ATSU | National Center for Osteopathic Principles and Practice Education

Introduction to OMM for MDs and DOs

- May 20, 2024 – May 23, 2024 Kirksville, MO
- NCOPPE & KCOM

ATSU | A.T. Still University

FIRST IN WHOLE PERSON HEALTHCARE

ATSU

National Center for Osteopathic Principles and Practice Education

Counterstrain: Posterior Thoracic

Heather Bird, DO

Karen Snider, DO, FAAO, FNAOME

– Presentation Preparation

Heather Bird, DO

Heather Bird, DO, is a resident at Still OPTI/ Northeast Regional Medical Center in Kirksville, MO. She is currently in her second year of an Osteopathic Neuromusculoskeletal Manipulative Medicine (ONMM) residency. Dr. Bird earned her Doctor of Osteopathy from Pacific Northwest University of Health Sciences College of Osteopathic Medicine.

Karen Snider, DO, FAAO, FNAOME

Karen Snider, DO, FAAO, FNAOME, is a professor at A.T. Still University's Kirksville College of Osteopathic Medicine (ATSU-KCOM). Dr. Snider is board certified in Neuromusculoskeletal Medicine and Osteopathic Manipulative Medicine. She earned her Doctor of Osteopathic Medicine from West Virginia School of Osteopathic Medicine, and she completed her residency at Northeast Regional Medical Center. Dr. Snider has earned fellowship awards from the American Academy of Osteopathy and the National Academy of Osteopathic Medical Educators.

Speaker Disclosure Statements

The speaker(s) disclose that s/he has no relevant financial relationships with any organization producing, marketing, reselling, or distributing healthcare goods or services consumed by, or used on, patients relative to the content of this presentation.

Planning Committee Disclosure Statement

- The Continuing Education Steering Committee (CESC), Osteopathic Principles and Practice (OPP) Committee members, and planners/reviewers of this activity disclose that they have no relevant financial relationships with any organization producing, marking, reselling, or distributing health care goods or services consumed by, or used on, patients relative to the content of this presentation.
- The copyrighted materials available in this PowerPoint are for educational use only. Redistribution of copyrighted materials is not permitted.
- No discussion of off-label use and/or investigation used in this presentation.

Objectives

- Identify, describe, and define counterstrain technique.
- Name and locate common tender points of the thoracic region.
- Demonstrate efficient physician ergonomics while diagnosing and treating somatic dysfunction.
- Demonstrate osteopathic manipulative treatment of the thoracic spine using counterstrain.

Counterstrain

Counterstrain,

1. **A system of** diagnosis and treatment that **considers** the dysfunction to be a **continuing, inappropriate strain reflex,** which is inhibited by applying a position of mild strain in the direction exactly opposite to that of the reflex. This is accomplished by specific directed positioning about the point of tenderness to achieve the desired therapeutic response.
2. Australian and French use: Jones technique, (correction spontaneous by position), spontaneous release by position.
3. Developed by Lawrence Jones, DO.

Counterstrain

- **Defined in 1955 by Lawrence Jones, DO**
- Patient presented to office with inability to stand up straight for the past 2 months
- Chiropractic techniques had not resolved the problem and then 2 months of osteopathic techniques did not help
- Dr. Jones finally had the patient find a comfortable position and stay in it for 20minutes
- Patient was assisted out of the position slowly and found he could stand upright with the pain resolved.

Counterstrain

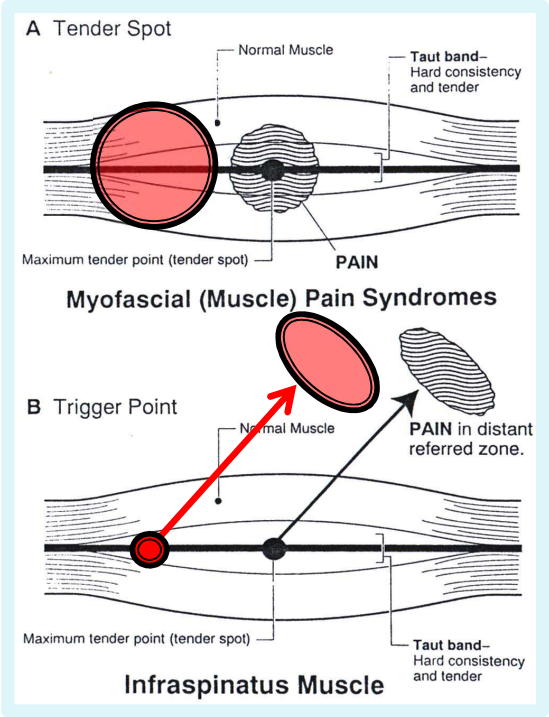
- Dr. Jones experimented with different positions for different problems
- Found that if he just positioned the affected areas of the body he only needed to maintain the position for 90 seconds
- Found discrete tender points associated with different problems
- Found both anterior and posterior tender points

Lawrence Jones, D.O., F.A.A.O.

Tender points vs Trigger points

- Tender points –small discrete hypersensitive areas within myofascial structures that result in localized pain

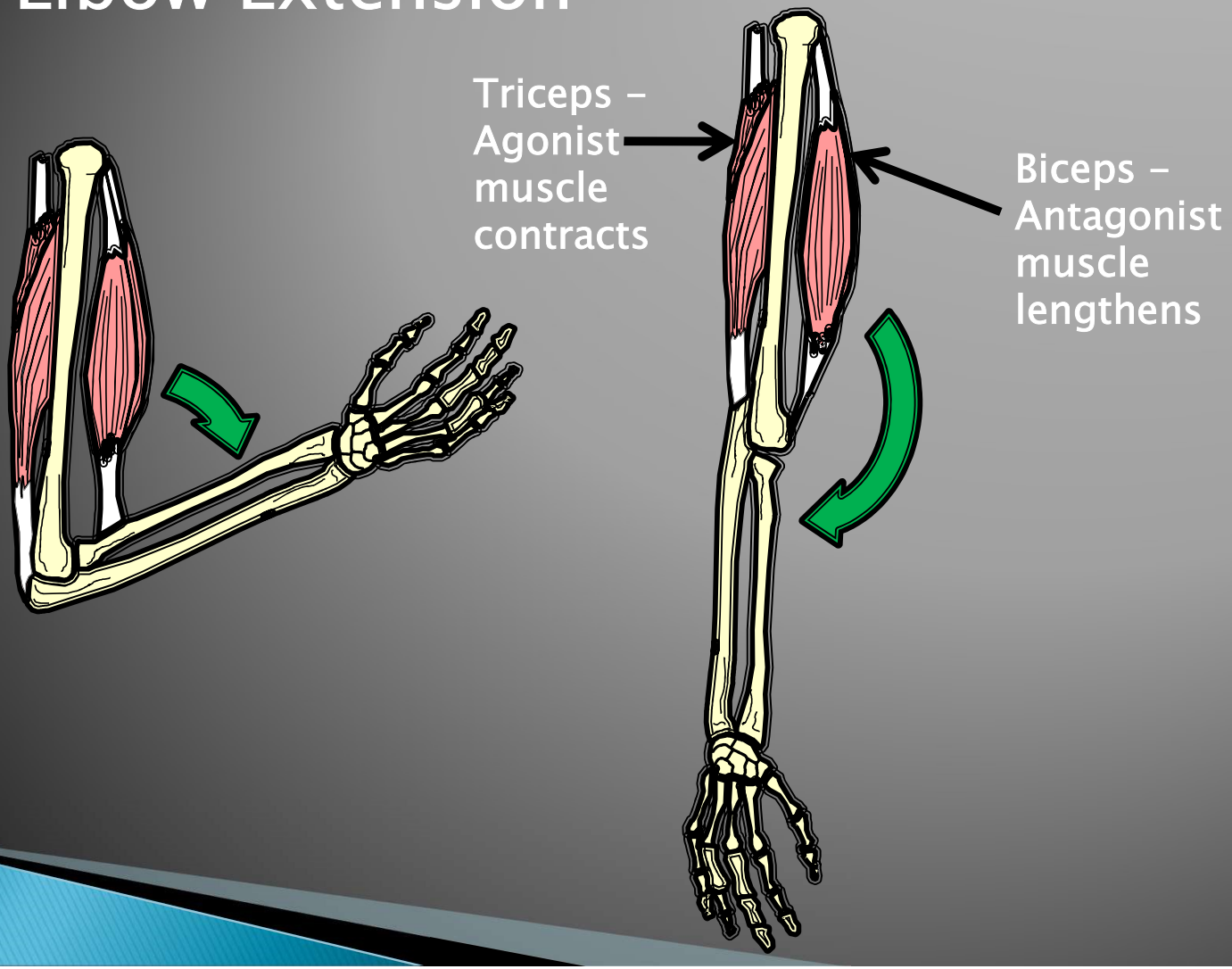
- Trigger point – small discrete hypersensitive areas within myofascial structures – palpation causes referred pain away from site.



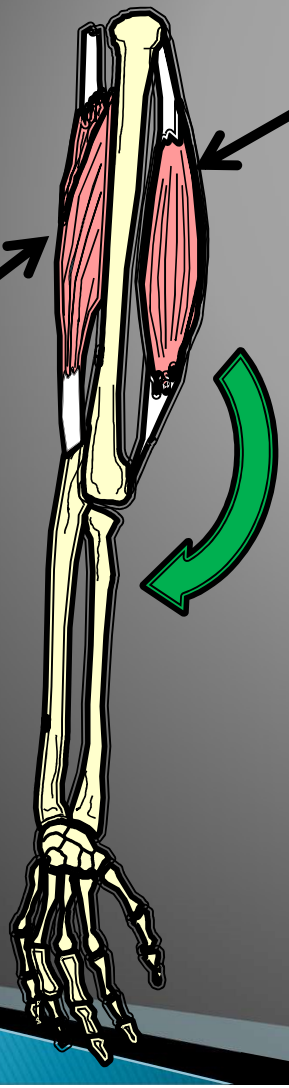
Counterstrain

- Originally called *"Spontaneous Relief by Positioning"*
- Then called *"Counterstrain"* or *"Strain and Counterstrain"*
- Dr. Jones thought the tender points were caused by the sudden lengthening of antagonistic muscles in response to an agonist muscle injury.
- The tender points are in the antagonistic muscle
- Treatment position places the antagonist muscle in a shortened position while lengthening the agonist muscle

Elbow Extension



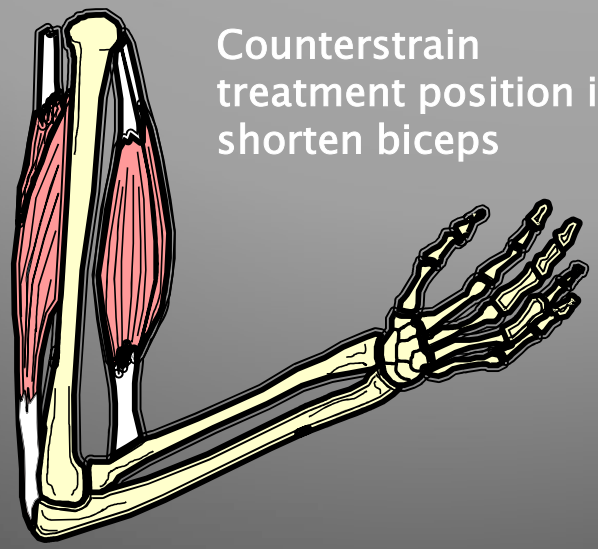
Elbow Extension



Biceps –
Antagonist lengthens

Sudden lengthening may cause a tender point in biceps

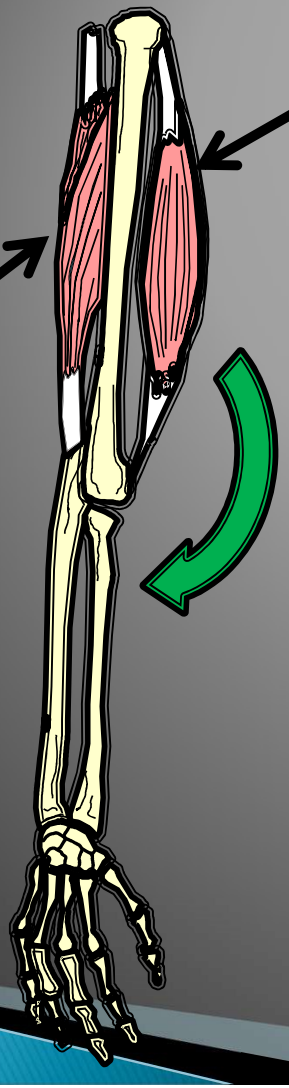
Triceps –
Agonist
contracts



Counterstrain treatment position is to shorten biceps

Sudden Elbow Extension

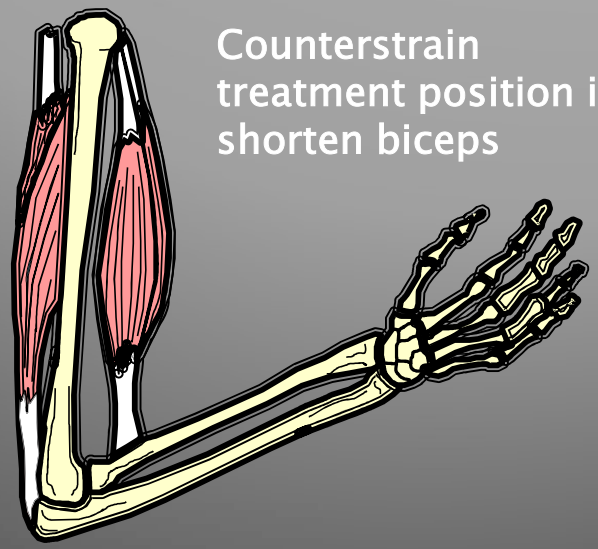
Elbow Extension



Biceps –
Antagonist lengthens

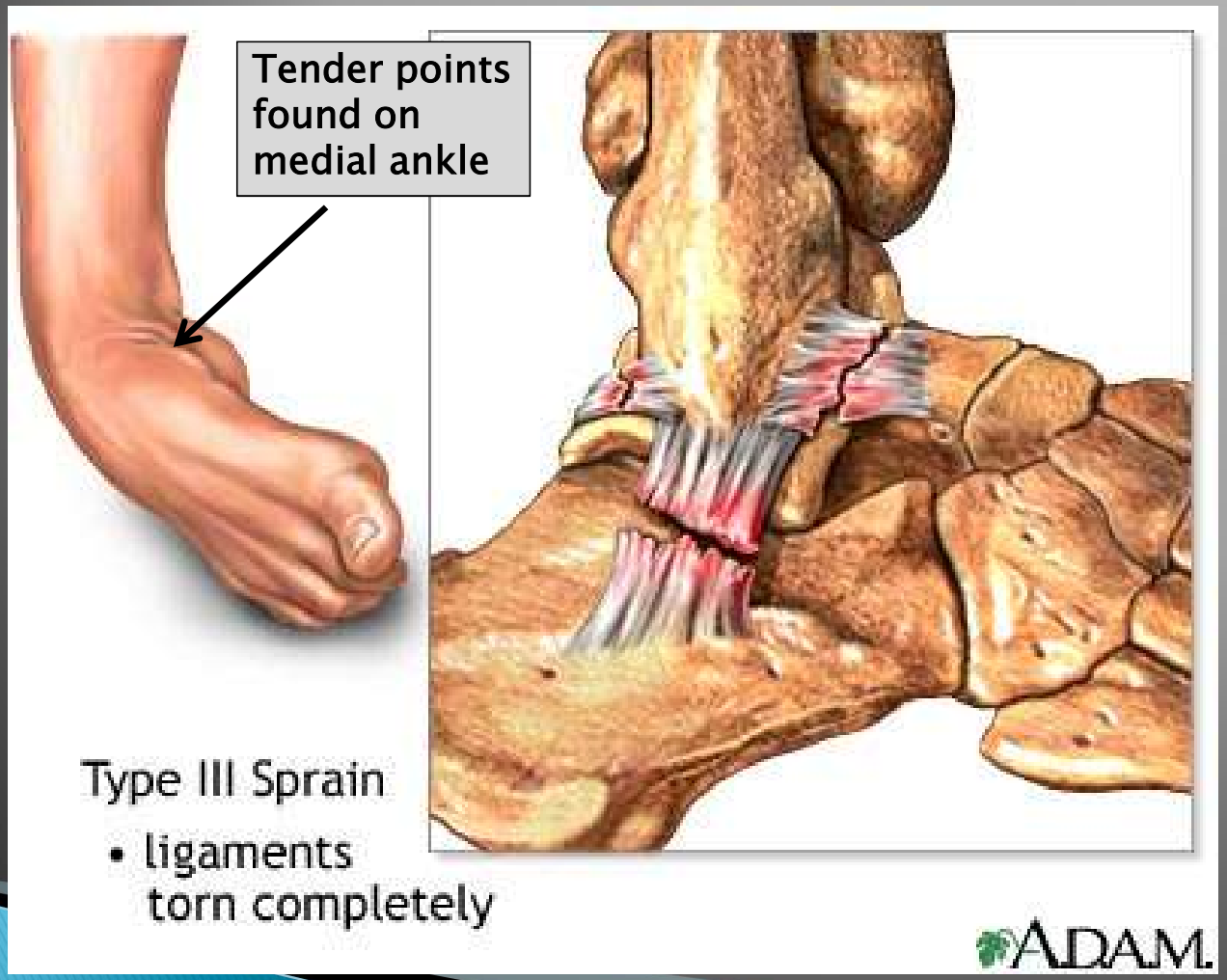
Sudden lengthening may cause a tender point in biceps

Triceps –
Agonist
contracts



Counterstrain treatment position is to shorten biceps

Strain and Counterstrain

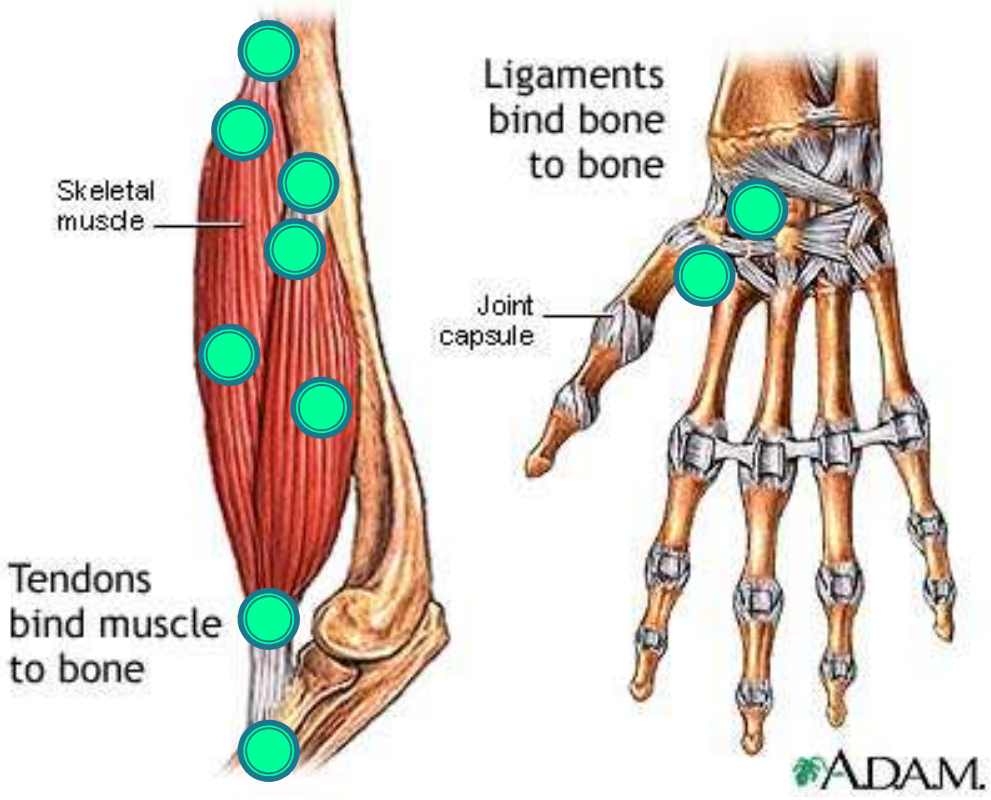


Tender Points

Tender points can be found in:

- Ligaments
- Tendons
  - Attachment to bone
  - Musculotendinous junctior
- Muscles
- Fascia

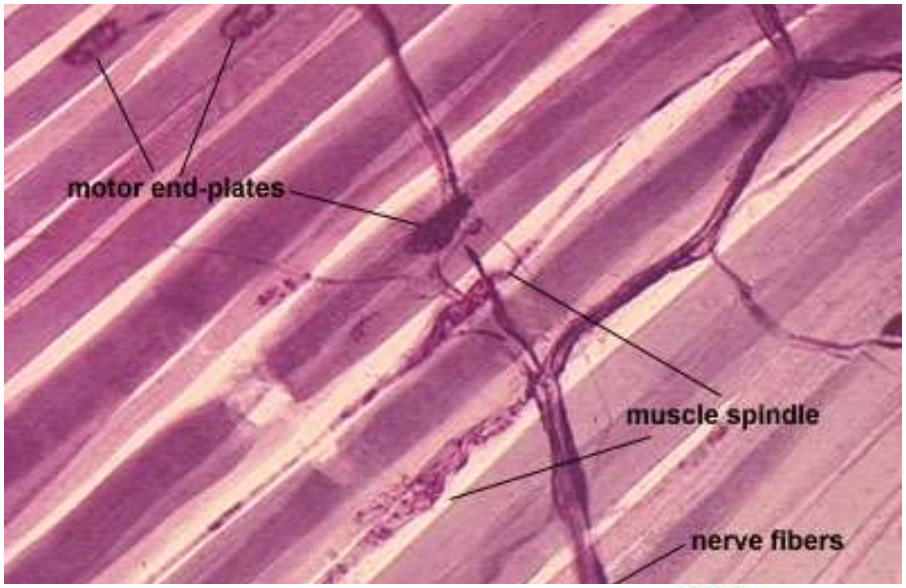
- Fascia contains contractile elements

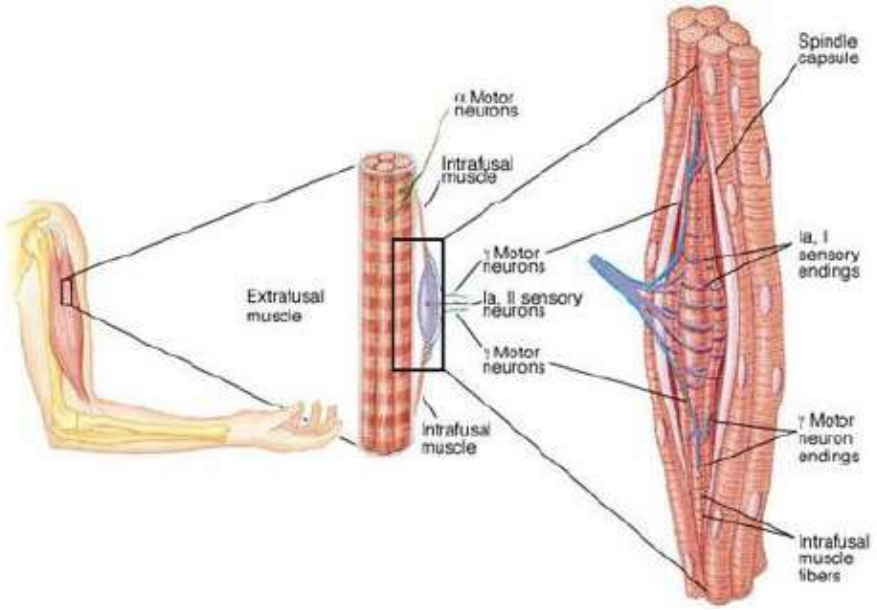


Tender Points

Tender points usually associated with the location of a motor point –

where a motor nerve pierces the fascia and enter the muscle

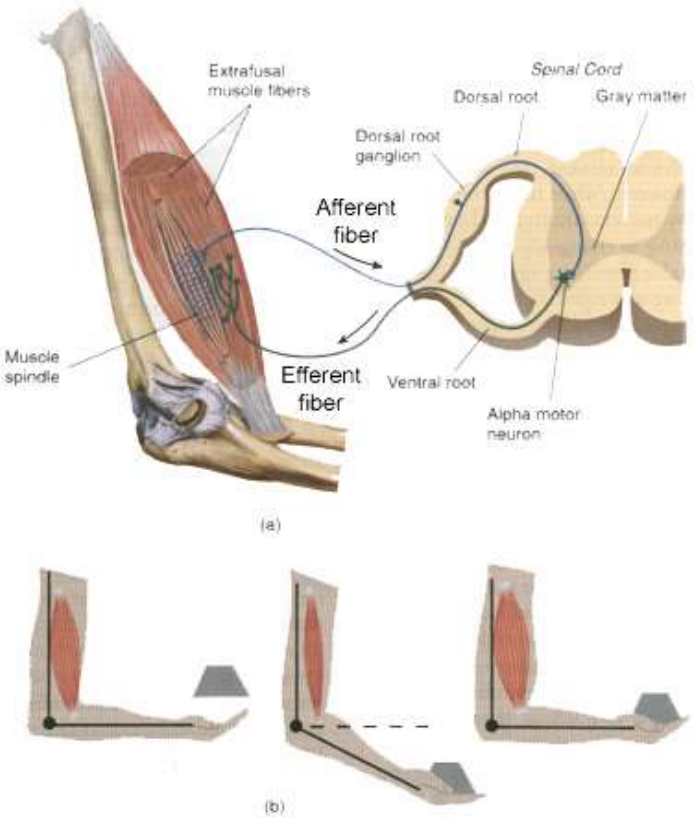




Tender Points

- Sudden lengthening of muscles send nociceptive impute to CNS via afferent nerves
- CNS send efferent messages to contract antagonist to prevent injury to muscle
- An inappropriate feedback loop may result and cause local and central sensitization

- Gamma Efferent System

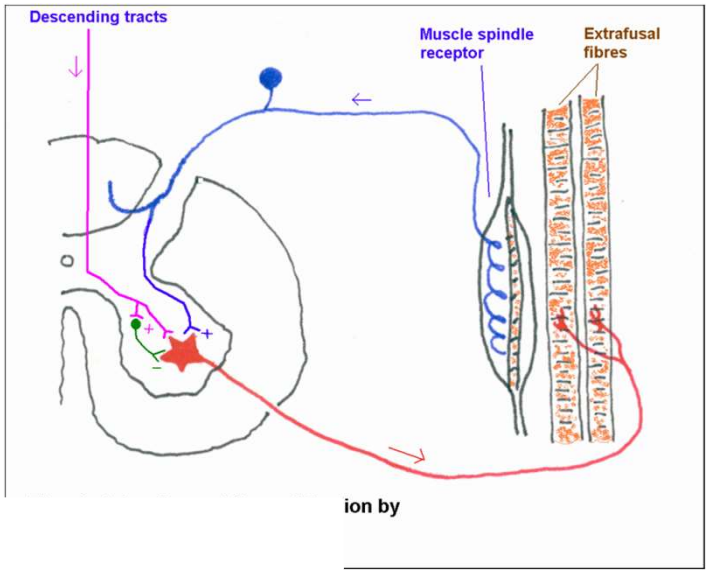


Neurological Reflexes

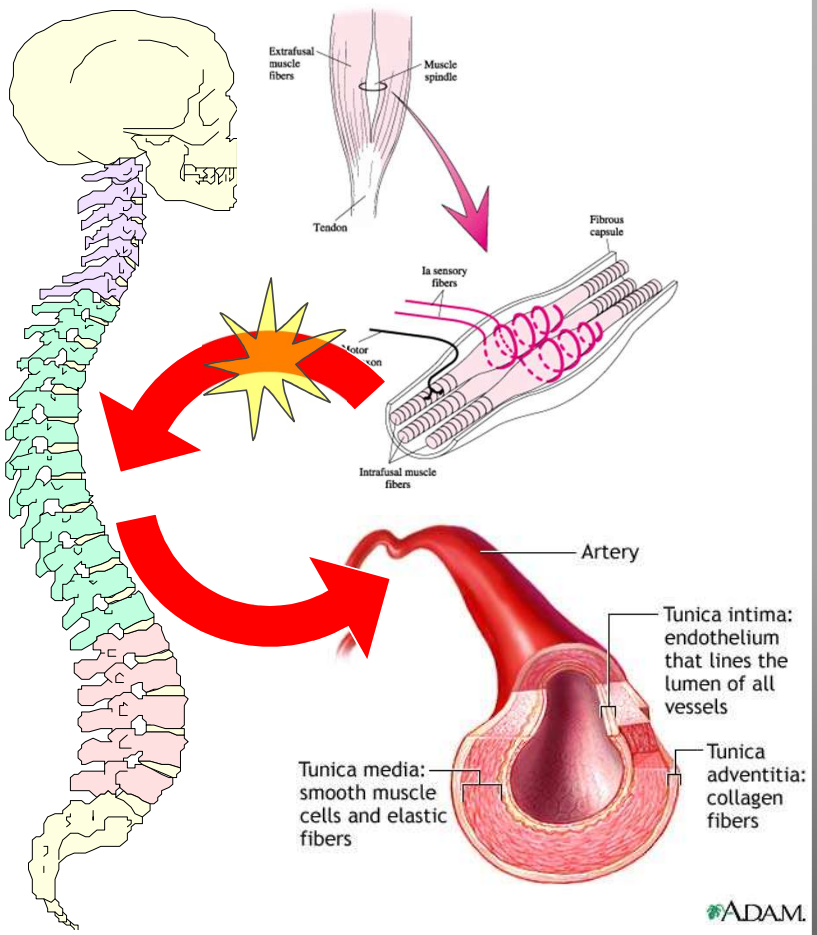
Segmental Facilitation

- "sensitization" or "up gain"

Dysfunction of somatic structures results in hyper-irritation of neuron groups in related spinal cord segments. The result is that these areas become hyperresponsive to stimuli.

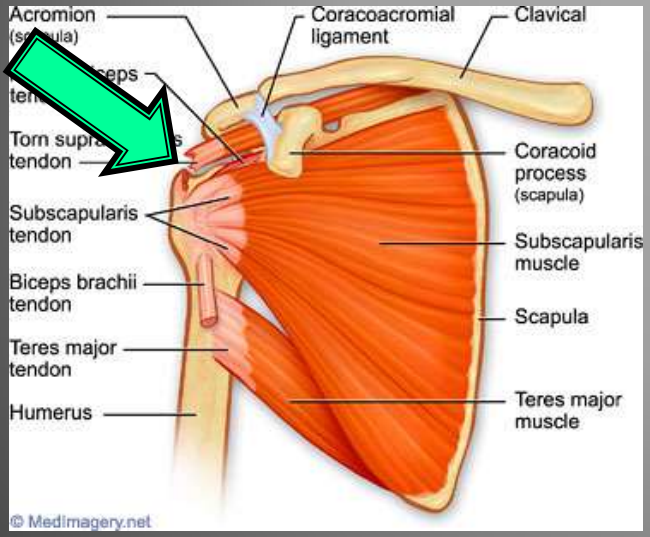


Neurologic Reflex

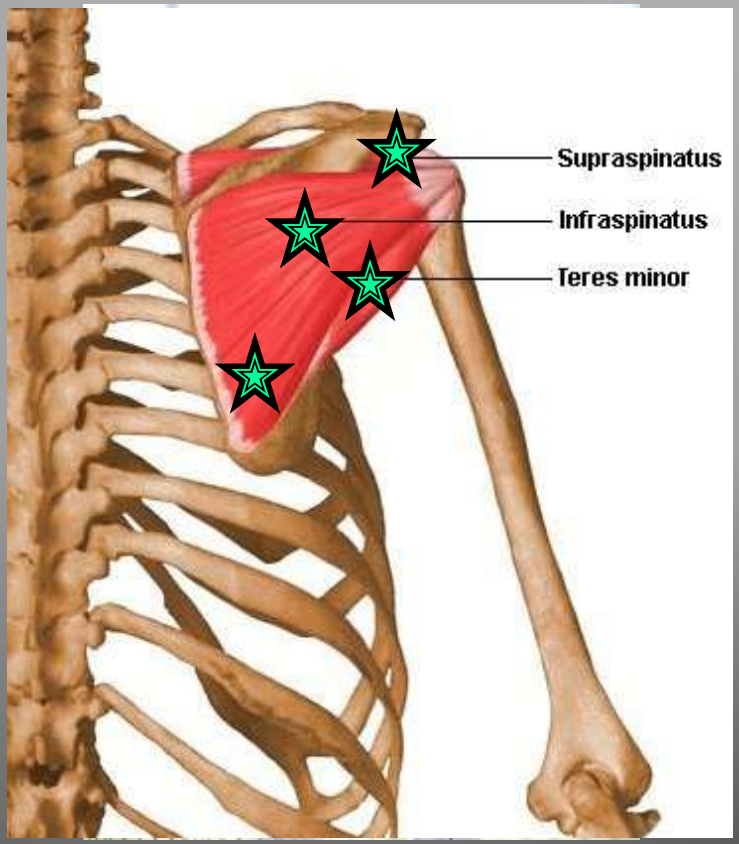


The cessation of nociceptive input into the spinal cord results in reduced sympathetic nervous system output

Somatosomatic Reflex



Localized somatic stimuli producing patterns of reflex response in segmentally related somatic structures



Segmental Facilitation

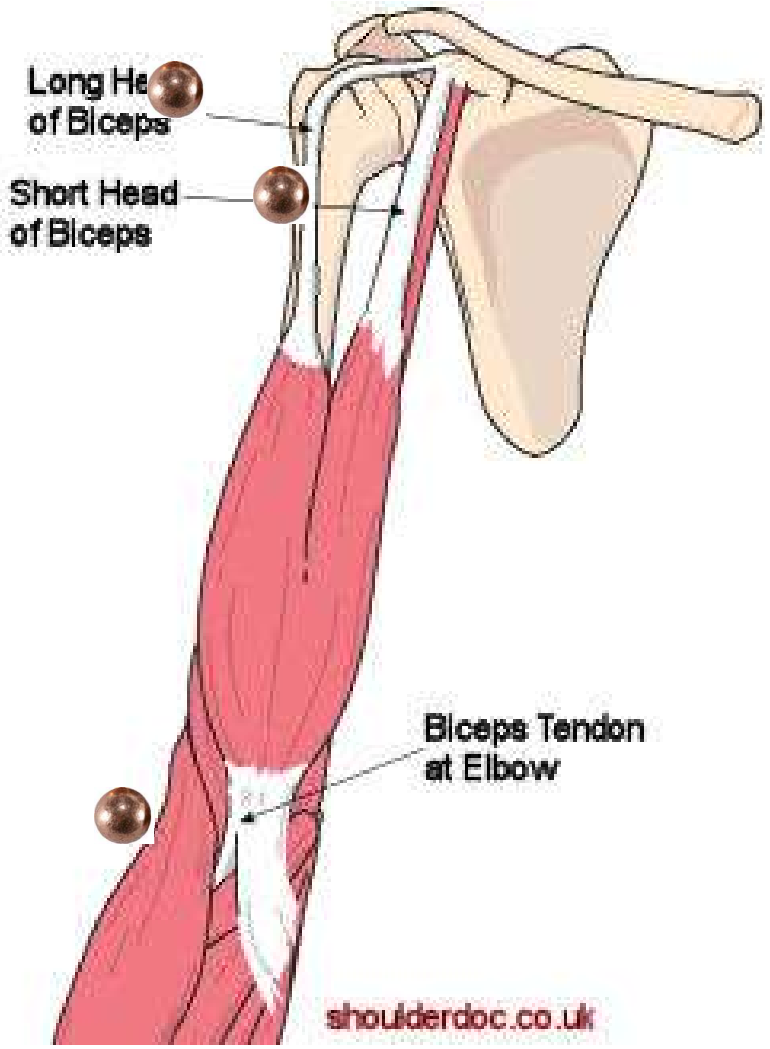
- Reduced excitatory threshold may develop throughout same spinal cord level
- Local changes in vascular and lymphatic tone will result

Tender Points

- Palpate with enough direct pressure to contact the anatomic structure
- American College of Rheumatology describes tenderness with less than 4kg of pressure to be significant

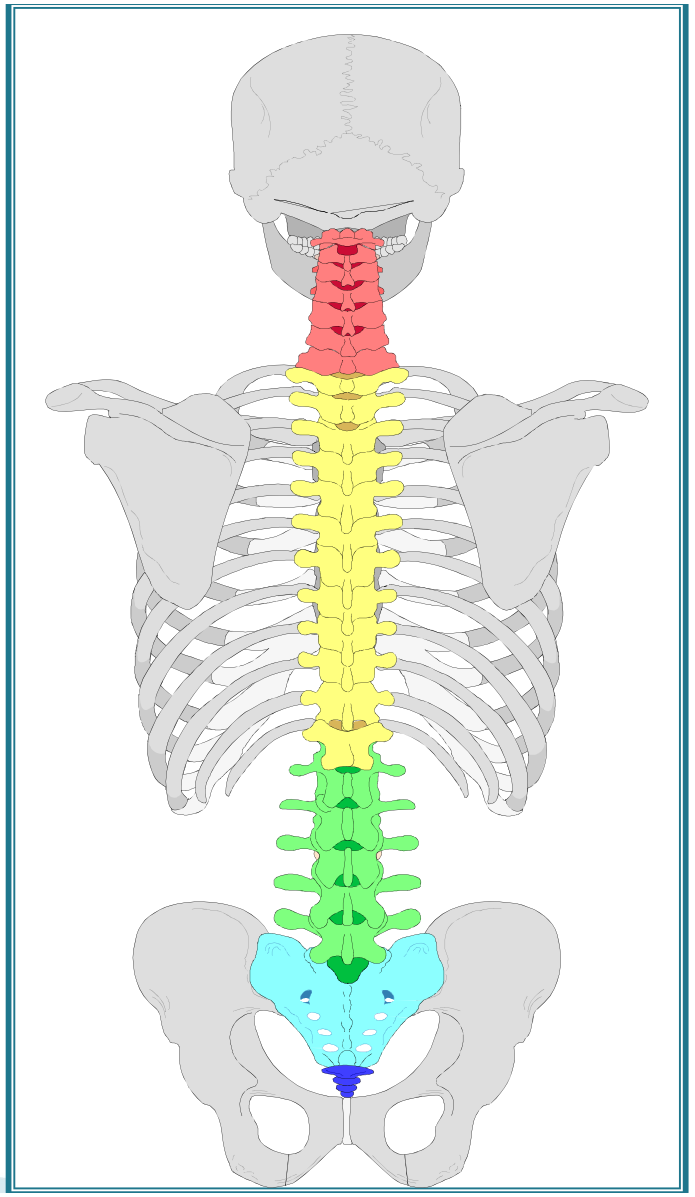
Tender Points

- Small, discrete area of hypertonicity and edema
- Tender to palpation, but may not hurt otherwise
- Patient often do not know they are present
- Feel like a small BB



Counterstrain Tender Points

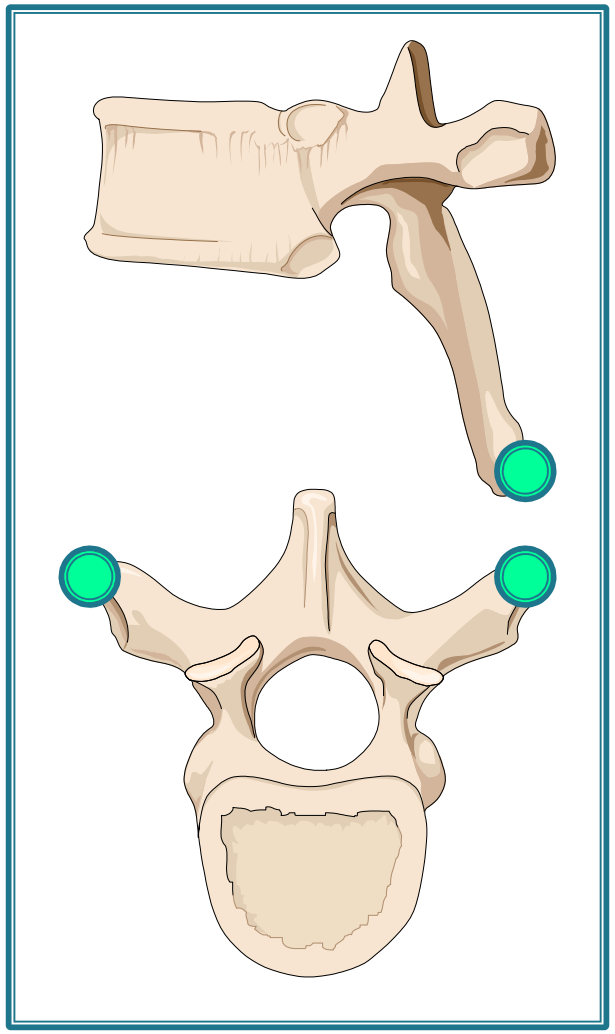
- Thoracic
  - Spinous processes
    - Midline
    - Inferolateral
  - Transverse processes
- Lumbar
  - Spinous processes
    - Midline
    - Inferolateral
  - Transverse processes
  - Upper Pole L5 (UPL5)



Palpating Tender Points

Thoracic spine

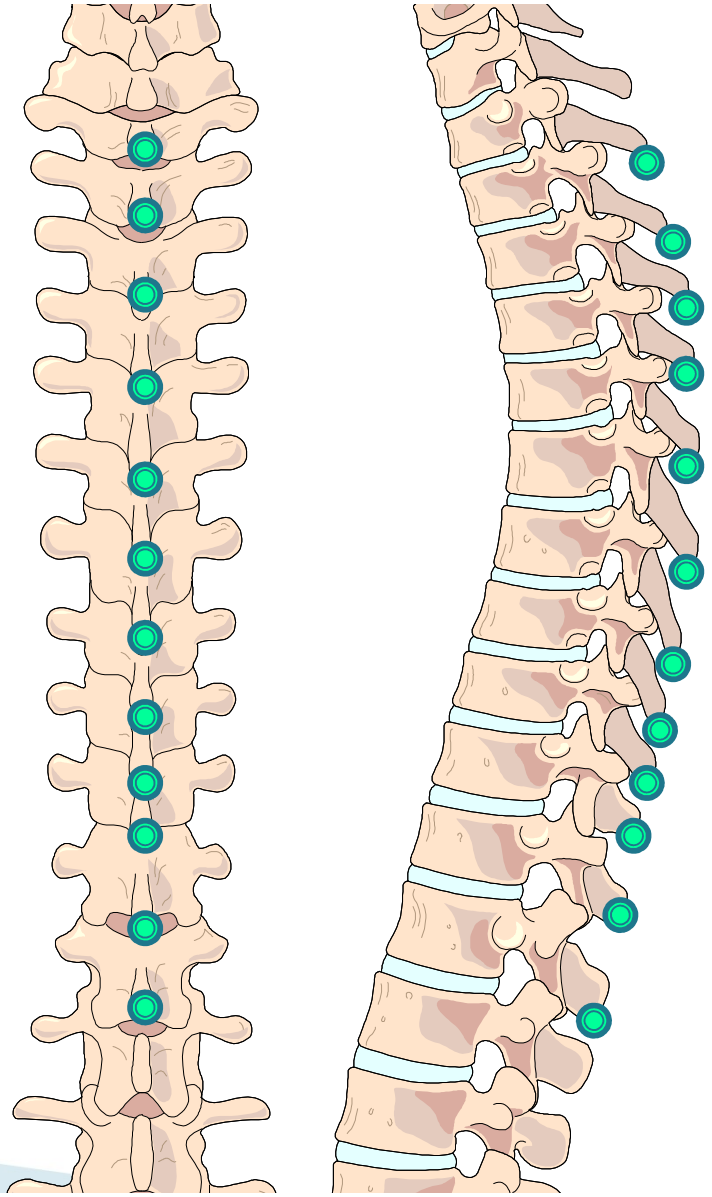
- Midline
  - On or between the spinous process
  - Inferolateral spinous process
- Lateral
  - Transverse processes



Palpating Tender Points

Thoracic spine

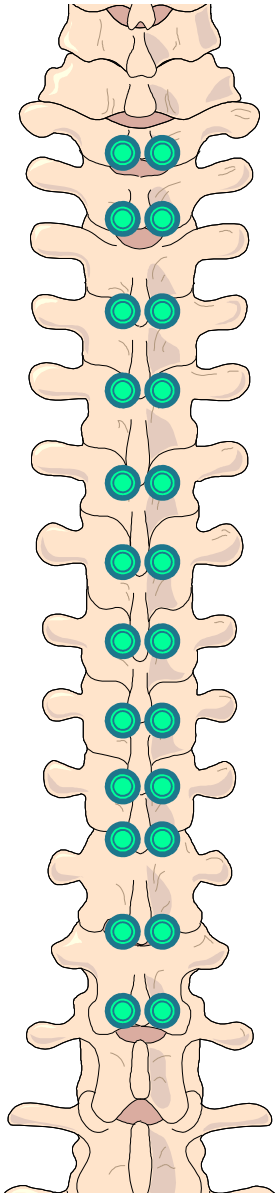
- Midline
  - <u>On or between the spinous process</u>
  - Inferolateral spinous process
- Lateral
  - Transverse processes



Palpating Tender Points

Thoracic spine

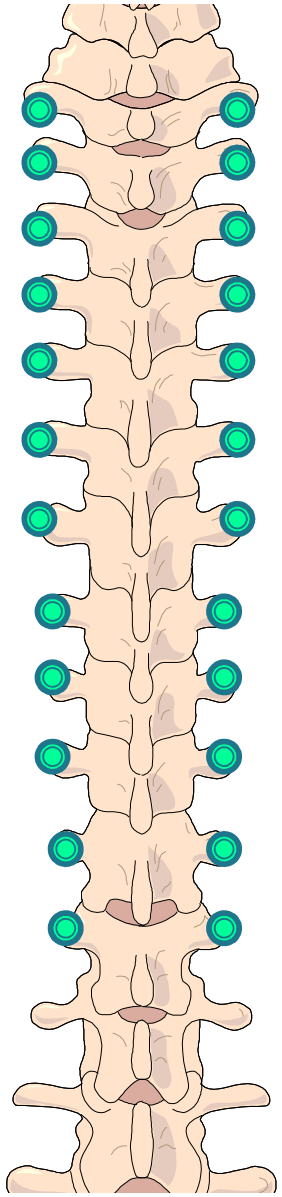
- Midline
  - On or between the spinous process
  - Inferolateral spinous process
- Lateral
  - Transverse processes



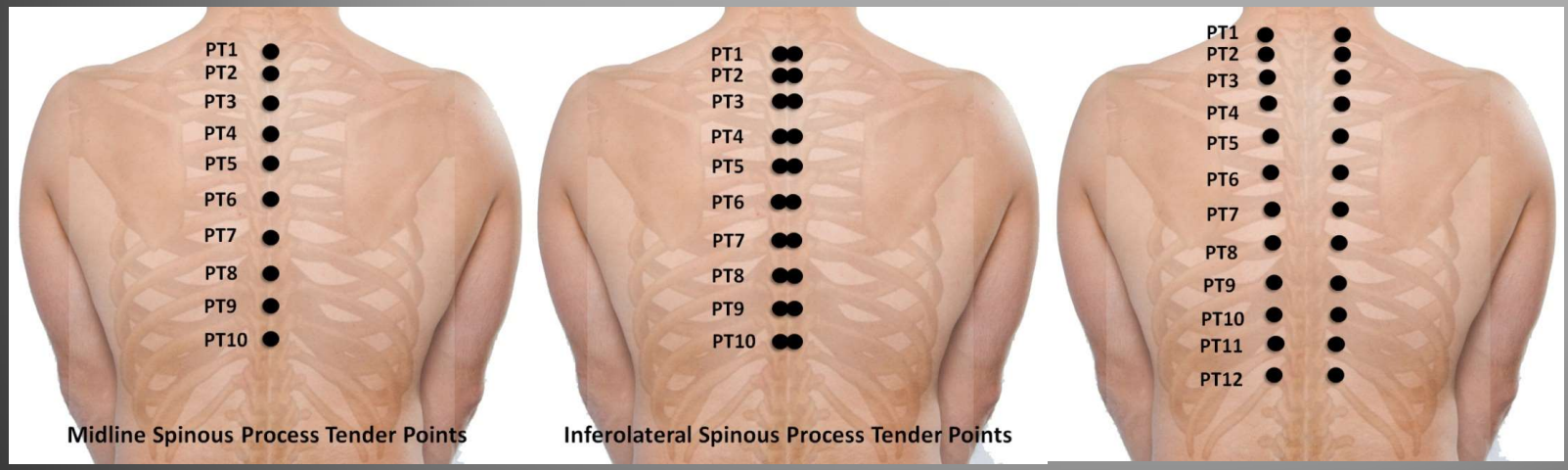
Palpating Tender Points

Thoracic spine

- Midline
  - On or between the spinous process
  - Inferolateral spinous process
- Lateral
  - Transverse processes



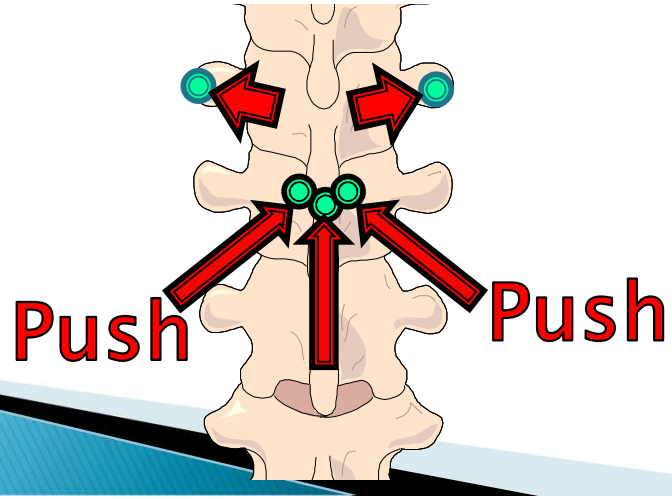
Thoracic Tender Points

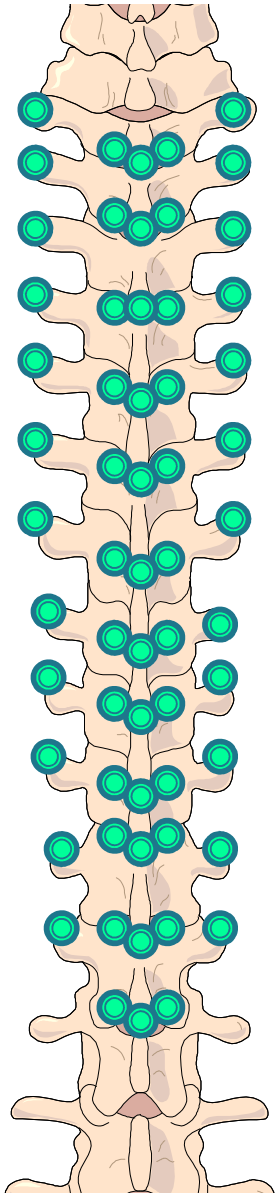


Laboratory Exercise

Palpate for thoracic spine tender points

- Midline
  - On or between the spinous process
  - Inferolateral spinous process
- Lateral
  - Transverse processes

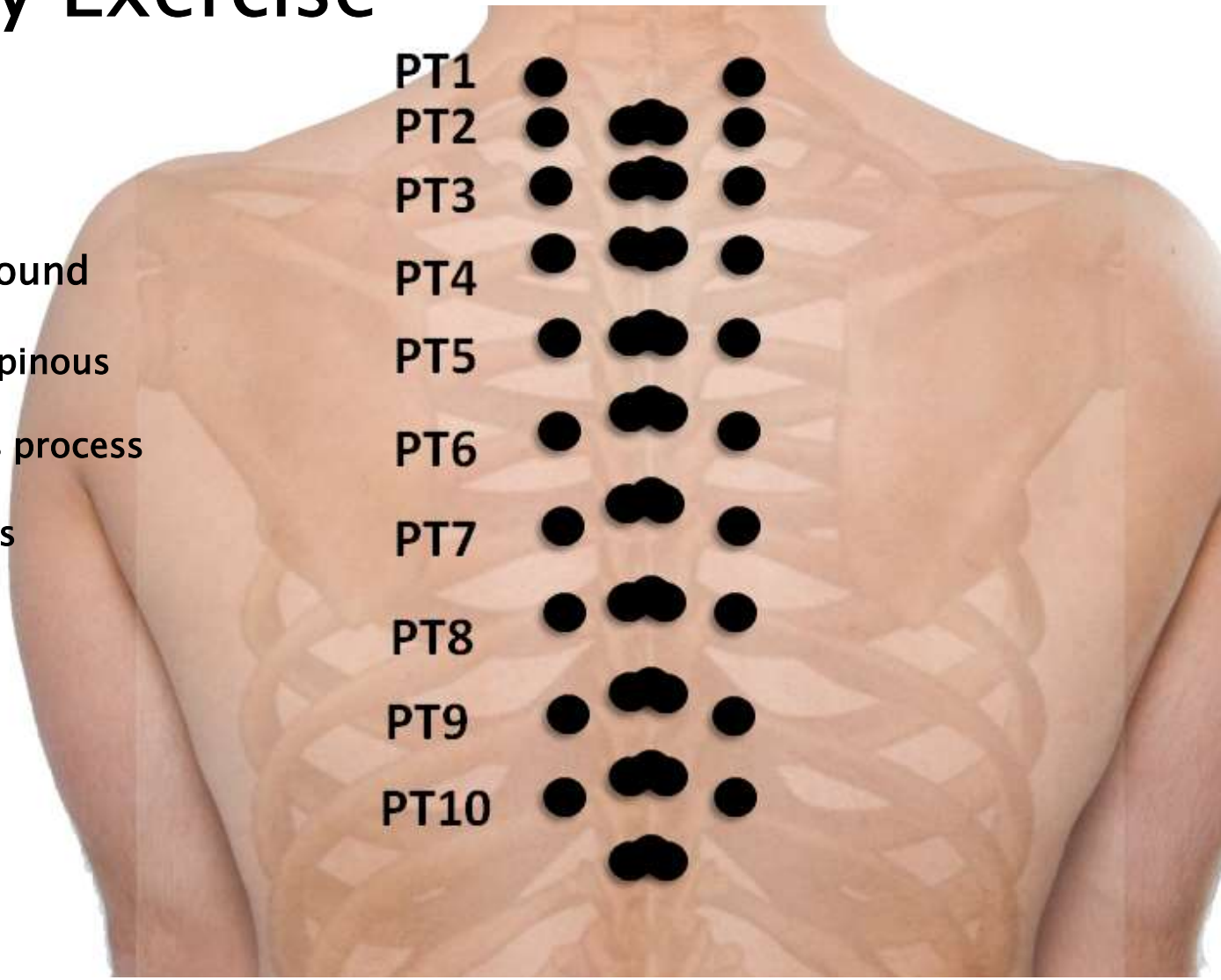




Laboratory Exercise

Circle all tender points found

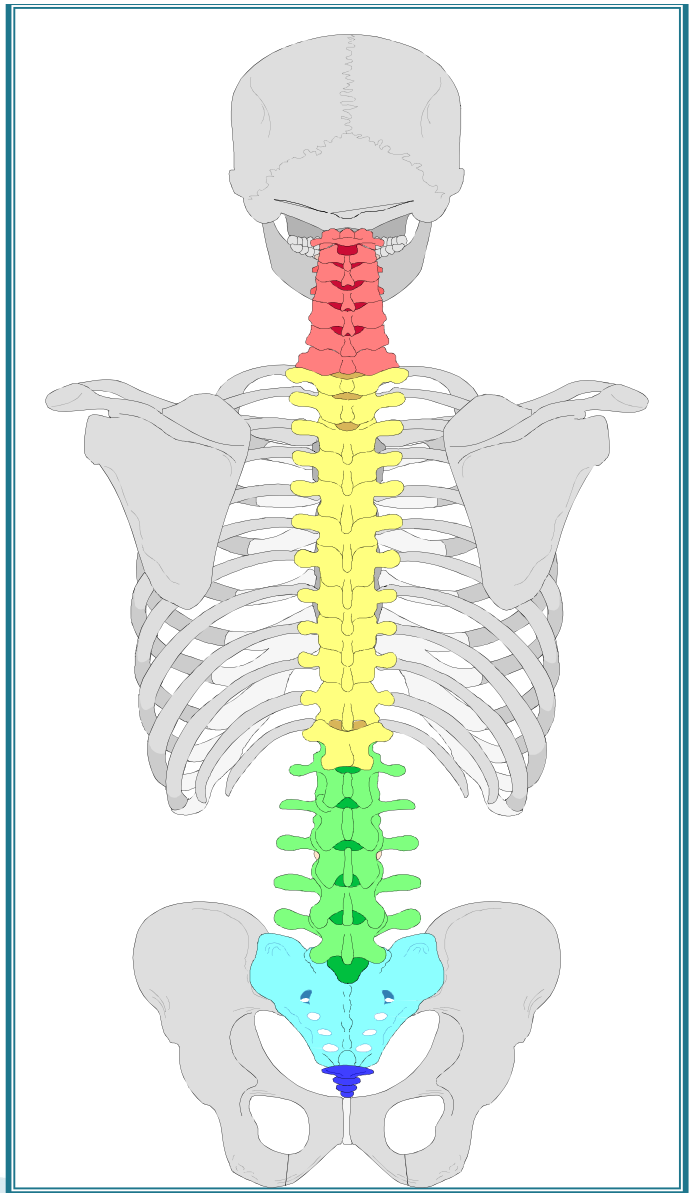
- Midline
  - On or between the spinous process
  - Inferolateral spinous process
- Lateral
  - Transverse processes



Thoracic Tender Points

Naming Tender Points

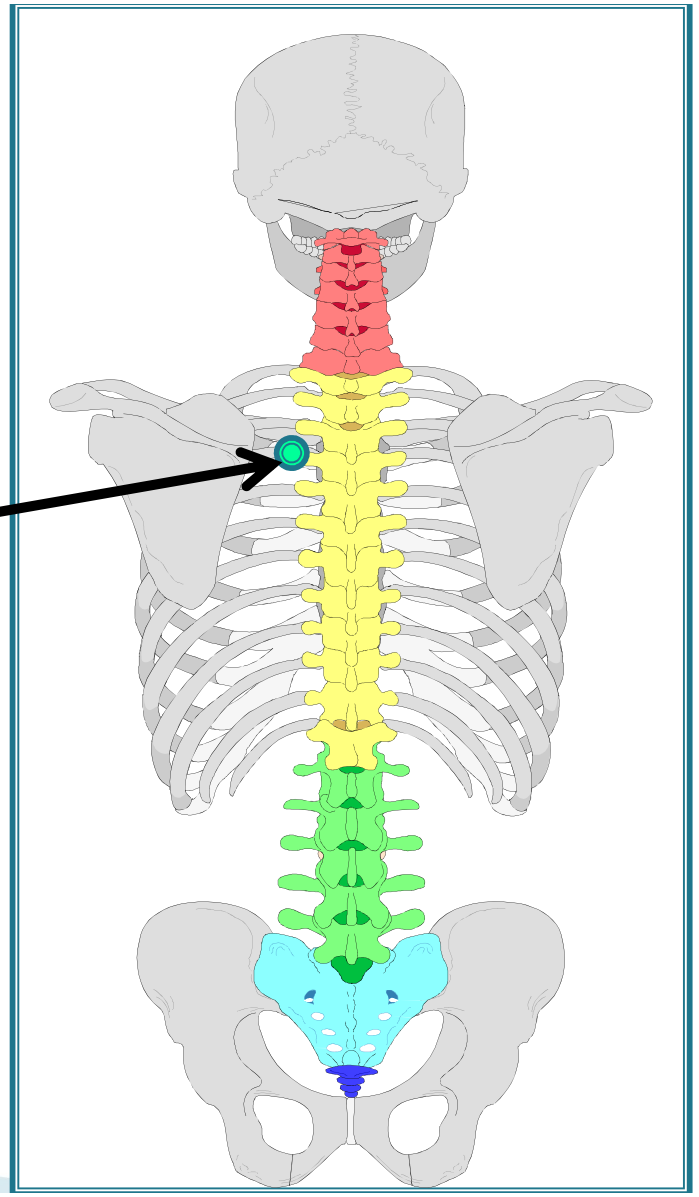
- The vertebral level
- Anterior vs Posterior
- Lateral versus Midline
- Left versus Right



Thoracic Tender Points

Naming Tender Points

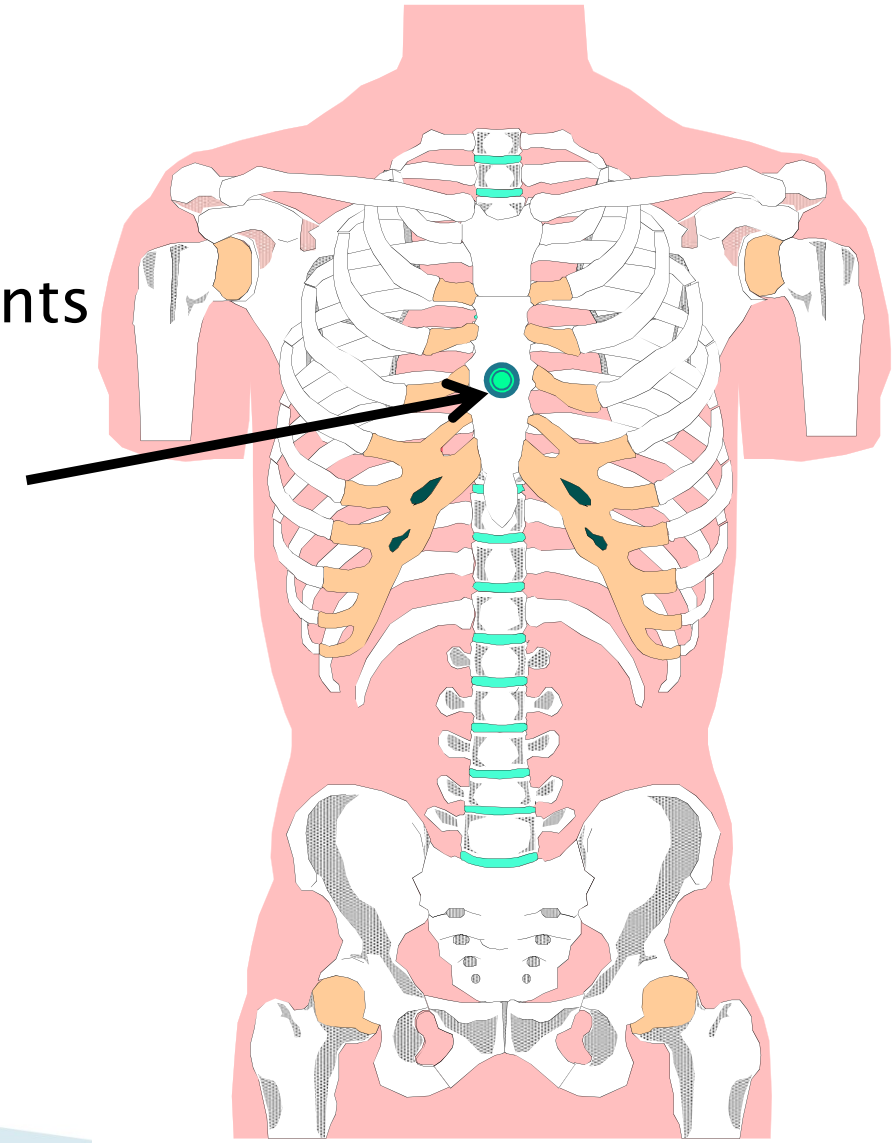
- Left Lateral Posterior T4
- Left T4 Transverse Process



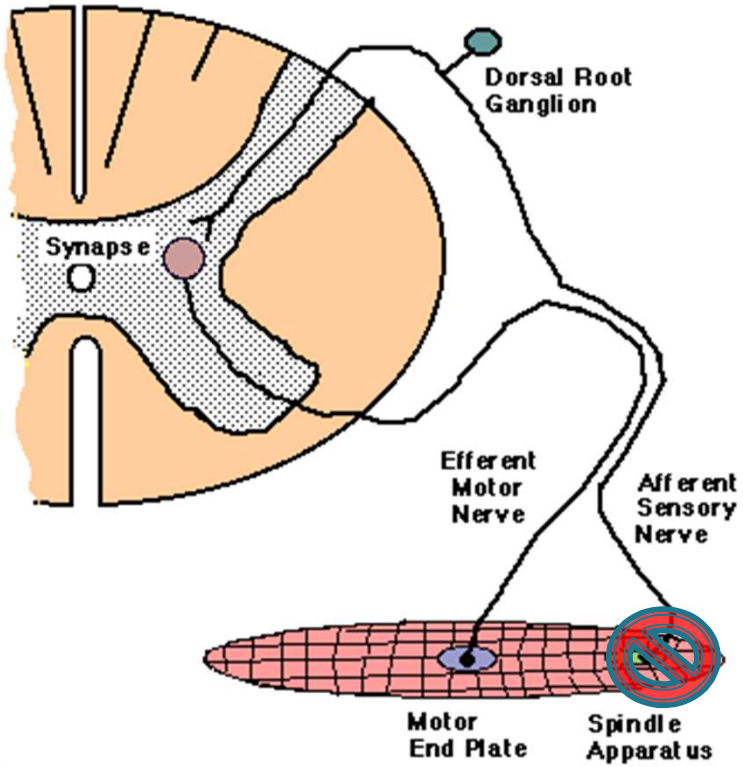
Thoracic Tender Points

Naming Tender Points

- Anterior T4



Counterstrain Treatment



Approximate the origin and the insertion of the affected structure to diminish nociceptive input into CNS and stop the offending reflex arc

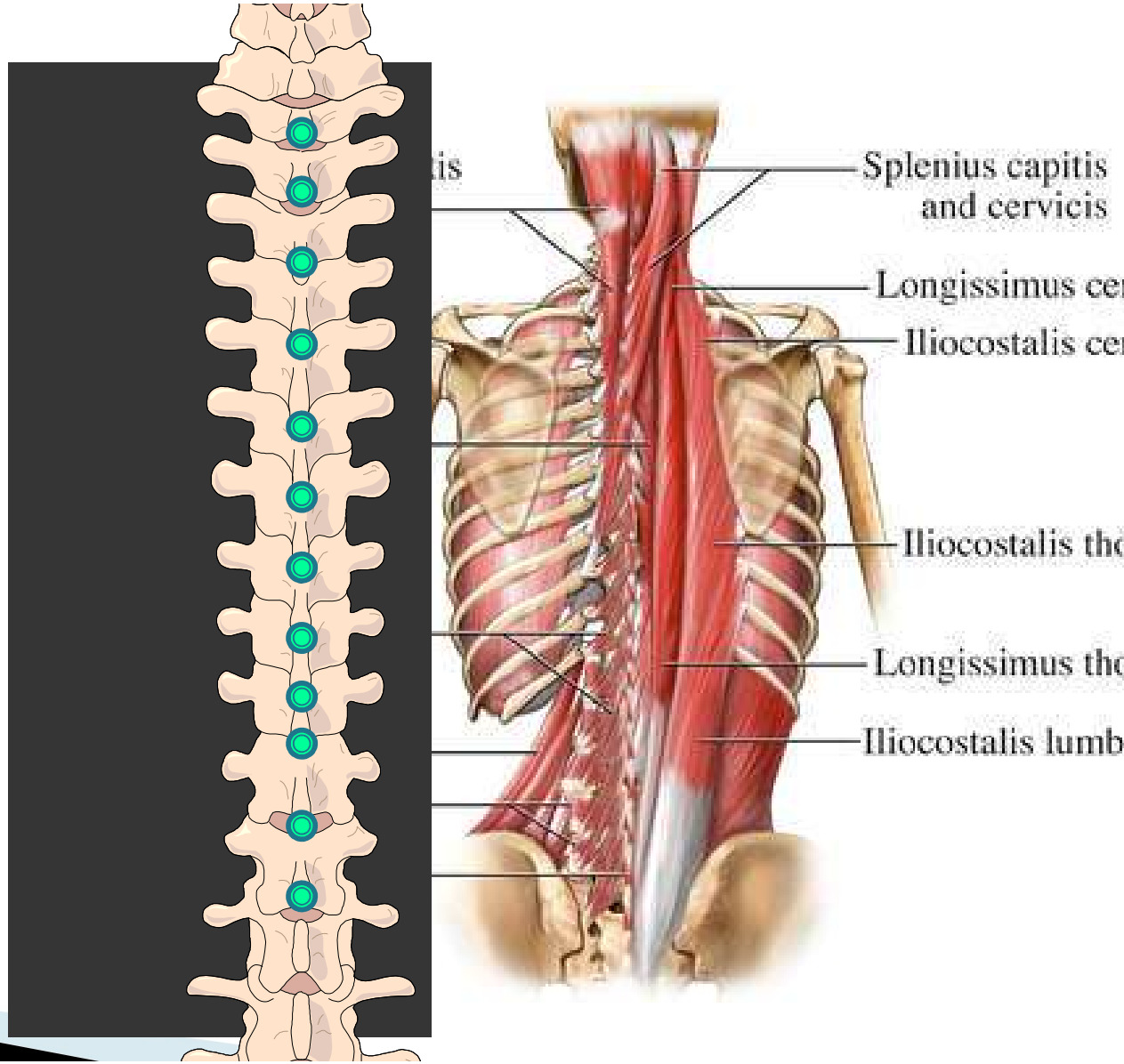
Hold for 90 seconds

Anatomy

Posterior Thoracic

- Midline
  - On or between the spinous process

- Interspinalis
- Multifidus
- Spinalis thoracic
- Semispinalis thoracic (T1-6)

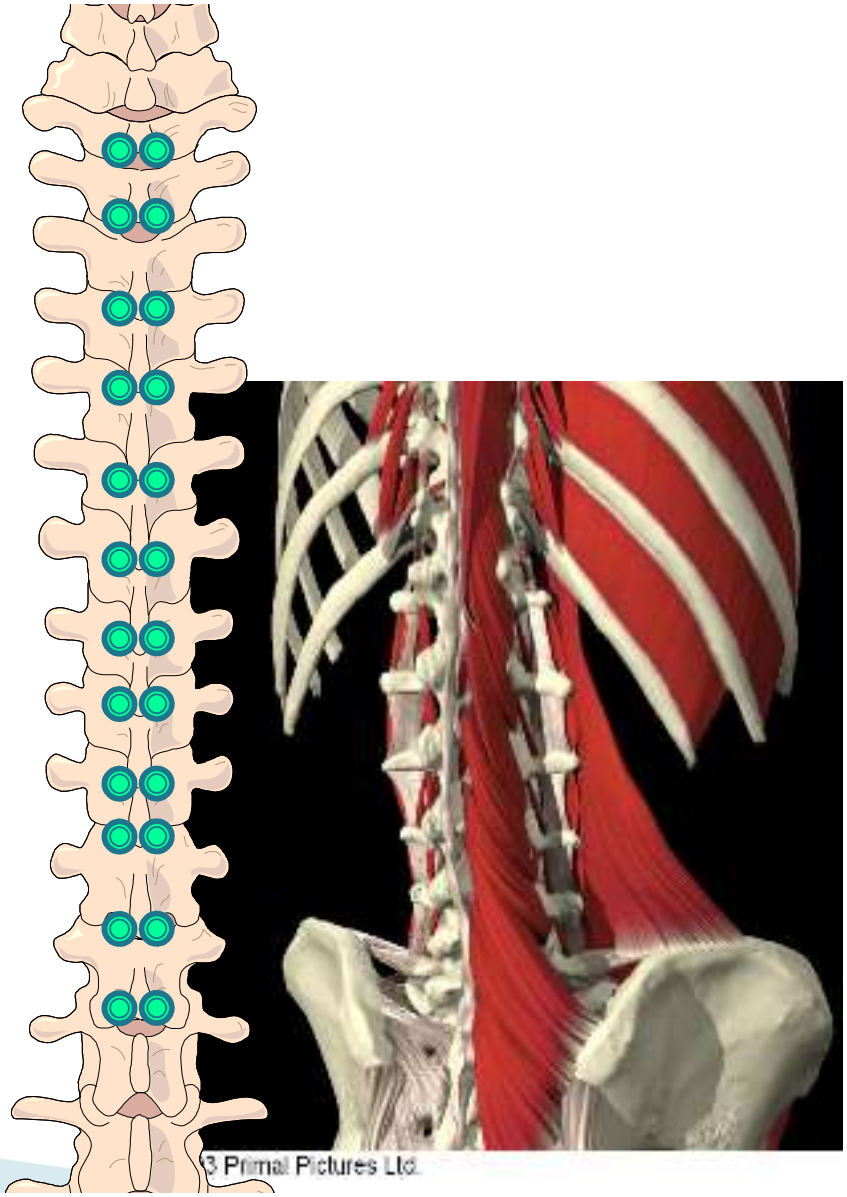


Anatomy

Posterior Thoracic

- Midline
  - Inferolateral spinous process

- Multifidus
- Rotatores
- Semispinalis thoracic (T1–6)

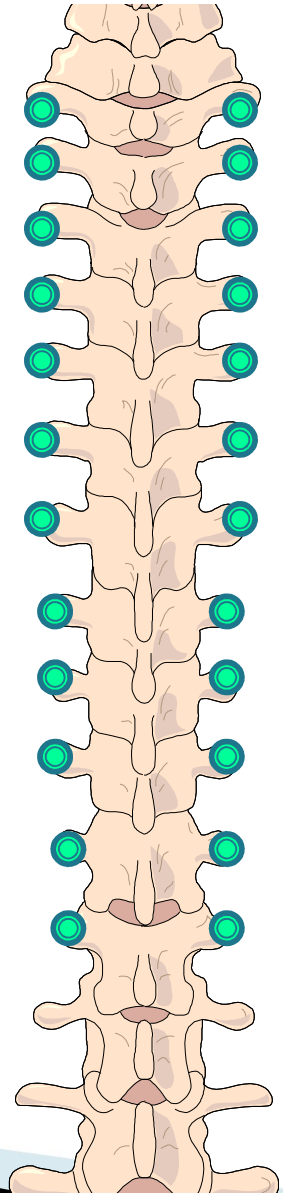


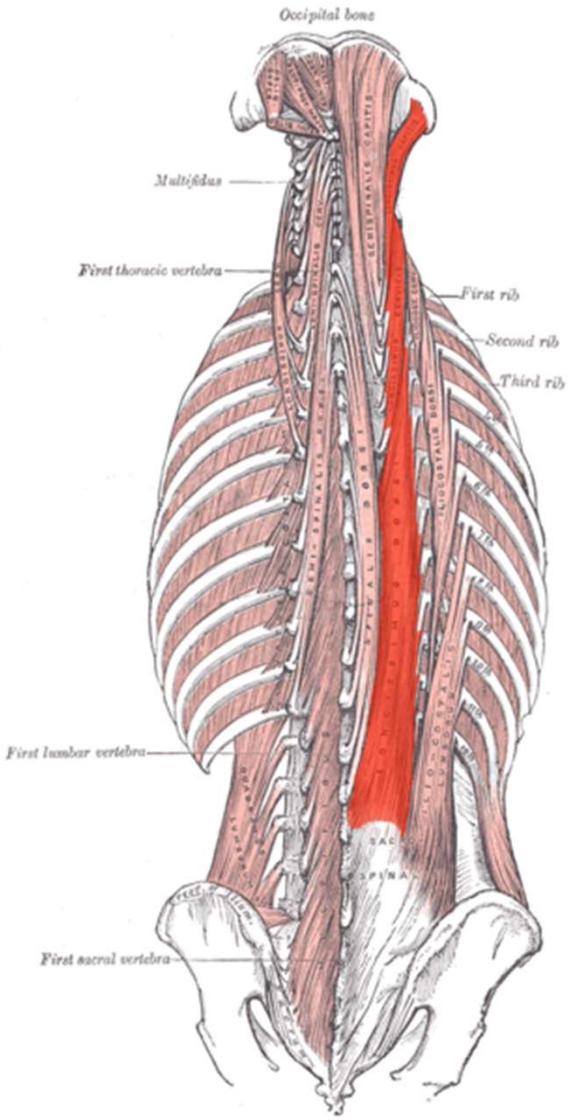
Anatomy

Posterior Thoracic

- Lateral
  - Transverse processes

- Levatores Costarum
- Longissimus thoracis
- Iliocostalis



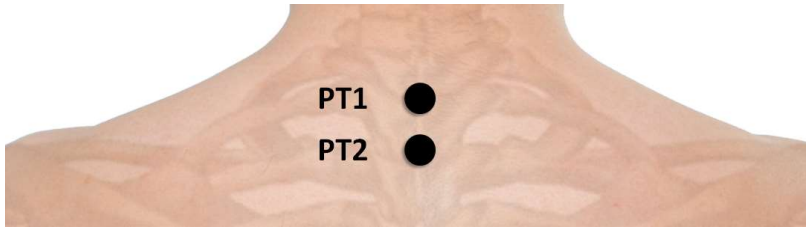


PT1-2 Spinous Process Locations

iCounterstrain p 55

Midline spinous process tender points

Found midline on tip of spinous processes



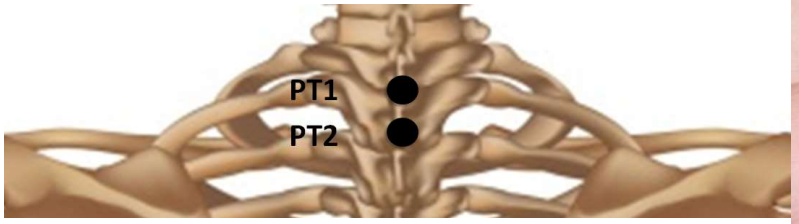
Treatment

1. Supine or prone
2. Midline – Pure cervical extension without sidebending

Note: Avoid excessive tension on anterior cervical fascia

E

Anatomical Considerations

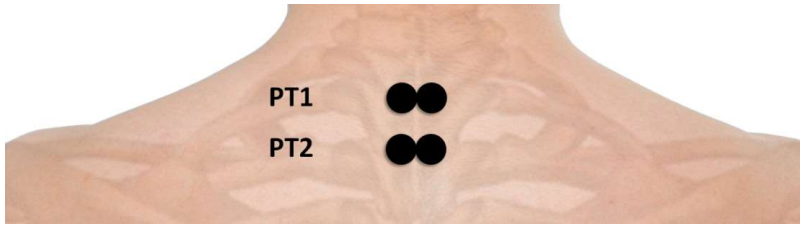


PT1-2 Spinous Process Locations

iCounterstrain p 56

Inferolateral spinous process tender points

Found on inferolateral aspect of spinous processes



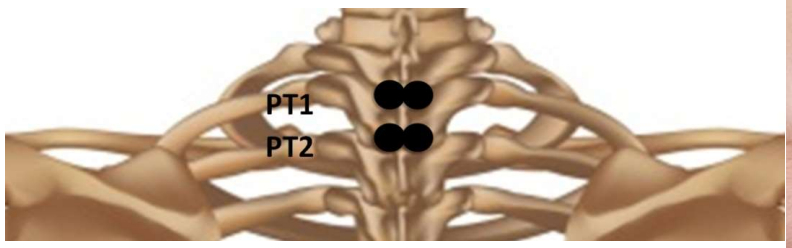
Treatment

1. Supine or prone
2. Thoracic extension using head and neck with rotation and sidebending away from point

Note: Avoid excessive tension on anterior cervical fascia

ESaRa

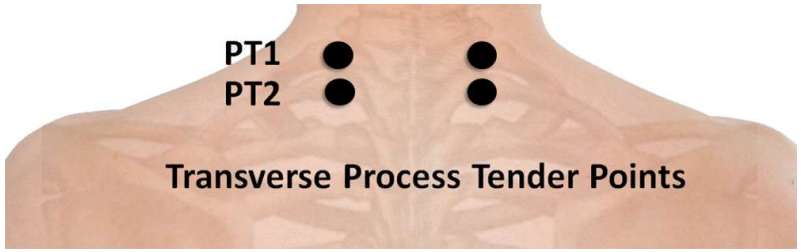
Anatomical Considerations



PT1-2 Transverse Process Locations

iCounterstrain p 60

Found on posterior aspect of corresponding transverse processes

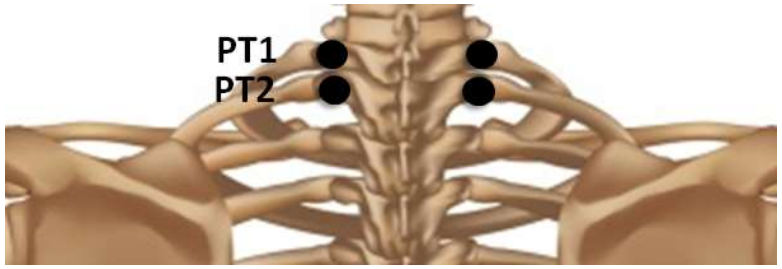


Treatment

1. Supine or prone
2. Thoracic extension using head and neck with rotation towards and sidebending away from point

ESaRt

Anatomical Considerations

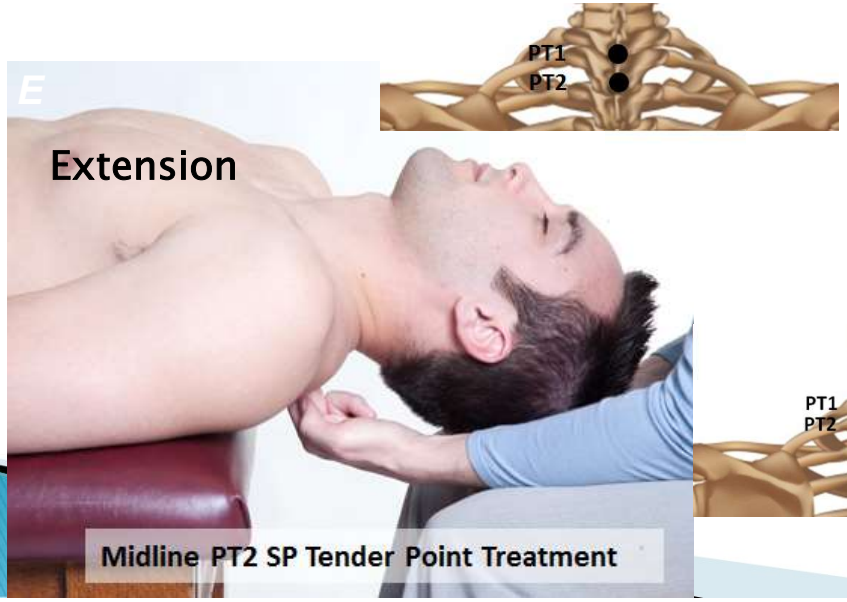


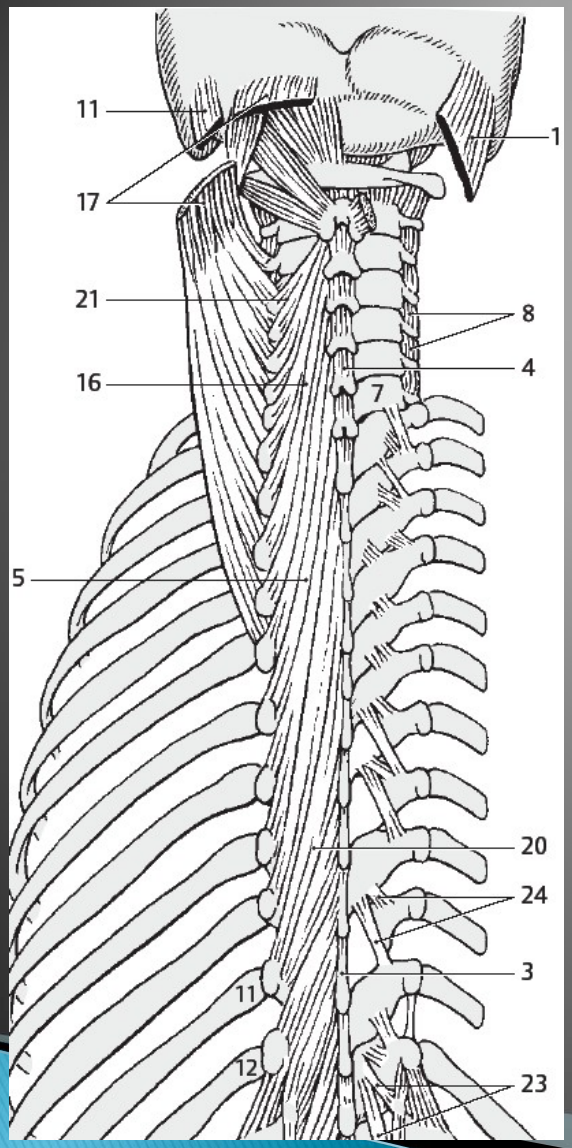
Counterstrain Treatment

1. **Find the tender point**
2. **Establish a pain scale - Ex. “This is a dollar worth of pain”**
3. **Position in standard treatment position – Usually wrap the body around the point or approximate the origin and insertion of the affected structure**
4. **Recheck TP – “If you had a dollars worth of pain before, how much is left now”**
    1. **Goal is Zero - minimum is 30% of original pain (30¢)**
    2. **Fine tune position for maximum effect**
5. **Hold treatment position for 90 seconds – patient must be relaxed**
6. **Slowly return to neutral**
7. **Recheck point –Goal is Zero on pain scale - - minimum is 30% of original pain**

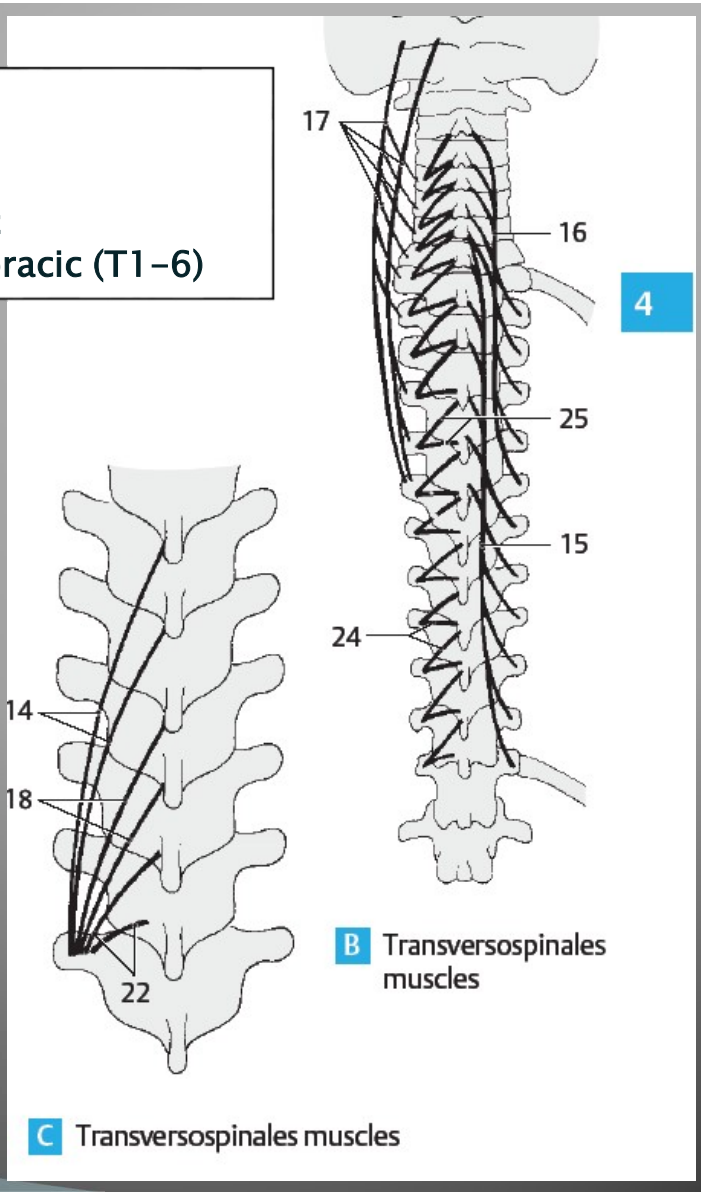
Lab Exercise – Posterior T1–T2

1. Find the tender point
2. Establish a pain scale
3. Position in standard treatment position
4. Recheck TP –Goal is Zero – minimum is 30% of original pain
5. Fine tune position for maximum effect
6. Hold treatment position for 90 seconds
7. Slowly return to neutral
8. Recheck point





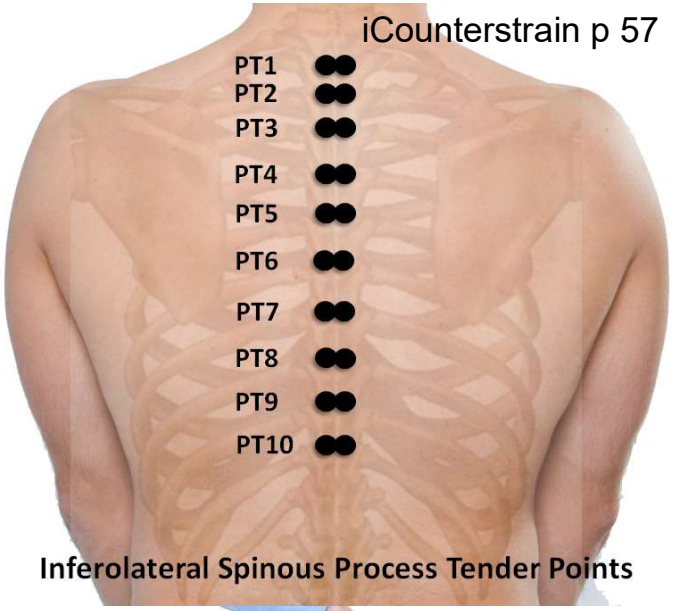
Interspinalis
Rotatores
Multifidus
Spinalis thoracic
Semispinalis thoracic (T1–6)



PT3-10 Spinous Process Locations

1. Midline: On tip of spinous processes
2. Inferolateral: On inferolateral aspect of spinous process

iCounterstrain p 57



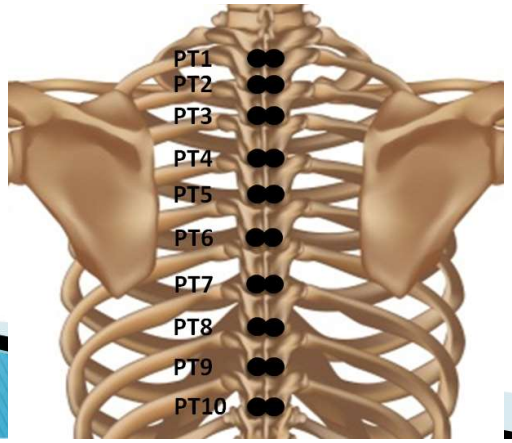
Inferolateral Spinous Process Tender Points

Treatment

1. Prone or supine
2. Midline: Pure thoracic extension without sidebending down to level of point
3. Inferolateral: Thoracic extension with rotation and sidebending away from point by pulling contralateral shoulder inferior and posterior, creating slight extension and rotation away from point

ESaRa

Anatomical Considerations

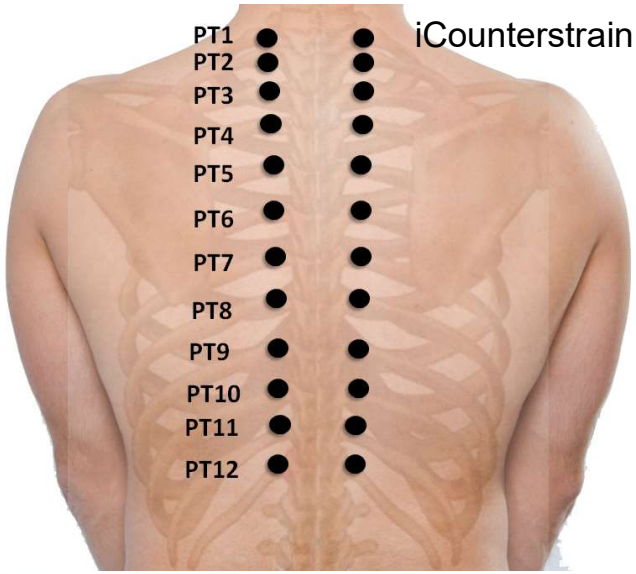



Right PT7 SP Tender Point Treatment

PT3-10 Transverse Process Locations

Found on posterior aspect of corresponding transverse processes

iCounterstrain p 61

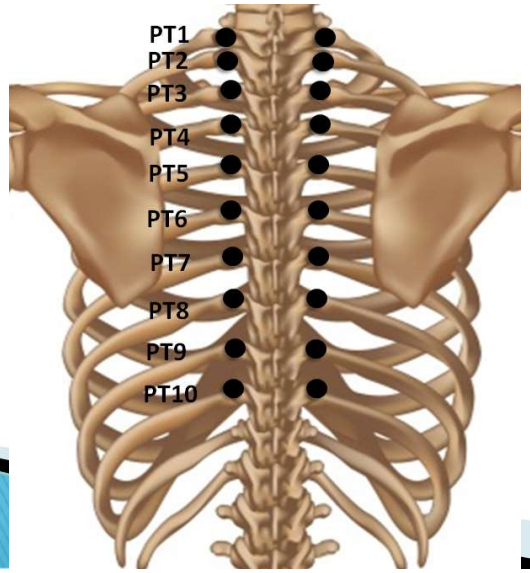


Treatment

1. Prone
2. Rotate head towards point
3. Sidebend trunk away from point by abducting ipsilateral shoulder, creating slight extension and rotation towards point

ESaRt

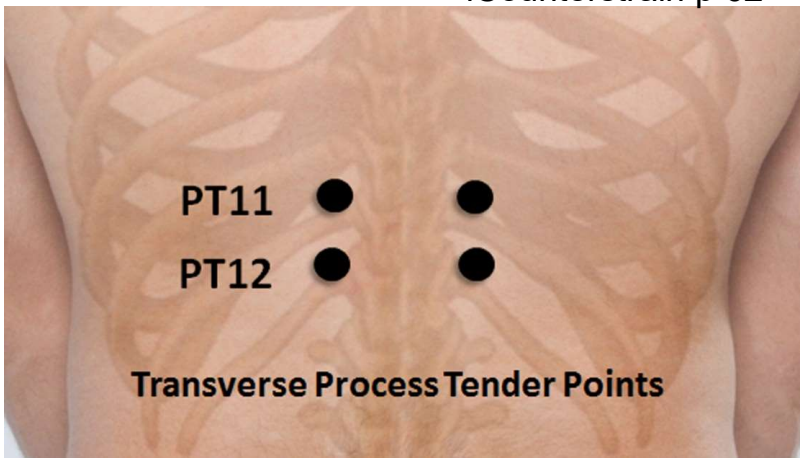
Anatomical Considerations



PT11-12 Transverse Process Locations

Found on corresponding transverse processes

iCounterstrain p 62

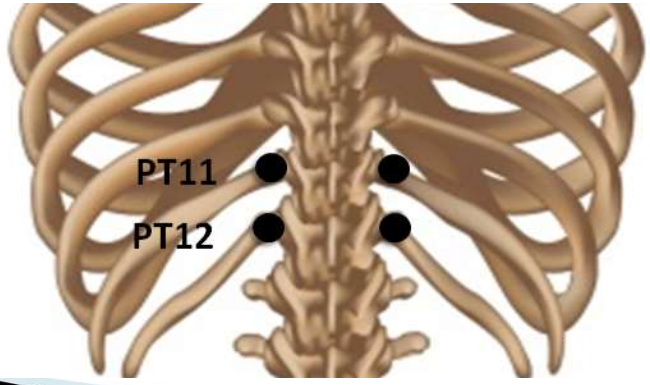


Treatment

1. Prone
2. Extend ipsilateral trunk by <u>rotating pelvis towards</u> (**trunk away**) point or by extending ipsilateral hip, creating slight extension and sidebending away from point

ESaRt

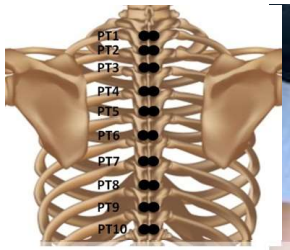
Anatomical Considerations



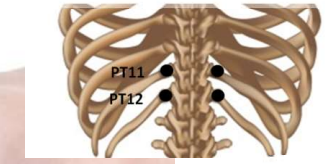
Lab Exercise – Posterior T3–T12

1. Find the tender point
2. Establish a pain scale
3. Position in standard treatment position

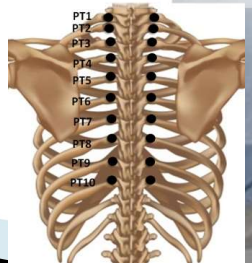
1. Recheck TP –Goal is Zero – minimum is 30% of original pain
2. Fine tune position for maximum effect
3. Monitor tender point
4. Hold treatment position for 90 seconds
5. Slowly return to neutral
6. Recheck point



R/L Spinous Processes



Transverse Processes



How Do You Get Tenderpoints?

Posterior Thoracic

- Extension injuries
- Sudden strains
- Overuse
- Weekend Warrior

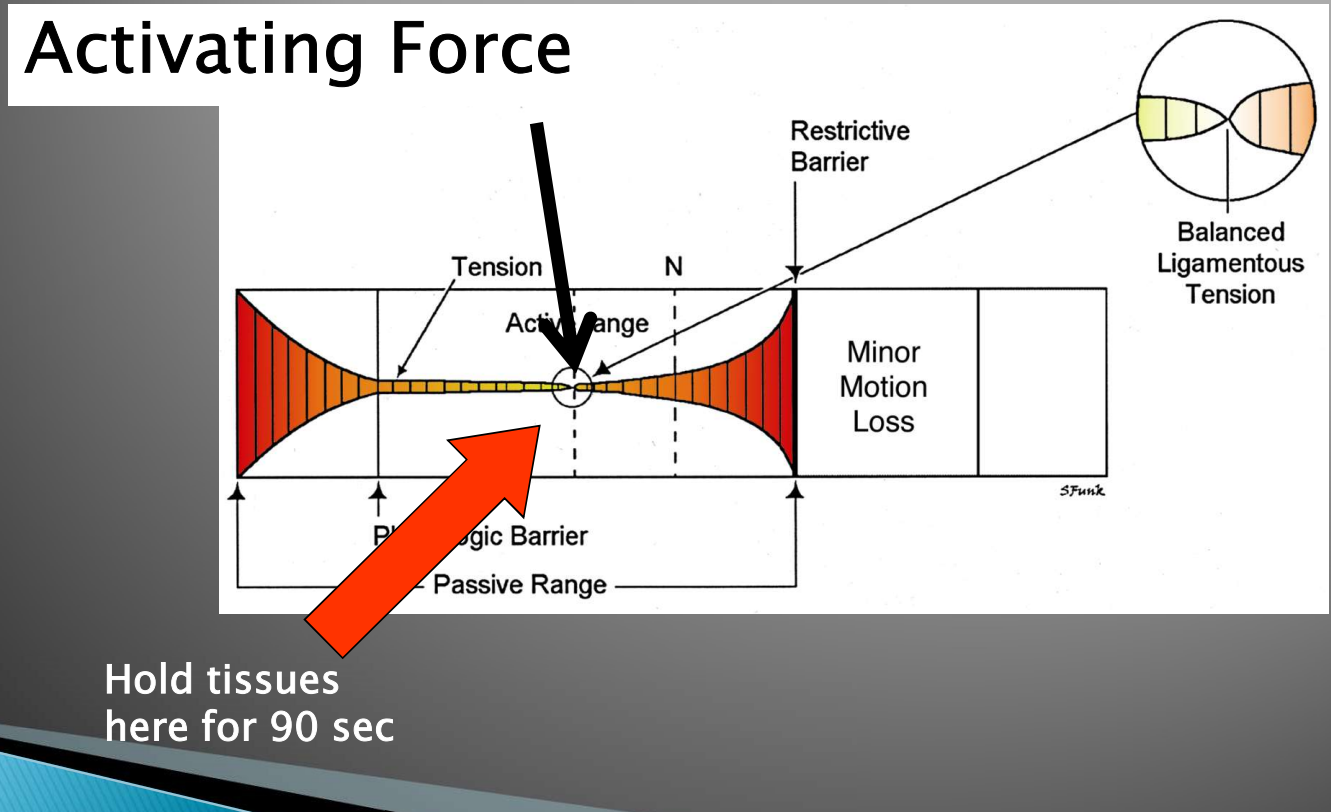
Technique Modalities

Over twenty different types of techniques listed in the AOA glossary.

Usually classified as

- Indirect (away from the motion barrier)
- Direct (towards the motion barrier)
- Combination of both

Counterstrain

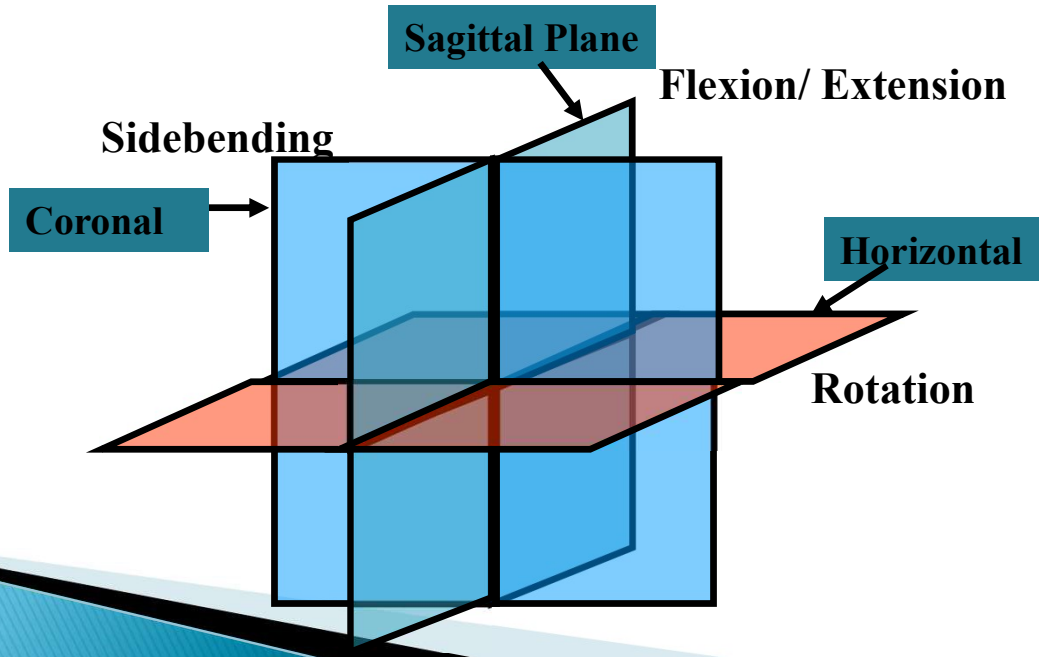


Counterstrain

- Body adapts to injury to reduce further irritation of affected structures
- This adaptation reduces irritation to affected areas, but may cause strain on other structures to protect injured site
- To treat the patient's strain, the physician counters the strain by reintroducing the original strain, which is the point of ease

Counterstrain

- Balance the tissue tensions in all three planes
- At the point of balance the tissue will soften



Counterstrain

- At the point of balance the tissue will soften
- Rechecking the tender point will reveal reduced tenderness – "0" optimum

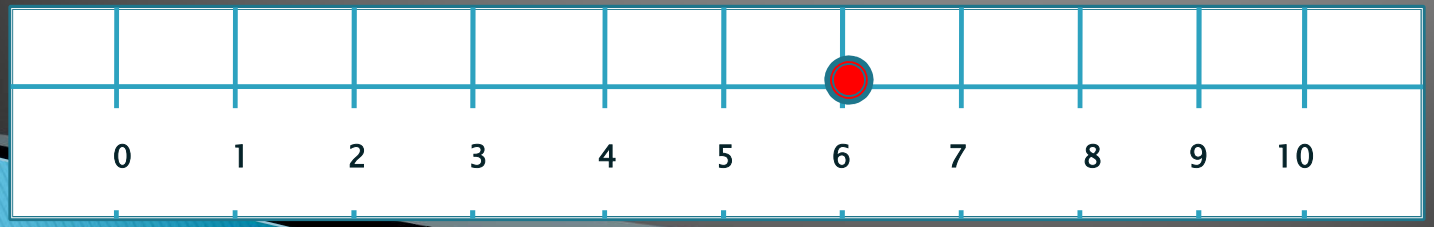
- As the point "releases" the tissue will
  - Become warm
  - Develop a "pulsation" sensation – Therapeutic Pulse
- Hold for 90 seconds
- Slowly return to neutral

Pain Scale

60 ¢

If you had a dollars worth of pain before, how much is left?

If your pain was a 10 before, how much is left?



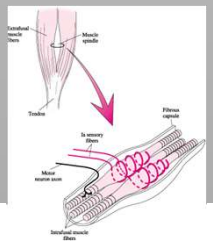
Counterstrain

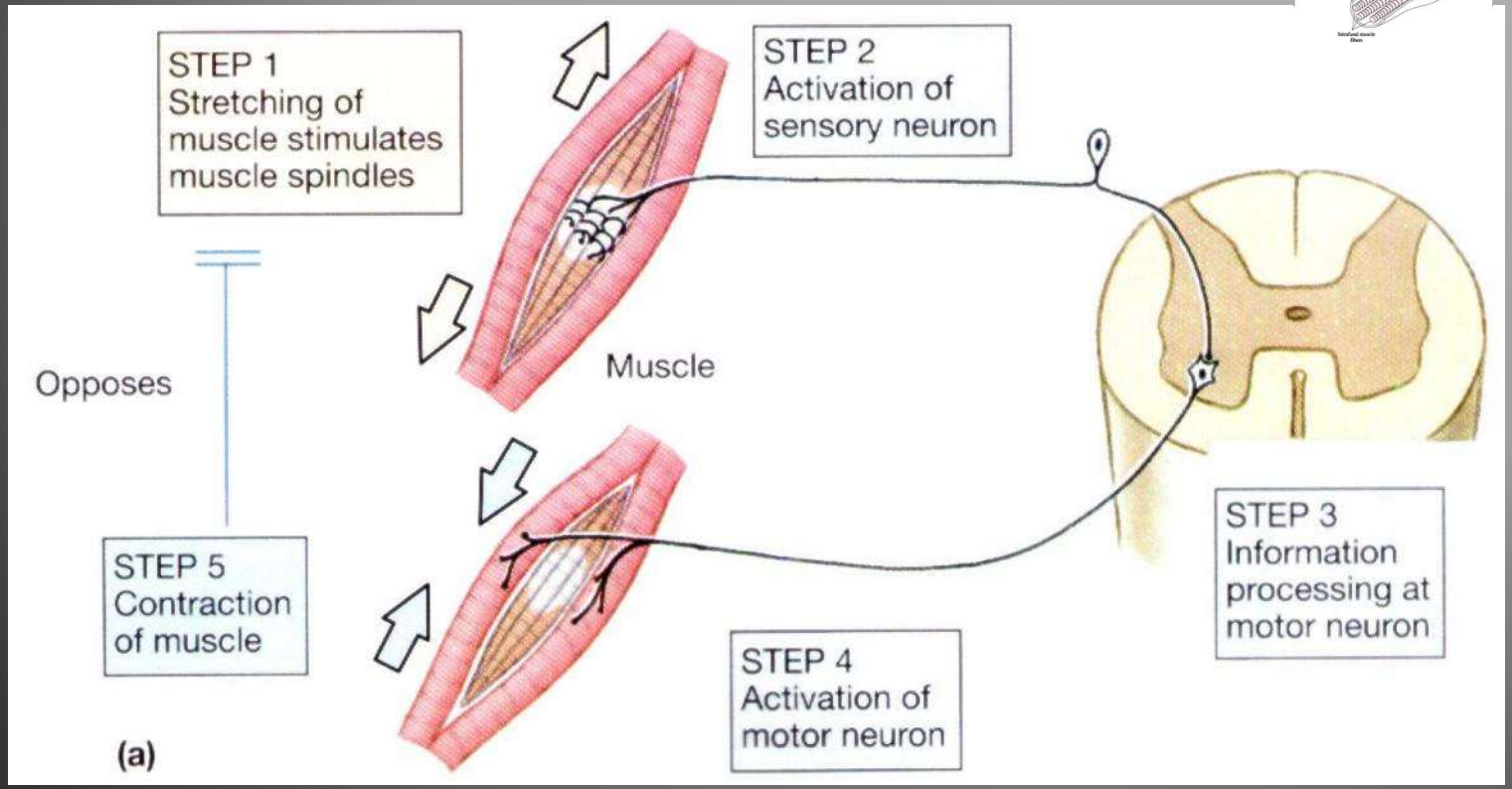
- At the point of balance the tissue will soften
- Rechecking the tender point will reveal reduced tenderness – "0" optimum
- As the point "releases" the tissue will
  - Become warm
  - Develop a "pulsation" sensation – Therapeutic Pulse
- Hold for 90 seconds
- Slowly return to neutral

Counterstrain

- As the point “releases” the tissue will
  - Becomes very warm
  - Develop a “pulsation” sensation
  - Tissue will relax and feel heavy

Counterstrain





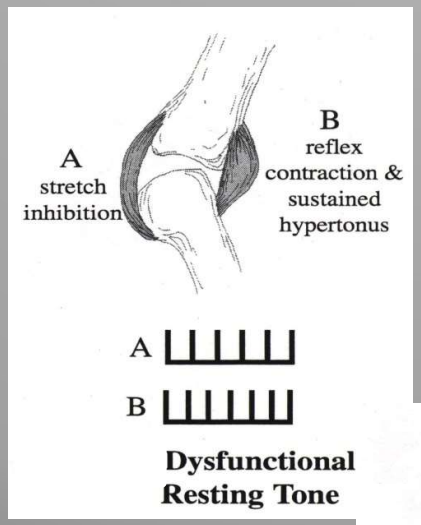
Theories of Counterstrain Technique

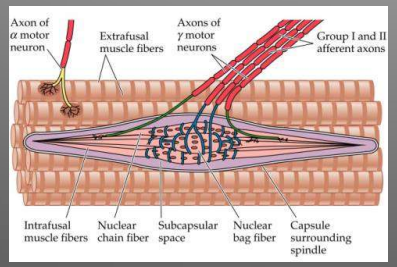
Proprioceptive Theory

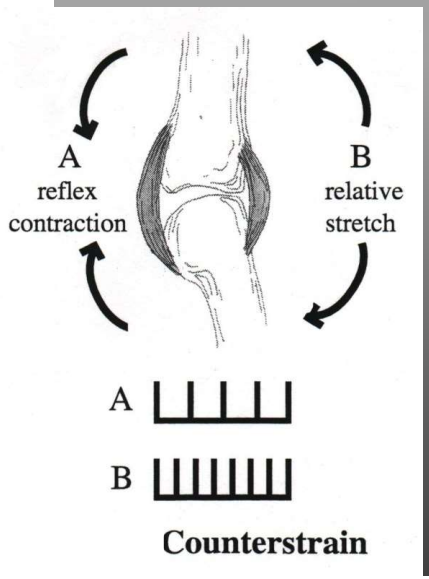
The Proprioceptive Theory proposes that tender points develop when muscle fibers are maintained in a hypertonic state due to an inappropriate proprioceptive reflex following an injury. During an injury, muscle spindles (composed of afferent sensory and gamma efferent nerves) are rapidly stretched, which causes the muscle being stretched (agonist) to reflexively contract to avoid further injury (through activation of alpha motor neurons). The reflexive contraction of the agonist muscle results in a sudden lengthening of the antagonist muscle. The sudden lengthening of the antagonist muscle likewise causes a reflexive contraction. The two opposing muscle contractions may lead to a muscular imbalance that manifests as altered motor neuron activity and tender points in the antagonist muscle which can persist after the original injury heals. Counterstrain treatment uses precise body positioning to shorten the antagonist muscle and reduce the muscle spindle activity and abnormal muscle contractions of both the agonist and antagonist muscles.

How Does Counterstrain Work??

- Stops the feedback loop to the spinal cord
- Counterstrain resolves the inappropriate proprioceptive reflex
  - Tenderpoints are in antagonist muscle
  - Tx shortens antagonist muscle to reduce spindle feedback
  - Slow return to neutral to avoid reactivation
  - Gamma Gain Theory
  - Proprioceptive Theory







Theories of Counterstrain Technique

Sustained Abnormal Metabolism Theory

The Sustained Abnormal Metabolism Theory suggests tissue injury alters local body position, affecting local microcirculation and tissue metabolism. The local nutrient supply and metabolic waste removal is reduced while pro-inflammatory interleukin production is increased. These changes lower the firing threshold of sensory neurons causing localized neuronal sensitization. During palpation, these changes manifest as localized edema and tenderness. The precise body positioning used in Counterstrain restores local vascular circulation and reduces localized production of inflammatory mediators. These effects persist even after normal tissue resting length is restored.

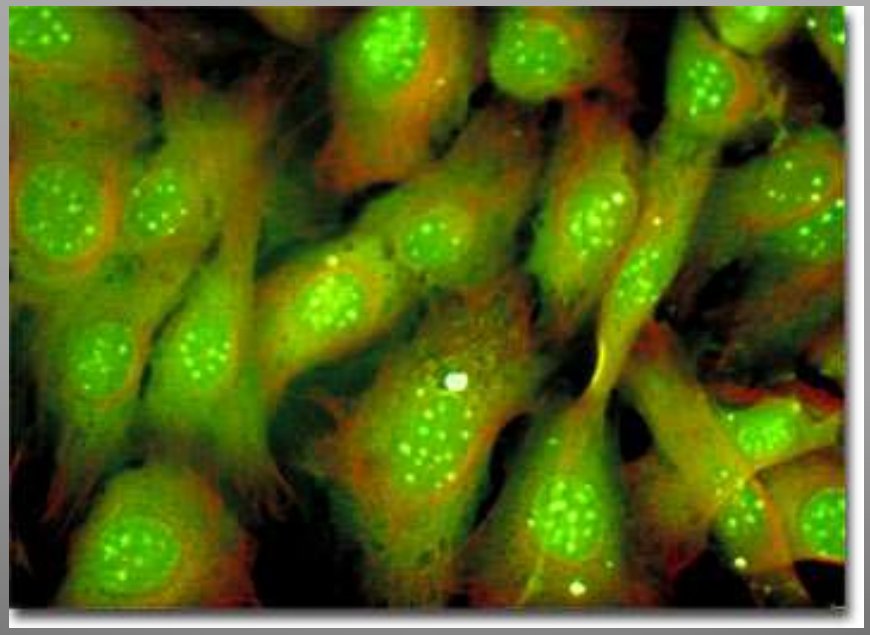
Impaired Ligamento-muscular Reflex Theory

The Impaired Ligamento-muscular Reflex Theory is similar to the Proprioceptive Theory. This theory, however, purposes that dysfunction may result from a protective reflex that occurs when ligaments are placed under strain. A localized strain in a ligament can reflexively inhibit muscular contractions that increase the ligamentous strain and can stimulate muscular contractions that reduce the strain.

Other Research

In Vitro Biophysical Strain Model for Understanding Mechanisms of Osteopathic Manipulative Treatment
(JAOA 2006)

- In vitro analysis of the effect strain on fibroblast gene expression
- Application of strain increased interleukin, cytokine and N_2O production
- Leads to vascular extravasation, capillary fluid slowing and tissue congestion



How Do You Get Tender Points?

Posterior Lumbar

- Extension injuries
- Sudden strains
- Overuse
- Weekend Warrior

Counterstrain Summary

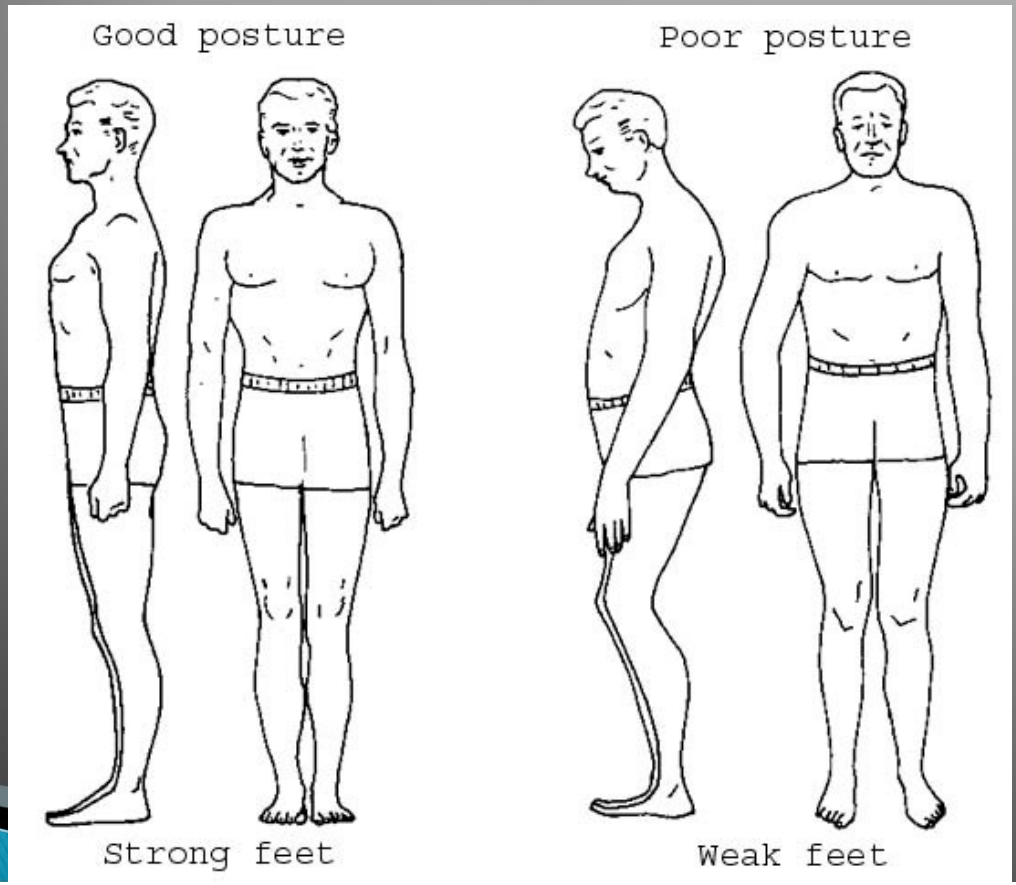
- If in doubt
  - Approximate the origin and insertion of the affected structure
  - Wrap the body around the point
  - The patient MUST relax
  - Hold for 90 secs
- If the tender points radiates
  - It is a trigger point
  - Counterstrain may or not work
- Tenderpoints that recur require lifestyle modification

Getting Rid of Tender Points

Stress Management

Getting Rid of Tender Points

Postural Strain =Muscle Imbalance



Getting Rid of Tender Points

Stretch and Strengthen

Getting Rid of Tender Points

Live Well

Eat well

Live healthy

Sleep well

Questions?