

The Hemiparetic Shoulder – Handle with care

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Learning Objectives

- To have a good understanding of the anatomy around the shoulder joint and the way in which it moves
- To gain an understanding of the complications affecting the shoulder post stroke
- To be able to identify patients who may be at risk of developing shoulder pain
- To be aware of the importance of careful handling of the hemiplegic shoulder

Incidence

- Glenohumeral joint (GHJ) subluxation is reported to be present in 17 – 81% percent of patients with hemiplegia following stroke
- Hemiplegic Shoulder Pain (HSP) has a reported incidence of 5 – 84% *Broeks et al 1999*

Onset

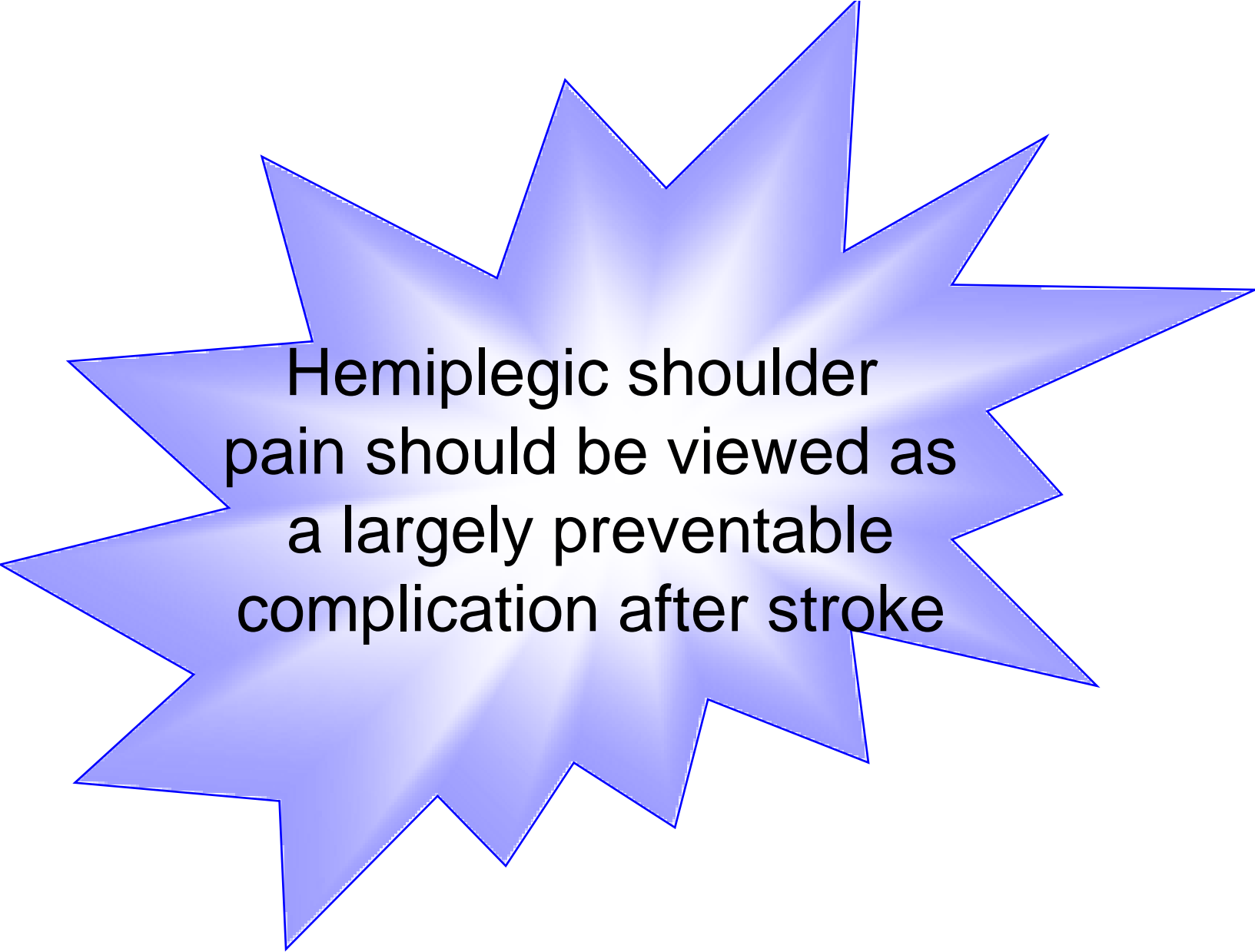
- GHJ subluxation occurs in the initial/early flaccid stages
- Hemiplegic shoulder pain (HSP) has an average onset of 2 – 3 months post stroke

Effects

- Prolongs rehabilitation
- Associated with reduced range of motion which then
 - Interferes with ADL's
 - Impedes balance
 - Difficulty with transfers and mobility

Why is it important?

- To facilitate early identification of patients who may be at risk of developing shoulder pain
- To allow us to put in place strategies to avoid the development of shoulder pain in “at risk patients”



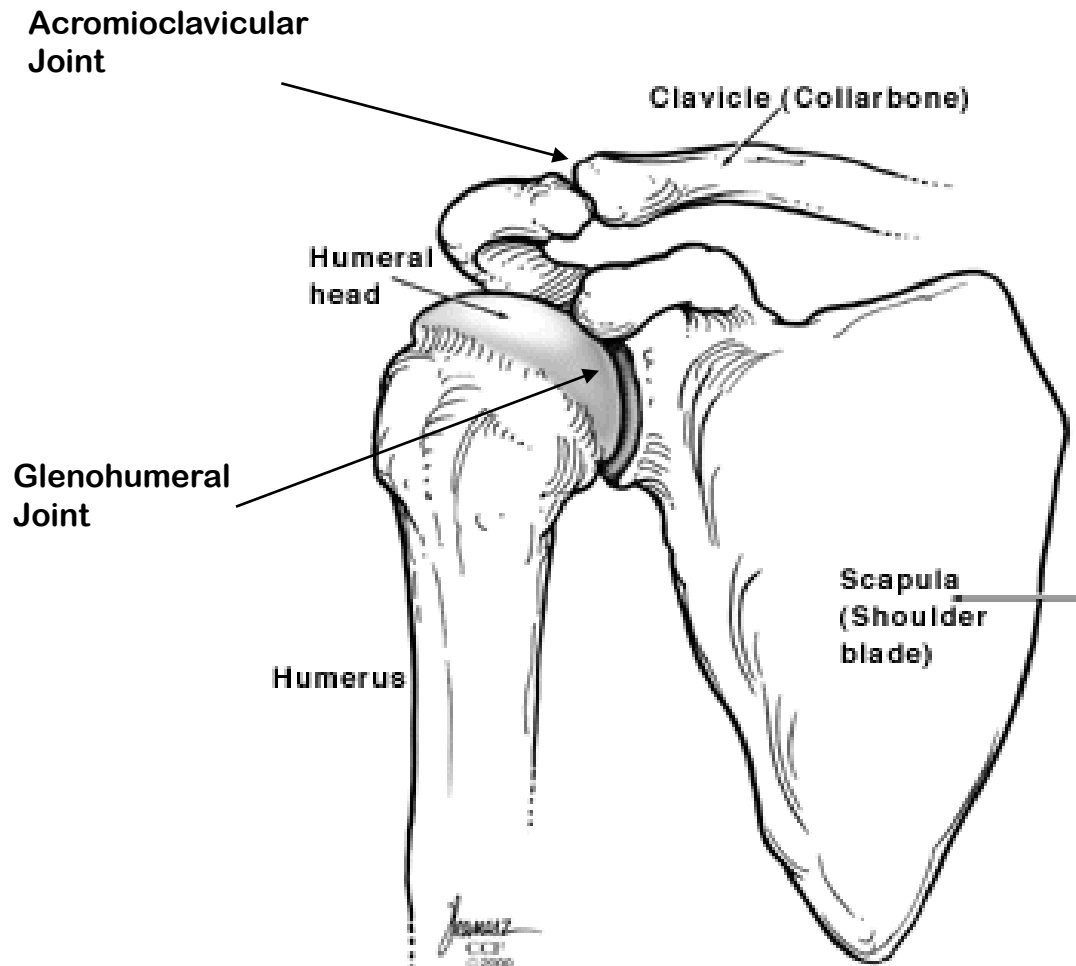
Hemiplegic shoulder
pain should be viewed as
a largely preventable
complication after stroke

Aetiology

- GHJ subluxation is due to paralysis of the rotator cuff muscles
- A number of co-factors are related to shoulder pain but the contribution of each one is unclear
- Likely that a single cause of HSP does not exist

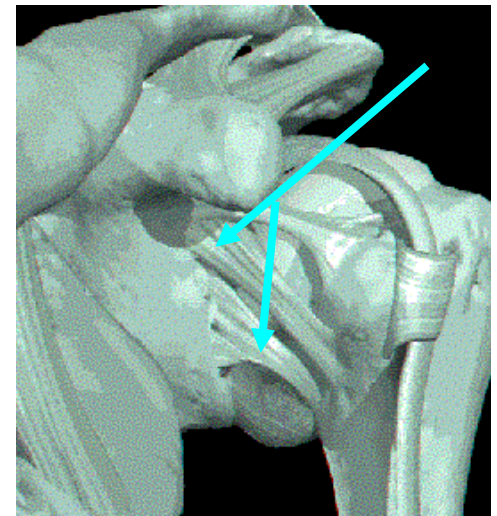
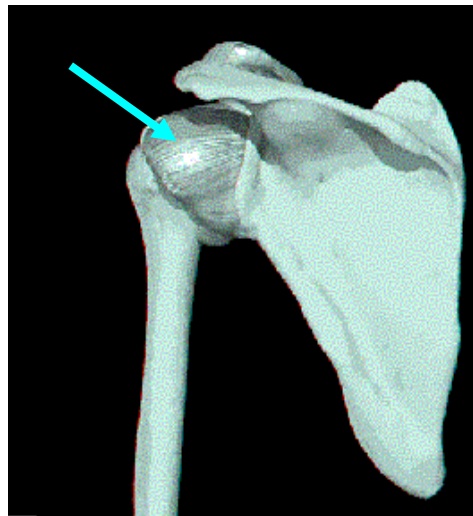
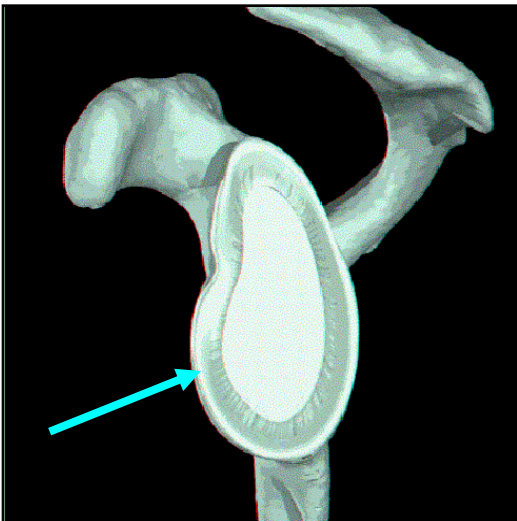
Overview of Shoulder Anatomy

The Shoulder Girdle

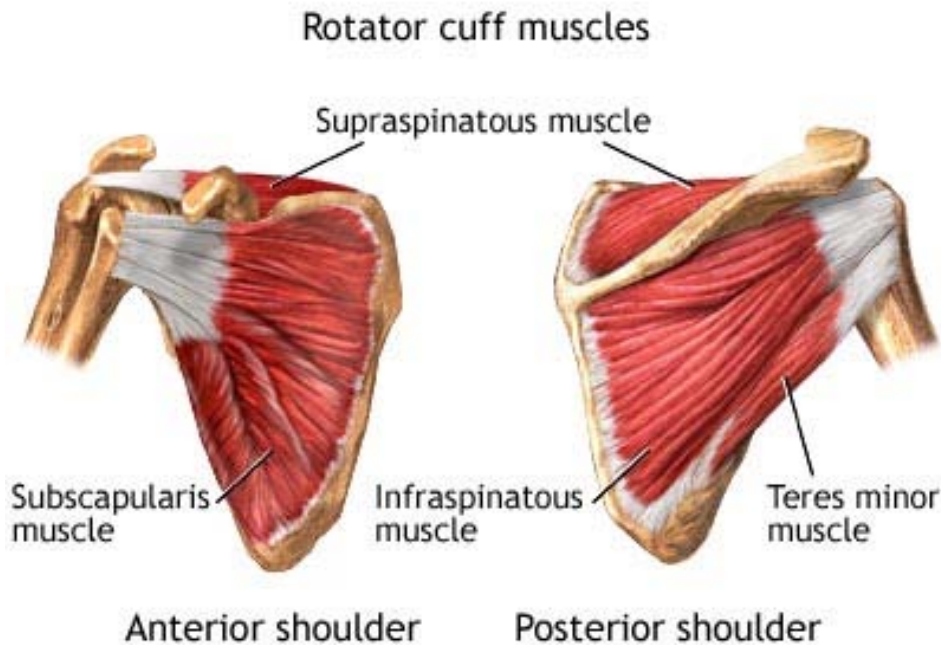


Structures That Help Stabilise the Glenohumeral Joint

- Glenoid Labrum
- Joint capsule
- Ligament
- Rotator Cuff



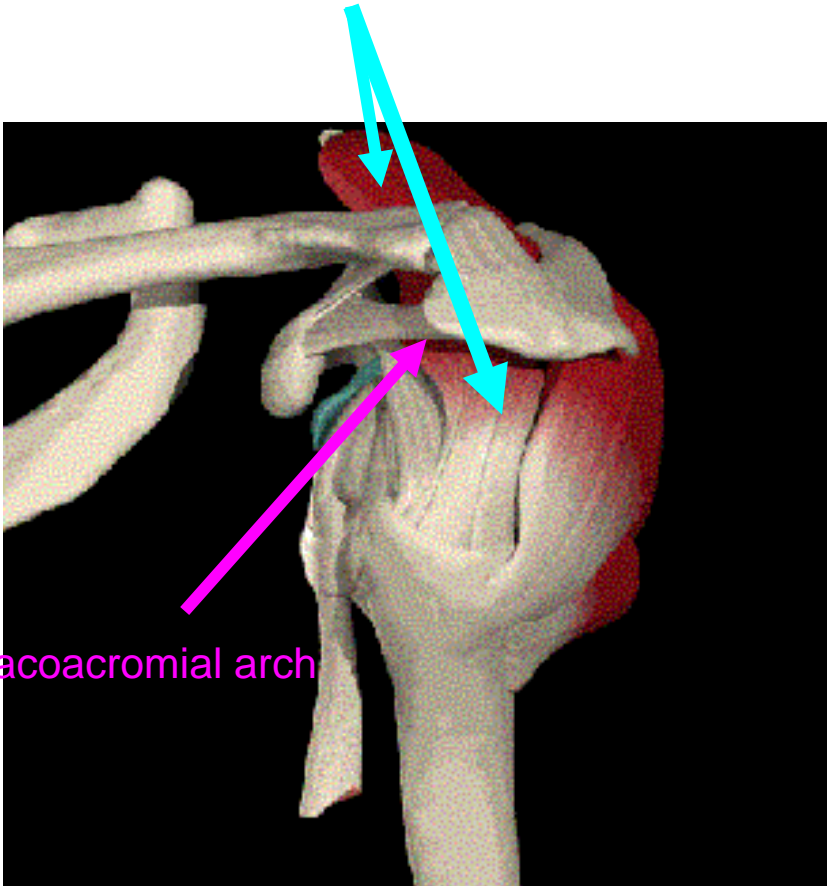
Rotator Cuff Muscles



- Supraspinatus
- Infraspinatus
- Teres Minor
- Subscapularis
 - Blend in and reinforce the joint capsule

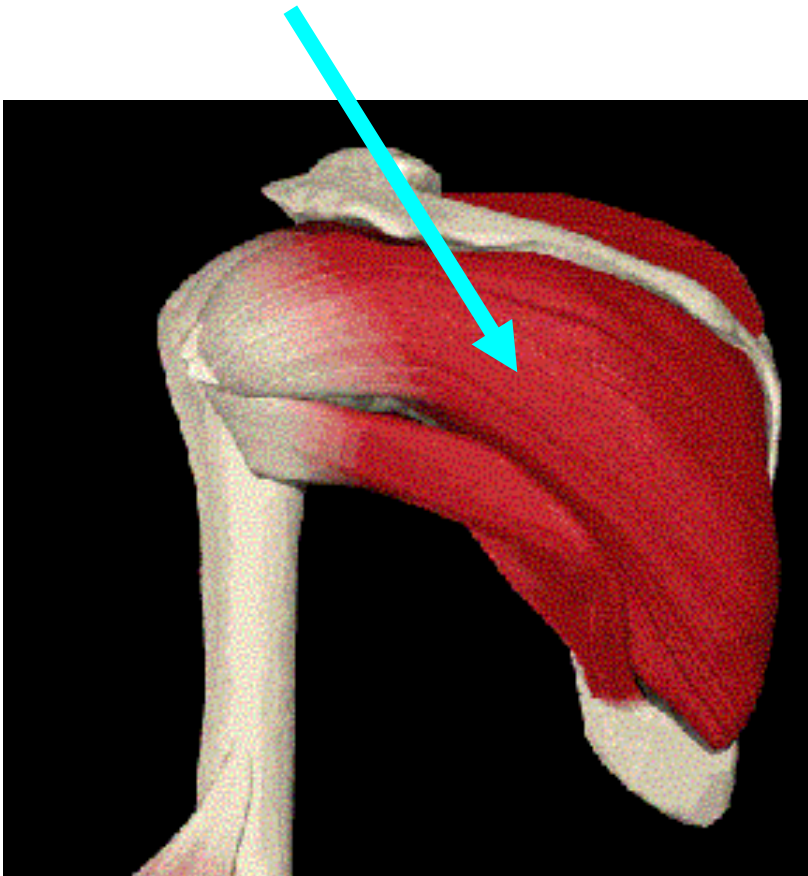
Supraspinatus

- **Origin:** supraspinous fossa
- Passes through the coracoacromial arch where it becomes susceptible to impingement
- **Insertion:** greater tubercle of humerus
- **Action:** initiates abduction of arm

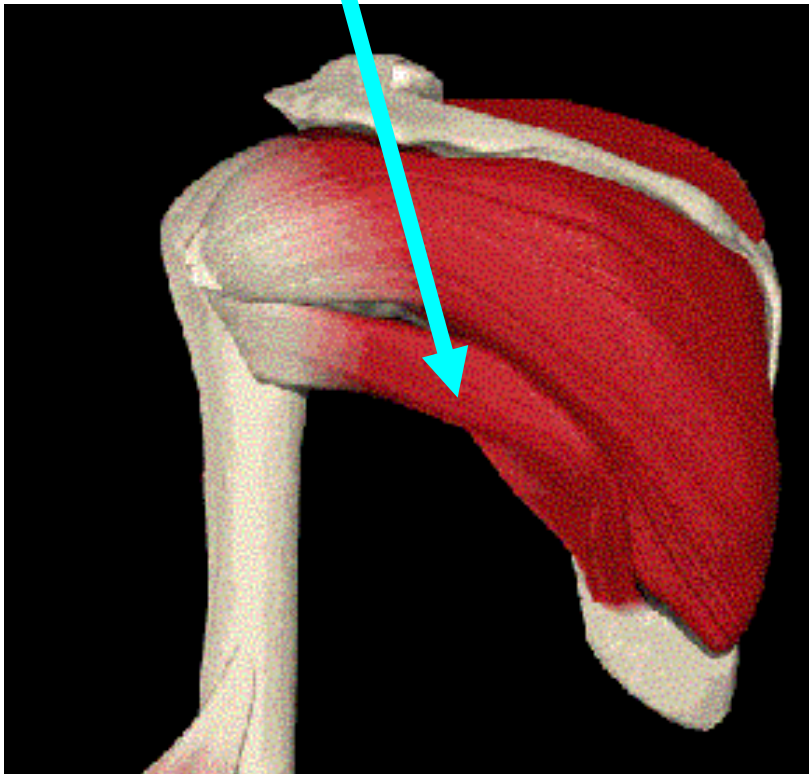


Infraspinatus

- **Origin:** in infraspinous fossa
- Passes around the back of the humeral head
- **Insertion:** middle facet of the greater tubercle of humerus
- **Action:** laterally rotates arm

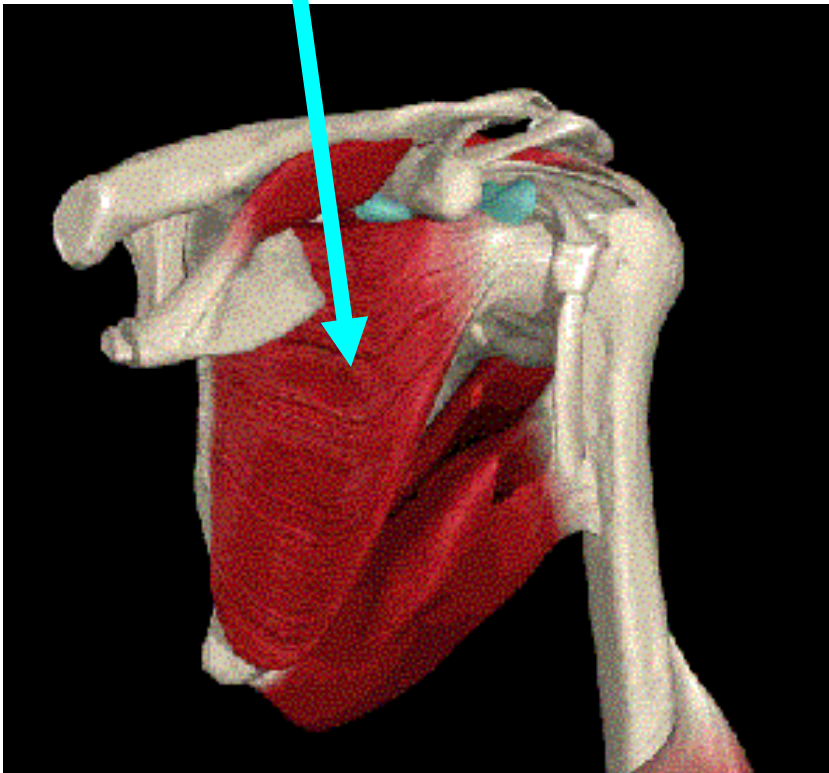


Teres Minor



- **Origin:** superior part of lateral scapula border
- Travels below infraspinatus
- **Insertion:** inferior facet of greater tubercle of humerus
- **Action:** laterally rotates arm

Subscapularis



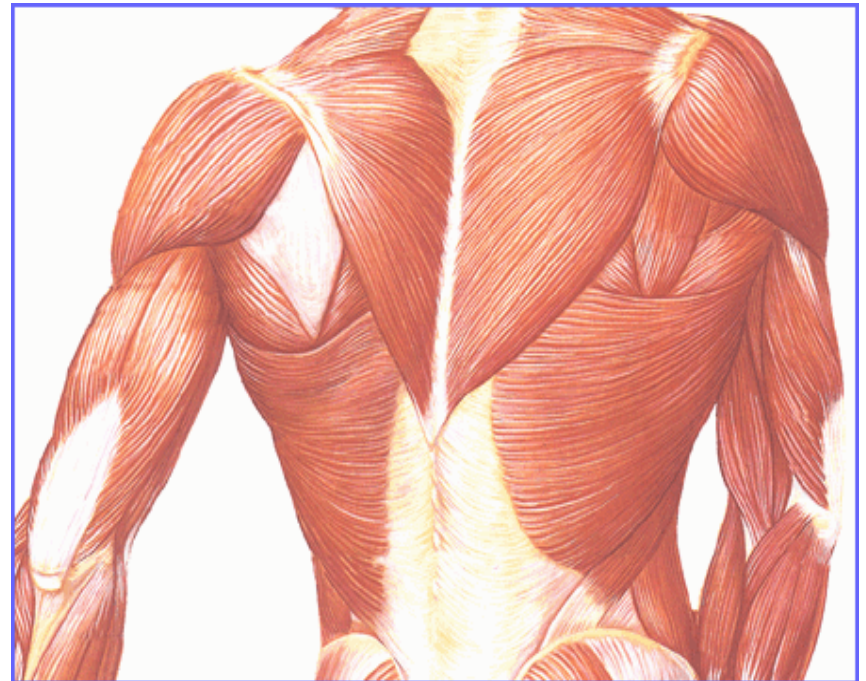
- **Origin:** subscapular fossa on the anterior surface of scapula
- Travels on the medial side of the humerus
- **Insertion:** lesser tubercle of humerus
- **Action:** medially rotates and adducts the arm

How do the Rotator Cuff Muscles Work Together

- Each muscle has its own individual rotatory element
- Together they stabilise the humeral head in the glenoid fossa
- Provide a compressive force into the glenoid fossa when all rotary forces are added together

Scapula Stabilisation

- Essential for normal shoulder girdle function
- Important to remember scapulohumeral rhythm
- Trapezius and Serratus Anterior most important stabilisers
- Need stability and mobility at both joints to achieve full range of motion



What can go wrong after stroke?

- Hemiplegia/hemiparesis
- Abnormal tone/spasticity
- Other neurological deficits
 - Sensation, proprioception, co-ordination
- Immobility
- Subluxation
- Impingement
- Soft tissue injury
- Brachial Plexus or peripheral nerve injury
- Shoulder-hand syndrome
- Pain related to the area of the lesion

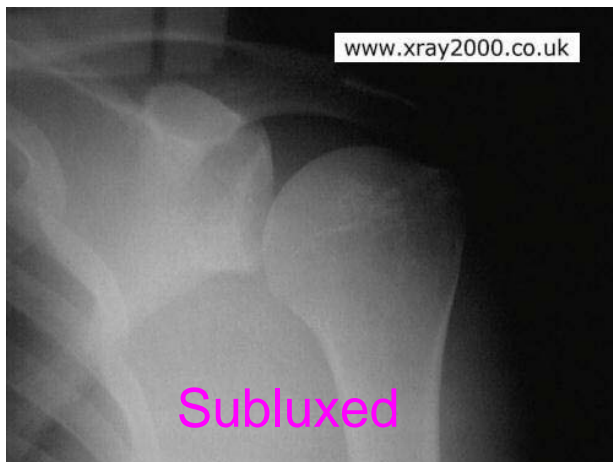
Impingement

- Compression of soft tissue between humeral head and coracoacromial arch
- During movement of the glenohumeral joint impingement is minimised by:
 - Lateral rotation of the humerus to alter the position of the tubercles of the humerus
 - Lateral rotation of the scapula
- Need to consider:
 - Postural and degenerative changes with age
 - Effect of tonal changes

Subluxation

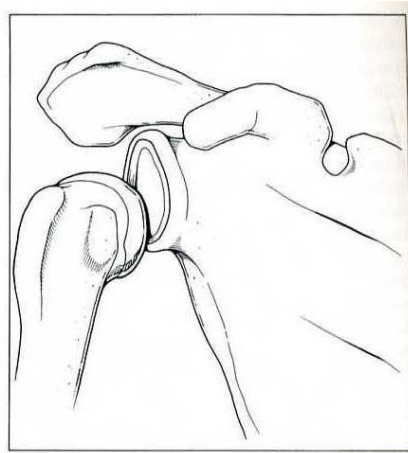


- Normal
 - Scapula held in lat rotation.
 - Posterior deltoid & supraspinatus **ACTIVELY** hold head of humerus in glenoid fossa.
 - Superior capsule and coracohumeral ligament **PASSIVELY** restrain head of humerus
- Subluxation:
 - Incidence substantially higher in patients with severe paralysis
 - More commonly develops in flaccid stage



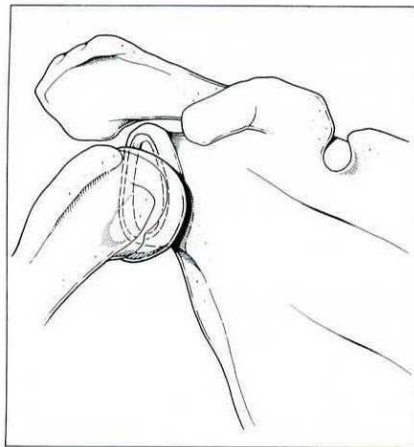
Common Subluxations due to Hemiplegia

A



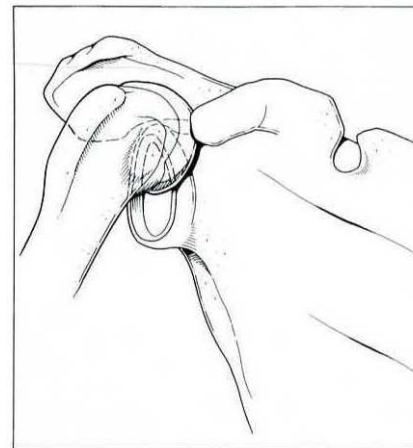
Inferior GHJ Subluxation

B



Anterior GHJ Subluxation

C



Superior GHJ subluxation

Flaccid Shoulder

- Paralysis of lateral rotators of scapula => glenoid fossa angled downwards
- Paralysis of deltoid and supraspinatus
- Superior capsule and coracohumeral ligament ineffective due to angle of glenoid fossa

⇒ Unopposed gravitational pull on arm

⇒ Inferior subluxation of humeral head



Relationship of Subluxation and HSP

- Shoulder subluxation itself is not painful but improper handling of the subluxed shoulder can cause HSP (*Bobath 1990*)
- Demonstrated by times of onset:
 - Shoulder subluxation → first few weeks post stroke
 - HSP → two – three months post stroke
- Evidence is largely inconsistent

How do we look after a hemiplegic upper limb?

- HSP can potentially be avoided if we start prophylactic management straight away
- All members of the MDT, the patient and carers need to be educated on the correct way to handle a vulnerable shoulder

How do we look after a hemiplegic upper limb?

- Adequate support and protection of the hemiplegic arm are essential at all times
 - Pillows to support shoulder and maintain alignment
 - Elevation to prevent oedema
 - Positions that avoid patterns of spasticity
 - Bexhill arm rest on wheelchair
- The affected arm **must never** be pulled or used as a lever to aid transfers

How do we look after a hemiplegic upper limb?

- Involvement of affected UL in activity
 - Provide sensory stimulation
 - Prevent development of learned non-use
 - Facilitate patient to attend to that UL
- Avoid impingement during passive or active assisted movements

Key Handling Points

- Manual reduction of subluxation before elevating arm
- Medial rotation must accompany flexion
- Lateral rotation must accompany abduction
- Scapula lateral rotation must accompany both flexion and abduction
- How much range is enough?
 - Go for functional range
- Remember these points when assisting patients with functional tasks

Other Management Options

- Shoulder cuffs, slings, braces
 - Variety of different types
 - No radiological evidence supporting a reduction in subluxation
- Advantages
 - Visual stimuli to handle with care
 - Can prevent trauma during ambulation
- Disadvantages
 - Can cause immobility
 - Can encourage flexor patterning of spasticity
 - Alters alignment of upper quadrant



Other Therapy Management Options

- FES
- Taping
- Heat
- Ice
- Acupuncture
- Electrotherapy
- Hydrotherapy

Summary

- HSP should be viewed as a largely preventable complication of stroke
- It is the responsibility of all members of the MDT to ensure they handle vulnerable upper limbs with care
- Nursing interventions such as positioning, transferring and assisting ADL's are rehabilitative interventions
(*Seneviratne et al 2005*)
- When handling the hemiplegic arm consider all joints involved and the effect your handling is having
- Ensure adequate support is provided for the arm whatever position the patient is in

References

- Bobath, B., 1990 Adult hemiplegia: evaluation and treatment. 3rd ed. London: Heinemann Medical Books
- Matteo, P., Nannetti, L., & Rinaldi, L., 2005 Glenohumeral subluxation in hemiplegia: an overview. *Journal of Rehabilitation Research & Development*, 42(4), pp. 557-568.
- Matteo, P. et al., 2007 Shoulder subluxation after stroke: relationships with pain and motor recovery. *Physiotherapy Research International*, 12(2), pp. 95-104.
- Seneviratne, C., Then, K.L., & Reimer, M., 2005 Post stroke shoulder subluxation: a concern for neuroscience nurses. *Axon*, 27(1), pp. 26-31.