TINNITUS
OF MYOFASCIAL ORIGIN

Erik Wijtmans, PT, MTC, CGIMS, CMTPT

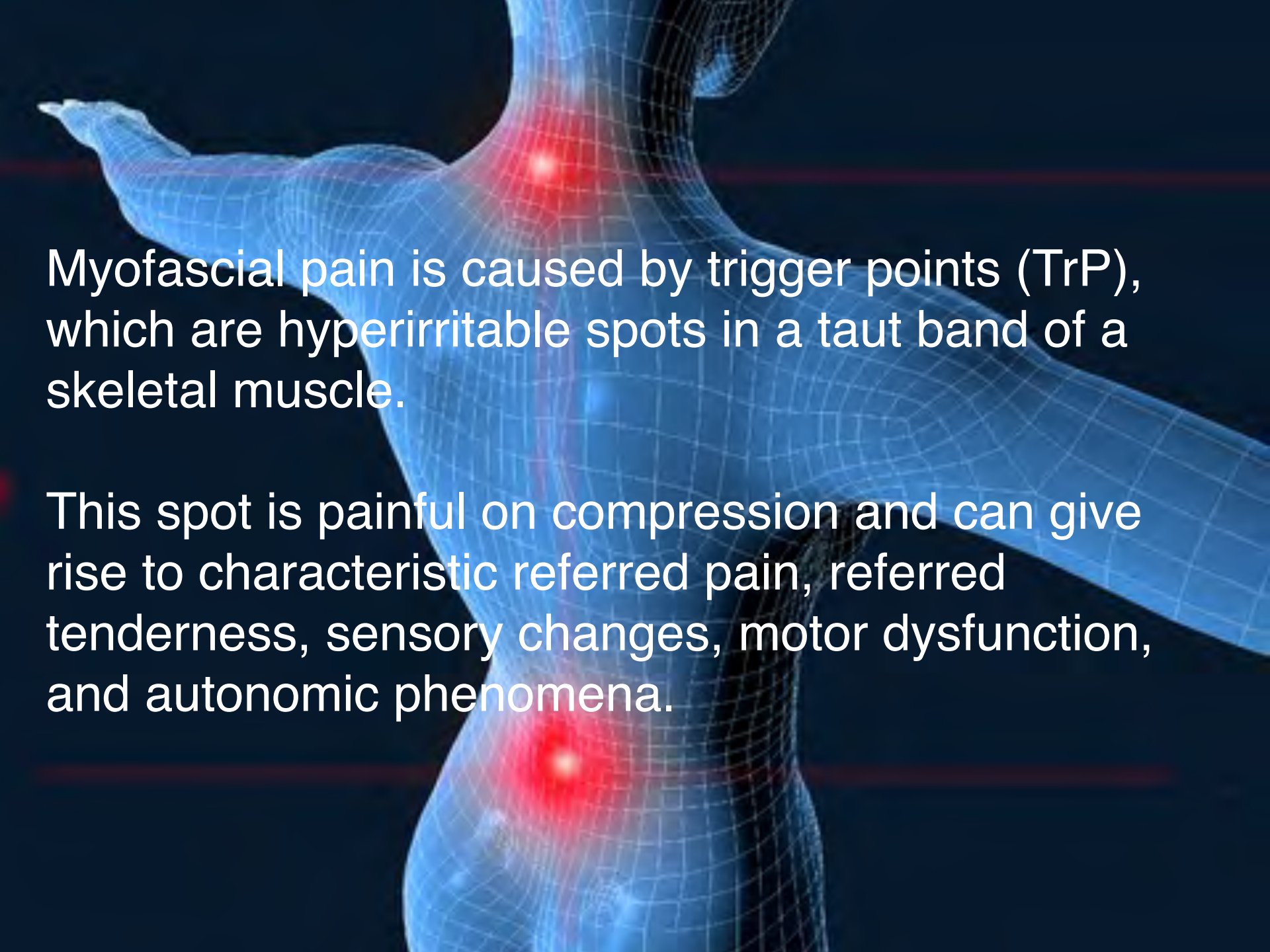
Faculty at Old Dominion University, Norfolk, VA
Founding Partner of The Therapy Network, Virginia Beach, VA
Senior Instructor and Examiner at Myopain Seminars, Bethesda, MD

TRI 2015 Conference, Ann Arbor, MI June 7 – 10, 2015

Outline

- Myofascial Pain and Dysfunction
- Trigger points
- Myofascial referral patterns – Which muscles are involved with tinnitus?
- Other myofascial symptoms in the head and neck
- Physical examination
- Treatment
- Rationale of obtaining a Local Twitch Response
- Missing piece of the puzzle
- Q&A

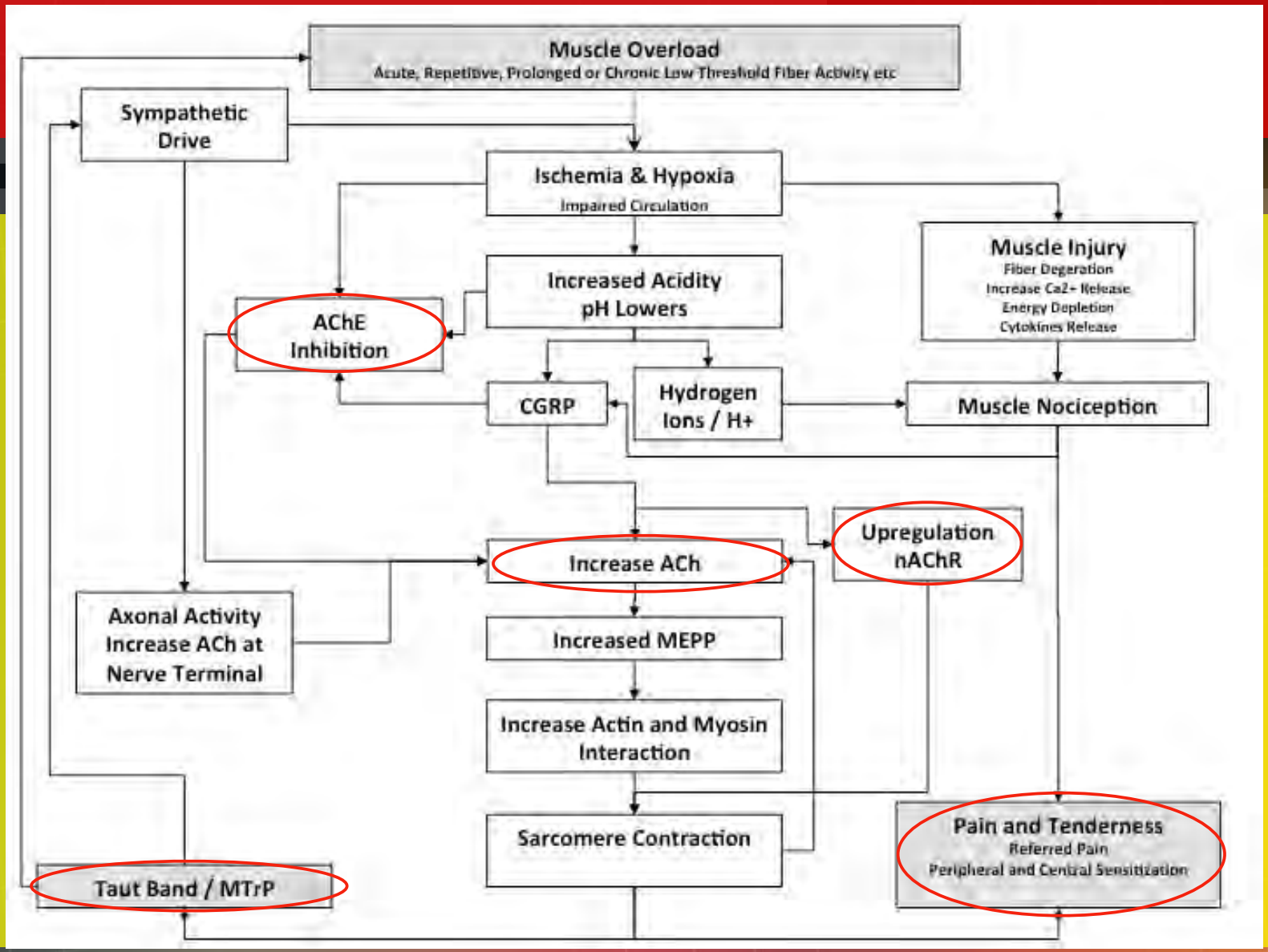
What is Myofascial Pain?



Myofascial pain is caused by trigger points (TrP), which are hyperirritable spots in a taut band of a skeletal muscle.

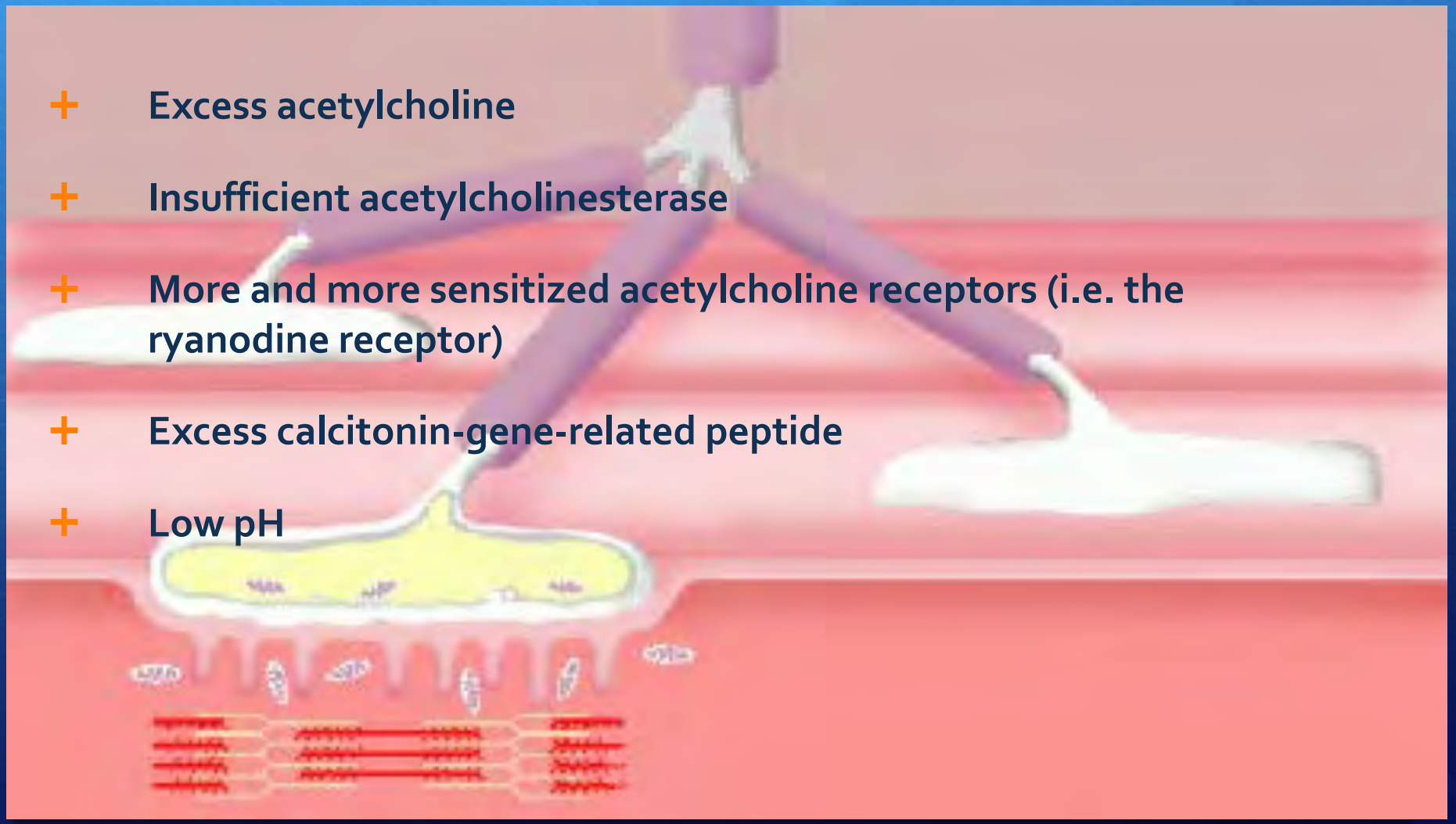
This spot is painful on compression and can give rise to characteristic referred pain, referred tenderness, sensory changes, motor dysfunction, and autonomic phenomena.

Integrated Trigger Point Hypothesis

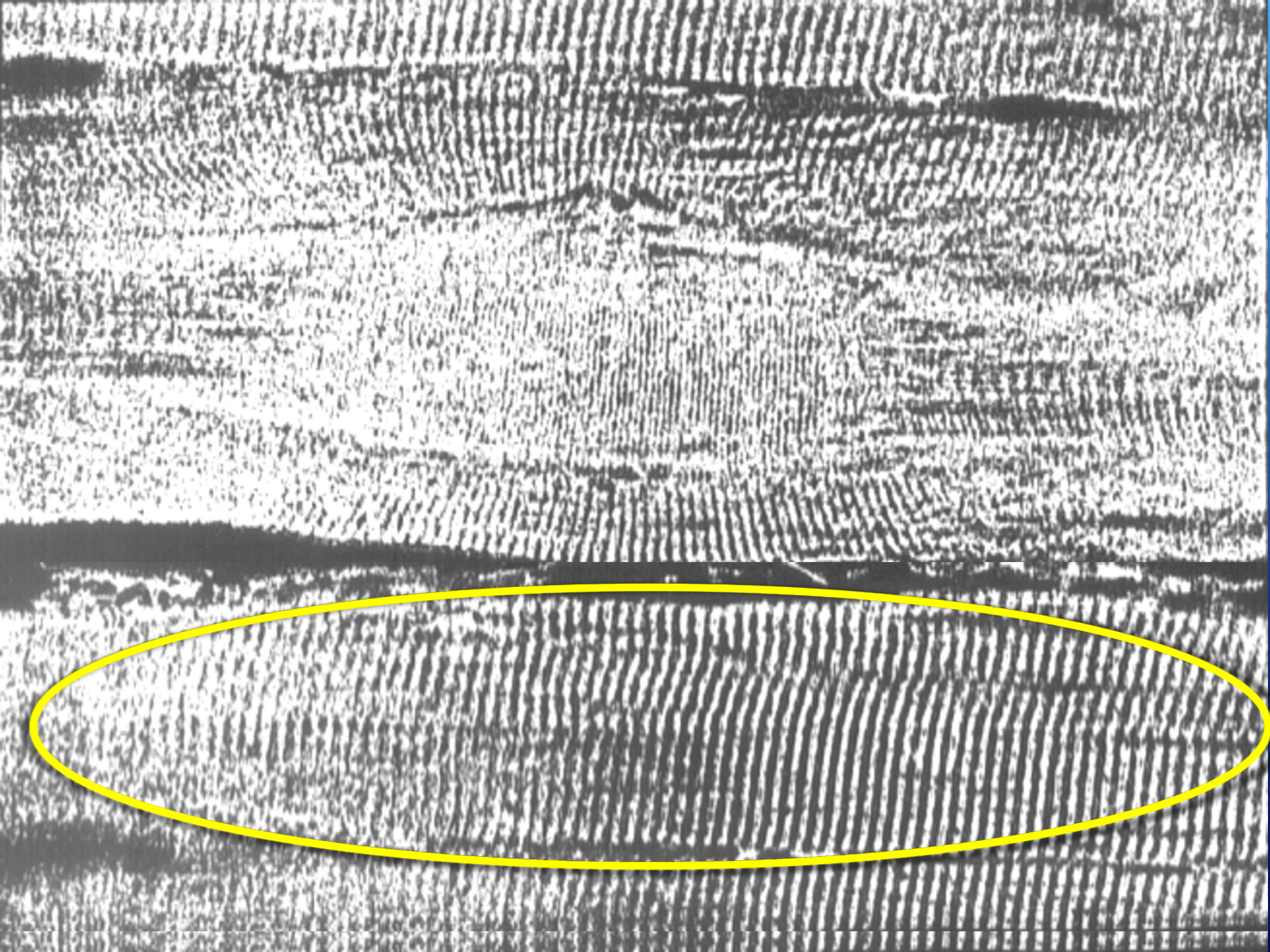


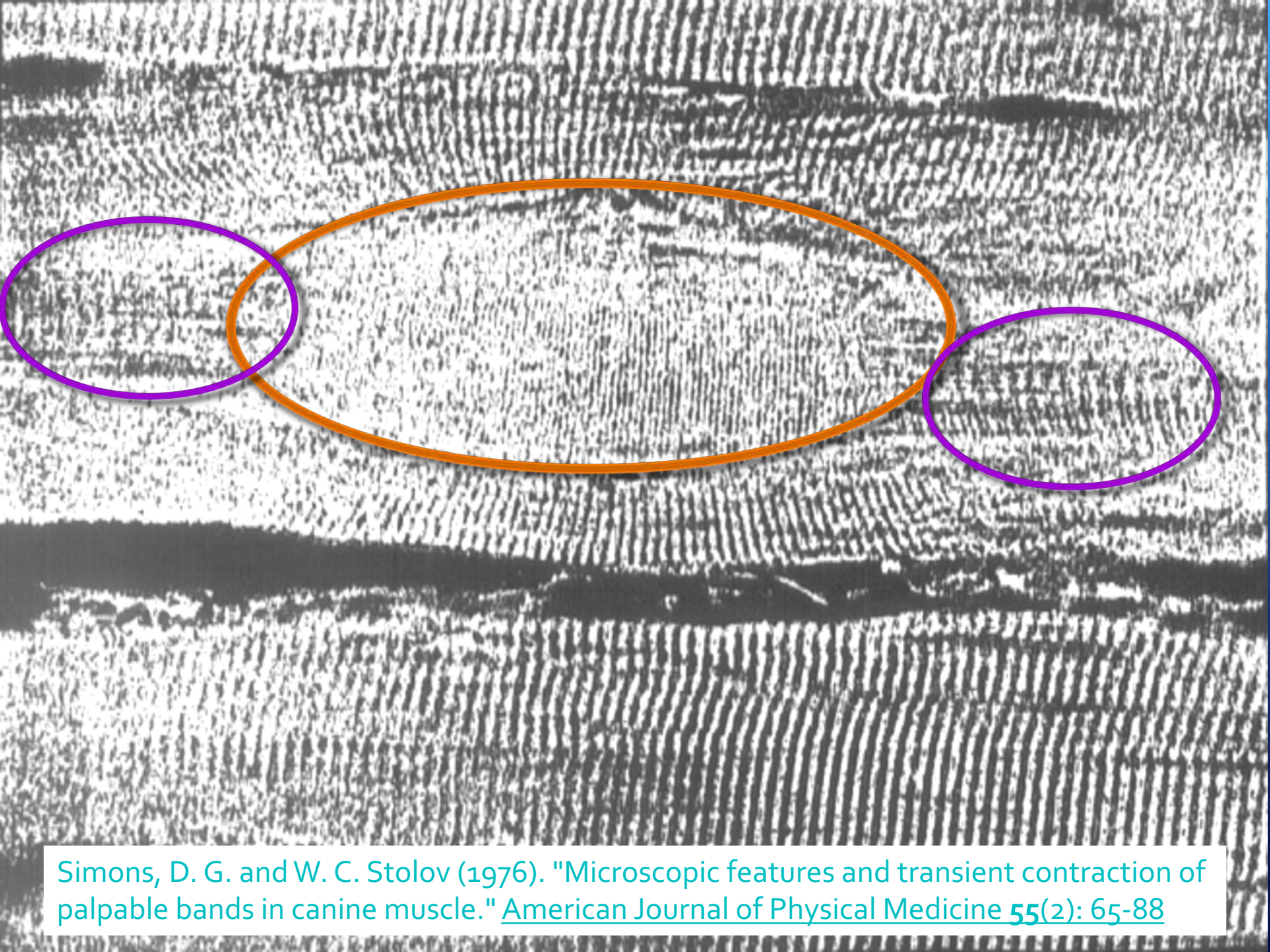
Dommerholt, J. and McEvoy, J., Myofascial Trigger Point Release Approach, in Orthopaedic Manual Therapy; from Art to Evidence, C. Wise, Editor., F.A. Davis: Philadelphia, in press.

Formation of a Myofascial Trigger Point



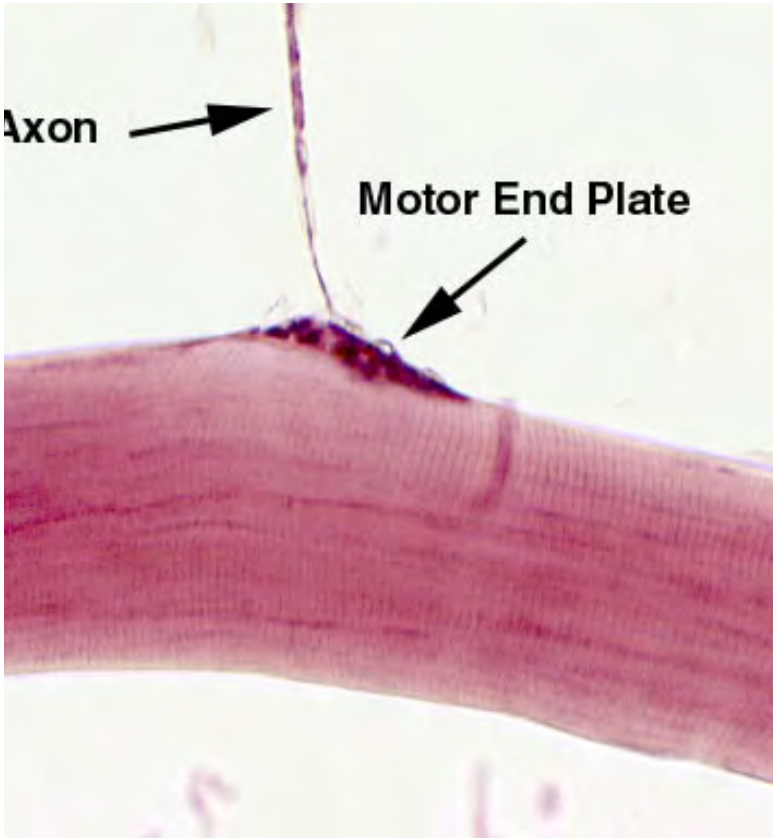
- Excess acetylcholine
- Insufficient acetylcholinesterase
- More and more sensitized acetylcholine receptors (i.e. the ryanodine receptor)
- Excess calcitonin-gene-related peptide
- Low pH

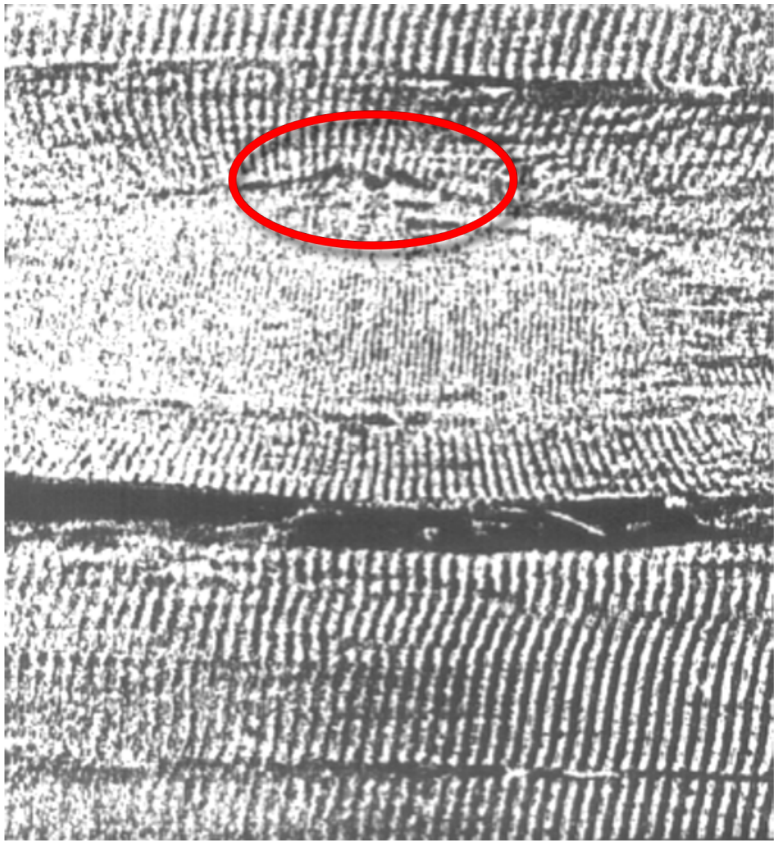


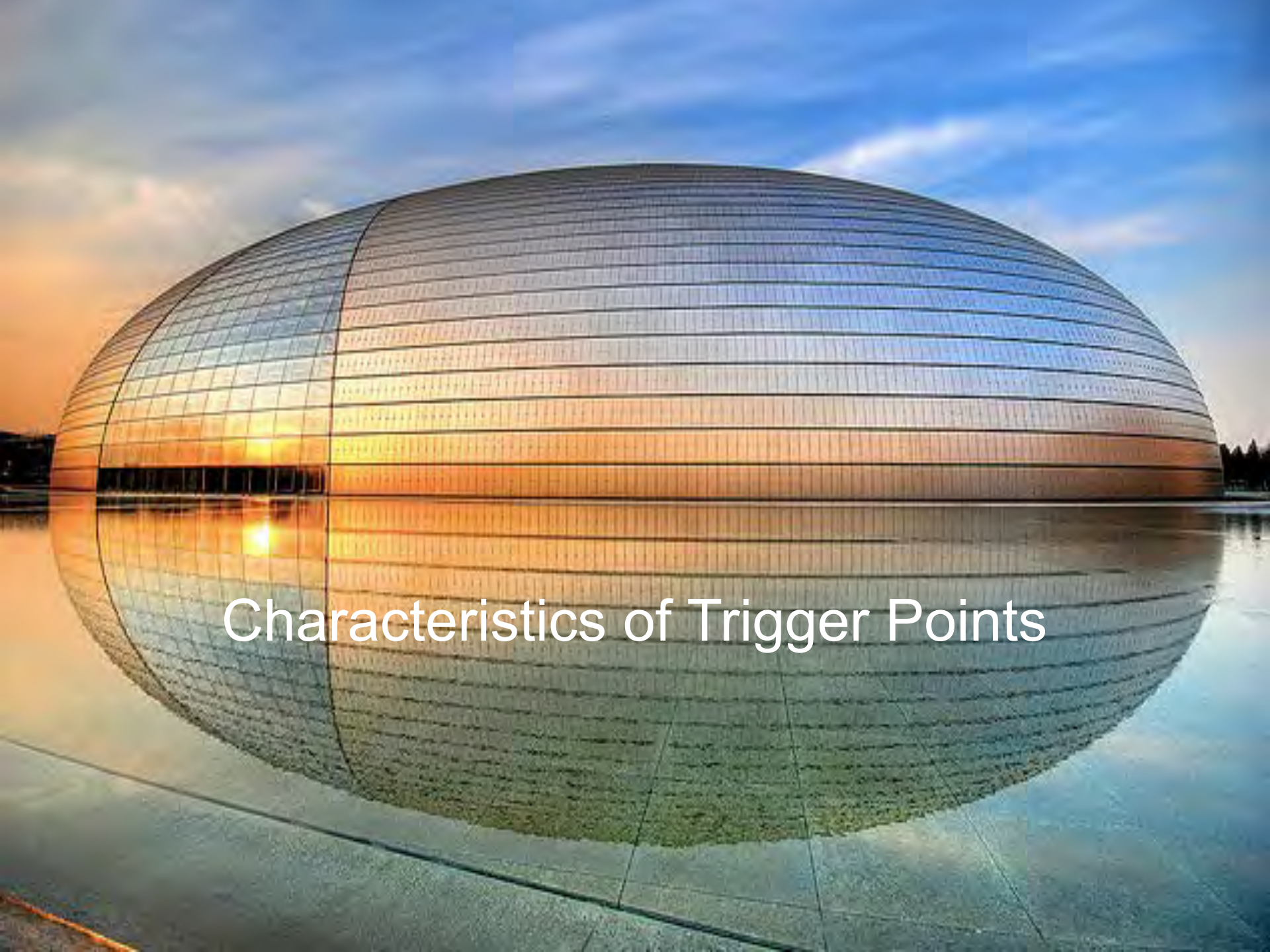


Simons, D. G. and W. C. Stolov (1976). "Microscopic features and transient contraction of palpable bands in canine muscle." American Journal of Physical Medicine **55**(2): 65-88

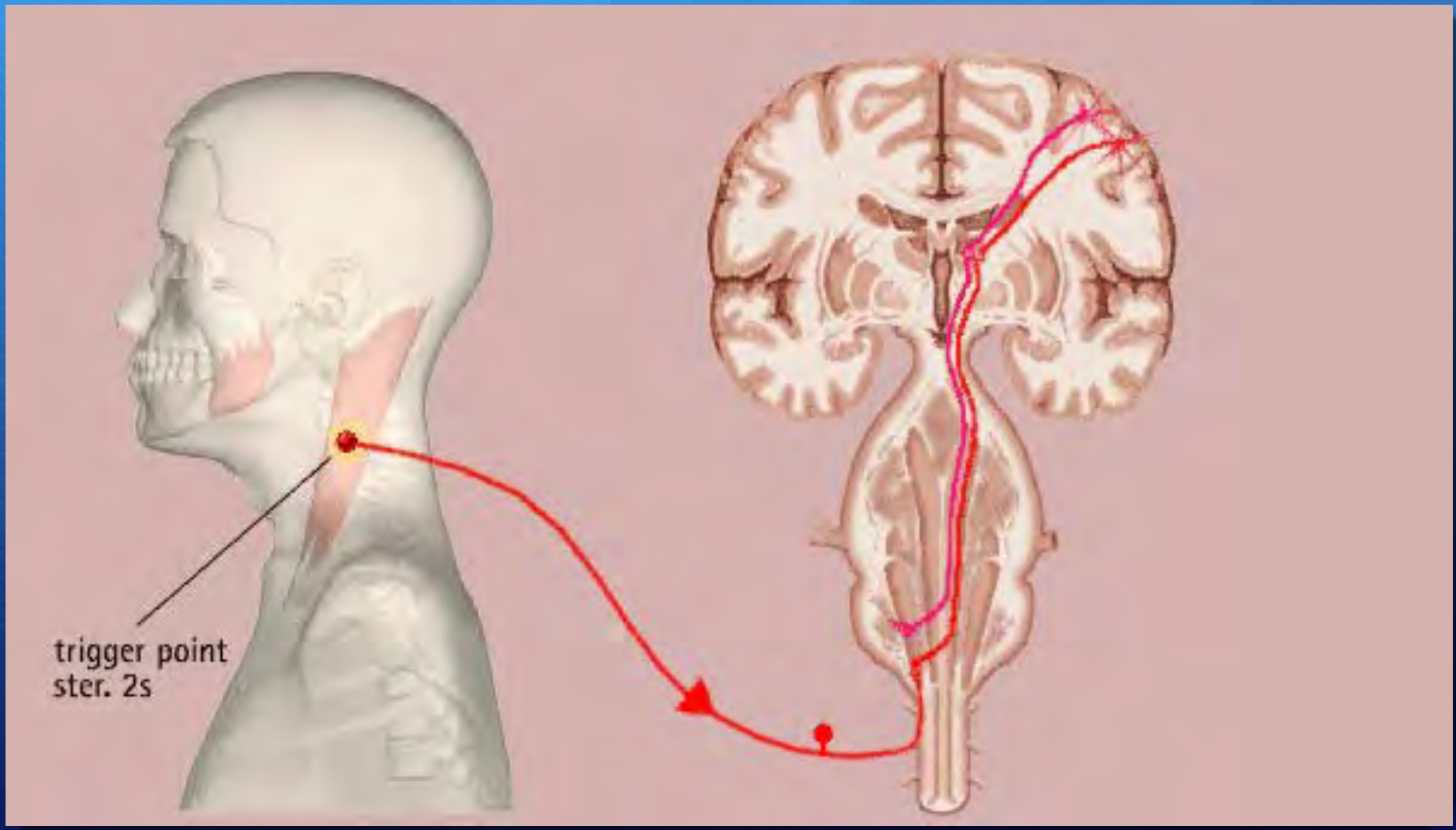
Motor Endplate





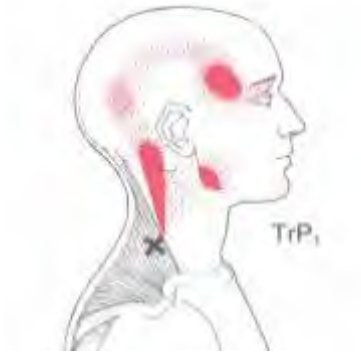

Characteristics of Trigger Points

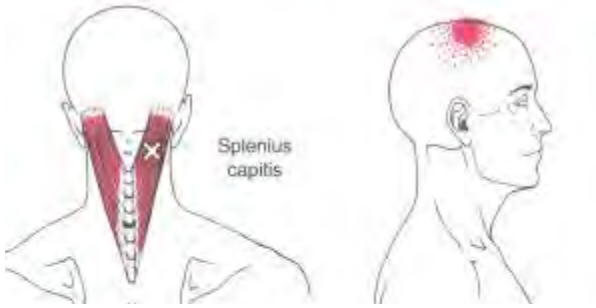
Expansion of Receptive Field



Sensory

- Local tenderness
- Referral of pain and other symptoms to a distant site
  - I.e. Tinnitus
- Peripheral sensitization
- Central sensitization
  - Hypersensitivity
  - Allodynia





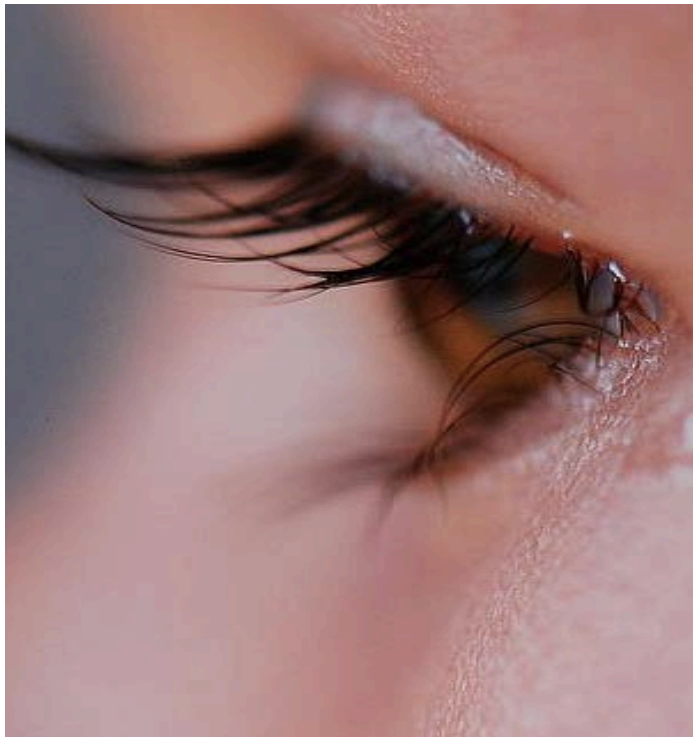
Motor

- Disturbed motor function
- Muscle weakness as a result of motor inhibition
- Muscle stiffness
- Restricted range of motion

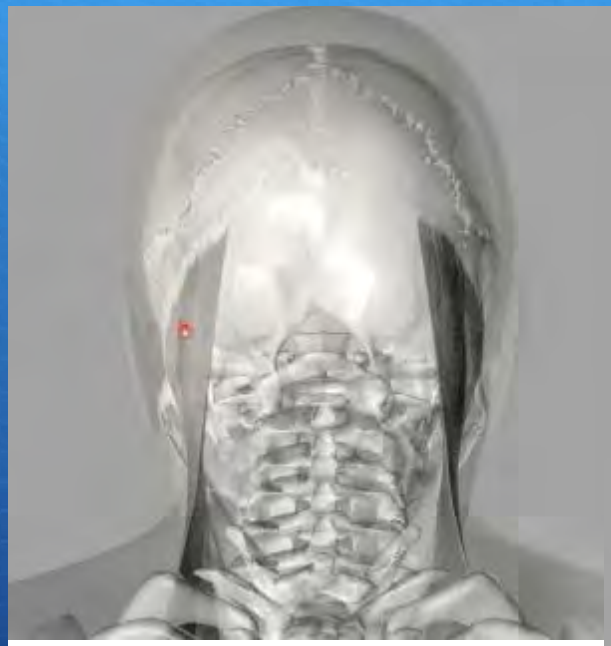
Autonomic

- Vasoconstriction
- Vasodilatation
- Lacrimation
- Piloerection

among others

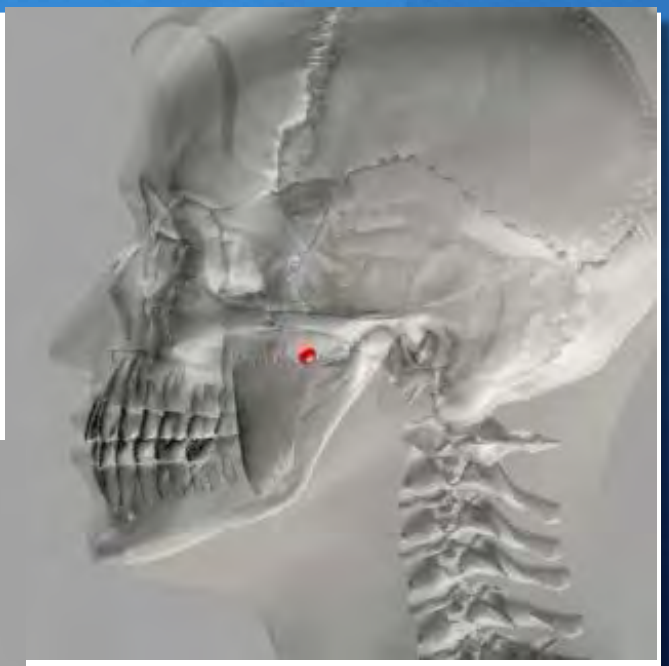


Referred Symptoms



Sternocleidomastoid muscle

Courtesy Hans-Werner Weisskircher



Masseter muscle

Lateral Pterygoid muscle

Otolaryngic Myofascial Pain Syndromes

William S. Teachey, MD

General otolaryngology practice:

A study of 257 consecutive new patients who presented with a variety of common ENT complaints.
106 or 41% of patients had myofascial trigger points attributed as the main cause of their symptoms.

Current Pain and Headache Reports 2004, 8:457–462

ENT Symptoms of MF origin

Table 1. Breakdown of various presenting symptoms of myofascial dysfunction in 106 patients

Symptom	Patients with symptom, n*	Patients with symptom, %
Facial or sinus pain	43	41
Ear pain	39	37
Hearing loss; ear blockage; ear fullness	22	21
Dizziness	19	18
Neck pain	17	16
Tinnitus	15	14
Headache	14	13
Throat discomfort	11	10
Pain in teeth/gums	2	2
External ear canal paresthesia	2	2
Nasal congestion	1	1
Facial paresthesia	1	1

*Many patients presented with more than one symptom.

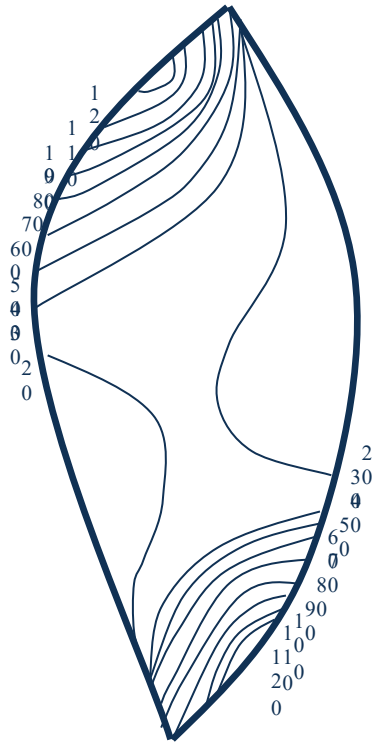
Teachey, WS. Otolaryngic myofascial pain syndromes. Curr Pain Headache Rep. 2004 Dec;8(6):457-62.

How do you develop TrP's?

Etiology of TrP's

Muscle overload is thought being the result of:

- **Uneven intra-muscular pressure distribution**
- Sustained low-level muscle contractions
- Repetitive low-level muscle contractions
- Eccentric muscle contractions
- Submaximal concentric muscle contractions
- Maximal concentric muscle contractions



Bron C, Dommerholt J, 2012 Etiology of Myofascial Trigger Points Curr. Pain and Headache Rep 16, 439-444

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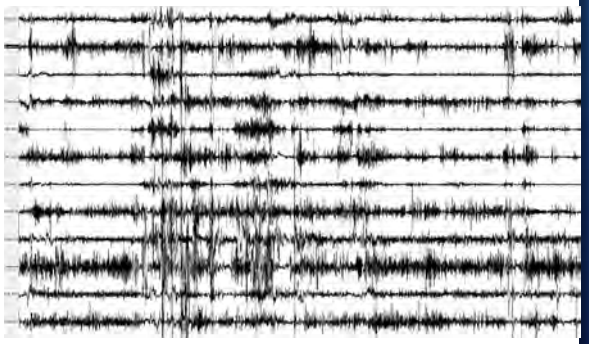

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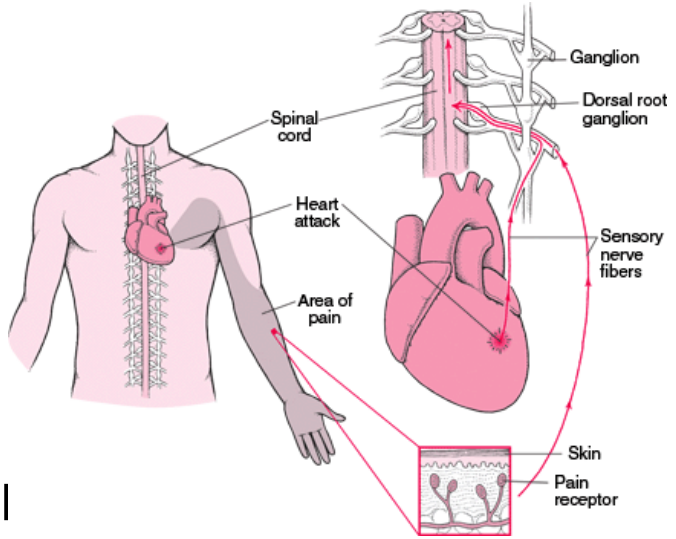
Other Contributing Factors

- **Direct Trauma**
- Persistent Muscular Contraction (emotional or physical cause)

  i.e,: poor posture, repetitive motions
- Stress / Tension
- Prolonged Immobility
- Systemic Biochemical Imbalance
- Afferent Input from Joints
- Afferent Input from Internal Orga



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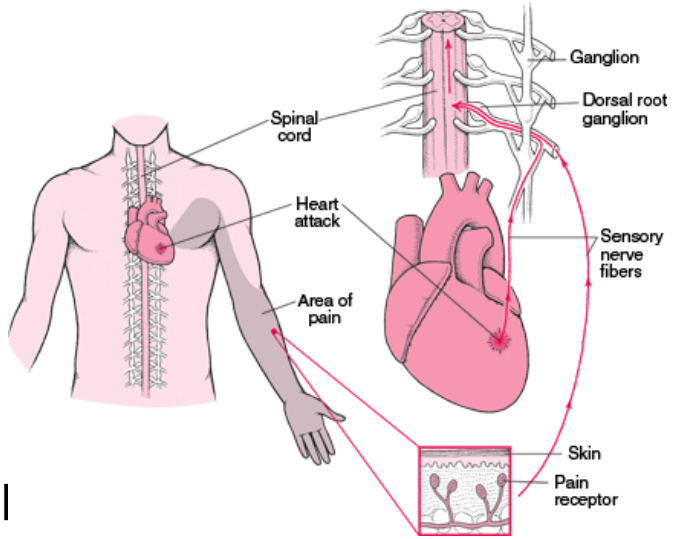

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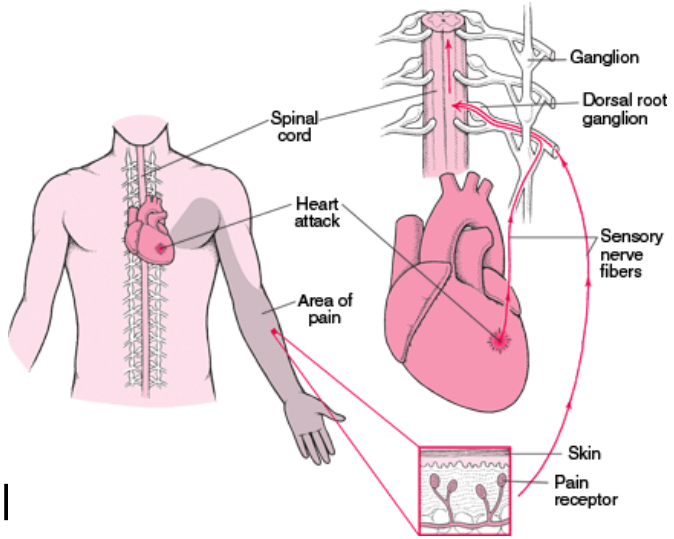

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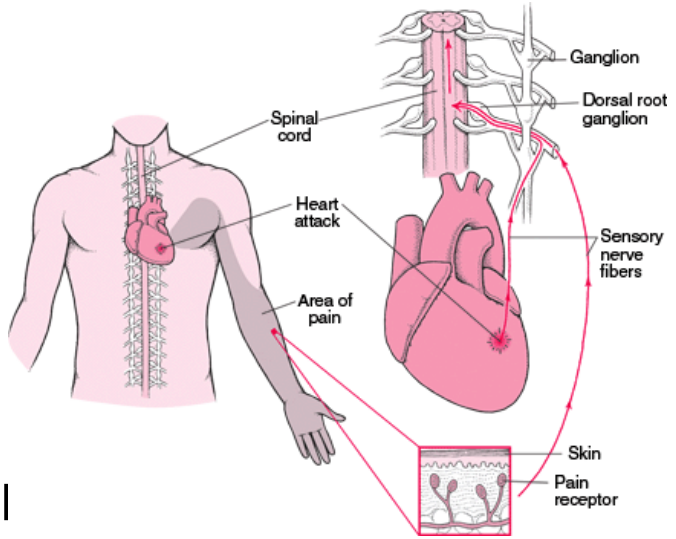

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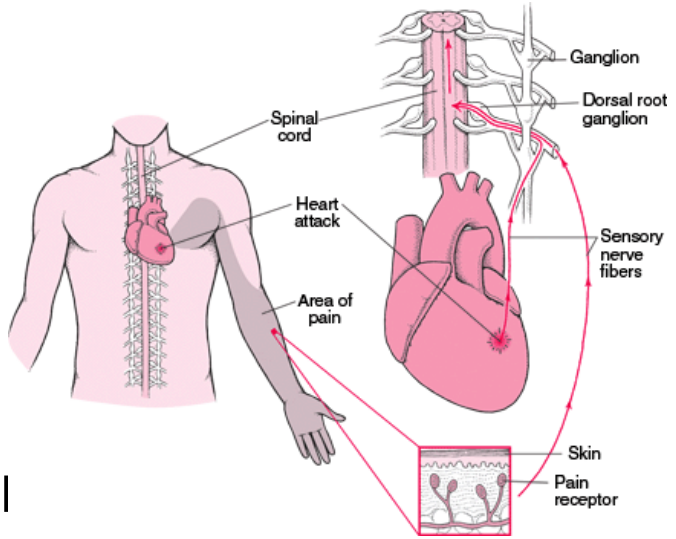

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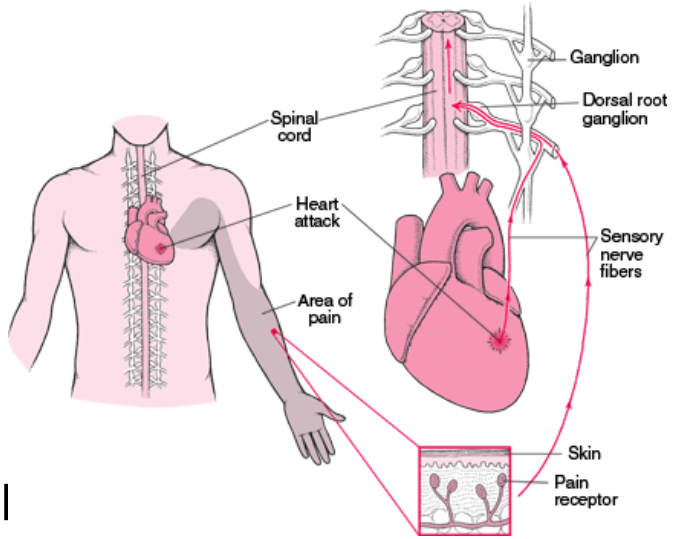

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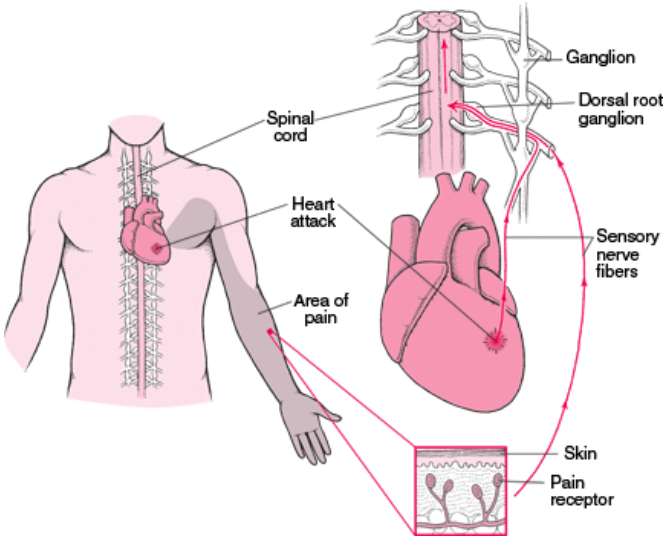
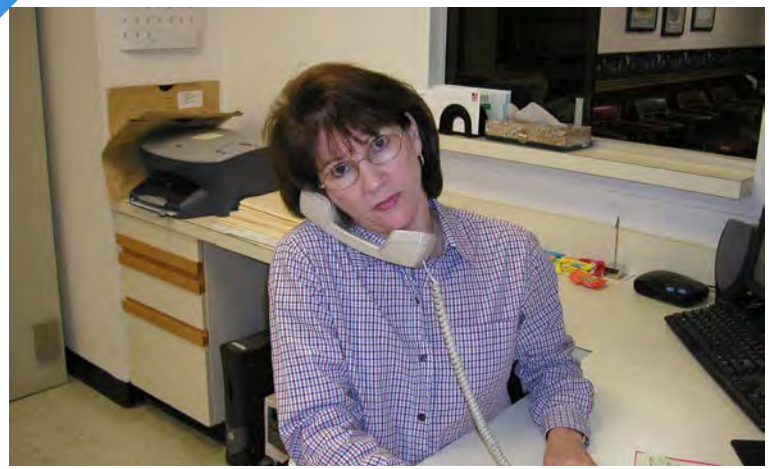


Posture



How do you identify TrP's?

Palpation !!

- Taut band within the muscle
- Exquisite tenderness at a point within the taut band
- Reproduction of the patient symptoms with digital pressure
  - Often, but not necessarily
  - Might need to hold pressure for 5-7 seconds

THIS IS THE ONLY WAY!

- They will NOT show up in
  - Radiographs
  - CT
  - MRI
  - Bloodwork

Flat Palpation
E.g. Masseter Muscle

Pincer Palpation
E.g. SCM muscle

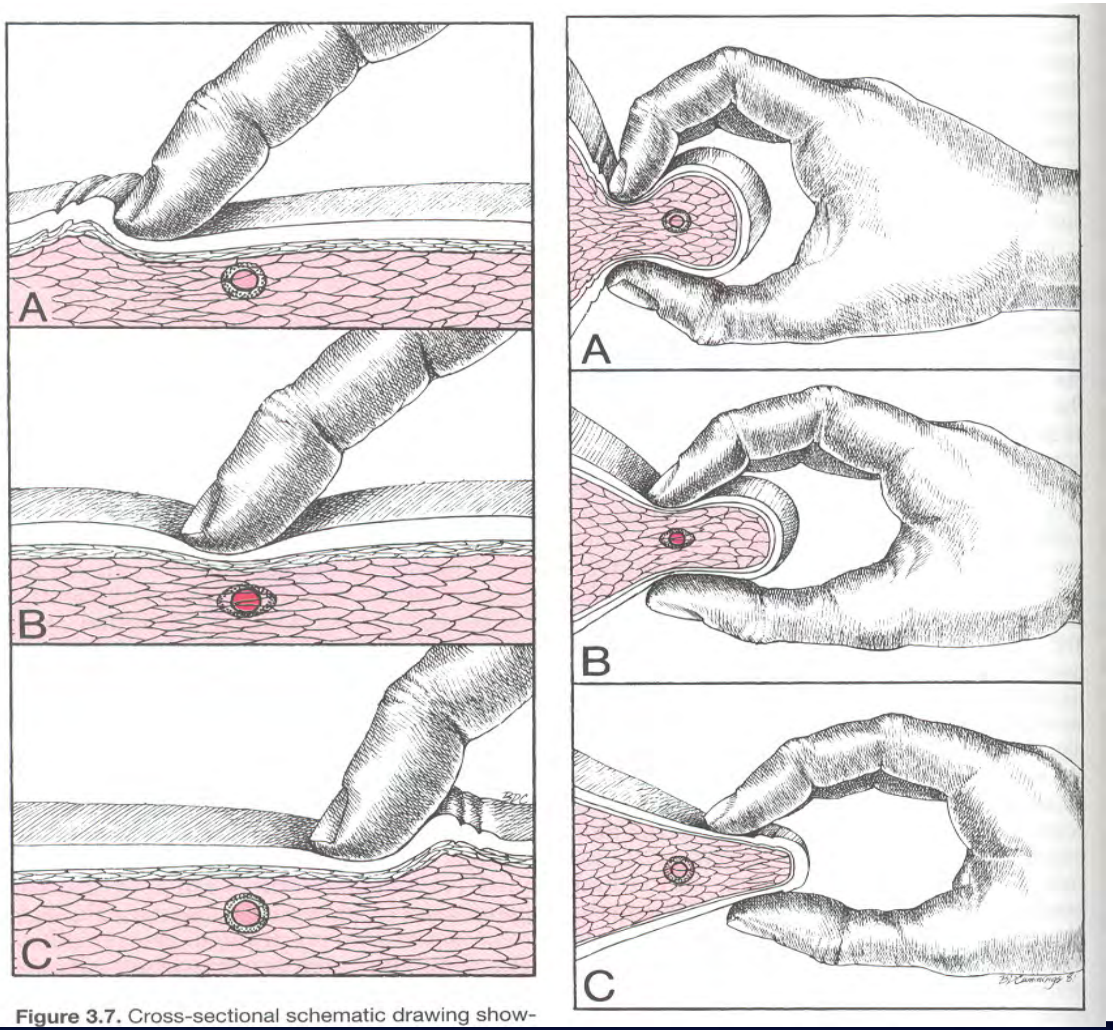
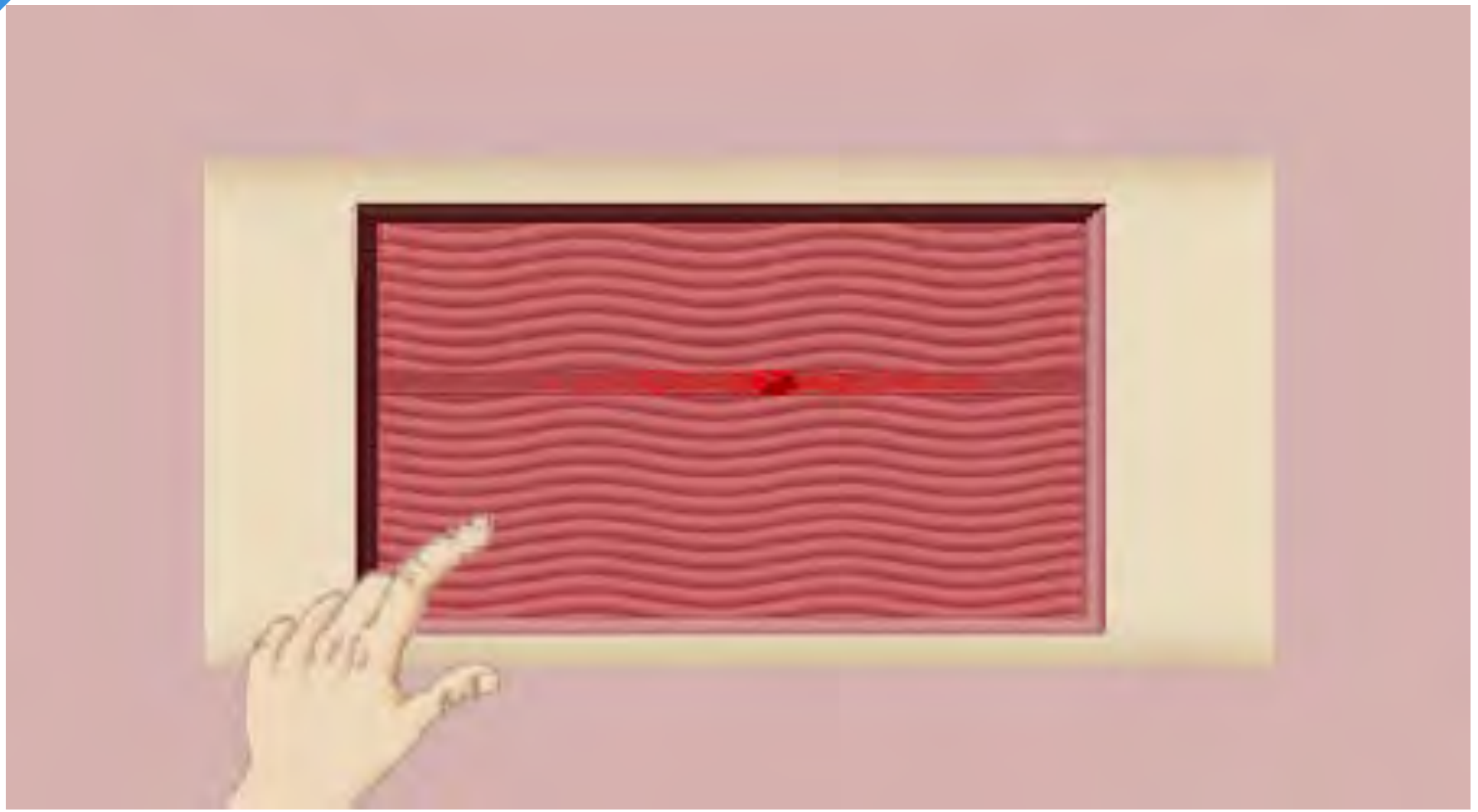


Figure 3.7. Cross-sectional schematic drawing show-

Flat Palpation



Pincer palpation SCM

Pincer Palpation Upper Trap

Courtesy Brian O' Neill, MD

How do you treat these TrP's?

LOCAL

- **Sustained digital pressure on the TrP (30 - 60 secs.)**
- **Trigger Point injections with 0.25% lidocaine**
- **Dry needling**

GLOBAL

- Correct biomechanical deficiencies (posture, muscle imbalances, joint/segmental dysfunctions)
- Correct muscle abuse/overuse (workouts, ADL's)
- Correct metabolic deficiencies
- Correct medical predisposing, precipitating & perpetuating factors
- Address psychosocial issues, stress, etc.

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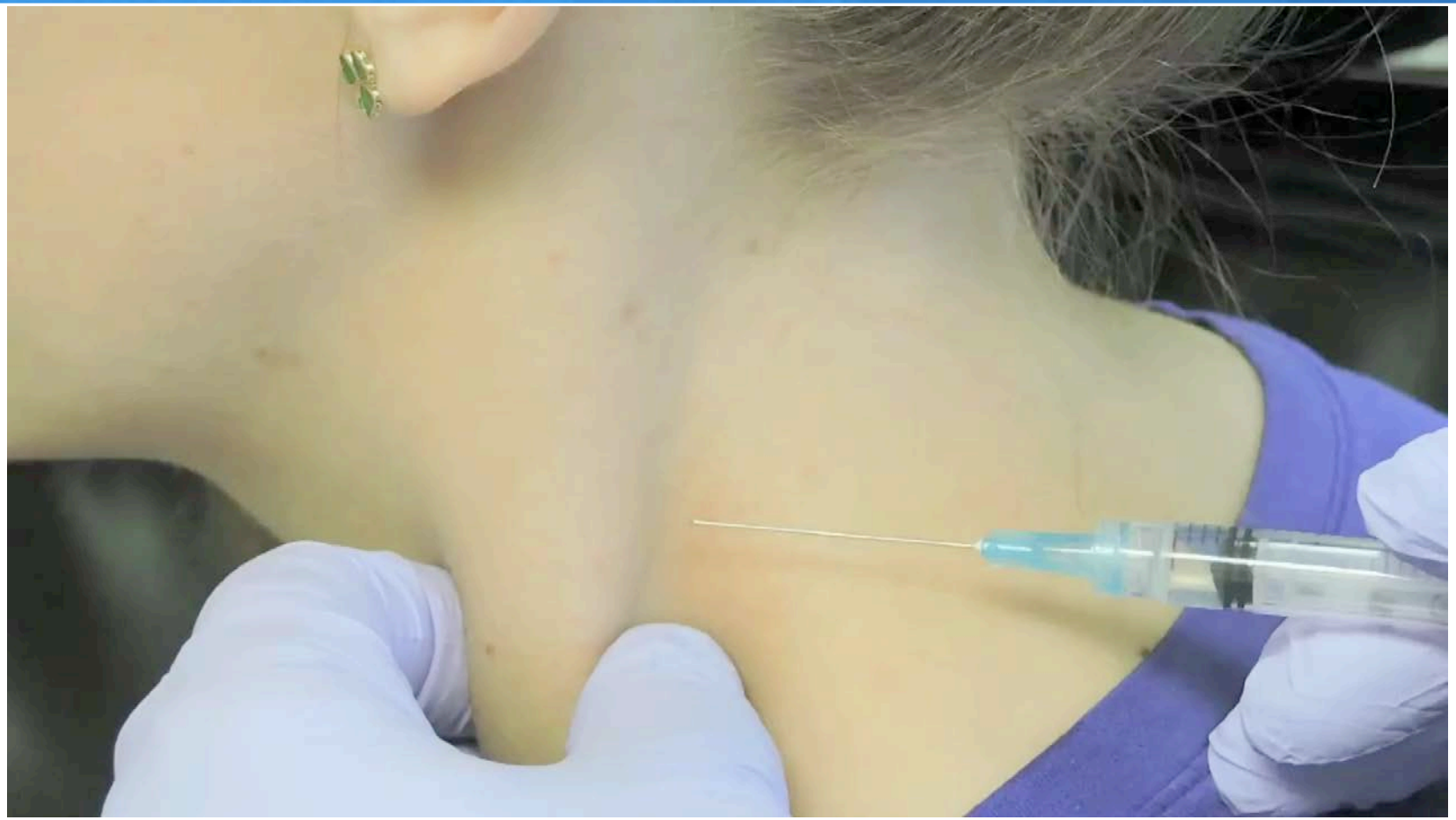
TrP Injection Upper Trapezius

Courtesy of William S. Teachey, MD

Helen Saunders

Trigger Point Injection SCM



Courtesy of William S. Teachey, MD

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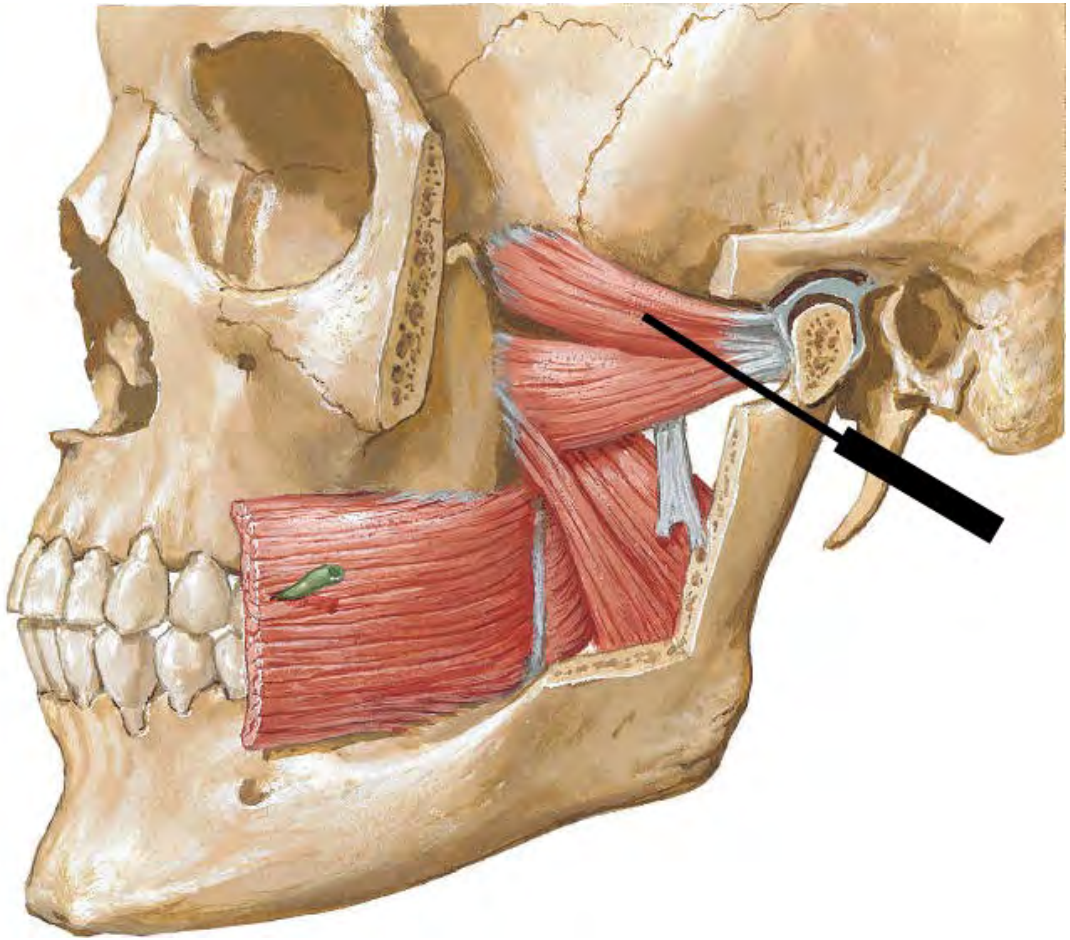
DENTSPLY Pharmaceutical, York, PA 17402

Trapezius Muscle

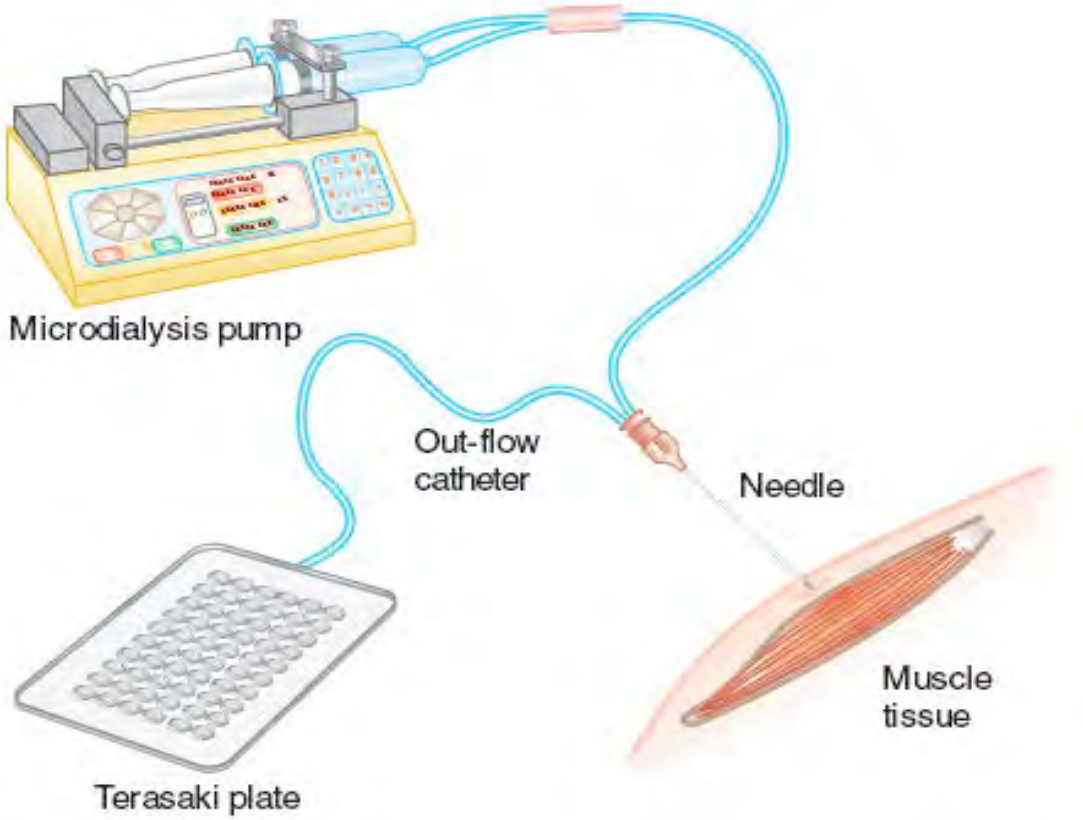
Lateral Pterygoid



Masseter Muscle

Why do you need to elicit a Local Twitch Response during treatment?

Microdialysis System



Shah, J.P., et al., An in-vivo microanalytical technique for measuring the local biochemical milieu of human skeletal muscle. J Appl Physiol, 2005. 99: p. 1980-1987

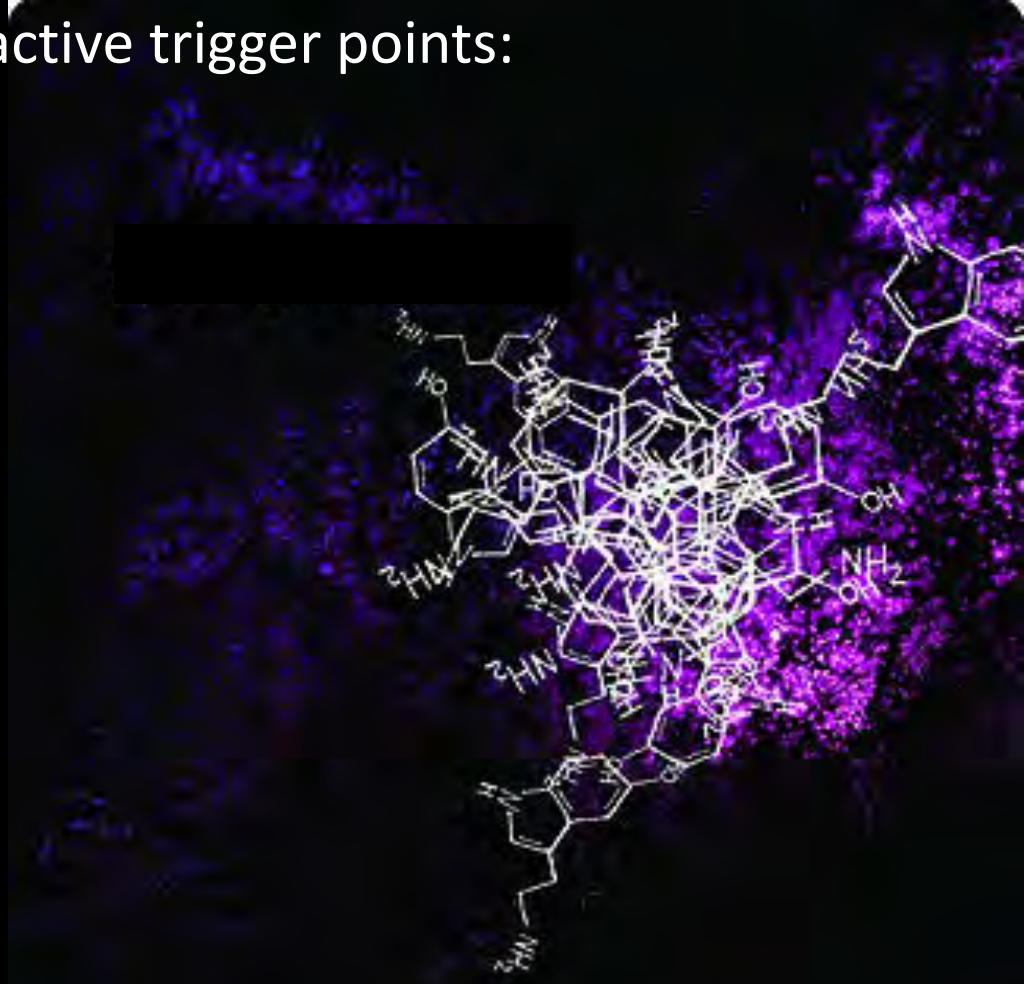
In and around active trigger points:

Elevated levels :

- Bradykinine
- CGRP
- Substance P
- Norepinephrine
- TNG – α
- Interleukin 1-β , 6 and 8
- Serotonin
- Noradreline

Reduced levels:

- Interleukin 12
- Low pH



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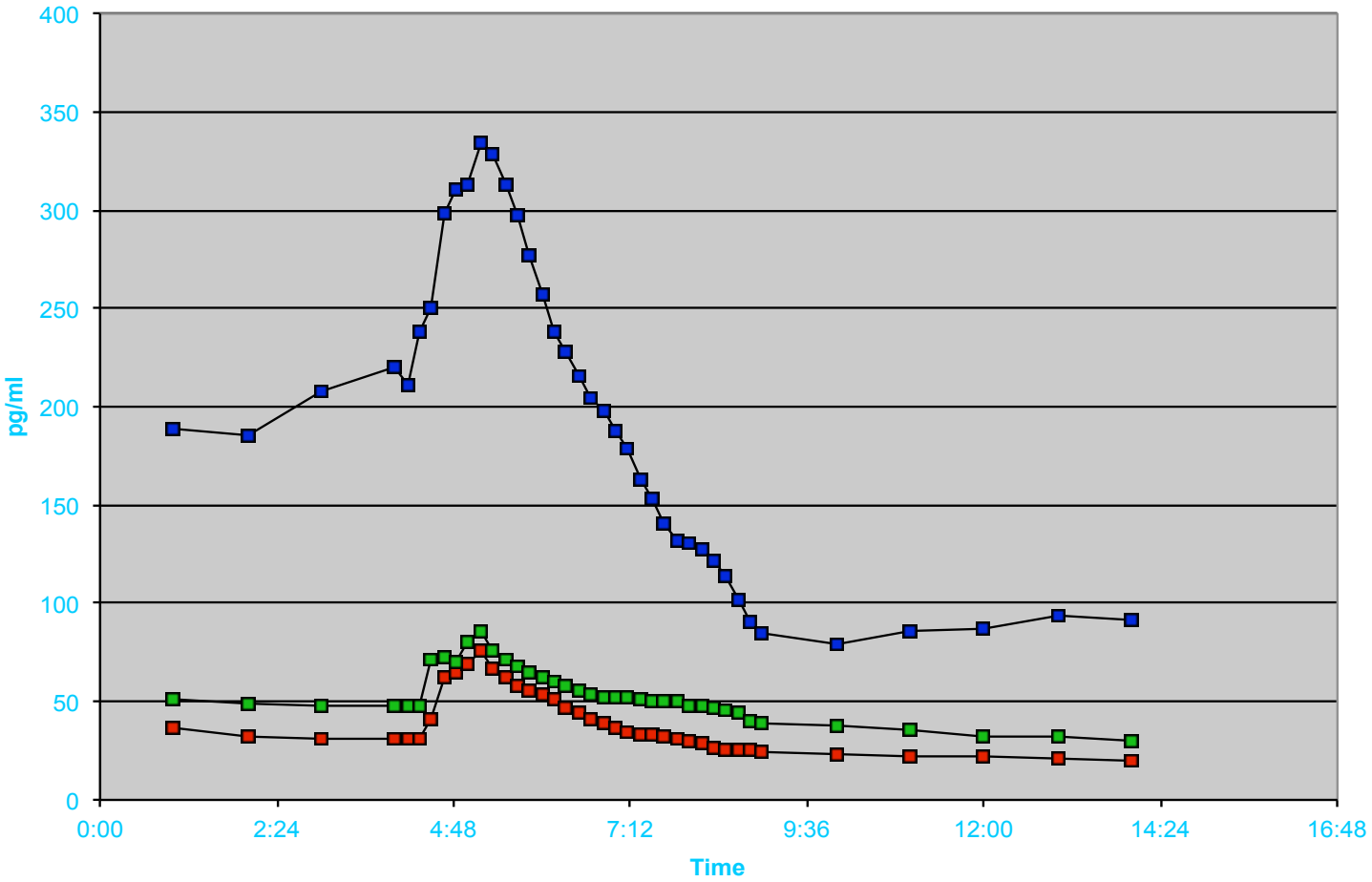
Substance P



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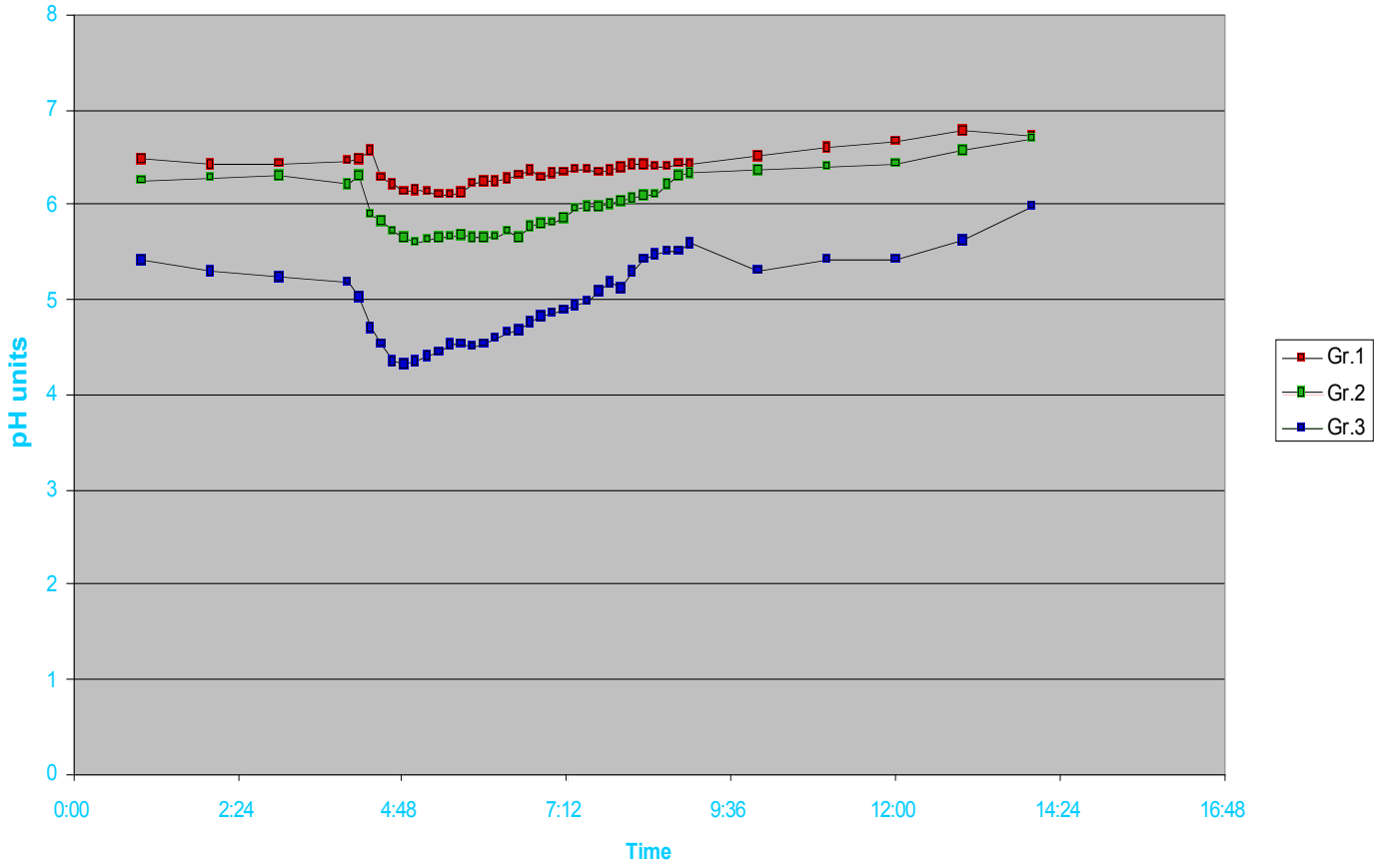
pH

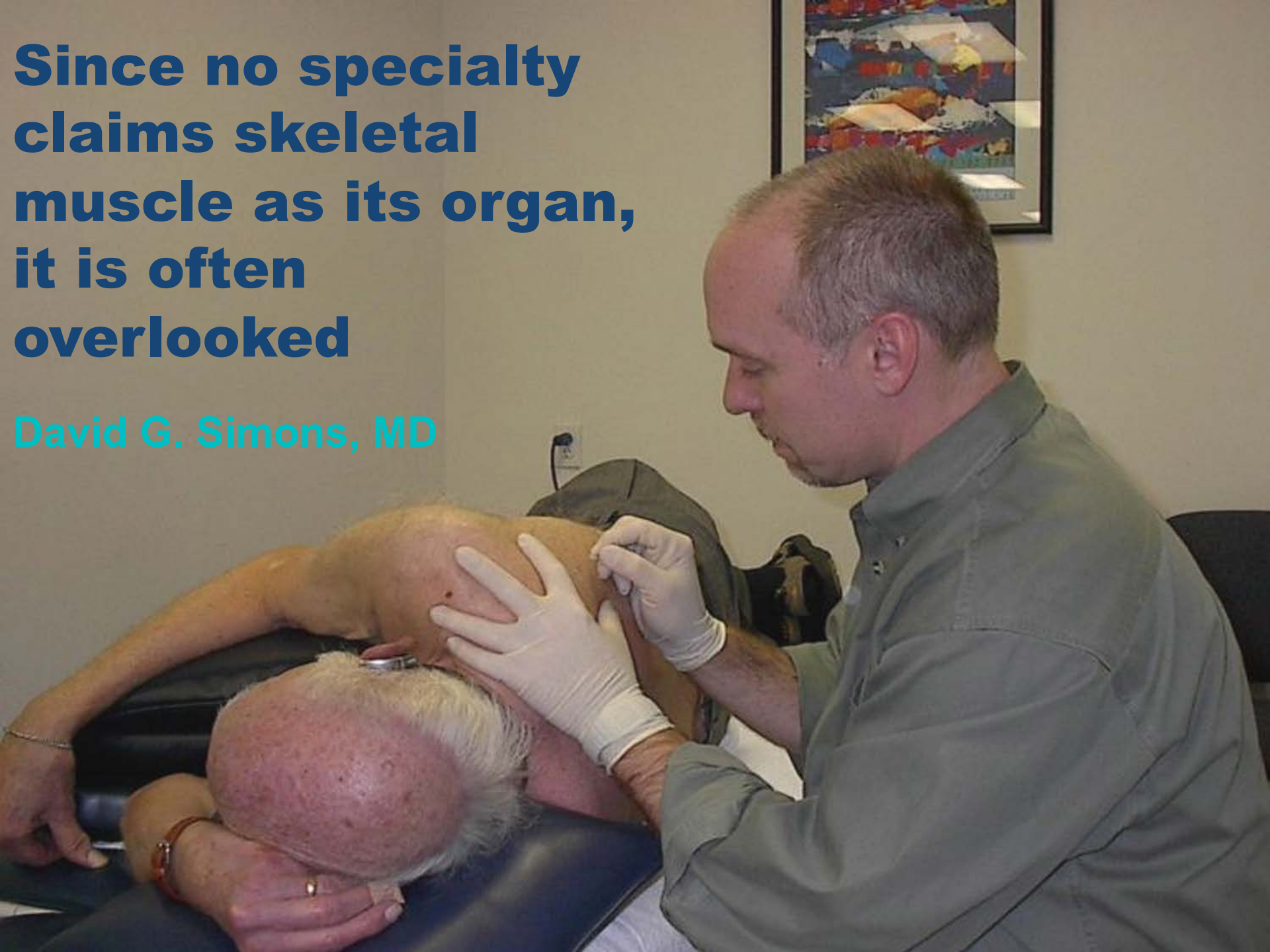


An in vivo microanalytical technique for measuring the local biochemical milieu of human skeletal muscle

Jay P. Shah,[1] Terry M. Phillips,[2] Jerome V. Danoff,[1,3] and Lynn H. Gerber[1]


TrP's are persistent peripheral sources of nociceptive input, which excite muscle nociceptors and contribute to peripheral and central sensitization

Why is not everyone looking at this?


Since no specialty claims skeletal muscle as its organ, it is often overlooked
David G. Simons, MD

With Thanks To

William S. Teachey, MD
Beach Ear Nose & Throat PC

Robert A. Levine, MD
Ynon Lerner, CMT

The Tel Aviv Sourasky Medical Center

The Therapy Network
TTN
RAISING THE STANDARD OF PHYSICAL THERAPY

myopain seminars

Questions?