Trigger Points

What are trigger points?

- Trigger points are hyperirritable areas of contracted muscle fibres that form a palatable nodule
- On a microscopic level, the contracted muscle fibres accumulate into a small thickened area causing the rest of the fibre to stretch
- The areas of contracted muscle restrict blood flow within the tissue causing an accumulation of waste products and reduced levels of nutrients available.

History of Trigger Points

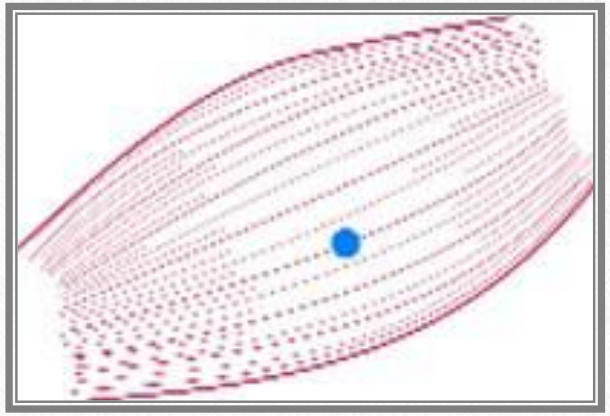
- 1930s -Dr Hans Lange used sclerometer to prove that tender areas in muscles are 50% harder than surrounding areas.
- 1940s- Janet Travell developed trigger point injection therapy and termed the "tender areas" described by Dr Hans "Trigger points"
- Travell mapped what she termed the body's trigger points and the manner in which pain radiates to the rest of the body.
- Therapists may use myotherapy (deep pressure as in Bonnie Prudden's approach, massage or tapotement as in Dr. Griner's approach)

Different types of trigger points

- Trigger points are described according to location, tenderness and chronicity as central (or primary), satellite (or secondary), attachment, diffuse, inactive (or latent) and active
- The main types of trigger points are:
  - Central/ primary trigger points
  - Satellite/ secondary trigger points
  - Active trigger points
  - Latent trigger points

Central/ primary trigger points

- These are the most well-established and painful points
- Pain is felt by the individual when they are active, and are usually what people refer to when they talk about trigger points
- Central trigger points exist at a neuromuscular point, which is the meeting place of a nerve and muscle



Satellite/ secondary trigger points

- These trigger points are “created” as a response to the central trigger point in neighbouring muscles that lie within the referred pain zone.
- Form in response to central trigger points within the pain referral patterns
- The primary trigger point is still the key to trigger pointing intervention: the satellite trigger points often resolve once the primary point has been effectively rendered inactive.
- Satellite points may also prove resilient to treatment until the primary central focus is weakened; such is often the case in the paraspinal and/or abdominal muscles.

Active trigger points

- This can apply to central and satellite trigger points.
- A variety of stimulants, such as forcing muscular activity through pain, can activate an inactive trigger point.
- This situation is common when activity is increased after trauma i.e a road traffic accident, where multiple and diffuse trigger points may have developed.
- This trigger point is both tender to palpation and elicits a referred pain pattern.
- Pain can limit range of movement

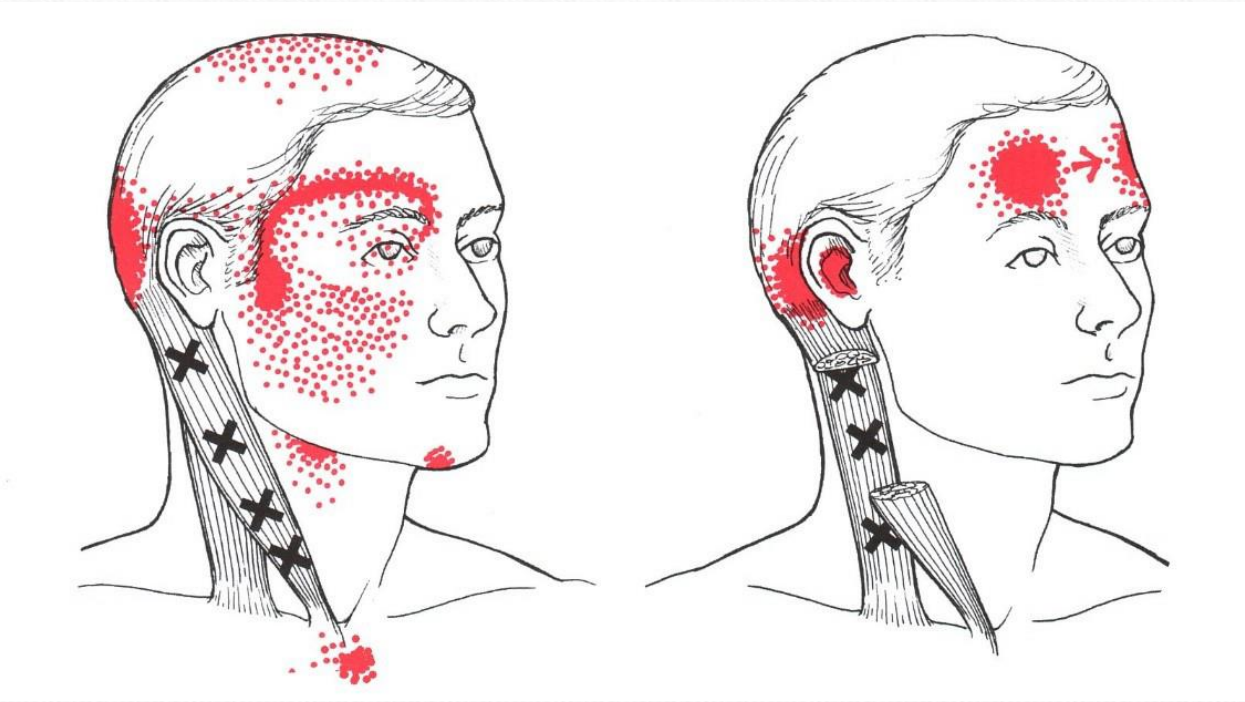
Latent trigger points

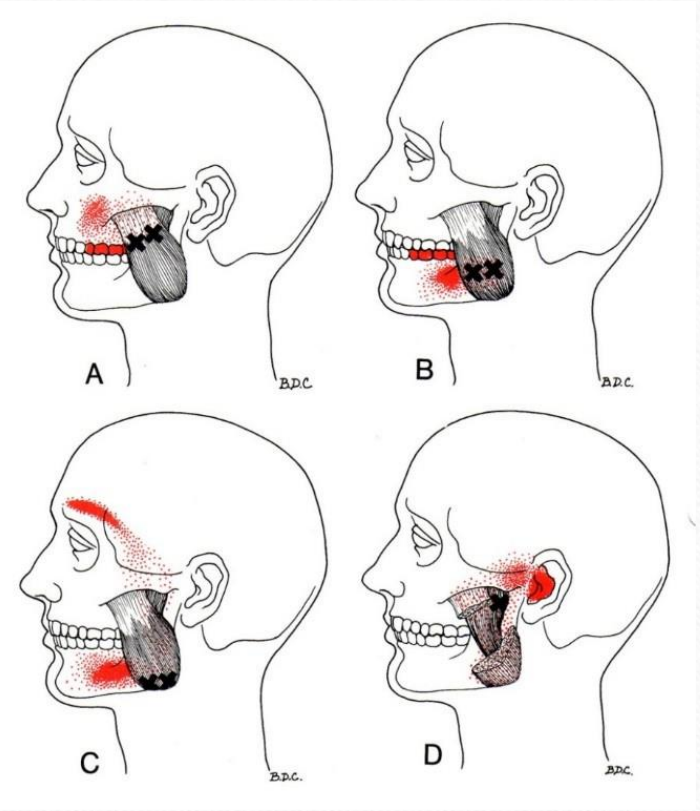
- This applies to lumps and nodules that feel like trigger points. These can develop anywhere in the body and are often secondary.
- These trigger points are not painful, and do not elicit a referred pain pathway.
- The presence of inactive trigger points within muscles may lead to increased muscular stiffness and tension. They can build up for years.
- It has been suggested that these points are more common in those who live a sedentary lifestyle (Starlanyl & Copeland 2001)
- These points are "potential" trigger points and may reactivate if the central or primary trigger point is (re)stimulated
- Reactivation may occur following trauma and injury

Symptoms of Trigger Points

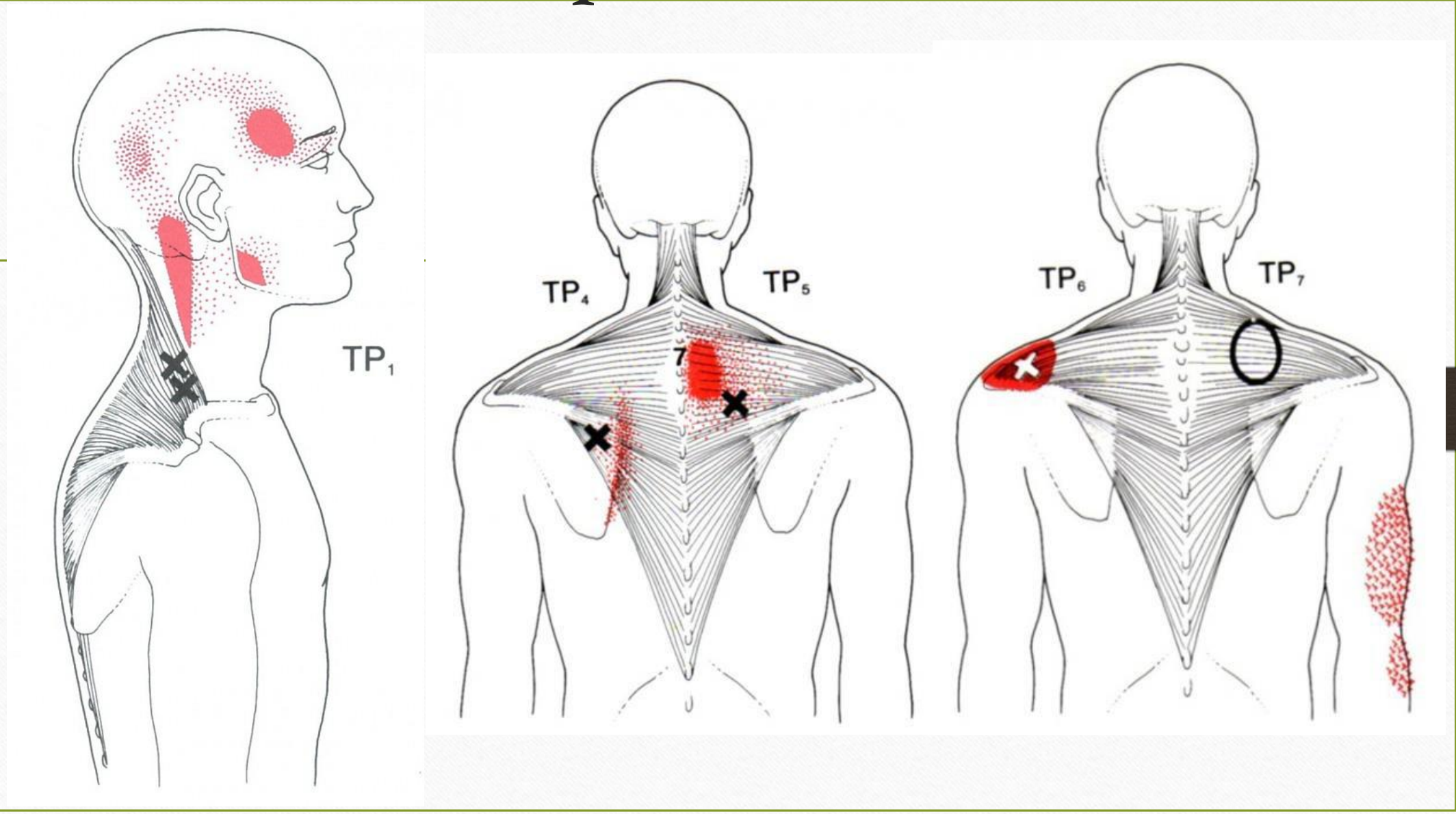
- Active trigger point referral symptoms:
- Dull ache
- Deep
- Pressing pain
- “Stabbing”
- Burning
- Referred pain
- Common reports of headaches, dizziness and pins and needles

Sternocleomastoid and Masseter

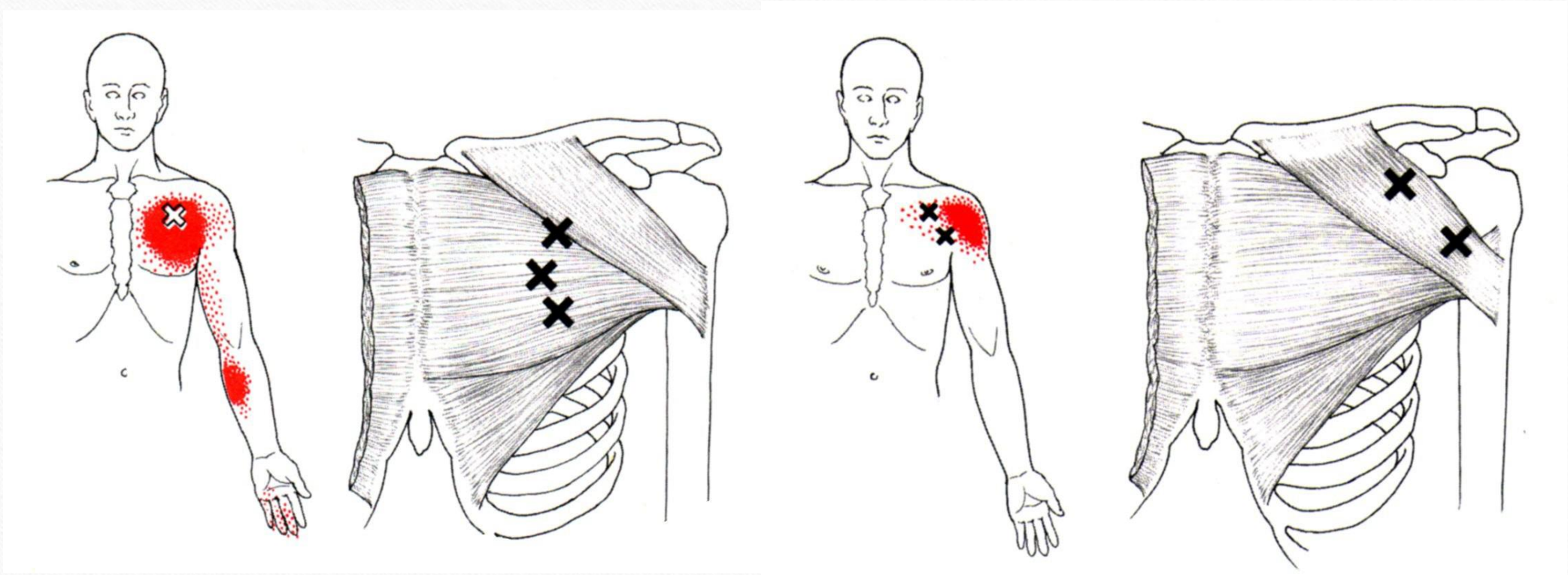




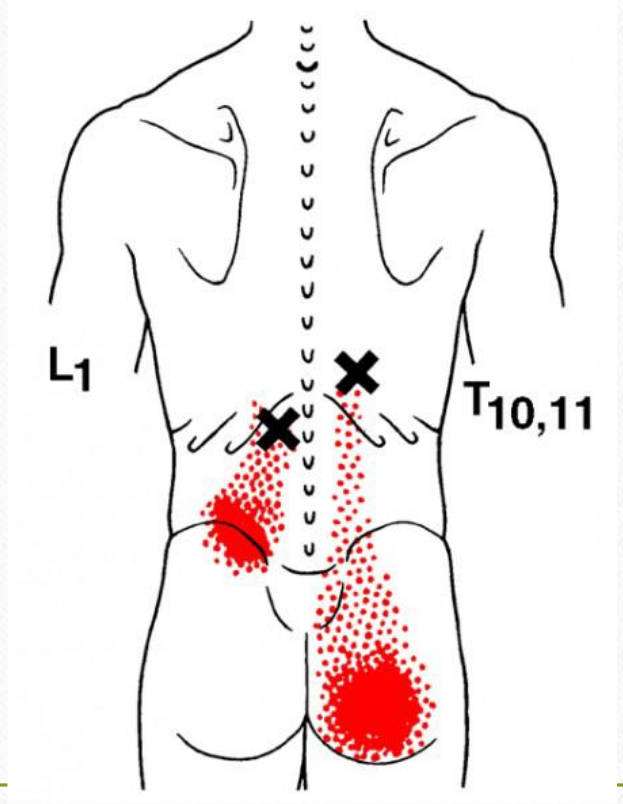
Trapezuis



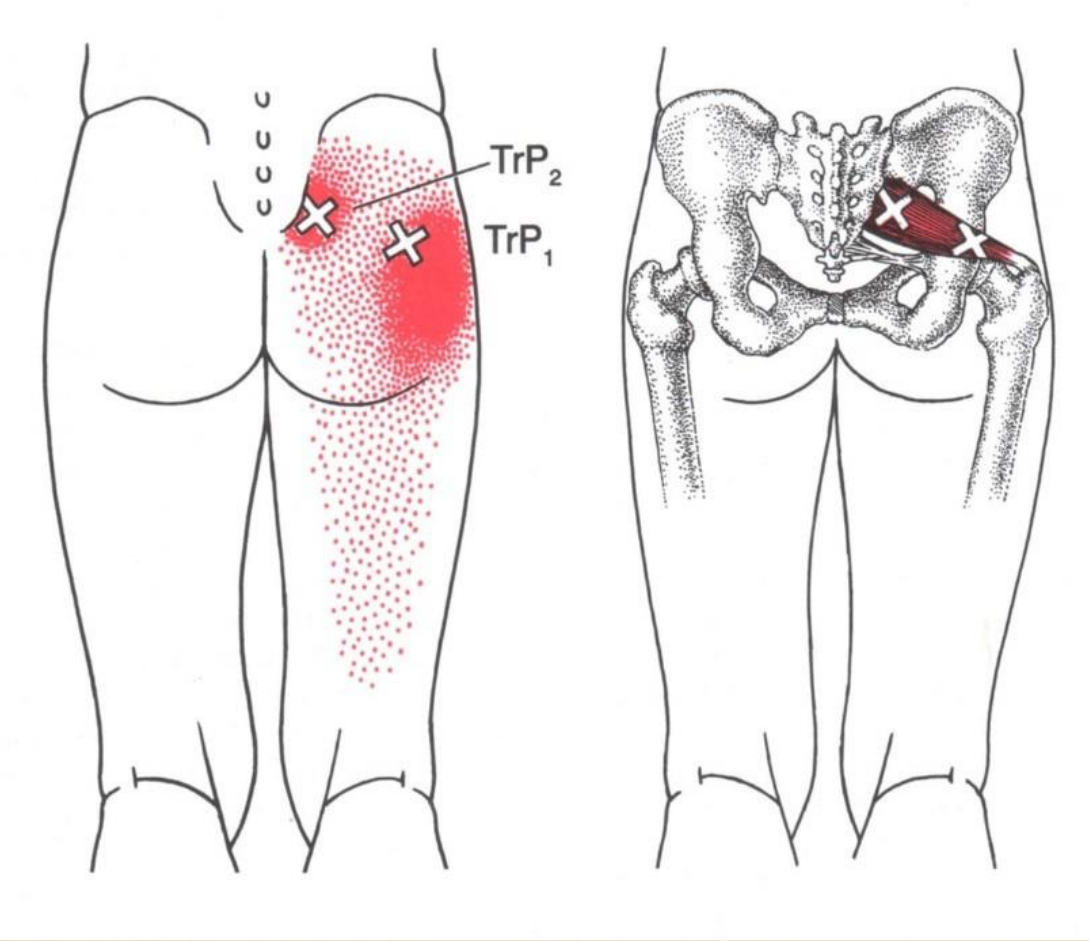
Pectorals



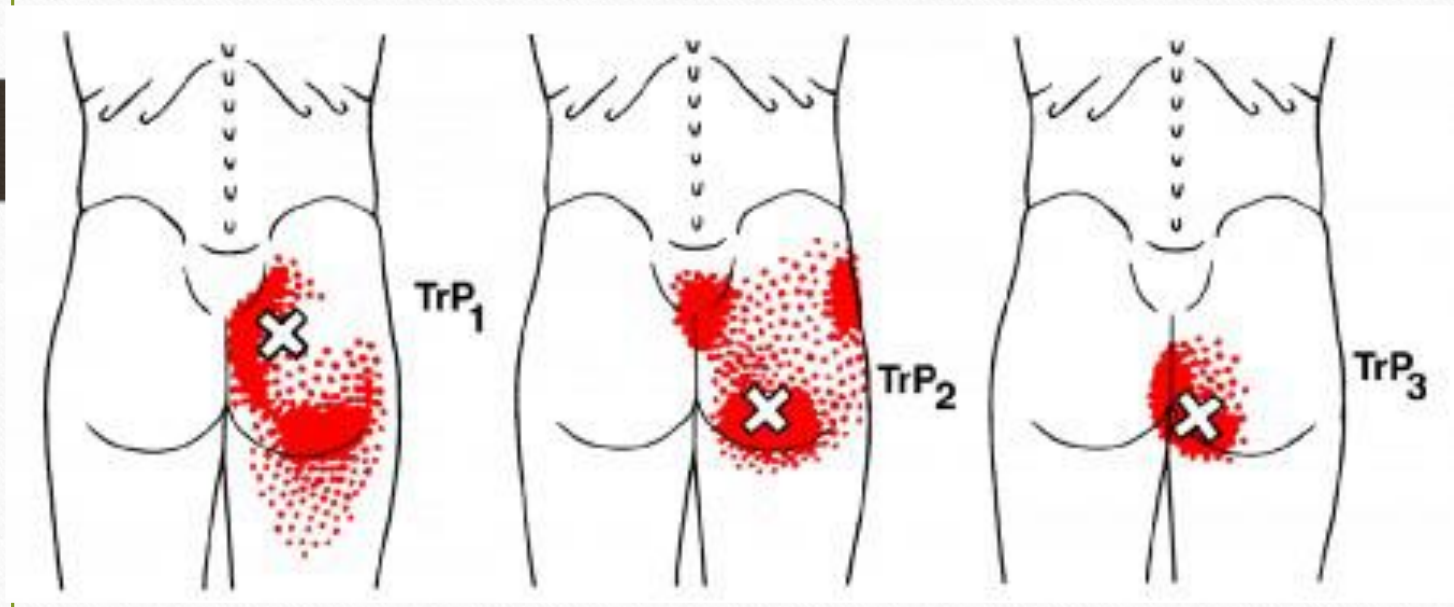
Quadratus Lumborum

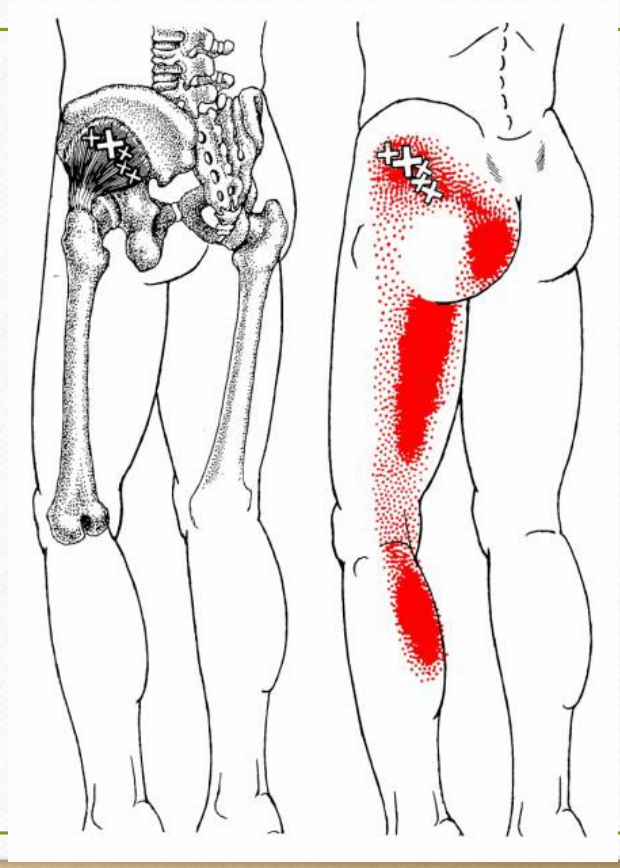


Piriformis

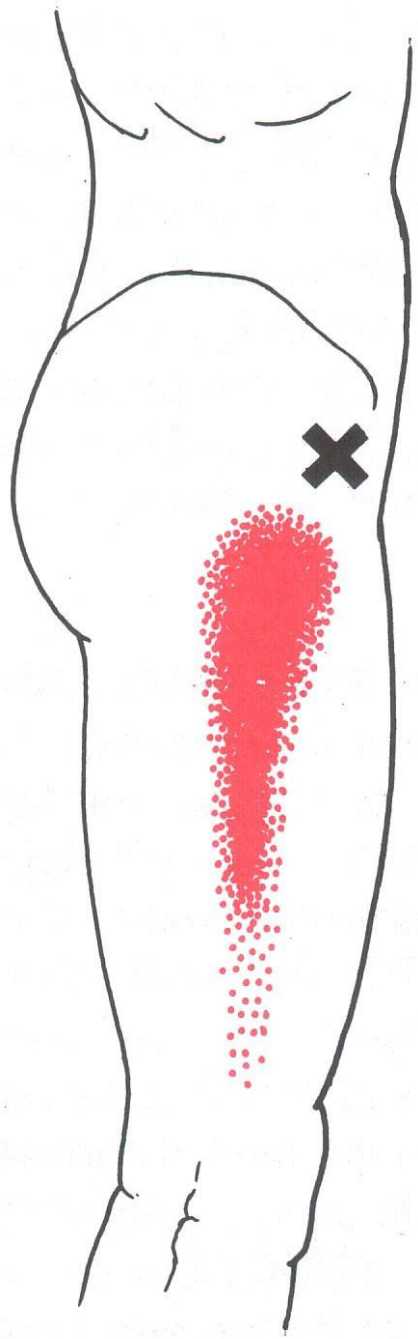


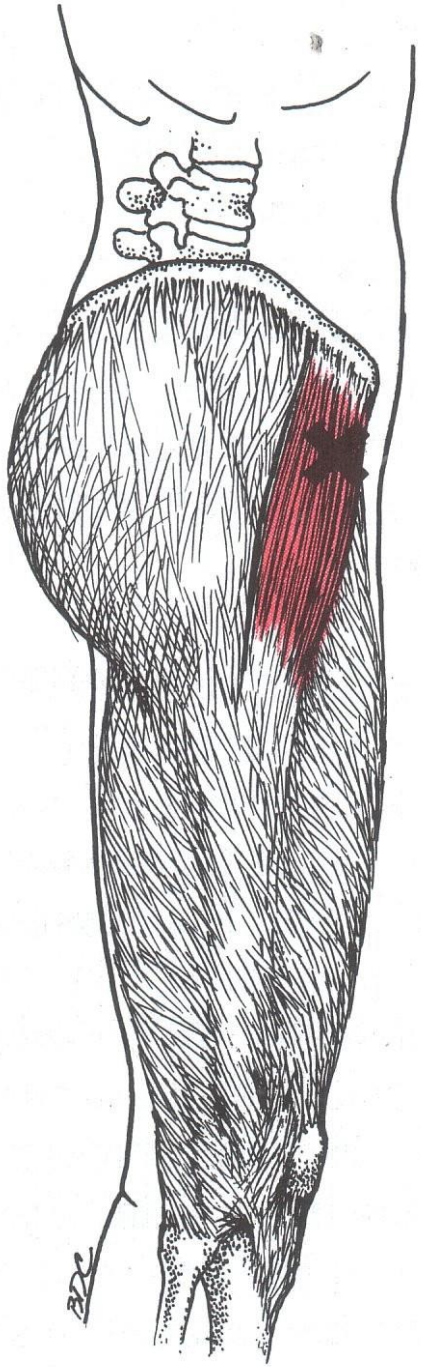
Glute maximus, medius and minimus

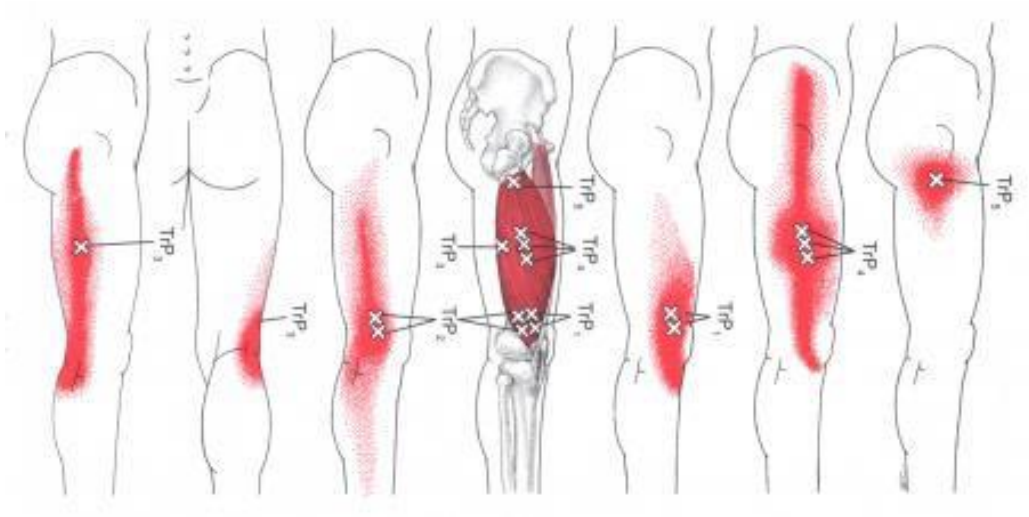




TFL

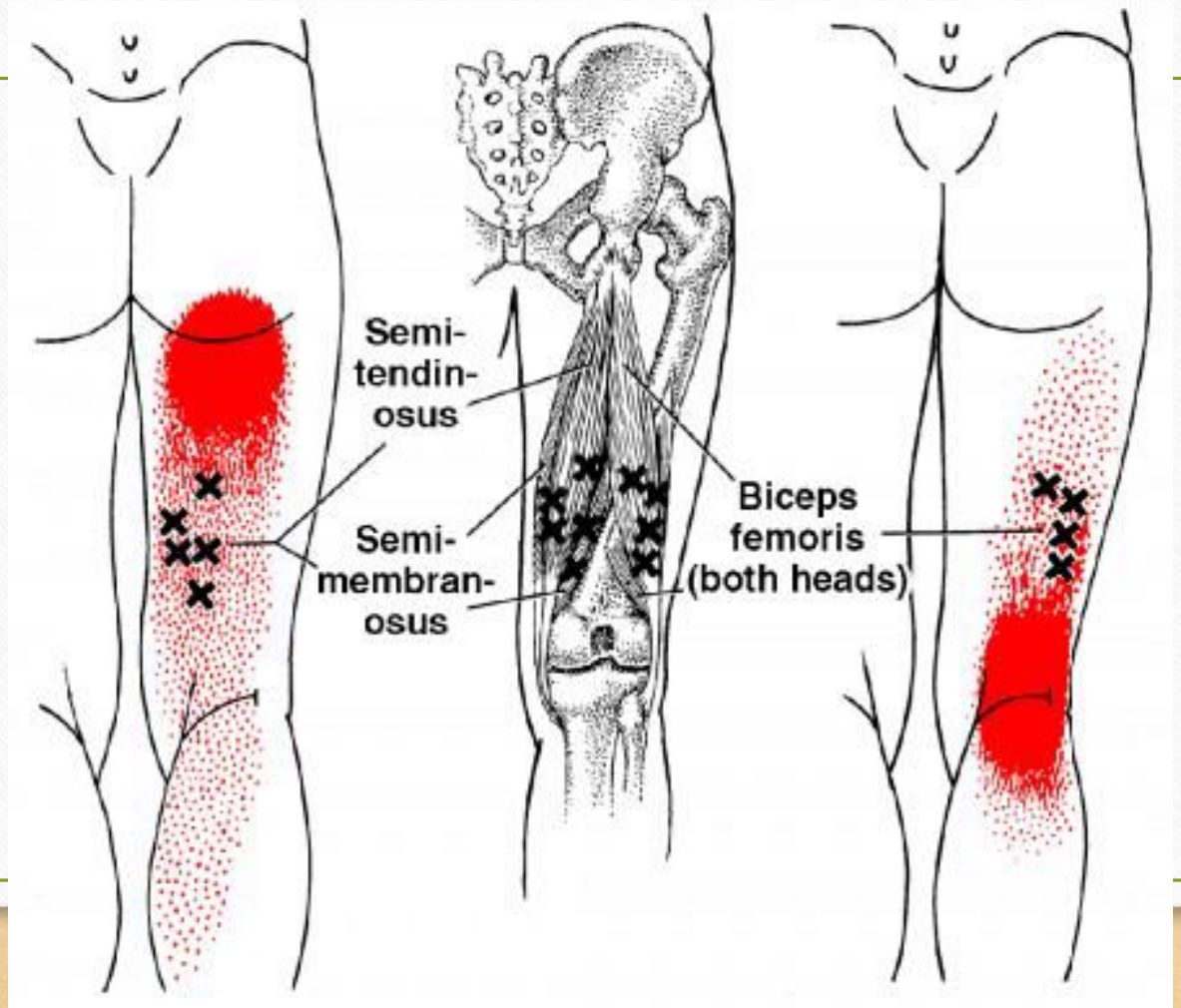






Vastus Lateralis

Hamstrings


Semi-
tendin-
osus
Semi-
membran-
osus
Biceps
femoris
(both heads)

Other Symptoms

A sensation of:

- Numbness
- Fatigue
- Weakness

A loss of:

- Flexibility
- Range of movement
- Muscular power and strength

Why are they present?

- Repetitive overuse injuries (using the same body parts in the same way hundreds of times on a daily basis) from activities such as typing/mousing, handheld electronics, gardening, home improvement projects, work environments, etc.
- Sustained loading e.g heavy lifting, carrying babies, briefcases, boxes or lifting bedridden patients.
- **Poor posture** due to our sedentary lifestyles, deconditioning, poorly designed furniture and technology.
- Muscle clenching and tensing due to mental/emotional **stress**.
- **Direct injury** such as a strain, break, twist or tear e.g car accidents, sports injuries, falling down stairs.
- Trigger points can even develop due to **inactivity** such as prolonged bed rest or sitting.

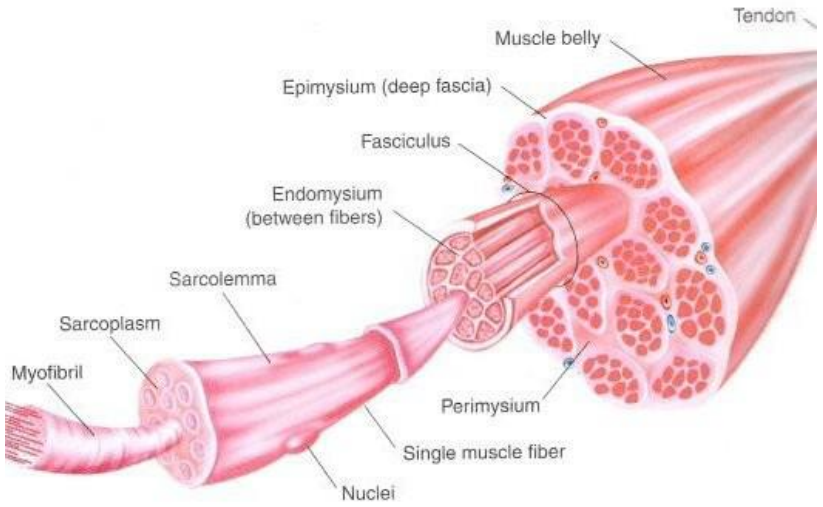
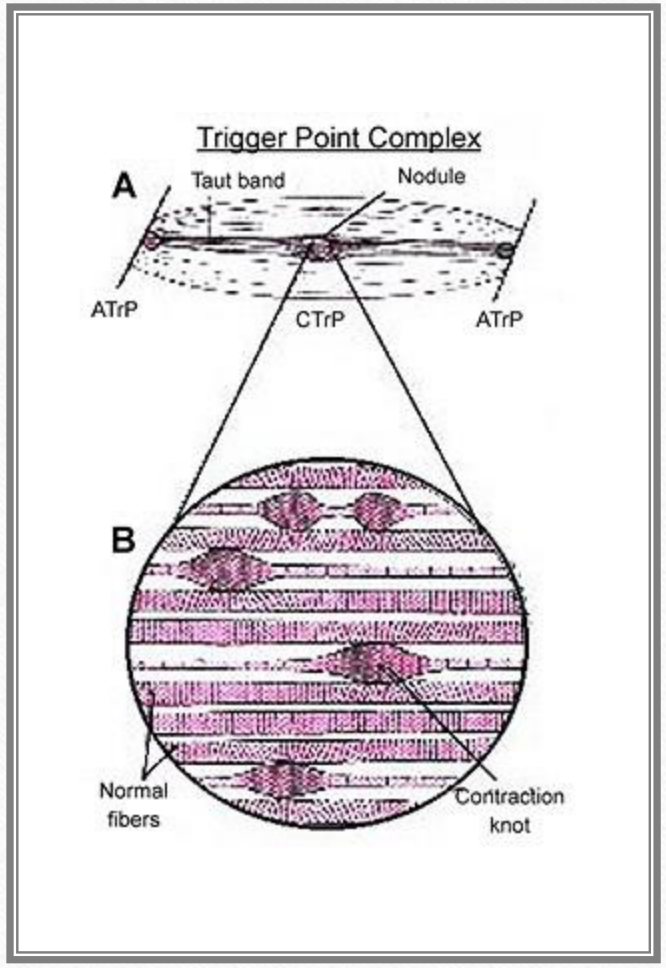


Figure 1: Muscle belly split into various component parts (from Essentials of Strength Training & Conditioning, National Strength & Conditioning Association)

The Trigger Point Complex

How are they formed?

- Within the muscle structure trigger points lye within a single muscle fibre
- They are located within each sarcomere which is where muscle contraction takes place
- Sarcomeres often get overstimulated and become difficult to release their contraction
- Each segment of sarcomeres becomes longer and shorter which stretches



How are they formed?

- Multiple sarcomere knots form trigger points
- Stretched segments of fibres give increased tension to the taut band of fibres.
- Blood flow is restricted in these fibres which reduces oxygenation and accumulative of waste products which irritate trigger points
- The body responds by sending out pain signals
- The brain stimulates decreased movement into these muscles which further tightens the structure

“Integrated trigger point hypothesis”

- Injury or overuse can stimulate release of acetylcholine (ACh).
- This stimulates the release of calcium from the sarcoplasmic retinaculum.
- The presence of calcium can allow muscular contraction through the sliding filament theory.
- Prolongs muscular contraction and reduces blood circulation which prevents the calcium pump receiving the energy needed to withdraw the calcium.
- Muscles stay contracted.

“Muscle spindle hypothesis”

- Proposes inflamed muscle spindles cause trigger points.
- Sustained muscular overload causes fatigue, muscular spasm and restricted blood flow.
- Causes muscle spindles to be surrounded by waste products e.g. lactic acid, potassium ions and inflammatory chemicals such as histamine.
- This results in inflammation of the muscle spindle and spasm of the extrafusal muscle fibres, forming the taunt band that we can palpate.

Indications and Outcome Measures

Indications	Outcome measures
Pain	VAS scale & subjective symptoms
Reduced AROM	Active range of movement
High muscle tension and tone	Muscle testing
Muscle tightness	Palpation
Muscle weakness	

VAS/ Numeric Pain Scale

- Simple and easy
- Before, during and after massage
- Record change
- Use with patient to see reduction in pain over the progression of treatments

Range of movement

- Pre and post measurements
- Goniometer or visual
- Standardise to produce reliable results
- Review each session
- Used to distinguish areas to treat and techniques types
- Valuable in the success of treatment

Muscle testing

- Measure nerve conduction, muscle recruitment to determine a deficit
- Test uninjured side for norm
- Patient will see and feel a progression
- Strengthening exercises needs to be used along side massage

Palpation

- **Temperature:** Tissue may be hot or cold, indicating inflammation or ischaemia
- **Texture:** Swelling (acute-hard, chronic – "boggy", congested) healthy tissues should have an even texture Adhesions feel like tissues are "stuck" and less mobile "audible crunching"
- **Tenderness:** Pain can be indicated through response/ use vas scores Structures that are too painful to palpate
- **Tone** Tissues may be hypertonic or hypotonic Use to compare

Contraindications

General	Local
Acute conditions requiring medical attention	Acute flare-up of inflammatory arthritides
Acute pneumonia	Aneurysms deemed life-threatening (may be general contraindication depending on location)
Advanced kidney, respiratory or liver failure	Local contagious condition
Diabetes with complications such as gangrene, advanced heart or kidney disease or very unstable or high blood pressure	Local irritable skin condition
Hemorrhage	Malignancy
Severe atherosclerosis	Open wound or sore
Severe and unstable hypertension	Recent burn
Shock	Undiagnosed lump
Systemic contagious or infectious condition	