Case 1 – Answer Key

Mr. Z is a 45 year old man who was the driver involved in a motor vehicle collision approximately two months ago. He presents to your general physiatry clinic with a complaint of left shoulder pain, present since the accident but worsening. He highlights that it is particularly painful at nighttime, and with associated activities such as pushing or pulling of the arm.

1. **What is your differential diagnosis for shoulder pain post trauma ?**

- *RC tear, strain, tendinopathy,*
- *Adhesive capsulitis*
- *GH instability, dislocation*
- *Glenoid labral tears*
- *AC joint sprain or separation*
- *Clavicle: fracture, osteolysis of distal clavicle*
- *Humeral fracture*
- *Scapular fracture*
- *Biceps tear, Bicipital tendonitis*
- *Pectoralis Major tear*
- *Nerve: neuritis, neuropraxia/burner*
- *Thoracic Outlet Syndrome*
- *DVT*
- *Referred pain: cervical or thoracic spine, elbow,*

2. **What specifics during history and physical examination will be relevant to identify the current pathology ?**
   Please review special tests of the shoulder and scapulae. ***Italics correspond to patient history in this case***

History :

- **Preexisting pain or symptoms** – *No history of shoulder pain or injury*
- **Location**– *anterior and lateral shoulder, from mid acromion to upper arm. Not pain or radiation to neck or elbow.*
- **Onset-** *immediately acute post trauma or gradual onset, constant or fluctuant – Noted pain to shoulder within few days of accident/surgery. Minimal at rest, fluctuates when moving or any pressure applied to arm/shoulder.*
- **Provoking or Palliating** –*Has responded to HM prescribed for leg injury post MVC, but now weaning off as leg pain improves, shoulder pain persists. Very painful if rolls onto it at night. Pain with any reaching, pushing or pulling activity.*
- **Quality** –*Aching pain with occasional stabbing components. No paresthesias, pins an needles, or distal weakness. He has noted some clicking in the shoulder, no severe clunking*
- **Radiation** - no radiation down to hand or up to neck
- **Severity** – VAS scale *(1-2/10 at rest, 7-8/10 at worst with activity)*

- **Treatment –** has not tried any treatment yet

- Past Medical History, Medications, Occupational, Social history, developmental – Any risk factors for shoulder pathology - *In this case no significant past medical history, no use of medications that could have tendinopathic effects, no occupational or sports/hobbies involving heavy use of the shoulder.*

Shoulder physical Exam – special tests review

Rotator Cuff/Supraspinatus Tests		
Empty can/supraspinatus test	A positive test is pain or weakness in the ipsilateral shoulder with resisted abduction of the shoulder, which is in internal rotation, with the thumb pointing toward the floor, and a forward angulation of 30 degrees.	Sensitivity: 79 Specificity: 38-50
Drop arm test	A positive test is noted if the patient is unable to return the arm to the side slowly or has severe pain after the examiner abducts the patient's shoulder to 90 degrees and then asks the patient to slowly lower the arm to the side.	Unavailable
Rotator Cuff/Infraspinatus and Teres Minor Tests		
Patte's test	A positive test is pain or inability to support the arm or rotate the arm laterally with the elbow at 90 degrees and the arm at 90 degrees of forward elevation in the plane of the scapula. This indicates tears of the infraspinatus and/or teres minor muscles.	Sensitivity: 36-71 Specificity: 71-91
Lift-off test	A positive test is the inability to lift the dorsum of his hand off the back with the arm internally rotated behind the back as starting position. This indicates subscapularis pathology.	Sensitivity: 50 Specificity: 84-95
Scapular Tests		
Lateral scapular slide test	This test allows for identification of scapulothoracic motion deficiencies using the contralateral side as an internal control The reference point used is the nearest spinous process. A scapulothoracic motion abnormality is noted if there is at least a 1-cm difference. The first position of the test is with the arm relaxed at the side. The second is with the hands on the hips with the fingers anterior and the thumb posterior with about 10 degrees of shoulder extension. The third position is with the arms at or below 90 degrees of arm elevation with maximal internal rotation at the glenohumeral joint. These positions offer a graded challenge to the functioning of the shoulder muscles to stabilize the scapula.	Sensitivity: 28-50 Specificity: 48-58
Isometric pinch test	Used to evaluate scapular muscle strength. The patient is asked to retract the scapula into an "isometric pinch." Scapular muscle weakness can be noted as a burning pain in less than 15 seconds. Normally, the scapula can be held in this position for 15 to 20 seconds with no discomfort.	Unavailable
Scapular assistance test	A positive test is when symptoms of impingement, clicking, or rotator cuff weakness are improved when assisting the lower trapezius by manually stabilizing the upper medial border (of the scapula) and rotating the inferomedial border as the arm is abducted or adducted.	Unavailable
Scapular retraction test	The test involves manually positioning and stabilizing the entire medial border of the scapula, which indicates trapezius and rhomboid weakness. The test is positive when there is increased muscle strength or decreased pain or signs of impingement with the scapula in the stabilized position.	Unavailable
Biceps Tendon Tests		
Yergason's test	The test is done with the elbow flexed to 90 degrees, with the forearm in pronation. The examiner holds the patient's wrist to resist supination and then directs active supination be made against his or her resistance. Pain that localizes in the bicipital groove indicates pathology of the long head of the biceps. It can also be positive in fractures of the lesser tuberosity of the humerus.	Sensitivity: 37 Specificity: 86

Speed's test	A positive test is pain in the bicipital groove with resisted anterior flexion of the shoulder with extension of the elbow and forearm supination.	Sensitivity: 68-69 Specificity: 14-55
Shoulder Impingement Tests		
Neer's sign test	The test is positive if pain is reproduced with forward flexion of the arm in internal rotation or in the anatomic position of external rotation. The pain is thought to be caused by impingement of the rotator cuff by the undersurface of the anterior margin of the acromion or coracoacromial ligament.	Sensitivity: 75-88 Specificity: 31-51
Hawkin's test	This test is positive if there is pain with forward flexion of the humerus to 90 degrees with forcible internal rotation of the shoulder. This drives the greater tuberosity under the coracoacromial ligament resulting in rotator cuff impingement.	Sensitivity: 83-92 Specificity: 38-56
Yocum's test	This test is positive if there is pain with raising the elbow while the ipsilateral hand is on the contralateral shoulder.	Unavailable
Shoulder Stability Tests		
Apprehension test	The test is positive if there is pain or apprehension while the shoulder is moved passively into maximal external rotation while in abduction followed by forward pressure applied to the posterior aspect of the humeral head. This test can be done either in the standing or supine position.	Sensitivity: 69 Specificity: 50
Fowler's sign	The examiner performs the apprehension test and at the point where the patient feels pain or apprehension the examiner applies a posteriorly directed force to the humeral head. If the pain persists despite the posteriorly applied force, it is primary impingement. If there is full pain-free external range, it is a result of instability.	Sensitivity: 30-68 Specificity: 44-100
Load and shift test	The scapula is stabilized by securing the coracoid and the spine of the scapula with one hand with the patient in a sitting or supine position. The humeral head is then grasped with the other hand to glide it anteriorly and posteriorly. The degree of glide is graded mild, moderate, or severe.	Sensitivity: 91 Specificity: 93
Labral Pathology Tests		
Active compression test (O'Brien)	The patient is asked to forward flex the affected arm 90 degrees with the elbow in full extension. The patient then adducts the arm 10 to 15 degrees medial to the sagittal plane of the body with the arm internally rotated so the thumb is pointed downward. The examiner then applies downward force to the arm. With the arm in the same position, the palm is then supinated and the maneuver is repeated. The test is considered positive if pain is elicited with the first maneuver and is reduced or eliminated with the second maneuver.	Sensitivity: 32-100 Specificity: 13-98.5
Crank test	With the patient in an upright position, the arm is elevated to 160 degrees in the scapular plane. Joint load is applied along the axis of the humerus with one hand while the other performs humeral rotation. A positive test is when there is pain during the maneuver during external rotation with or without a click, or reproduction of the symptoms. The test should be repeated in the supine position when the muscles are more relaxed.	Sensitivity: 46-91 Specificity: 56-100
Compression-rotation test	With the patient supine, the shoulder is abducted to 90 degrees, and the elbow flexed at 90 degrees. A compression force is applied to the humerus, which is then rotated, in an attempt to trap the torn labrum with reproduction of a snap or catch.	Sensitivity: 80 Specificity: 19-49
Acromioclavicular Joint Tests		
Apley scarf test	A positive test is pain at the acromioclavicular joint with passive adduction of the arm across the sagittal midline attempting to approximate the elbow to the contralateral shoulder.	Unavailable
Thoracic Outlet Tests		
Adson's test	A positive test is a decrease or obliteration of the ipsilateral radial pulse with inspiration, chin elevation, and head rotation to the ipsilateral side.	Specificity: 18-87 Sensitivity: 94
Wright's hyperabduction test	A positive test is obliteration of the palpated radial pulse at the wrist when the ipsilateral arm is elevated to 90 degrees.	Unavailable
Roos test	A positive test reproduces the patient's usual upper limb symptoms within 3 minutes of moderate opening and closing of the fist with the arms and elbows flexed to 90 degrees.	Unavailable
Costoclavicular test	A positive test is indicated by a reduction in the radial pulse with shoulder retraction and depression as well as chest protrusion for 1 minute.	Unavailable

3. Mr. Z is noted to have a history and exam consistent with rotator cuff pathology (anterolateral shoulder pain, positive empty can test, pain with resisted internal/external rotation). **Imaging –** You were able to access his trauma scans and it did include an anterior-posterior (AP) and lateral x-ray of the left shoulder with no bony injury or

dislocation. On review of this x-ray, acromiohumeral invterval is 7 mm. **Mr. Z asks you about ordering an MRI. What will you order and explain your rationale to Mr. Z.**

> *– Similar sensitivity and specificity for rotator cuff disease. U/S – usually more accessible, dynamic, user dependent. MRI likely to provide greater detail about GH joint and muscle quality, and is considered the standard.*

4. Imaging is completed revealing a partial thickness, 1 cm articular sided tear of the supraspinatus. **Mr. Z asks you if he should see a surgeon for the tear and who is generally a good candidate for surgery. Should Mr. Z be referred for surgical consultation ? What can you tell him about what surgeons generally consider before offering a rotator cuff repair?**

- *Size - **Small:** <1cm in length **Medium**: 1-3 cm **Large:** 3-5 cm **Massive:** >5 cm.*
- *Partial thickness vs full thickness.*
- *Quality of tissue and integrity of repair (stronger tissue if <50 years old).*
- *Acute vs. chronic tears/duration.*
- *Trauma vs. degenerative tear*
- *First vs. revision surgery*

5. Mr. Z is not sure if he has coverage for physiotherapy through his motor vehicle accident claim. **He asks you to advise him on exercises that he can do at home. Please review principles of a physiotherapy program for scapular stabilization and rotator cuff rehab.**

Rehab protocols may vary based on non-operative or operative. General principles for RC pathology include starting with gentle ROM and scapular stabilization exercises, progressing to gentle strengthening of RC without resistance until restoring pain free ROM and then progressing to greater resistance.

- *Shoulder pendulum*
- *Supine Passive ROM of shoulder*
- *Active assist ROM of shoulder (Cane, Wall crawl, pulleys)*
- *Shoulder Shrugs*
- *Isometric scapular retraction and depressions*
- *Prone arm raises (0, 90, 1290 degrees)*
- *Closed chain scapulothoracic strengthening (wall push, floor push)*
- *Prone or seated rows with elastic, pulleys*
- *Shoulder internal and external rotation at 0, 45 and 90 degrees*
- *Scapular plane elevation*
- *Correcting postural stressors – forward head carriage, rounded shoulders*

References:

1. Brukner & Khan's Clinical Sports Medicine, Fifth Edition, 2017
2. Orthobullets: www.othobullets.com
3. Fowler Kennedy rotator cuff protocol https://www.fowlerkennedy.com/wp-content/uploads/2023/03/SMALL-ROTATOR-CUFF-REPAIR-PROTOCOL-November-2015.pdf