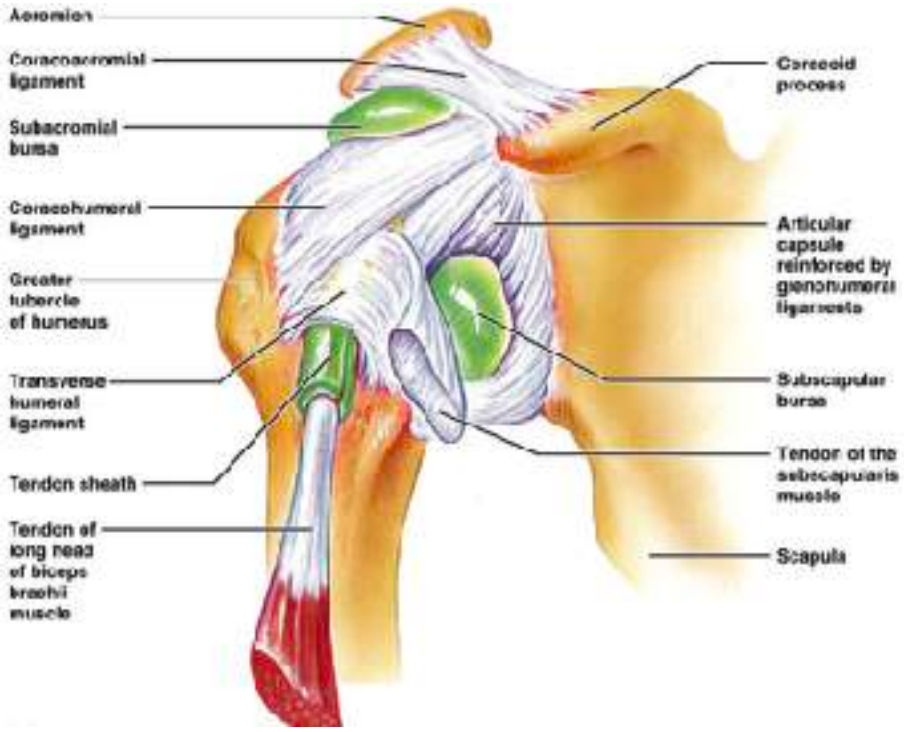
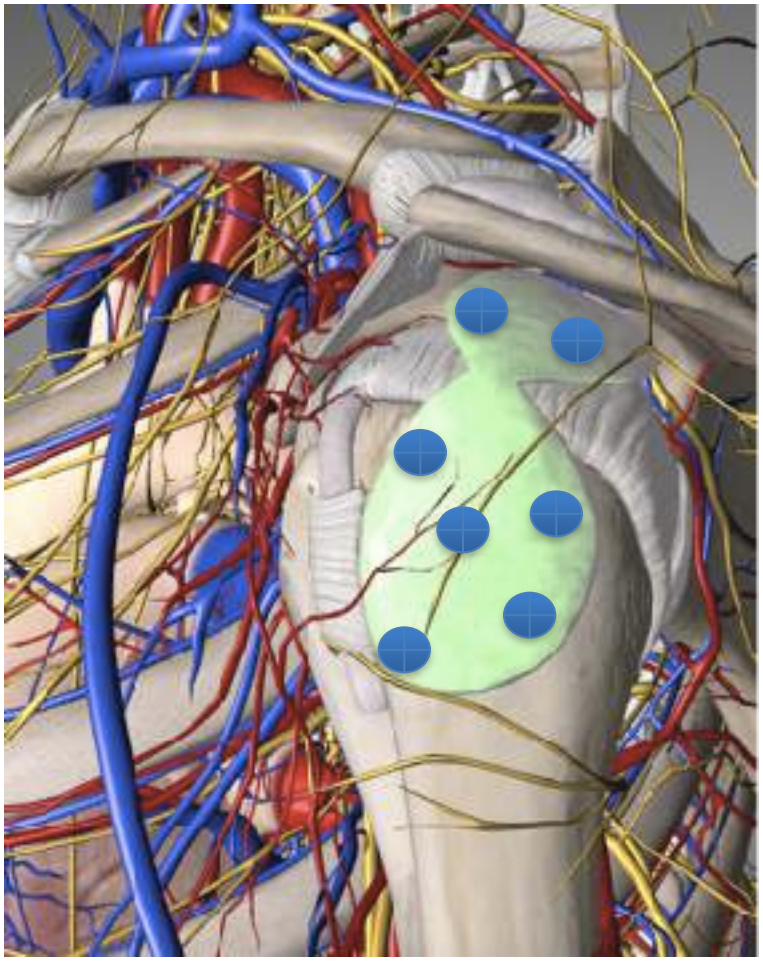
The Sub Acromial Space

- The sub acromial bursa 6-12 bursae around the shoulder – help decrease friction (plastic sleeve)
- Innervation – superior articular branch of the suprascapular nerve (C5/6) + articular branch of the lateral pectoral nerve
- A/C Joint?



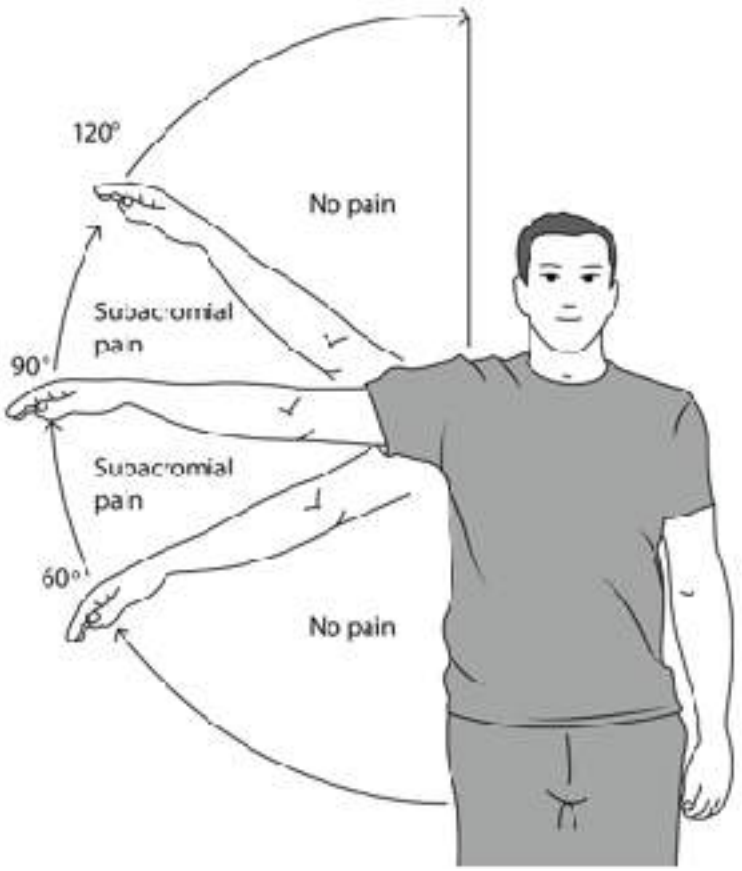
Bursopathy - Pathology

- **Easily infiltrated by local chemical milieu:**
- **Correlation between pain chemicals and cytokines**
- **May well be a major source of SPS**
- **Packed with sensory fibers, mechano-receptors and nociceptors:**
- **TT – Ultrasound guided infiltration of HCZ +/- Lignocaine**
- **TT – rebalance kinematics**



Impingement

- **Secondary to altered kinematics or instability**
- **Scapulothoracic imbalance – Serratus Ant**
- **Athletes**
- **Muscle tightness/Imbalance:**
  - Pec Major – Anterior force
  - Pec Minor – limits upwards rotation
  - Posterior capsule tightness
- Glenohumeral internal rotation deficit **- GIRD**
  - loss of internal rotation greater than or equal to 20º



MRI – Age Related?

MRI Diagnosis of RC disease - Frost et al 1999 J Sho El Surg 8 (6) 565-568

- 42 subjects with SPS
- 31 age matched asymptomatic controls
- Shoulders evaluated with MRI
- Findings:
  - SIS group – 55% had RC pathology on MRI
  - Control group 52% had RC pathology on MRI
    - 31-39 years = 32%
    - 40-49 years = 48%
    - 50-59 years = 72%

Conclusions:

- "RC pathology related to age"
- "RC pathology on MRI does NOT correlate with symptoms"

- **N=96 asymptomatic subjects dominant shoulder**
- **40-60 yrs. 1 in 4 (28% structural pathology)**
  - 4% FTT
  - 24% PTT
- **>60 (n=46) 1 in 2 (54% structural pathology)**
  - 28% FTT
  - 26% PTT

MRI & RC Pathology (Sher et al 2005 JBJS 77A)

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Break

Examination

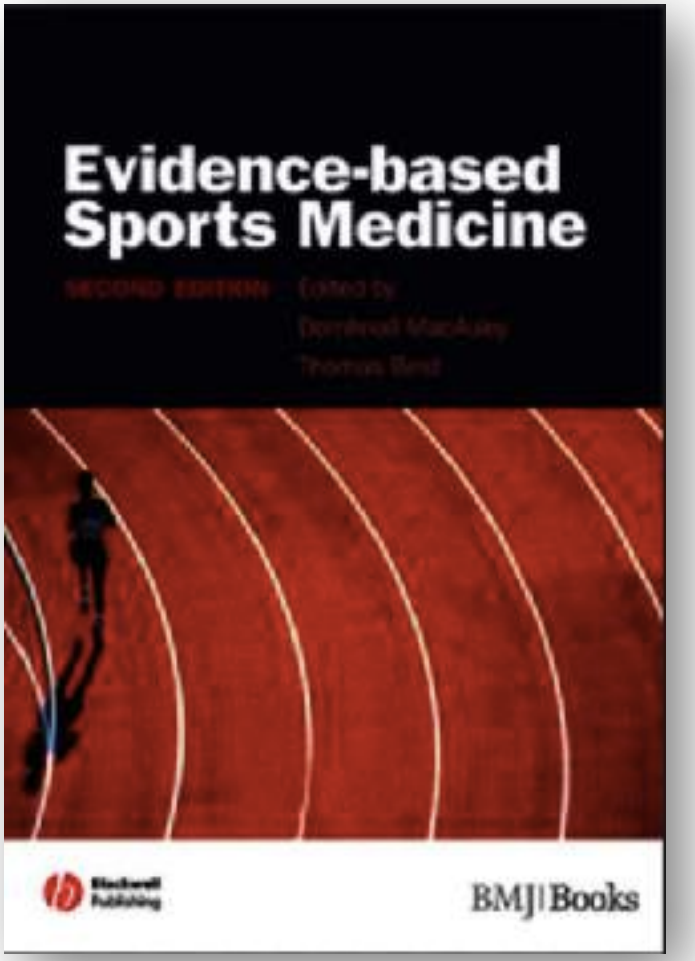
- Look for postural anomaly - upper crossed pattern?
- Thoracic Spine Mobility
- Inspection - Wasting
- Dynamic Scapula Dyskinesis – ask patient to raise both arms repeatedly until fatigue of scapula stabilizers – fails to keep scapula on thoracic wall
- Check active scapula retraction
- Check for Major or Minor winging (Serratus Anterior – Lev Scap)
- Compare Sides
- Check Active and Passive ROM
- Abduction:
  - First 43% Deltoid
  - Next 25% Subscapularis
  - Infraspinatus and Teres Minor Next 22%
  - Supraspinatus final 9%
- **Flexion – S/TJ**
- Apley – T10?
- FFT – No power
- Look at Scapulohumeral Rhythm

Clinical testing

Systematic review: **Lewis J and Tennant D (2007)**

"How effective are our diagnostic tests for rotator cuff pathology?" ***(evidence based sports medicine (2nd Ed) MacAuley D and best T (Eds). Blackwell publishing. Chapter 18***

"It is NOT possible to make a definitive diagnosis with the clinical tests currently in use"



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Testing & The Empty Can Test

Which clinical examination tests provide clinicians with the most valuable information when examining the shoulder – Hegedus 2012 British Journal of Sports Medicine 46: 964-978

"the use of any single test to make a pathognomonic diagnosis can not be unequivocally recommended … combinations of tests only marginally better"

The "empty and full can" tests do NOT selectively activate supraspinatus.

EMG study: Boettcher CE, Ginn KA, Kathers I. J Sci Med Sport. 2009 12(4):435-439

"These tests do not fulfill the basic criteria to be valid diagnostic tools for supraspinatus pathology"

Clusters - Physical examination tests of the shoulder: A systematic review with meta analysis of individual tests 200

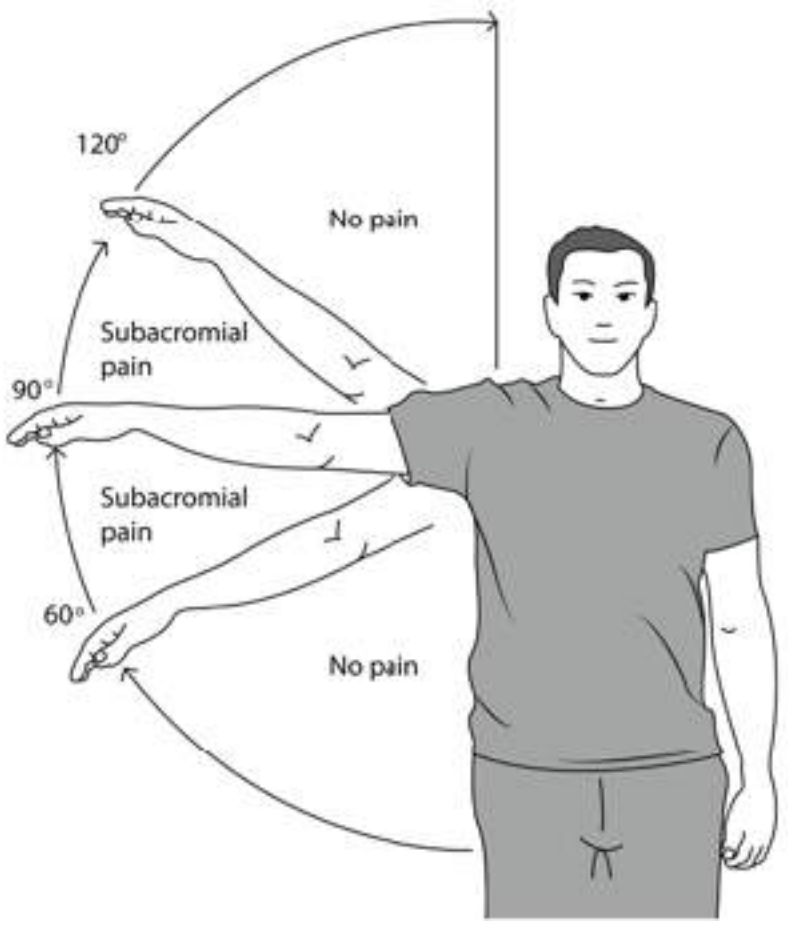
Brit J Sports Med 42:80-92

FFT Cluster by Park Et al 2005

Signs: Drop arm test, painful arc, Infraspinatus m test

- 3 signs = 91% Probability
- 2 signs = 69% probability
- 1 sign = 33% probability

Painful arc test



Drop-arm test

- Place affected arm into maximum abduction
- Ask patient to slowly lower arm to the side.
- Sudden dropping of the arm suggests rotator cuff tear (Moseley 1960).
- Test Sensitivity: 27%
- Test Specificity: 88%

Infraspinatus/Teres minor

- Stand alongside the patient on the affected side.
- Flex arm at the elbow to 90°
- While supporting the patient around the waist on the opposite side, ask the patient to resist your attempt to push the arm into internal rotation.
- It is important to ensure that your pressure is applied above the wrist to avoid undue stress across the wrist.

Infraspinatus/Teres Minor – Horn blowers test

- Infraspinatus/teres minor: assessed together by checking external rotation against resistance, if weak then can be assessed individually

- Patient is unable to ER the arm to 90 degrees with the arm in abduction

Examination – YOUR HANDS ARE THE BEST

Areas of dysfunction:

(Check biceps groove for tenderness, check triceps, feel for insertion of supraspinatus (cuff), feel for insertion of deltoid, feel biceps short head, feel relationship with pec major & min, check teres group) BE GENTLE.

ANTERIOR

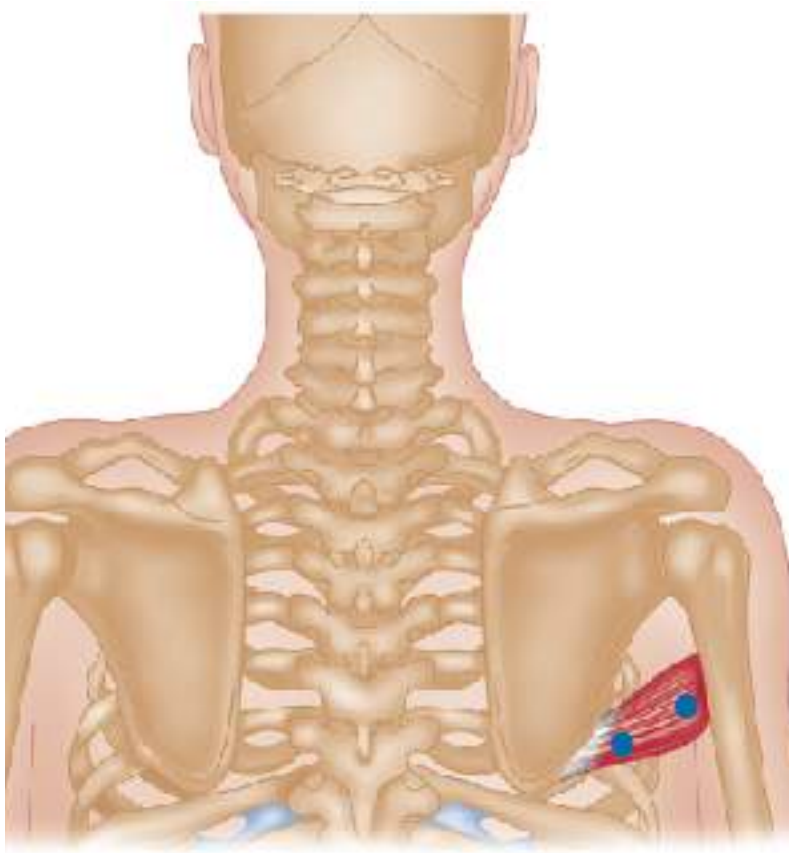
POSTERIOR

LATERAL

Important structures

- Lateral myofascia of UEX & Deltoid
- Teres Minor
- Teres Major
- Subscapularis
- Long head Biceps
- Long head Triceps
- Infraspinatus

Teres Major



ORIGIN

- Oval area on lower third of posterior surface of lateral border of scapula.

INSERTION

- Medial lip of intertubercular sulcus (bicipital groove) of humerus

ACTION

- Adducts humerus. Medially rotates humerus. Extends humerus from flexed position.

NERVE

- Lower subscapular nerve, C5, 6, 7, from posterior cord of brachial plexus.

BASIC FUNCTIONAL MOVEMENT

- Example: reaching into back pocket.

NAT Rotator Cuff Treatment Protocol

Step 1 – Posterior to Midline

Pause on Deltoid Bands? Rotator Interval

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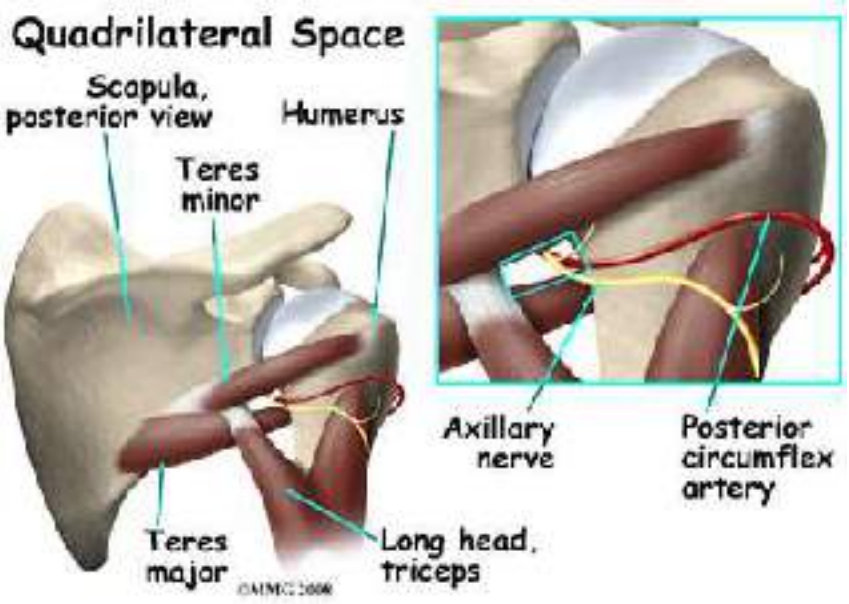
Rotator Cuff Step 2 – Teres Major

Rotator Cuff Step 3 – Passive Circumduction

Rotator Cuff Step 4 – Prone work to LHT and Teres Minor



Rotator Cuff Step 5

Rotator interval

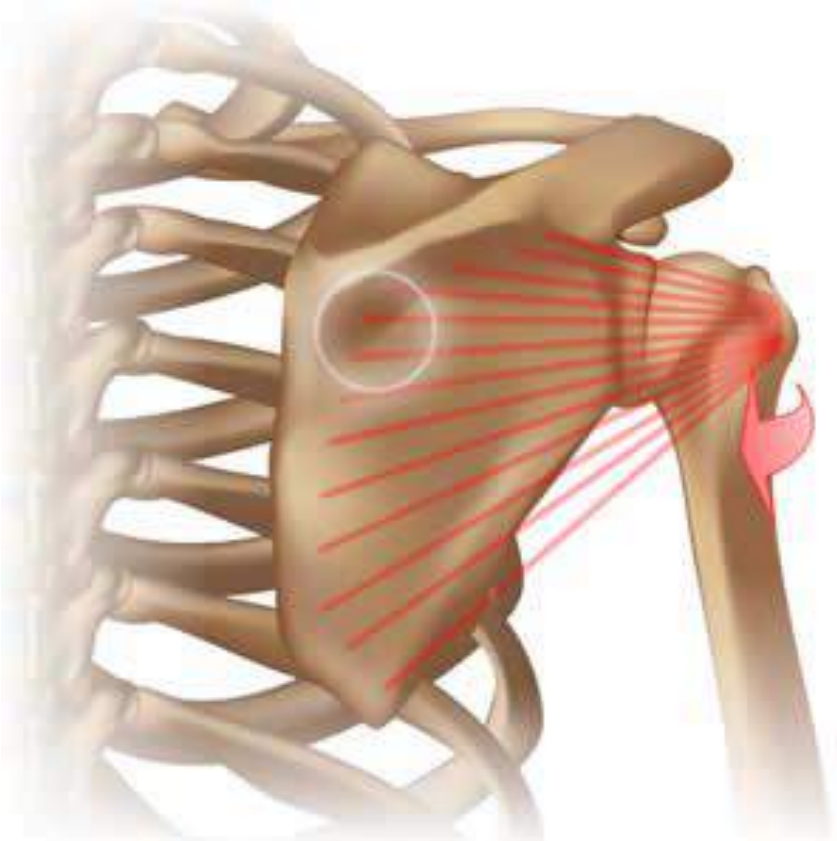
Pec. Min/SHB

Rotator Cuff Step 6

Central & Lateral bowstringing

Medial bowstringing

Rotator Cuff Step 7



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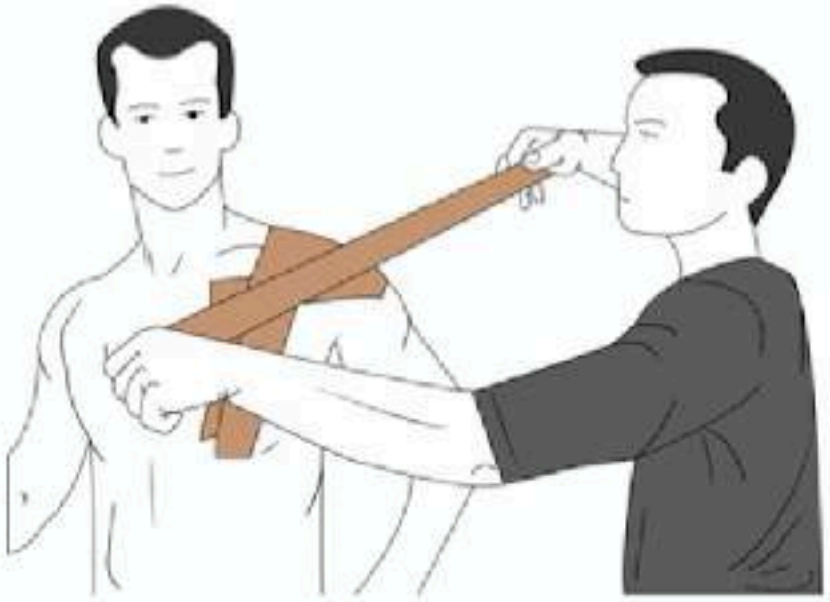
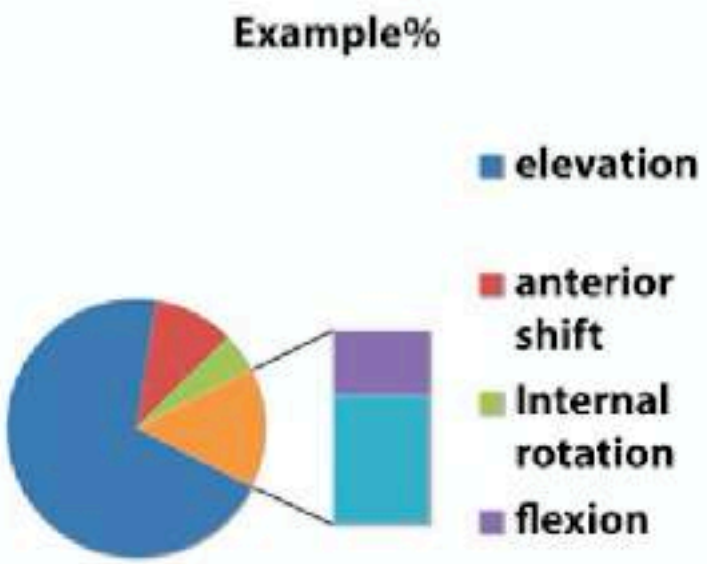
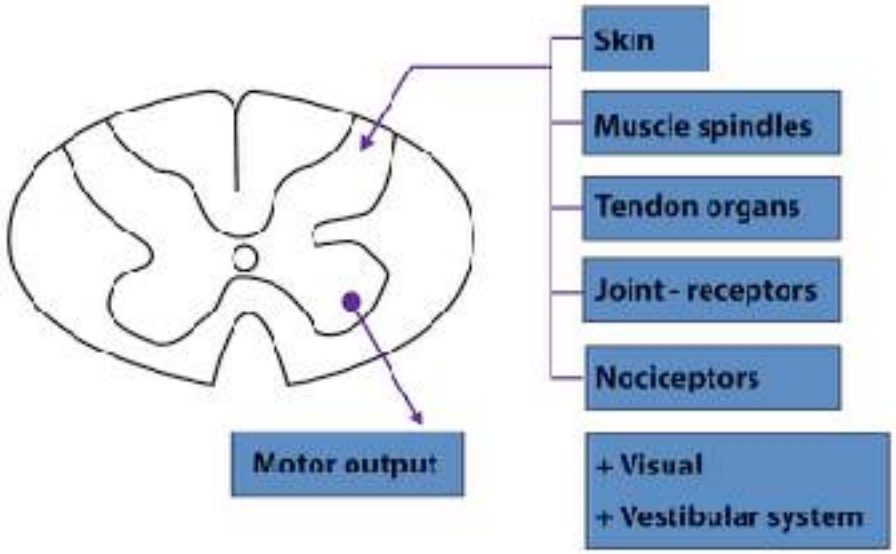
Stack and Strap





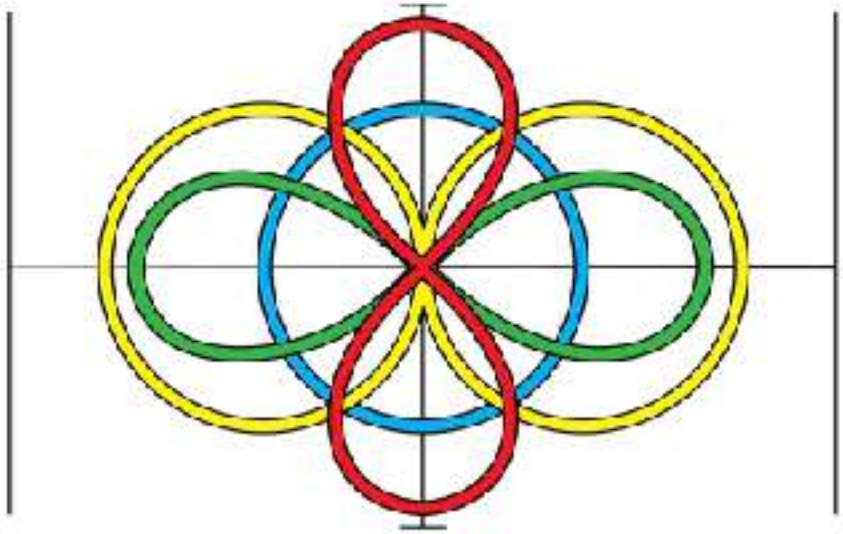
Proprioceptive - Motor Control & Exx

- Joint position sense
- Proprioception
- Muscle timing
- Body needs a target
- Brushing teeth
- Serving in tennis
- Where is the target
- How fast do we throw?
- What else is happening in the body when we let go?
- Sensory-motor rehab for RC and for Biceps pathology.
- Use of ‘Laser Pen’



Accurate Motor Control

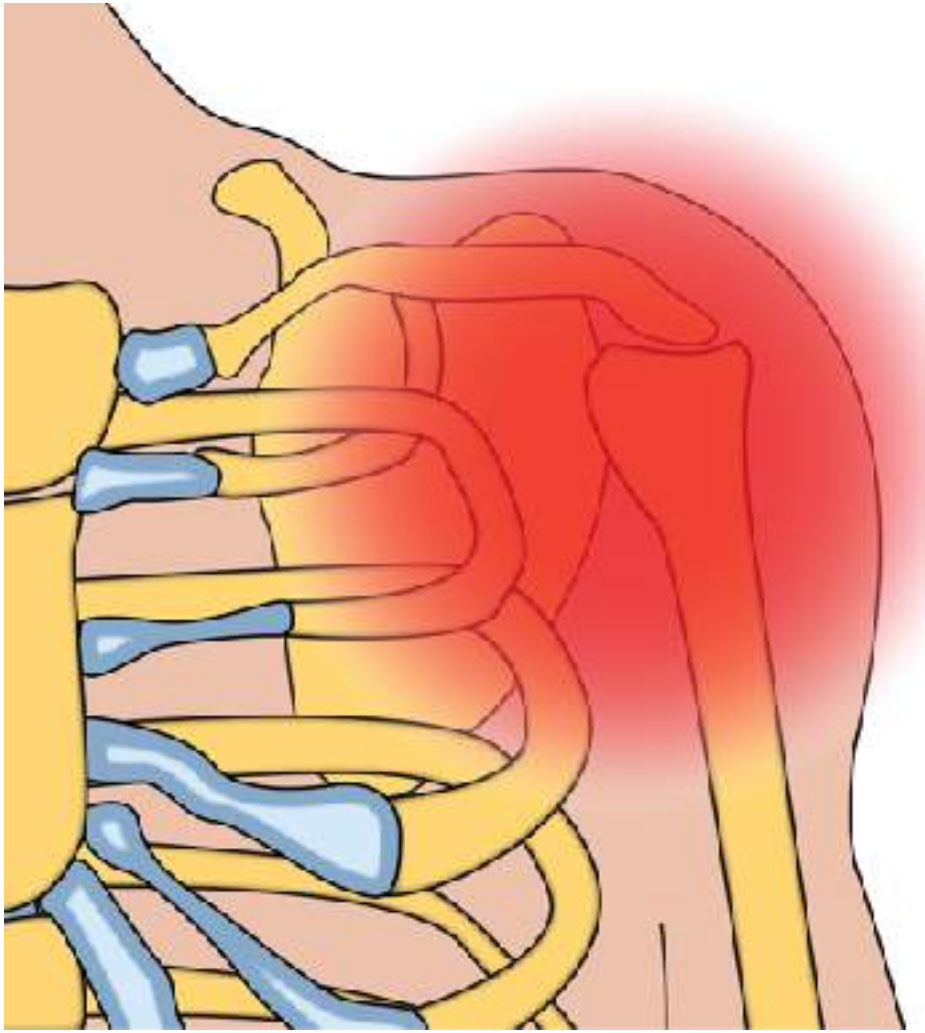
- **Closed Chain**
  - **Closed** kinetic **chain exercises** or **closed chain exercises** (CKC) are physical **exercises** performed where the hand (for arm movement) or foot (for leg movement) is fixed in space and cannot move. The extremity remains in constant contact with the immobile surface, usually the ground or the base of a machine
- **Open Chain (OKC)**
- **Proprioception**
- **Joint repositioning**
- **Strength**
- **Accuracy**



Rotator Cuff Rehab protocols

Break

SPS – Technique NAT



SPS –Step 1 - Prone

Prone Teres Major/Minor

Step 1 - NAT SPS - Non-surgical Decompression

NAT Sub Acromial Decompression

Step 2

SPS Step 2 - modification

SPS Step 3

SPS Step 3 - modification

SPS Step 4

SPS Step 5 Short Head Biceps (SHB) - Pec. Minor & Rotator Interval

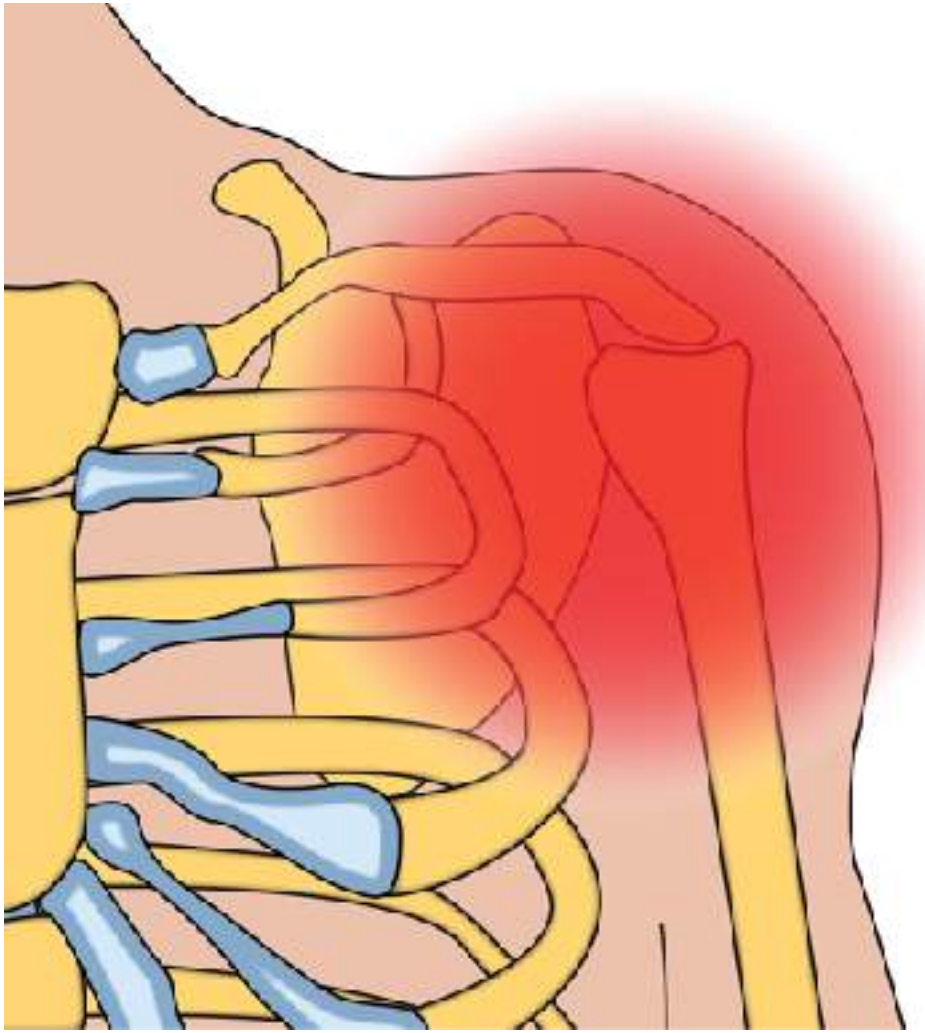
Rotator interval

Pec. Min/SHB

SPS Step 6

Break

ACJ – Technique NAT



Scarf test (A/C joint)

- **The patient's shoulder is positioned in 90° of flexion and then forcefully adducted across the body toward the opposite shoulder, compressing the acromioclavicular joint.**
- **Reproduction of the patient's pain with this manoeuvre indicates acromioclavicular joint pathology.**
- **Sensitivity 77% (Chronopoulos et al. 2004)**

NAT ACJ

Step 1

SPS Step 2

SPS Step 3

SPS Step 4 Short Head Biceps (SHB) - Pec. Minor & ACJ

ACJ from Above

Pec. Min/SHB

SPS Step 5

NAT HIP

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Hip and shoulder – rear and front legs

- **Hip and Shoulder share an intimate relationship, especially when we think of locomotion and 'four-legged' dynamics.**
- **Our shoulders are a modified forelimb which has been externally rotated (supinated) and our hind limbs (legs) internally rotated (pronated).**
- posterior oblique sling mechanism which translates rotational forces from the Gluteus Maximus on one side to the Latissimus Dorsi on the other. And the Anterior oblique sling translating anterior forces from the Adductor complex and Psoas fibers to the opposite Internal Oblique; and even to the mediastinal fascia and shoulder via the diaphragm.
- Ambulatory walking of less than 0.75km per hour translates hip and shoulder forces to the same side, whilst a gait of >0.75km per hour tends to engage the opposite limb and sling mechanism.

LIGHT BULB MOMENT

- OLYMPICS- HOCKEY PLAYERS . LONDON 2014
- Excessive Gluteal Overload: Insidious fatigue; endurance threshold
- Increases resting load to the Adductor relationship.
- Latent trigger point ; holding patterns :Resolution of gluteal overload

NAT Hip

"The key was unlocked when the realization that the tonicity housed in the adductor muscles was the key to the gluteus overload, once it was cleared then the gluteus overload was resolved".

FUNCTION

- Movements of the Hip Joint involve a particular pattern of sequential muscle activation.
- The specific patterns of muscular movement that we will look at are hip extension, hip abduction as well as hip rotational movements.
- All of these patterns are made possible by the coordination of specific muscle groups.