# Acute nontraumatic shoulder pain

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*The immediate management and investigation of an acute pain presentation in general practice is discussed in this article.*



***John is a 46-year-old abattoir worker who presents to your urban general practice complaining of moderate to severe mechanical right shoulder pain and weakness. This developed gradually while he was lifting carcasses onto a conveyor belt at work yesterday. Aside from smoking a packet of cigarettes a day for the past 30 years and often consuming two standard alcoholic drinks per day, his past medical history is unremarkable.***

***What information do you need from John to help in his assessment?***

***Answer:*** A detailed history is required, including the mechanism of injury, a pain history, a musculoskeletal history (including weakness, active range of motion, activity limitation) and screening for red flag conditions, along with a full medical, psychological, medication and social history (including occupation and sports participation).[1]

Red flag conditions that need to be excluded (and suggestive symptoms and signs) include:

- significant trauma (unexplained deformity, swelling or erythema)
- a major rotator cuff tear (significant weakness not due to pain, or bruising in the absence of trauma)
- concurrent or suspected malignancy
- inflammatory or infectious conditions (fever, night sweats, weight loss or arthralgia)
- referred pain from another condition (symptoms or signs suggestive of pulmonary or cardiovascular compromise, significant unexplained sensory or motor deficit).[1,2]

If any of these conditions are suspected then the patient should be referred promptly for specialist evaluation.[2]

***John reports that the current pain in his right shoulder is similar in location and nature to a longstanding paroxysmal, mild, mechanically evoked pain that he has been experiencing in relation to his work. Usually the shoulder is stiff for the first few minutes of his shift and can become progressively painful; occasionally the pain persists for a few hours after he finishes work. Since his injury yesterday, he has experienced constant moderate pain in the right shoulder, which interrupted his sleep last night, and severe mechanically evoked right shoulder pain, which makes showering and dressing himself difficult.***

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### 1. Special shoulder tests to assess patients with shoulder pain

- Neer impingement sign: pain felt during passive forward shoulder flexion or passive shoulder abduction in the scapular plane
- Hawkins–Kennedy impingement sign: pain felt during passive internal rotation while the shoulder is in 90 degrees forward flexion or in abduction in the scapular plane and the elbow in 90 degrees flexion
- Painful arc sign: pain during active forward shoulder flexion in the scapular plane
- Jobe test (also known as the empty can or supraspinatus muscle test): pain or weakness during resisted forward shoulder flexion in the scapular plane from 90 degrees shoulder flexion with the shoulder internally rotated (thumb pointing inferiorly)
- Infraspinatus muscle test: pain or weakness during resisted external rotation with the arm adducted and elbow flexed at 90 degrees

***John is unable to lift anything heavy with his right arm, which has affected some domestic activities.***

***What should you cover in the physical examination?***

***Answer:*** Physical examination should include vital signs, a focused cardiac, respiratory and rheumatological examination and then a detailed musculoskeletal examination focusing on the cervical spine and shoulder joint. This examination should include:[1]

- posture
- active range of motion of the cervical spine
- active and passive range of motion of the shoulder joint
- isometric strength testing of the rotator cuff
- special shoulder tests – the Neer impingement sign, Hawkins–Kennedy impingement sign, painful arc sign, Jobe test and infraspinatus muscle test (Box 1 and Figures 1a to c).[3] Videos illustrating these tests are available online (e.g. at http://thepainsource.com).

It is important to be mindful that the examination may be limited by the patient's pain. Minimising the patient's discomfort can ensure rapport is maintained.

Individual special shoulder tests are not accurate for detecting rotator cuff disorder.[4,5] However, combinations of these tests have a relatively high degree of accuracy.[3,6] Positive findings for any combination of at least three of the above tests predicts rotator cuff disorder with a moderate degree of accuracy (sensitivity and specificity both approximating 75%).[6] Positive findings for the combination of the Hawkins–Kennedy impingement sign, painful arc sign and infraspinatus muscle test have a high degree of accuracy for diagnosing rotator cuff disorder, with a post-test probability of 95%.[3]

***John's cardiac, respiratory and rheumatological examination findings are normal. He is right handed. His cervical spine and right shoulder posture is normal and there is no obvious swelling or deformity. The active range of motion of the right shoulder is reduced in all directions owing to pain, but the passive range of motion and power are preserved. The Neer impingement sign, Hawkins–Kennedy impingement sign, painful arc sign and infraspinatus muscle test are positive.***

**What investigations are indicated?**

***Answer:*** In the absence of features suggesting red flag conditions, further investigations are not indicated in the first six weeks of acute shoulder pain.[1] It is advisable to educate patients on the limitations of imaging given the high prevalence of asymptomatic rotator cuff tears (28% in patients aged 40 to 60 years and 54% in those aged over 60 years).[7] If a major rotator cuff tear is suspected then MRI or ultrasound examination performed by a skilled clinician are equally sensitive and specific.[1,2,4] These investigations should be arranged based on local resources and costs. In the presence of significant trauma, plain radiographs are a valuable initial investigation.[2]

***As John has no features suggesting a red flag condition, you explain to him that investigations are not warranted at this stage, especially as results often do not help with the diagnosis.***

**What is your diagnosis?**

***Answer:*** You diagnose John with acute non-traumatic rotator cuff disorder. Rotator cuff disorder (or syndrome) encompasses a number of conditions (Box 2).[1,2] It can be further classified as acute or chronic (duration less or



**Figures 1a to c. Three of the special shoulder tests. a (left). Neer test for pain during passive forward shoulder flexion or passive shoulder abduction in the scapular plane. b (centre). Hawkins-Kennedy test for pain during passive internal rotation while the shoulder is in 90 degrees forward flexion or abduction in the scapular plane. c (right). Jobe test for pain or weakness during resisted forward shoulder flexion.**

greater than three months, respectively) and traumatic or nontraumatic.

Across the western world, rotator cuff disorder is a common complaint among adult patients presenting to GPs. The incidence of rotator cuff disorder in this population in the Netherlands is 14.7 per 1000 patients per year.[8] In the United Kingdom, the prevalence of rotator cuff disorder in the general practice patient population has been estimated at 16%.[9] In both Australia and the UK, rotator cuff disorder is the third most common musculoskeletal condition of patients presenting to GPs.[9,10]

The prevalence of rotator cuff disorder is also influenced by occupational and environmental factors. Occupational factors that increase its prevalence include work that involves:[11-13]

- repetitive movements of the shoulder
- vibrational forces
- frequent positioning of the hands above shoulder level
- forceful movements
- high and low psychosocial job demands
- working in the fish and meat processing industry
- a low level of social support.

The prognosis of acute shoulder pain is worsened by a number of factors. There is strong evidence that a high pain intensity, a high shoulder pain and disability index (SPADI) score and a longer duration of a shoulder condition predict the persistence of shoulder pain.[14] There is also moderate evidence that male sex, age greater than 55 years, perceived poor general health, increased sick leave utilisation, increased healthcare professional visits, the perception of high job demand and the perception of low social support also predict the persistence of shoulder pain.[14] Workplace factors specific to predicting persistent shoulder pain include work involving greater forceful effort, awkward posture, high psychological demands and low decision latitude.[15]

***In light of his impaired function since the injury, John feels that he cannot work. He requests a medical certificate for four weeks.***

***How would you manage this patient?***

***Answer:*** Conservative management with regular reassessment for four to six weeks is the recommended first-line management for acute rotator cuff disorder.[1,2,16,17] Ideally this should involve a patient-centred and goal-directed approach directed by a collaborative multidisciplinary team with a shared decision-making process involving the patient, healthcare providers and the workplace.[2,18,19] Conservative strategies to manage acute rotator cuff disorder can be broadly divided into education, analgesic medication, physical therapy and return-to-work programs.

All patients should be encouraged to maintain usual activity within the limits of pain, with reinforcing education on the strong evidence that early mobilisation of acute limb injuries is beneficial in terms of reduced symptoms, improved range of motion and return to work.[20,21] Patients should also be reassured that conservative management of acute shoulder conditions leads to recovery in most patients (50% by six months, 60% by 12 months and 75% at 22 months).[22,23]

Analgesic medication is a recommended initial treatment in patients with significant pain associated with acute rotator cuff disorder.[1,2,16] There is strong evidence that NSAIDs are superior to placebo in terms of effects on pain and function over the short term in patients with rotator cuff disorder.[24-26] However, long-term prescription of systemic NSAIDs should be considered with caution as it is associated with infrequent but serious gastrointestinal and cardiovascular complications.[27] Topical NSAID preparations may be a safer alternative as they have few systemic side effects and are effective relative to placebo in patients with acute musculoskeletal pain.[28] Although there is strong evidence that paracetamol is an effective analgesic in patients with acute pain with fewer side effects than NSAIDs, there is no direct evidence in patients with acute rotator cuff disorder.[1,25,29] Similarly, there is no evidence supporting use of opioid analgesics in patients with acute shoulder pain.[26] If opioid analgesics are being considered in patients with chronic noncancer pain then it is advisable to consult the recommendations on their use from the Faculty of Pain Medicine, Australian and New Zealand College of Anaesthetists.[30]

Although there is no evidence that prescribed exercise has any adverse effect on acute rotator cuff disorder and it is recommended by many guidelines, there is mixed evidence of any clinical effect.[1,16] Prescribed exercise generally comprises stretching, active range of motion and progressive resistance strengthening exercises. A good example of a comprehensive prescribed exercise regimen specific to rotator cuff disorder is available from the American Academy of Orthopaedic Surgeons (http://orthoinfo.org).[31]

A recent Cochrane review (published after the above guidelines) found strong evidence that the combination of manual therapy and prescribed exercise was no different to placebo and very weak evidence that prescribed exercise alone was no different to placebo, both in contradiction of the previous version of the review.[32,33] Both reviews included studies of patients with acute or chronic rotator cuff disorder, making the results difficult to interpret for patients with the acute disorder. A previous systematic review that is more relevant to patients with acute rotator cuff disease found strong evidence that prescribed exercise may reduce pain in both the short and long term.[25] It is important to note that in this population there is no significant difference in outcome between individualised or group exercise and home-based or physiotherapy centre-based exercise.[1,34]

Returning an injured worker to meaningful work as soon as possible is associated with a significant reduction in duration of occupational disability.[1] In the acute phase of any workplace injury, the most effective interventions are offered at the workplace and include low-intensity, work-specific interventions such as ergonomic modifications, graduated activity

**2. Conditions encompassed by rotator cuff disorder[1,2]**

- Shoulder impingement syndrome
- Subacromial bursitis
- Painful arc syndrome
- Calcific tendinosis
- Partial and full thickness rotator cuff tears
- Long head of biceps tendinosis or rupture

upgrading and cognitive behavioural therapy.[35] The input of specialist allied health professionals, occupational physicians and rehabilitation physicians is valuable in developing a return-to-work program. In patients with work-related acute upper limb disorders, there is moderate evidence that workplace accommodations (suitable duties, modified work, task redesign, ergonomic modifications) by an occupational therapist result in significantly improved productivity at three months and reduced sick leave at four to 12 months.[36,37] Well-trained case managers can also have a significant positive impact for such patients, with moderate evidence of greater patient satisfaction, decreased symptom severity, increased function and an earlier return to work.[38]

***On review at six weeks after the injury, John's right shoulder pain is reduced to moderate mechanically evoked pain. He attributes the reduction to a short course of ibuprofen and ongoing paracetamol. He consulted a local physiotherapist and subsequently has performed daily shoulder strengthening exercises, but his active range of motion remains restricted by pain. John also responded to your encouragement to minimise any absence from work when you negotiated a two-week medical certificate. He returned to full-time work just one week after the injury but is only managing light duties having failed a brief trial of usual duties last week. He also continues to have difficulty with strenuous domestic activities and relies on the assistance of his brother-in-law. John is frustrated by his situation and wonders whether surgery or any other intervention might be helpful.***

***What is your response?***

***Answer:*** Persistent pain and functional limitation at six weeks post-injury is an indication for imaging of the shoulder to reassess your diagnosis.[1,2] MRI is preferable, but ultrasound examination is a good alternative if access to MRI is an issue. The conservative management strategies used and the potential to optimise them should also be reviewed at this stage.

If a non-full thickness rotator cuff tear is identified then a maximum of two subacromial corticosteroid injections for short-term symptomatic relief can be considered, but the supportive evidence for this therapy is weak and it may suppress healing.[1,2,16,39] Other minimally invasive or noninvasive interventions such as acupuncture, transcutaneous electrical nerve stimulation (TENS), therapeutic ultrasound and platelet-rich therapies are not recommended because of a paucity of supportive evidence.[1,2,16,25,40-42]

Referral to an orthopaedic surgeon is consistently recommended for patients with symptomatic, large (over 3 cm), full-thickness rotator cuff tears, with mixed recommendations for symptomatic patients with smaller full-thickness and non-full thickness tears. However, there is limited or no evidence supporting these recommendations.[1,2,16] A Cochrane review of surgery for rotator cuff disorder found moderate evidence that there is no significant difference between open or arthroscopic surgery and conservative management.[43] In contrast, there are a few low- to very low-quality surgical studies that have shown significant symptomatic improvement with rotator cuff repair, but only in patients with symptomatic, chronic, full-thickness rotator cuff tears without radiological evidence of muscle atrophy or fatty infiltration.[16]

Regardless of whether subacromial corticosteroid injections or surgical management are added to conservative management strategies, the persistence of shoulder pain or functional limitation for more than three months after onset of rotator cuff disorder should prompt consideration of referral to local specialist multidisciplinary pain medicine services. This especially applies to patients with significant pain, functional limitation or modifiable negative prognostic factors. **PMT**

COMPETING INTERESTS: None.

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