rheumatism. Now recognized as myofascial pain syndrome.
- Jonas Kellgren 1911-2002, elicited pain relief by injecting TPs (*Kellgren JH. - Observations on referred pain arising from muscle. - Clinical Science 1938; 3: 175-190)*




326 FEB. 12, 1938 REFERRED PAINS ARISING FROM MUSCLE THE BRITISH MEDICAL JOURNAL

that novocain injection may be of therapeutic value in these cases, though the reason for its permanent effect is at present uncertain, and is under investigation.

The injection of local anaesthetics is of course a well-known therapeutic measure which has claimed occasional successes in these complaints, as indeed have most forms of local therapy. The uncertain results obtained with local therapy are not surprising when one considers that without an accurate knowledge of the distribution of muscular pains the therapy must often be applied to areas of referred pain and tenderness instead of to the source of the pain. It remains to be seen how much a further knowledge of muscular pain will help in the treatment of these very difficult cases.

(trapezius or rhomboids). The tender spots were infiltrated with 16 c.cm. novocain. This abolished the pain and he could move his head and neck painlessly through an almost normal range. One week later he was quite free from symptoms and had a full range of movement in the neck, though he had had some pain for two days after the injection.

Case II

A housewife, aged 35, who for two weeks had suffered from an aching pain felt down the outside of the left arm from the shoulder-tip to the elbow. The pain was continuous and aggravated by use of the arm, and she also had sudden stabs of pain when moving the abducted arm.

CASE 1 CASE 2 CASE 3 CASE 4 CASE 5 CASE 6 CASE 7 CASE 8

Showing the distribution of pain (hatching) and tender spots (black) in eight cases in which the pain was abolished by anaesthetizing the tender spots with novocain.

- Janet Travell **1901-1997:**
  - First woman & first civilian ever to hold the post of White House physician.
  - Coined the term Trigger Points in 1942

Trigger Point Therapy

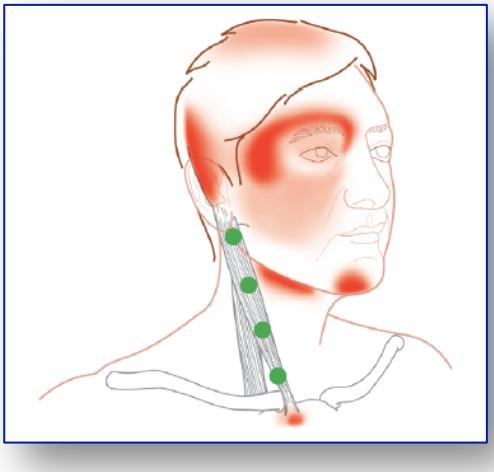
- In Frozen Shoulder TPs manifest differently due to the pathological state of the joint
- Niel Asher technique treats TPs as nociceptive inputs, and uses them in a novel way to gain greater effect
- Most practitioners probably use them without realising
- Increasingly accepted and understood by the conventional world
- GPs want to help patients, but have limited time, many learn needling of TPs
- Needling not most effective technique, but can be useful, particularly in chronic cases
- Needling a taught band elicits "twitch response", where muscle twitches – has important therapeutic outcomes
- Hands-on therapists have an important role to play – palpatory skills at a much higher level
- Other than GPs, within the conventional world, many using TP needling, (neurologists, orthopods)
- TP theory not universally accepted:
  - see Quintner and Cohen[1]
  - "The Horse is Dead"[2]

Therapeutic touch

- Taboo around touch in modern society, unlike the other senses
- Therapeutic touch is historic, within every community
- Touch is very primal, very bonding
- Paper by Dunbar[3]: Demonstrated that grooming by apes is a type of rough massage

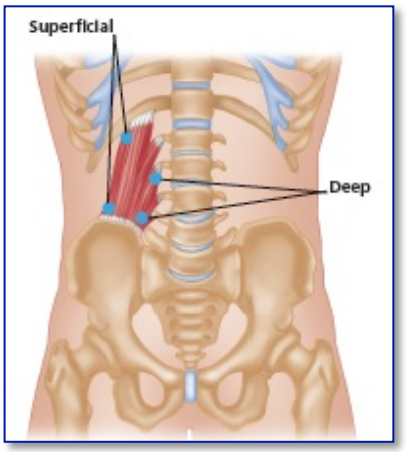
What are TPs?

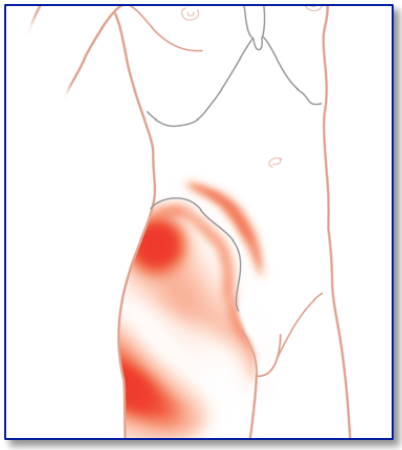
- Dr. Janet Travell to describe painful lumps or nodules felt within tight bands of muscle. Trigger points all seem to have the following characteristics:
- Pain, often exquisite, is present at a discrete point.
- A nodule is embedded within a taut band in the muscle.
- Pressure reproduces the pain symptoms, with radiations in a specific and reproducible distribution (map).
- Pain cannot be explained by findings from a neurological examination.



[1] Quintner, Bove and Cohen (2015) Rheumatology p. 270-277
[2] Quintner and Cohen (2008). The Horse is Dead. *Pain Medicine (Letters to the editor).* 9 (4). P 464-465.
[3] Dunbar RIM, (2010) The social role of touch in humans and primates: Behavioural function and neurobiological mechanisms, Neuroscience and Biobehavioral Reviews 34 260–268

Pain Maps





Reduced mechanical efficiency!

- Trigger points develop in the *muscle belly*; so multi-pennate (several heads) muscles such as the deltoid or serratus anterior may have several trigger points at once.
- Result of overstimulation of the muscle spindle, which becomes sticky and permanently 'switched-on', this is the lump that we feel.
- Embedded in the muscles remotely from where the pain is felt.
- Makes its host muscle shorter and fatter and reduces its efficiency: this can lead to pressure on nerves and blood vessels.
- Reduced efficiency = increased risk of injury
- Think of effect on antagonists

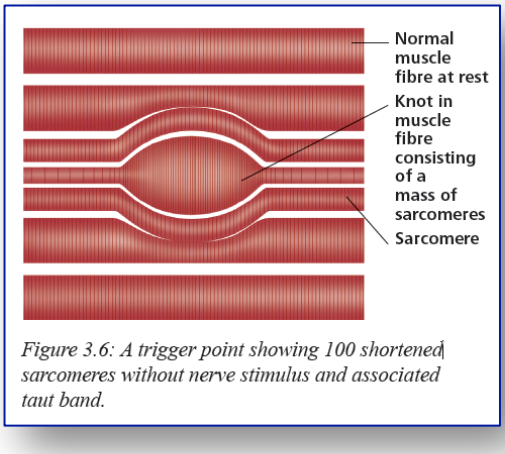
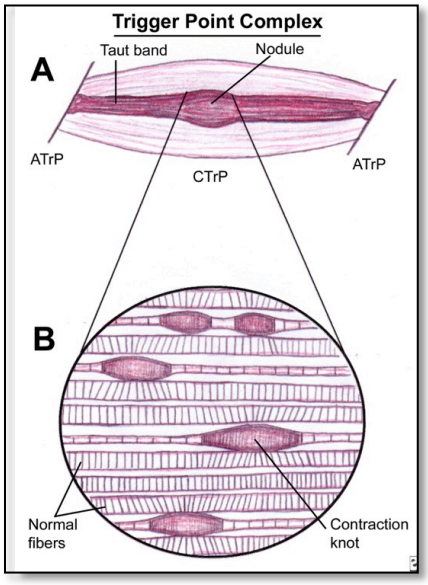
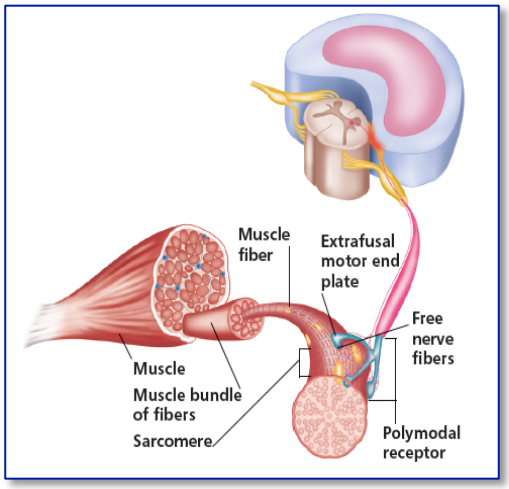


Figure 3.6: A trigger point showing 100 shortened sarcomeres without nerve stimulus and associated taut band.

Taut Bands



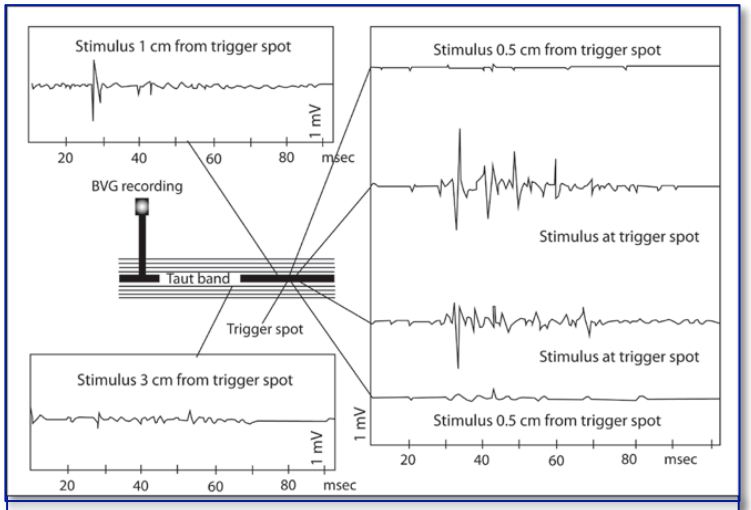


Aetiology. Several possible trigger point mechanisms (Dommerholt et al. 2006):

- Low-level muscle contractions
- Uneven intramuscular pressure distribution
- Direct trauma
- Unaccustomed eccentric contractions
- Eccentric contractions in unconditioned muscle
- Maximal or submaximal concentric contractions

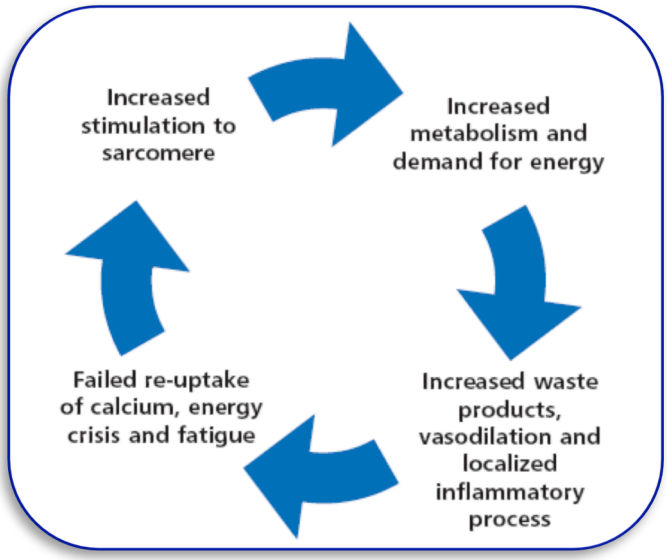
Evidence. Studies over the past decade[1] have:

- Imaged trigger points;
- Demonstrated that their activation results in CNS activation through fMRI scanning;
- Demonstrated electrophysiological activity at the trigger point;
- Shown biochemical changes in the trigger point zone.
- Further studies have shown that manipulation of the trigger point modulates muscle function, and induces local and referred pain.
- Mense et al demonstrated a connection with peripheral and central sensitization.

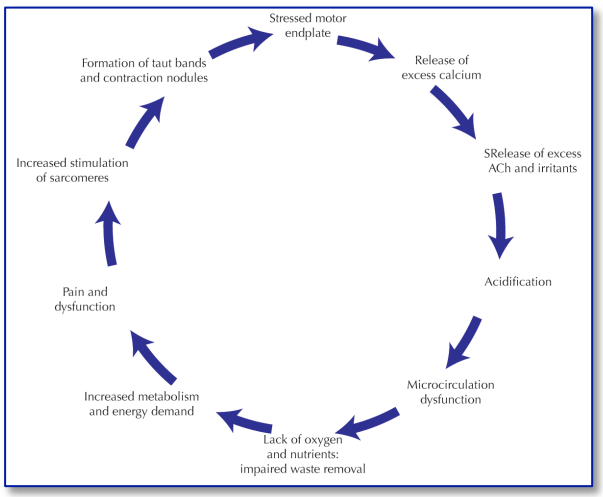


Local twitch response (LTR) in a rabbit tender spot. LTRs are elicited only when the needle is placed accurately within the trigger spot. (Adapted from: Hong 1996.)

What is happening inside the muscles: Sarcomere Contraction Flow-Chart



Vicious Cycle of Energy Crisis



- Sustained dysfunction and sarcomere contraction leads to local intracellular and extracellular chemical changes including:
- Localized ischemia/hypoxia
- Increased metabolic needs
- Increased energy (required to sustain contraction)
- Failed reuptake of calcium ions into the sarcoplasmic reticulum
- Localized inflammation (to facilitate repair)
- Compression or watershed effect on local vessels
- Energy crisis
- Production of inflammatory agents (which sensitize local autonomic

Summary of A.N.S. Effects

- Hypersalivation – increased saliva
- Epiphora - abnormal overflow of tears down the cheek
- Conjunctivitis – reddening of the eyes
- Ptosis – drooping of the eyelids
- Blurring of vision
- Increased nasal secretion
- Goose bumps/flesh

Classification of TPs

- Central (or Primary) Trigger Points
- Satellite (or Secondary) Trigger Points
- Attachment Trigger Points
- Diffuse Trigger Points
- Inactive (or Latent) Trigger Points
- Active Trigger Points

Peripheral Sensitization

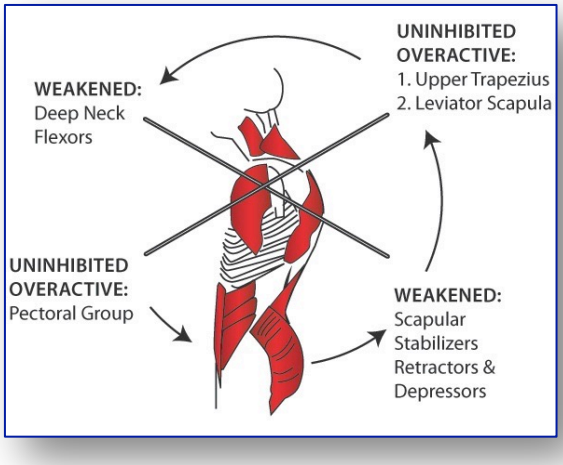
- Within 48 hours MTPs cause inflammation, chronic facilitation, and changes in feedback from the host muscle.
- Drop in the excitation threshold of polymodal nociceptors so that even normally innocuous, light stimuli activate them.
- After sensitization of "pain fibers," stimuli that as a rule are non-painful can cause pain (Schaible 2006);
- Also Mechano-insensitive nerve fibers can become mechano-sensitive. "This recruitment of silent nociceptors adds significantly to the nociceptive input to the spinal cord.
- Resting discharges may be induced or increased in nociceptors" (Schaible 2006).
- Continuous afferent barrage into the spinal cord.

Central Sensitization

- Over time - peripheral changes move deeper into the nervous system and the pattern becomes established centrally.
- The superficial, the deep, and the ventral spinal cord show pronounced changes in their response properties (Schaible 2006).
- This is a form of neuroplasticity: after sensitization, an increased percentage of neurons in a segment respond to stimulation of an inflamed tissue.
- The sensitivity of the spinal cord neurons becomes enhanced, so that an input that was previously subthreshold may now be sufficient to activate the neurons.
- This effect is magnified up and down the spinal cord over several segmental levels both caudally and cephalically, which may lead to lowered activation thresholds for other MTPs.

Common Postural Problems & Mid Back Pain *(after Janda (1998))*

- Poor posture is a powerful 'activator and perpetuator' of myofascial trigger points
- Always worth considering in chronic trigger point syndromes
- Postural muscles - type 1 fibres; - more resistant type of trigger point
- Head forward posturing and scapular protraction (upper crossed pattern) have both been associated with subacromial impingement (Greenfield et al. 1995, Warner et al. 1992).
- Altered scapular kinematics has been shown in patients with dysfunctional scapular musculature (Ludewig and Cook 2000), rotator cuff fatigue (Tsai 1998) and altered thoracic and cervical curvature (Wang et al. 1999), either structural or functional.
- Occupational and habitual postures (cross legged)
- High Heels!!!



Three Main Causes of Pain

Nociceptive Pain
- Localized to area
- Signs of Inflammation
- Associated with history of
  - Infection
  - Trauma
  - Cancer
  - Steroid use

Neuropathic Referred Pain
- Radiating Pain
- Uni or bilateral
- Symptoms of neuropathy
- Paresthesia
- Burning sensation
- Signs of Neuropathy
- Allodynia
- Hyperesthesia
- Hyperalgesia
- Look for Vertebral Damage (shingles)

Somatic Referred Pain
- From somatic structure
- Facet Joint
- Muscle
- Ligament
- Minimal local tenderness
- MTrP's for muscles
- No inflammation

Mechanical

- According to Dr. Bob Gerwin – the head of pain medicine at John Hopkins University School of Medicine, up to 95% of mechanical musculoskeletal back pain may be trigger point related, especially in chronic back pain.
- Trigger points have been implicated in a range of conditions and they can often mimic others: Conditions ranging from fibromyalgia, bursitis, headache, dizziness, earache, and even toothache.
- Untreated trigger points may lead to central sensitization.

Red Flags

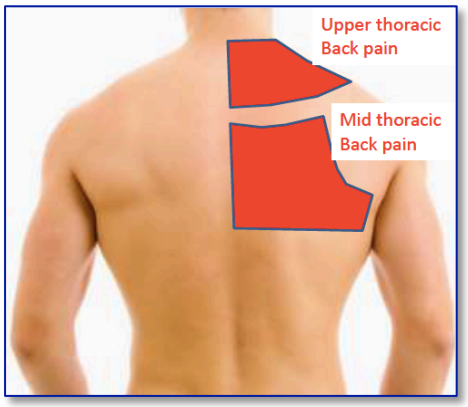
- Age of appearance <20 or >50
- Severe Trauma
- Constant, Non mechanical unrelenting pain
- Chest pain
- Prior history of:
  - Cancer
  - Steroid use
  - HIV or Drugs
- Generally unwell (fever, weight loss, etc.)
- Lumbar flexion severely diminished
- Widespread neurological dysfunction
- Structural defect
- ESR > 25 (other inflammation markers)
- Vertebral collapse on plain radiology

Beliefs, Attitudes, and Emotions

- Beliefs and attitudes about pain
- Pain behavior
- Litigation issues
- Diagnostic and treatment issues
- Emotions: anger, depression, hopelessness
- Family problems
- Work problems

Interscapular and Mid Back Pain

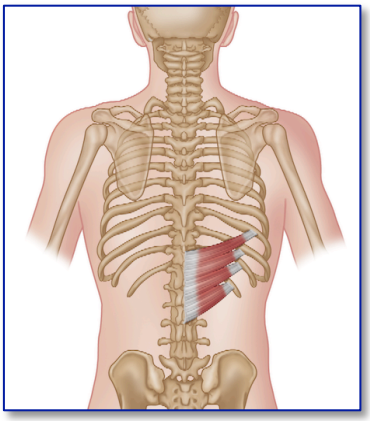
- Mid Thoracic back pain:
  - Scaleni
  - Latissimus Dorsi
  - Levator Scapulae
  - Illiocostalis thoracis
  - Multifidi
  - Rhomboidei
  - Serratus posterior superior

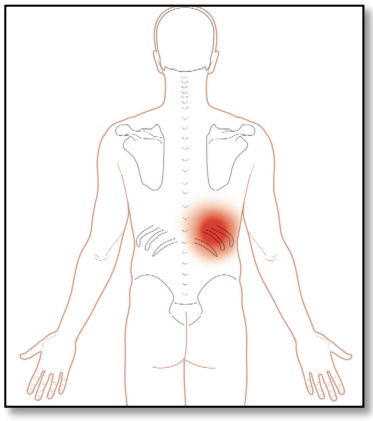


- Infraspinatus
- Trapezius
- Serratus anterior

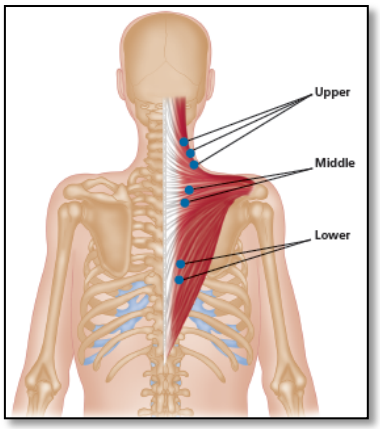
- Lower thoracic Back pain
  - Serratus posterior inferior
  - Intercostal

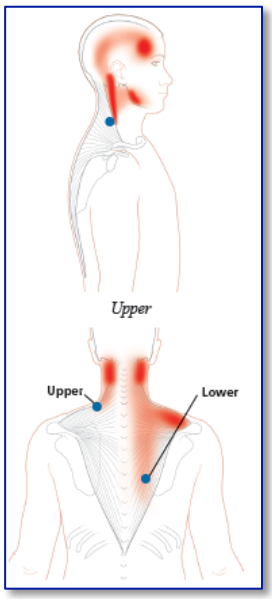
Mid-Back Pain: Serratus Posterior Inferior



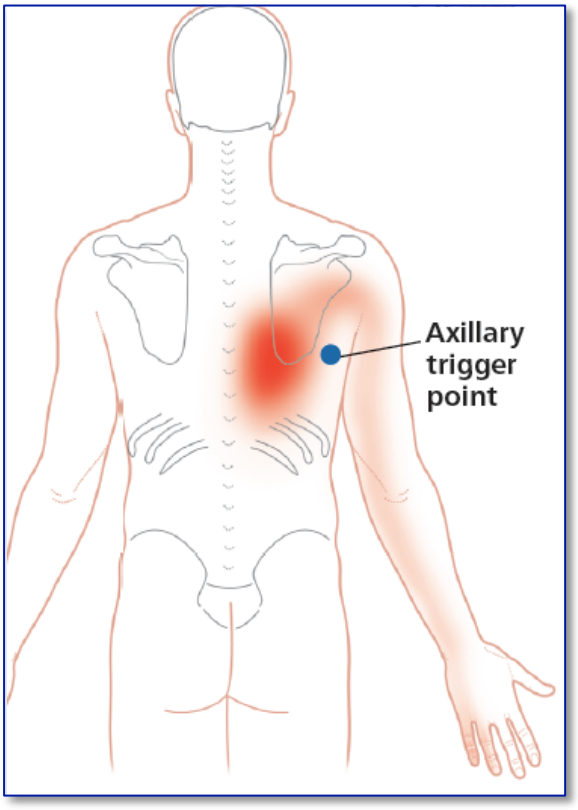


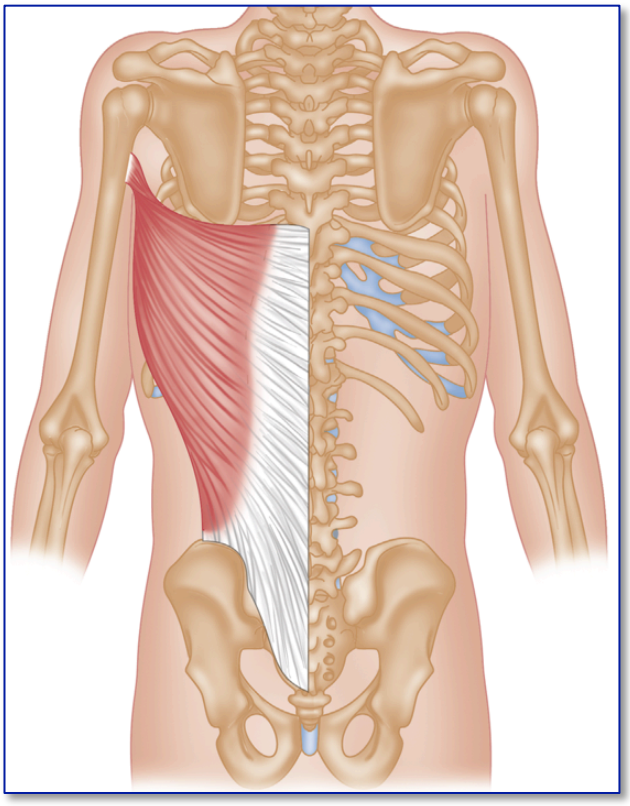
Middle and Lower Trapezius



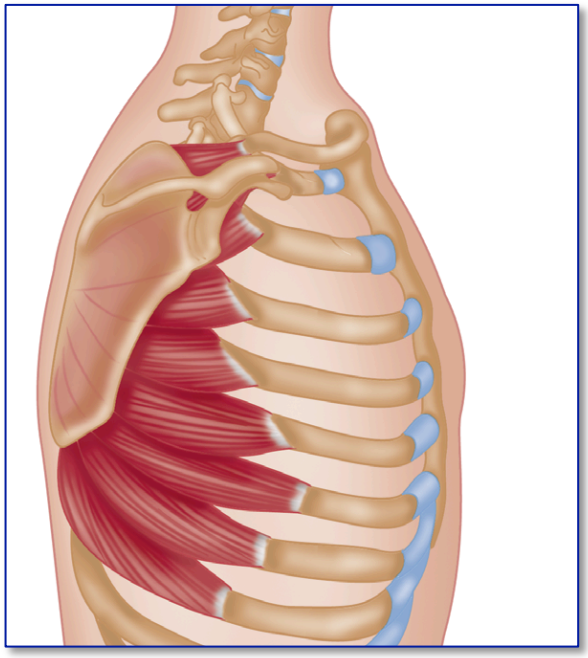


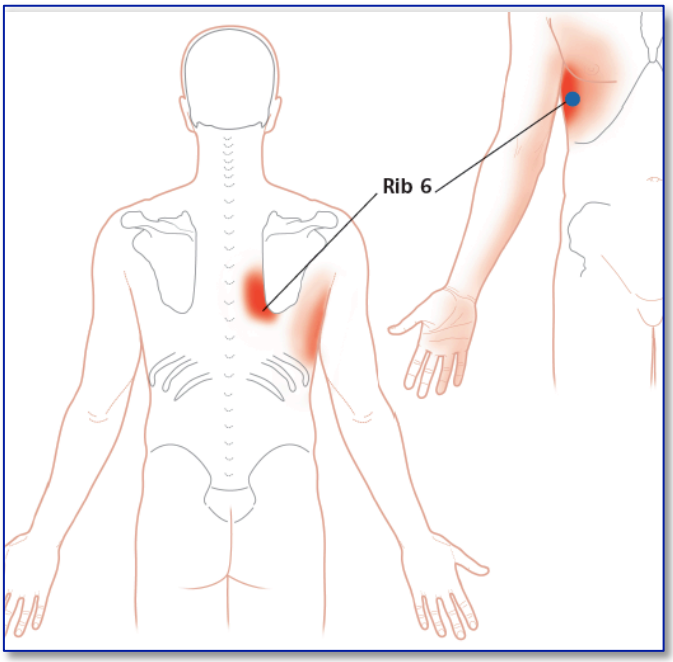
Latissimus Dorsi



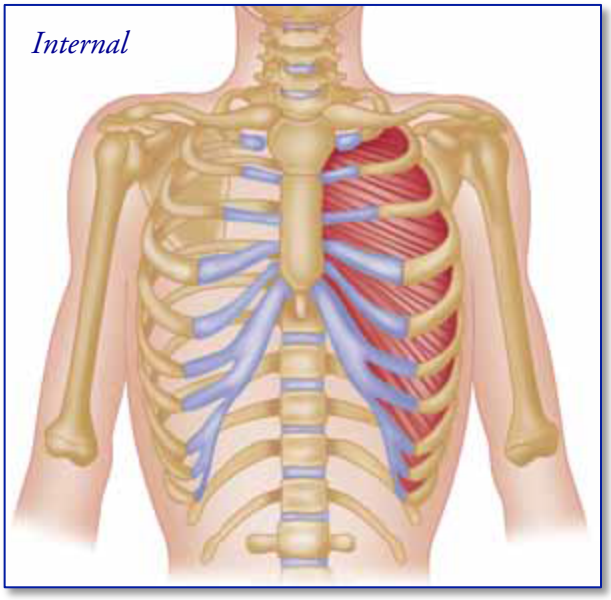


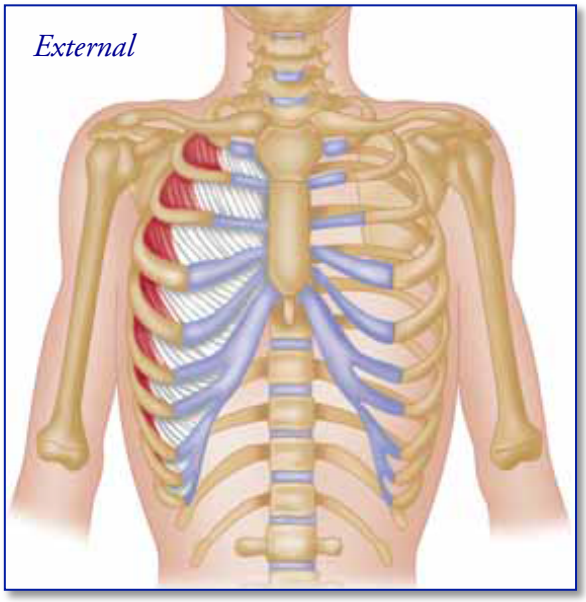
Serratus Anterior



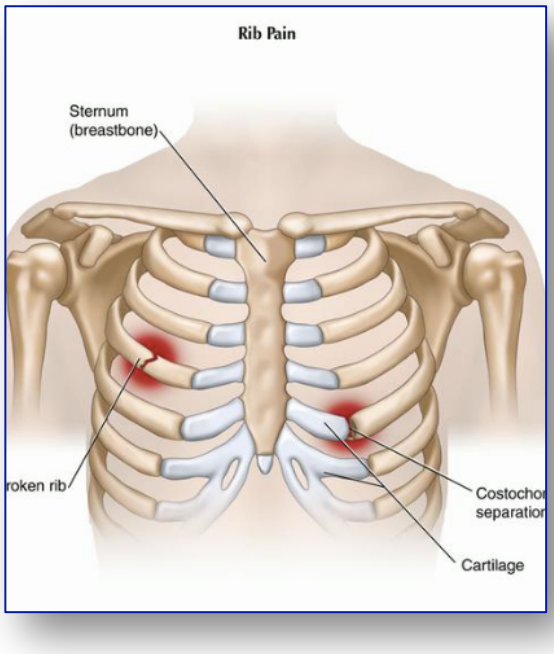


Intercostals



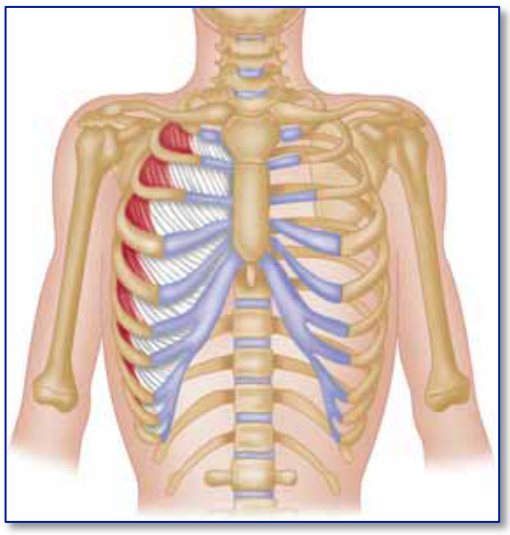


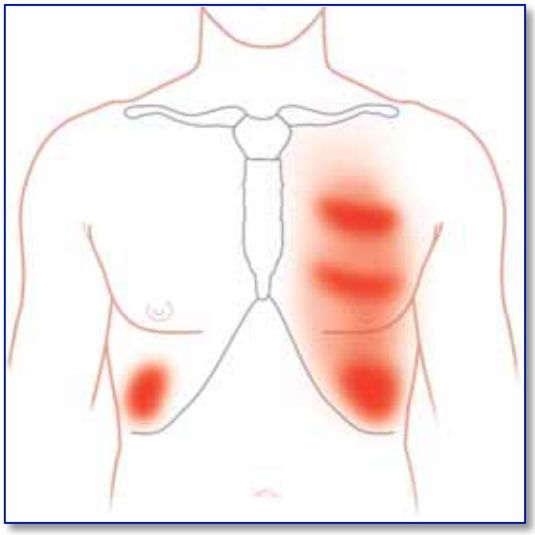
Intercostal Factors (COPD & Fracture)



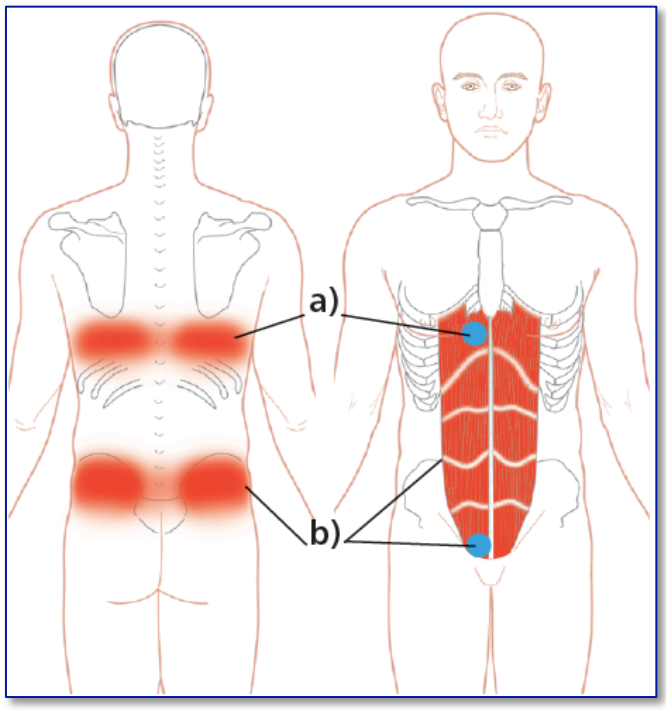
Note that needling immediately post-fracture (not necessarily rib fracture) can speed the healing process

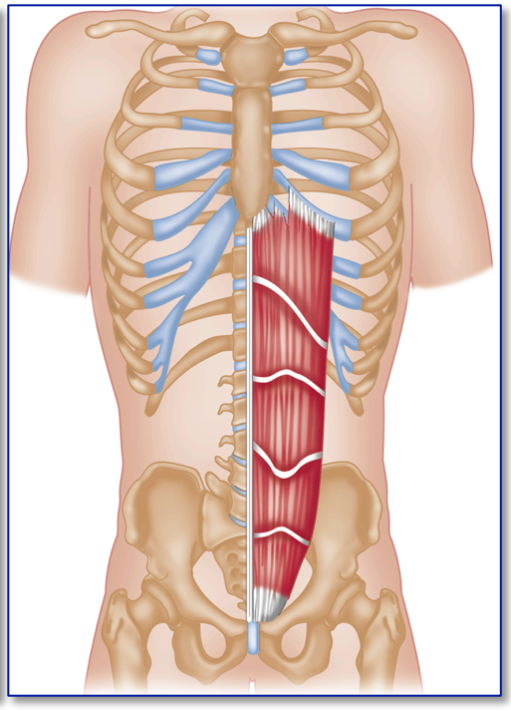
Intercostal Pain Map



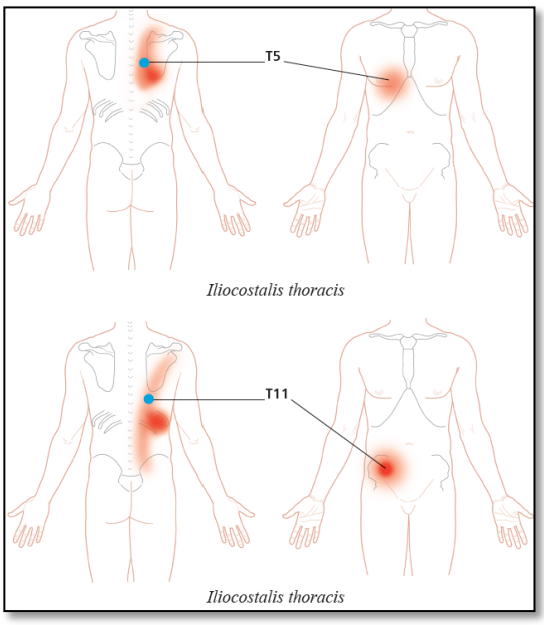


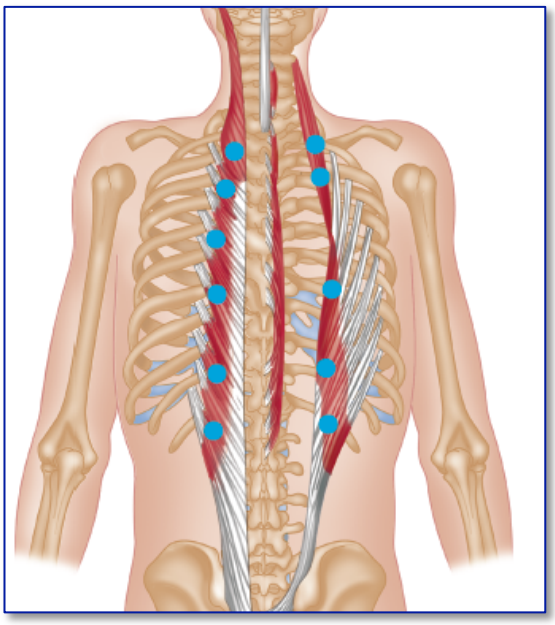
Rectus Abdominis





Erector Spinae





Trigger Point Techniques

- Simple to understand and master
- Fit into osteopathic protocols
- Proprioceptive
- Rely on palpation rather than clinical investigations
- Range
- Elbows!!!!
- Inhibition Compression Technique & Deep Stroking Massage

Inhibition Compression Technique (ICT)

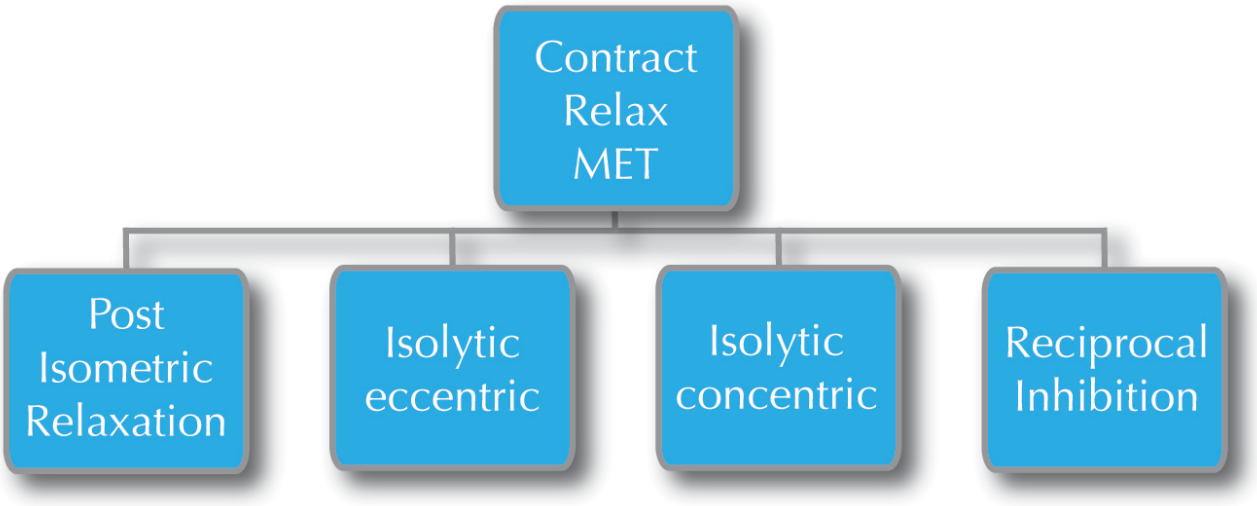
- Identify the trigger point
- Place the patient in a comfortable position, where the affected/host muscle can undergo full stretch
- Apply gentle and gradually increasing pressure to the trigger point, while lengthening the affected/host muscle until you hit a palpable barrier. This should be experienced by the patient as discomfort and not as pain.
- Apply sustained pressure until you feel the trigger point soften. This can take from a few seconds to several minutes.
- Repeat, increasing the pressure on the trigger point until you meet the next barrier, ans so on.
- To achieve a better result, you can try to change the direction of pressure during these repetitions.

Deep Stroking Massage (DSM)

- Place the patient in a comfortable position, where the affected/host muscle can undergo full stretch
- Lubricate the skin if necessary
- Identify and locate the trigger point or taut band
- Position your thumb/applicator just beyond the taut band, and reinforce with your other hand.

- Apply sustained pressure until you feel the trigger point soften, and continue stroking in the same direction toward the attachment of the taut band. This should be experienced by the patient as discomfort and not as pain.
- Repeat the stroking in the opposite direction.

Muscle Energy Techniques



Stretch and Release

- Identify the trigger point
- Place the patient in a comfortable position, where the affected/host muscle can undergo full stretch
- Using 10-25% of their power, ask the patient to contract the affected/host muscle at its maximal pain-free length, while applying isometric resistance for 3-10 seconds; stabilize the body part to prevent muscle shortening
- Ask the patient to relax the muscle or "let it go."
- During this relaxation phase, gently lengthen the muscle by taking up the slack to the point of resistance (passive) – note any changes in length.
- Repeat several times (usually 3).

Reciprocal Inhibition Technique

- Identify the affected/host muscle and take it into relaxation.
- Ask the patient to contract the antagonist muscle against 35-45% isometric resistance.
- Manual therapy of the antagonist will have a reciprocal inhibition effect.

Post Isometric Relaxation

- Identify the trigger point
- Place the patient in a comfortable position, where the affected/host muscle can undergo full stretch
- Take the stiff joint to a comfortable position near the endpoint, and ask the patient to actively contract the affected/host muscle.
- Gently resist this voluntary contraction.Allow relaxation.

- During the relaxation, passively stretch the joint to a new (increased) endpoint.

CRAC

- Find the joint/soft tissue restriction or "biting point".
- Contract agonist. Relax (agonist).
- Contract agonist. Stretch agonist.
- Hold stretch for 15-30 seconds.
- Repeat 3 times.

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[1] Imaging studies on trigger points over the last decade:

I. Chen Q, Bensamoun S, Basford J, et al. Identification and quantification of myofascial taut bands with magnetic resonance elastography. Arch Phys Med Rehabil 2007; 88:1658-1661.

II. Sikdar S, Shah JP, Gilliams E et al. Assessment of myofascial trigger points (MTrPs): a new application of ultrasound imaging and vibration

III. Niddam DM, Chan RC, Lee SH, et al. Central modulation of pain evoked from myofascial trigger point. Clin J Pain 2007; 23:440-448.

IV. Hong CZ, Simons DG. Pathophysiologic and electrophysiologic mechanisms of myofascial trigger points. Arch Phys Med Rehabil 1998; 79: 863-872.

V. Shah JP, Phillips TM, Danoff JV, et al. An in vitro microanalytical technique for measuring the local biochemical milieu of human skeletal muscle. J Appl Physiol 2005; 99: 1977-1984.

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