

CLINICAL ASSESSMENT IN THE WORKPLACE SERIES

Upper limb disorders

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Disorders of the upper limb cause significant morbidity and incur substantial costs. These conditions are amongst the most common reasons for attendance to occupational physicians, and they are also commonly encountered in the practice of a wide array of medical specialities (rheumatology, orthopaedic surgery, rehabilitation and neurology). Despite this collective experience, standardized methods for labelling these conditions and algorithms for their clinical evaluation and treatment are only beginning to be developed. The purpose of this review is to outline a classification system for upper limb disorders, to address the features of the clinical history and examination which are of most benefit in reaching a diagnosis, and to briefly outline approaches to investigation and treatment.

Key words: Clinical assessment; epidemiology; musculoskeletal disorders; occupation.

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CLASSIFICATION

The one year period prevalence of upper limb pain in the general population varies from one to five per cent, and the incidence of this symptom is estimated at 1 per 100 person years for adults of working age. Prevalence estimates as high as nine per cent and incidence rates of 1 per 100 person years have been reported for this group of disorders among specific occupational groups such as packers and meat cutters. In general terms, there appears to be an association between repetitive use of a particular muscle group or joint in the workplace and the risk of a regional pain syndrome at that site. However, few of these workplace studies have attempted to categorize these upper limb disorders into discrete pathophysiological entities. The limited data available suggest that around 50% of individuals presenting with upper limb pain syndromes would fulfil criteria for these discrete entities (for example rotator cuff tendinitis) while the remainder fall into a less well-defined category in which the history and physical examination do not permit accurate localization of the lesion. Table 1 illustrates the principal discrete diagnoses which should be considered in individuals presenting to occupational physicians with pain in the upper limb. They are best

characterized as disorders affecting the shoulder, elbow, and hand/wrist complex. At the shoulder, the most frequent causes of pain are disorders of the rotator cuff (either acute tendinitis or an exacerbation of chronic rotator cuff degeneration) and capsulitis of the glenohumeral joint ('frozen shoulder'). Other important differential diagnoses include bicipital tendinitis, dysfunction of the acromioclavicular joint, and arthritis of the glenohumeral joint (either an inflammatory arthritis such as rheumatoid disease or osteoarthritis). The rotator cuff consists of a series of muscles which hold the humeral head in its articulation with the glenoid fossa of the scapula. The cuff, particularly in its superior region where it is comprised by the supraspinatus muscle, is subjected to stresses when the arm is in the elevated position. In addition,

Table 1. Classification of disorders of the upper limb

Shoulder	Rotator cuff disorders Capsulitis (frozen shoulder) Bicipital tendinitis Acromioclavicular joint dysfunction Gleno humeral arthritis
Elbow	Epicondylitis Olecranon bursitis
Hand/wrist	Carpal tunnel syndrome Tenosynovitis — extensor pollicis longus flexors/ extensors of fingers Arthritis

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impingement can occur as the supraspinatus tendon is compressed between the humeral head and the overlying acromion. Rotator cuff tendinitis typically results from eccentric overload of the shoulder while tears of the rotator cuff usually follow trauma (a fall on to the outstretched arm, a hyperabduction injury or a fall on to the side of the shoulder). Capsulitis of the shoulder is a condition of unknown aetiology in which there is progressive inflammation of the glenohumeral capsule and consequent painful restriction of active and passive shoulder movement in all directions. On occasion, capsulitis may follow an episode of rotator cuff damage or occur secondarily to underlying diseases such as myocardial infarction, diabetes mellitus or stroke. The disorder has three phases in its natural history. After an initial painful period of one to two months, there is progressive restriction of shoulder movements which may last a further three or four months, during which the pain wears off. There is then a final period, lasting as long as two years, during which there is resolution of the range of movements and eventual return of shoulder function.

The most frequent disorders of the elbow to occur in relation to occupational activities are olecranon bursitis and epicondylitis. The olecranon bursa lies superficial to the tip of the ulnar and may become inflamed as a consequence of synovitis affecting the elbow joint or as a result of external pressure. The epicondyles of the lower humerus are the principal sites of insertion of the common flexors (medial epicondyle) and extensors (lateral epicondyle) of the lower arm. These insertional sites may become inflamed by trauma or repetitive use. Reported surgical findings in individuals who present with the clinical manifestations of epicondylitis include inflammation at the entheses, entrapment of the radial nerve, articular disease of the radio-humeral joint, and lesions of the annular ligament. While all of these may contribute to pain and localized tenderness, it is the lesion at the entheses which is thought to initiate the disorder.

The major disorders affecting the wrist and hand are carpal tunnel syndrome, tenosynovitis, and arthritis of the hand joints. Carpal tunnel syndrome is by far the most commonly studied work-related upper limb disorder. An increased risk of carpal tunnel syndrome has been observed among workers who are exposed to vibration from tools, and in jobs in which repetitive flexion and extension of the wrist is essential. Tenosynovitis typically affects the extensor poliosis longus tendon (de Quervain's syndrome) but may also involve the long extensors and flexors of the forearm. These disorders show associations with strenuous manual tasks in which the work is repetitive and requires the use of high forces. This group of disorders has been catapulted into the public eye through the non-specific description 'repetitive strain injury'. However, clear clinical evidence of tenosynovitis is only present in a small proportion of these patients and the appropriate means of classifying and treating the majority of these patients remains uncertain.

Table 2. Features of the history relevant to the differential diagnosis of work related upper limb disorders

Pain
Swelling
Stiffness
Loss of function
Relationship to trauma
Occupational history (with emphasis on activity pattern)

CLINICAL EVALUATION

History

The most important symptom of musculoskeletal disease is pain (Table 2). In eliciting a history of pain, particular attention must be given to the localization of the pain and whether its distribution is suggestive of an articular or peri-articular disorder, or whether it is referred. In the upper limb, pain can be referred to the shoulder or elbow from cervical route irritation at the C5/6 or C6/7 levels respectively. Thus, a dermatomal distribution and other neurological symptoms such as paraesthesia in the fingers or paresis of grip strength are important to ascertain. Swelling and stiffness are indicators of localized articular or peri-articular inflammation. The history should also include a detailed assessment of upper limb function, and assessment of the relationship of symptoms to preceding trauma or infection. A full occupational history should be taken in which direct questioning about various occupational physical activity patterns should be included. Finally, assessment of leisure physical activities may also shed light on the underlying diagnosis.

Physical examination

Table 3 illustrates the major components of the physical examination for each of the three important articular sites in the upper limb. The clinical examination should follow a standard sequence of inspection, palpation, movement and specific stress tests. Thus, at the shoulder, the region should be inspected for erythema, bruising and swelling. Comparison with the contralateral side should reveal any apparent asymmetry. Palpation is principally aimed at assessing tenderness in the region of the subacromial bursa, the bicipital and supraspinatus tendons, the glenohumeral joint margin and the acromio-clavicular joint. The full range of active and passive movements (abduction, flexion, extension, internal and external rotation) should be assessed. Difference in the pattern of movement restriction provides the major clinical distinction between rotator cuff disease and capsulitis or glenohumeral arthritis. In rotator cuff disease, there is typically inability to maintain abduction through a painful arc between 30° and 120°. Resisted abduction, and external rotation, are also painful and restricted. Adhesive capsulitis, in contrast, is associated with painful restriction of both active and passive movements in all directions. Finally, the examination of the shoulder should be completed

Table 3. Important aspects of the clinical examination in work related upper limb disorders

Examination	Symptom
Shoulder	
Inspection	Erythema, bruising, swelling, asymmetry
Palpation	Tenderness (subacromial bursa, tendons, glenohumeral joint, acromioclavicular joint)
Movement	Active/passive range of movement
Stress tests	Acromioclavicular joint, biceps tendon
Elbow	
Inspection	Swelling (olecranon bursa)
Palpation	Tenderness at epicondyles
Movement	Flexion/extension Resisted wrist extension (lateral epicondylitis) Resisted wrist flexion (medial epicondylitis)
Wrist	
Inspection	Thenar wasting (CTS) Swelling (tenosynovitis)
Palpation	Tinel/Phalen sign Tenderness (tenosynovitis)
Movements	Pinch, grip, opposition Wrist flexion/extension
Specific tests	Sensory/motor median nerve Resisted flexion/extension (tenosynovitis) Finkelstein's test (de Quervain's syndrome)

with stress tests for the acromio-clavicular joint (passive movement of the hand on the affected side towards the contralateral shoulder) and of the biceps tendon (resisted flexion and supination).

At the elbow, inspection is primarily aimed at distinguishing swelling arising from olecranon bursitis. Palpation should be directed towards localized tenderness in the region of the epicondyles. Although the range of movement should include assessment of flexion and extension, the most helpful manoeuvres to distinguish medial and lateral epicondylitis are resisted flexion and extension of the wrist respectively, with the elbow held at right angles.

In evaluation of the wrist and hand, the thenar eminence should be inspected (wasting being a relatively early feature of carpal tunnel syndrome) and any swelling over the tendon sheaths should be noted. The tendons should be palpated for localized superficial tenderness (when present, characteristic of tenosynovitis) and Tinel and Phalen's signs should be elicited. These indicate compression of the median nerve in the carpal tunnel. The major functional movements of the hand to be assessed include pinch, grip and apposition, while wrist flexion and extension may be limited by tenosynovitis. Specific tests which might be helpful in delineating the most frequent hand and wrist disorders include full sensory and motor neurological examination of the hand for deficit in a median nerve distribution, resisted flexion and extension of the fingers (for tenosynovitis) and Finkelstein's manoeuvre (pain on flexion and ulnar deviation of the wrist, in the region of the extensor pollicis longus tendon sheath).

INVESTIGATIONS AND TREATMENT

The majority of work-related upper limb disorders will not require further investigation. Most of the anatomical diagnoses illustrated in Table 1 will become apparent in a physical examination, and when features are non-specific, further investigations are unlikely to be of assistance. The mainstays of treatment for the soft tissue disorders include modification of the workplace to avoid the offending physical activity, the use of physical therapies to reduce pain (for example local heat, splinting, friction rubs, ultrasound and short wave diathermy), and local injections with corticosteroid (particularly suitable for rotator cuff tendinitis and adhesive capsulitis medial and lateral epicondylitis, tenosynovitis and carpal tunnel syndrome). Although non-steroidal anti-inflammatory drugs may be of some assistance in relieving symptoms, their effects are variable. The provision of basic physiotherapy services within an occupational health department therefore needs to be given consideration.

Investigations are sometimes required if disorders fail to settle after completion of these basic treatment regimens. The most useful investigations are plain radiography (to exclude underlying articular disease); immunological tests such as the ESR and an auto-antibody screen (to exclude the presentation of an inflammatory polyarthritis); certain specific investigations such as nerve conduction studies for entrapment neuropathies of the median nerve at the wrist or the anterior interosseous nerve at the elbow, and magnetic resonance imaging for the shoulder. It is entirely appropriate that the initial therapeutic regimen (including steroid injections) and baseline investigations, be carried out in the primary care or occupational health setting. However, failure to resolve or the need for the specialized investigations will require referral to the most appropriate secondary care speciality.

FURTHER READING

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