

# Dry Needling in the Pediatric Population

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The official health care provider  
of Sporting Kansas City



# Objectives

Following the presentation you will be able to:

- Define dry needling (DN) and describe the benefits, risks, indications, and contraindications.
- Describe the mechanism of trigger point dry needling and supporting literature.
- Describe clinical application and supplementary treatment options.

# About Us

## Dr. Mellony Mann, PT, DPT, CMTPT

- Associate of Science Physical Therapist Assistant – Washburn University 2008
- Bachelor Health Services Administration – Washburn University 2008
- Doctor of Physical Therapy – Rockhurst University 2014
- Dry Needling Certification (CMTPT) through Myopain Seminars



## Dr. Nick Wedel, PT, DPT, ATC

- Bachelor of Science Athletic Training - Kansas State University 2010
- Doctor of Physical Therapy - University of Kansas Medical Center 2015
- Dry Needling Certification through Benchmark Rehab Partners



Disclosure:  
We have no financial or relationships to disclose in relation to today's presentation.

# Dry Needling is **NOT** Acupuncture

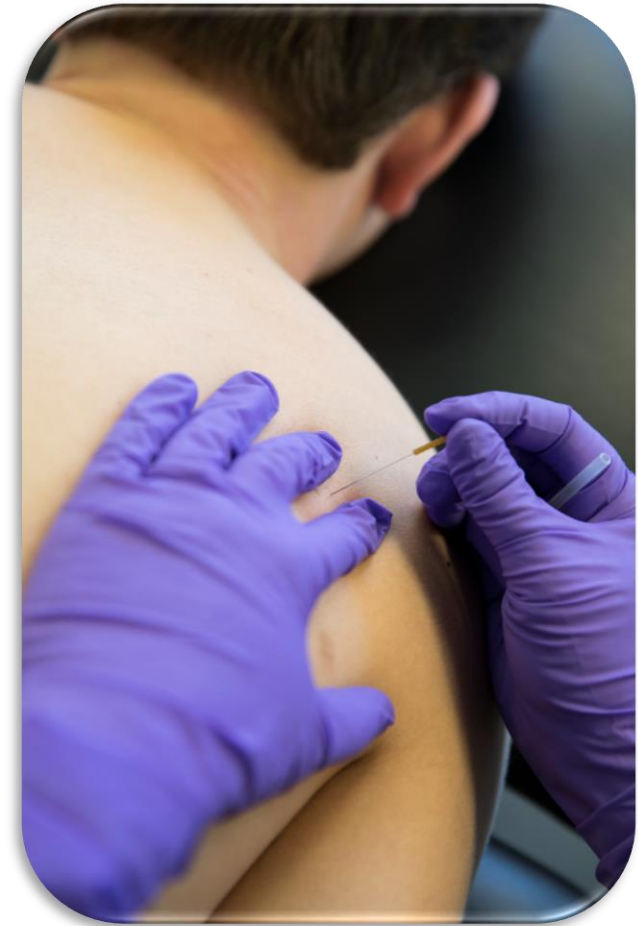


# What is Trigger Point Dry Needling?

- "Rapid, short term needling to altered or dysfunctional tissue in order to improve or restore function."
- "Dry needling is a skilled intervention that uses a thin filiform needle to penetrate the skin and stimulate underlying myofascial trigger points, muscular, and connective tissues for the management of neuromusculoskeletal pain and movement impairments."

-PAANZ, 2014

- APTA, 2013



# Benefits and Risks

- **Benefits**

- Reduces local and referred pain
- Improves ROM and muscle activation patterns
- Alters chemical environment of trigger points
- Reverses some central sensitization over time

- **Risks**

- Soreness
- Bruising
- Raised area/swelling
- Pneumothorax

# Indications and Precautions of Trigger Point Dry Needling

## Indications:

- Local and referred pain
  - Trigger points, taut bands, muscle spasm
- Impaired muscle activation patterns
- Decreased range of motion
- Headaches

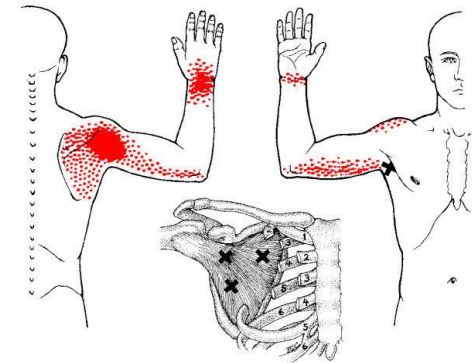
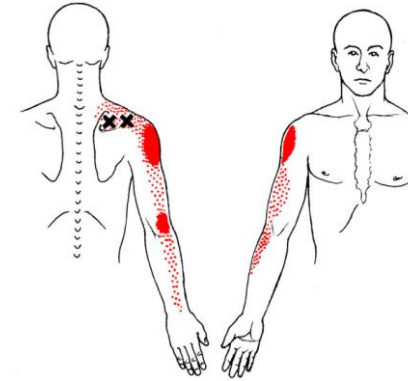
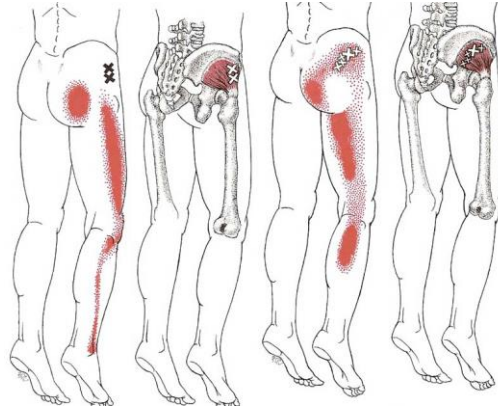
## Precautions:

- Abnormal Bleeding
- Implants
- Lymphedema
- Cognitive impairment
- Needle aversion or phobia
- Pregnancy
- Local or systemic infections



# Muscle Pain Characteristics

- Aching
- Cramping
- Local
- Vague
- Referred to deep somatic tissue
- Activates emotional centers of the brain





# Commonly Treated with Dry Needling

- Back Pain
- Headaches
- Neck Pain
- Shoulder Pain
- Jaw Pain (TMJD)
- Elbow, wrist, and hand pain
- Pelvic Pain
- Hip Pain
- Knee Pain
- Foot Pain (including Plantar fasciitis)
- Tendinitis/tendinopathy
- Back Pain
- Chronic Pain
- And MORE!



# Development of a Trigger Point

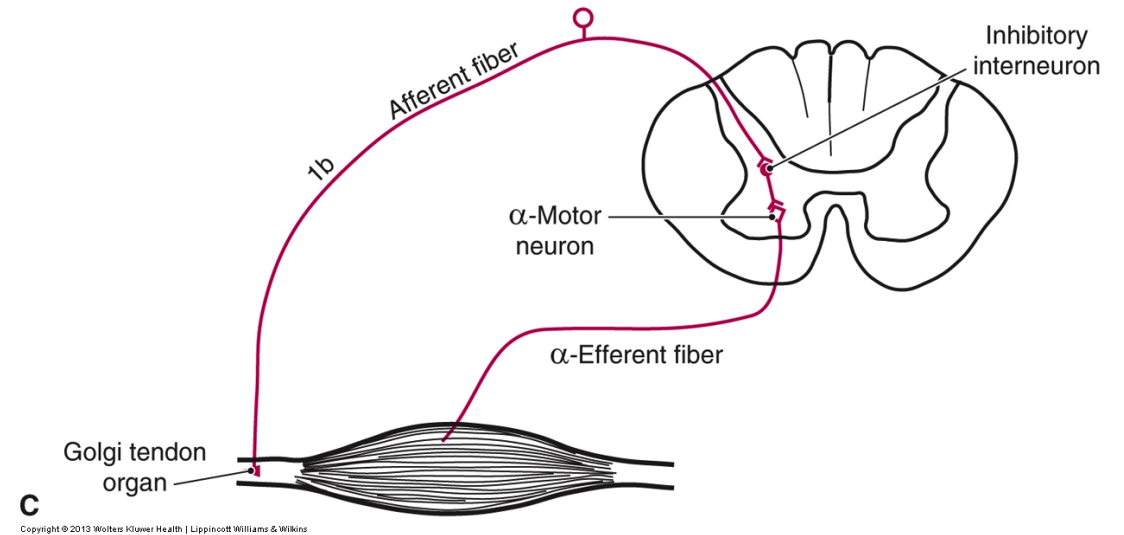


# Performance of Dry Needling

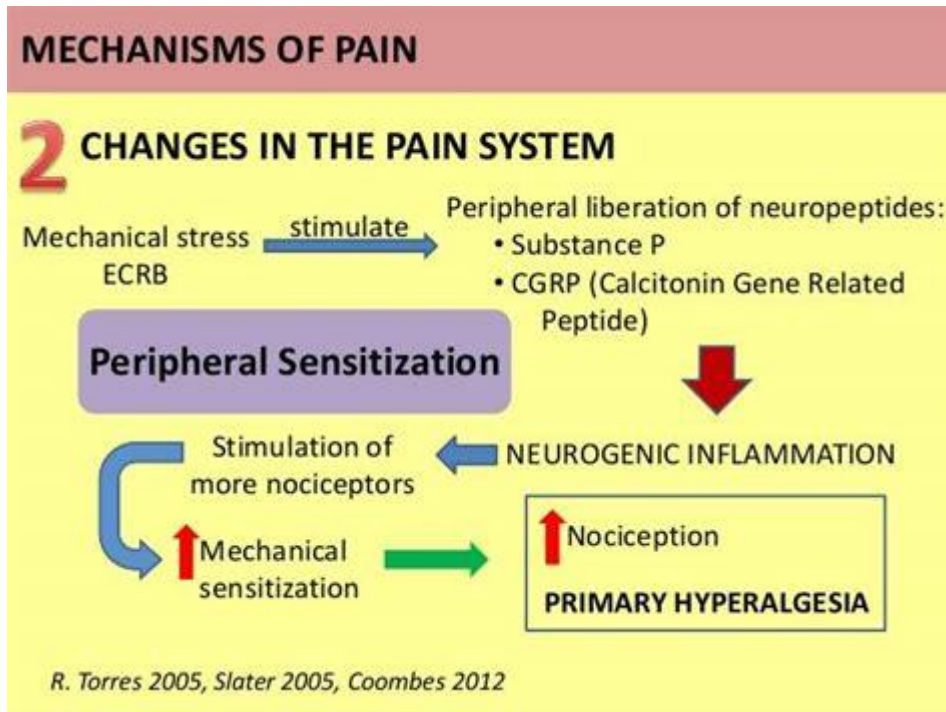


# Mechanism of Dry Needling

- Neuromuscular response
  - Motor endplate irritability is correlated with pain intensity.
    - Needling provides high pressure mechanical stimuli to "sensitive loci" or the sensitized afferent nerve fibers.
    - This stimulates alpha-motor neurons at the spinal cord to break the cycle of irritability.



# Mechanism of Dry Needling



- Circulatory response
  - Vasodilation
    - Creates "wash out" scenario
    - Reduces Substance P (SP)
    - Calcitonin gene-related peptide (CGRP) increases vasodilation to increase delivery of B-endorphins.



# Post Needling Soreness

- Effects of spray and stretching after needling
  - Performed upper trap stretch in addition to 3-5 sweeps of ethyl chloride spray and repeated 2-3 times.
  - Results:
    - Significantly reduced VAS rated soreness at 6 hours post needling.
    - No significant difference 6-72 hours post needling.
- Psychological factors influencing post needling soreness
  - Effects of catastrophic thinking, kinesiophobia, pain anxiety, and fear of pain
  - Results:
    - Catastrophic thinking was associated with lower levels of soreness.
    - Pain-related anxiety was linked to greater soreness.

Martin-Pintado-Zugasti, A et al, 2014

Martin-Pintado-Zugasti, A et al, 2017

# The Local Twitch Response

- What is a local twitch response?
  - "LTR is characterized by a visible contraction of part of the taut band in the involved muscle upon mechanical stimulation with needling or palpation to a sensitive site in a trigger point region."
- What is pistoning?
  - It is a "fast-in and fast-out" movement of the needle in a fan or cone pattern performed to the taut band or trigger point
- What is winding?
  - It is a rotation of the needle once inserted into the taut band or trigger point.
  - Pistoning and winding can be performed together to enhance stimulation to the receptors and elicit an LTR.



# Is a Local Twitch Response Needed?

- Review of 6 prior studies

- LTR

- High nerve irritability broken by stimulating afferent fibers
    - No conclusive evidence LTR was needed

- Poor short term results and no long term results
    - Winding may be just as or more effective than pistoning.
    - Amount of pistoning correlated to increased post needling soreness
    - Study by Cagnie et al, 2012 showed a 72% increase in upper trap blood flow for 15 post needling and it stayed elevated for 60 min post.

# Comparative Treatment Options

- Systematic review of 15 studies
  - Treatment of myofascial pain syndrome, mechanical neck pain, temporomandibular pain, and total knee arthroplasty
- Effects on pain intensity:
  - DN vs. Sham/control
    - DN had better short term reduction in pain
  - DN vs. Pharmacological Intervention (wet needling)
    - Similar results in short term, inconclusive in medium and long term
  - DN vs. Manual Therapy
    - Similar effects

# General Overview

- Effects of DN on secondary outcomes:
  - DN vs Sham/Control:
    - DN is effective in the short term for improving Pressure Pain Threshold (PPT), quality of life, and improving ROM of the neck and shoulder.
    - No improvement in ROM for temporomandibular joint and knee.
    - Insufficient evidence for effects on disability, medication intake, and sleep quality.

- DN vs Pharmacological Interventions:
  - Similar effects on ROM and quality of life.
  - Insufficient evidence on PPT, depressive symptoms, sleep quality and medication intake.
- DN vs manual therapy:
  - Similar effects on PPT, ROM, and disability.

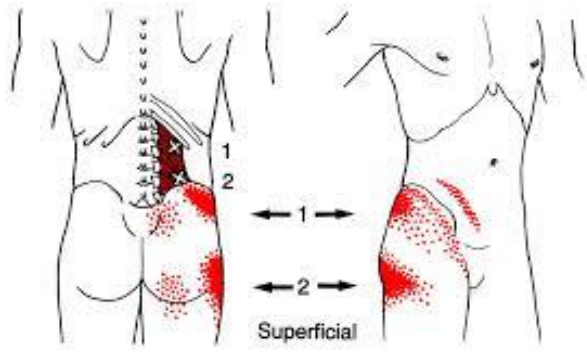
# Talking to the Young Athlete

- Trigger Point and Taut Bands
- The needle
- The "poke"
- What it might feel like
- Why they should do it
- What to expect after

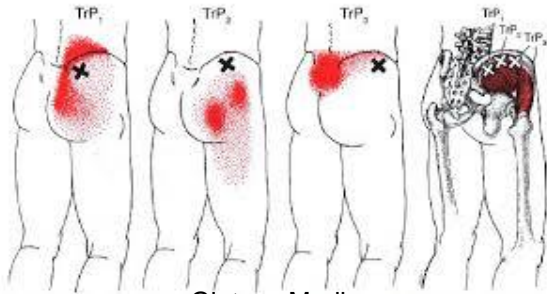
If at ANY point you want to  
**STOP, we STOP.**

**MY BODY  
MY RIGHTS**

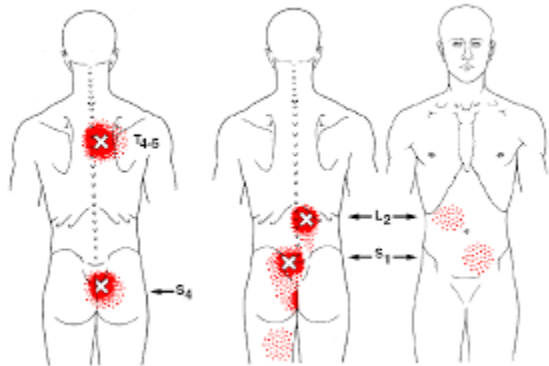
# Back Pain



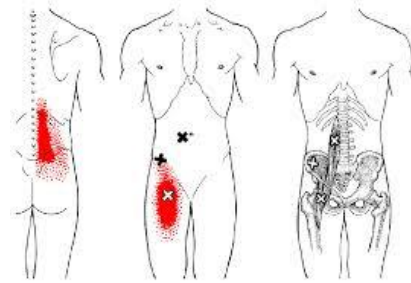
Quadratus Lumborum



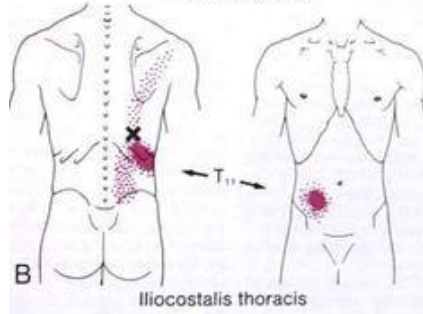
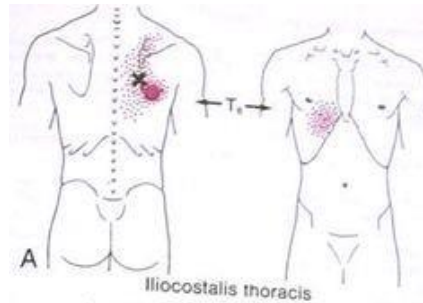
Gluteus Medius



Multifidi



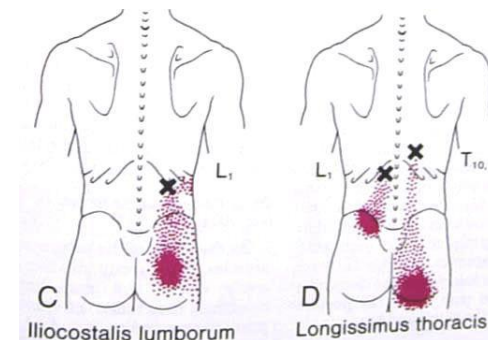
Psoas Major



- Dry needling vs. classic PT on chronic low-back pain.
  - Test group: Dry needling to gluteus medius, quadratus lumborum, multifidus, and erector spinae plus massage.
  - Results:
    - Decreased TrP number and sensitivity in DN group.
    - Significant changes in depression in DN group vs control.

# Back Pain Case Study

- 12-year-old male soccer player (goalie)
- Chronic low back pain >6 months located in lower thoracic and upper lumbar spine on the left
- Imaging showed concerns for irregularity at L5
- Pain with trunk forward and backward bending.
- Dry needling completed to left longissimus and iliocostalis.
- Immediate decrease in pain
- Increase in trunk backward bending

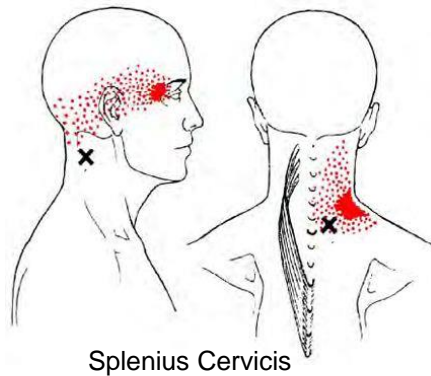


# Back Pain Case Study

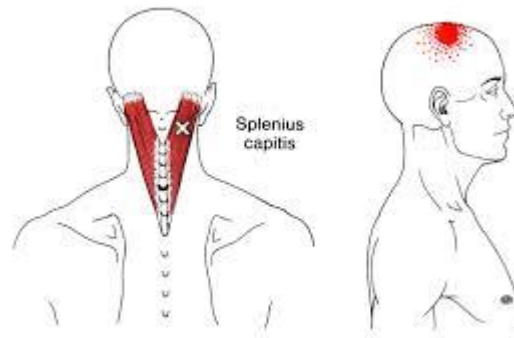


# Neck and Headache Pain

- Chronic tension type headache and referred pain
  - 100% had multiple active trigger points.
  - Referred pain: neck>head

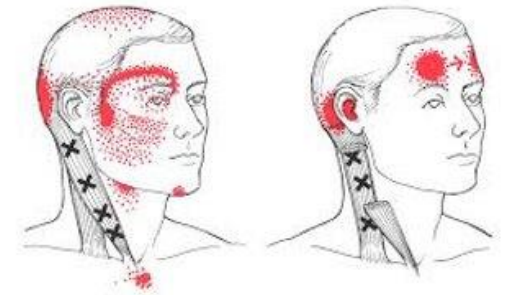


Splenius Cervicis



Splenius capitis

- Most common muscles impacted:
  - Suboccipitals
  - Upper trapezius
  - Sternocleidomastoid (SCM)
  - Splenius Capitis
  - Levator Scapulae
  - Superior Oblique



Sternocleidomastoid

Fernandez-de-las-Penas, 2010



# Neck and Shoulder Pain

- Survey of 72 people with shoulder pain showed:
  - Active trigger points
    - Infraspinatus – 77%
    - Upper Trapezius – 58%
  - Latent trigger points
    - Teres Major – 49%
    - Anterior Deltoid – 38%
- Dry needling vs. Control/Sham
  - Needling superior in short and medium term
  - No difference in long term
- Dry needling vs. Wet Needling
  - Wet needling superior in medium term
  - No difference in short or long term

Liu et al, 2015

# Neck Pain Case Study

- 16-year-old female cheerleader
- Practicing as a base when a flyer landed on her neck and shoulder
- Diagnosed with neck strain and referred to physical therapy
- Pain on left with decreased and painful side bend right, and right rotation
- Dry needling: left upper trap, left splenius capitis and cervicis, and left cervical multifidi
- Immediate improvement in AROM
- Improvement in pain by next visit

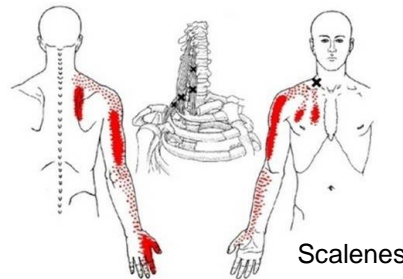
# Neck Pain Case Study



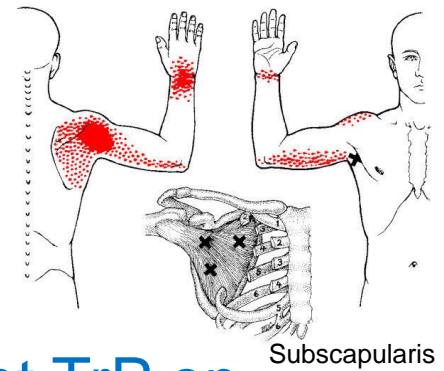
# Shoulder Pain

- Elite swimmers unilateral shoulder pain
  - Studied active and latent trigger points
  - Levator scapulae, upper trapezius, infraspinatus, SCM, scalenes, and subscapularis
  - More active TrP in those with shoulder pain than without

Hidalgo-Lozano et al (2011)

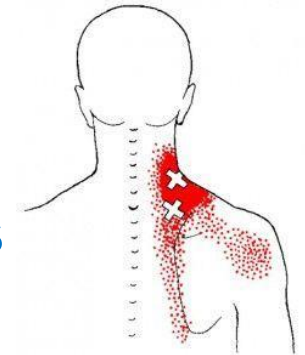
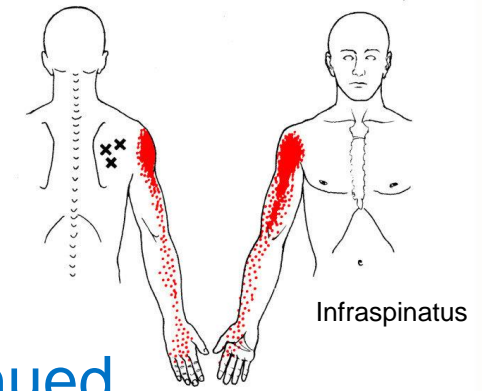


- Scapular elevation
  - Studied effect of latent TrP on muscle activation pattern during scapular elevation
  - Trapezius, serratus anterior, levator scapulae, rhomboids, pectoralis minor, infraspinatus, and middle deltoid
  - Presence of latent TrP altered muscle activation pattern during elevation

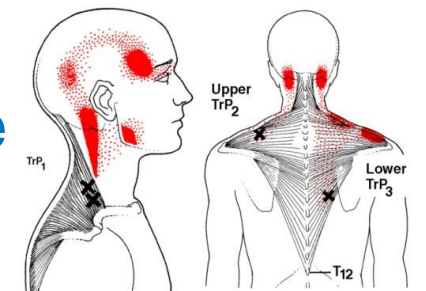


# Shoulder Case Study - 1

- 14-year-old female swimmer
- Chief complaint of left shoulder pain and popping
- Previous PT intervention with no improvement in pain and continued compensation patterns
- Referred for dry needling
- Dry needling: Left upper trapezius, levator scapulae, and infraspinatus followed by focused therapeutic exercise.
- Following two sessions patient had 1/10 pain with decreased compensation patterns
- After third session the patient returned to full competition pain free



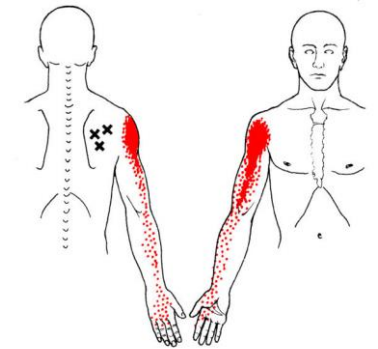
Levator Scapulae



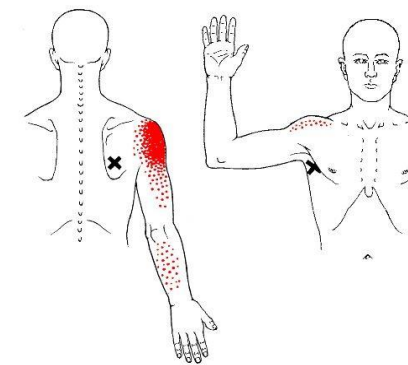
Upper Trapezius

# Shoulder Case Study - 2

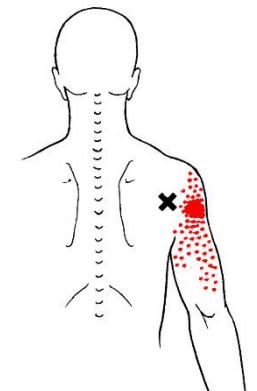
- 18-year-old cheerleader
- Boating accident with left bicep trauma
- Chief Complaint: Left arm pain and decreased active shoulder elevation
- Interventions: Aquatic and land based physical therapy
- Dry needling: Upper Trapezius, Infraspinatus, Teres Major and Minor, and Middle Trapezius
- Immediate improvement in AROM and pain



Infraspinatus



Teres Major



Teres Minor

# Shoulder Case Study 2



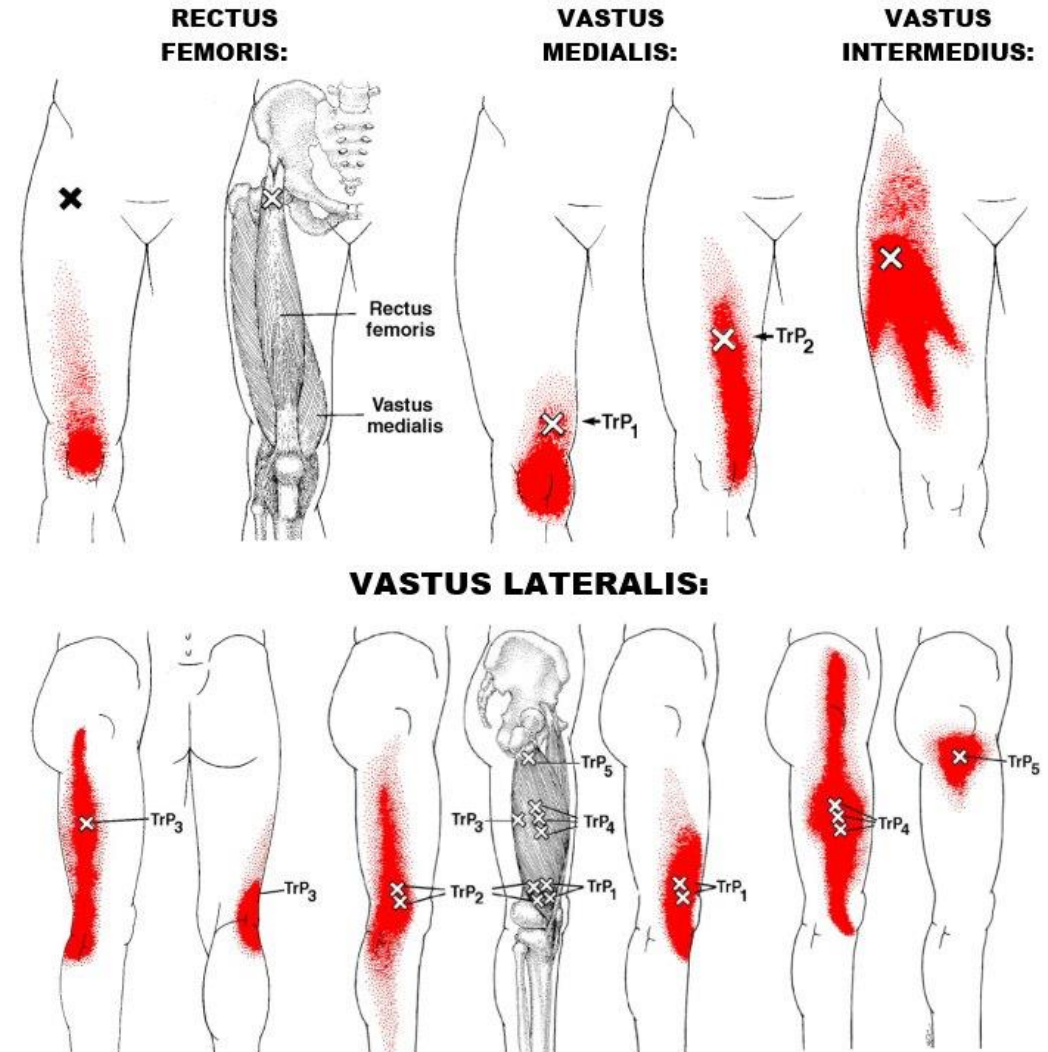
# Muscle Performance

- Volleyball players unilateral shoulder pain
  - Month long tournament
  - Measured range, pain, strength
  - Dry Needled: Infraspinatus and teres minor
  - All scores improved despite continuing to participate in tournament
- Review of needling on muscle force production
  - No change in force production after needling
  - Possible increase in cervical isometric strength in sedentary individuals



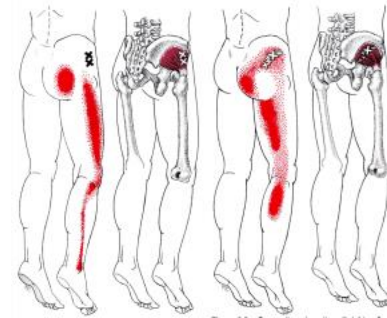
# ACL and Knee Pain

- Study on quadriceps late stage ACL rehabilitation
  - EMG and passive mechanical properties before and after dry needling
  - Results:
    - Flexion AROM improved
    - Decreased resting activation of vastus lateralis
    - Decreased resistance of vastus medialis
    - Changes in pain

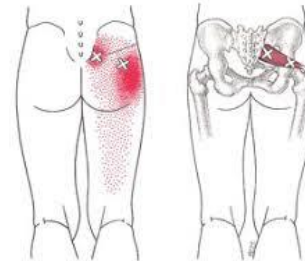


# Hip Pain

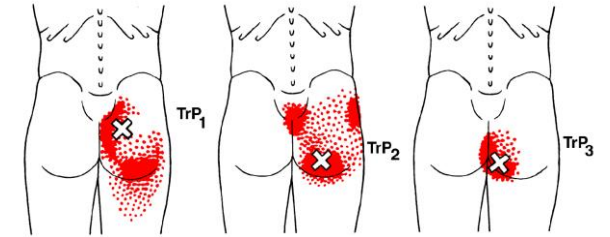
- Lateral hip and thigh pain
  - Studied dry needling, stretching, and strengthening on pain and function
  - Assessed immediately after study and at 12 months
  - Improvements in pain, sleep, and functional mobility



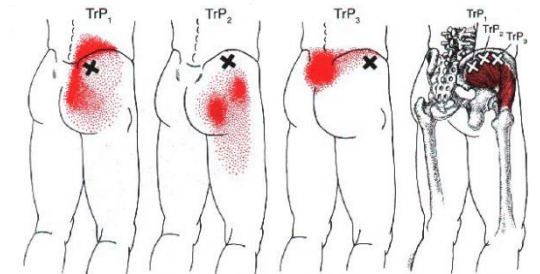
Gluteus Minimus



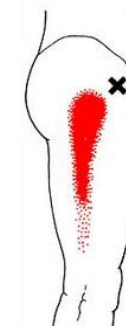
Piriformis



Gluteus Maximus



Gluteus Medius



TFL

# Effects of Dry Needling on Muscle Strength and Joint ROM

- Elite soccer players
  - Effects on thigh muscle strength and hip flexion range of motion
  - Dry needling plus water pressure massage vs placebo laser plus water pressure massage
- Results:
  - Improved muscular endurance of knee extensors and hip flexion for 4 weeks post needling
  - Improved hip flexion range of motion for 4 weeks post needling
  - Improved hip extension force production
  - No reduction in muscle injuries

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