Shoulder examination for the MRCS part B (OCSE)

Richard Hayes
Karl Trimble

Abstract

Shoulder examination may be tested during the MRCS OSCE. This article will describe the requirements of the clinical examination part of the OSCE as well as providing the candidate with a practical structure for examination of the shoulder. Foremost in the candidate's mind should be an idea of how they will be assessed and how to accrue marks. A clinical examination station not only tests fluent clinical examination, in the domains of 'clinical knowledge' and 'technical skill', but also assesses 'communication skills' and 'professionalism. Ultimately, success in the MRCS OSCE is a combination of delivery of technical skill, clinical knowledge, good communication and professionalism. A technically flawless examination performed without regard to professional behaviour and good communication is unlikely to be good enough to pass. With that in mind, this article will cover all aspects of the shoulder examination from start to finish in more detail than required to give the depth of knowledge required to excel.

Keywords Examination; MRCS; OSCE; part B; shoulder

The OSCE format

The OSCE consists of eighteen assessed stations with a number of rest and preparation stations. Candidates have 1 minute outside each station to read the scenario and then 9 minutes in the station itself.

Physical examination is tested in four stations and marks will be awarded for the technical skill of the examination itself, but also communication and professionalism. After 6 minutes the examiner will ask for the findings to be presented and then the candidate will be invited to answer some scripted questions about the clinical situation at which the candidate may accrue further marks for clinical knowledge.

A simulated scenario is as follows.

Candidate instructions

You are a core surgical trainee in the outpatient clinic and are asked to see a patient referred by his GP on account of left shoulder pain. After 6 minutes (or sooner if you are ready) you will be asked to present your findings and have a discussion with the examiner. The examiner will not prompt you unless they feel the patient is being made uncomfortable or embarrassed.

This station tests physical examination skills and not history taking. You should restrict communication with the patient to issues relevant to your physical examination. Let the examiner know if you are ready to summarize your findings before 6 minutes.

Richard Hayes *BA (Hons) MBBCh MRCSEd is a Core Surgical Trainee at Torbay Hospital, Torquay, UK. Conflicts of interest: none declared.*

Karl Trimble *FRCS (Tr and Orth) is an Orthopaedic Surgeon at University Hospital Plymouth, UK. Conflicts of interest: none declared.*

Shoulder anatomy (Figure 1)

Before considering examination the shoulder it is crucial to understand the anatomy of the joint being tested. The shoulder 'joint' is in fact a complex interaction between four joints: the sternoclavicular, acromioclavicular, scapulothoracic and glenohumeral joints.[1] It has a relatively loose multi-axial synovial joint, thus allowing it to have a very wide range of movement.[2] At OSCE stage you will already have a good grasp of shoulder anatomy, osteology, important anatomical relationships of blood vessels, muscles, tendons and the brachial plexus.

The examination

After confirming with the examiner your candidate number and that you understand the scenario, you should proceed to clean your hands and introduce yourself to the patient. There is often debate regarding 'narrating' your examination as you proceed. Narration is not encouraged, but neither will it be penalized. Equally some candidates find it helpful to narrate in order to maintain structure and to alert the examiner to particular aspects of their approach or findings.

Patients, simulated or otherwise, often report they feel more at ease when the examining clinician verbalizes what they are doing.

Here we set out everything that could reasonably be expected in 6 minutes at MRCS level. Naturally there is a very large number of clinical tests and assessments that may be carried out as part of a shoulder examination that will be more appropriate for FRCS examination.

Exposure

Ask the patient to stand if they can and expose the patient as appropriate, shirtless for men (bra should remain worn for women). Make sure you can access all aspects of the joint in question and can see and access the spine and contralateral shoulder. The examination should proceed with the familiar musculosketal 'look, feel, move' scheme.

Look

- Look for obvious pain or discomfort in movement, standing etc.
- Assess the skin quality as well as the contours of the shoulder.
- Look for asymmetry, spinal deformity (lordosis, kyphosis or scoliosis).
- Look for scars indicating injury or previous surgery.
- Shoulder dislocation presents with squaring of the lateral aspect of the shoulder (you may be asked about this)
- Assess soft tissue mass and muscle bulk. This may be diminished in disuse atrophy.
- Specific muscle groups will atrophy depending on underlying pathology.
- Deltoid atrophy is indicative of axillary nerve damage (C5,6 — damaged in humeral fracture).

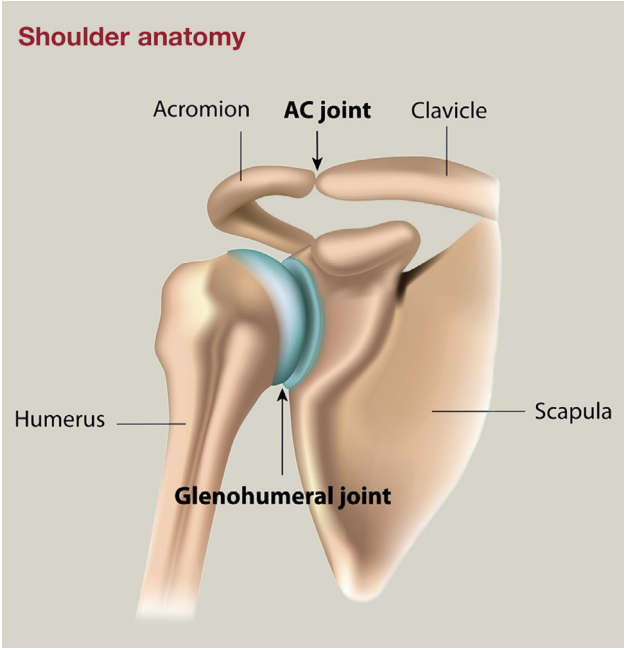

Figure 1

- Obvious winging of the scapula is likely due to long thoracic nerve damage (C5-7).
- Wasting of the muscles overlying the scapula, the muscles of the rotator cuff indicate cuff tear.
- Steps in the clavicle or at the acromioclavicular joint may represent previous injuries or malunion.

Feel — anterior

- Palpate the sternum and clavicle joint for scars, steps or tenderness, signs of previous injury or malunion.
- Palpate the acromioclavicular joint for deformity or tenderness and the coracoid process. These landmarks are important.
- Assess muscle bulk and quality of pectoralis and deltoid for particular nerve distribution atrophies (see above).

Feel — lateral

- Palpate the proximal humerus for tenderness or swelling, then assess the greater tuberosity of the humerus for tenderness; a number of tendons insert here.
- Palpate the sub-acromial margins, tenderness may indicate rotator cuff pathology.
- Assess for sensory loss in the regimental badge area, specific for axillary nerve injury (C5,6).

Feel — posterior

- Posterior shoulder structures are best palpated standing at the patient's side rather than behind them so as to maintain eye contact and assess for pain.
- Assess the bony landmarks of the scapula and the rotator cuff muscles originating from the posterior surface of the scapula.
- Palpate the cervical and thoracic spine and the paraspinal muscles to assess for referred pain. Remember 30% of shoulder pain is referred from the neck.[2]

Move

Movements should first be tested actively in order to see what patients can do for themselves.

The movements that should be assessed are flexion (forward elevation), extension, abduction, internal and external rotation (Figure 2).

Note internal rotation is best tested by seeing how far a patient can reach behind their back between the scapulae, maybe asking the patient 'how high can they scratch their back between the shoulder blades', at this point it is worth comparing both sides for any marked difference, note the dominant side often has a slightly more limited range of motion (e.g. T4 vs T8).

You should observe these movements dynamically from the patient's front, side and back.

Testing individual muscles

Deltoid is an abductor of the arm is to be tested in at least 45 degrees of abduction with the arm straight and thumb pointing upward so as to negate the effect of supraspinatus which initiates abduction.

Serratus anterior is tested by asking the patient to push away from a wall with their arms straight. Assess for winging of the scapula indicating a compromized long thoracic nerve.

Pectoralis can be assessed by asking the patient to put their hands on their hips and squeeze.

Trapezius is tested by asking the patient to shrug their shoulders upwards against resistance, as in a cranial nerve examination.

Special tests

Beyond the gross movements of the shoulder there are some special tests with which candidates should be familiar. They are important because they lead to clinical distinction between different tendon pathologies, this in turn allows more accurate diagnoses and planning of further tests.

The rotator cuff

The rotator cuff muscles may be asked about individually. Remember the cuff consists of four muscles surrounding the glenohumeral joint. (S.I.T.S) (Figure 3):

- **Supraspinatus:** initiates shoulder abduction, originates in the supraspinous fossa on the posterior aspect of the scapula and inserts into the greater tubercle of the humerus. Supraspinatus is innervated by the suprascapular nerve C5,6.
- **Infraspinatus:** an external rotator of the shoulder also inserts onto the greater tubercle of the humerus but originates from the infraspinous fossa of the scapula. It too is innervated by the suprascapular nerve C5,6.
- **Teres minor:** another external rotator of the shoulder originates from the lateral border of the posterior aspect of the infraspinous fossa and inserts onto the greater tubercle and part of the joint capsule. Its nerve supply is from the axillary nerve C5,6.
- **Subscapularis:** an internal rotator of the shoulder originates from the anterior scapula in the subscapular fossa and inserts into the lesser tubercle of the head of the humerus C5,6.

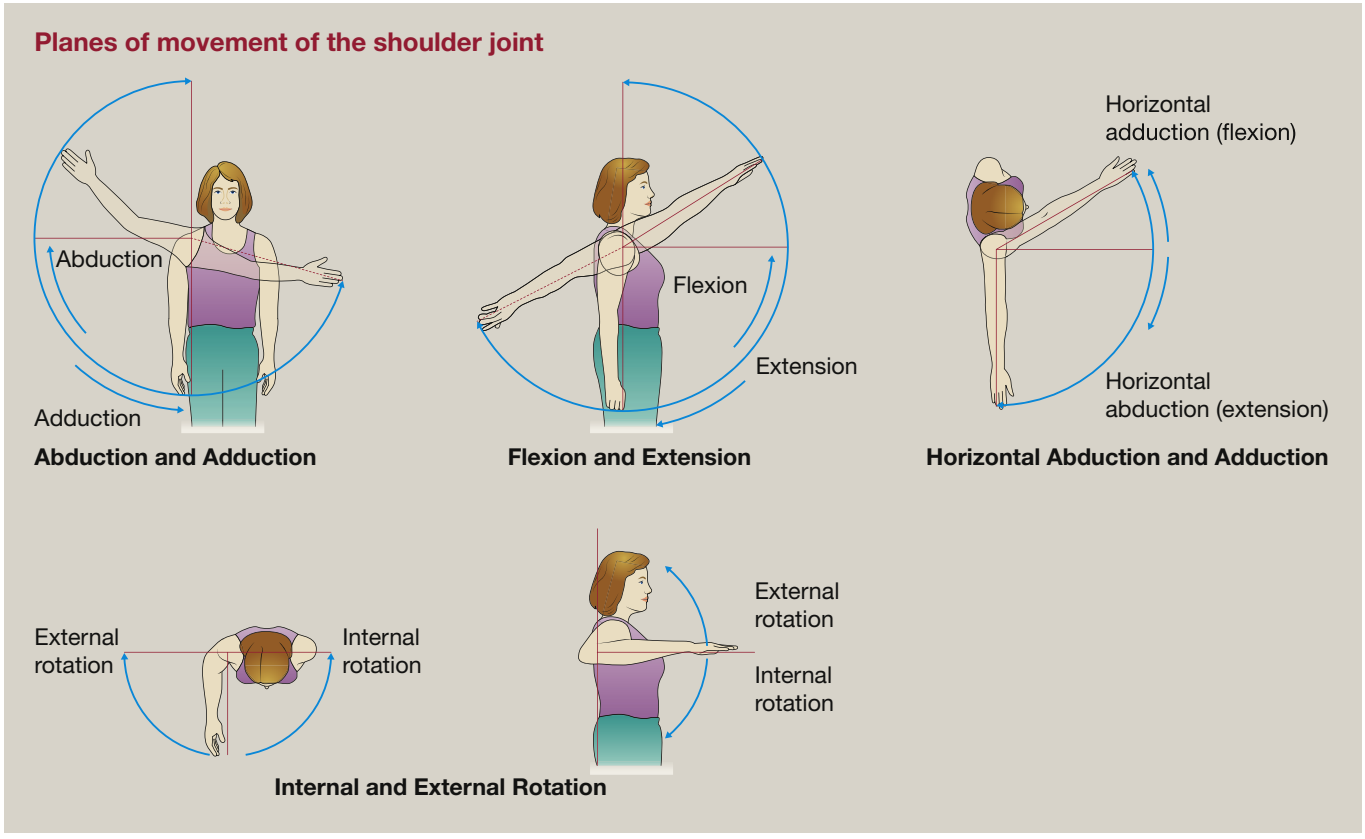

Figure 2

Supraspinatus, Jobe's test

Jobe's test, otherwise known as the empty can test, assesses for acute tears of supraspinatus. The technique involves abducting the shoulder to 90 degrees with the thumb pointing to the floor, as if emptying a can. Downward pressure from the examining clinician is then resisted by the patient. Reproduction of pain constitutes a positive test for supraspinatus pathology.

Infraspinatus and teres minor

It stands to reason that the two external rotators of the shoulder are assessed by the same special test, although this means it is difficult to distinguish between the two.

The arms should be held by the sides of the body with the elbows flexed to 90 degrees. Pain on resisted external rotation is a positive test for external rotator pathology.

Subscapularis, Gerber's lift-off test

In this test the hand is placed behind in the small of the back palm facing rearward, the examining clinician gently applies pressure to the patient's palm and the patient is asked to lift the hand out of the small of their back, lack of power or pain at the shoulder is indicative of a subscapularis problem.[3]

Tests for acromioclavicular joint impingement — Hawkins' test

Seventy-four per cent of shoulder pain diagnoses involve impingement.[4]

Sub-acromial impingement usually identifies rotator cuff pathology and characteristically patients complain of pain between 60 and 120 degrees abduction.

Sub-acromial pain beyond 120 degrees (terminal arc pain) is often associated with glenohumeral arthritis or acromioclavicular arthritis.

Impingement tests involve raising the limb with the elbow straight in flexion (forward raise) and then abduction of the shoulder.

Reproduction of discomfort through the arc is a positive test for impingement.[5]

Patients often voluntarily flex the elbow and rotate the shoulder to avoid the painful 'pinch' of impingement.

Instability — the apprehension test

This is not a test that ought to be performed routinely in the MRCS OSCE; however, we detail it here for completeness. In a patient with an unstable shoulder, usually due to previous dislocation, passively abducted and externally rotated the shoulder will provoke the patient to resist examination or ask the examining clinician to stop for fear of reproducing the unstable situation, hence the term 'apprehension test'.

When you have finished your examination

Thank the patient, offer them their clothing as appropriate, gel your hands once more and turn to your examiner. You will either have finished ahead of time or have been asked to stop as your

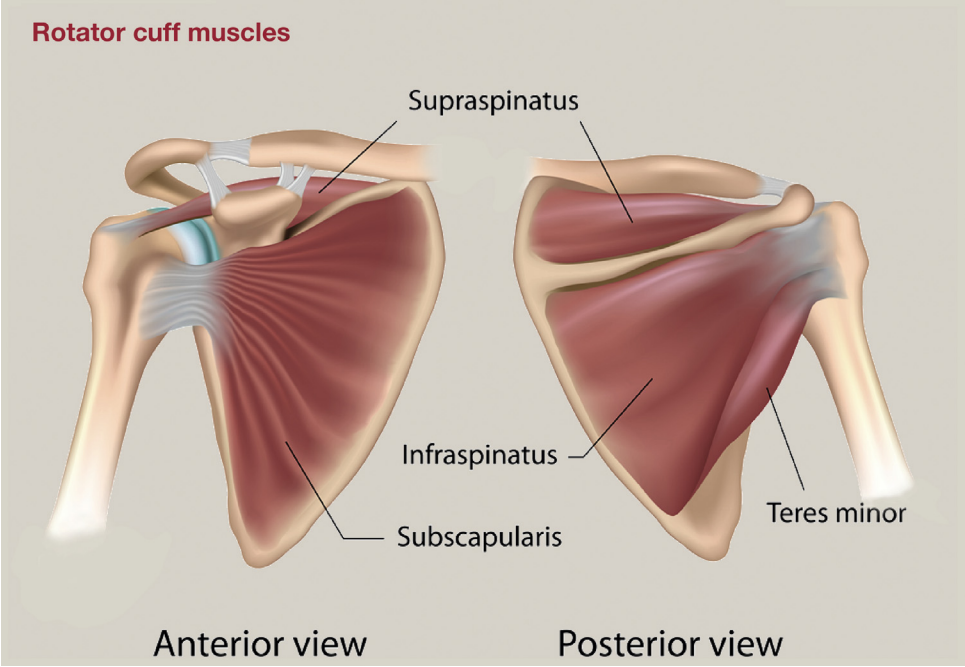

Figure 3

6 minutes (of the 9 minutes) will have elapsed. You will be asked to present your findings at this point.

Be concise, try to remember the patient's name and age, this information will have been included on the information sheet.

'Today I examined Mr X's shoulder, he is a 42-year-old man complaining of pain on lifting his arm'.

'The positive (and relative negative) findings were'…

These are likely to be pain, reduced range of movement, positive tests (e.g. impingement and rotator cuff pathology).

I would go on to examine the cervical spine and the elbow as well as conducting appropriate tests and investigations (depending on your findings).

Appropriate tests are likely to be two view radiographs of the joint in question. Or possibly an ultrasound scan or MRI scan which may indicate pathology of the rotator cuff.

Potential diagnoses

From the outset consider potential diagnoses based on the scenario information and your examination findings.

Causes of reduced range of movement:[1]

- **Mechanical:** rotator cuff tendinopathy, impingement, osteoarthritis, adhesive capsulitis (frozen shoulder), neuromuscular weakness.
- **Trauma:** dislocation, subluxation/instability, previous fracture.
- **Tumour:** primary or metastatic.
- **Inflammatory:** septic arthritis, rheumatoid arthritis, psoriatic arthritis.

Causes of shoulder pain:[1]

- **Anterior:** anterior dislocation, previous proximal humeral fracture, biceps tendinopathy
- **Lateral:** rotator cuff tear or calcific tendinopathy.
- **Posterior:** posterior dislocation, scapular fracture.
- **Deep pain:** adhesive capsulitis, osteoarthritis, infection, malignancy.
- **Referred pain:** cervical spine, rib fracture, referred pain from intra-abdominal pathology.

A checklist

This seems a lot to bring together in 9 minutes, the key is to focus on the basics. As such see below a sample 'checklist', which is by no means the one and only way of approaching the station but could be used as a memory aid.

- Read instructions and compose yourself (remember name, age and details of scenario).
- On entering the examination bay, you will be asked to confirm you have understood instructions.
- Introduce yourself to patient while cleaning your hands (hand gel).
- Ask permission to examine their shoulder and confirm complaint (e.g. right shoulder pain on movement).
- Suggest the patient stops you if you are causing them pain.
- Maintain eye contact.
- Expose shoulder and position patient (standing).
- Look — kyphosis, scoliosis, skin, scars, muscle bulk, bony steps, squaring.
- Feel — anterior, lateral, posterior, spine.
- Move — active (flexion, extension, internal/external rotation, abduction) note and comment on any pain/crepitus/limitation in range.
- Move — resisted movements (deltoid, serratus anterior, pectoralis, trapezius).
- Move — rotator cuff resisted (Jobe's test, External rotators, Gerber's lift-off test).

- Move — Hawkins test for AC joint impingement, mention test for apprehension.
- Aim to finish the above within 6 minutes.
- Thank the patient and if appropriate offer them their gown/shirt.
- Clean your hands once more.
- Turn to your examiner, clasp your hands in front of you and present your findings.
- Answer questions to the best of your ability about the examination and further tests and investigations. (two view x-rays joint above and joint below).

Conclusions

There is no single 'right' way to do well in a shoulder examination station at MRCS level. However, there is a 'right' approach to preparing for it.

That is to know the anatomy involved and to remember what is being assessed.

It is sometimes said that half the marks have been won before you touch the patient in the examination station. While this might not be absolutely true it is certainly a good reminder that the examiner is looking at your patient interaction as a whole.

Full marks for professionalism and communication may compensate for a less than perfect technical examination, though remember, the examination stations primarily test clinical and technical skill. ◆

REFERENCES

1 Gogalniceau P, Pegrum J, Lynn W. Physical examination for Surgeons (An aid to the MRCS OSCE). CUP, Cambridge University Press, 2015.

2 Paladstanga N, Soames R. Anatomy and human movement. 6th ed. Churchill Livingstone Edinburgh, 2012.

3 Gerber C, Krushell RJ. Isolated rupture of the tendon of the subscapularis muscle. Clinical features in 16 cases. *J Bone Jt Surg Br* 1991; **73:** 389–94.

4 Mäkelä M, Heliövaara M, Sainio P, Knekt P, Impivaara O, Aromaa A. Shoulder joint impairment among Finns aged 30 years or over: prevalence, risk factors and co-morbidity. *Rheumatology (Oxford)* 1999; **38:** 656–62.

5 Krill MK, Rosas S, Kwon K, Dakkak A, Nwachukwu BU, McCormick F. A concise evidence-based physical examination for diagnosis of acromioclavicular joint pathology: a systematic review. *Phys Sportsmed* 2018; **46:** 98–104. https://doi.org/10.1080/00913847.2018.1413920. Epub 2017 Dec 13. Review.

