بسم الله الرحمـٰن الرحيم

{وَإِذَا مَرِضْتُ فَهُوَ يَشْفِينِ}

PBL Clinical | FINAL 1

The Shoulder

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Reviewed by : NST member

The Shoulder: Anatomy and disorders

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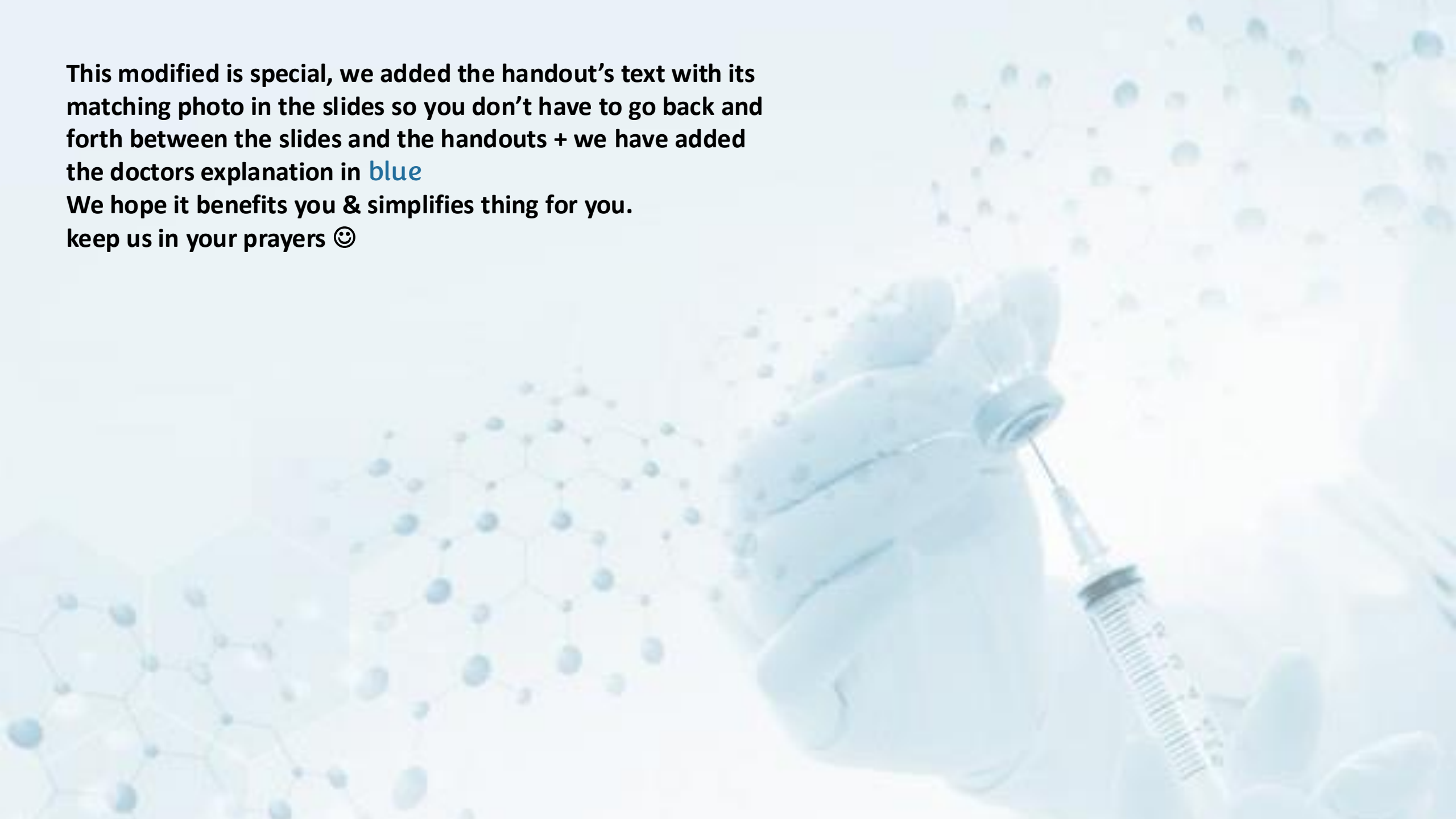
This modified is special, we added the handout's text with its matching photo in the slides so you don't have to go back and forth between the slides and the handouts + we have added the doctors explanation in blue
We hope it benefits you & simplifies thing for you.
keep us in your prayers ☺



Why Study the Shoulder?

- Shoulder pain is one of the most common musculoskeletal complaints.
- Essential for daily activities: dressing, lifting, reaching overhead.
- Most mobile joint in the body **this makes it susceptible to multiple pathologies.**

Learning Objectives

- Understand basic shoulder anatomy.
- Explain how stability is maintained.
- Recognize three common shoulder disorders:
  - Shoulder dislocation.
  - Rotator cuff disease.
  - GH osteoarthritis.

Shoulder Anatomy Overview

Shoulder Dislocation

- Shoulder ***dislocation*** is where the ball of the shoulder (***head of the humerus***) comes entirely out of the socket (***glenoid cavity of the scapula***).

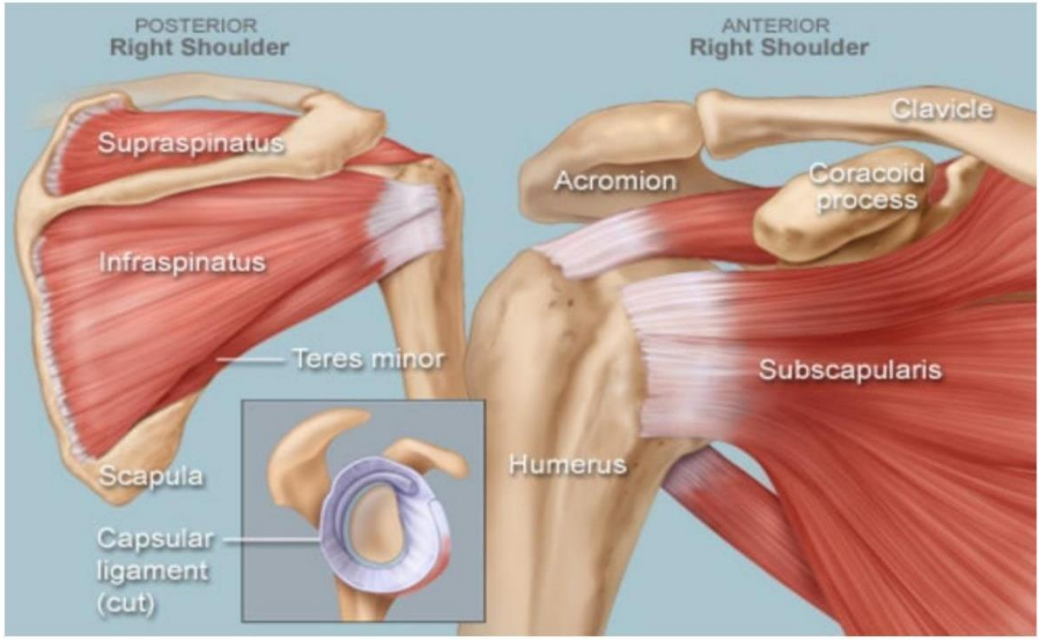
- ***Subluxation*** refers to a partial dislocation of the shoulder. The ball does not come fully out of the socket and naturally pops back into place shortly afterwards.

- The **glenohumeral joint** is the joint between **head of humerous and glenoid cavity of the scapula** (main one that allows extensive motion and the most mobile joint in the body).
-
- And a small joint which is the **acromiocalvicular** joint.

- Both are **synovial type joints.**

Recall The Anatomy..

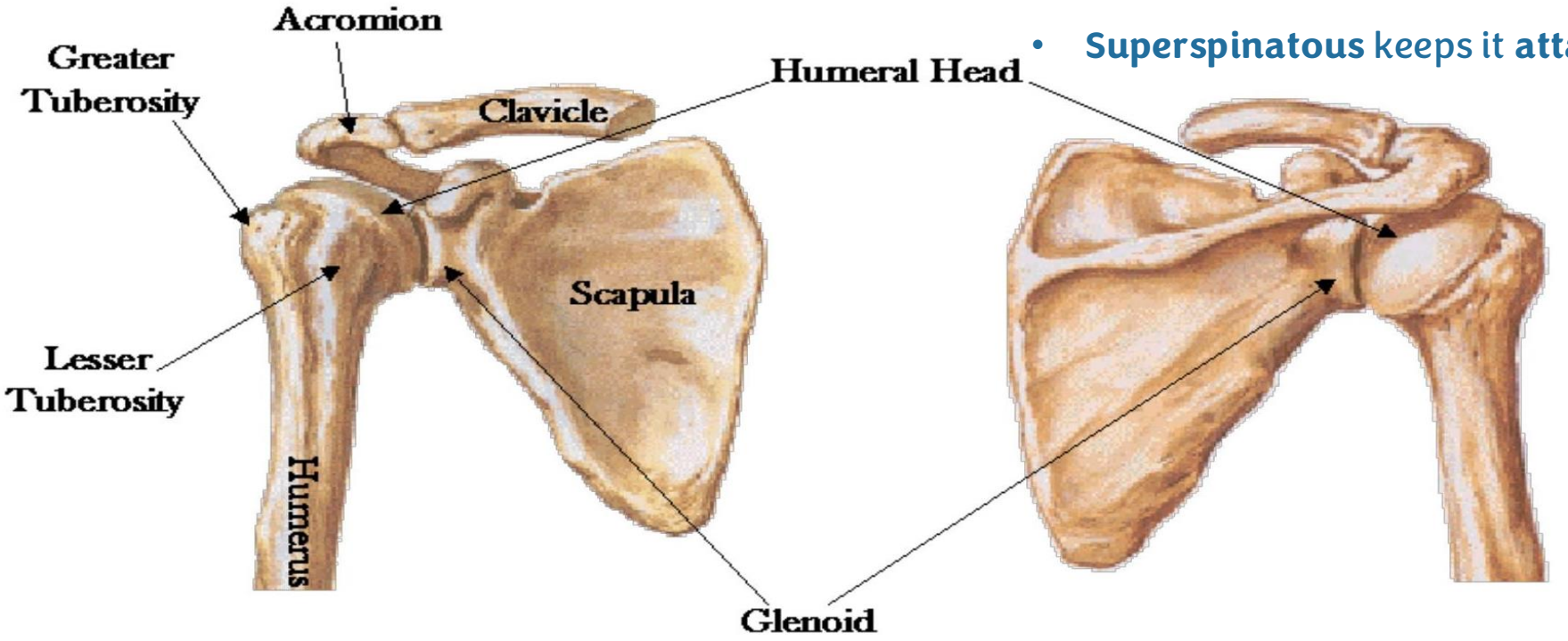
- Bones
- Muscles
- Capsules
- Ligaments



Bones of the Shoulder

- if **supraspinatous** is injured this doesn't mean u can't raise ur arm 15 degrees but rather **the moment u raise ur arm (which is the responsibility of the deltoid muscle) the head of humerus will shift upwards, touching the acromion (superior migration) = painful abduction <u>BUT</u> they are still able to abduct.**
- So the role of **supraspinatous** is to **counter the force that the deltoid muscle exerts on humeral head.**
- **Deltoid** raises humerus.
- **Superspinatous** keeps it **attached to the glenoid.**

Bones



Rotator cuff muscles

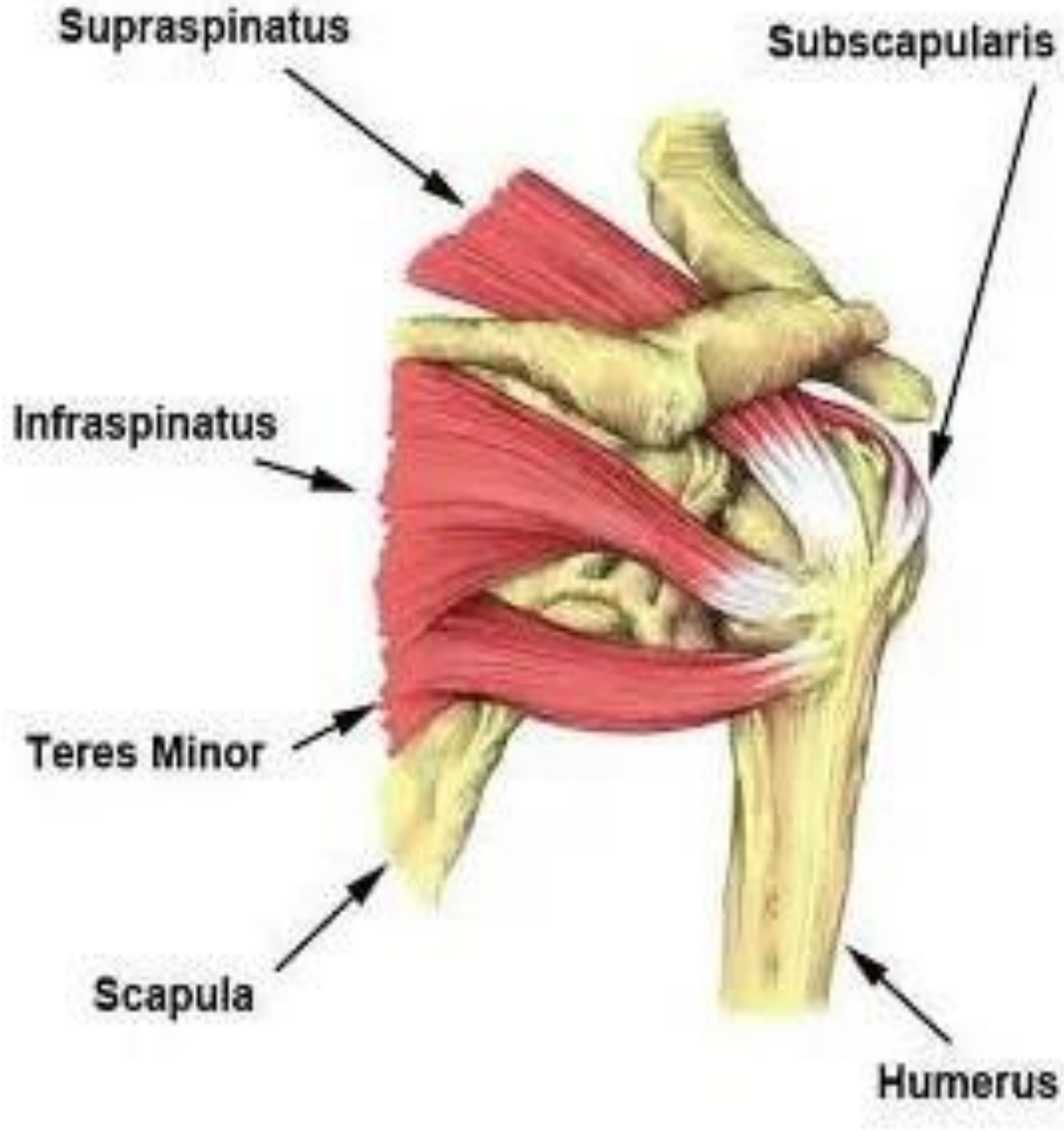
Basic Anatomy

- The rotator cuff is made of four muscles, each with a specific action at the shoulder. They help keep the head of humerus attached to glenoid.

- (mnemonic is SITS).

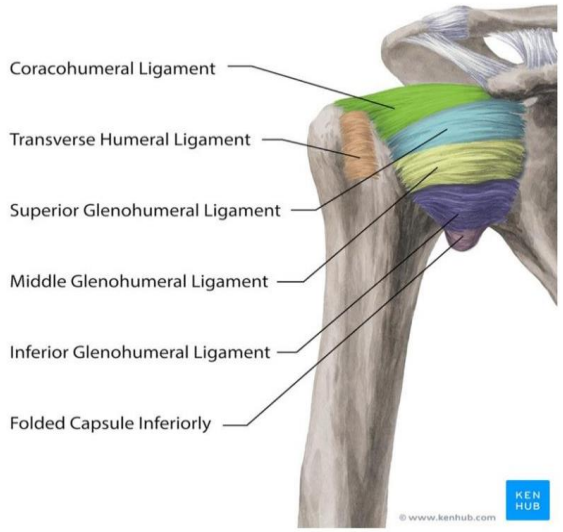
- **Muscles are (SITS) :**

  - Supraspinatus – abduction common source of pathology.
  - Infraspinatus – external rotation.
  - Teres minor – external rotation.
  - Subscapularis – internal rotation.



Shoulder Ligaments

Ligaments



- Important ligaments that connects glenoid with humerus, but Why are they important?
- The most important one is the inferior part of glenohumeral ligament because it helps in stability and to prevent anterior dislocation (will be talked about in upcoming slides),Also might rupture if dislocated.

- The middle glenohumeral ligament is also important cause when it becomes thick patient will experience something called “frozen shoulder” which happens when there is severe pain and stiffness in shoulder.

- We study these ligaments to for fun but because each one will give me a certain pathology!!!

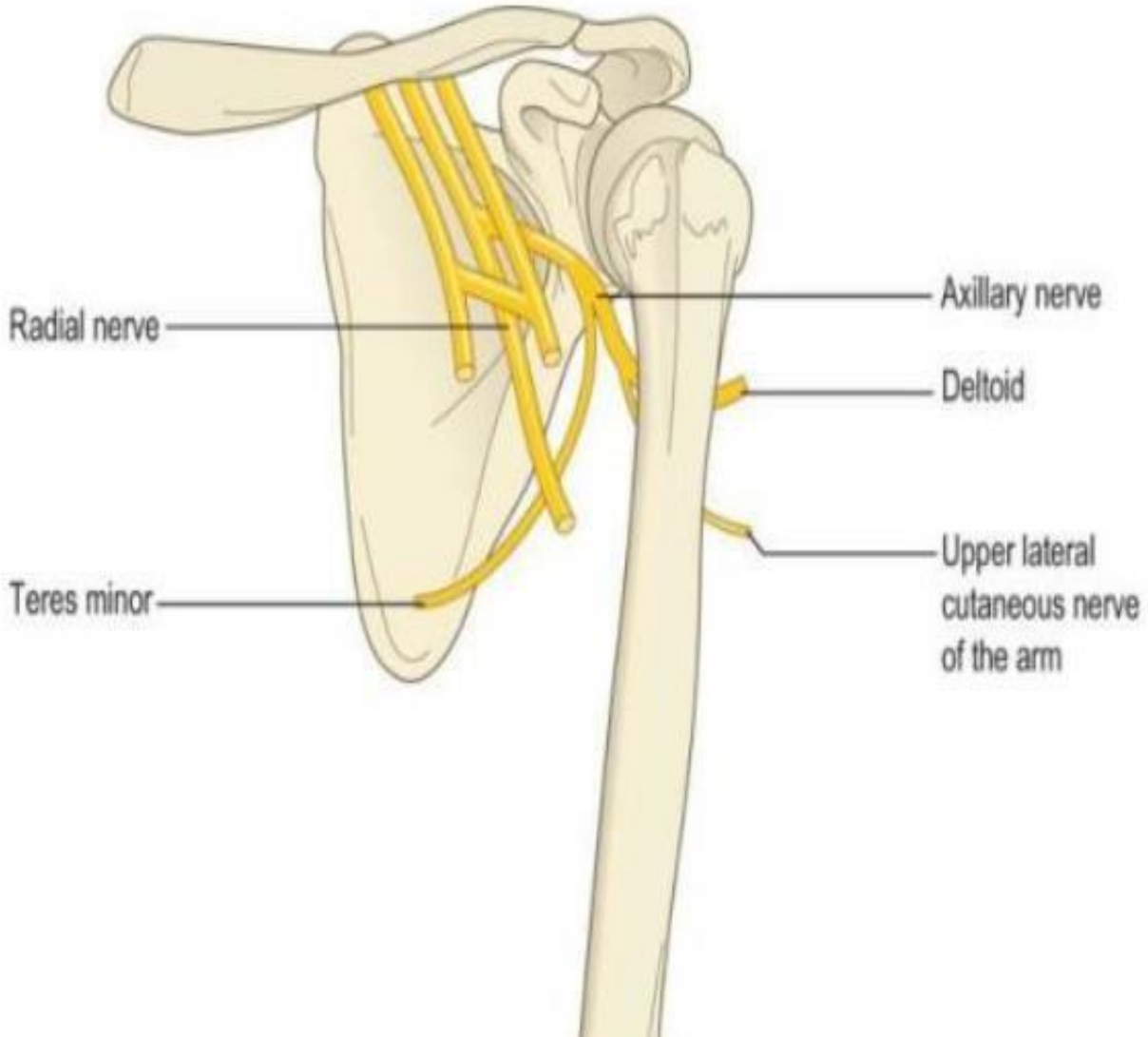
- The labrum is also important!
- It’s a fibrocartilaginous tissue that surrounds the glenoid
- It has many important functions

1) It’s the site where these ligaments attach to glenoid
2) It increases the concavity of glenoid making shoulder joint more stable

Shoulder Nerves

- Axillary nerve (posterior cord) passes behind and around humeral neck and supplies deltoid and Teres minor and gives sensation to lateral ridge of shoulder.
- One of the problems that can happen is if u have a dislocation or fracture the Axillary nerve can be damaged which is very bad.

- Also should be very careful with surgeries around shoulder so you didn't damage the Axillary nerve.



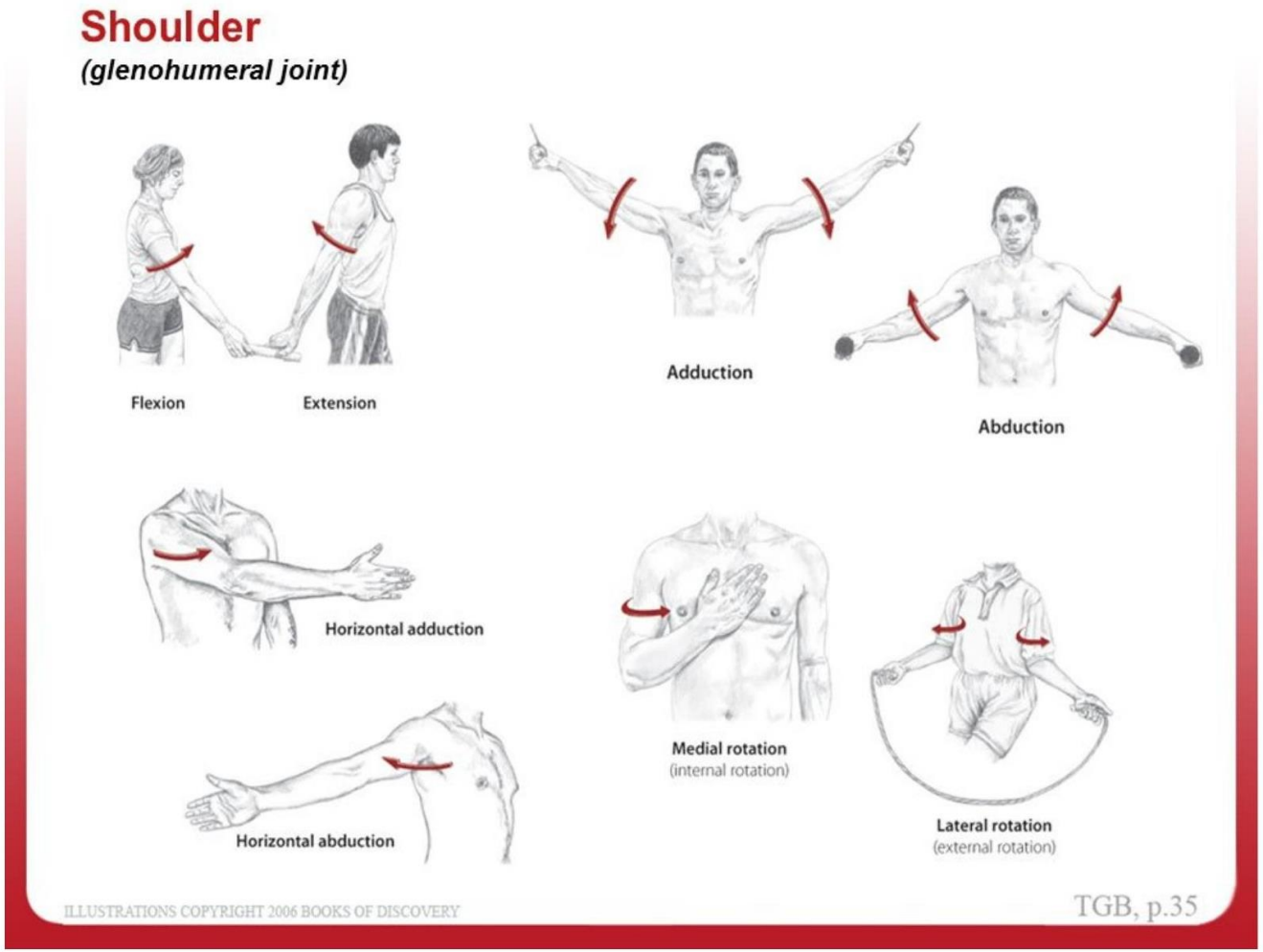
Range of Motion

Has a wide range of motion

- Clinically we test four motions :

1) Abduction (You can normally do 180 degrees).
2) Forward flexion (180 degrees).
3) internal rotation (touch contralateral scapula).
4) External rotation (variable, some can do 90 degrees some 50 degrees).

✓ We always compare between left and right sides!!!



Clinical Case 1

➢ **Presentation :**

- Patients with a shoulder dislocation usually present after the acute injury. They will almost certainly be aware that the shoulder is dislocated. Shortly after the shoulder is dislocated, the muscles will go into spasm and tighten around the joint.

- They will hold their arm against the side of their body. The deltoid will appear flattened, and the head of the humerus will cause a bulge and be palpable at the front of the shoulder.

- It is important to assess patients with a shoulder dislocation for:
  - Fractures
  - Vascular damage (e.g., absent pulses, prolonged capillary refill time and pallor)
  - Nerve damage (e.g., loss of sensation in the "regimental patch" area).

22-year-old football player falls on outstretched hand.

Severe pain and deformity.

Numbness over lateral shoulder CAUSE

AXILLARY NERVE IS DAMAGED (traction injury).

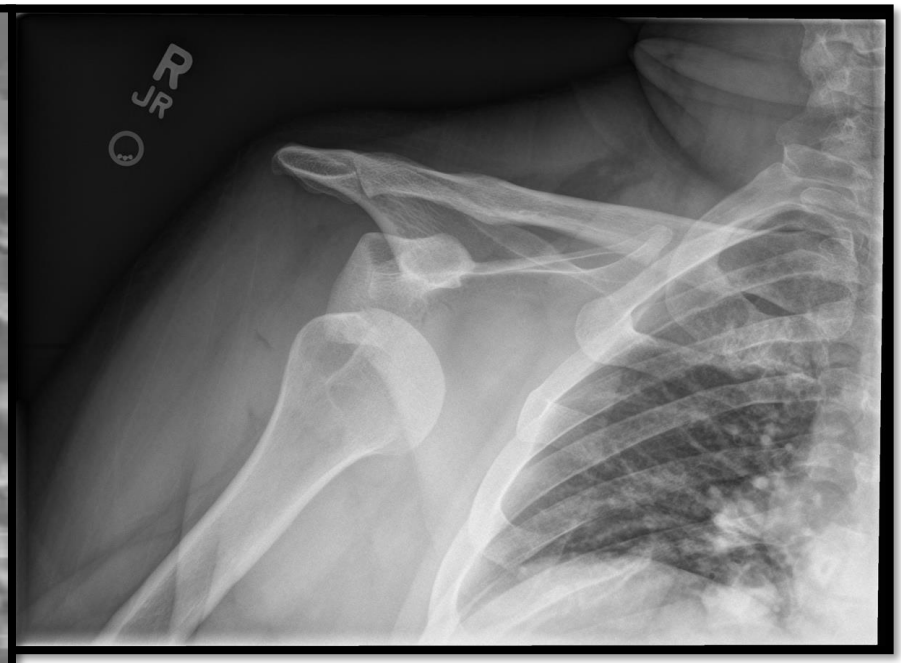
likely diagnosis? ANTERIOR

Shoulder dislocation

➢ **Investigations :**

- ***X-rays*** may be used in an acute presentation to confirm a dislocation and exclude fractures. X-rays are performed after reduction to confirm the shoulder is reduced and assess for fractures.
- ***MRI scan*** of the shoulder. This can be used to assess the shoulder for damage (e.g., ***Bankart*** and ***Hill-Sachs lesions***) and planning for surgery.
- ***Arthroscopy*** involves inserting a camera into the shoulder joint to visualise the structures.

Normal anatomy



Anterior dislocation

➢ Any shoulder joint dislocation is an emergency, if its dislocated for a long time two things can happen :

1) Articular cartilage of shoulder joint will lose its blood supply, which will lead to early damage of articulate cartilage (AVN avascular necrosis) which will lead to arthritis.

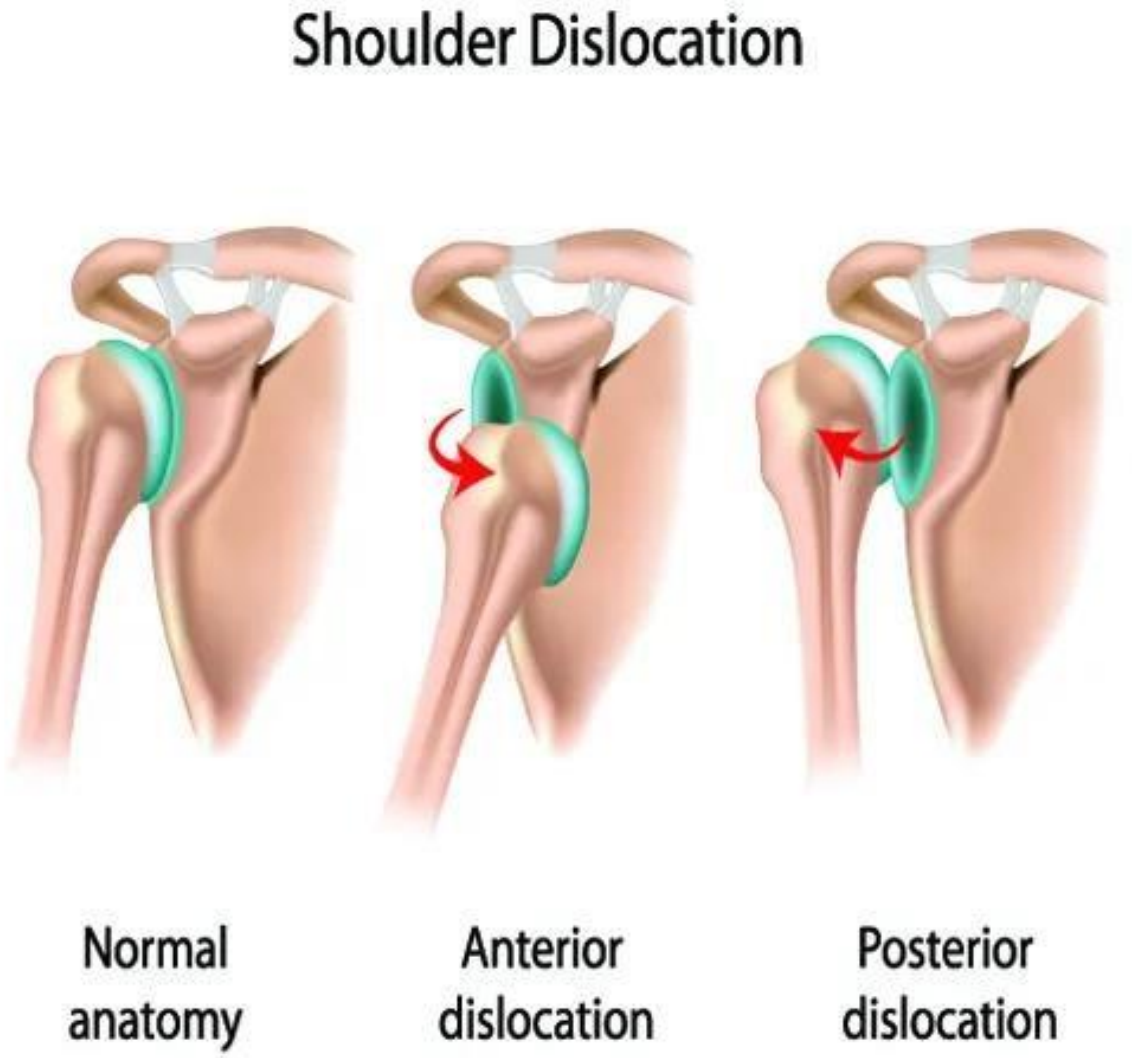
2) The dislocated humeral head will exert pressure on brachial plexus, injuring the brachial plexus.

- More than 90% of shoulder dislocations are ***anterior dislocations***. This is where the head of the humerus moves anteriorly (forward) in relation to the glenoid cavity. This can occur when the arm is forced ***backwards*** (posteriorly) whilst ***abducted*** and ***extended*** at the shoulder

- ***Posterior dislocations*** are associated with electric shocks and seizures. Humerus head moves to the back

➢ **Associated Damage**

- The ***glenoid labrum*** surrounds the ***glenoid cavity***. The labrum is a rim of cartilage that creates a deeper socket for the head of the humerus to fit into. When the shoulder dislocates, the labrum can tear along one edge.
- ***Bankart lesions*** are tears to the anterior portion of the labrum. These occur with repeated anterior subluxations or dislocations of the shoulder.
- ***Hill-Sachs lesions*** are compression fractures of the posterolateral part of the head of the humerus. As the shoulder dislocates anteriorly, the posterolateral part of the humeral head impacts with the anterior rim of the glenoid cavity. Part of the humeral head is damaged, making the shoulder less stable and at risk of further dislocations.
- ***Axillary nerve damage*** is a key complication. The axillary nerve comes from the ***C5*** and ***C6*** nerve roots. Damage causes a ***loss of sensation*** in the "***regimental badge***" area over the ***lateral deltoid***.
- It also leads to motor weakness in the ***deltoid*** and ***teres minor*** muscles.
- ***Fractures*** can occur alongside shoulder dislocations, affecting the:
  - ***Humeral head***
  - ***Greater tuberosity*** of the ***humerus***
- ***Rotator cuff tears*** may occur with shoulder dislocations, particularly in older patients.

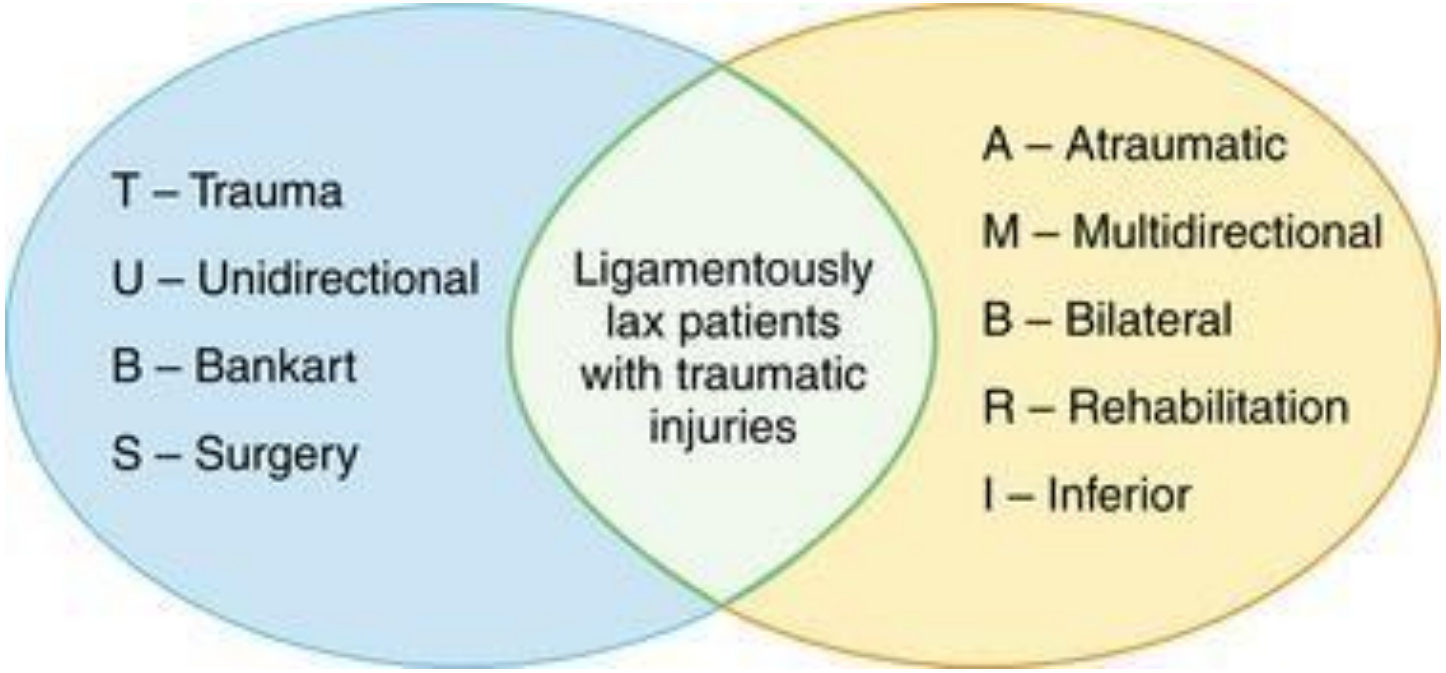


- For patients with recurrent instability its very likely that one of these shoulder stabilizers was damaged.
- Most commonly labrum rapture on inferior part.

Shoulder stabilizers

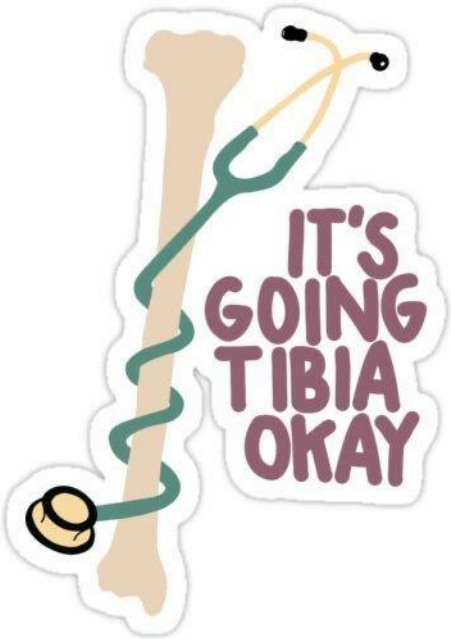
- Gleno-humeral ligament
- Glenoid labrum
- Bony anatomy
- Negative pressure inside capsule
- Rotator cuff muscles

Pathophysiology



Labral tear

Rupture on inferior part, which will cause the ligaments that help with stability non-functioning which will cause recurrent dislocation practically in young patients.



Acute management

Acute Management

Ideally, the shoulder should be relocated as soon as safely possible. Muscle spasm occurs over time, making it harder to relocate the shoulder and increasing the risk of neurovascular injury during relocation.

There are various options for closed reduction of shoulder dislocations. The most common one is the traction-countertraction method

- Give patient anesthesia, and have someone pull the patients arm, and another person putting a sheet around the patients Axilla and pulling in the opposite direction so the force of traction-countertraction will reduce the shoulder back in and once its reduced back in u will hear a pop and the shoulders contour is back to normal.

Ongoing (chronic) management

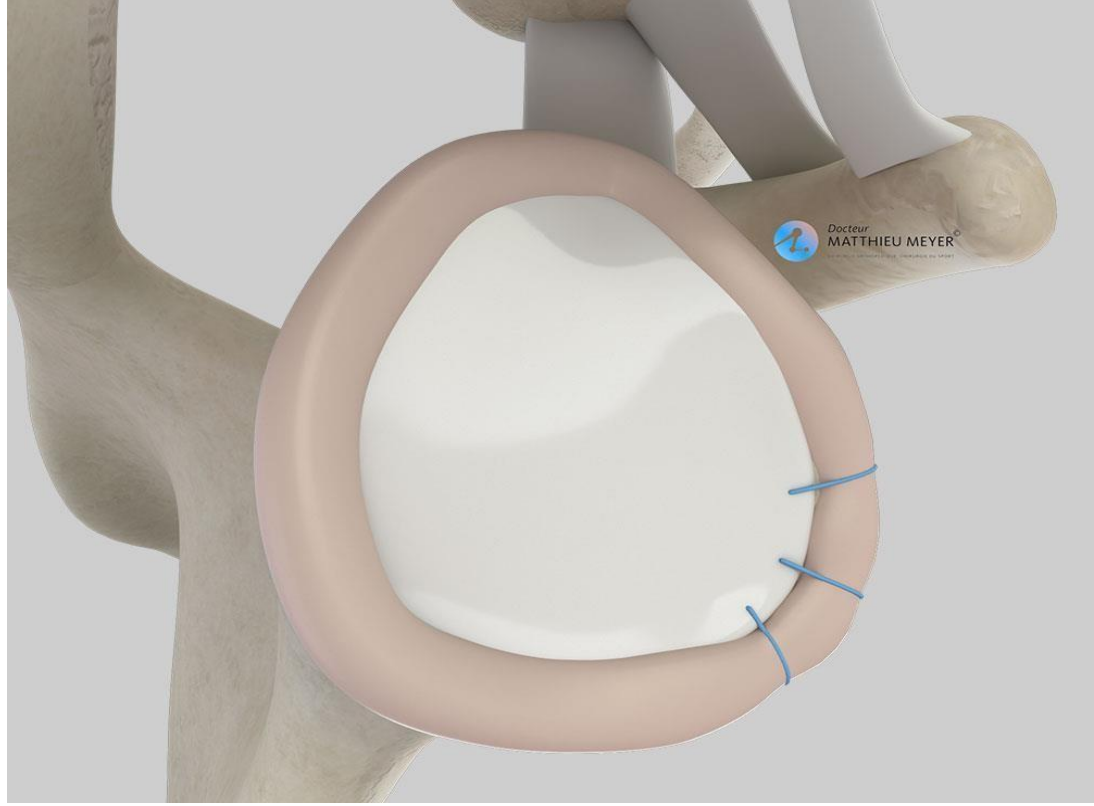
Ongoing Management

- There is a high risk of ***recurrent dislocations***, particularly in younger patients.

- ***Physiotherapy*** is recommended to improve the function of the shoulder and reduce the risk of further dislocations.

- ***Shoulder stabilisation surgery*** may be required to improve stability and prevent further dislocations. This may be an arthroscopic or an open procedure. Underlying structural problems are corrected, such as:
  - Repairing Bankart lesions

- Recurrent instability and dislocations can occur in up to 20% of patients after surgery.



Risk of recurrent dislocation
➔ young

Physiotherapy

Shoulder stabilization surgery

- ***Repairing labral tear***

Clinical Case 2

52-year-old man with shoulder pain for 6 months

Pain lifting the arm and reaching overhead

Night pain

Weakness in abduction

Diagnosis is rotator cuff tear

Rotator Cuff Tear

Rotator Cuff Tears

Rotator cuff tears refer to injury to the tendons of the rotator cuff muscles. The tendon may be partially or fully torn.

Tears of the rotator cuff can occur due to an **acute injury** (e.g., a fall onto an outstretched hand) or degenerative changes with age. They may be related to overhead activities, such as playing tennis or overhead construction work.

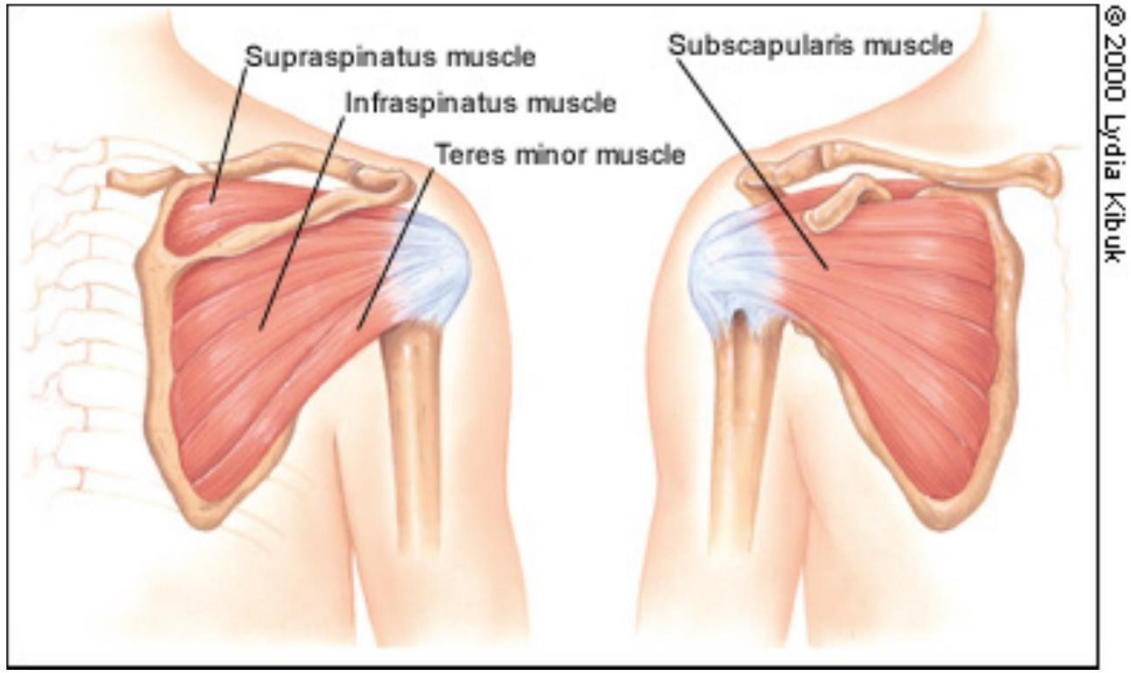
Rotator cuff tear

Important functions:

- Counterbalance the upward pull of the deltoid on the humerus.
- Hold the head of the humerus secure in the glenoid.
- Externally rotate the shoulder which is important during arm elevation.

Rotator Cuff Muscles

Rotator Cuff Muscles



Presentation

Rotator cuff tears may present either with an acute onset of symptoms after an acute injury, or with a gradual onset of symptoms. Patients typically present with:

- Shoulder pain
- Weakness and pain with specific movements relating to the site of the tear (e.g., abduction with a supraspinatus tear)
- Patients may find it difficult to get comfortable at night due to pain in the shoulder, disrupting sleep

Pain around shoulder

Sleep disturbed by pain

Weakness with specific movements relating to the muscle

Rotator Cuff MRI

Investigations

X-rays will not show soft tissue injuries such as rotator cuff tears. They may be helpful for excluding bony pathology, such as osteoarthritis.

Ultrasound or ***MRI scans*** can diagnose a rotator cuff tear.

Investigations

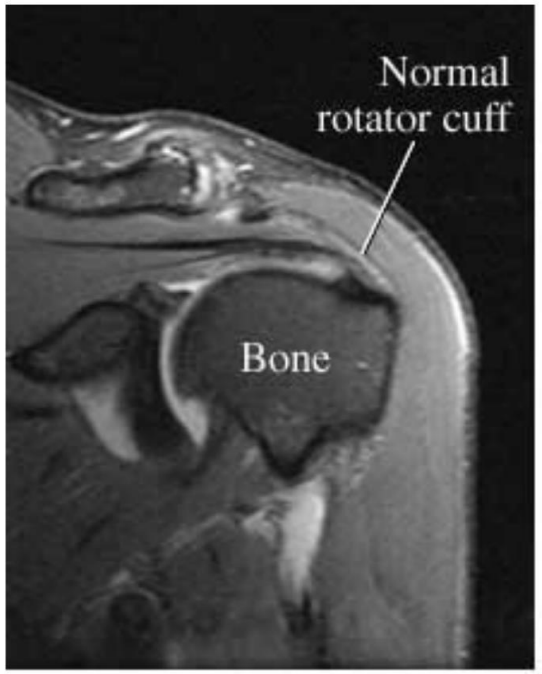


Figure 1

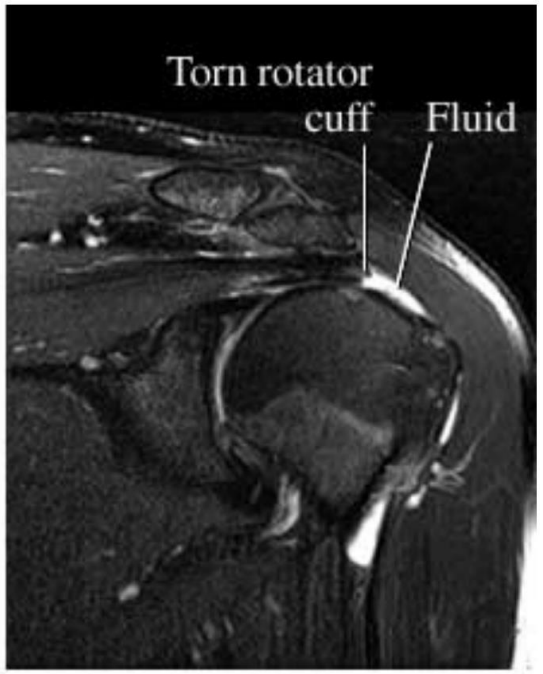


Figure 2

Management

Patients with degenerative rotator cuff tears may be managed conservatively, particularly where they are at increased risk of complications from surgery. Active or young patients and those with acute or full-thickness tears are more likely to be managed with surgery. Surgery may be used where physiotherapy fails.

Non-surgical options are:

- ***Rest*** and ***adapted activities***
- ***Analgesia*** (e.g., NSAIDs)
- ***Physiotherapy***

There are many options for surgical management, depending on individual factors. The main option is ***arthroscopic rotator cuff repair***, where the tendon is reattached to the bone during an ***arthroscopy*** (keyhole surgery), we stitch the tendons back together but surgery is our last option!

Rest and ***adapted activities***

Analgesia

Physiotherapy Steroid

injection

Surgery ➔ ***Arthroscopic rotator cuff repair***

Clinical Case 3

75-year-old lady with chronic shoulder pain

Gradually worsening stiffness

Difficulty reaching overhead

Glenohumeral Osteoarthritis

Degenerative joint disease of the shoulder

Affects articular cartilage

Pain, stiffness

Crepitus , muscle wasting and reduced range of motion (External rotation)

Risk factors

Old age, post – trauma, family history, inflammatory arthritis

Investigations :

Damage to articular cartilage (arthritis) and we don't have mechanism in our body to repair articular cartilage with articular cartilage so it repairs with bone or fibrous cartilage which is not efficient.

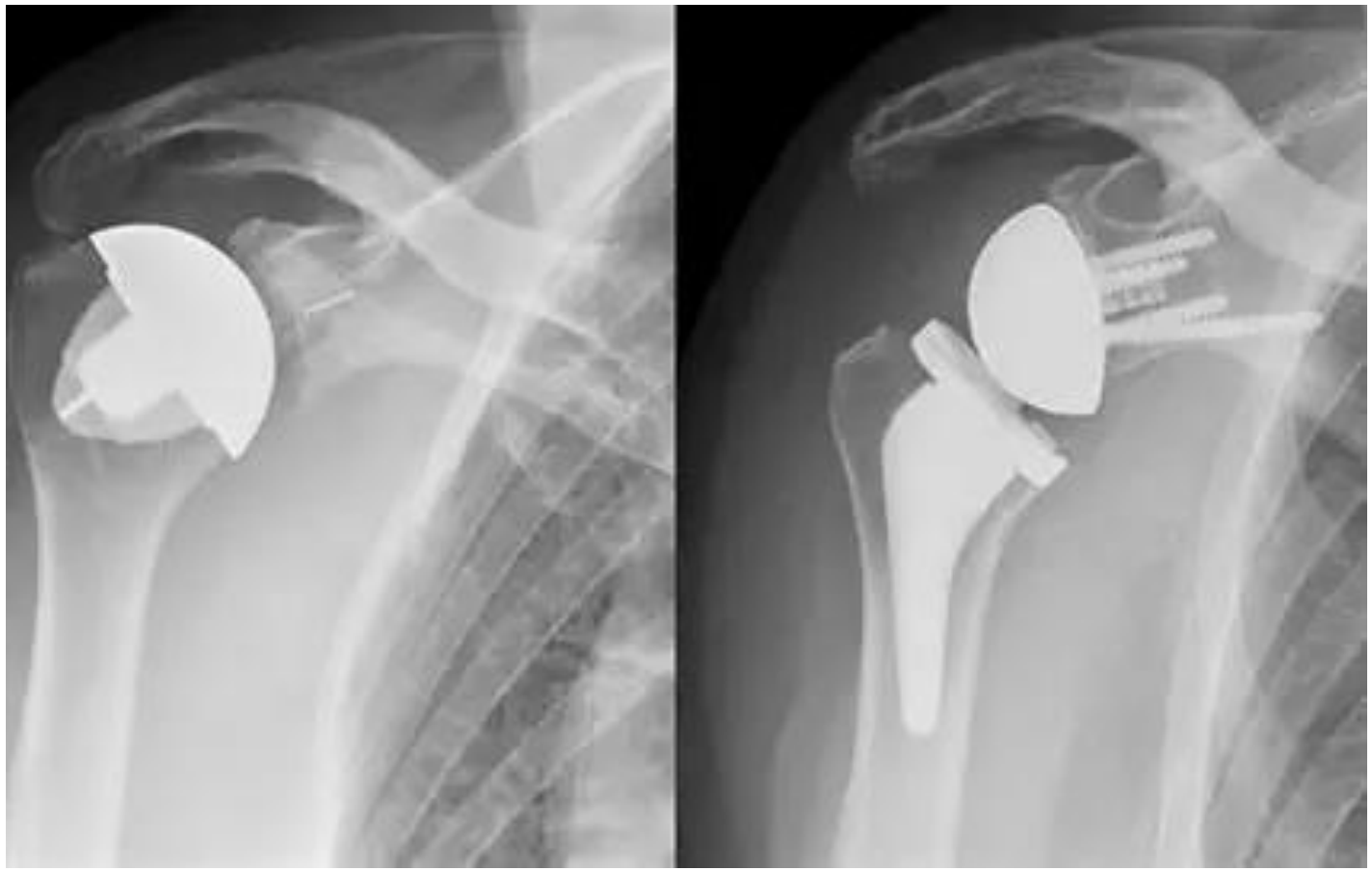
Shoulder X-ray :

General osteoarthosis changes:

1) Narrowed joint space
2) Subchodral sclerosis Cause friction
3) Osteophytes New bone formed at periphery to help stabilize the joint
4) Subchondral cysts
   Extra pressure on bones

Management

- Analgesia
- Activity modification
- Physiotherapy – Deltoid strengthening Steroid injections
- Surgery – Shoulder replacement



Take-Home Messages

- Young trauma → dislocation
- Middle age pain → rotator cuff tear Soft tissue
- Old age → Glenohumeral Arthritis Anatomy explains shoulder pathology

Shoulder Dislocation

Shoulder ***dislocation*** is where the ball of the shoulder (***head of the humerus***) comes entirely out of the socket (***glenoid cavity of the scapula***).

Subluxation refers to a partial dislocation of the shoulder. The ball does not come fully out of the socket and naturally pops back into place shortly afterwards.

More than 90% of shoulder dislocations are ***anterior dislocations***. This is where the head of the humerus moves anteriorly (forward) in relation to the glenoid cavity. This can occur when the arm is forced ***backwards*** (posteriorly)
whilst ***abducted*** and ***extended*** at the shoulder.

Posterior dislocations are associated with electric shocks and seizures.

Associated Damage

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- ***Humeral head***
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Rotator cuff tears may occur with shoulder dislocations, particularly in older patients.

Presentation

Patients with a shoulder dislocation usually present after the **acute injury**. They will almost certainly be aware that the shoulder is dislocated. Shortly after the shoulder is dislocated, the muscles will go into spasm and tighten around the joint.

They will hold their arm against the side of their body. The deltoid will appear flattened, and the head of the humerus will cause a bulge and be palpable at the front of the shoulder.

It is important to assess patients with a shoulder dislocation for:

- Fractures
- Vascular damage (e.g., absent pulses, prolonged capillary refill time and pallor)
- Nerve damage (e.g., loss of sensation in the "regimental patch" area)

Apprehension Test

The ***apprehension test*** is a special test to assess for ***shoulder instability***, specifically in the ***anterior direction***. It is likely to be positive after previous ***anterior dislocation*** or ***subluxation*** of the shoulder. This may be performed after recovery from any acute injuries.

The patient lies **supine**. The shoulder is **abducted to 90 degrees**, and the **elbow is flexed to 90 degrees**. The shoulder is then slowly ***externally rotated*** in this position while watching the patient. As the arm approaches 90 degrees of external rotation, patients **with shoulder instability will become anxious and apprehensive**, worried that the shoulder will dislocate.

Investigations

X-rays may be used in an acute presentation to confirm a dislocation and exclude fractures. X-rays are performed after reduction to confirm the shoulder is reduced and assess for fractures.

MRI scan of the shoulder. This can be used to assess the shoulder for damage (e.g., ***Bankart*** and ***Hill-Sachs lesions***) and planning for surgery.

Arthroscopy involves inserting a camera into the shoulder joint to visualise the structures.

Acute Management

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Ongoing Management

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Recurrent instability and dislocations can occur in up to 20% of patients after surgery.

Rotator Cuff Tears

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Tears of the rotator cuff can occur due to an **acute injury** (e.g., a fall onto an outstretched hand) or degenerative changes with age. They may be related to overhead activities, such as playing tennis or overhead construction work.

Basic Anatomy

The rotator cuff is made of four muscles, each with a specific action at the shoulder (mnemonic is SITS):

- **S** – ***Supraspinatus*** – ***abducts*** the arm
- **I** – ***Infraspinatus*** – ***externally rotates*** the arm
- **T** – ***Teres minor*** – ***externally rotates*** the arm
- **S** – **S*ubscapularis*** – ***internally rotates*** the arm

Presentation

Rotator cuff tears may present either with an acute onset of symptoms after an acute injury, or with a gradual onset of symptoms. Patients typically present with:

- Shoulder pain
- Weakness and pain with specific movements relating to the site of the tear (e.g., abduction with a supraspinatus tear)
- Patients may find it difficult to get comfortable at night due to pain in the shoulder, disrupting sleep.

Investigations

X. rays will not show soft tissue injuries such as rotator cuff tears. They may be helpful for excluding bony pathology, such as osteoarthritis.

Ultrasound or ***MRI scans*** can diagnose a rotator cuff tear.

Management

Patients with degenerative rotator cuff tears may be managed conservatively, particularly where they are at increased risk of complications from surgery. Active or young patients and those with acute or full-thickness tears are more likely to be managed with surgery. Surgery may be used where physiotherapy fails.

Non-surgical options are:

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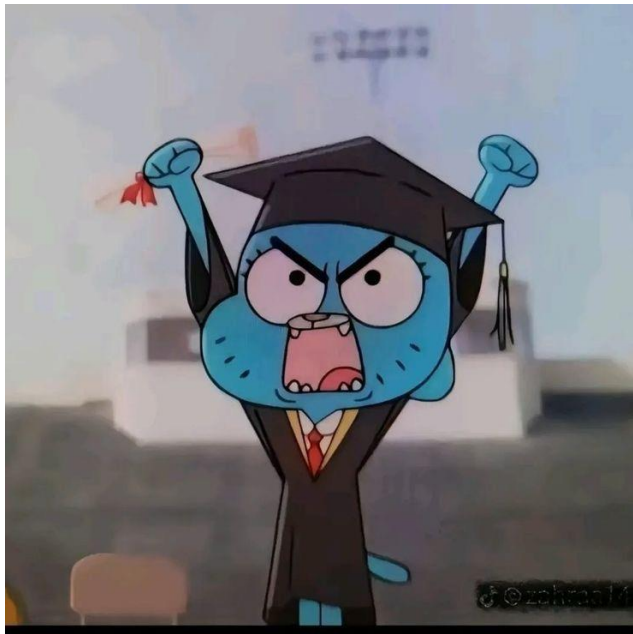
- ***Analgesia*** (e.g., NSAIDs)
- ***Physiotherapy***

There are many options for surgical management, depending on individual factors. The main option is ***arthroscopic rotator cuff repair***, where the tendon is reattached to the bone during an ***arthroscopy*** (keyhole surgery).

رسالة من الفريق العلمي:

ادعوا إلى أمي بالشفاء العاجل

وَوَصَّيْنَا الْإِنسَانَ بِوَالِدَيْهِ حَمَلَتْهُ أُمُّهُ وَهْنًا عَلَىٰ وَهْنٍ وَفِصَالُهُ فِي عَامَيْنِ أَنِ اشْكُرْ لِي وَلِوَالِدَيْكَ إِلَيَّ الْمَصِيرُ



For any feedback, scan the code or click on it.

Corrections from previous versions:

Versions	Slide # and Place of Error	Before Correction	After Correction
V0 → V1			
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