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Assessing wrist pain: a simple guide

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Abstract

Wrist pain is a common presenting symptom, affecting any age group. Assessment of wrist pain can be very challenging for junior clinicians and non-specialists, especially in patients with a chronic condition. This article looks at the bony and neurovascular anatomy of the wrist joint and describes a simple guide to clinical assessment of wrist pathology, highlighting the awareness of red flag signs, which would warrant an immediate referral for secondary care input.

Key words: Assessment; Algorithm; Red flags; Wrist pain

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Introduction

Wrist pain is often secondary to an injury (traumatic) but a large proportion may be atraumatic. Based on the duration of symptoms, it can be broadly classified as acute (less than 2 weeks), sub-acute (between 2 weeks to 3 months) or chronic (beyond 3 months). Associated symptoms may include swelling, stiffness, clicking and trouble gripping objects, making daily function very difficult. Clinical assessment of the wrist can be very exacting, so this article presents a simplified algorithm as a guide to assessment of wrist pathology.

Anatomy

The wrist is a complex joint, constituted by the distal radius and ulna and the proximal row of carpal bones (scaphoid, lunate, triquetrum and pisiform) (Figure 1). Figure 2 outlines the neurovascular anatomy of the wrist joint.

To understand the movements occurring between the various articulations (biomechanics) within the wrist joint, Woon (2016) described the column and row concepts. The three columns are:

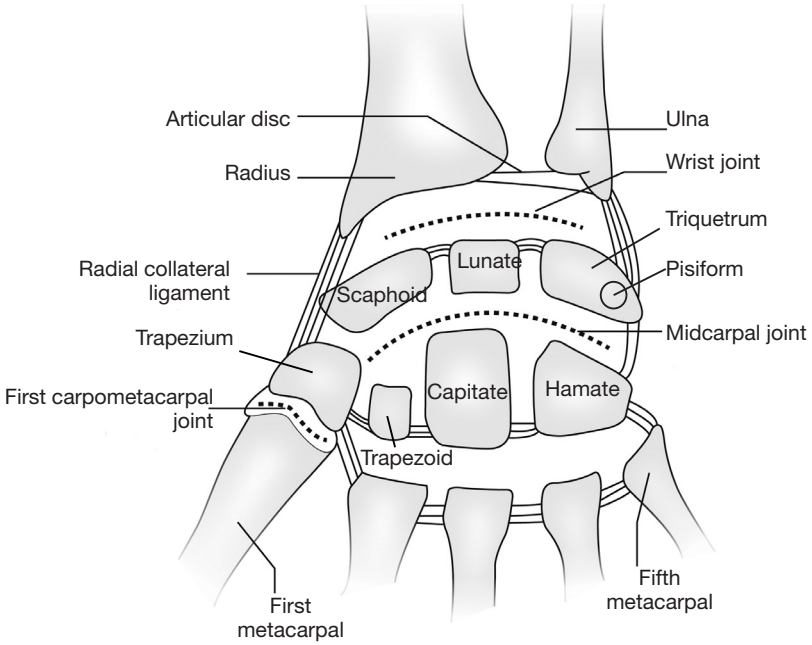

Figure 1. Bony anatomy of the wrist joint.

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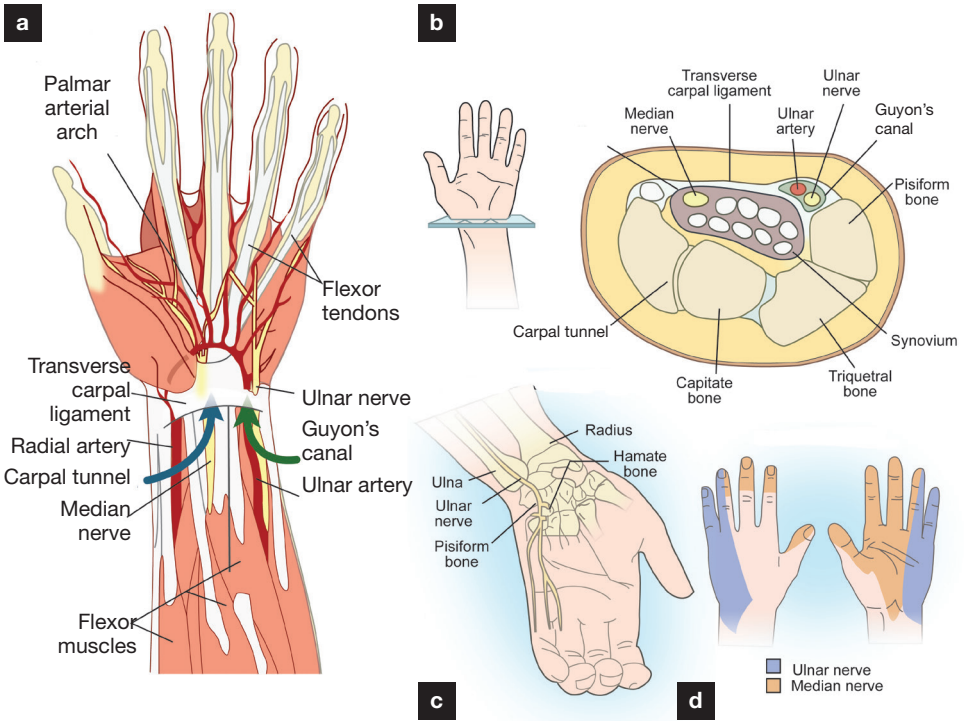

Figure 2. Neurovascular anatomy of the wrist. a. Palmar view of the hand. b. Normal section through the left wrist. c. Path of the ulnar nerve. d. Innervation of the hands.

1. The lateral (mobile) column, comprising the scaphoid, trapezium and trapezoid bones. The scaphoid is the centre of motion
2. The central (flexion-extension) column, comprising the lunate, capitate and hamate bones. The luno-capitate articulation is the centre of motion and its function is flexion-extension
3. The medial (rotation) column, comprising the triquetrum and the distal carpal row; its motion is rotation.

The row concept divides the anatomy into proximal and distal, with the scaphoid forming a bridge between rows. Motion occurs within (intra-carpal) and between (inter-carpal) the two carpal rows.

Initial assessment of the wrist

Quick screening

Inspect and look at the dorsal and palmar aspects of the wrist for any obvious swelling, deformity and muscle wasting. Ask the patient to lift their hands and assess the extension and flexion of the fingers, and then ask them to make a fist to assess tendon function.

Palpate for any local rise in temperature (best felt on the back of the hands) and areas of tenderness.

Assess the movements and compare with the other side: average wrist flexion 70°, extension 70°, radial deviation 20° and ulnar deviation 40° (Figure 3). Supination (normally 80°) and pronation (normally 80°) occur in the forearm involving the superior and inferior radio-ulnar joints (Forman et al, 2005).

Function can be assessed by asking the patient to shake hands for overall strength, hold a pen for pinch grip, pick up a coin and turn a key for fine motor skills. Palpate the radial and ulnar arteries to assess peripheral circulation.

Peripheral nerve function can be assessed simply by asking the patient to make an OK sign (median nerve), cross their index and middle fingers (ulnar nerve) and point with their index finger (radial nerve).

Functional outcome score

The DASH (Disabilities of Arm, Shoulder and Hand) Score is a very useful 30-item questionnaire administered by the patient, which has been reported to have good validity,

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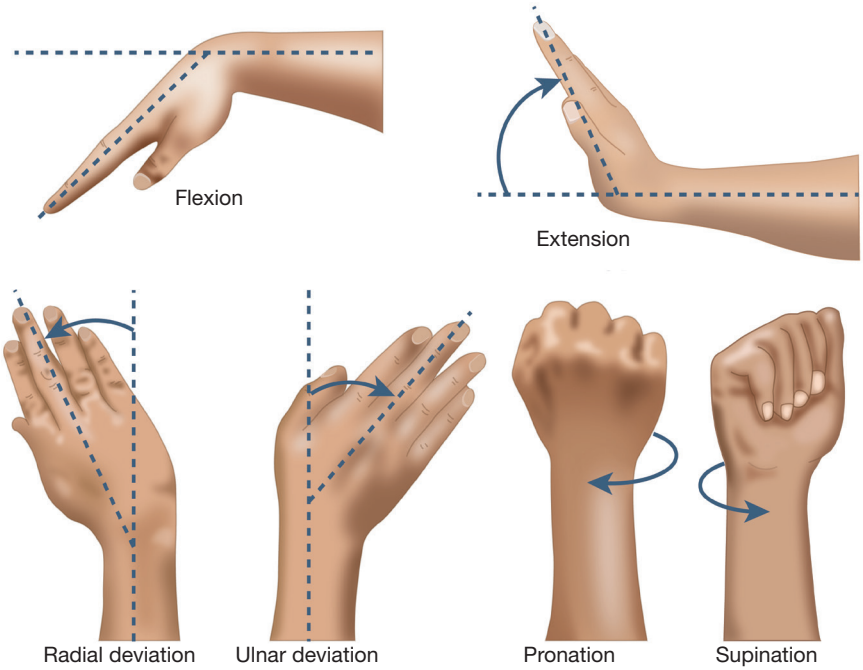

Figure 3. Wrist joint movements.

reliability and responsiveness (Changulani et al, 2008). It gives a good overall assessment of symptoms and function of the upper limb.

Red flags

Following a thorough history and clinical examination, it is imperative to exclude red flag signs (Singh, 2018) to reduce morbidity. The following scenarios warrant an immediate referral for secondary care input (emergency department, trauma and orthopaedic surgery or rheumatology).

1. Fractures
2. Dislocation
3. Infection (septic arthritis or osteomyelitis)
4. Systemically unwell with signs of inflammatory disease, eg acute flare of rheumatoid arthritis (stiffness >30 minutes, fever, rash, hot and/or swollen joints, weight loss)
5. Suspicion or previous history of malignancy.

Aetiology

It is useful to broadly categorise wrist pain into diffused and localised symptoms (Figure 4).

Diffuse wrist pain

Diffuse wrist pain is associated with stiffness and reduced range of motion, and is commonly caused by osteoarthrosis (rheumatoid or osteoarthritis). Initially these patients can be managed conservatively with rest, activity modification, comfort splints (may need referral to local therapists) and simple analgesia including non-steroidal anti-inflammatory drugs being very effective, along with paracetamol. Physiotherapy should be suggested to maintain joint kinematics and this is extremely useful in preventing secondary stiffness.

However, if there are signs of systemic unwellness in the presence of inflammatory disease (stiffness >30 minutes, fever, rash, hot or swollen joints, weight loss), this requires admission and referral to rheumatology services to control the acute phase.

Localised wrist pain

Localised wrist pain can be categorised into three groups: radial sided, central and ulnar sided.

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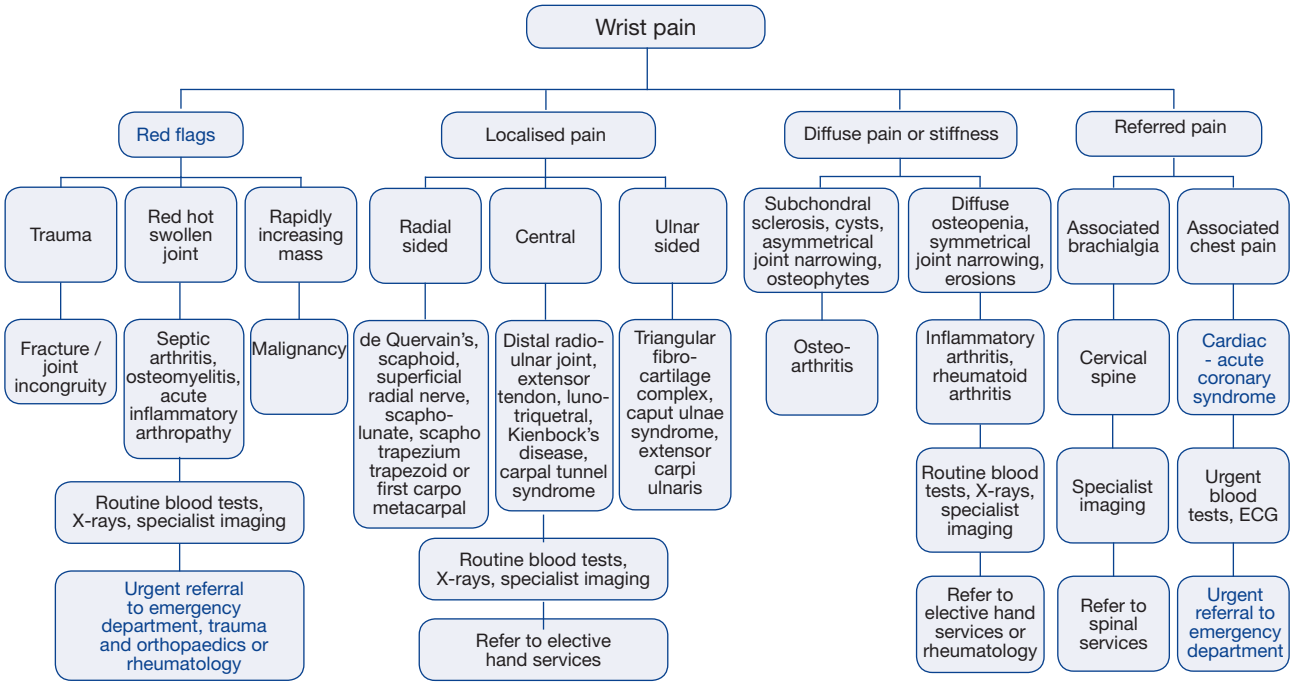

Figure 4. Wrist pain aetiology and assessment algorithm. ECG = electrocardiogram.

Radial-sided wrist pain

Radial-sided wrist pain (Shehab and Mirabelli, 2013) includes the following:

1. De Quervain's disease – indicated by tenderness of the first extensor compartment tendons (abductor pollicis longus and extensor pollicis brevis) and a positive Finkelstein's test (radial wrist pain on ulnar deviation with thumb into the palm)
2. Ganglion – usually non-tender but may be painful. More common on the dorsal aspect but may be presently volarly. The most common source is the scapho-lunate joint (dorsal)
3. Superficial radial nerve neuropathy – associated with a burning sensation along the course of the nerve and pain at night
4. Scaphoid – previous injury may have led to an un-united scaphoid fracture, which could remain painful and cause restricted wrist dorsiflexion (difficulty in doing push-ups). Chronic non-union could lead to scaphoid non-union advanced collapse – a pattern of progressive wrist arthritis
5. Scapho-lunate ligament injury – chronic untreated ruptures of the scapho-lunate ligament may result in inter-carpal instability and scapho-lunate advanced collapse
6. Scapho-trapezium trapezoid arthritis
7. First carpo-metacarpal thumb arthritis.

Central wrist pain

Causes of central wrist pain include:

1. Carpal tunnel syndrome – patients experience pain at night and often shake their hands to get comfortable. Associated altered sensation and pins and needle-type symptoms in the radial three digits are usually present on examination. Three tests are used for diagnosis: Tinel's sign (percussing over the nerve reproduces this altered sensation), Durkin's test (compression on the median nerve over the carpal tunnel reproduces the symptoms) and Phalen's test – a provocative test performed by asking the patient to maximally flex their wrists for 30–60 seconds to reproduce symptoms
2. Extensor tenosynovitis – extensor tendon pain and swelling is most commonly associated with rheumatoid arthritis
3. Distal radio-ulnar joint – may be affected as a result of previous fractures (distal radius or forearm) or injuries proximally to the radial head
4. Luno-triquetral ligament injury – chronic untreated ruptures of the luno-triquetral ligament may result in inter-carpal instability causing persistent pain, clicking and arthritis

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5. Kienbock's disease (avascular necrosis of the lunate) is a rare condition that can lead to chronic pain, dysfunction and disability.

Ulnar-sided wrist pain

The majority of cases are the result of affected soft tissue, triangular fibrocartilage complex injury or extensor carpi ulnaris subluxation.

1. Triangular fibrocartilage complex tears may be painful and associated with weakness of hand grip
2. Caput ulnae syndrome in rheumatoid arthritis – this results from stretching of the ulnar carpal ligaments as a result of synovitis, causing dorsal subluxation of the distal ulna and instability
3. Extensor carpi ulnaris subluxation – usually volarly in rheumatoid arthritis. This further leads to loss of ulnar deviation and extension of the wrist, and the wrist begins to deviate radially.

Referred pain

Wrist pain may manifest as generalised arm pain, also known as brachialgia, which is secondary to cervical spine pathology. This is commonly the result of cervical spondylosis leading to cervical disc prolapse and/or spinal stenosis causing nerve impingement. Failure of conservative measures will warrant referral to spinal services.

Any associated central or left-sided chest pain should raise suspicion of a cardiac cause, ie acute coronary syndrome, and should be immediately referred to the emergency department.

Investigations

Routine blood tests (full blood count, differential white cell count, C-reactive protein, erythrocyte sedimentation rate) are usually very helpful in the work-up for suspected infection and further monitoring treatment, when prescribed antibiotic therapy in liaison with the microbiologist. Inflammatory arthropathy is generally a clinical diagnosis but may need further specific blood tests to further confirm the type.

Plain radiographs (Figure 5) are very useful if there is a history of injury or there are associated symptoms of stiffness and reduced range of motion, raising the suspicion of arthritis. Gilula (1979) lines (Figure 6) are very useful in detecting any mal-alignment or incongruity.

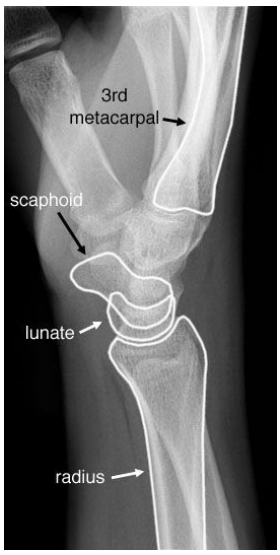

Figure 5. Lateral wrist radiograph showing normal bony relationships.

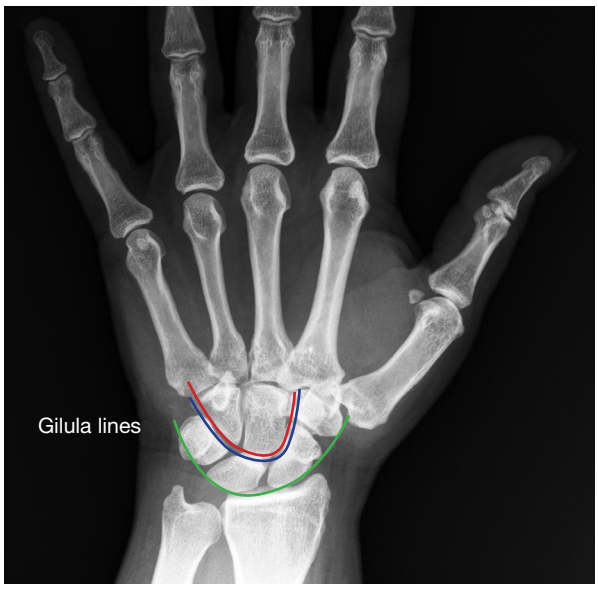

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Figure 6. Postero-anterior wrist radiograph demonstrating Gilula lines.

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Key points

- The wrist is a complex joint, so it is essential to understand the bony and neuro-vascular anatomy.
- Following an initial assessment, it is crucial to exclude red flag signs that would warrant immediate referral to the appropriate specialty.
- Having a sound knowledge of the possible pathological conditions and dividing symptoms into diffuse or localised (radial-sided, central or ulnar-sided) can help reach a differential diagnosis and formulate a management plan for patients.
- It is vital not to miss referred causes of wrist pain.

Ultrasound is useful for assessing soft tissue swellings, most commonly a ganglion cyst and tendon pathology. Magnetic resonance imaging is valuable in excluding infection (osteomyelitis or septic arthritis), occult fractures particularly scaphoid, cartilage tears, defects or pathology, ligamentous pathology and neoplasia. Computed tomography scans are very useful in assessing bony pathology, for instance avascular necrosis and fracture morphology specially in cases of non-union, commonly involving the scaphoid.

van Vugt et al (1999) reported that with careful history taking, thorough physical examination and simple imaging techniques, a diagnosis could be made in 78% of cases.

Conclusions

Wrist assessment can be very exacting but if clinicians remember the anatomy and perform a systematic examination, it is possible to form a good differential diagnosis and treat patients appropriately. The proposed algorithm will hopefully serve as a good guide to wrist assessment and evaluation.

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Conflicts of interest

The authors declare no conflicts of interest.

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Curriculum checklist

This article addresses the following requirements from the general internal medicine training curriculum

- Managing patients in an outpatient clinic, ambulatory or community setting, including management of long-term conditions
- Managing medical problems in patients in other specialties and special cases
- Managing a multidisciplinary team including effective discharge planning

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