CERVICAL SPINE TIPS

- **A Musculoskeletal Approach to managing Neck Pain**
- **An ALGORITHM, as a management guide**

Rick Bernau & Ian Wallbridge

June 2010

THE PROCESS

- An interactive approach to the management of neck pain
- The Algorithm is your worksheet
- A list of Key Tips has been provided
- To have some fun!
- Please ask questions at any stage and give us feedback
- However we only have an hour, so will need to move quickly

SUMMARY of the Workshop

- Discussion about the neck and it's functions
- Neck Pain, what is it, where is it felt and what is associated with it?
- Natural history
- Examination of the neck and allied structures
- Other factors to be considered
- Breathing
- Imaging
- Treatment
- The non responder
- Referral
- Trigger Points

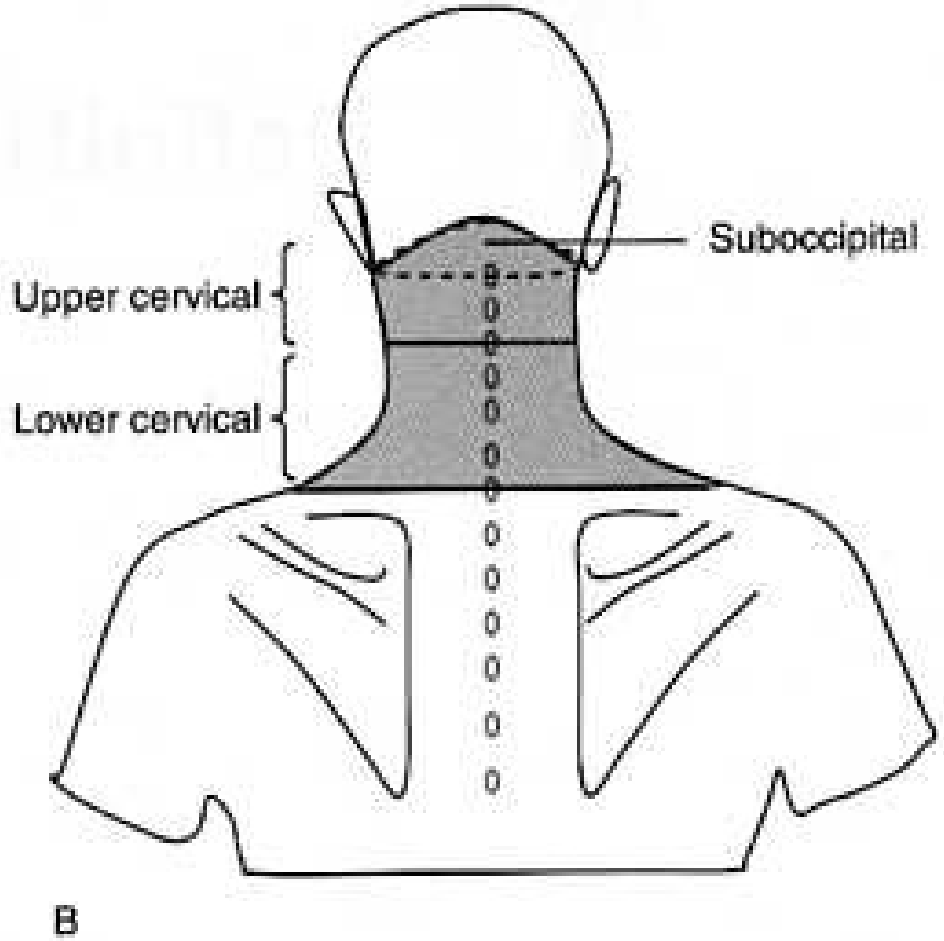
THE NECK

- **WHAT ARE IT'S MAIN FUNCTIONS?**

POSSIBLE FUNCTIONS of the NECK

- *To hold up the head*
- *To provide a safe conduit for the spinal cord*
- *To provide a passage for air to enter the lungs*
- *To provide a passage for food and water to the stomach*
- ***To hold up the arms***
- ***To provide a mobile platform for the eyes***
- *And to a lesser extent for the ears*

Is this neck pain?

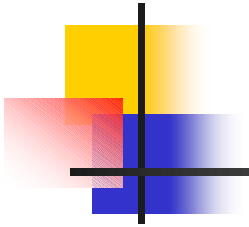


WHERE IS THE PAIN FELT?

- *At the level of the injury*
- *Referral patterns for each segment*
- *Referral to the shoulder and/or arm*
- *Referral patterns from involved neck muscles (Trigger points)*
- *Radicular pain from nerve root involvement*

ASSOCIATED CONDITIONS

- ***Very few neck problems present solely with symptoms in the neck***
- *There may be referred pain to the* ***shoulders and arms***
- ***Commonly other areas of the musculoskeletal system are involved***
- *Almost invariably the* ***upper thoracic spine***
- *In a large number middle and lower back*
- ***Most shoulder injuries have a cervical component***

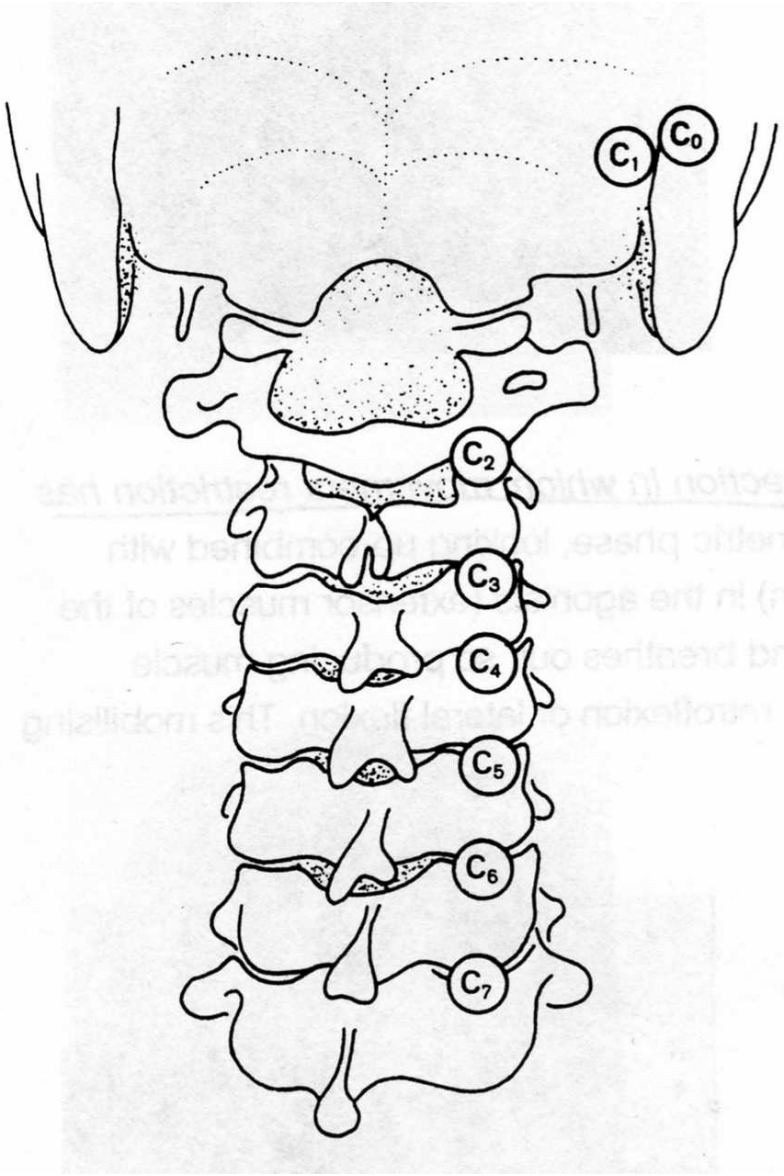


History is almost always more valuable than examination

PAIN (HISTORY) ....

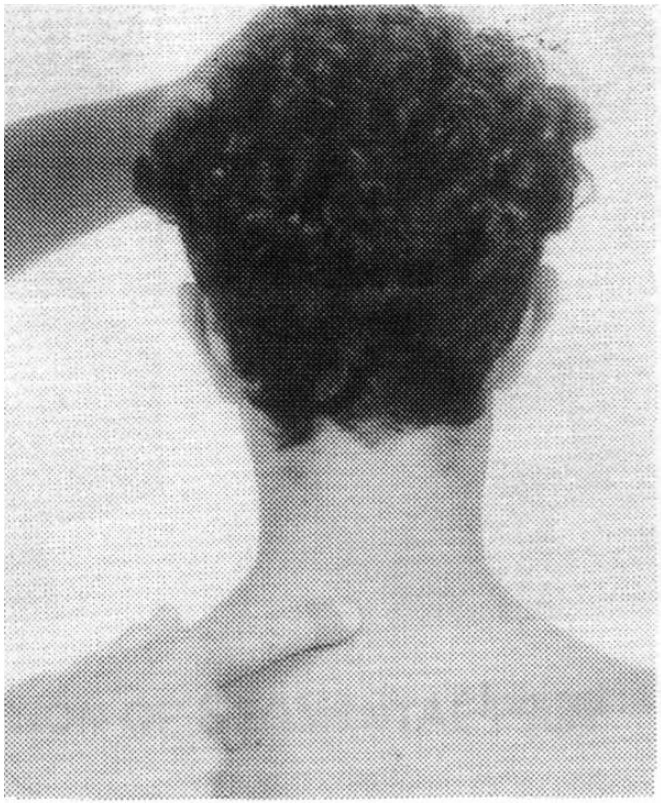
- ***Cause***
- ***Duration***
- ***Position and Radiation***
- ***Quality – Somatic / Neurogenic***
- ***Intensity / VAS score***
- ***Aggravating / Relieving factors***
- ***Pain Drawing***
- **Associated Features**


(superior view)
C2
C3
C4
C5
C6
C7
T1


C1
C0
C2
C3
C4
C5
C6
C7

Landmarks

C2 Spinous process



C7 Spinous Process

WHAT IS THE MOST COMMON CAUSE OF

- **HEADACHE?**
- **ARM PAIN?**

- **SOMATIC REFERRED PAIN**

THE CHARACTER OF THE PAIN

- *Deep, spreading, aching, dull, sore - think* ***somatic***
- *Superficial, moving, stabbing, shooting, burning - think* ***radicular***

- *"is it like anything you can imagine?"*
- *"is it like other sensations you've felt?"*

FURTHER DISTINCTION

- **KEY POINT: -** ***Character***

- *Shooting, distal arm radiation, and neurological signs - think* ***radicular origin***

- *Aching, only proximal arm radiation, and no neurological signs – think* ***somatic origin***

RADIATION

- ***The most important issue is where the pain is felt consistently, not the extent of the radiation***
- *Does it **stay** or does it **start and spread?***
- *Distinguish radiation from the neck, rather than radiation to the neck (think visceral)*

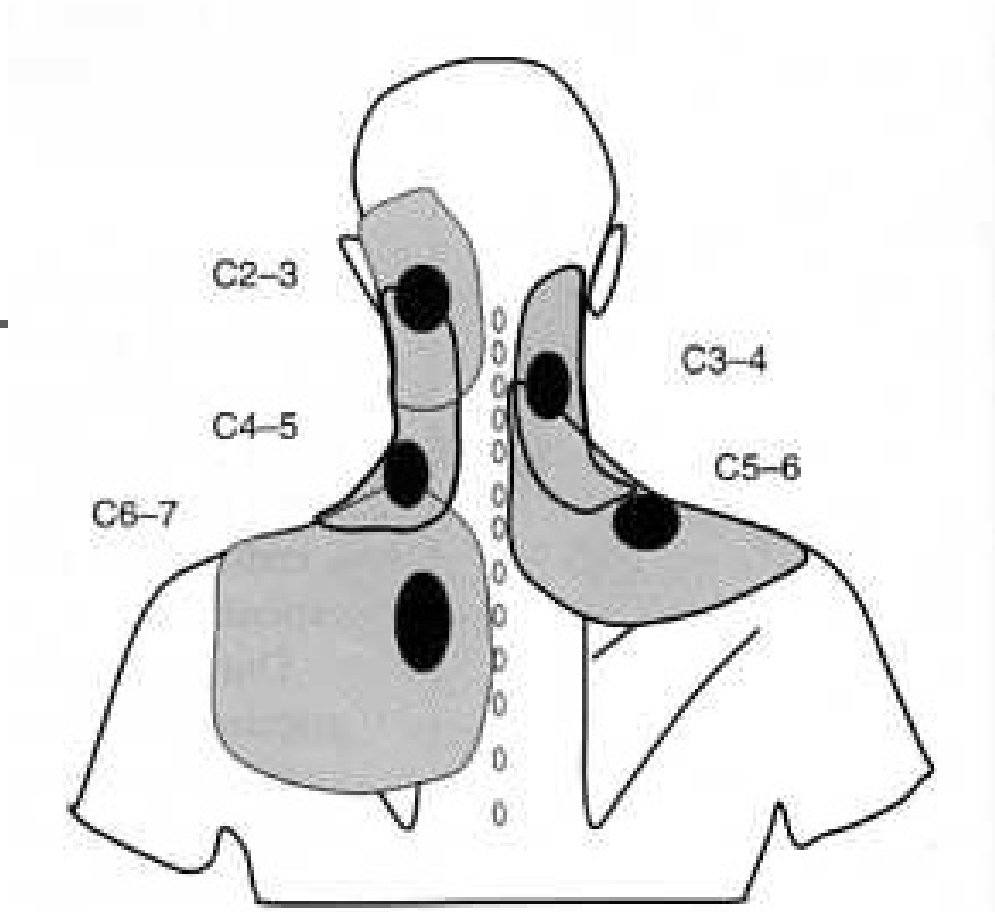
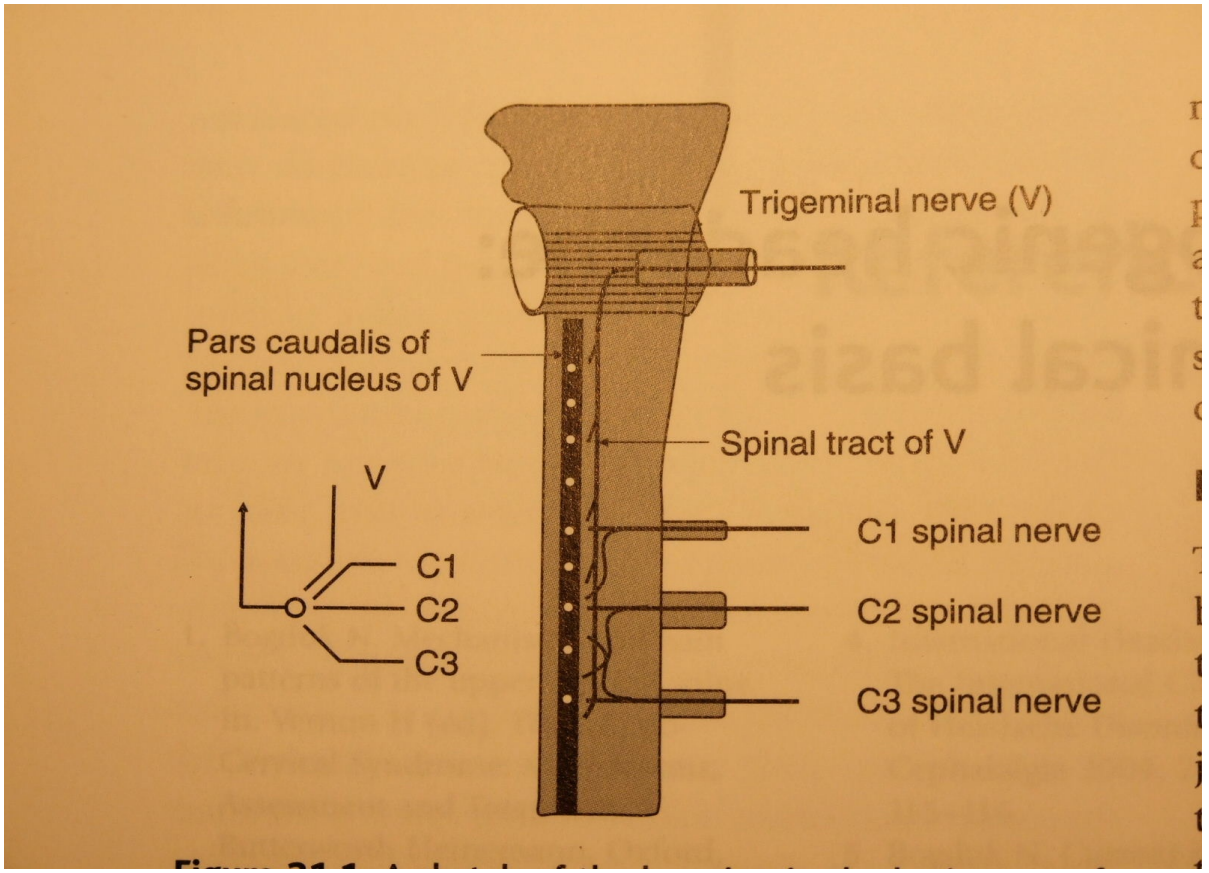


Figure 5.1 Centroids for the segmental origin of referred pain from the cervical spine. The shaded areas indicate the typical zones of referral, from the segments indicated, in normal volunteers and patients. The dark areas represent the centroids, or core areas, where patients feel the pain maximally when it arises from the segment indicated.

Cervicogenic Headaches



RED FLAGS

- ***Fractures***
- ***Tumours – bony metastases***
- ***Radicular pain and/or radiculopathy*** *(altered sensation)*
- *Infection – osteomyelitis / discitis*
- *Visceral – cardiac / thyroid*
- *Vascular – arterial dissection*

EXAMINATION

- ***Look*** *for asymmetry, restriction and abnormal breathing patterns (see later)*
- ***Feel*** *for tenderness over facet joints and in cervical muscles, particularly feeling for trigger points (see later)*
- ***Move*** *the neck to check for restriction, both active and passive to determine level(s) of injury*

CERVICAL ROTATION

- *Upper cervical rotation, mainly C 1-2, is 50% (45 degrees). Examine in full flexion, which isolates to above C3*
- *Lower cervical rotation, from C3 to Th1 is also 50% (45 degrees). Examine in full extension, which excludes upper cervical rotation*

OTHER EXAMINATION

- *Assess the rest of the spine, as other areas may be involved and aggravating symptoms / preventing resolution*
- *Assess shoulder ROM, as restricted shoulder mobility may affect the neck*
- *Check breathing. Is it full diaphragmatic? or is the patient using accessory muscles, particularly trapezius, levator scapulae and excessive use of the scalenes*

STRESS (DYSFUNCTIONAL) BREATHING

- ***If the patient is breathing incorrectly, this may be a major factor in non resolution***
- ***Non diaphragmatic breathing will lead to:***

  (1) Excessive muscle tightness

  (2) Loss of Core Stability

ROUTINE CLINICAL PRACTICE

- ***In musculoskeletal medicine, the evaluation of respiratory mechanics should be a routine part of every physical examination, especially for patients with chronic cervical symptoms***
- ***We will show you how to assess breathing patterns***

MUSCLES OF RESPIRATION

- *The primary muscles responsible for respiration are the **diaphragm, intercostal muscles, scalenes, lateral abdominal muscles, muscles of the pelvic floor and the deep intrinsic muscles of the spine***
- *Each of these muscles, in addition to respiration, serves a dual role in postural function as stabilisers (i.e. Core Stability)*
- *The **scalene muscles** lift and expand the rib cage during inspiration and are active at a low level during every inspiratory effort and are therefore considered a primary, not an accessory muscle*

BREATHING DYSFUNCTIONS and COMMON PAIN SYNDROMES

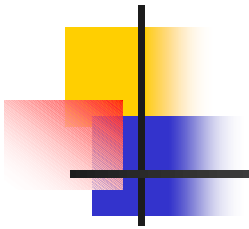
- ***The diaphragm plays a vital role in spinal stability***
- ***When its function is compromised, the spine is inevitably affected***
- ***The reverse is true. When there is muscle dysfunction, as in neck pain, it is very common to find abnormal breathing patterns***

FAULTY BREATHING PATTERNS

- *The most important fault in respiration is* ***lifting the thorax with the accessory muscles and not, or only partially, using the diaphragm, instead of widening the thorax in the horizontal plane***
- ***This over-strains the cervical and upper chest muscles, leading to chronic cervical strain***

ACCESSORY MUSCLES OF RESPIRATION

- *The **pectoralis major, pectoralis minor, latissimus dorsi, trapezius and levator scapulae** are not typically considered **accessory respiratory muscles***
- *In **dysfunctional,** or **paradoxical breathing,** they assume a more respiratory than postural function and contribute to the faulty pattern of lifting the ribcage up during inspiration*
- *This can lead to **overuse syndromes** in these muscles - **?? Fibromyalgia***



- ***Respiratory mechanics must be intact for both normal posture and spinal stabilisation to be possible***
- *A normal motor program for respiration must be* ***sub cortically "set"*** *in the nervous system*

MANAGEMENT

This commonly requires three things:

1. ***Treatment of underlying causative factors***
2. ***Breathing re-training with correct biomechanics***
3. ***Practice until this new program becomes "sub cortical" and functionally integrated***

"If breathing is not normalised – no other movement pattern can be"

- Karel Levitt

RESPIRATORY TRAINING

- ***KEY ADVICE: correct posture,*** *avoid tight clothing, holding tension in the abdomen and be mindful of signs of stress*
- ***KEY FACILITATION EXERCISES: respiratory training,*** *yoga, qi gong, or tai chi*
- ***KEY RELAXATION EXERCISES:*** *scalenes, upper trapezius and levator scapulae*

IMAGING

- ***Would you order X rays?***
- ***When should you order an MRI?***

CRITERIA FOR SELECTING PATIENTS FOR X RAYS

	LR
Midline posterior tenderness	1.9
Neurological deficit	7
Abnormal level of consciousness	11.8
Immediate onset of pain	2.9
Impaired ROM	2.5

Cervical Spondylosis

- ***Age related changes are seen in asymptomatic individuals.***
- ***Disc degeneration or zygapophyseal joint osteoarthritis is NOT a significant predictor for neck pain. .***
- ***Osteoarthritis is an age related change.***

MRI

- ***Only really useful in suspected neurological injury.***

TREATMENT

- *Most will resolve with simple treatment, or will go directly to an alternative practitioner (physiotherapist, osteopath or chiropractor)*
- *You will probably treat with NSAIDs and referral*
- *EBM states that heat is the most effective in the first 24 hours and paracetamol is as effective as NSAIDs*
- ***Provided there are no RED FLAGS, there is no need for referral or imaging studies***

The NON RESPONSIVE PATIENT

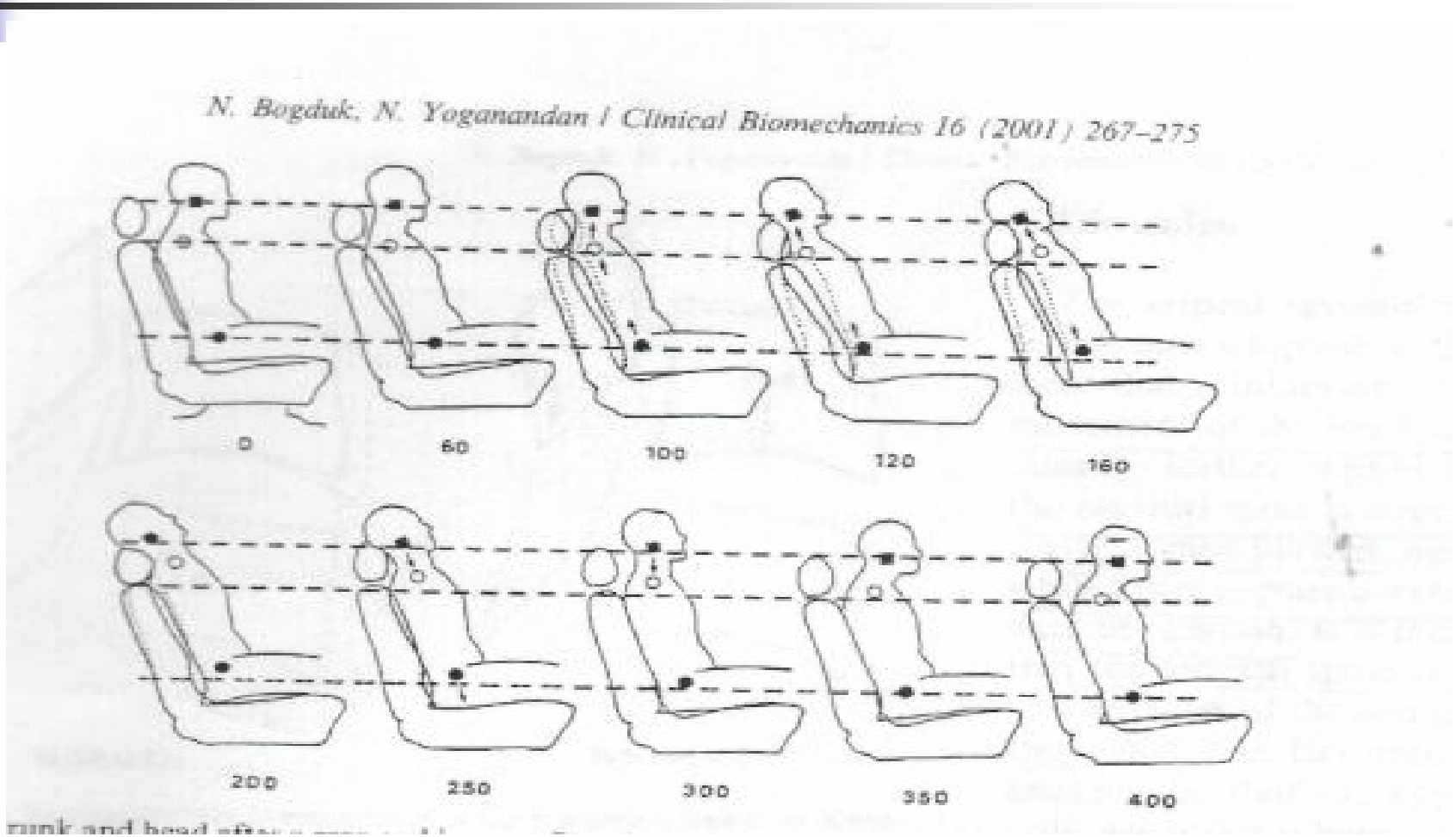
- ***Persistent headaches*** and/or ***Migraines***, usually following an upper cervical whiplash-type injury
- ***Chronic neck pain, with or without somatic referred pain*** (remember headaches are somatic) at lower levels, where mechanism of injury is similar

THE NON RESPONDER

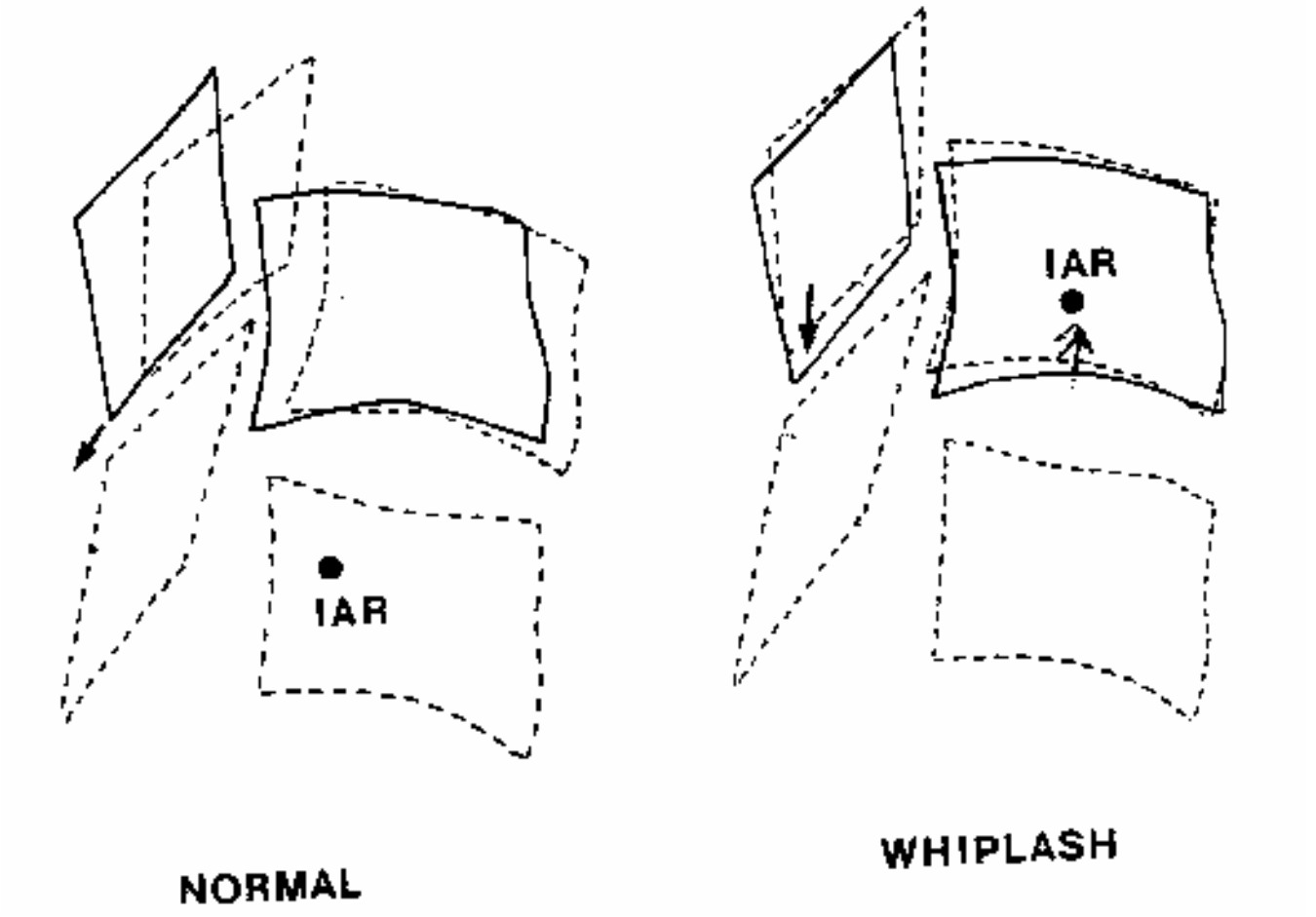
- ***What would you do?***
- ***How long before referral?***
  - ***No response to treatment / six weeks***
  - ***New or changing symptoms***
  - ***Concern about possible Red Flags***

THE MIND CAN ABSORB ONLY AS LONG AS THE SEAT CAN ENDURE

WHIPLASH


N. Bogduk, N. Yoganandan / Clinical Biomechanics 16 (2001) 267–275
0
60
100
120
160
200
250
300
350
400

Mechanism of injury



Zygoapophyseal joint injury

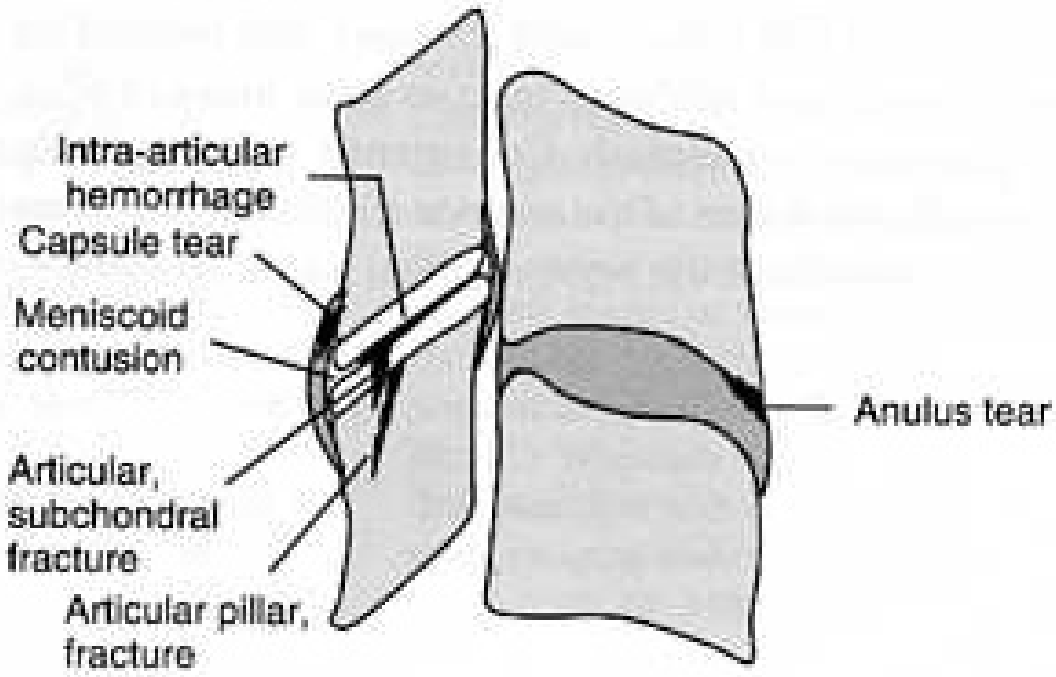


Figure 17.5 A sketch of the possible lesions of whiplash, as predicted by biomechanics studies.

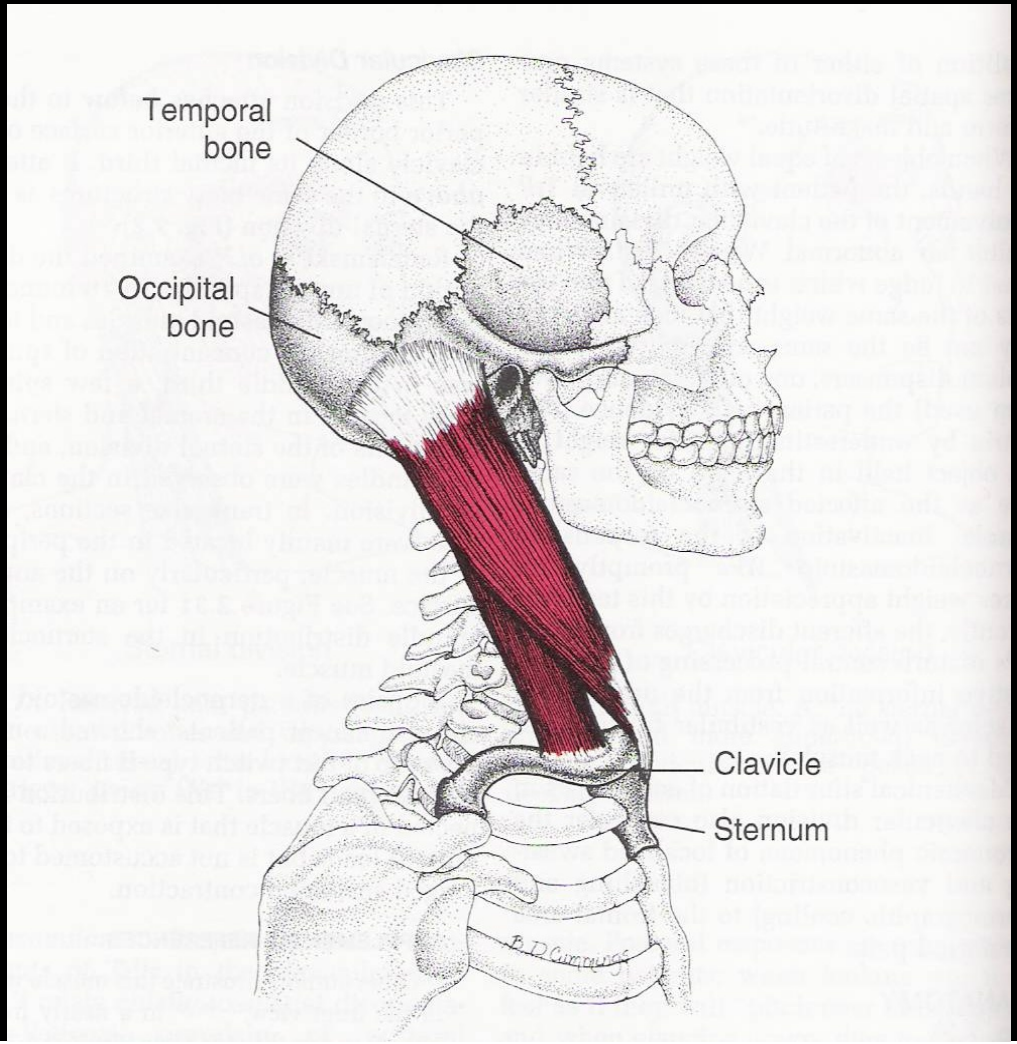
TRIGGER POINTS

- There are four major muscles we need to consider
- **STERNOCLEIDOMASTOID**
- **LEVATOR SCAPULAE**
- **ANTERIOR SCALENE**
- **TRAPEZIUS**

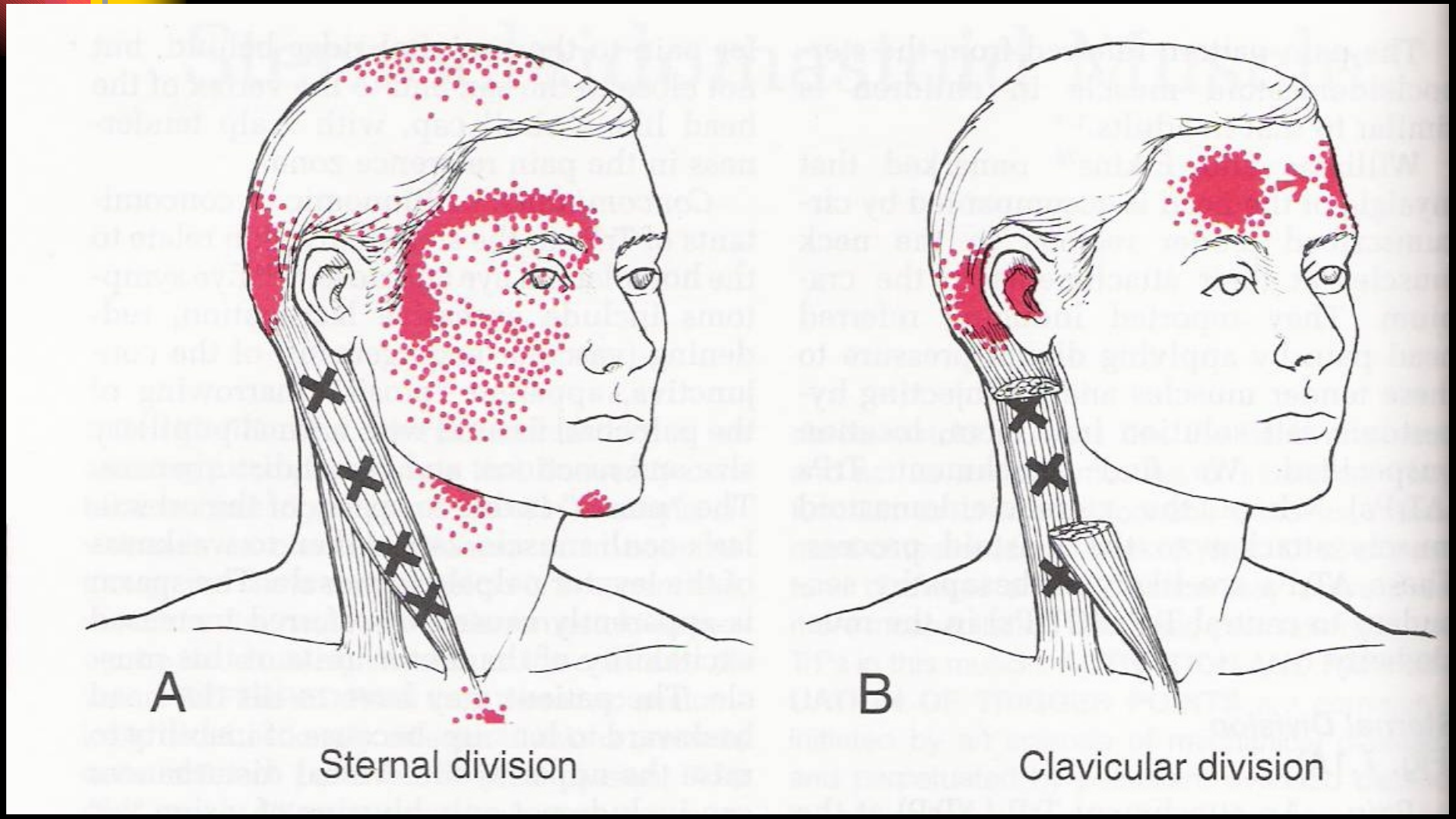
The THREE KEY POINTS

- **ORIGINS and INSERTIONS**
- **REFERRED PAIN PATTERNS**
- **EXAMINATION and TREATMENT**

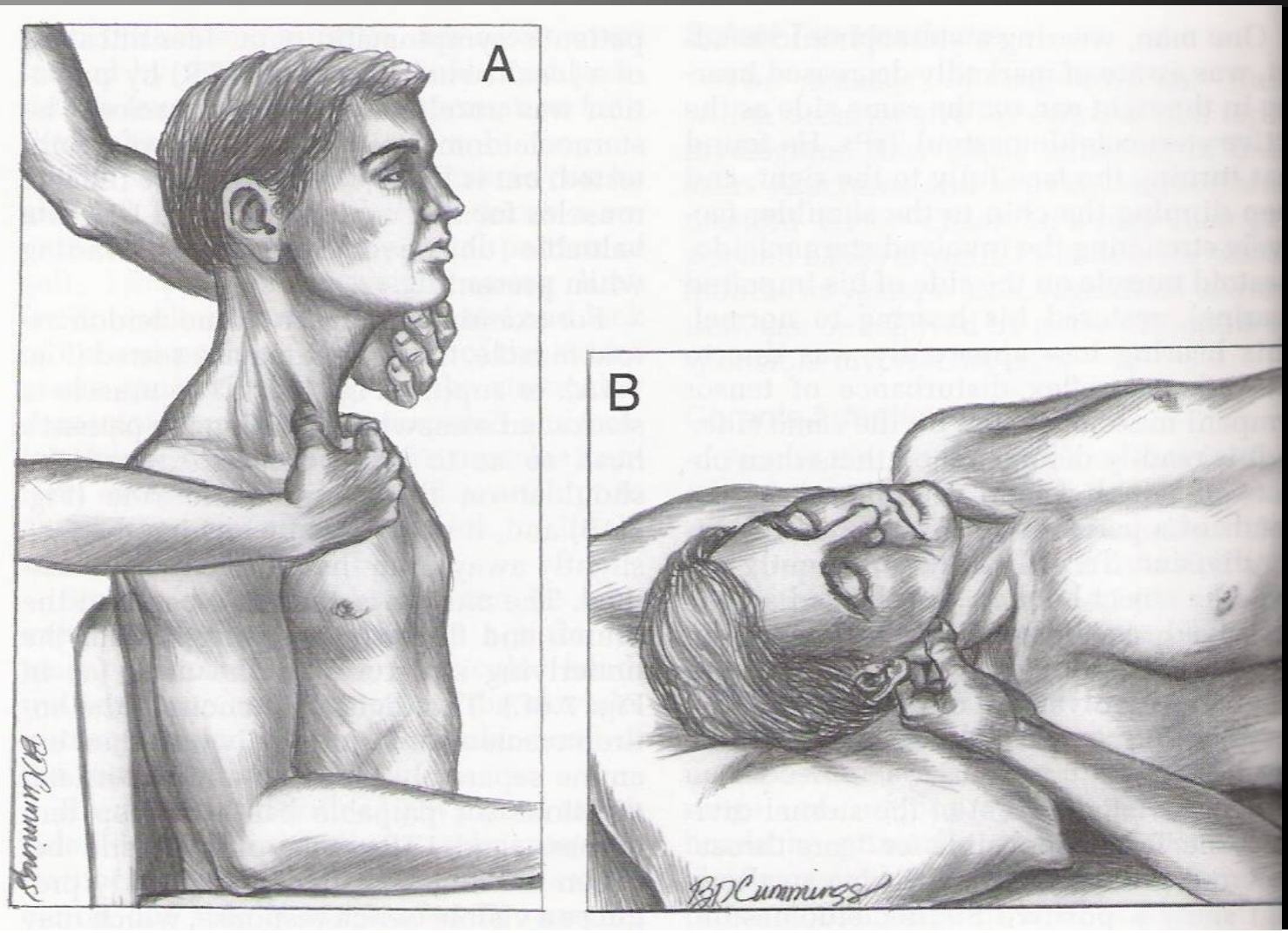
Sternocleidomastoid- origin and insertion



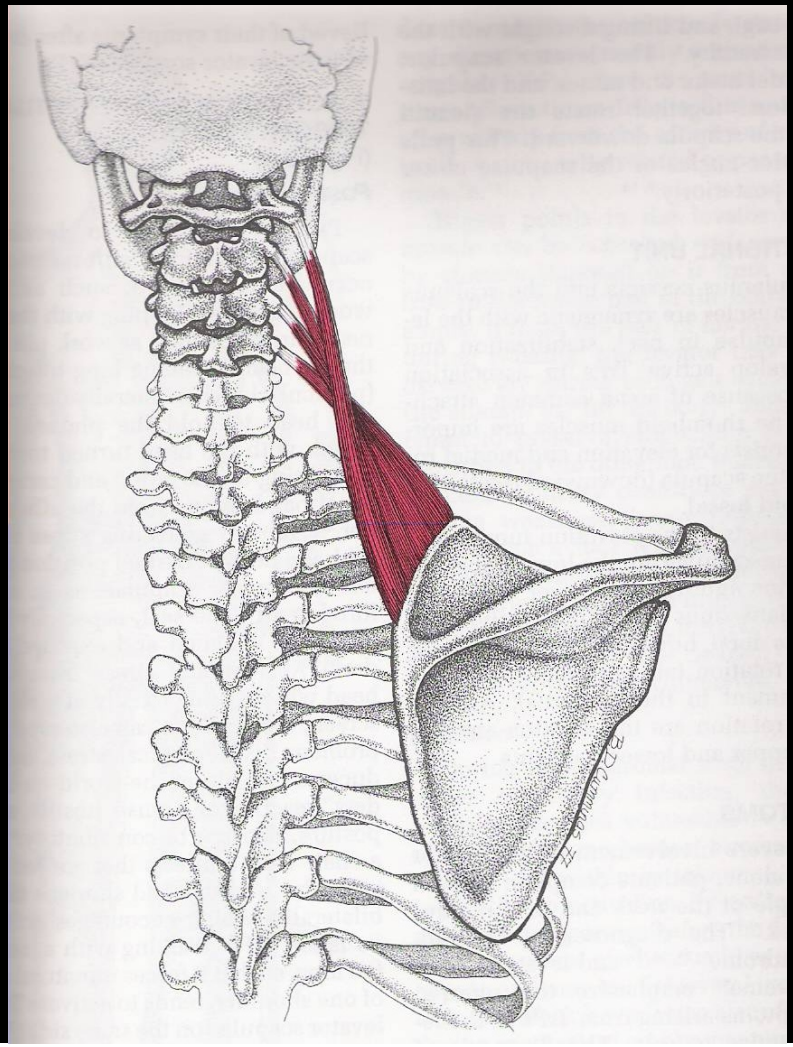
Sternomastoid - referral patterns



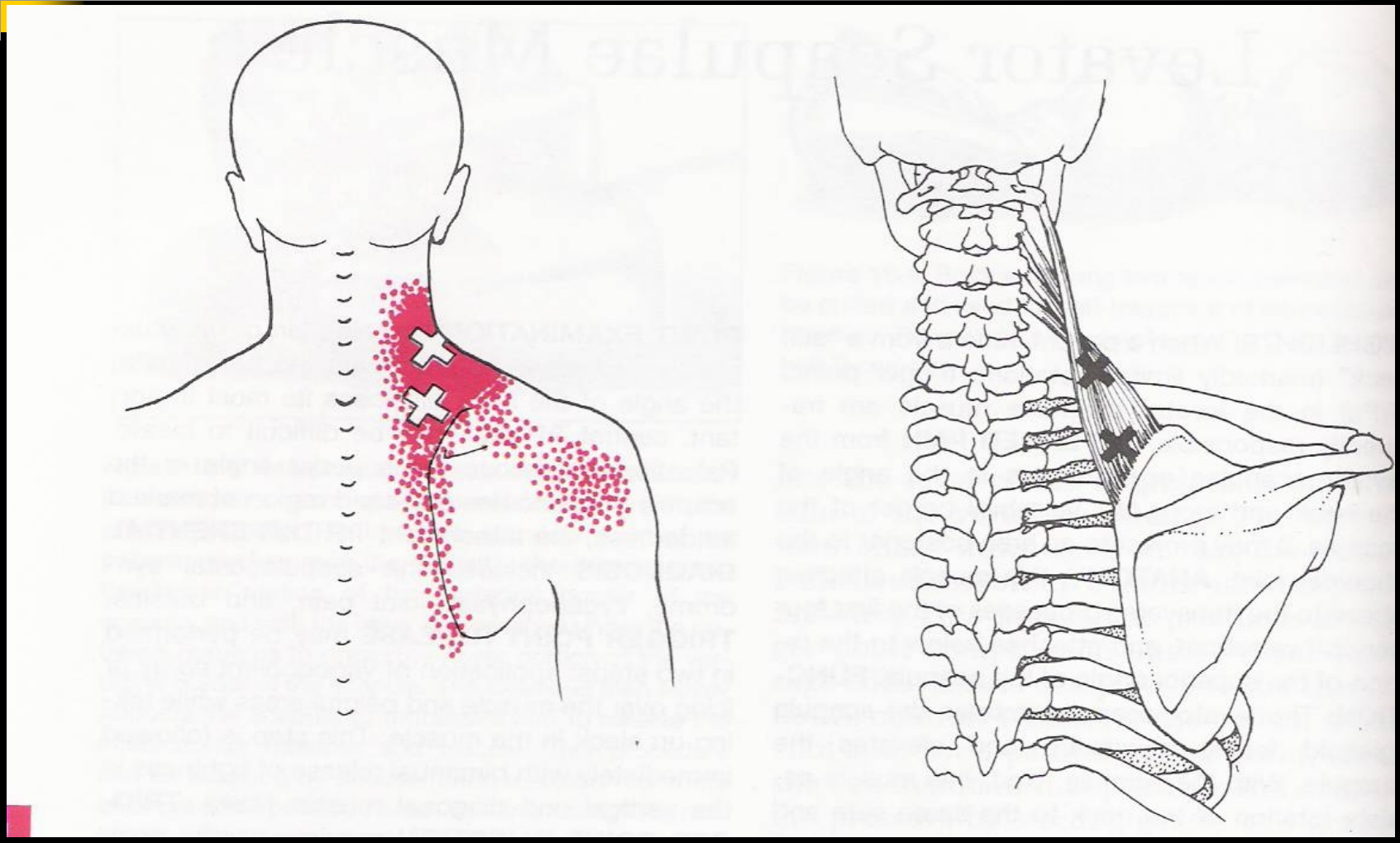
Sternocleidomastoid examination - seated & supine



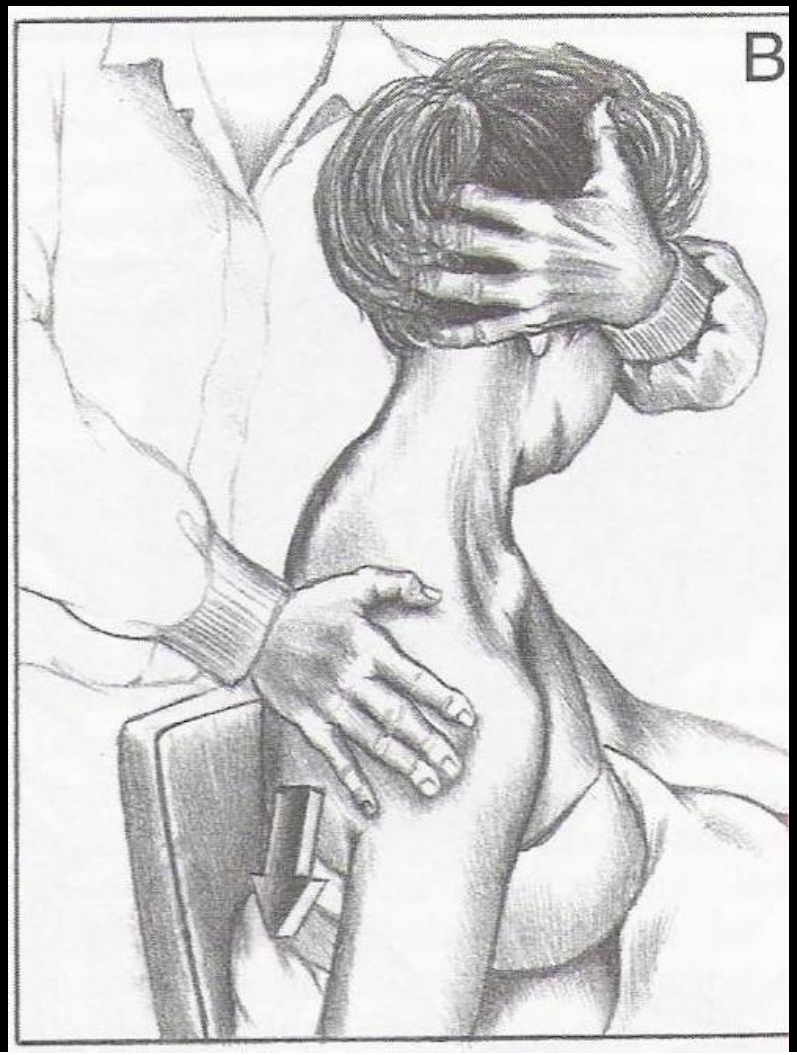
Levator Scapulae- origin and insertion



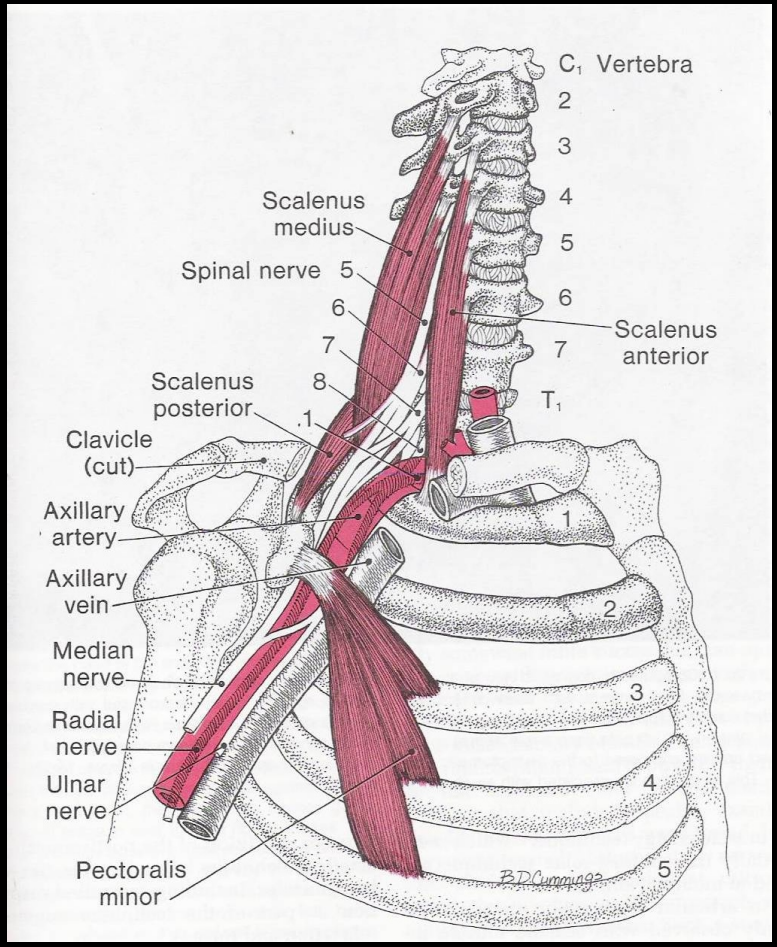
Levator Scapulae- referral patterns



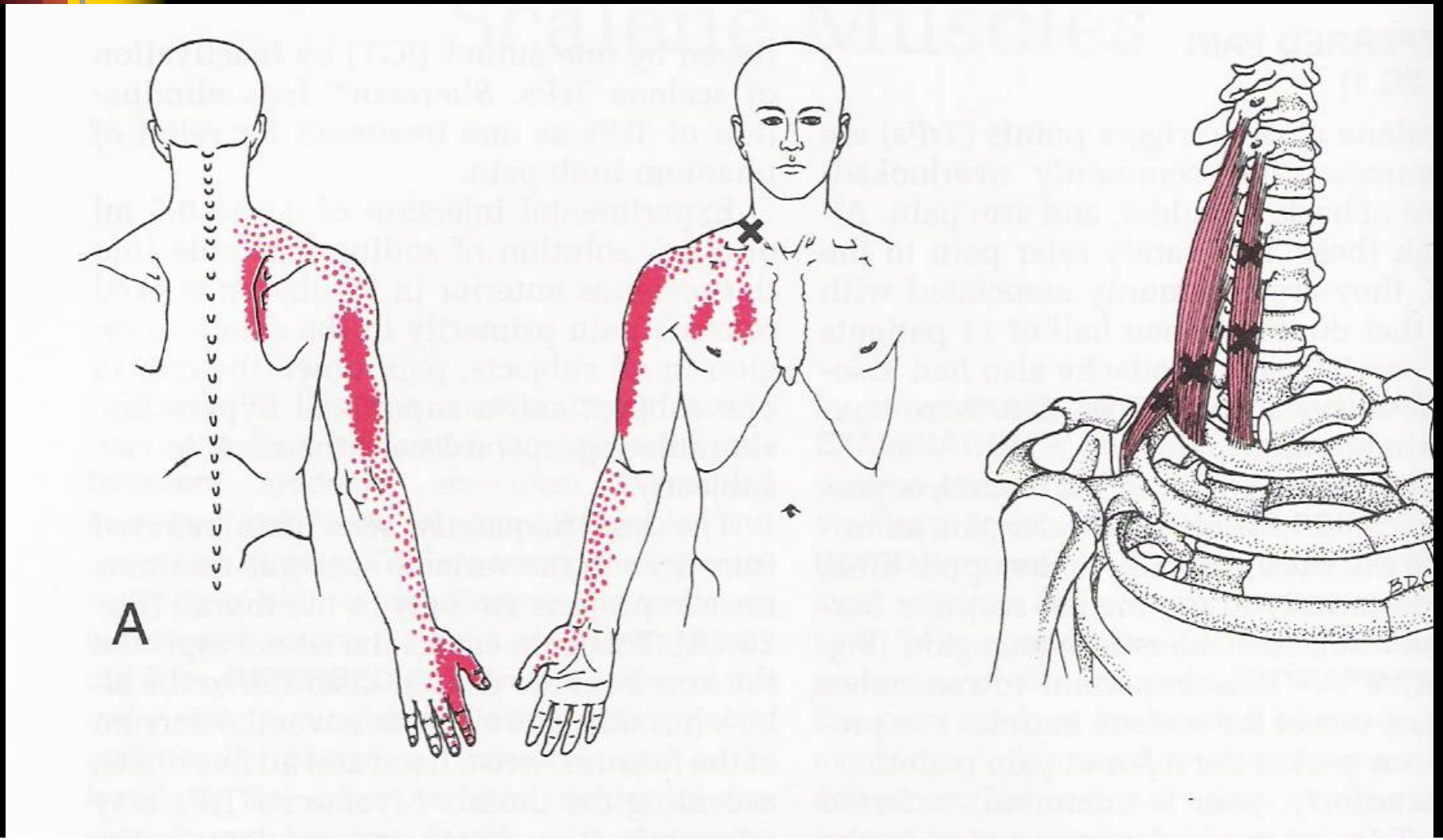
Levator Scap - exam & treatment



Scalenes – origin and insertion



Scalenes – referral patterns

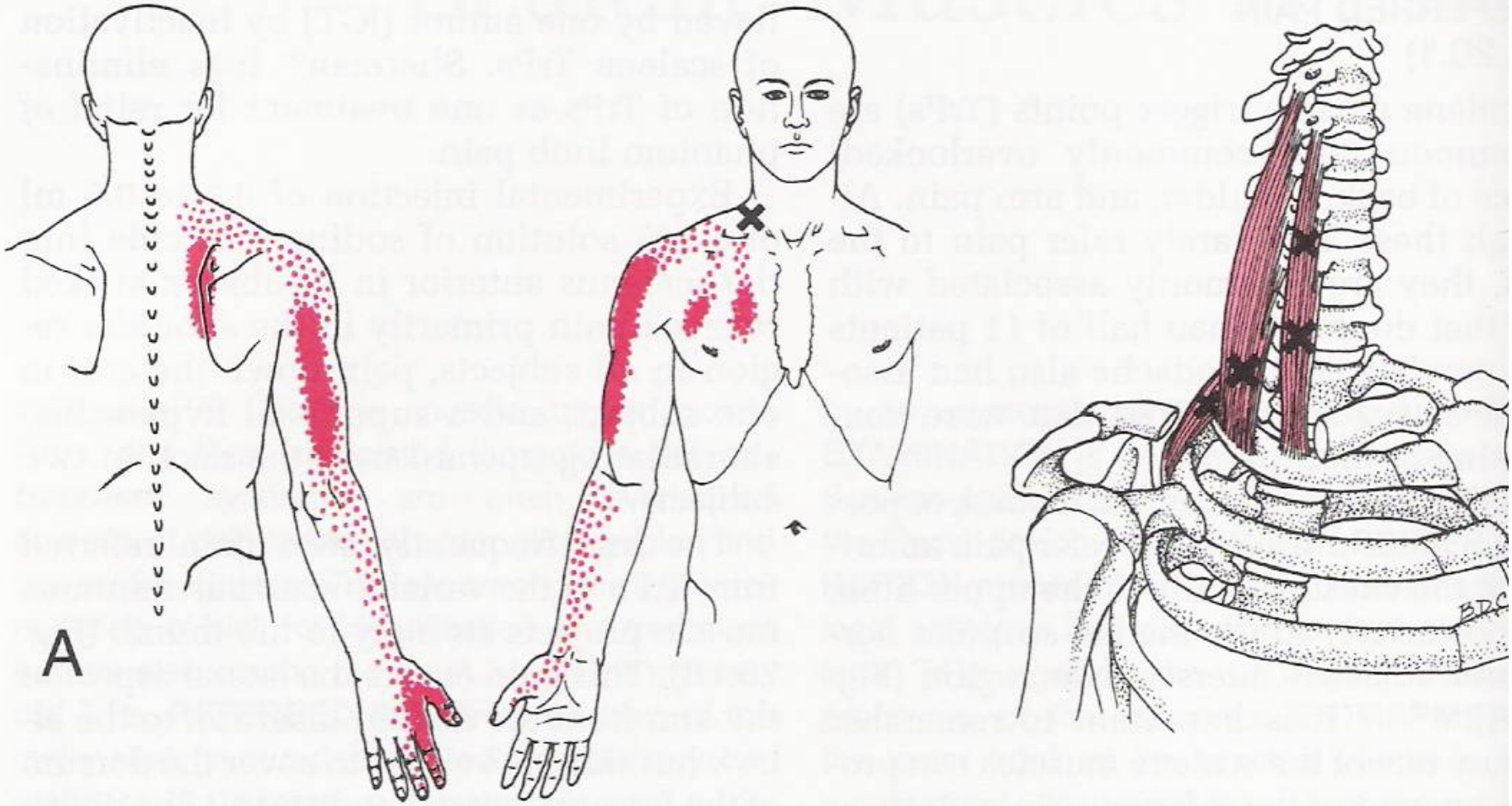


Take home point

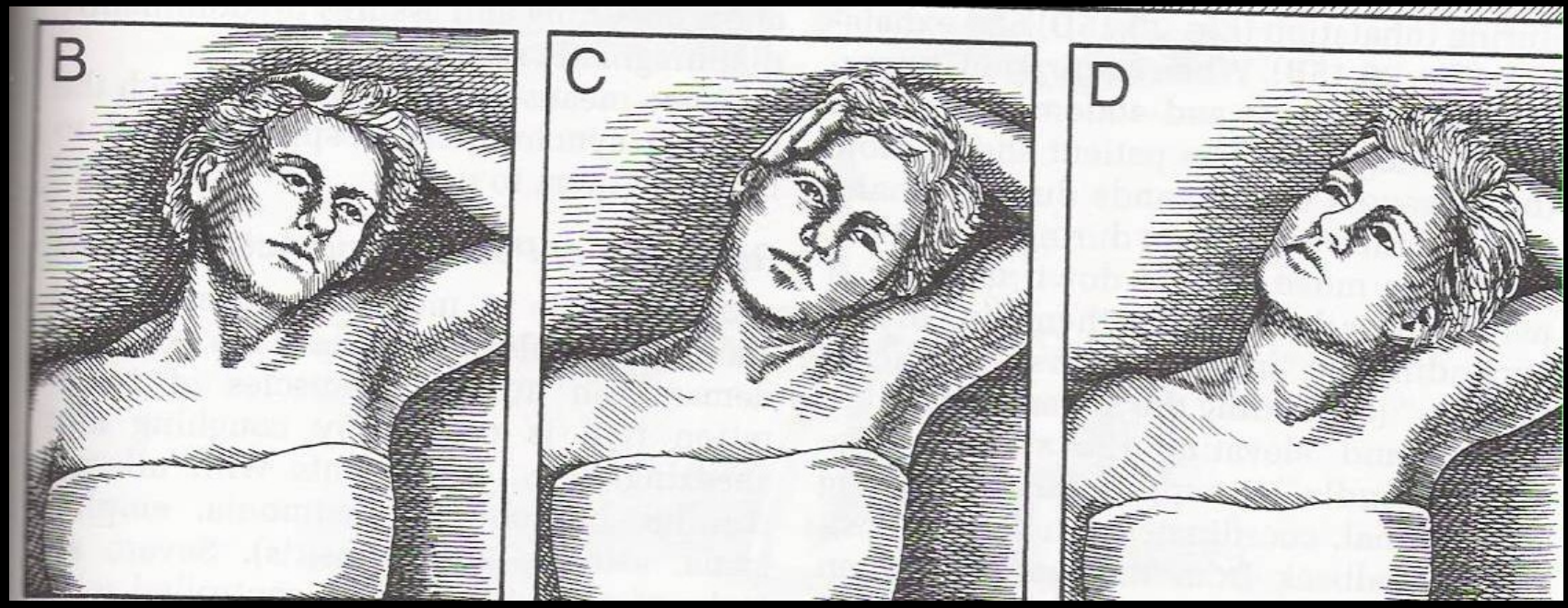
Medial border scapular pain, plus arm pain

…think…

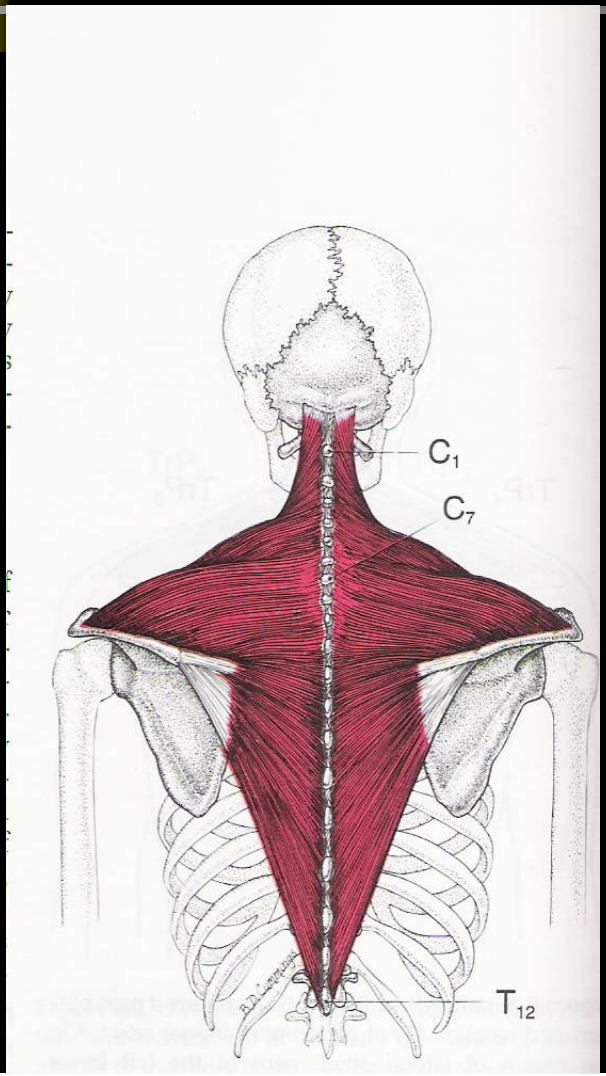
scalene

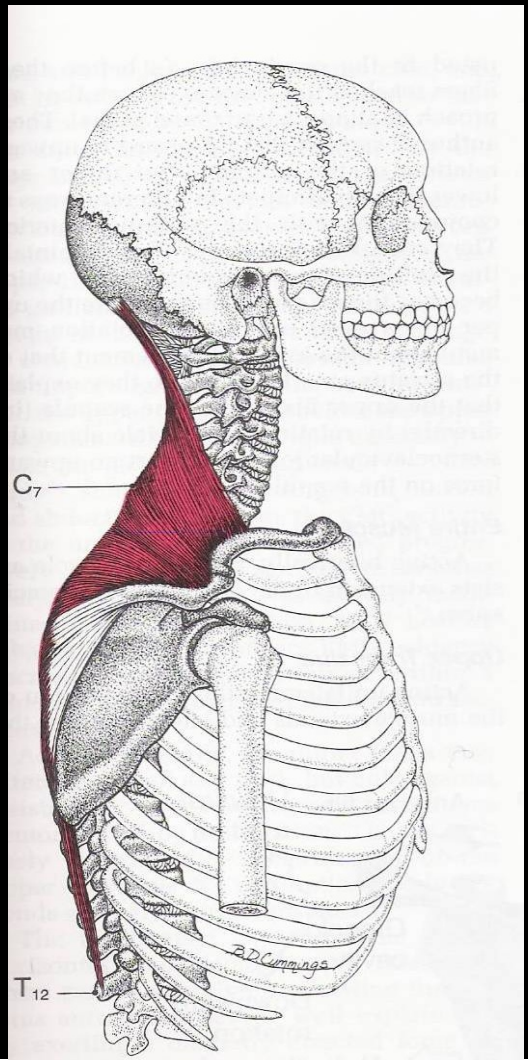

A

Scalene: posterior, middle, anterior treatment

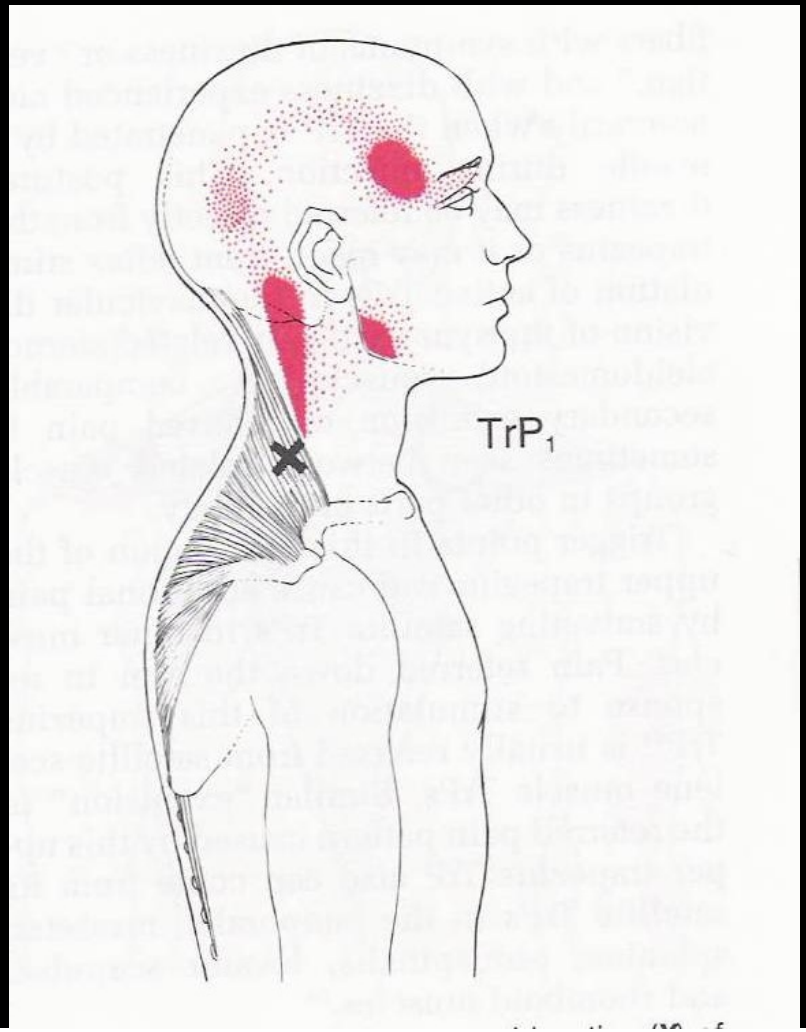


Trapezius- origin and insertion

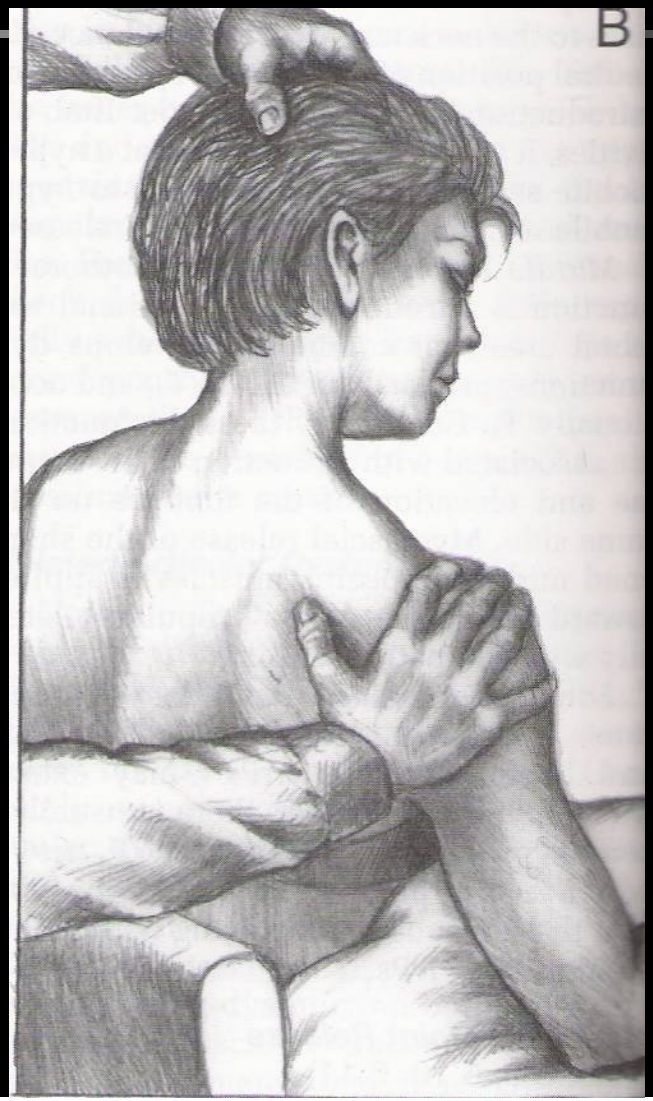




Trapezius (upper vertical fibres) -referral pattern

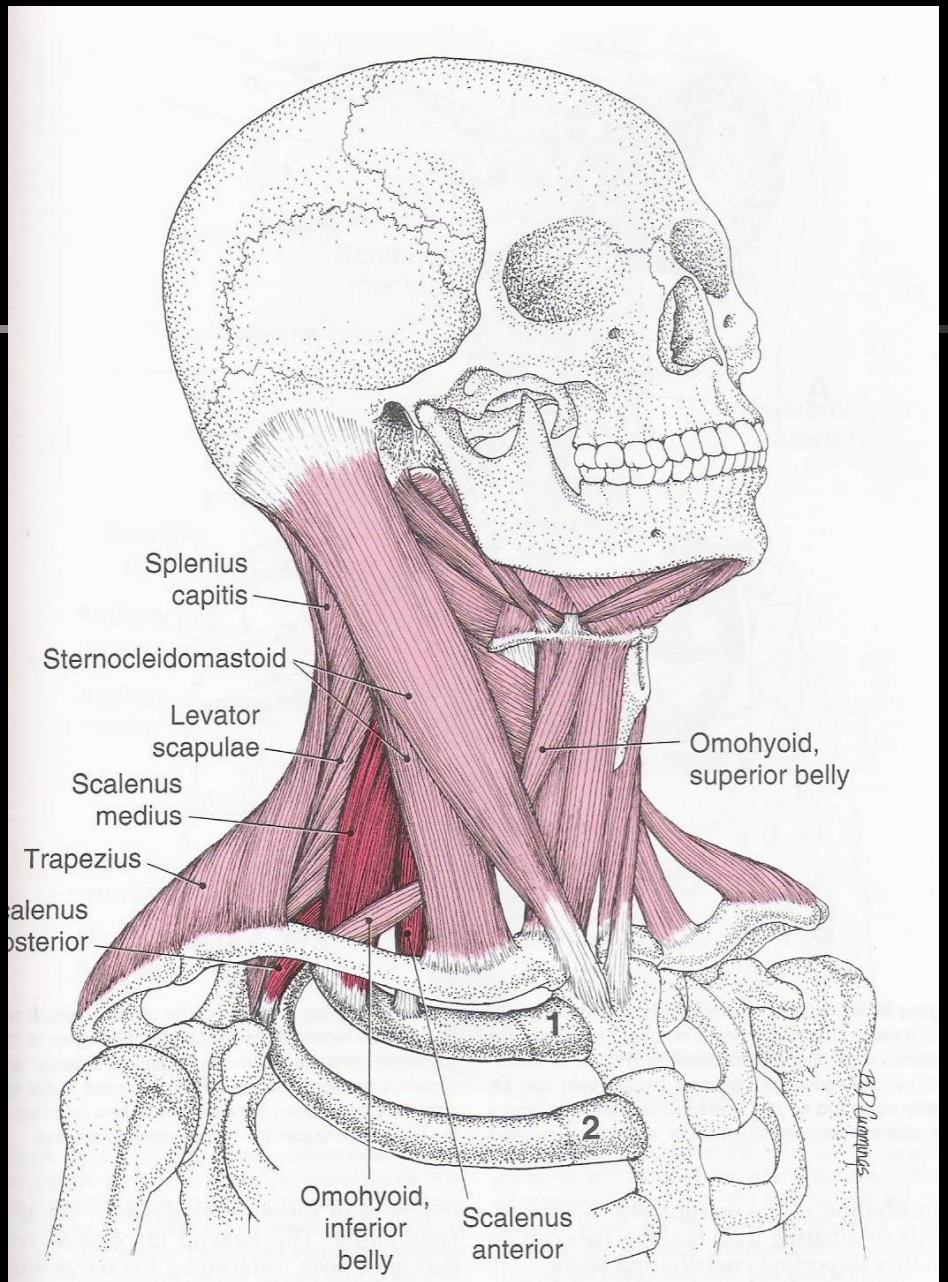


Trapezius – exam and treatment



Putting it together – the big 4

- Sternocleidomastoid
- Levator scap
- Scalene
- Trapezius



igure 20.7. Neighboring muscles (*medium red*) that though they do not have the same fiber direction. It

Thank you – the end