

THEME

Musculoskeletal
medicine



Scott Masters

MBBS, FRACGP, GDipMusMed, FAFMM, is Immediate Past President, Australian Association of Musculoskeletal Medicine, Senior Clinical Lecturer, University of Otago, New Zealand, and a musculoskeletal physician, Caloundra, Queensland. scotty1@ozemail.com.au

Simon Burley

BAppSc(Phty), MAPA, is a physiotherapist, Sunshine Coast, Queensland.

Shoulder pain

BACKGROUND

Shoulder pain is common in general practice and is a condition that frequently becomes chronic. Presentation includes either pain, weakness and stiffness, or a combination of these symptoms.

OBJECTIVE

This article presents a systematic approach to diagnosing and managing disorders of the shoulder joint and surrounding structures.

DISCUSSION

Thorough history taking (including psychosocial aspects) and skilled examination are essential; special investigations rarely affect the general practitioner's management of shoulder pain. The tendency toward chronicity of shoulder pain (increased by certain biological and psychosocial risks) means that the clinician should adopt a patient centred approach in choosing from a wide range of treatment modalities.

Shoulder pain is a common presentation in general practice, with approximately 1% of adults consulting a general practitioner with new shoulder pain annually.¹ The 1 month period prevalence of shoulder pain is 16%.² Just 50% of new episodes of shoulder disorders recover within 6 months,³ rendering it a condition with likely long term consequences. A 2005 BEACH report indicated that 0.8% of all patient encounters in general practice were due to shoulder pain.⁴ Shoulder pain is associated with impaired physical and psychosocial functioning.⁵ Confident management of shoulder pain is an important skill for general practice.

Basic anatomy

The glenohumeral joint is the most commonly dislocated major joint in the human body due to its lack of bony support and relatively lax capsule (*Figure 1*). The capsulolabral supports provide the static constraints while the rotator cuff supplies the dynamic support (*Figure 2*).

The rotator cuff is responsible for depressing the humeral head against the labrum, acting as a dynamic stabiliser of the glenohumeral joint. In complete tears of the cuff, the humeral head migrates caudally because of the unopposed action of the deltoid.

Scapular stability is dependant on proper function of serratus anterior, rhomboids and trapezius. Dysfunction of these muscles puts extra load onto the rotator cuff.

Unlike other joints where tendon injury can occur, the shoulder is unique in that the rotator cuff tendons can be impinged between two bones: the acromion above and the greater tuberosity of the humerus below.

Presentation

People with acute musculoskeletal dysfunction of the shoulder girdle usually present with three major symptoms: pain, weakness and stiffness, or any combination of these three symptoms.

Initial assessment involves a search for red flag conditions and risk factor identification including biological and psychosocial risk factors (*Table 1, 2*); diagnostic determinations; and arrangement of a management plan.

Red flags

Acute shoulder pain may be the first warning sign of serious disease. Although uncommon, the following should be considered:

- tumours: 7% of bony metastases occur in the proximal humerus⁶
- inflammatory arthropathy: eg. rheumatoid arthritis, gout and psoriatic arthropathy. Consider polymyalgia rheumatica in patients over 60 years of age
- visceral disease: any condition that irritates the mediastinal pleura, pericardium or diaphragm can cause shoulder pain. Consider myocardial ischaemia

- Septic arthritis: rare in the shoulder (less than 0.01%)
- Fracture/dislocation: usually history of trauma and sudden onset of pain. Increased vigilance is required in osteoporotic patients.

Referred pain

Other somatic sources will refer pain to the shoulder due to convergence of their sensory afferents to similar areas in the dorsal horn of the spinal cord. The cervical (especially C4/5) and upper thoracic zygapophyseal joints, cervical intervertebral discs, and cervical muscles may all refer pain to the shoulder.

History

A full pain history is mandatory as with all musculoskeletal pain problems. Some associations are shown in *Table 3*. A systems review is necessary, especially in relation to cardiac, respiratory and gastrointestinal disorders. Enquiry into associated neck symptoms, radicular pain and radiculopathy is important in assessing the role of the cervical spine. Asking the patient to indicate where the pain actually is might show that what they described as 'shoulder pain' is actually better described as relating to the neck or arm.

Epileptic seizures may be associated with posterior shoulder dislocation.

It is important to ask patients involved in physical type employment, recreation and sports about any changes in work load, type of activity and equipment change. The mechanism of any injury needs to be documented. Enquiry into the patient's psychosocial domain is essential in determining prognosis and appropriate management.

Examination

The degree of pain and disability needs to be assessed at the first visit. This can be performed by recording visual analogue scale pain scores for 2–4 activities that the patient finds difficult to perform since suffering the shoulder pain.

There are no clinical tests that are both reliable and valid for any specific shoulder clinical entity.⁷ However, physical examination can:

- possibly identify potentially serious conditions
- measure and monitor the degree of dysfunction
- enable development of a treatment program tailored specifically to the patient's physical and psychosocial needs, and
- engender patient confidence.

If the patient's pain can be reproduced by shoulder movements or special tests such as Hawkins impingement test (*Figure 3*), then a somatic cause for the pain is more likely. If the pain is reproduced by a Spurling test (*Figure*

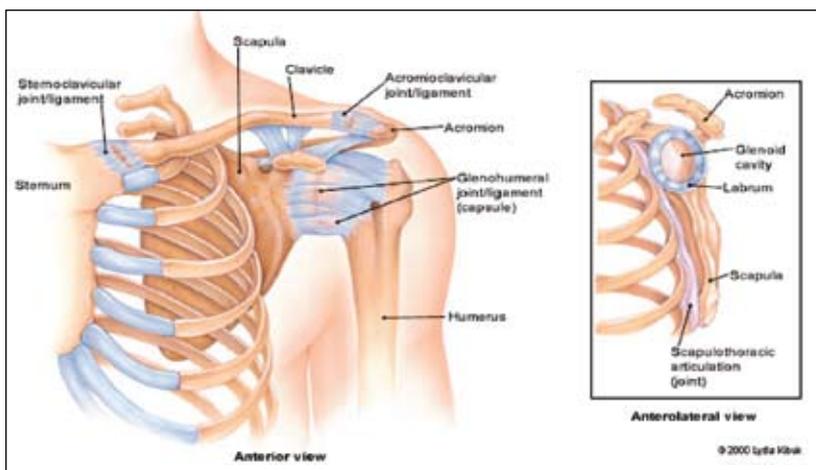


Figure 1. Anatomy of the shoulder girdle

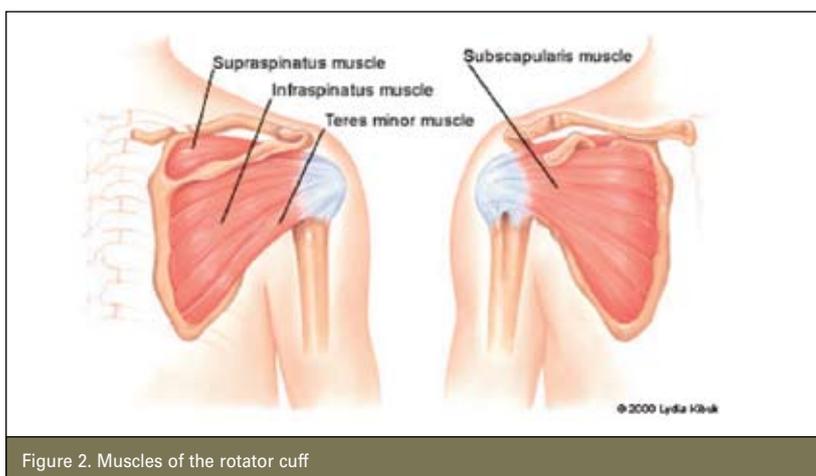


Figure 2. Muscles of the rotator cuff

Table 1. Biological factors contributing to shoulder pain

- Work above shoulder height
- Low frequency vibration
- Repetitive work tasks
- Heavy work load
- Work pace
- Driving for long periods
- Shift work
- Sleep disturbance
- Smoking
- Caffeine consumption

Table 2. Psychosocial risk factors (yellow flags)

- Job dissatisfaction
- Uncertain work demands
- Poor support at work
- High mental workload
- Psychological distress
- Immigrant status

4) and radiates into the arm, then radicular pain should be suspected and further investigation (eg. cervical magnetic resonance imaging [MRI]) could be contemplated. Some common clinical patterns are detailed in *Table 3*. If the patient's pain cannot be reproduced on examination of the relevant musculoskeletal structures then red flag conditions need to be revisited. This should include

examination of the chest and abdomen with relevant investigations. Examination of the shoulder should involve:

- inspection of skin and soft tissue contours
- recording active and passive range of movement
- checking strength in all directions
- palpating shoulder girdle – muscles and their attachments, acromio- and sterno-clavicular joints, other bony landmarks
- special tests (eg. apprehension test for glenohumeral laxity)
- cervical spine examination
- other body systems depending on red flags.

Investigations

X-ray is warranted if a bony lesion or advanced arthritis is



Figure 3. Hawkins impingement test – shoulder placed in 90 degrees of forward flexion and then internally rotated

Table 3. Pain associations

Diagnosis	Clinical features	Investigations	Management
Rotator cuff dysfunction (Impingement, painful arc, rotator cuff tendinosis, subacromial bursitis)	Age 30–60 years, associated with repeated overhead activities, painful abduction 60–120 degrees, full passive ROM, reasonable power with empty can test, +ve Hawkins impingement test, night time pain with bursitis	None needed unless red flags on history or examination	Control pain – medication, subacromial injection, GTN patch Improve function through supervised rehabilitation including a graded exercise program
Rotator cuff full thickness tear	Increasing prevalence with age, marked weakness in abduction and external rotation, retraction of muscle may be palpable if large tear, often night time pain	Ultrasound, MRI if considering surgery	Consider surgical repair, otherwise supervised rehabilitation. Younger patients with an acute traumatic tear are more likely to require surgery
Scapulothoracic dysfunction	Important consideration in people involved in repetitive activities Scapular winging on examination	Nil	Improved function through scapular stabilisation program
Frozen shoulder syndrome	Age 40–60 years, slow onset and may mimic rotator cuff dysfunction initially, decreased passive ROM in at least three directions	Normal plain X-ray	Oral or intra-articular corticosteroids, suprascapular nerve block, analgesia, gentle home exercise program to maintain strength and mobility
Acromioclavicular joint dysfunction	Painful abduction from 120+ degrees, pain with forced horizontal flexion, AC joint tender to palpation	May see AC subluxation on plain X-ray	Avoid direct and indirect trauma, joint injection Avoid elevation over 120 degrees in early acute phase Acute pain can be assisted with taping support
Glenohumeral instability	+ve apprehension test, may have: generalised ligamentous laxity, episodes of ‘dead arm’	Plain X-ray may reveal Hill-Sachs or Bankart lesion	Stability strength program Surgery



Figure 4. Spurling test – spine extended with head rotated to affected shoulder while axially loaded



Figure 5. Subacromial space

- lateral approach
 - palpate most lateral point of shoulder
 - inject ~1.3 cm below acromion
 - advance needle medially, horizontally and slightly posteriorly for ~2–3 cm
- posterolateral approach – as above but start more posteriorly and palpate the gap between the acromion and the head of the humerus. An assistant can add downward traction to the arm to increase the space. Aim needle toward the AC joint in an anterosuperior direction

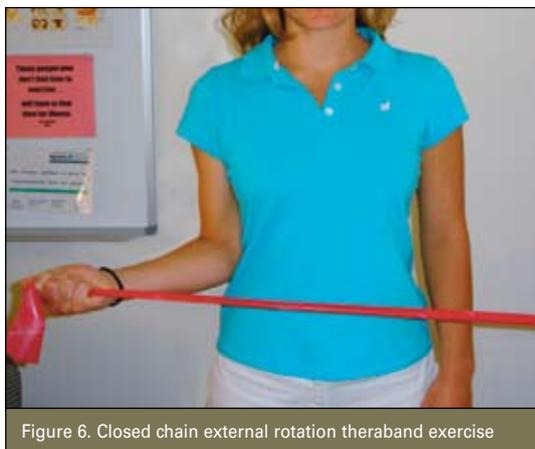


Figure 6. Closed chain external rotation theraband exercise

suspected from the history or examination. However, as age increases, the chance of an asymptomatic radiological finding also increases. The chance of finding a partial or complete rotator cuff tear by MRI in asymptomatic individuals over 60 years of age is more than 50%; for those aged 40–60 years it is more than 25%.⁸ The results for ultrasound are similar. Ordering an ultrasound rarely changes the GP's management; however, it can help confirm clinical suspicion of a full rotator cuff tear. An Australian study suggests that current radiological investigations are at a higher level than is necessary for optimal management.⁹

Management

Advice needs to be tailored to the individual with consideration given to their age, occupation, expectations and lifestyle. General principles include:

- let patients nominate their priorities in management (eg. pain reduction, improved sleep, restoration of specific functional goals such as playing tennis)
- use analgesics to allow sleep normalisation and resumption of safe activities. Both topical and oral nonsteroidal anti-inflammatory drugs (NSAIDs) have been shown to be superior to placebo for pain and function in the short term¹⁰
- subacromial corticosteroid injection for rotator cuff tendinosis (*Figure 5*) has been shown to be superior to lignocaine alone or oral diclofenac for short term pain relief and range of movement¹¹
- encourage normal activities and home exercise. Avoid rest. There is weak evidence that strengthening exercises are of benefit in improving function both in the short and long term.¹² Examples of some simple home exercises are shown in *Figures 6–8*
- identify biological and psychosocial risk factors (yellow flags) early and modify if possible. Assess the workplace environment for factors that may delay recovery. In sports injuries, assessing technique and modifying appropriately can be essential (eg. swimming stroke, tennis serve, golf swing)
- work with a management team, which can include allied health professionals such as physiotherapists, occupational therapists and psychologists
- if there is no improvement after 3–4 weeks, re-assess. Check for red flags and yellow flags. Consider other conservative, empirical management options: massage, manual therapy, injections (trigger point or proliferant), psychological interventions, closer supervision of rehabilitative exercises, rechecking biomechanical factors. Further investigation may be warranted and a surgical opinion could be sought.

Rotator cuff dysfunction

The most common presentation to GPs will be rotator cuff dysfunction (see *Case study*).¹³ Pain relief through medication and/or subacromial injections, therapeutic exercise, education and reassurance are the mainstays of management. Surgical intervention may be needed if the patient does not respond to 2–3 months of conservative management.

Other specific interventions of potential benefit

- Oral steroids for frozen shoulder¹⁴ – prednisolone 25

mg/day reducing to 12.5 mg over 3–4 weeks reduces pain and increases movement in the short term

- Intra-articular injection of steroid for frozen shoulder¹⁵
- Topical glyceryl trinitrate for rotator cuff dysfunction¹⁶ – reduces pain and increases function at 24 weeks
- Sclerosing polidocanol injections – a pilot study suggests effectiveness in persistent rotator cuff dysfunction¹⁷
- Acupuncture¹⁸ – may give short term pain and function relief.

Physiotherapy case study

Brian Dundee, 62 years of age, has been referred for physiotherapy by his GP. The provisional diagnosis is 'right shoulder rotator cuff impingement'. No radiological investigations have been undertaken as there are no red flag issues.

History

The shoulder pain began 8 weeks earlier following a weekend of energetic gardening. A 2 week course of NSAIDs has eased his rest pain but not pain on activity.

Subjective assessment

Visual analogue scale: pain on activity equals 6/10
Night pain present only if he rolls onto the shoulder
Brian has been unable to return to gardening.

Objective assessment

Abduction limited to 80 degrees actively and near full range passively
Flexion is painful over final 20 degrees
Positive impingement test
Other features thought to contribute to rotator cuff tendon impingement were found:
Scapulae dyskinesis¹ – the scapula is positioned downwardly rotated and protracted at rest and during arm elevation
Tight posterior capsule² – as evidenced by a loss of internal shoulder rotation. The hand behind back test to only L5 and passive internal rotation of the shoulder at 90 degrees abduction = 45 degrees
Rotator cuff weakness³ – supraspinatus empty can dynamometer test* = 1.4 kg (left = 6.8 kg).

Treatment

There is limited evidence that exercise and manual therapy are beneficial in rotator cuff disease.^{4,5} A 6 week program with weekly visits to a physiotherapist is commenced
Initially Brian is given an explanation of the likely mechanism of injury and instructed how to stay active – including light gardening – yet avoid further aggravation.

The program is then directed toward three features: deep massage and stretches to restore posterior capsule and posterior cuff flexibility, scapular stability and scapulohumeral rhythm correction exercises, and rotator cuff strengthening exercises (the principles of closed chain exercises, cuff pre-setting and <40% intensity are utilised to encourage cuff muscle activation).

Outcome

At 6 weeks, Brian returns to his GP with the following report:

'Activity pain 1/10

Abduction: pain at end of range

Full internal rotation: hand behind back to T8

Supraspinatus empty can test = 4.5 kg

Improved scapulothoracic posture and coordination

Brian has been advised to continue the exercise program for a further 6 weeks then return for final evaluation. He has now returned to full gardening activities and has been instructed on how to best avoid shoulder impingement positions during activity'.

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* Empty can test: arm held at 90 degrees abduction slightly forward of the frontal plane (scaption position or in line with the scapula). Arm internally rotated so thumb is pointing down as if emptying a can. Patient is asked to apply upward pressure into a dynamometer for force measurement



Figure 7. Scaption exercise – keeping scapulae retracted, abduct arms in the scapular plane up to shoulder height



Figure 8. Scapular stability exercise – shoulder blade held down and back (feel its position with opposite hand) as gentle pressure is applied to the ball. Keep the shoulder blade still as the ball is rolled 10 cm up/down and 10 cm in/out

Outcome

Cohort studies reveal a trend to chronicity.¹⁹ Only 50% of patients recover within 6 months increasing to 60% by 12 months. A recent Queensland study¹³ confirms these figures and reveals a close association between degree of pain/disability at presentation and outcome at 6 months follow up. The Queensland study also revealed that patients who had not fully recovered at 6 months had higher risk of depression at presentation. Biological and psychosocial risk factors for chronicity are shown in *Table 1, 2*.²⁰

Conclusion

In diagnosing and managing shoulder pain in general practice, clinicians need to be alert to the biopsychosocial influences that have led to the patient's health disorder. A thorough history taking and skilled examination are essential. Treatment needs to be individualised under an umbrella of management guidelines.

Conflict of interest: Dr Masters has received payment from Pfizer, Merck Sharpe & Dome, Boehringer Ingelheim and Mundipharma for providing educational evenings to GPs.

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