PROGRESSIVE INHIBITION OF NEUROMUSCULAR STRUCTURES

Akira Shinomiya

Kansas College of Osteopathic Medicine – Class of 2026

Wife, no children, and a niece for whom dignity is often sacrificed

Can cook 3-5 dishes without causing a kitchen fire

Amateur gardener with a 50% survival rate

Enjoyed prior to medical school:
Hiking, taking road trips, falling out of planes, a cup of tea with a slice of pie

Current non-medical goals:
Rediscover things enjoyed prior to medical school, find new things to enjoy.

Personal view on life:
Life is too short to take everything so seriously

BUT FIRST! PHYSIOLOGY

- Pathological Muscle Contraction = Contracture
  - Sustained contraction
  - Stress
  - Trauma and Reflexes

- Dysfunctional Components:
  - Hormones
  - Inhibitory Signals
  - Continuous excitatory signals
  - Dysfunctional Neuronal Feedback
    - Golgi Tendon Organ

BUT FIRST! PHYSIOLOGY – SUSTAINED CONTRACTION

- Frequent → Continuous muscle contraction
- Altered baseline of muscle tone
- Muscles become chronically shortened
  - As opposed to stretching, yoga, pilates → lengthened muscles, flexible
- "New Normal"

NEUTRAL

SWAYBACK

SLOUCHED

FORWARD HEAD/
ROUNDED

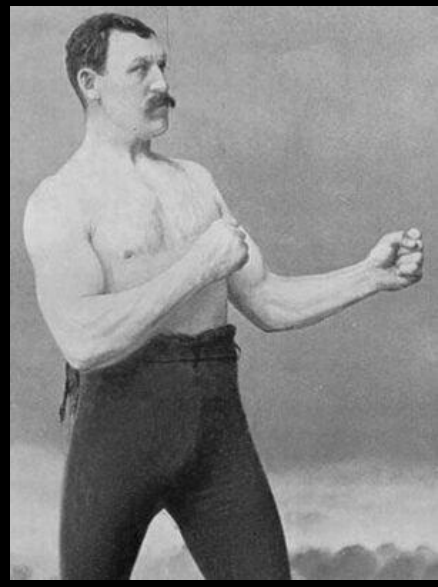
POST TILT/FLAT
BACK

BUT FIRST! PHYSIOLOGY – STRESS

- Sympathetic and Stress Hormones (fight, flight, freeze)
  - Norepinephrine, Epinephrine, Cortisol
  - Prime muscles for movement and responsiveness

  - Chronically elevated BP, HR, blood glucose, muscle tone

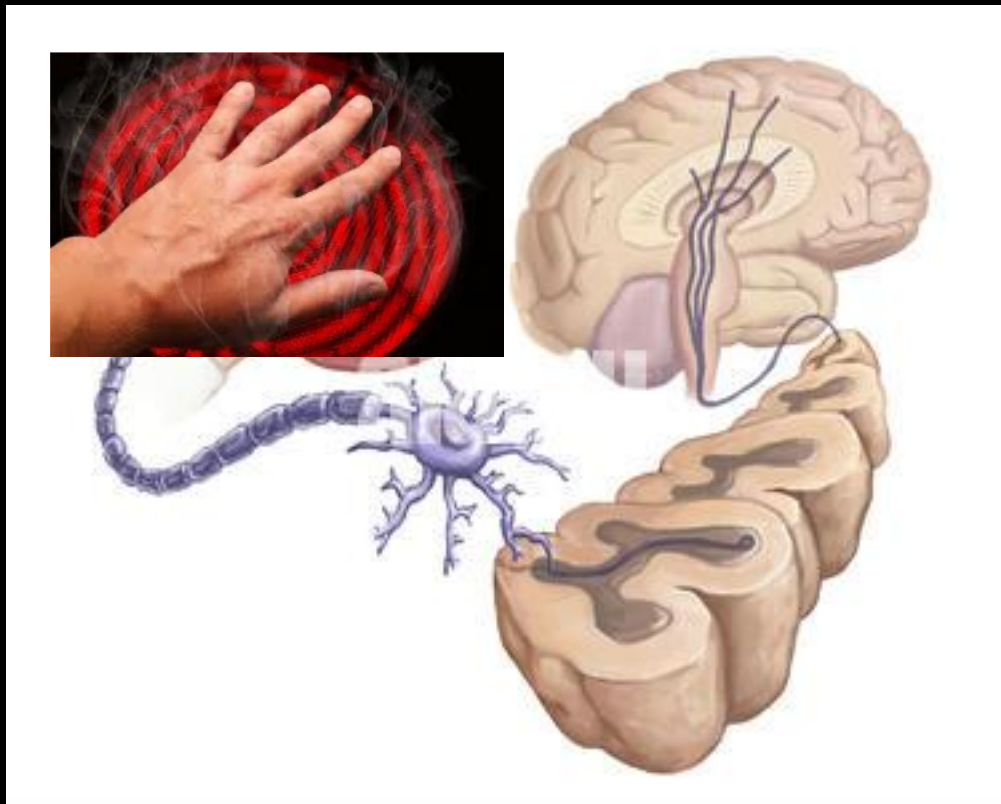
  - "Carry stress in shoulders"

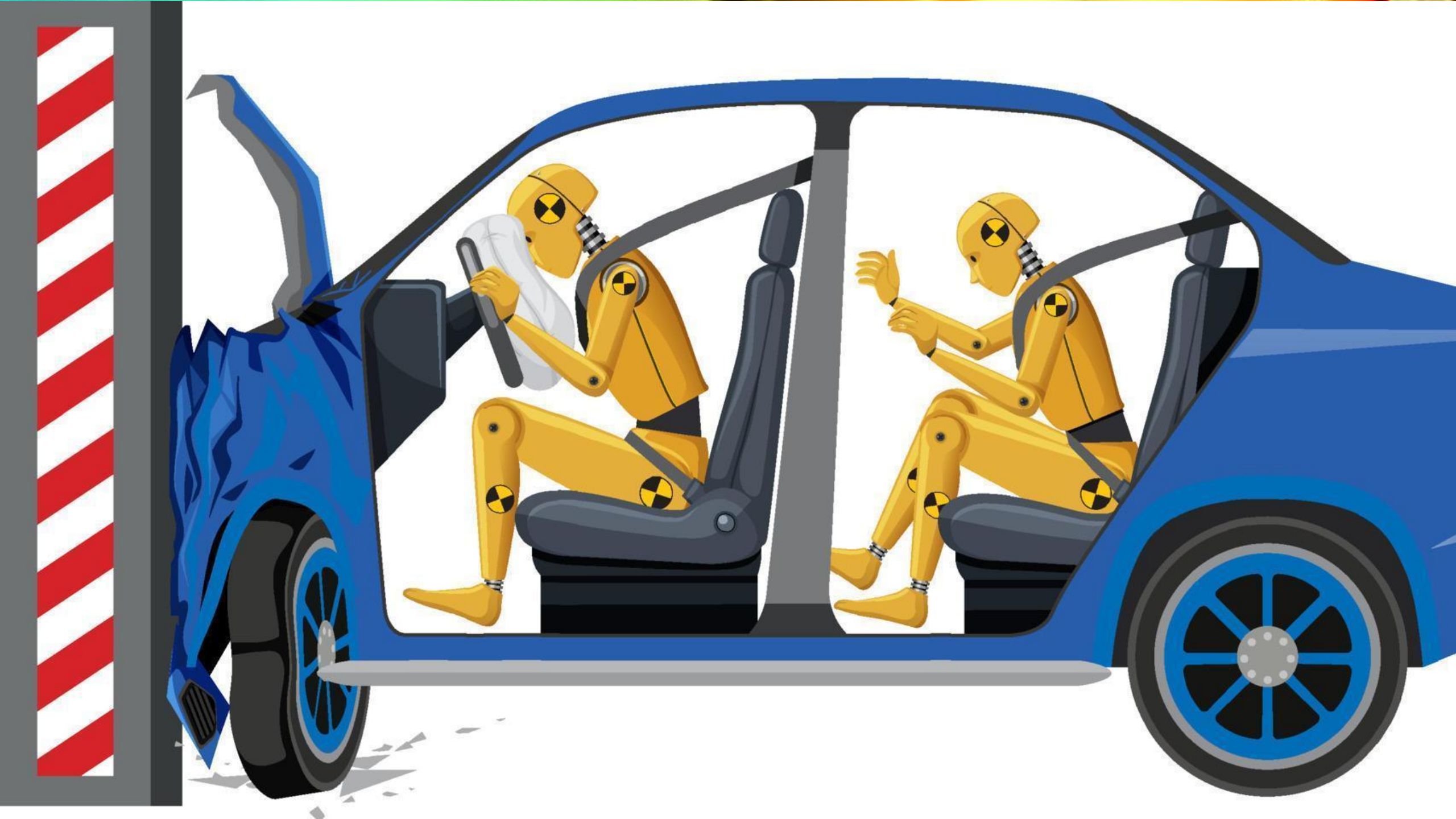


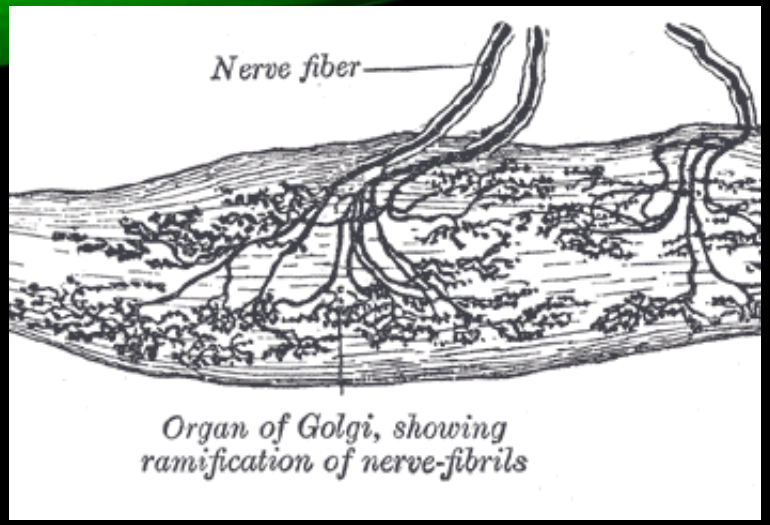
BUT FIRST! PHYSIOLOGY - TRAUMA

- Nociceptive Flexion Reflex/Pain Withdrawal Reflex
  - Spinal reflex meant to protect body from harm
  - Heat receptors and pain receptors trigger involuntary response
    - → muscle contraction in flexors
    - → muscle relaxation in extensors
      - → Limb is pulled away

- Trauma → toxic metabolites
  - → Toxic metabolites
  - → Nociceptive reflex
  - → Sustained muscle contraction







BUT FIRST! PHYSIOLOGY

- Golgi Tendon Organ
  - Stretch receptor within muscle tendon
  - Moderates muscle tension from going too strong or too fast
  - Prevents muscle tear and helps fine motor movements

Cyclobenzaprine (Flexeril)	Inhibits descending serotonergic and noradrenergic facilitation pathways
Methocarbamol (Robaxin)	(thought to) stabilize neuronal membrane and inhibit polysynapse
Carisoprodol (Soma)	GABA-A agonist, affects spinal interneurons
Tizanidine (Zanaflex)	Decreases motor neuron excitation
Baclofen (Lioresal)	GABA-B agonist, hyperpolarizes motor neurons, decreases excitation
Diazepam (Valium)	enhances GABA-A activity, hyperpolarizes neurons, decreases excitation

PINS

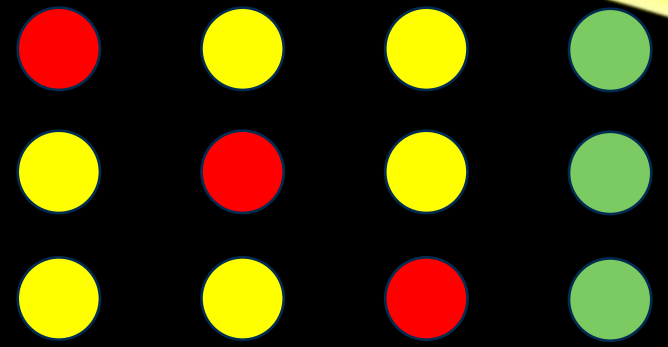
- Manually treating persistent or resistant dysfunction with pressure, direct inhibition.
- Inhibition = Steady pressure to soft tissues to effect relaxation and normalize reflex activity
- Addressing the overlapping zones where more than one nerve, muscle, or fascial tissue may be contributing to the persistence of somatic dysfunction

PINS MECHANISM… WE THINK

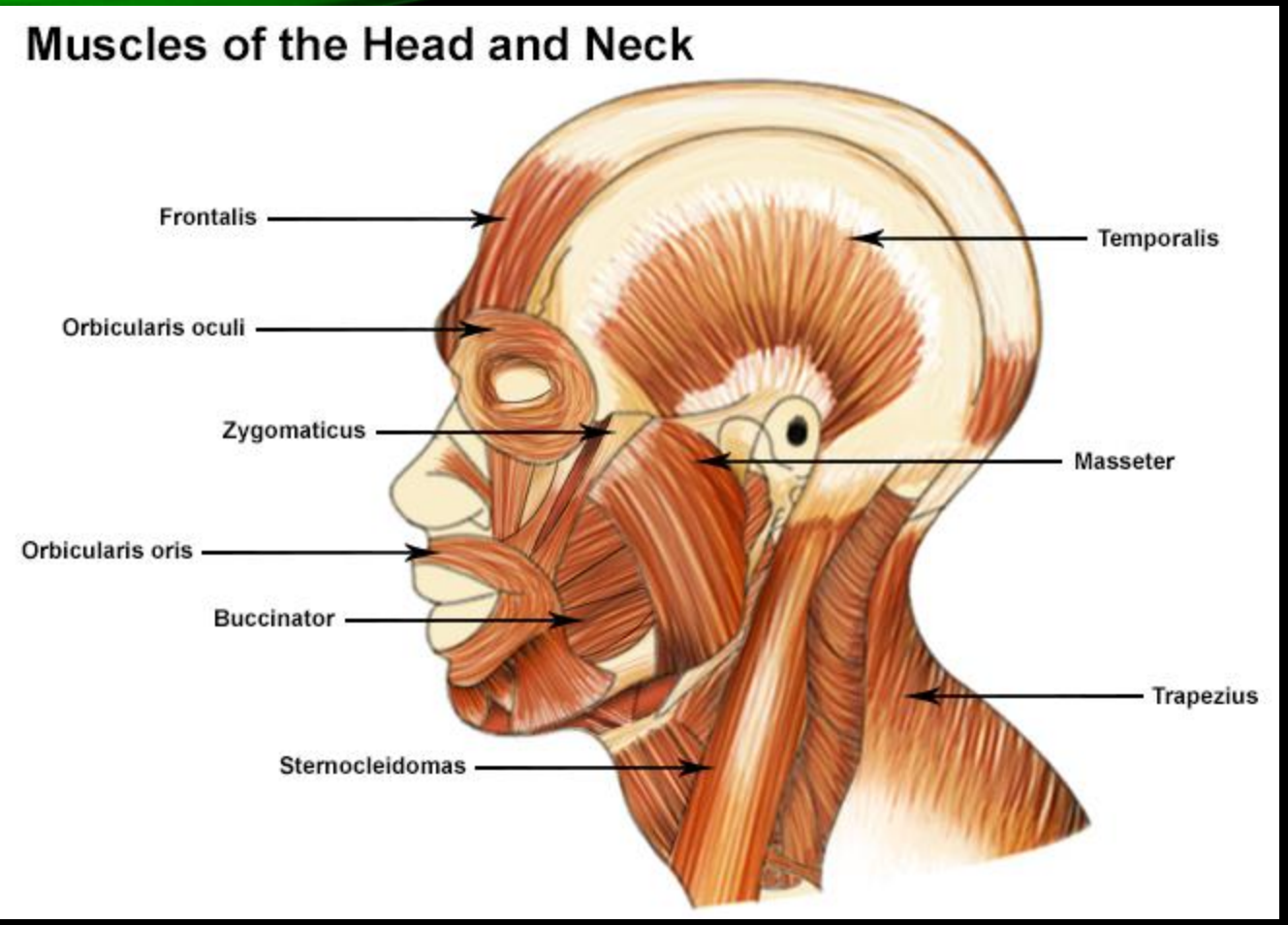
- Stretches and releases myofascial restrictions
- Interrupts nociceptive pain-spasm cycle
  - Protective mechanism = pain → muscle contraction as a protective measure
- Activates Golgi Tendon Organ
  - Inhibits contraction

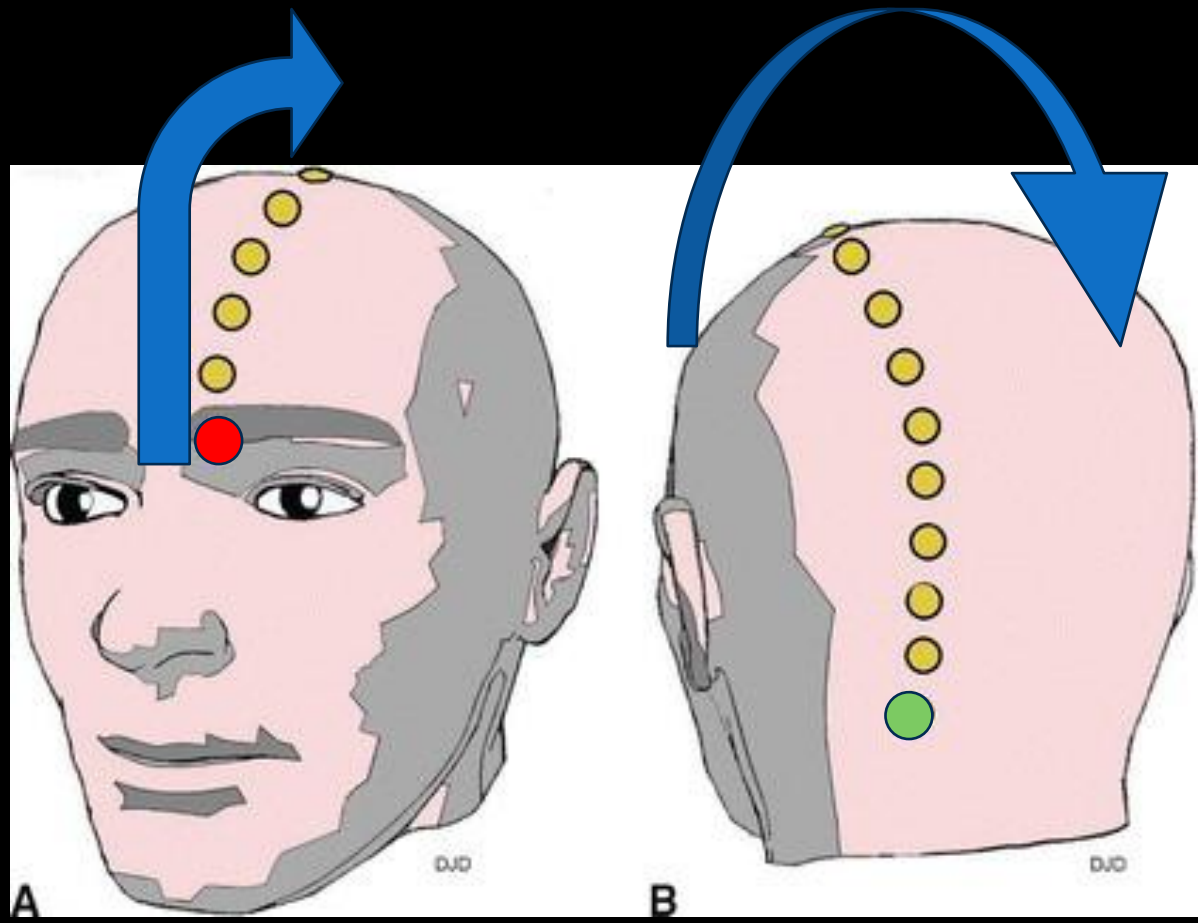
- Locate the primary point by examining tissue in the region of the patient's complaint.
- Locate another sensitive point with knowledge of anatomic structures.
- Determining the treatment points is critical to the treatment outcome
- For purpose of proceeding in a logical fashion, the point that is more sensitive is designated as the "primary point" or the "first point."
- The other point is then referred to as the end point.
- The end point is typically the insertion/distal end of the muscle.

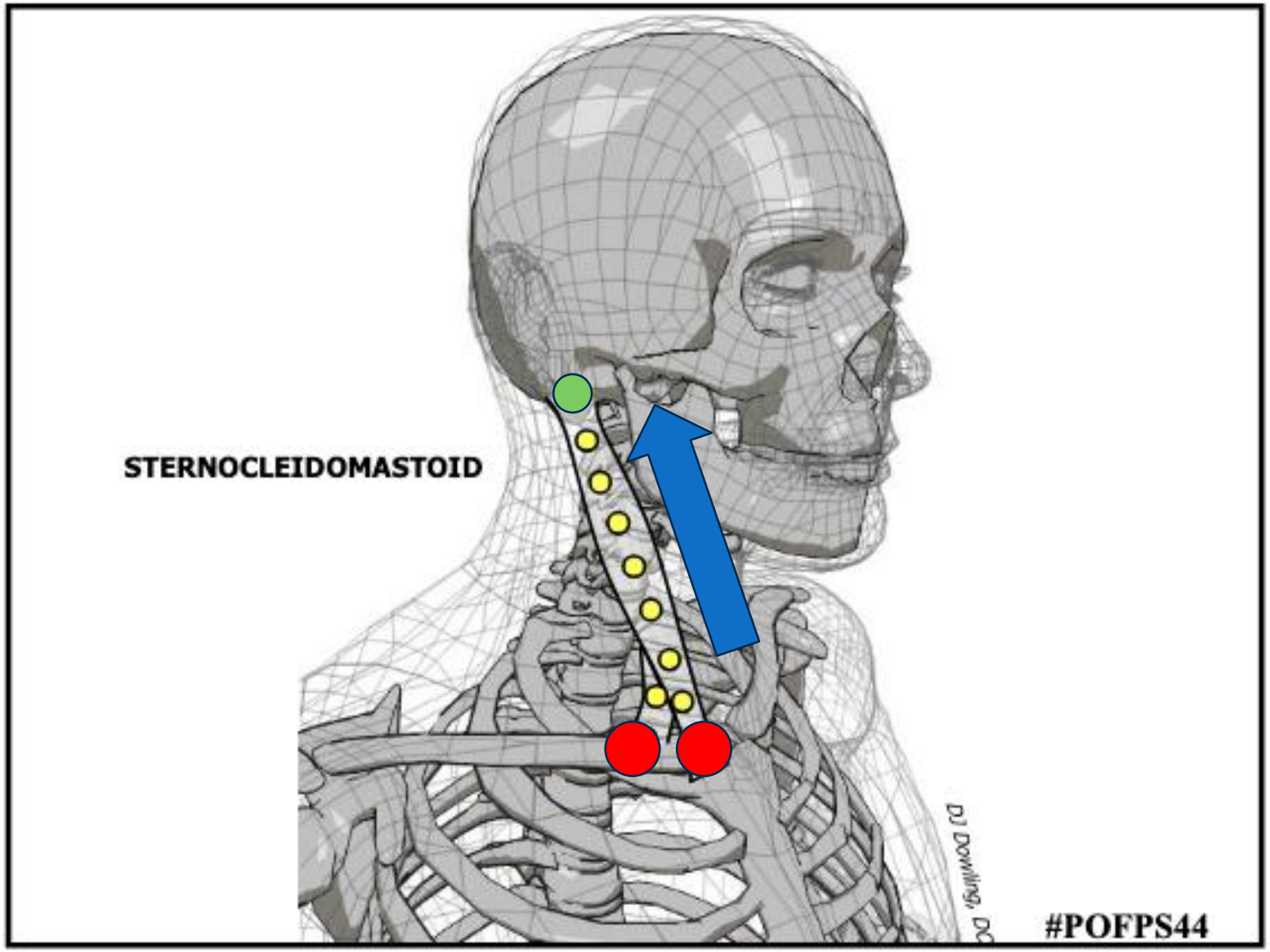
- Press **both** primary (more sensitive) and end points **simultaneously**, using thumbs or pads of fingers
- Few ounces of pressure is exerted, which should be enough to elicit patient's symptoms and applied equally
- Maintain **constant pressure** on the end point throughout the treatment.
- Ask what the patient is feeling. It should be firm but not overly painful

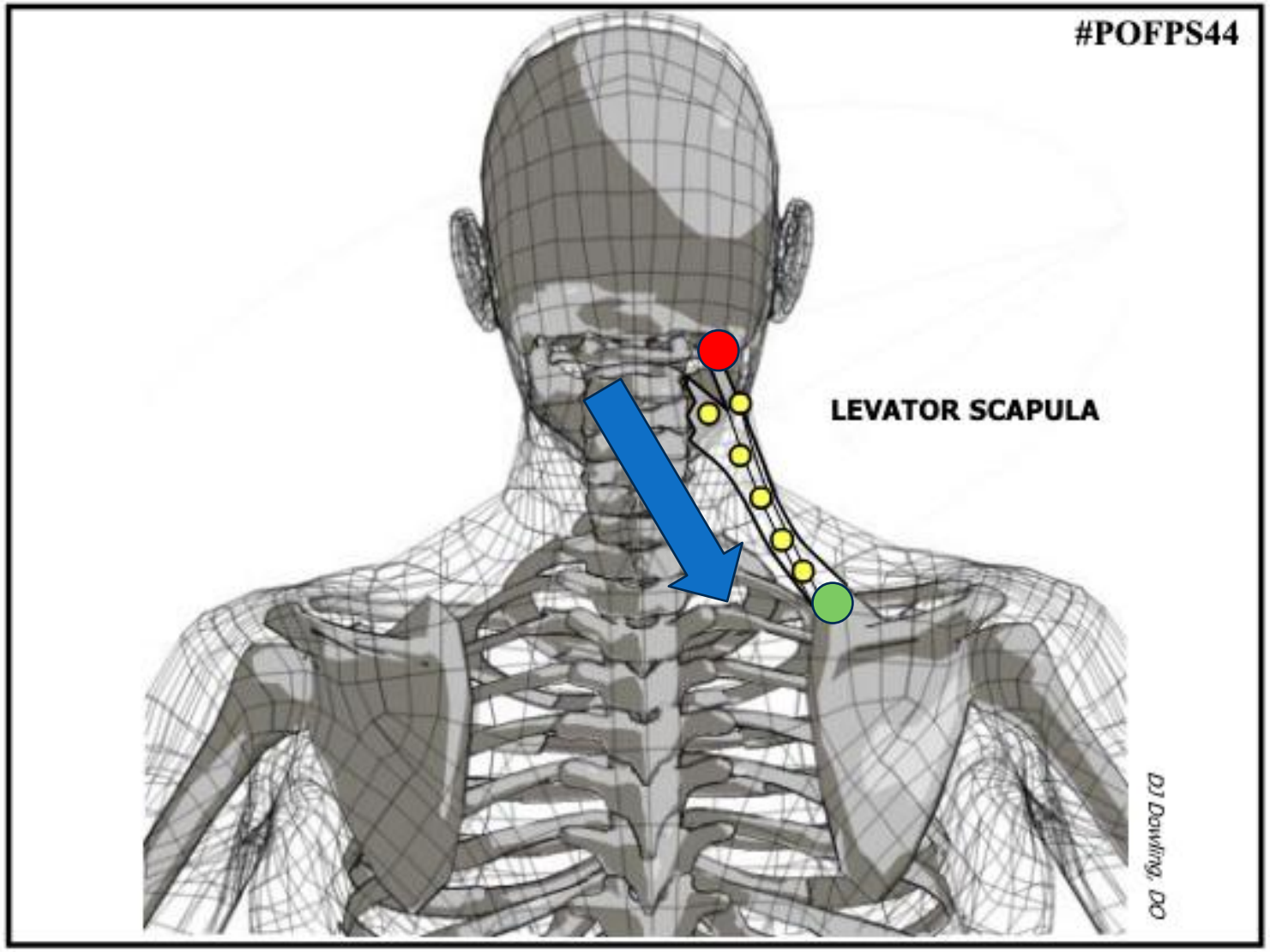


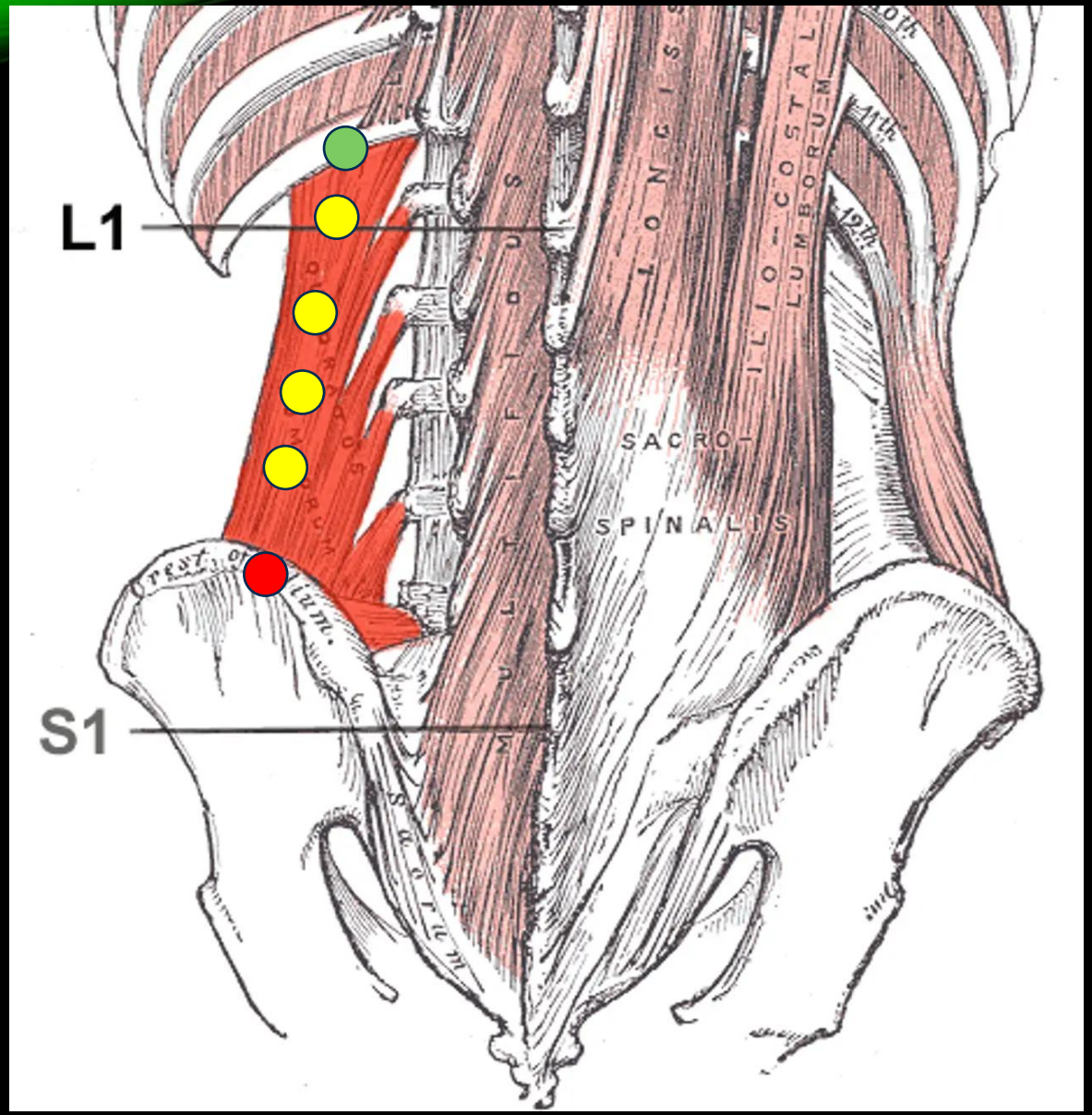
- Maintain pressure on for 20-30 seconds
  - Note tissue changes and muscle tone
  - Patient may note a decrease in pain
- Move the primary point finger toward the end point, about 1-2 cm in distance, maintaining constant contact.
- The end point finger never stops the pressure
- Continue the process until the proximal or primary point finger meets with the end point finger
- The conclusion of treatment should be based on palpatory findings, not solely on the patient's subjective complaints

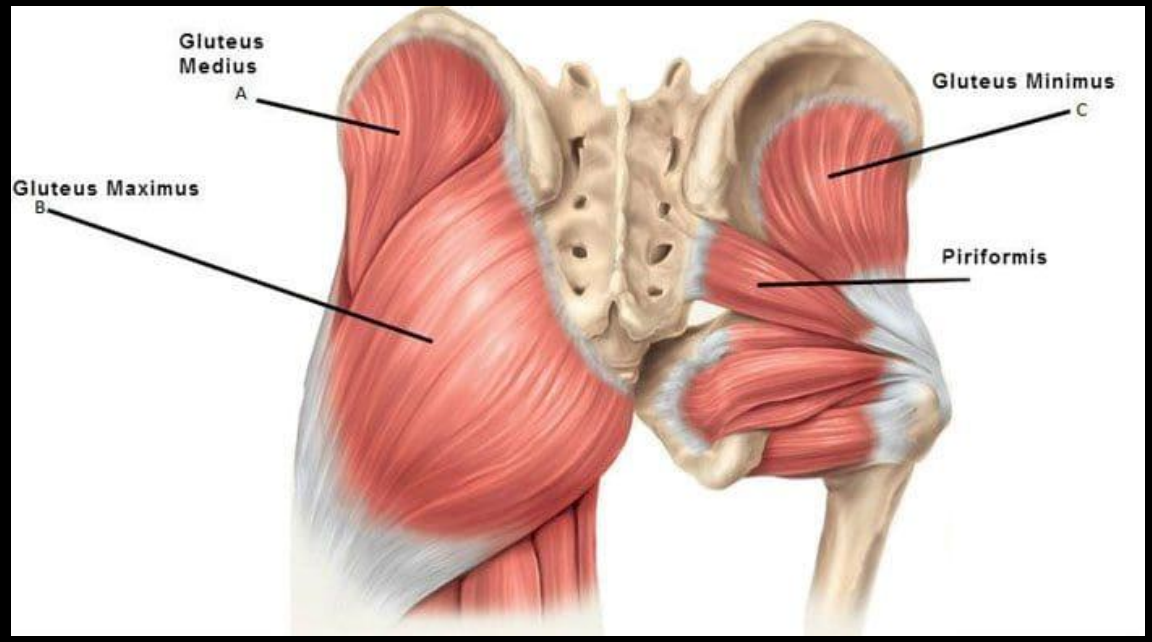

Muscles of the Head and Neck
Frontalis
Temporalis
Orbicularis oculi
Zygomaticus
Masseter
Orbicularis oris
Buccinator
Trapezius
Sternocleidomas

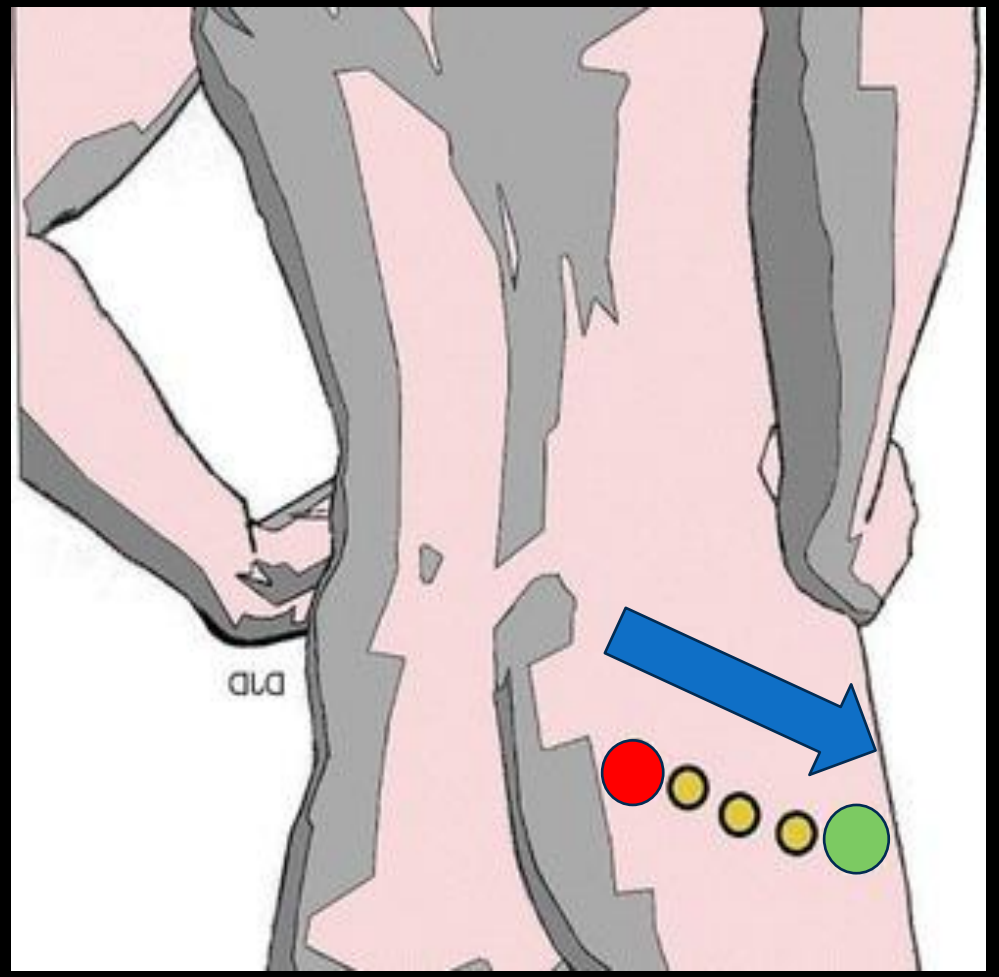

A
B

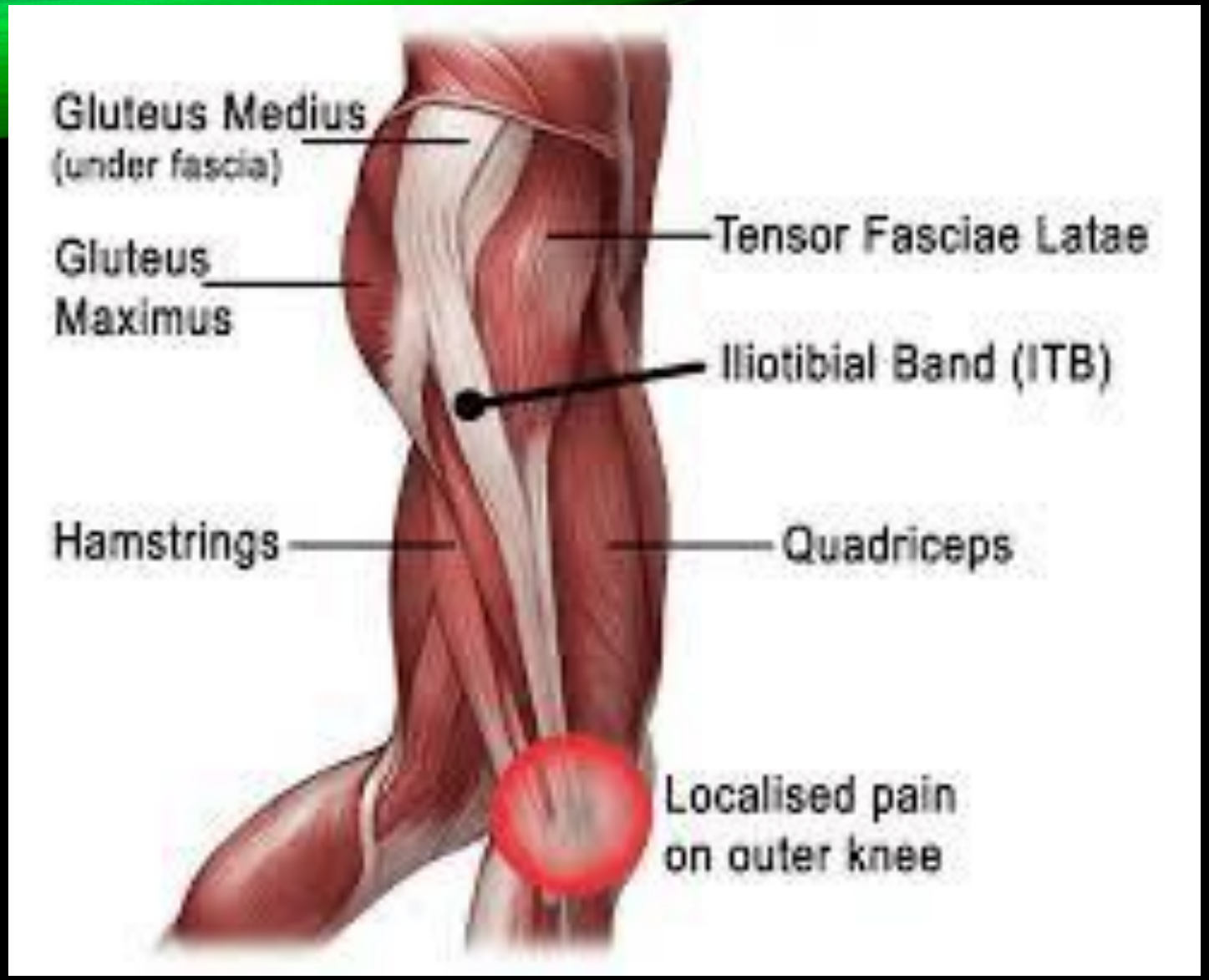

STERNOCLEIDOMASTOID
#POFPS44

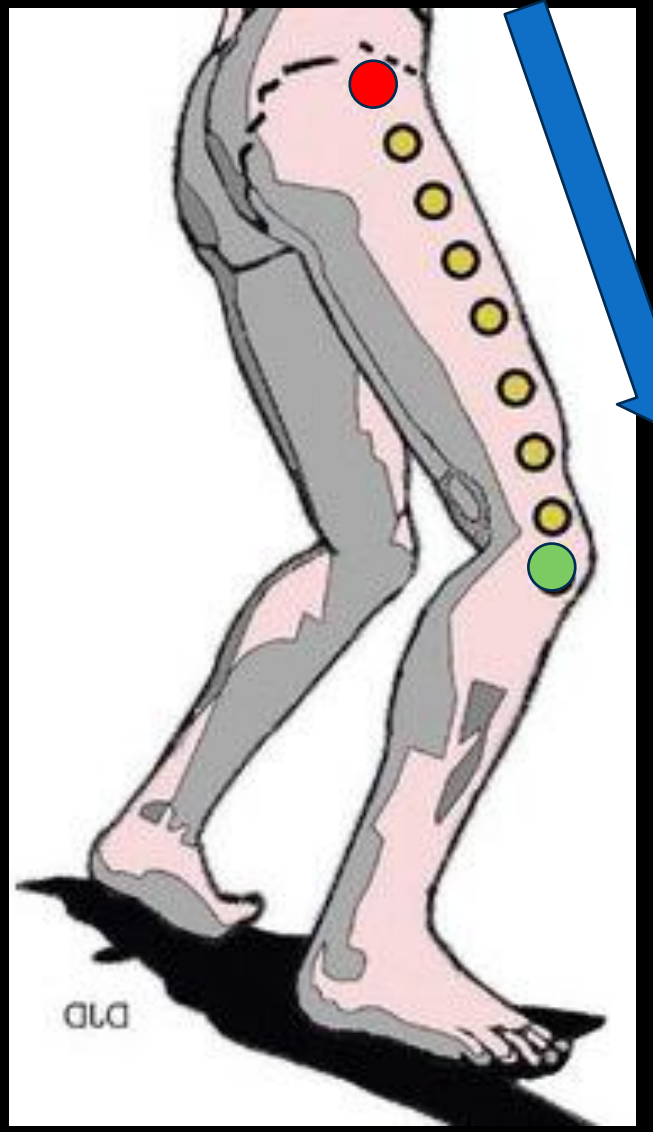

#POFPS44
LEVATOR SCAPULA
DJ Dowling DO

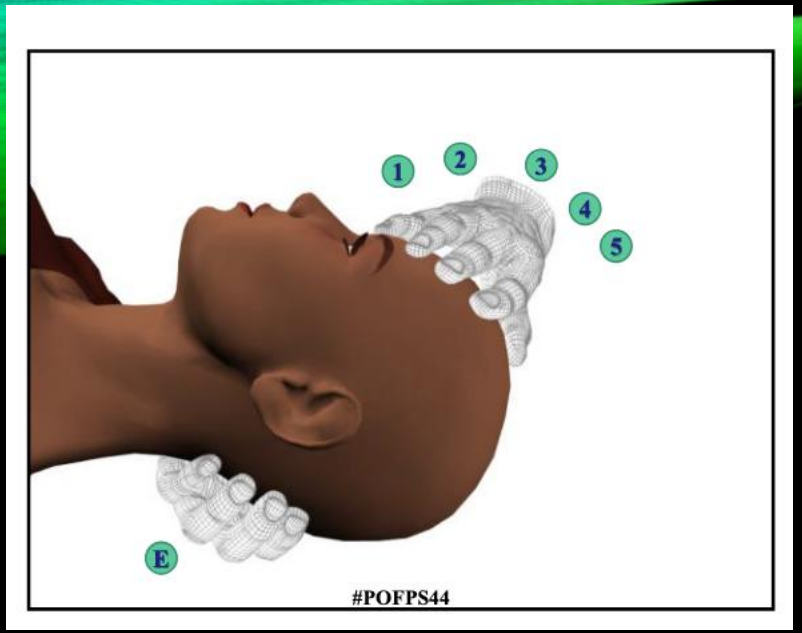

L1
S1
LONGISSIMUS
ILIO-COSTALIS
LUMBORUM
SACRO-
SPINALIS

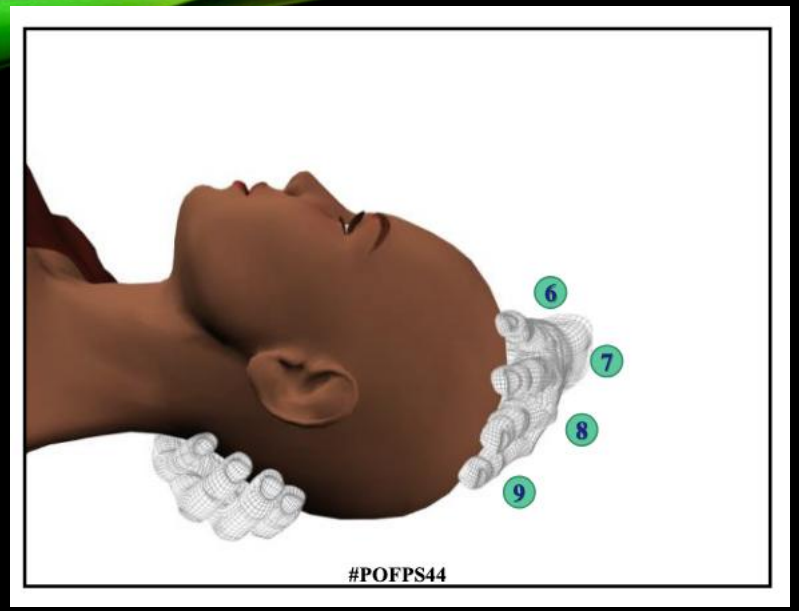

Gluteus
Medius
A
Gluteus Minimus
C
Gluteus Maximus
B
Piriformis

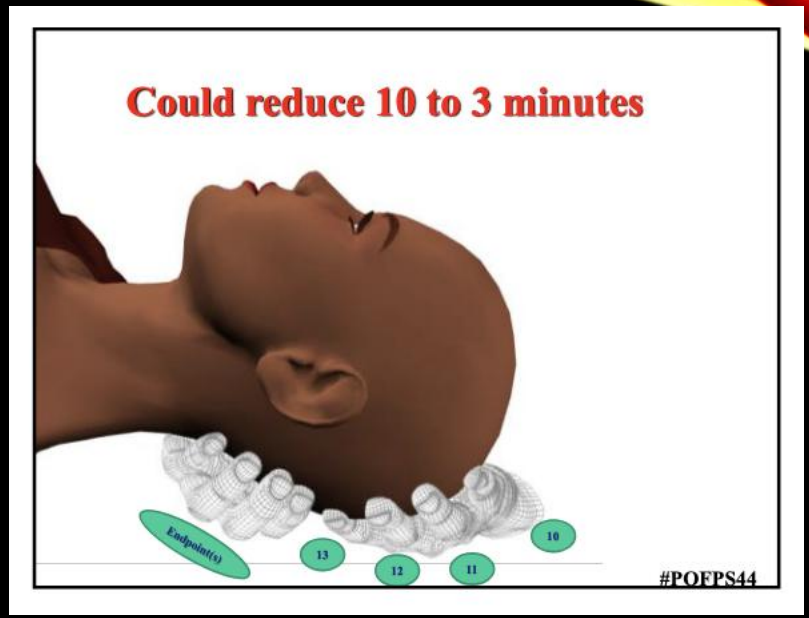



Gluteus Medius
(under fascia)
Gluteus
Maximus
Tensor Fasciae Latae
Iliotibial Band (ITB)
Hamstrings
Quadriceps
Localised pain
on outer knee









- Dennis Dowling DO, Pennsylvania Osteopathic Family Physicians Society, August 9, 2019

QUESTIONS?

REFERENCES

- Seffinger, M.A. *Foundations of Osteopathic Medicine: Philosophy, Science, Clinical Applications, and Research*. 4th Ed. Chapter 40J pages 1012-1022

- Dowling DJ. Progressive inhibition of neuromuscular structures (PINS) technique. *J Am Osteopath Assoc*. 2000;100(5):285-298.