

# Shoulder pain in general practice

Kenneth Vassallo

## Case scenario

A 65 year old gentleman presented with a 1 week history of pain in the left shoulder. Pain started after spending 2 days painting his house. He was taking paracetamol regularly yet it only gave him minor relief. On examination he had a painful arch and was tender under the acromium.

## Introduction

The principal function of the shoulders is to position the hands such that they operate optimally. The shoulder mobility thus necessarily has evolved at the expense of stability, and the resulting 'freedom of movement' of the joint predisposes it to a variety of conditions.<sup>1</sup> Indeed, self-reported prevalence of shoulder pain is estimated to be between 16% and 26% and each year in primary care about 1% of adults over the age of 45 years present with a new episode of shoulder pain; it is the third most common cause of musculoskeletal consultation in primary care.<sup>2</sup> Shoulder problems tend to present mainly as pain, but it is not uncommon to have associated stiffness and restriction of movement e.g. in cases of adhesive capsulitis (frozen shoulder).<sup>3</sup> Due to the pivotal role the shoulder has in hand function, any disability or pain in the shoulder is likely to affect a person's ability to carry out daily activities (eating, dressing, and personal hygiene) and work.<sup>1</sup> Thus it is essential that in primary care a good diagnosis of the principal shoulder pathology is made and treatment started immediately to attain prompt recovery and avoid chronicity and complications.

## Key words

Shoulder pain, musculoskeletal diseases, joint disease, arthralgia

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## Aetiology

The aetiology can be divided into three main categories:

- Referred pain
- Systemic illness
- Musculoskeletal pain arising from the shoulder

### *Referred Pain*

There are a number of cervical, thoracic and abdominal conditions that cause referred pain to the shoulder (Table 1). If a patient presents with shoulder pain not related to movement of the shoulder then one needs to think of these conditions. Most of these conditions have a number of associated signs and symptoms and these must be sought if one is suspecting referred pain.

### *Systemic illness*

These are not that common and usually shoulder involvement is part of a whole array of symptoms, and the presentation most of the time is not that of shoulder pain (Table 2).

### *Musculoskeletal pain arising from the shoulder*

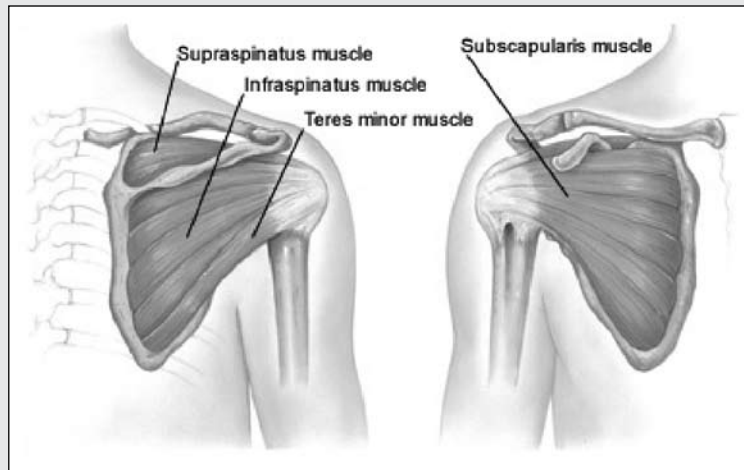
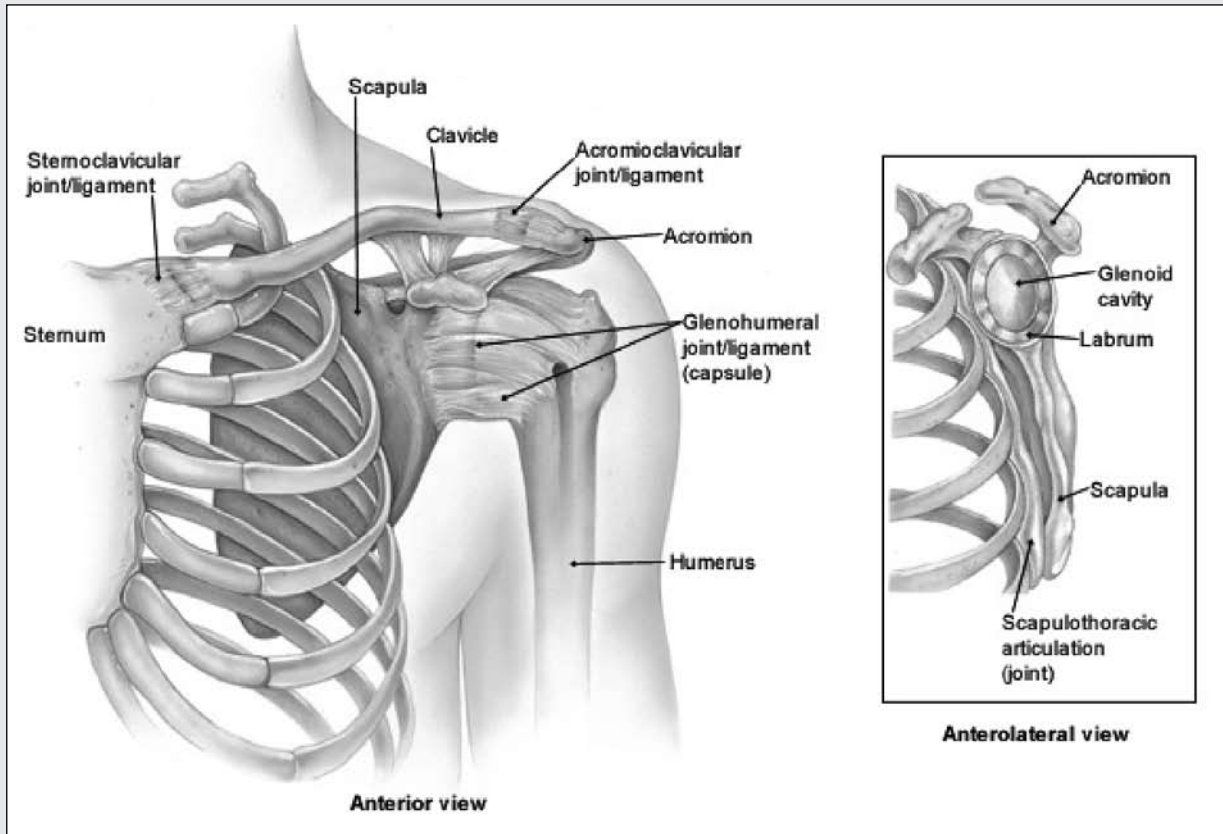
As previously highlighted, the shoulder joint sacrifices stability for mobility, thus making it more prone to injury. Injury can be three-fold; acute (trauma), chronic (overuse), or a mixture of both.<sup>3</sup> In order to fully understand the process of injury, the main structure involved and the resulting symptoms and signs on physical examination one needs to have a sound knowledge of the anatomy.

The shoulder is composed of the humerus, glenoid, scapula, acromion, clavicle and surrounding soft tissue structures. Glenohumeral stability is due to a combination of ligamentous and capsular constraints, surrounding musculature and the glenoid labrum. Static joint stability is provided by the joint surfaces and the capsulolabral complex, and dynamic stability by the rotator cuff muscles (supraspinatus, infraspinatus, subscapularis and teres minor) and the scapular rotators (trapezius, serratus anterior, rhomboids and levator scapulae) (Figure 1).<sup>6</sup>

Apart of the anatomy, one needs to be aware of the high risk sports and occupations that predispose to shoulder trauma. These include;<sup>7</sup>

- Cashiers
- Construction workers
- Hairdressers

**Figure 1: Anatomy of the shoulder joint**



***Subscapularis facilitates internal rotation.***

***Infraspinatus and teres minor muscles assist in external rotation.***

***Supraspinatus initiates and assists abduction.***

- Workers using keyboards for long periods, e.g. IT, secretarial jobs.
- Athletes that are involved in sports that entail throwing, that involve repetitive arm movements or high-impact contact sports, e.g. field athletics, rugby and swimming/diving.

Most of these activities either result in repetitive overhead function or unaccustomed repetitive strenuous activity.

Table 3 highlights the most common categories of shoulder problems and their respective mode of injury.

### **History and examination**

In most cases a proper clinical evaluation usually discloses the cause of the problem.<sup>6</sup> There is a wide array of physical tests that can be performed in order to pinpoint the exact source of pain. Such tests are useful when one is considering specific intervention in secondary care, yet they are of little help for conservative management in primary care.<sup>2</sup> A simple logical approach will help the primary care physician identify the likely disorder present and guide his patient accordingly, all within the time constraints of their clinic practice.

A detailed clinical guideline has been issued by the American

Academy of Orthopaedic surgeons for patients with localised shoulder pain. This can be obtained from their website at [http://www.aaos.org/Research/guidelines/chart\\_o8.pdf](http://www.aaos.org/Research/guidelines/chart_o8.pdf)

## History

A detailed history is presented in Table 4 and Figure 2.<sup>2,5,8</sup>

## Examination

The examination of the shoulder tends to follow the usual stages of musculoskeletal examination consisting of inspection, palpation, active ROM (range of movements), passive ROM and specific tests to assess the different anatomical structures in order to try to pinpoint the source of the problem.

Local anaesthetic injection can be used in order to assist the examination in cases when pain precludes an adequate examination and motion is limited, particularly in overuse injuries, when the exact location of the shoulder pain is not clear, or when trying to differentiate apparent weakness from limited motion due to pain. Such a procedure should only be performed by GPs experienced in such a technique.<sup>3</sup>

## Inspection

Expose both shoulders and note any scars, obvious asymmetry, discoloration, swelling, or muscle asymmetry (wasting).<sup>11</sup>

## Palpation

Gently palpate around the main landmarks and identify any areas of tenderness/change in temperature/crepitus.<sup>11</sup> Tenderness in the subacromial space is indicative of impingement syndrome. Acromioclavicular joint problems tend to cause very localised tenderness or swelling over the joint.<sup>2</sup>

## Active ROM

If there are no symptoms, test both sides simultaneously. Otherwise, start with the normal side.<sup>3,11</sup>

**Flexion:** Ask the patient to move the arm forward to a range of 0 to 180°.

**Extension:** Ask the patient to move the arm backward to a range of 0 to 50°.

**Abduction:** The patient should be able to lift their arm in a smooth, painless arc to a position with hand above their head. Normal range is from 0 to 180°.

**External rotation:** The elbow flexed 90° on the side and the patient is made to externally rotate. Normal range: 0-65°.

**Internal rotation at 90° of forward flexion:** Abduct arm at 90° and flex elbow at 90°, as to have fingers pointing downwards and palm facing backwards. Try to rotate forearm posteriorly as much as possible.

**Adduction and internal rotation (Appley Scratch Test):** Ask the patient to place their hand behind their back, and instruct them to reach as high up their spine as possible. Note the extent of their reach in relation to the scapula or thoracic

spine. They should be able to reach the lower border of the scapula (~ T7 level).

**Abduction and external rotation:** Ask the patient to place their hand behind their head and instruct them to reach as far down their spine as possible. Note the extent of their reach in relation to the cervical spine, with most being able to reach ~C7 level.

## Passive ROM

If there is pain or limitation with active ROM, assess the same movements with passive ROM.<sup>11</sup> Note if there is pain and, if so, which movement(s) precipitates it. Also note if you feel crepitus with the hand resting on the shoulder.

Pain/limitation on active ROM but not present with passive suggests a structural problem with the muscles/tendons.

## Specific tests

### Tests for impingement, rotator cuff tendonitis and sub-acromial bursitis.<sup>11</sup>

*Neers test:*

1. Place one of your hands on the patient's scapula, and grasp their forearm with your other. The arm should be internally rotated such that the thumb is pointing downward.
2. Gently forward flex the arm, positioning the hand over the head.
3. Pain suggests impingement.

Hawkin's test is a similar test that can be used for more subtle impingement.

Neer's and Hawkin's test will help to identify that there is pathology of the structures underneath the coracoacromial arch, whether it is the subacromial bursa, tendonitis, tendon tear it is sometimes difficult to decide on clinical grounds.

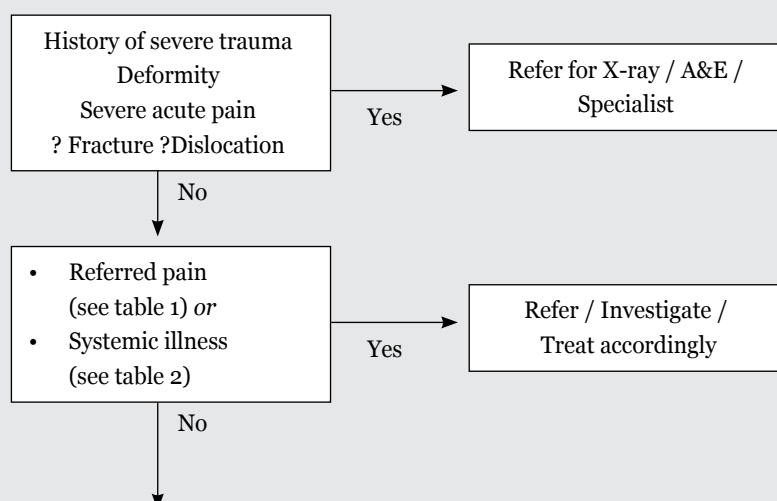
## Tests for rotator cuff muscles/tendons

### Supraspinatus

*Empty can test:*

1. Have the patient abduct their shoulder to 40°, with 30° forward flexion and full internal rotation (i.e. turned so that the thumb is pointing downward). This position prevents any contribution from the deltoid to abduction.
2. Direct them to forward flex the shoulder, without resistance.
3. Repeat while you offer resistance.
4. If there is a partial tear of the muscle or tendon, the patient will experience pain and perhaps some element of weakness with the above manoeuvre. Complete disruption of the muscle will prevent the patient from achieving any forward flexion. These patients will also be unable to abduct their arm, and instead try to "shrug" it up using their deltoids to compensate.

**Figure 2:** Algorithm for the management of shoulder pain



### Rotator Cuff Disorder

#### History

See table 3 for aetiology

- 35 – 75 years
- Painful Arc (70°-120°) active abduction
- Pain located over anterolateral aspect of shoulder
- Pain worse at night
- Pain worse with activities in an overhead or forward flexed position.

#### Glenohumeral Instability (<40 years)

- Usually have prior injury
- Pain; Intermittant/episodic/prolonged
- Apprehension; avoids certain positioning of the arm from fear of pain/dislocation
- Dysfunction; inability to do an activity (sport etc) due to apprehension
- Arm at times suddenly “falls asleep”

#### Examination

- Wasting
- Tenderness subacromial area (impingement syndrome)
- Tenderness bicipital groove (biceps tendinitis)
- Active movements painful +/- restrictive
- Full range of passive movement +/- painful
- Painful Arc (70°-120°) active abduction
- Positive Neer’s and Hawkin’s Test (impingement)
- Empty Can Test / Drop arm test (supraspinatus)
- Speed manouver / Yergason’s test (biceps tendinitis)
- Apprehension / Relocation test (glenohumeral instability)

OR

### Frozen Shoulder

#### History

See table 3 for aetiology

- 40-60 years
- Decreased active & passive ROM
- Global pain / Slow in onset / can be located at deltoid insertion
- Unable to sleep on affected side

#### Examination

- No local tenderness
- Passive external rotation <50% of other side

OR

### Glenohumeral Joint Arthritis

#### History

See table 3 for aetiology

- >60 years
- Progressive pain/crepitus/ ↓ROM
- Decreased active & passive ROM
- Global pain
- Can get night pain

#### Examination

- Tender Glenohumeral joint posteriorly
- Crepitus
- Passive external rotation <50% of other side

**Table 1: Referred pain**<sup>1,4</sup>

<b>Condition</b>	<b>Associated signs and symptoms</b>
<b>Cervical pathology (e.g. degenerative disc disease)</b>	Pain related to neck movement, cervical tenderness, pain extending to below elbow, associated neurological symptoms/signs in upper limbs.
<b>Chest wall pathology (e.g. costochondritis of upper ribs)</b>	Tenderness over ribs, pain on deep inspiration.
<b>Cardiac (e.g. myocardial ischaemia, pericarditis)</b>	Risk factors of coronary vascular disease present, pain related to exertion, compressive in nature, sweating, nausea, palpitations, pallor, fever, tachycardia, hypo/hypertension etc.
<b>Pulmonary (e.g. pneumonia, pancoast tumour)</b>	Fever, shortness of breath, weight loss, lethargy, cough / sputum, haemoptysis.
<b>Diaphragmatic irritation (e.g. perforated peptic ulcer)</b>	Fever, abdominal pain, guarding/rebound, systemically unwell, toxic.

*Drop arm test for supraspinatus tears:*

Adducting the arm depends upon both the deltoid and supraspinatus muscles. When all is working normally, there is a seamless transition of function as the shoulder is lowered, allowing for smooth movement. This is lost if the rotator cuff has been torn:

1. Fully abduct the patient's arm, so that their hand is over their head.
2. Now ask them to slowly lower it to their side.
3. If the supraspinatus is torn, at ~ 90° the arm will seem to suddenly drop towards the body. This is because the torn muscle can't adequately support movement through the remainder of the arc of adduction.

**Infraspinatus and Teres Minor**

Contraction allows the arm to rotate externally:

1. Have the patient slightly abduct (20-30 degrees) their shoulders, keeping both elbows bent at 90 degrees.
2. Place your hands on the outside of their forearms.
3. Direct them to push their arms outward (externally rotate) while you resist.
4. Tears in the muscle will cause weakness and/or pain.

**Subscapularis**

Contraction causes internal rotation. Function can be tested using "Gerber's lift off test"

1. Have the patient place their hand behind their back, with the palm facing out.
2. Direct them to lift their hand away from their back. If the muscle is partially torn, movement will be limited or cause pain. Complete tears will prevent movement in this direction entirely.

**Biceps Tendinitis:** The biceps muscle flexes and supinates the forearm and assists with forward flexion of the shoulder. Inflammation can therefore cause pain in the anterior shoulder area with any of these movements:

1. Palpate the biceps tendon where it sits in the bicipital groove, which is formed by the greater and lesser tubercles of the humeral head. Pain suggests tendonitis. It helps to have the patient externally rotate their shoulder. You can confirm the location of the tendon by asking the patient to flex and supinate their forearm while you palpate, which should cause it to move. Resisted Supination (Yergason's Test) and Speed's Manoeuvre can also be used.

**Biceps Tendon Rupture:** As a result of chronic tendonitis or trauma, the long head of the biceps may rupture. When this occurs, the biceps muscle appears as a ball of tissue and there is a loss of function.

**Glenohumeral Instability**

The Apprehension Test:

1. Have the patient lie on their back with the arm hanging off the couch.
2. Grasp the elbow in your hand and abduct the humerus to 90°.
3. Gently externally rotate their arm while pushing anteriorly on the head of the humerus with your other hand.
4. Instability will give the sense that the arm is about to pop out of joint.

A Relocation Test can be done if + apprehension test

All the above tests and indeed other tests which have not been described here are available graphically and on video from the following online source: <http://medicine.ucsd.edu/clinicalmed/Joints2.html>.

## Investigations

Investigations include mostly imaging – X-ray, CT Scan, MRI, U/S. Blood investigations may be required when one suspects systemic illness. Imaging is generally required as part of the initial assessment only in cases of acute trauma when one suspects dislocations, trauma or complete tendon tears. In other cases investigations are only considered when initial management fails. In primary care there is little benefit to order more than X-ray assessment reserving CT scan, MRI and U/S for a specialist's intervention.

## Management

Management of systemic illness, referred pain, fractures and dislocations will not be covered as these fall outside the scope of primary care. In primary care one tends to manage mainly the chronic conditions: Rotator cuff disorders, frozen shoulder, and glenohumeral degenerative joint disease.

In most cases management consists of a combination of physiotherapy, drugs, steroid injection and surgery.

### Rotator cuff disorders

In the acute phase of pain, one is treated with rest, modified activities (decreased overhead activity), ice and NSAIDs. Once pain permits, one should proceed immediately with exercise to maintain ROM<sup>5</sup> and once the acute process has subsided one should initiate a rotator cuff strengthening program. Specific strengthening exercises are applicable for those with glenohumeral instability, especially athletes.<sup>8</sup> People with a history of significant instability should always be referred to secondary care.<sup>2</sup>

If one fails to respond to initial management after an interval of around 4-6 weeks, one can either try corticosteroid infiltration or refer for secondary care. Young people with instability might require stabilization procedure whilst elderly people might benefit from arthroscopic subacromial decompression.<sup>8</sup>

### Steroid injections

Overall, systematic reviews and more recent studies suggest equivalent short term benefit for physiotherapy (incorporating supervised exercise) and steroid injections in the management of shoulder disorders.<sup>2</sup> In a primary care population with undifferentiated shoulder disorders, participants allocated to a physiotherapy treatment group were less likely to re-consult with a general practitioner than those receiving steroid injections alone.<sup>12</sup> Yet still steroid injection ought to be used in early cases failing to respond to oral analgesia/anti-inflammatory and physiotherapy. Not more than three injections should be given, leaving an interval of six weeks between injections.<sup>1</sup>

### Frozen shoulder

Ideally one tries to avoid a frozen shoulder by treating painful shoulder conditions promptly and insisting on mobilization.

Patients with frozen shoulder are managed with NSAID to control the pain and activity modification together with a physical exercise program aimed at stretching initially to improve ROM, then muscle strengthening.<sup>5</sup> Intra-articular steroid injection can also be used to control the pain.<sup>8</sup> In patients with severe pain physiotherapy alone can be of little help as movement is distressing and may well be counterproductive.<sup>2</sup> Such cases should be treated with a combination of steroid injection and physiotherapy. Patients who do not respond to the above after an eight week period may be referred to secondary care.

No treatment is an alternative approach. There has been some evidence to suggest that at 18-24 months following the onset of frozen shoulder, many patients improve without treatment.

**Table 2:** Systemic illness <sup>1, 4, 5</sup>

<b>Condition</b>	<b>Associated signs and symptoms</b>
Malignant tumour (e.g. Metastatic - breast, lung, stomach, kidney or myeloma)	Past history of CA, weight loss, decreased appetite, lump, skin infiltration, radiological findings.
Polymyalgia rheumatica	Stiffness and pain in girdle muscle usually in the morning, power sustained, low grade fever, lethargy, decreased appetite.
Brachial neuritis	Pain followed by weakness and sensory symptoms, reflex loss, usually affects young males, follows a viral illness, self limiting.
Herpes Zoster	Burning pain followed by vesicle formation, usually co-morbid state and elderly.
Paget's Disease	Pain at other sites, kyphosis, cranial nerve involvement, bowing of the tibia, elderly, X-ray changes.
Fibromyalgia	Superior shoulder pain overlying trapezius, trigger points, guarded cervical spine ROM, sleep disturbance, fatigue, depression, investigations all normal.



**Table 3:** Categories of shoulder problems and their respective mode of injury <sup>1,5,8,9</sup>

### Acute

<b>Condition/Syndrome</b>	<b>Aetiology</b>
Fractures of clavicle, humerus and scapula	Fall on the outstretched hand or direct blow to shoulder.
Glenohumeral dislocations	Anterior (most common) – fall on the hand Posterior (rare) – direct blow on the front of shoulder or forced internal rotation of the abducted arm
Acromioclavicular (AC) joint sprain and separation	A direct blow to the superior aspect of the shoulder or a lateral blow to the deltoid area often produces this injury. Occasionally, an AC sprain results from falling onto an outstretched hand.
Rotator cuff injury/tear	Acute injury can occur at any age yet it is typical in those <40 years and results secondary to trauma that causes sudden jerky movement of the shoulder. Can range from an inflammatory process to a complete tear.

### Chronic

<b>Condition/Syndrome</b>	<b>Aetiology</b>
Rotator cuff tendinitis (including biceps tendon / bursitis / tears)	<p>The aetiology of these is usually multifactorial involving glenohumeral instability, impingement syndrome, repetitive overhead activity, acute injury.</p> <p>Glenohumeral instability; can be atraumatic as is commonly seen in swimmers and throwing athletes (due to imbalance of muscle power) or following a dislocation.</p> <p>Impingement syndrome; impingement of the periarticular soft tissues between the greater tuberosity of the humerus and the coracoacromial arch can be;</p> <ul style="list-style-type: none"> <li>• Primary due to overuse in the elderly</li> <li>• Secondary due to glenohumeral instability (in the young), acromioclavicular joint arthritis, thickened coracoacromial ligament, subacromial spurs.</li> </ul> <p>Impingement has three stages</p> <ul style="list-style-type: none"> <li>• Stage I - Oedema and haemorrhage, affecting persons younger than 25 years</li> <li>• Stage II - Fibrosis and tendinitis, affecting persons aged 25-40 years</li> <li>• Stage III - Tears of cuff, affecting persons older than 50 years</li> </ul>
Frozen Shoulder (Adhesive Capsulitis)	This results from thickening and contraction of the capsule around the glenohumeral joint and causes loss of motion and pain. This results following a period of immobilisation for any cause e.g. rotator cuff lesions, fractures, CVA etc. It is more common in people with diabetes.
Arthritis of the glenohumeral joint	Multiple causes; cuff arthropathy, arthritis of dislocation/trauma, avascular necrosis, part of a systematic disease (rheumatoid arthritis or ankylosing spondylitis), and osteoarthritis.

**Table 4: History<sup>10</sup>**

- Age
- Extremity dominance
- Onset and duration of symptoms
- History of trauma, dislocation, subluxation
- Weakness, numbness, paresthesias
- Sports participation
- Past medical history
- Previous history of joint problems
- Stiffness, ROM (range of motion) limitation
- Night pain
- Occupation, position of arm when working
- Aggravating factors
- Alleviating factors
- Previous treatment
- Pain location - anterior shoulder, upper arm, superior shoulder, interscapular
- History of malignancy

However, there can be significant residual impairment even after this amount of time has elapsed.<sup>5</sup>

**Steroid Injections:** In a study comparing triamcinolone injection and/or physiotherapy for the management of frozen shoulder it was shown that steroid injection is effective in improving shoulder-related disability at six weeks following treatment. Physiotherapy treatment is effective in improving the range of external rotation at six weeks after commencement of treatment.<sup>13</sup> Another study showed that the combination of intrarticular injection with physiotherapy is effective in improving shoulder pain and disability in patients with adhesive capsulitis, and provides faster improvement in shoulder ROM. When used alone supervised physiotherapy is of limited efficacy in the management of adhesive capsulitis.<sup>14</sup> Note that steroid infiltration should be given early in cases of rotator cuff disorders, where severe pain impairs mobility in order to avoid the development of frozen shoulder.<sup>1</sup>

#### **Glenohumeral degenerative joint disease**

Treatment is initially conservative using heat and ice, NSAIDs, range-of-motion exercises and corticosteroid injections. Patients for whom conservative therapy fails can be referred for further evaluation and treatment in secondary care.<sup>8</sup>

Shoulder replacement may be considered in secondary care.<sup>5</sup>

## **Conclusion**

Shoulder pain is a common and important musculoskeletal problem. Management should be multidisciplinary and include self help advice, analgesics, relative rest, and access to physiotherapy.

Poorer prognosis is associated with increasing age, female sex, severe or recurrent symptoms at presentation, and associated neck pain. Mild trauma or overuse before onset of pain, early presentation, and acute onset have a more favourable prognosis.<sup>2</sup>

Patients need to be advised from the start that it may take time for the complete resolution, and that it is essential that they follow the instructions given, if they want a good recovery.

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