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Musculoskeletal Medicine - Cervical and Thoracic Spine - Pre-Conference Workshop

Thursday, 20 June 2013

Start 8:30am

Duration: 120mins

Works



Rotorua GP CME 2013
NZMA
New Zealand Medical Association

General Practice Conference & Medical Exhibition

20-23 June 2013 | Energy Events Centre | Rotorua

Upper limb/shoulder pain

Dr Rick Bernau

Dr Ian Wallbridge

2013

Hands on Shoulder, an approach to pain

- Brief Overview of pain history & anatomy
- Problems of examination and diagnosis
- Take home pattern recognition of myofascial pain
- Take home exam and treatment options

Useful links

- <http://www.triggerpointtherapist.com/products/trigger-point-dvd/shoulder-pain-protocol/>
- www.pressurepointer.com/PressurePointerManual.pdf

TAXONOMY

**NATIONAL MUSCULOSKELETAL
INITIATIVE SUGGESTED**

**SOMATIC FIBRO-MUSCULAR
IMPAIRMENT OF THE
SHOULDER**

Bamji et al- 1996

- **3 Rheumatologists achieved 46% agreement in diagnosis.**
- **All recommended injection of cortisone for almost everything**

- **Third most common musculoskeletal complaint in general population**
- **Account for approximately 5 % of musculoskeletal consultations to general practitioners**

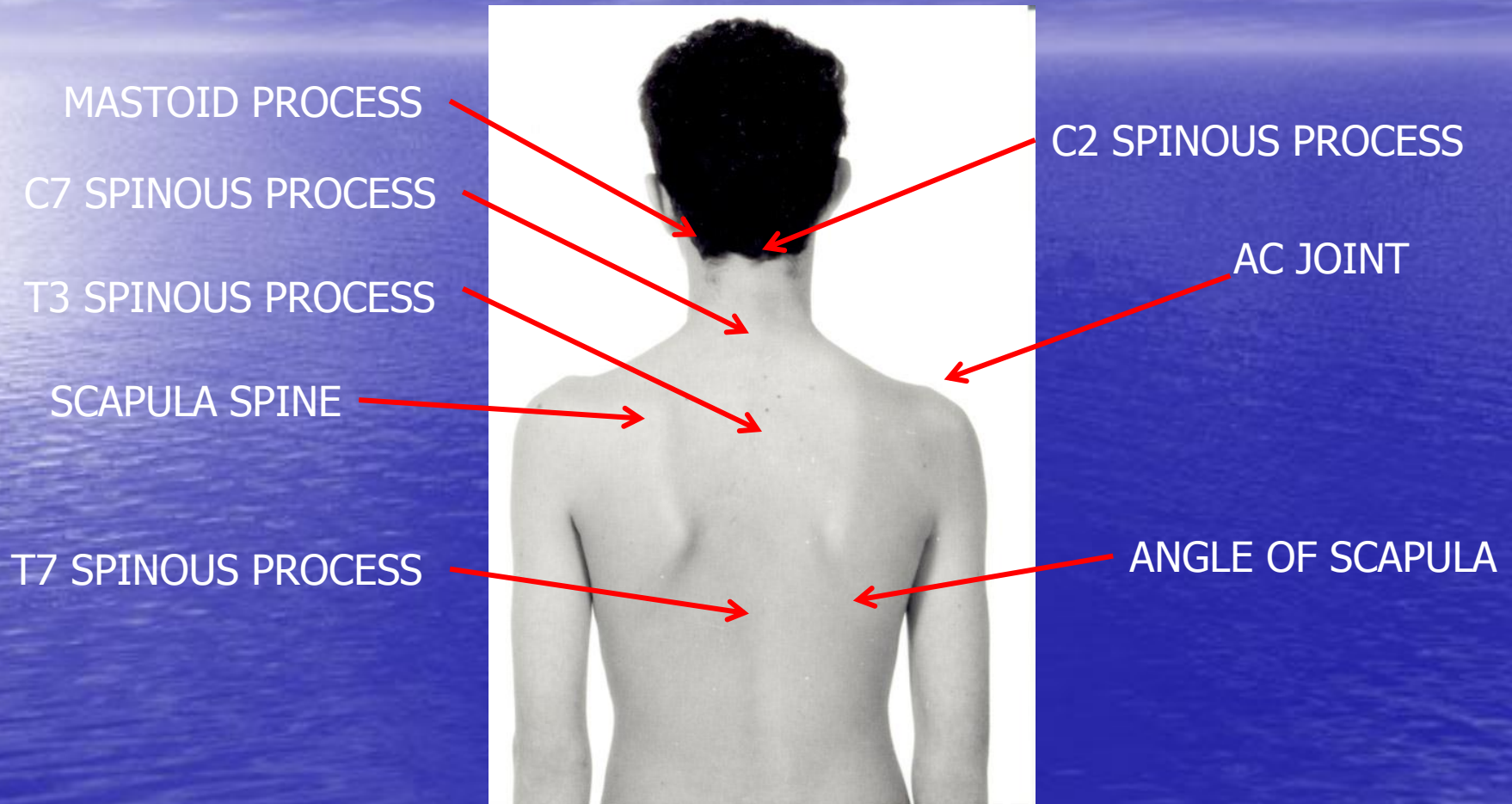
Considerable cost to public of NZ

SHOULDER COMPLEX

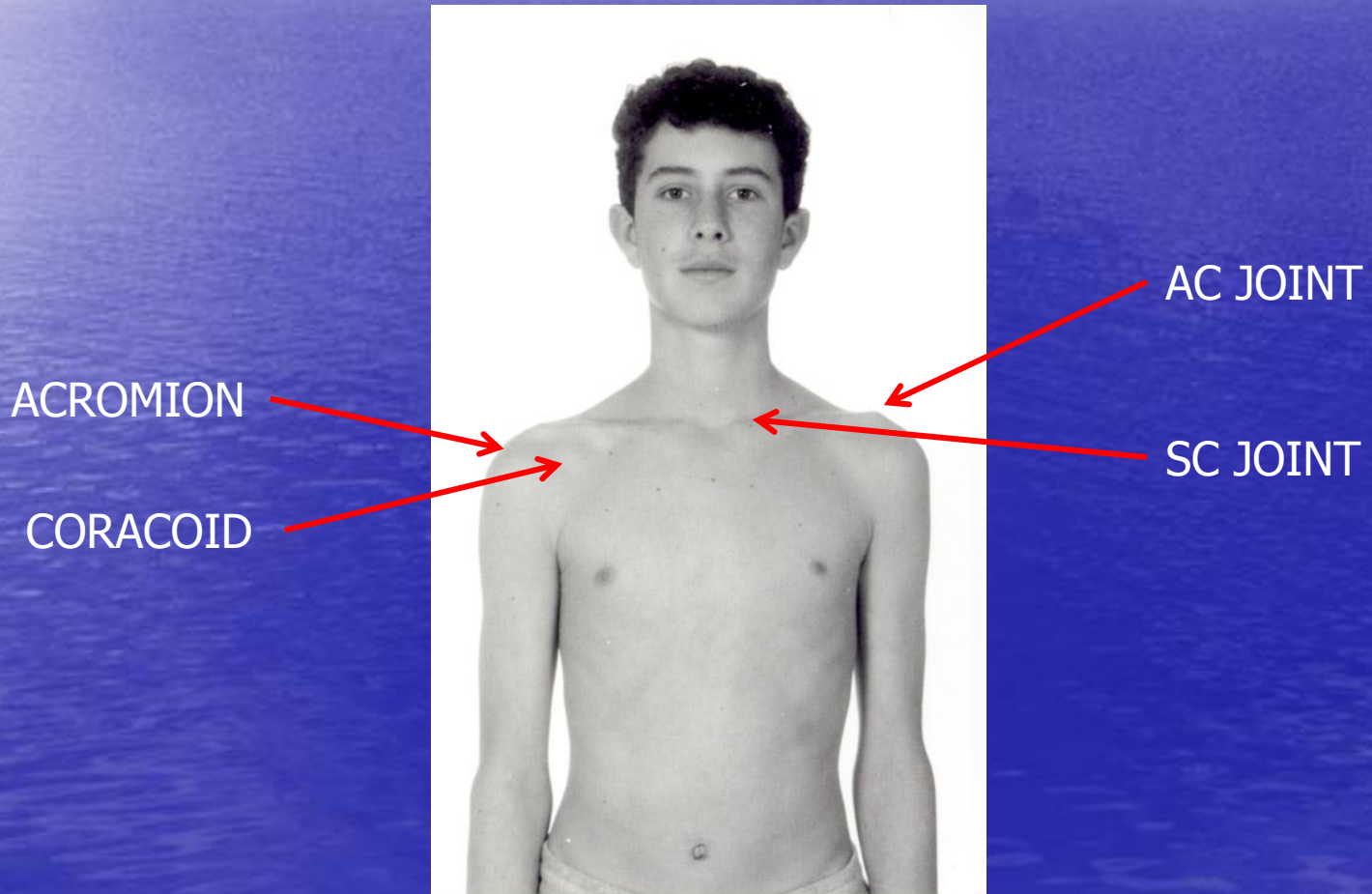
ANATOMY

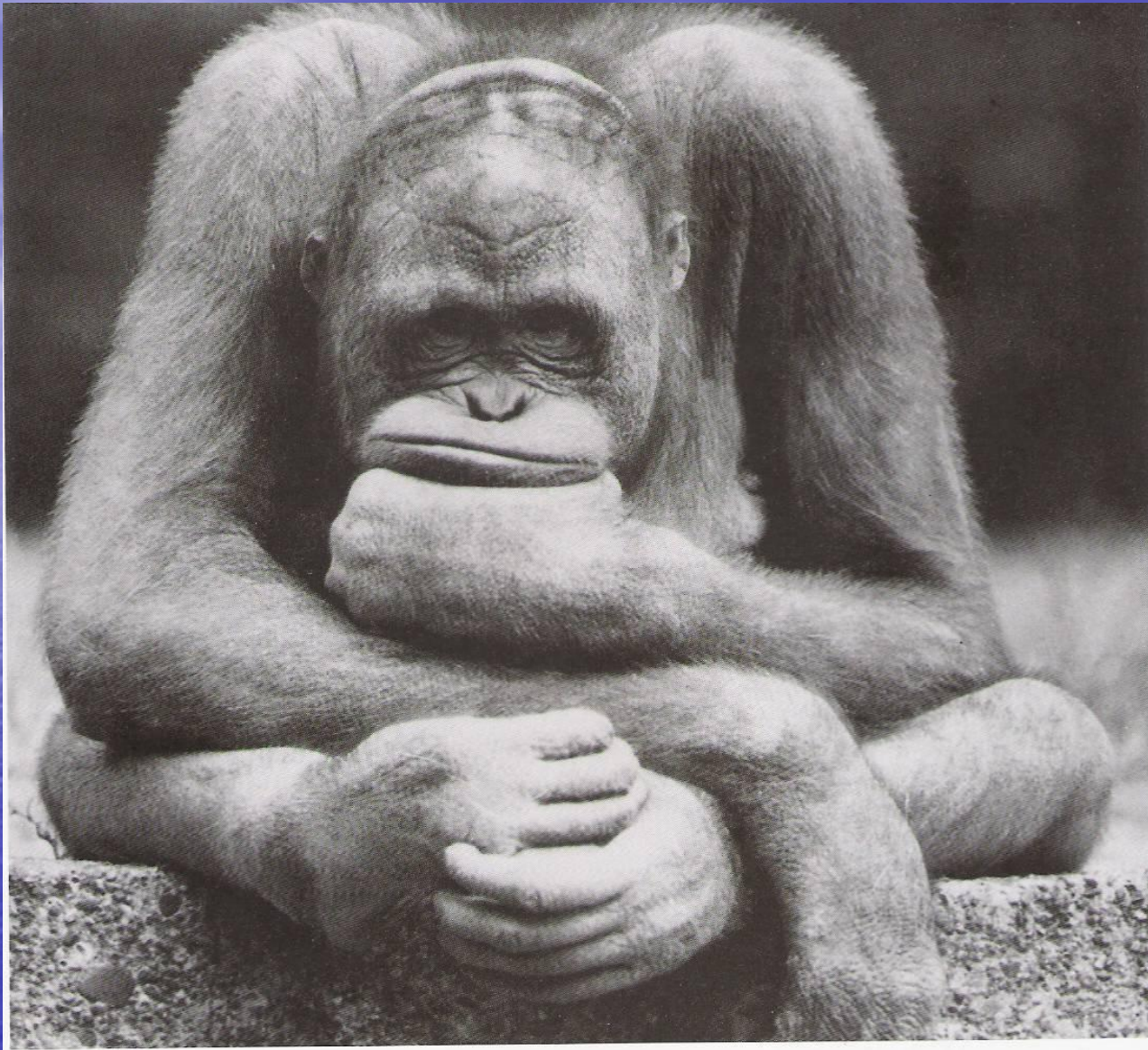
- **Sterno-clavicular joint**
- **Acromio-clavicular joint**
- **Gleno-humeral joint**
- **Subacromial 'joint'**
- **Scapulo-thoracic 'joint'**

Surface anatomy (post)



Surface anatomy (ant)





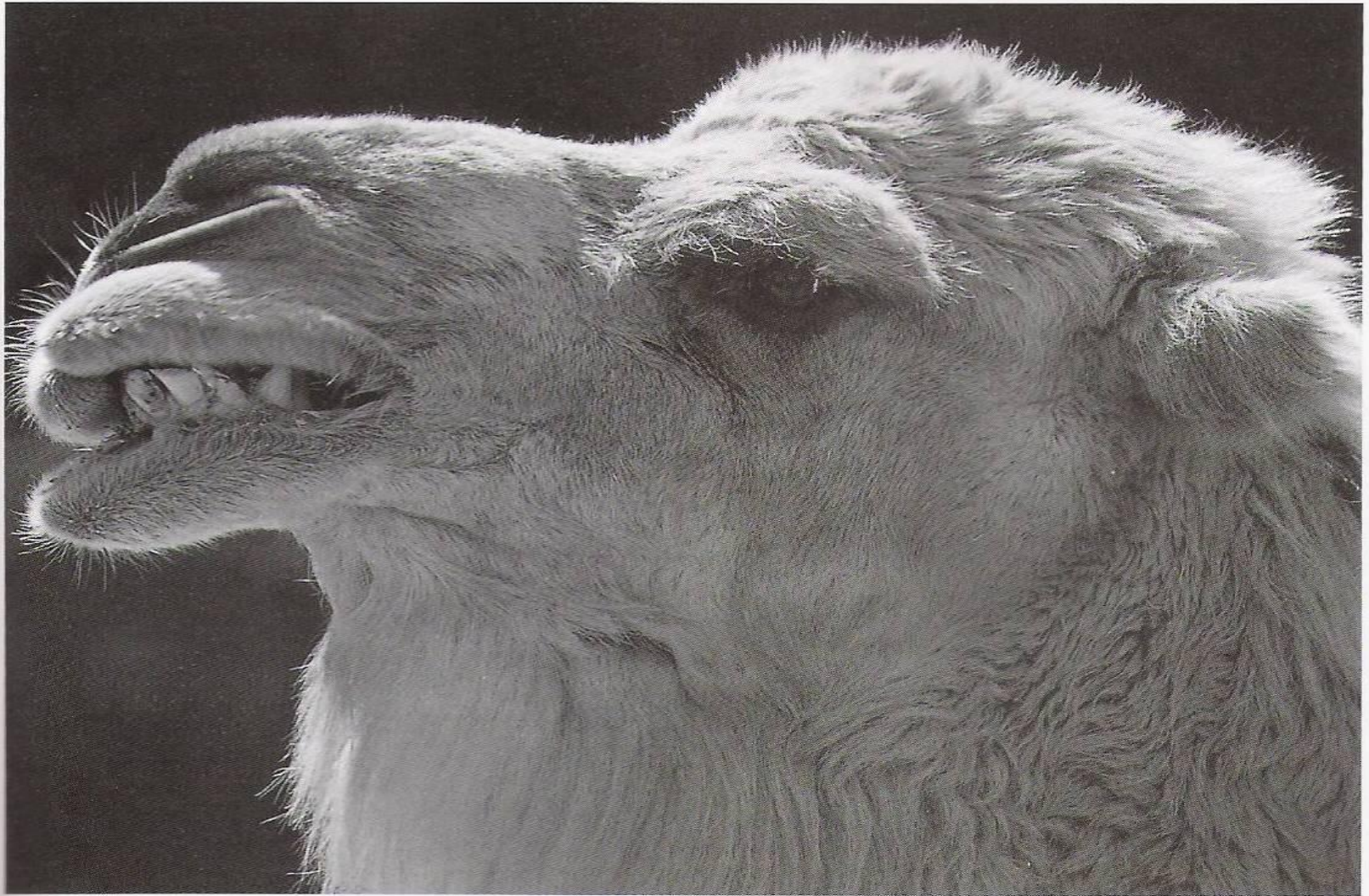
Oh what to do, what to doooo?



Well, if you're like most people, you'll hide behind a flimsy belief that everything will sort itself out.



Then you'll spend the rest of your life
looking over your shoulder, waiting for everything
to go wrong all over again.



All the while becoming crusty and cynical

10 point history & red flag acronym

Socrates ad(s)

- Site
- Onset
- Character
- Radiation
- Alleviating factors
- Times of occurrence
- Exacerbating factors
- Severity
- Associated factors
- Disability scores
- Systems review gives.....

Vision

- Visceral/Vascular
- Infection
- Significant Fracture
- Inflammatory
- Other
- Neoplasm

Socrates ads vision

- **SITE**
- Assist patient to find main focus/ worst /most often.

Socrates ads vision

- **O**nset
- - **Duration**- acute /chronic
- **Mode**- gradual /sudden (think vascular)
 - spontaneous/traumatic
 - well/ill

(Spontaneous and ill think red flag-risk factors for spinal infection)

“ were you well or ill or stressed when it started”

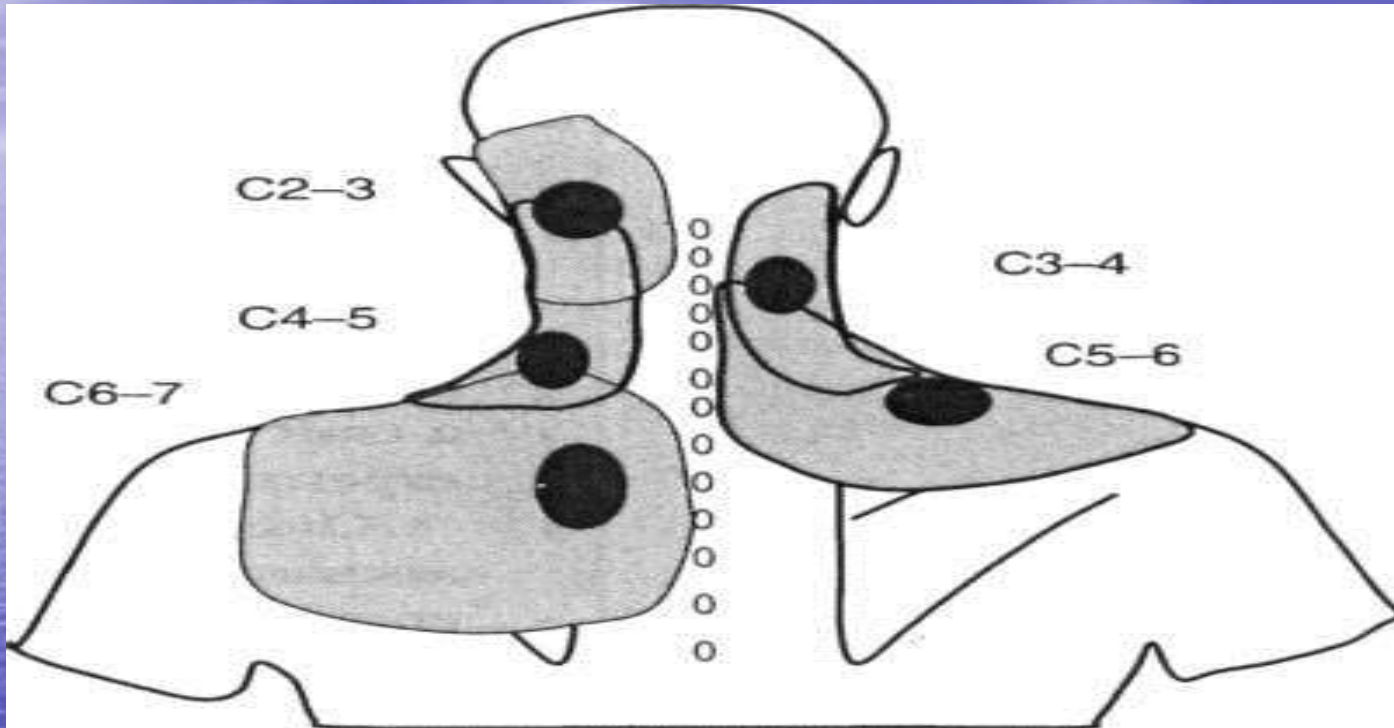
Socrates ads vision

- Character
- -deep spreading aching dull sore (think somatic)
- -superficial moving stabbing shooting burning (think radicular/neurogenic)

Socrates ads vision

- Radiation
- The most important issue is where pain is felt consistently not the extent of the radiation

Z joint pain maps



C2-3 suboccipital

C3-4 levator scap

C4-5 angle between neck and top of shoulder girdle

C5-6 supraspinatus fossa (radiate to deltoid)

C6-7 ss and is and gravitates to medial border scapula

Anatomy and Pain Pattern

Teres Minor



Teres Minor



Socrates ads vision

- **A**lleviating factors
 - posture
 - heat/cold
 - manual
 - drug (prescription or “natural”)

Socrates ads vision

- Times of occurrence
- night (think red flag especially if combined with spontaneous onset)

Socrates^e ads vision

- **E**xacerbation
- - movement/activity (if not think red flag)
- “if you're in pain what makes it worse”

Socrates ads vision

- Severity
- VAS Visual analogue pain score 0-10/10

Socrates **a**ds Vision

- **A**ssociated factors
- -nausea weakness parasthesiae etc

Socrates ads Vision

- Disability score

Socrates ad**s**

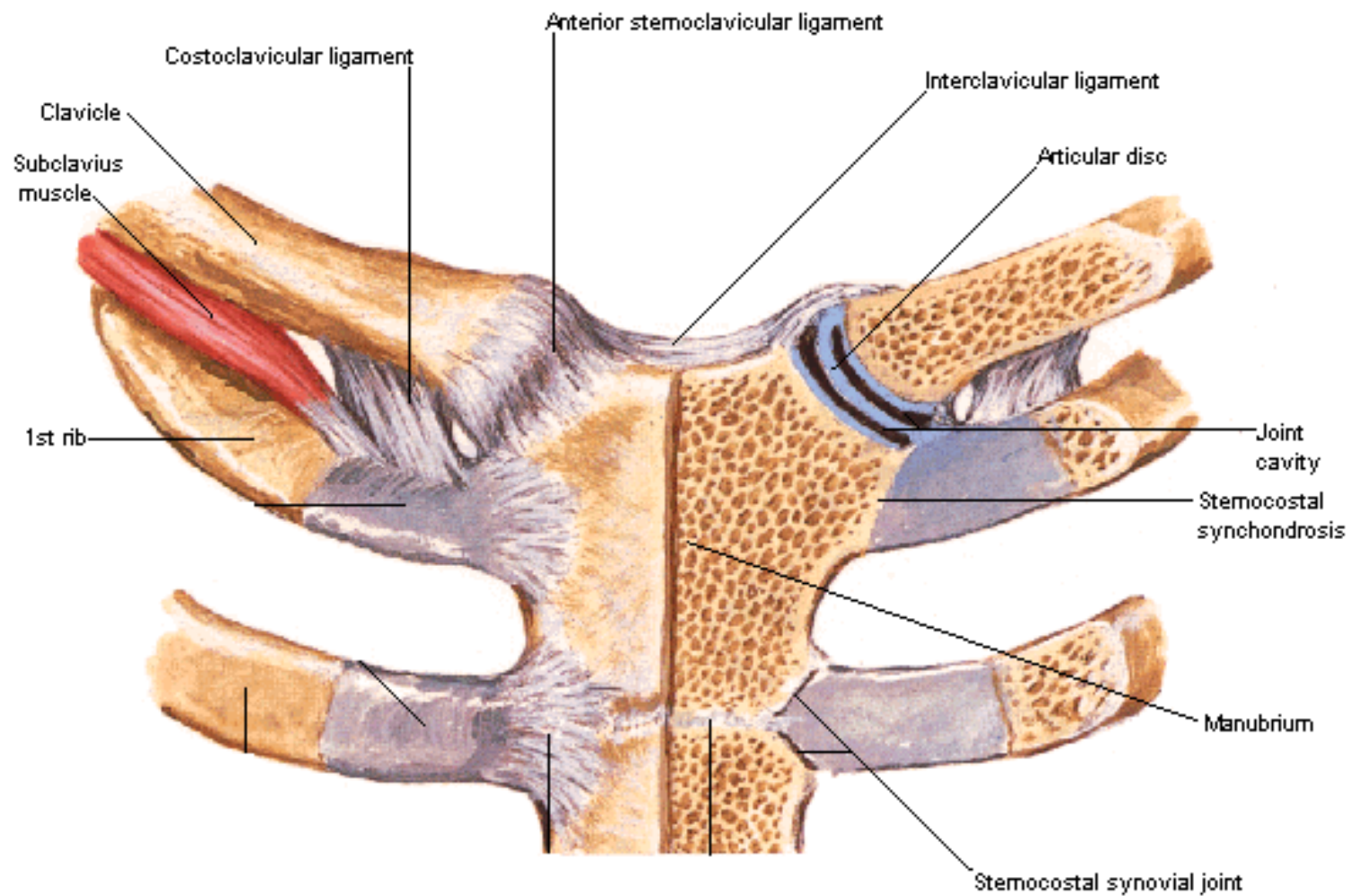
– **S**ystems review
is for the red flag check

- **V**isceral/Vascular
- **I**nfection
- **S**ignificant Fracture
- **I**nflammatory
- **O**ther
- **N**eoplasm

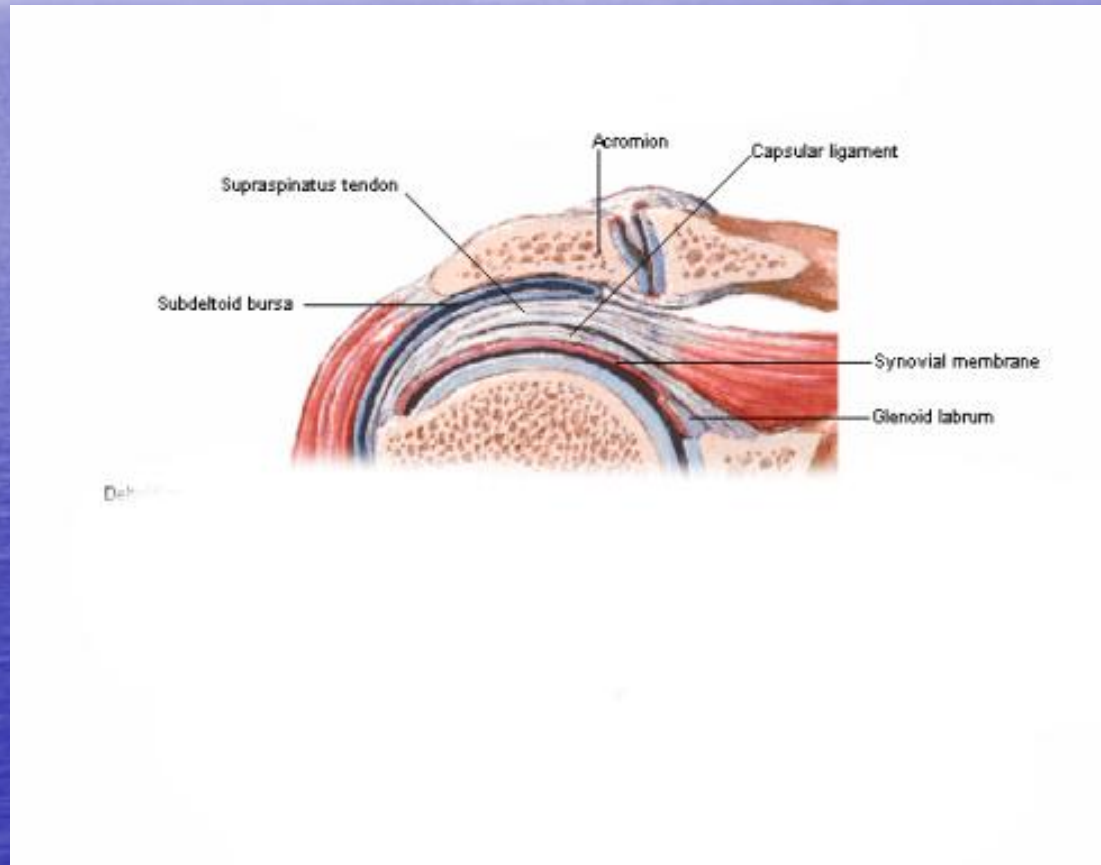
Take home point!!!!!!!!!!!!!!!!!!!!!!

- Socrates Ad(s) = pain history
- The red flags are **VISION** which are mercifully rare generally diagnosed by history and systems review+/- imaging
- By exclusion left with **SOMATIC FIBRO-MUSCULAR IMPAIRMENT OF THE SHOULDER**

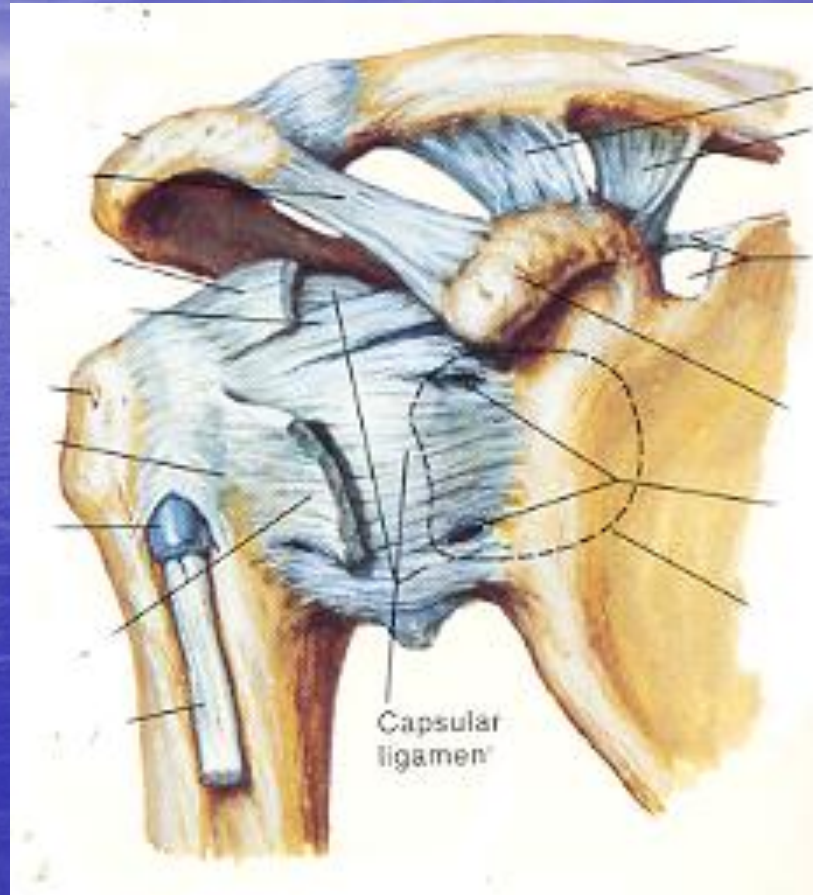
Sternoclavicular Joint



ACROMIO-CLAVICULAR JOINT



ACROMIO-CLAVICULAR JOINT





MOBILE

LACKS

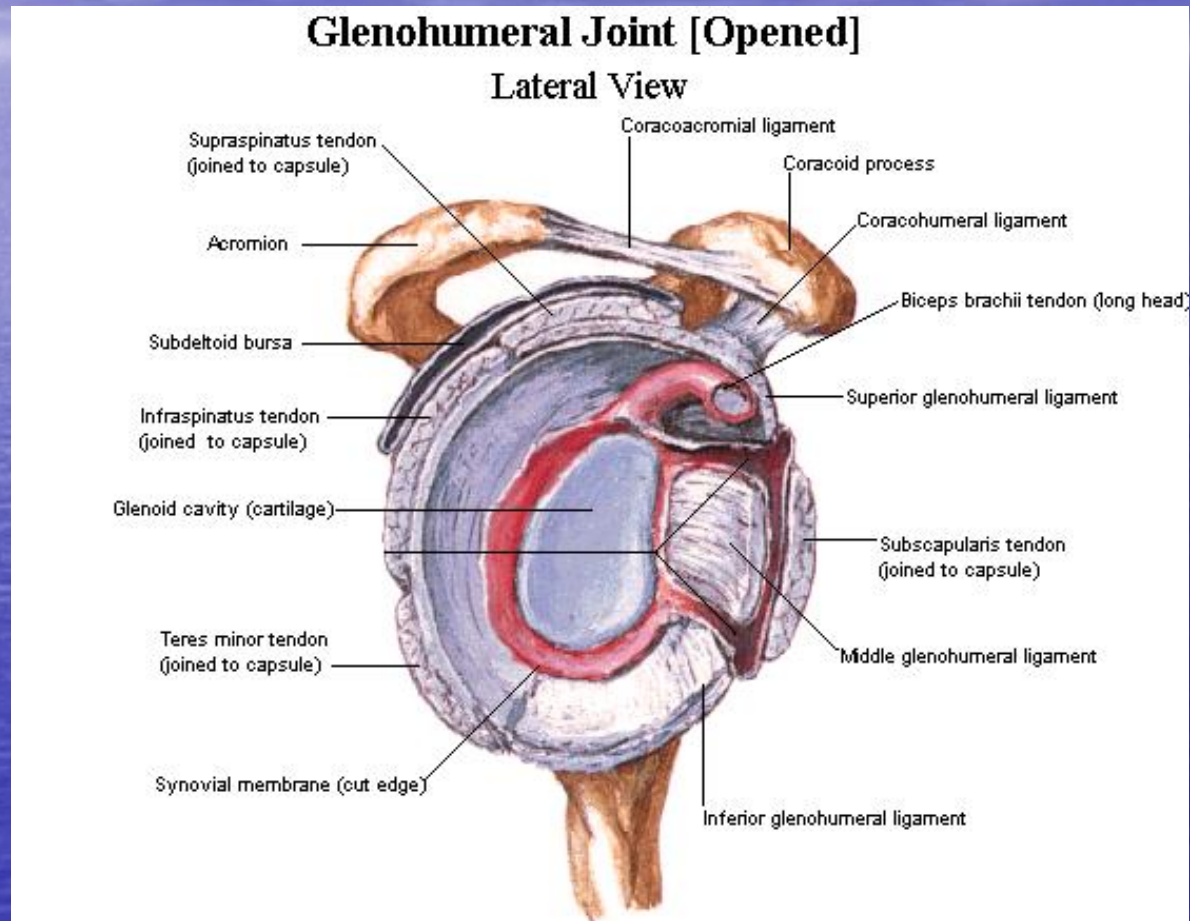
STABILITY

STABILITY

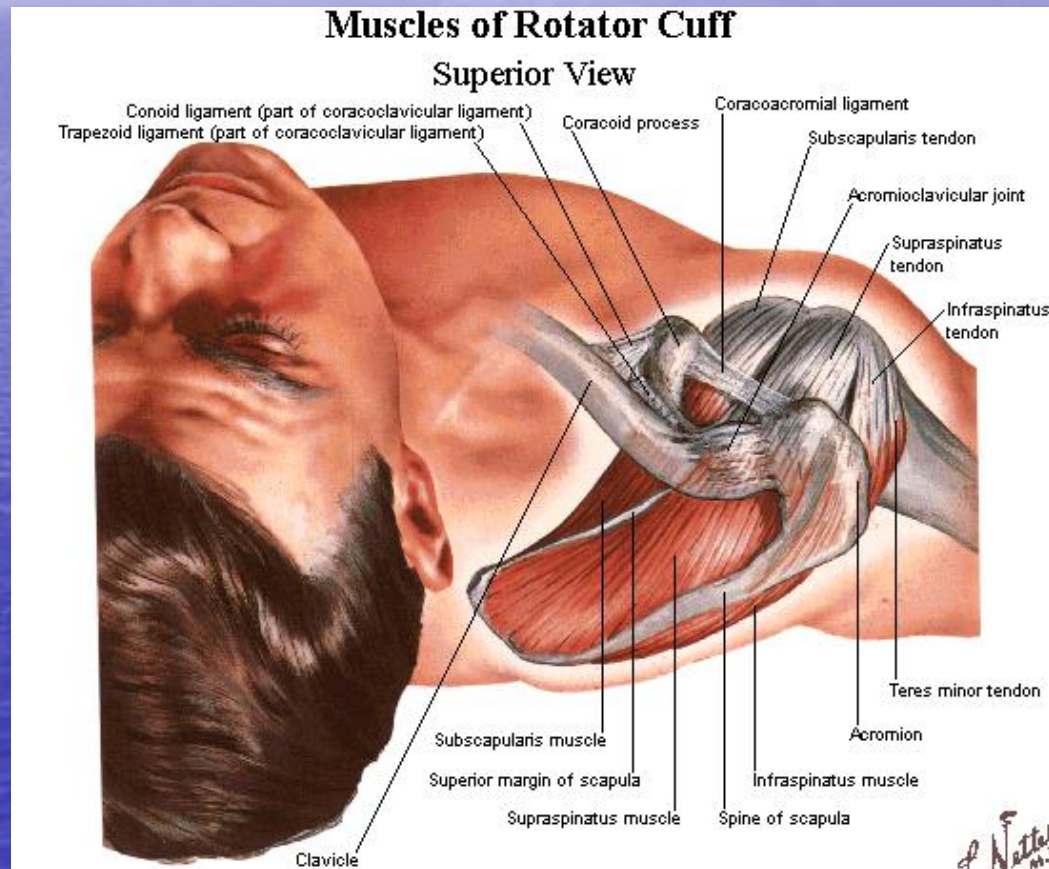
- **STATIC**

- **DYNAMIC**

STATIC STABILITY

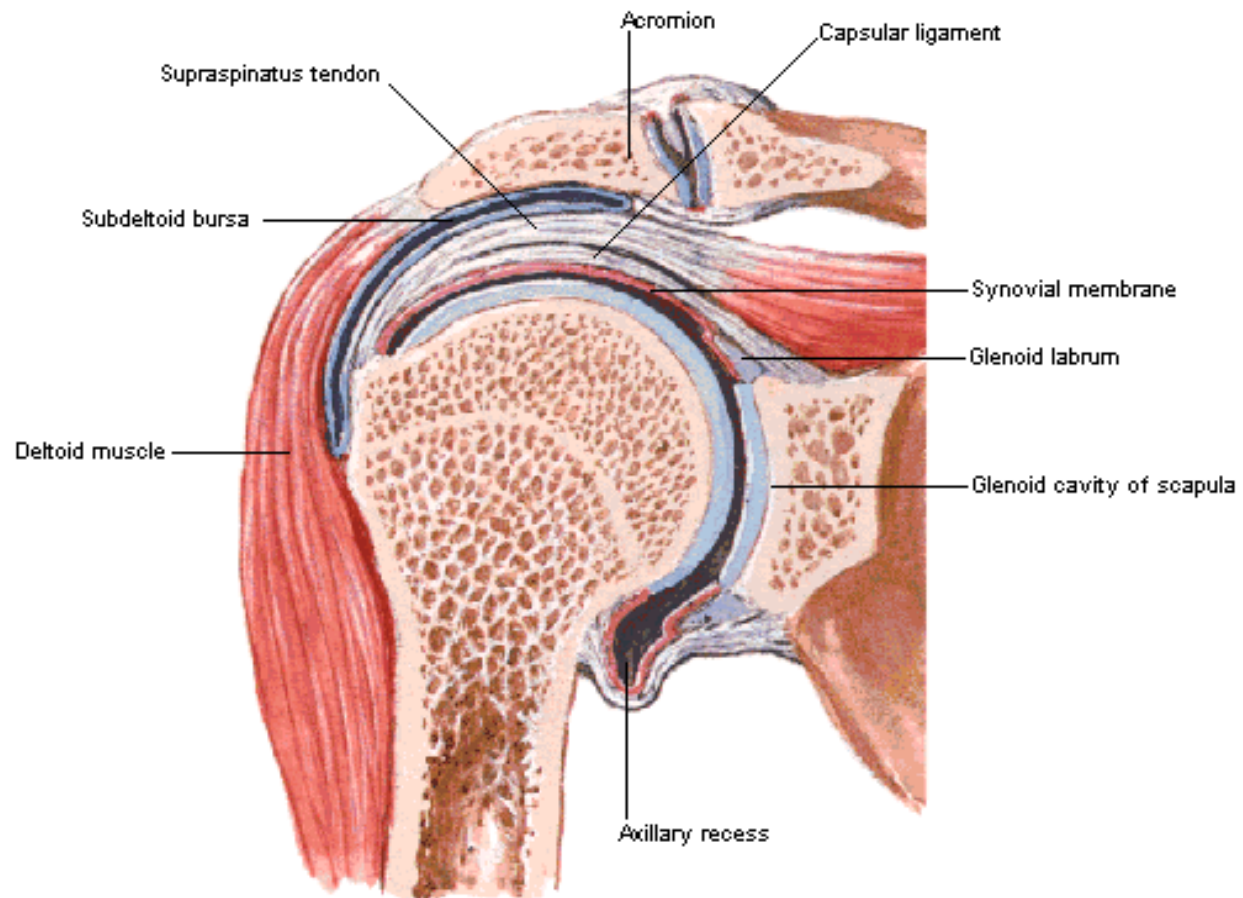


DYNAMIC STABILITY



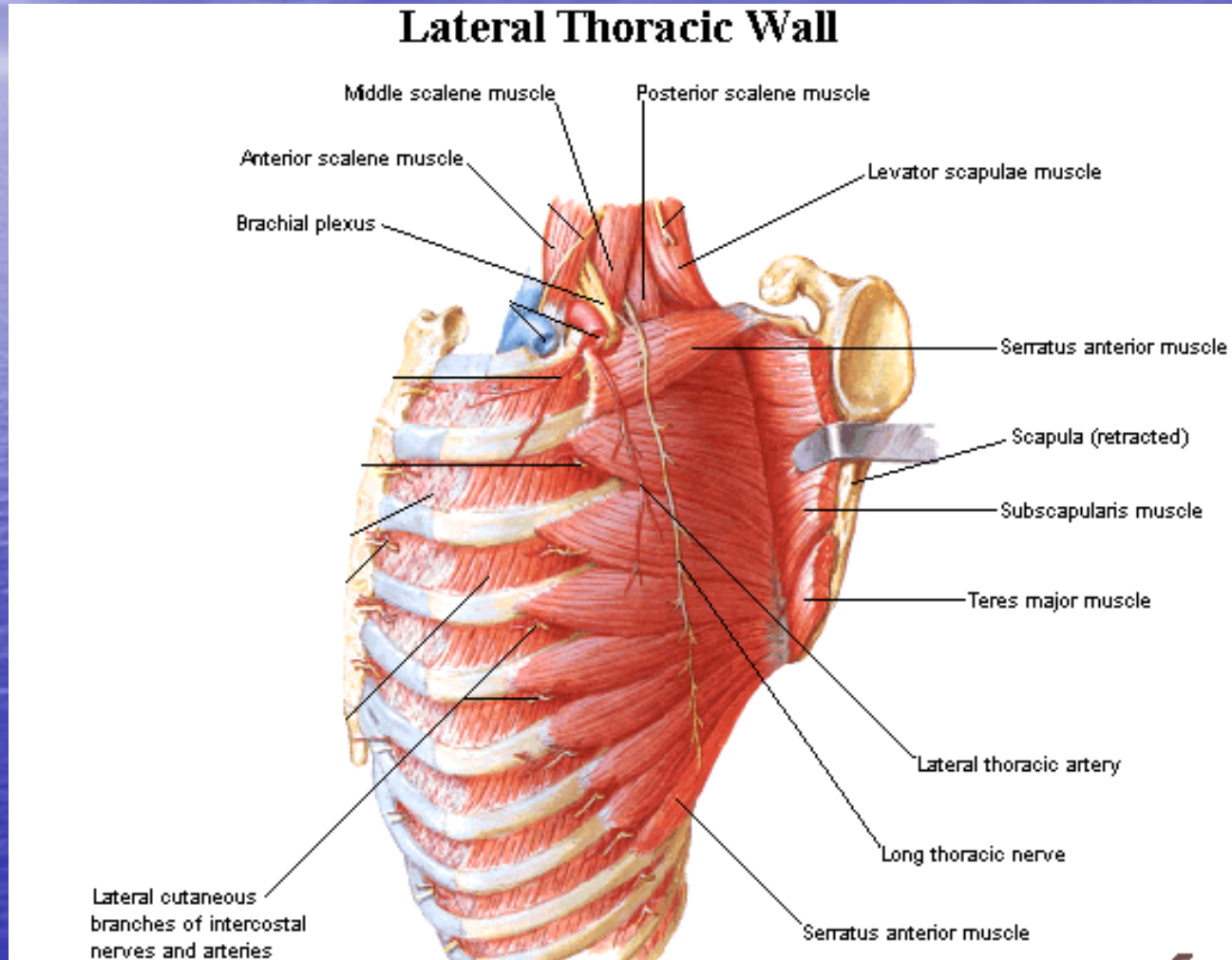
GLENOHUMERAL JOINT

Glenohumeral Joint
Coronal Section through Joint

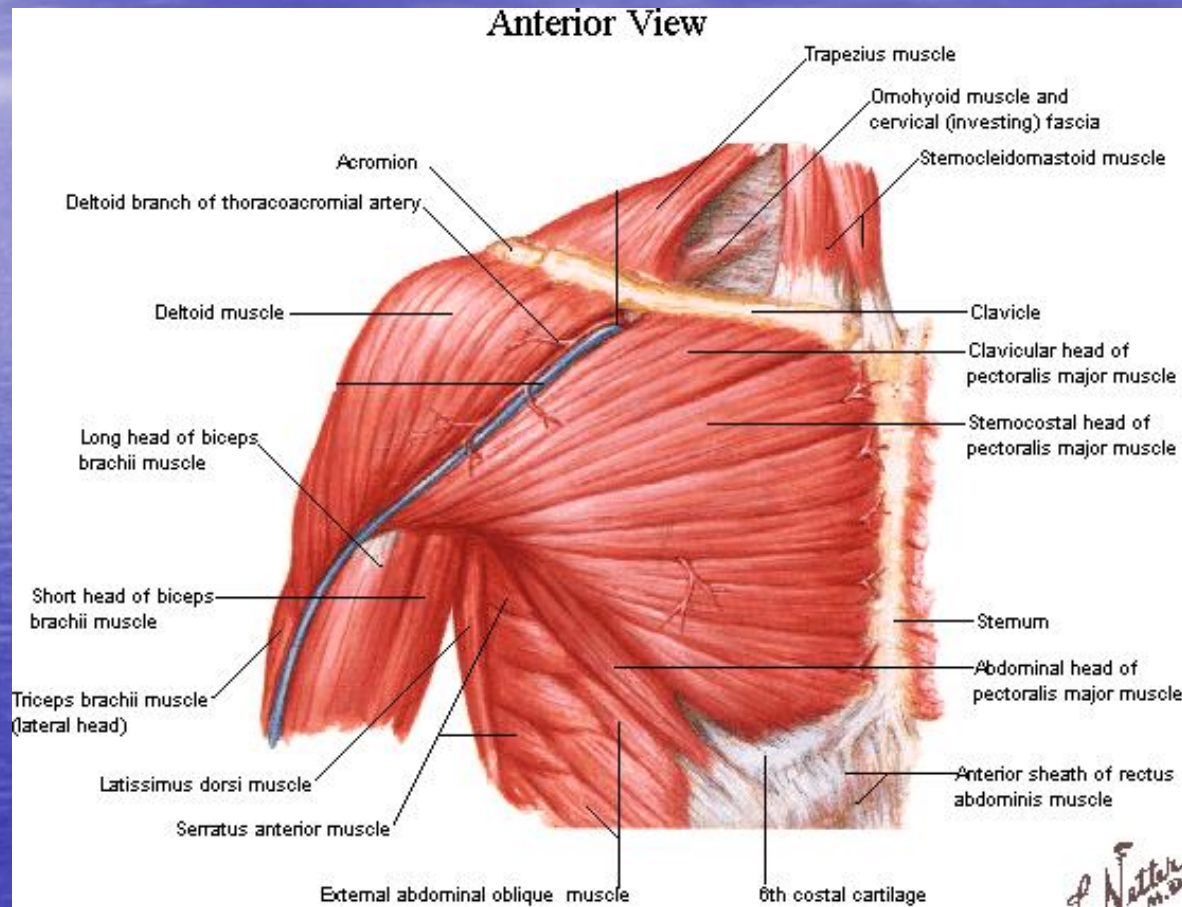


SCAPULO-THORACIC “JOINT”

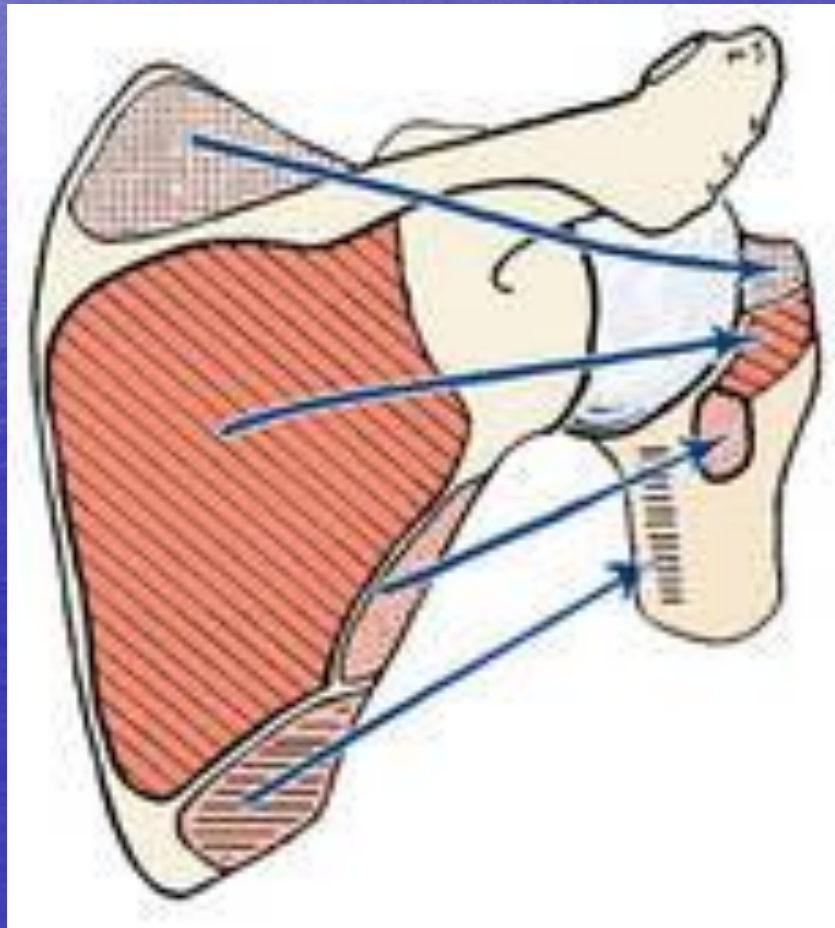
SCAPULA STABILISERS



POWER MUSCLES



SSITT acronym

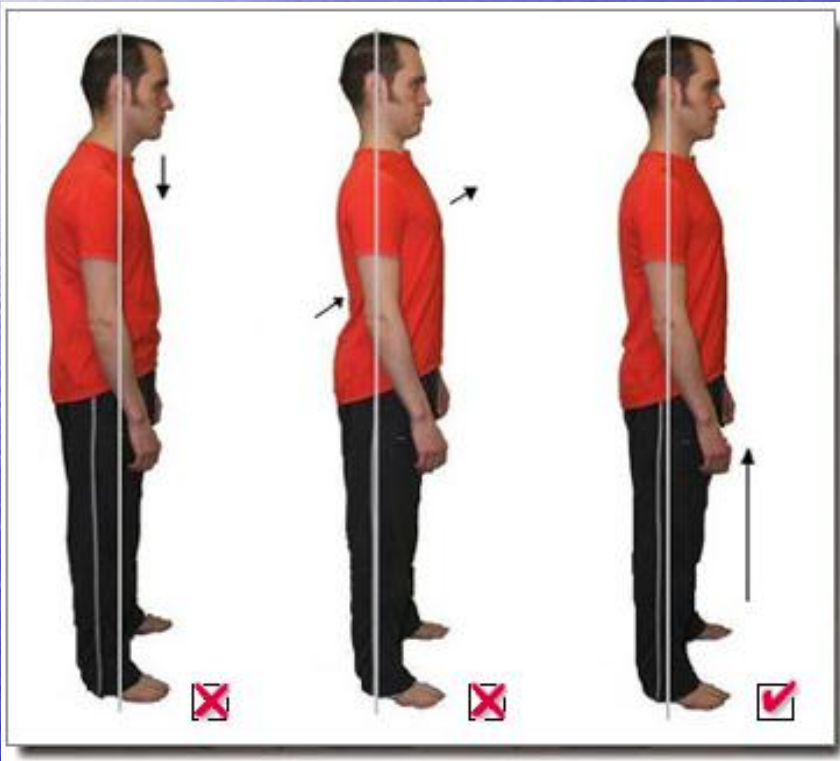


Examination

- Look: Posture and Breathing,
- Move : shoulder and C and T spine screen
- Feel : anatomy and myofascial pain patterns

LOOK

Posture



Breathing



Treatment of Shoulder Impingement

Rick Bernau June 2013

A 68 year old man with a 15 – 20 year history of left shoulder “impingement”

- Ian is a business man, who dates his left shoulder problems to a wake boarding injury 15 – 20 years ago. He also has a “rugby prop’s” neck, restricted, but only painful recently, when he woke with his neck jammed, a month prior to being seen
- X rays showed generalised degenerative changes throughout the facet joints, with moderate to severe narrowing of the discs from C4-C7. He had degenerative changes affecting the AC joint, but the subacromial space is well preserved and no rotator cuff calcification and US showed partial tears to supraspinatus, probable tendinosis, but also mild bicipital tendinosis. Given the symptoms are primarily those of impingement, sub deltoid steroid injection could be considered
- He was to be referred to an Orthopaedic surgeon for an opinion, but chose to seek a second opinion

EXAMINATION, DIAGNOSIS and TREATMENT

- Poor posture, non diaphragmatic breathing, (R) shoulder elevated, generalised (L) sided muscle tightness, from hip flexors to neck
- (L) shoulder abduction painful beyond 135 degrees and limited to 160 degrees, plus 20 degrees loss of internal rotation
- C 4-6 rotational > side bending restriction, associated TPs in ant scalene, trapezius, lev scap enthesis and suboccipital, Th 4-6 and mod (L) SI
- DIAGNOSIS: - Cervical dysfunction, with secondary shoulder dysfunction, aggravated by his excessive (L) sided muscle tightness, non diaphragmatic breathing and poor posture
- TREATMENT: - Breathing corrected, mobilisations, laser acupuncture and stretching to the trigger points -> near full (L) shoulder ROM, improved cervical and lesser mid and lower back ROM, with considerably less discomfort
- Explanation. Postural modification, breathing training and see in two weeks

FOLLOW UP (one week)

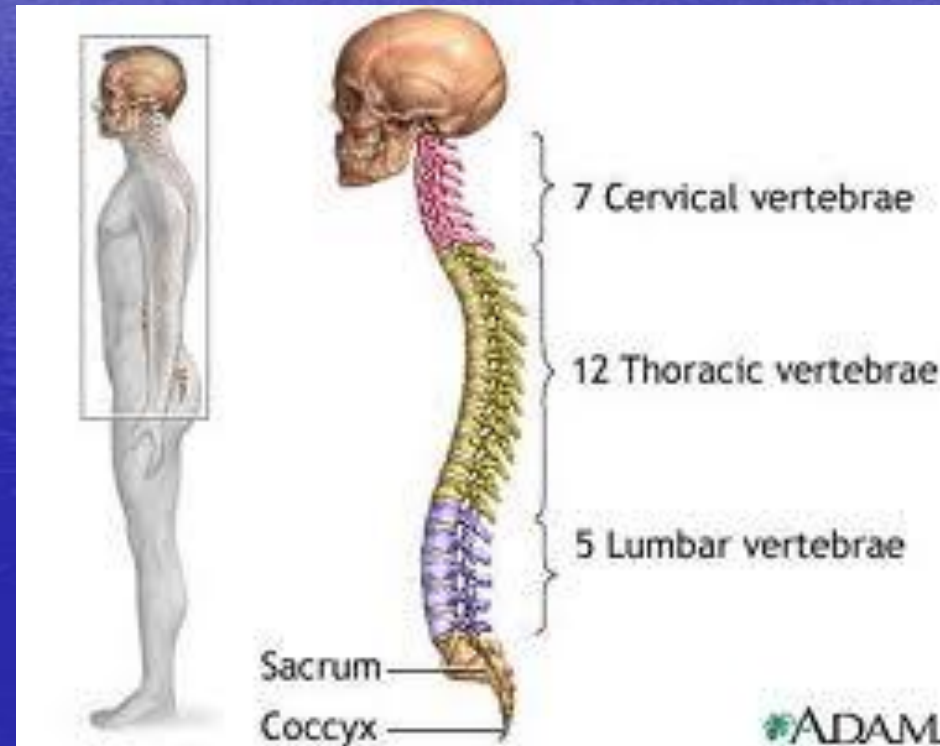
- All severe pain settled. Left shoulder mobility almost equal to the right and tightness only when reaching above his head. His breathing was much better and he had converted the whole of his office staff to correct posture (being the boss you can get away with it)
- ON EXAMINATION: - Breathing full, mod (R) C 5-6 (L) lev scap and trap TPs, in his (L) shoulder he had 5-10 degrees decreased abduction and internal rotation, but minimal discomfort. (L) SI full
- TREATMENT: - Mobilisations and trigger point therapy, as before -> near full and even cervical ROM. (L) shoulder only end range tightness on internal rotation
- SIX WEEKS LATER: - phoned and essentially symptom free, full mobility and very happy

MOVE

Shoulder movements

- Active passive resisted
- ?WHY
- Impingement and rotator cuff screening
- Don't forget scapulothoracic AC and SC joints

C and T spine Screen



EXAMINATION

- Various clinical tests described
- **None of the tests is absolutely diagnostic for one pathology only.**



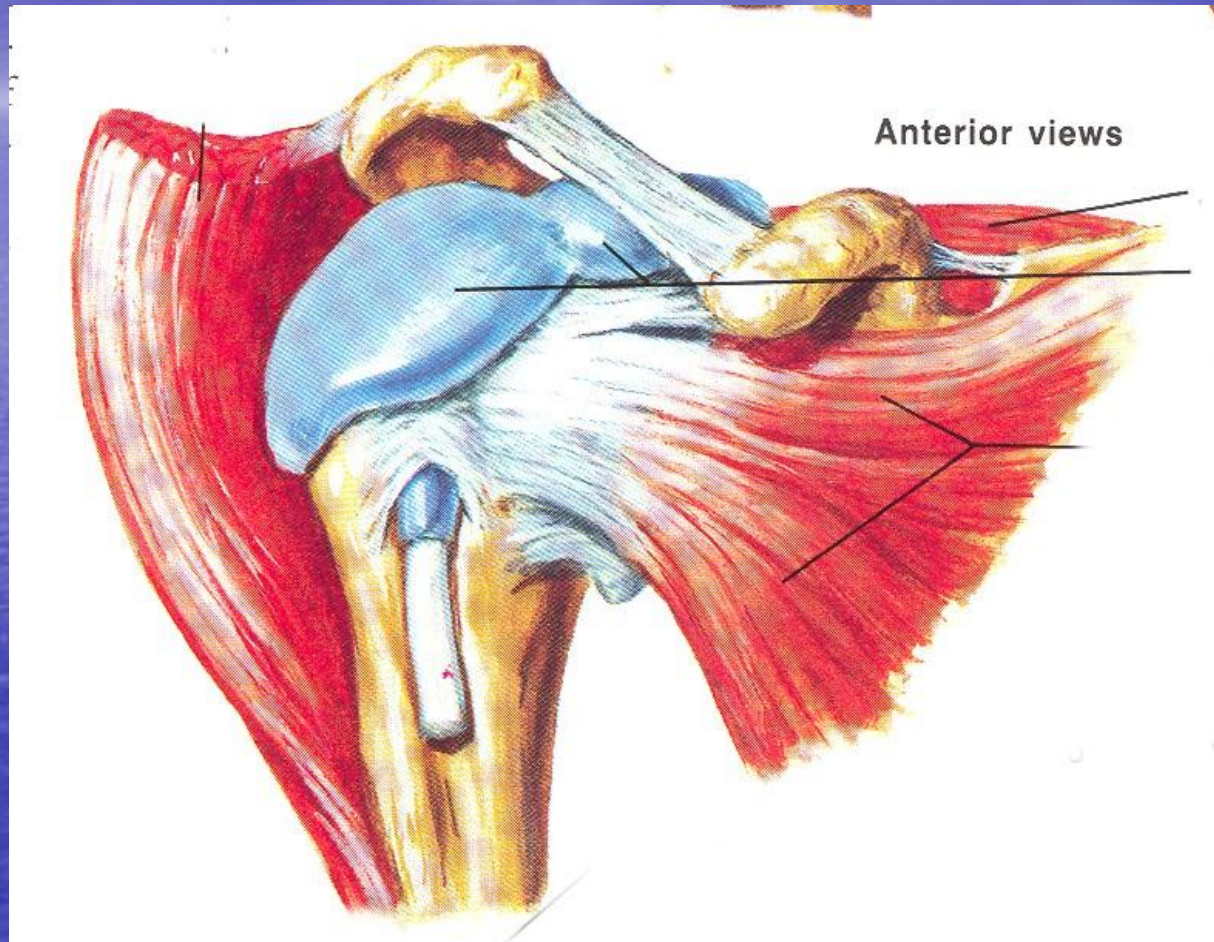
Limitations of shoulder tests

- Various tests for **subacromial impingement** lack validity
- However combinations of tests may improve accuracy in diagnosis
- [Park et al Bone Joint Surg [Br] 2005;87A(7) 1446-55]
- Various tests for **rotator cuff tear** lack validity [Hughes et al Aust J Physiother 54:3,159-70]
- but may rule out a tear [Dinnes et al Health Technology Assess 7:29,iii, 1-166]
- However combinations of tests may improve accuracy in diagnosis
- [Murrell, GA et al The Lancet 357, March 10, 2001 769-770]
- Tests more helpful when abnormality more severe
- [Murrell, GA et al The Lancet 357, March 10, 2001 769-770; Park et al Bone Joint Surg [Br] 2005;87A(7) 1446-55]

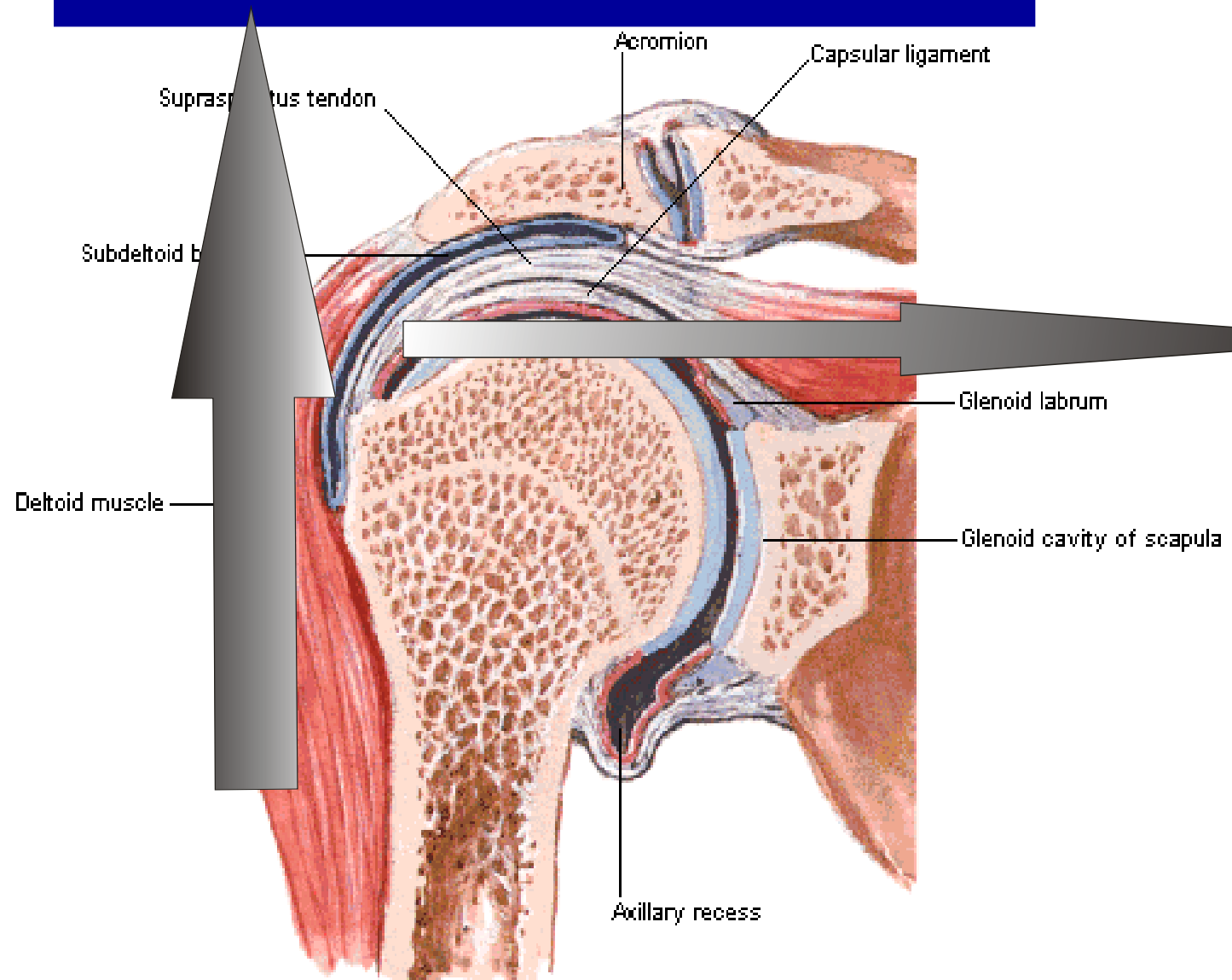
IMPINGEMENT

- **LOSS OF COUPLED MOTION**
- **'PAINFUL ARC'**

SUBACROMIAL SPACE



SUBACROMIAL "JOINT"



Impingement tests

Neer test

(Neer CS 2nd. Impingement lesions. *Clin Orthop Relat Res* 1983;183:70–7)

- Posture: patient seated or standing and the examiner standing.
- Fixation: ipsilateral scapula to prevent protraction
- Test: passive forward elevation of the arm
- Pay attention to: pain in the shoulder.
- The pain is relieved by injecting 10 ml of lidocaine (5ml 1% xylocaine) beneath the anterior acromion.
- Background: the greater tubercle impinges the degenerated supraspinatus and subacromial bursa against the acromion.

In stage I rotator cuff pathology sens 86%, spec 49%

In stage II sens 68%, spec 49% (Park et al 2005)

sens 79%, spec 53% (Hegedus)



Impingement tests

- **Hawkins-Kennedy test**

(Hawkins RJ, Kennedy JC. Impingement syndrome in athletes. *Am J Sports Med* 1980;8:151-8)

- Posture: seated or standing, with arm in 90° in forward elevation in the scapular plane.
- Fixation: stabilisation of the scapula to minimise upward rotation during performance of the internal rotation manoeuvre.
- Test: passive **internal rotation** of the shoulder until pain occurs; **external rotation in abduction**
- Pay attention to: pain with forced internal/external rotation.
- Background: the greater tubercle forces the supraspinatus tendon against the coracoacromial ligament.

Stage I pathology sens 76%, spec 45%

Stage II pathology sens 72%, spec 45% (Park et al 2005)

sens 79%, spec 59% (Powers 2010)



Jobe: used EMG to isolate use of specific muscles of rotator cuff

Devised Empty can test to isolate supraspinatus muscle

Impingement tests

Empty can test (thumb down)

- Posture: sitting or standing, shoulders in 90° abduction, 30° of horizontal adduction and full internal rotation.
- Fixation: the examiner places their hands on the upper side of the upper arm.
- Test: the patient maintains this position against downwards resistance.
- Pay attention to: primarily muscle **weakness**, less attention should be paid to pain.
- Background: strength test of the supraspinatus muscle. The subscapularis, infraspinatus and teres minor are electrically comparatively silent in this position.

Full can test (thumb up)

Reinold: modified Empty can test; found more supraspinatus EMG activity with Full can test



Empty can test

- Sensitivity 53%, Specificity 82% (Park et al 2005)

Full can test

- Sensitivity 86%, Specificity 57% (Kelly BT et al 2003; Itoi 1999)

Impingement tests summary

Consider 1.Neer 2.Hawkins Kennedy 3.empty can: but...

If patient weak in abduction **or** external rotation, **and**

> 65 years old

>90% chance of a rotator cuff tear, and

a 28% likelihood of a full-thickness rotator cuff tear.

- Park HB, Yokota A, Gill HS, *et al.* *Diagnostic accuracy of clinical tests for the different degrees of subacromial impingement syndrome. J Bone Joint Surg Am* 2005;87:1446–55.

Rotator cuff tests

External rotation lag sign

Hertel R, Ballmer FT, Lombert SM, *et al.* *Lag signs in the diagnosis of rotator cuff rupture. J Shoulder Elbow Surg* 1996;**5**:307–13.

- Posture: seated with the back towards the examiner. The shoulder in 20° abduction, the elbow in 90° flexion and maximal external rotation minus 5° to avoid elastic recoil in the shoulder.
- Fixation: the examiner supports the elbow and holds the wrist in this position.
- Test: the patient is asked to maintain this position, while the examiner releases the wrist.
- Pay attention to: the capacity of the patient to hold the arm in the same position. When an angular drop (lag sign) occurs, the test is positive.
- Background: *a lag sign of more than 5° is suggestive of a (partial) tear of the infraspinatus or supraspinatus tendons.*
- The external rotation lag sign has a value as a specific test for the infraspinatus and supraspinatus muscles.

In stage I rotator cuff pathology the sens 98% and spec 98%
In stage II and III , sens 95% and spec 72%
(Walch et al 1998)



Rotator cuff tests

Drop arm test

Codman EA. *The shoulder: rupture of the supraspinatus tendon and other lesions in or about the subacromial bursa*. Brooklyn, New York, USA: G Miller & Co Medical Publishers, 1934:148–9.

- Posture: supine or sitting with the arm next to the body.
- Fixation: no fixation is applied.
- Test: the patient abducts the arm horizontally. Then, the arm descends actively to the horizontal position and further.
- Pay attention to: during the last 90° of descent to the anatomical position the patient may lean to the affected side and may lower the whole arm quite suddenly in abduction.
- Background: originally this test was designed for the assessment of supraspinatus tendon tears. Later on, the test was also used to assess infraspinatus injuries.
- The drop arm test produces few false-positive tests assessing the infraspinatus and supraspinatus muscles.



Rotator cuff tests

Supine impingement test

Litaker D, Pioro M, El Bilbeisi H, *et al.*
Returning to the bedside: using the history and physical examination to identify rotator cuff tears. J Am Geriatr Soc
2000;48:1633–7.

- Posture: patient supine with arms on the table.
- Fixation: the examiner elevates the arm to full elevation.
- Test: the hand is supinated and the arm is adducted against the ear. The arm is then internally rotated.
- Pay attention to: the test is positive if the manoeuvre produces an increase in pain.
- Background: the test was designed to assess any rotator cuff tear. Pain results from narrowing and compressing the subacromial space.

The supine impingement test may be valuable as a screening tool to assess



Starting position



Ending position

Rotator cuff tests

Speed Test

(Crenshaw and Kilgore 1966)

- Posture: the patient holds arm in forward flexion with elbow extended.
- Fixation: the examiner places hand over lower forearm.
- Test: the patient maintains this position against downwards resistance.
- The test is positive when pain is localized to the bicipital groove
- Background: tests for pain arising from the long head of biceps. Confounded by impingement and joint effusion

Sens 40%, Spec 75%
(Park et al 2005)



Rotator cuff tests

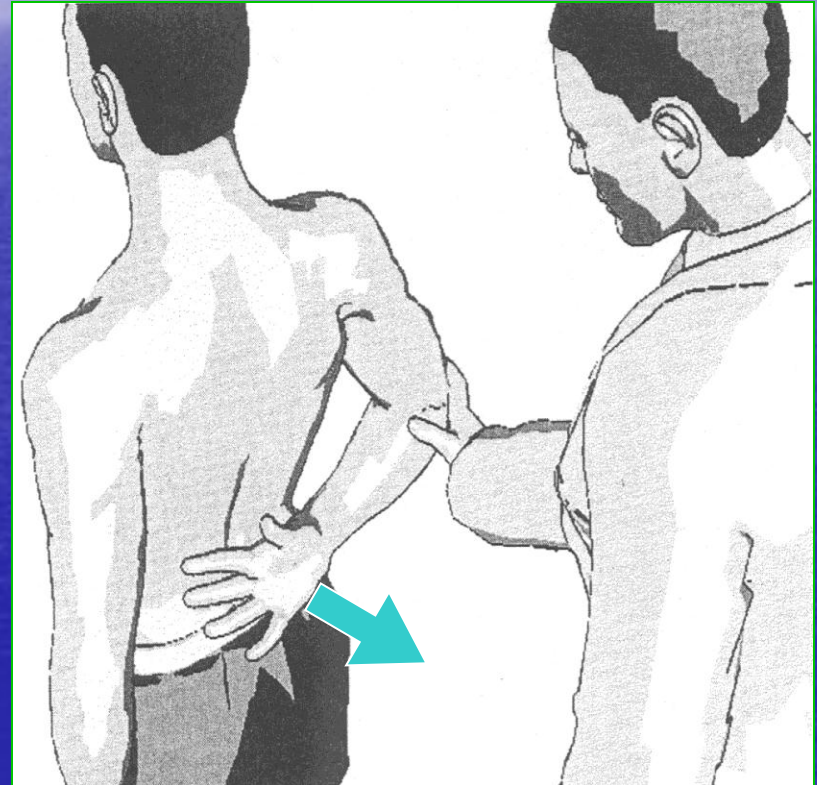
Subscapularis Lift-off test

(Gerber and Krushell 1991)

- Posture: patient is standing with the hand of the affected arm behind lower back.
- Fixation: examiner fixates elbow.
- Test: patient exerts lifts hand off back posteriorly
- Pay attention to: the patient feels weakness and cannot move hand posteriorly.
- Specific test for subacpularis tears.

Sens 18%, Spec 92%

(Barth et al 2006)



Rotator cuff tests

Belly press test

Gerber C, Hersche O, Farron A. Isolated rupture of the subscapularis tendon. *J Bone Joint Surg Am* 1996;78:1015–23.

- Posture: patient is sitting with the hand of the affected arm on the abdomen.
- Fixation: no fixation is applied.
- Test: patient exerts pressure on the abdomen with the hand until maximal internal rotation.
- Pay attention to: the patient feels weakness and cannot maintain maximal internal rotation. The elbow drops backwards, and internal rotation is lost. Pressure is exerted by extension of the shoulder and flexion of the wrist.
- Background: *the test was designed as an alternative to the lift-off test for shoulders that had decreased internal rotation.*
- The belly press test may be valuable as specific test to rule out subscapular tears.



rotator cuff tear summary

Prospective study, comparing results of 23 clinical tests from 400 patients (presenting with shoulder pain) with and without rotator cuff tears, confirmed by arthroscopy.

3 simple tests were predictive for rotator cuff tear:

1. supraspinatus weakness
2. weakness of external rotation
3. Impingement (using Hawkins-Kennedy test in int/ext rotation)

- When all 3 were positive, or if 2 tests were positive and the patient was aged 60 or older, the individual had a 98% chance (PTP) of having a rotator cuff tear
- combined absence of these features excluded this diagnosis (actual = 5% chance).
- If only one test positive, clinical testing is indeterminate; need imaging
- *George A C Murrell, Judie R Walton. The Lancet, Vol 357, March 10 2001, 769-770*

FEEL

Structures

- Consider skin drag test and layers of palpation
- Don't forget
- AC joint
- SC joint
- Scapulothoracic

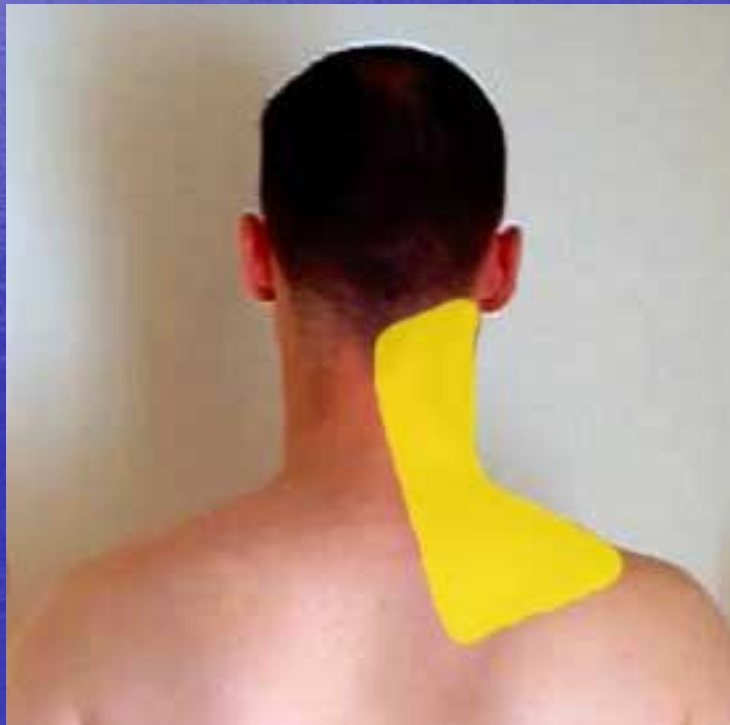
Myofascial Pain Patterns

- Common patterns as follows.....

Levator scapula Anatomy



Levator scapula pain pattern



Levator scap stretch



Anatomy Infraspinatus



Pain patterns Infraspinatus



Stretch Infraspinatus



Anatomy and Pain Pattern Teres Minor

Anatomy



Pain Pattern



Stretch

Teres Minor



Anatomy and Pain pattern Supraspinatus



Anatomy

Rhomboid



Serratus Posterior Superior



Pain Pattern

Rhomboid



Serratus posterior



Stretch

Rhomboid



Serratus Posterior



Anatomy Scalene



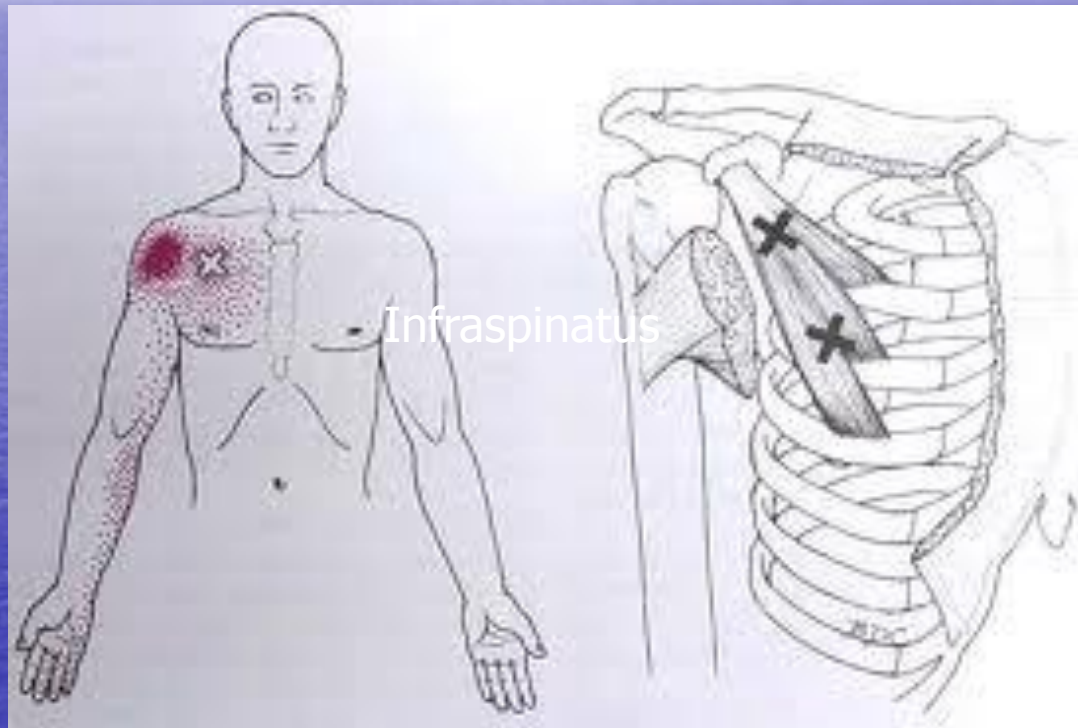
Pain Pattern Scalenes



Stretch Scalene



Anatomy and Pain Pattern Pectoralis Minor



Stretch Pect Minor



Quizzzzzzzz time

- Whats the 10 point pain history acronym?

Socrates ad(s)

- Site
- Onset
- Character
- Radiation
- Alleviating factors
- Times of occurrence
- Exacerbating factors
- Severity
- Associated factors
- Disability scores
- (Systems review gives..... red flags)



What are the red flags?



VISION

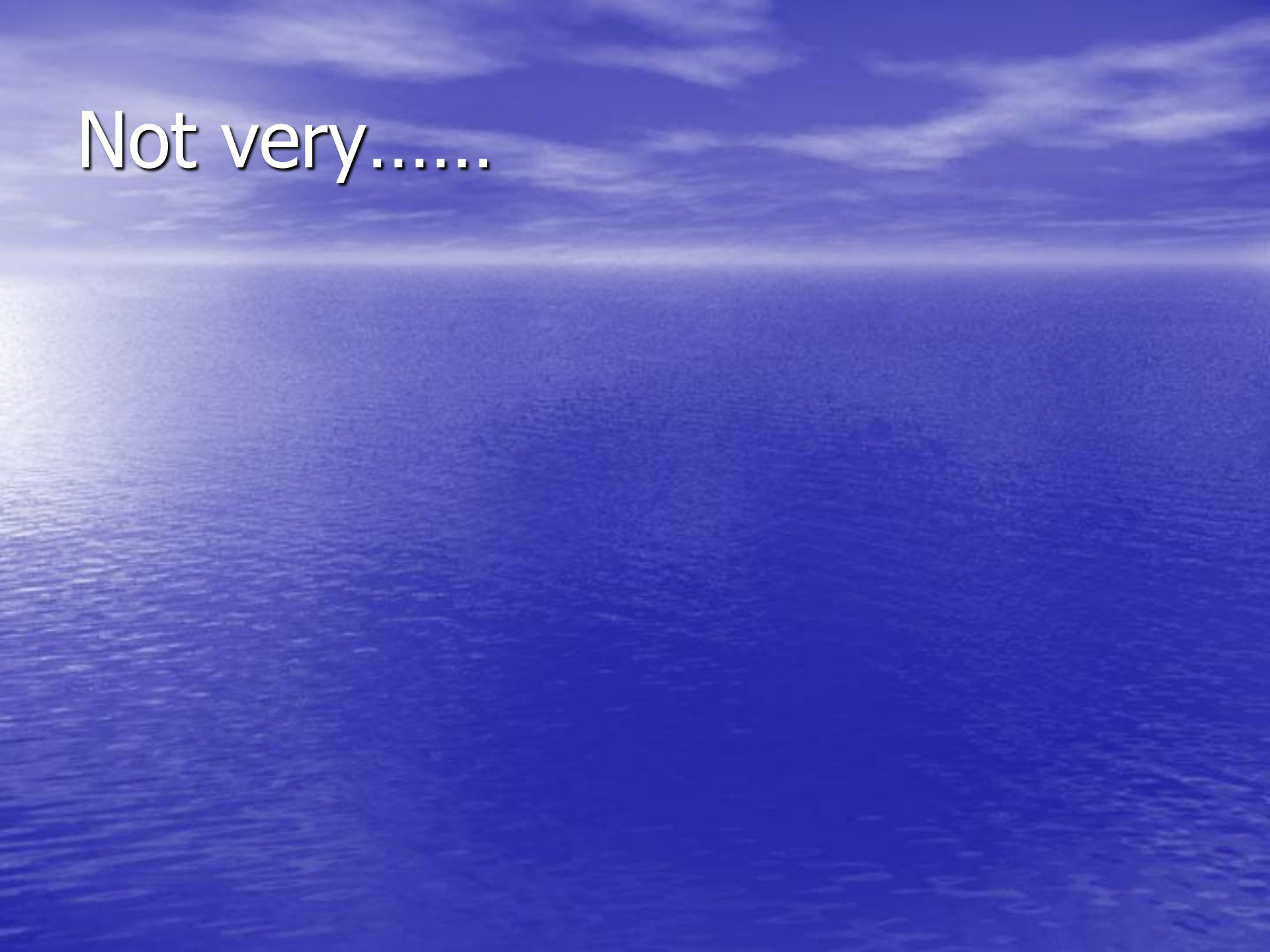
- Visceral/Vascular
- Infection
- Significant Fracture
- Inflammatory
- Other
- Neoplasm

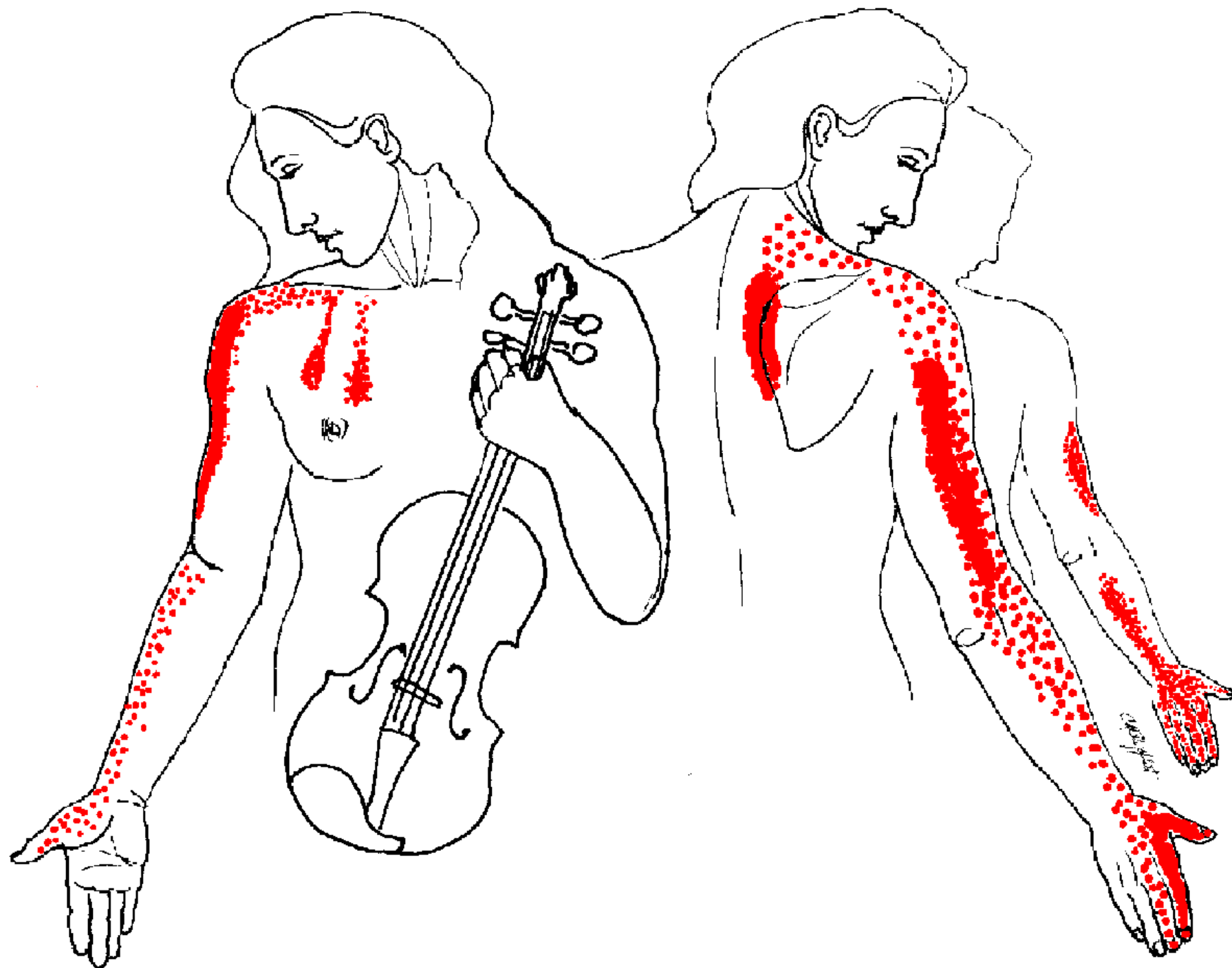
Whats the best way to not miss red flags- history or exam?

History (+/- MRI)

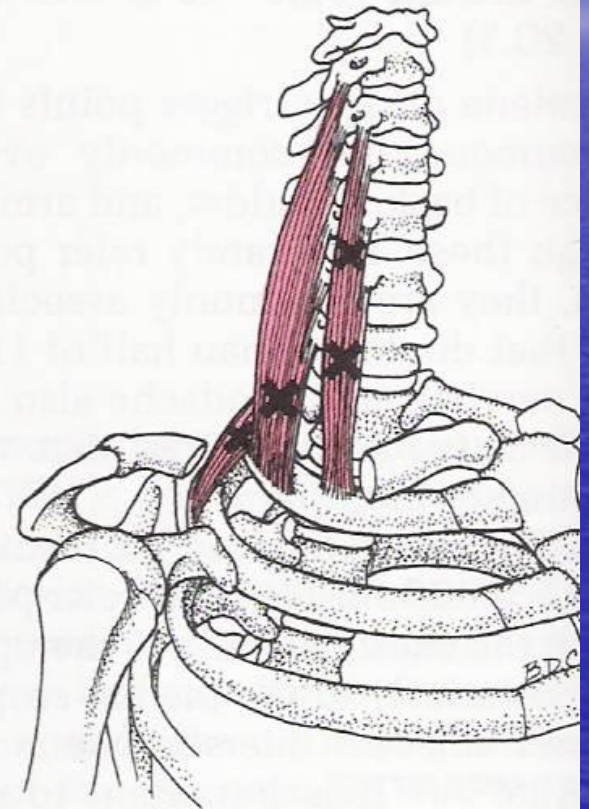
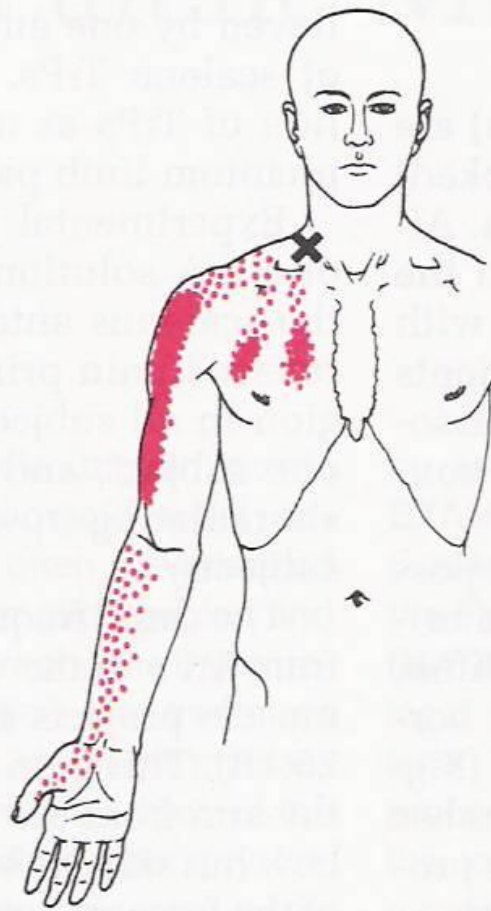
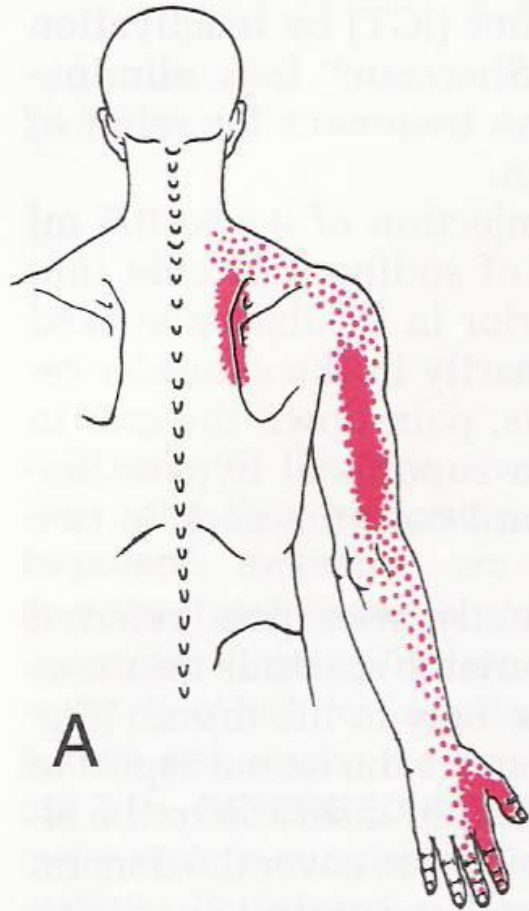
How accurate are impingement
and rotator cuff examination
examinations?

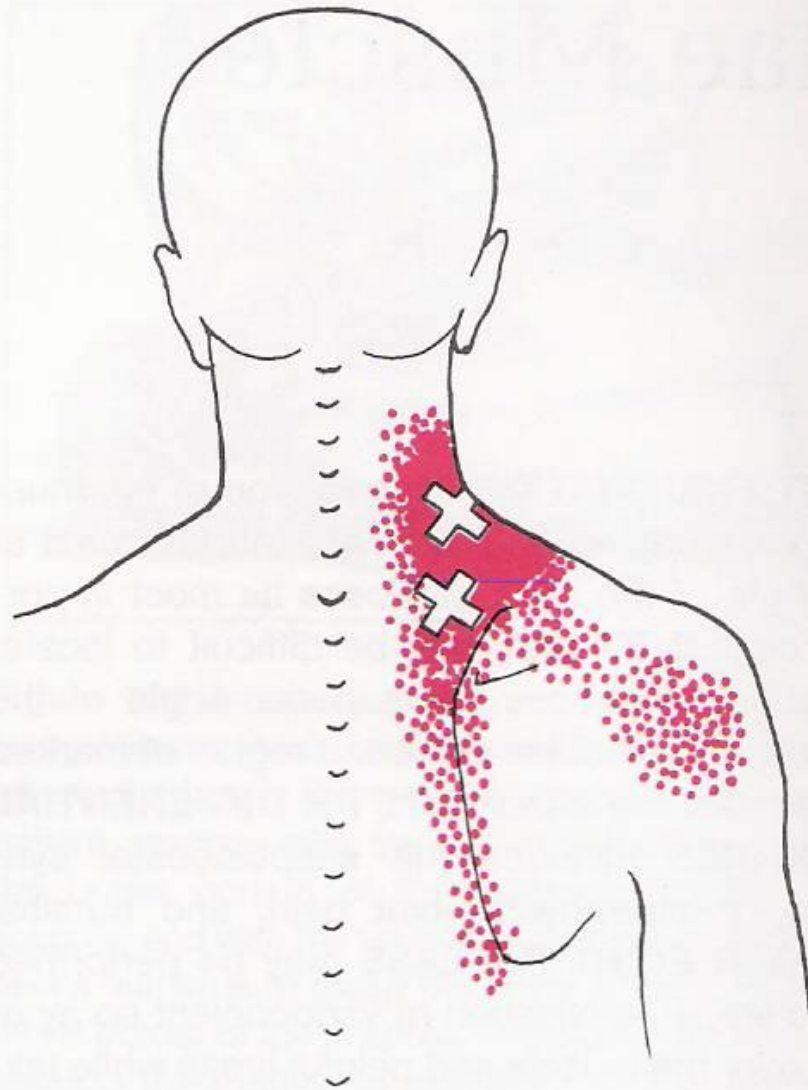
Not very.....





Scalenes – referral patterns





Levator Scapulae- referred pain patterns

