

# Clinical examination of the wrist, thumb and hand

## CHAPTER CONTENTS

Referred pain . . . . .	319
History . . . . .	319
Inspection . . . . .	320
Functional examination . . . . .	320
The distal radioulnar joint . . . . .	320
The wrist . . . . .	321
The thumb . . . . .	322
The intrinsic muscles of the hand: dorsal and palmar interossei. . . . .	324
Palpation. . . . .	324
Accessory tests . . . . .	324
Examination of the fingers . . . . .	325
Passive movements . . . . .	325
Resisted movements . . . . .	325
Palpation . . . . .	325

## Referred pain

When a patient refers to the wrist as the site of symptoms, an area is indicated in which there are many structures that could be responsible. The region that patients call the wrist contains:

- The distal radioulnar joint
- The wrist joint
- The tendons that control the wrist
- The trapezium–first metacarpal joint
- The tendons that control the thumb
- The tendons that control the fingers
- The intrinsic muscles of the hand.

When a patient feels pain proximal to the distal radioulnar joint, this is usually described as being in the forearm. The

same applies distally, where pain is described as being in the fingers.

Pain is usually the result of a local lesion, although more proximal causes, such as cervical, shoulder girdle and shoulder disorders, as well as problems at the elbow, may refer pain to the distal part of the upper limb. However, in a lesion in the distal part of the limb, the patient is able to point accurately to the exact site of the lesion and it is only when the clinical examination of the wrist and hand is negative that the lesion should be sought more proximally.

Paraesthesia, being a 'nerve symptom', may result either from lesions higher up in the segment (e. g. cervical spine or thoracic outlet) or from local lesions (e. g. ulnar nerve problem or carpal tunnel syndrome).

## History

The history is seldom distinctive and therefore examination must be relied on for diagnosis. However, some questions are important.

- *What is the problem?* The patient describes the symptoms that are experienced in the wrist, thumb, hand or fingers. They are variable and may include pain, paraesthesia, numbness and weakness.
- *How did it start? Was there an injury?* Especially when a capsular pattern is found during the examination, the possibility of a fracture must be considered.
- *Or did it start after particular exertion?* Most ligamentous, muscular or tendinous lesions result from overuse. The symptoms may have started *spontaneously*, as usually happens in arthrotic or arthritic disorders.
- *How has the problem developed?* Because of the distal localization of the lesion, its evolution can only be judged in terms of the intensity of the symptoms, or by their appearance or disappearance, but not by reference of the symptoms.

## Inspection

The typical articular deformities of arthrotic or arthritic changes in the joints are well known.

Local swelling may be found. In dorsal subluxation of a carpal bone, the bony projection is visible when the wrist is held in flexion. A cyst on the dorsal aspect may mimic such a subluxation. The same applies to mal-united fractures, where bony outcrops may be visible on inspection. Palpation or disappearance of a fluid collection after puncture will help to reveal the difference.

Another important aspect is generalized swelling. Swelling coming on quite soon after a trauma – for example, a fall – is highly suggestive of fracture of a carpal bone. Spontaneous swelling occurs in rheumatoid arthritis and is quite often bilateral. In long-standing rheumatoid arthritis, multiple large ganglia may also occur.

In arthrosis at the trapezium–first metacarpal joint, the thumb is often visibly fixed in adduction; osteophytes can be seen and felt.

There may be changes in the colour of the hands, which may suggest a circulatory disorder – for example, Raynaud's syndrome, or a cervical rib pressing on the subclavian artery or vein.

## Functional examination

Many different structures – inert and contractile – lie close together and have to be examined. It should be clear that by passive testing, which is meant to examine the inert structures, either stretching or pinching may elicit symptoms. In some instances, painful movement of a contractile structure is provoked – for example, of a tendon within its sheath.

The wrist, thumb and hand are examined using 21 tests (Box 20.1).

## The distal radioulnar joint

The two movements described below test the integrity of the distal radioulnar joint. Painful supination is also a localizing sign in tendinitis of the extensor carpi ulnaris in the groove at the distal part of the ulna. The normal end-feel of both movements is capsular (elastic).

### Passive pronation

The patient holds the elbow in 90° flexion. The examiner grasps the patient's forearm just proximally to the wrist with both hands. The heel of the contralateral hand is placed on the palmar aspect of the ulna, the fingers of the other hand at the dorsal aspect of the radius. Pronation is performed by a simultaneous movement of both hands (Fig. 20.1a).

### Box 20.1

#### Tests for the wrist, thumb and hand

##### The distal radioulnar joint

- 2 passive movements

##### The wrist

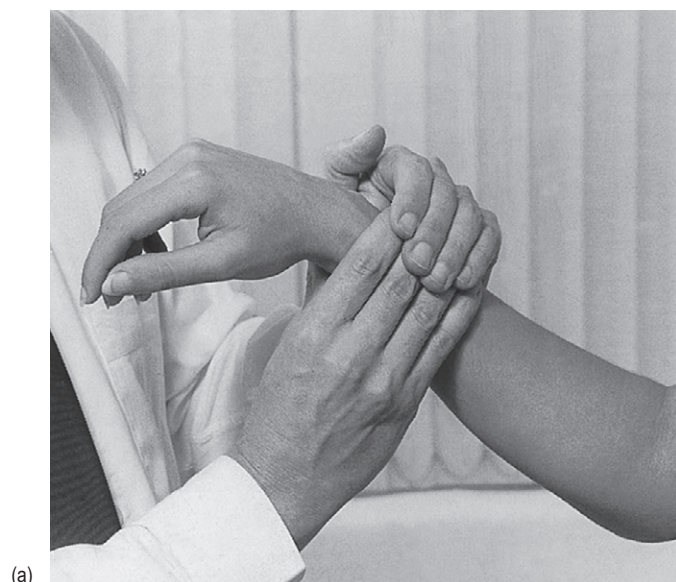
- 4 passive movements
- 4 resisted movements

##### The thumb

- 1 passive movement
- 4 resisted movements

##### The hand

- 6 resisted movements of the fingers



(a)



(b)

Fig 20.1 • Passive pronation (a) and supination (b).

*Passive supination*

The examiner changes hand position and puts the fingers of the contralateral hand on to the palmar aspect of the radius and the heel of the other hand on the dorsal aspect of the ulna. Supination is again performed by a movement of both hands (Fig. 20.1b).

## The wrist

### Passive movements (Fig. 20.2)

The normal end-feel of flexion and extension is capsular (elastic). If these movements are positive, the examiner must be able to tell whether the condition is of the capsular or the non-capsular type (see Ch. 23).

*Passive flexion*

The patient holds the elbow flexed at a right angle. The examiner takes hold of the patient's forearm with the contralateral hand, in order to achieve good fixation. With the other hand,

the patient's hand is grasped and the wrist is flexed to the end of its range. The movement stretches the structures on the dorsal aspect of the wrist (ligaments, tendons) and pinches some structures on the palmar aspect (Fig. 20.2a).

*Passive extension*

Using the same grip, the examiner can bring the wrist into extension. Extension stretches the palmar tissues and pinches other tissues dorsally (Fig. 20.2b).

*Passive radial deviation*

The examiner brings the patient's hand into radial deviation, which stretches the structures at the ulnar side of the wrist – the ulnar collateral ligament and the extensor carpi ulnaris (Fig. 20.2c).

*Passive ulnar deviation*

The examiner brings the patient's hand into ulnar deviation, stretching the structures at the radial side of the wrist – the radial collateral ligament and the tendons in the first tunnel (the extensor pollicis brevis and abductor pollicis longus) (Fig. 20.2d).



(a)



(b)



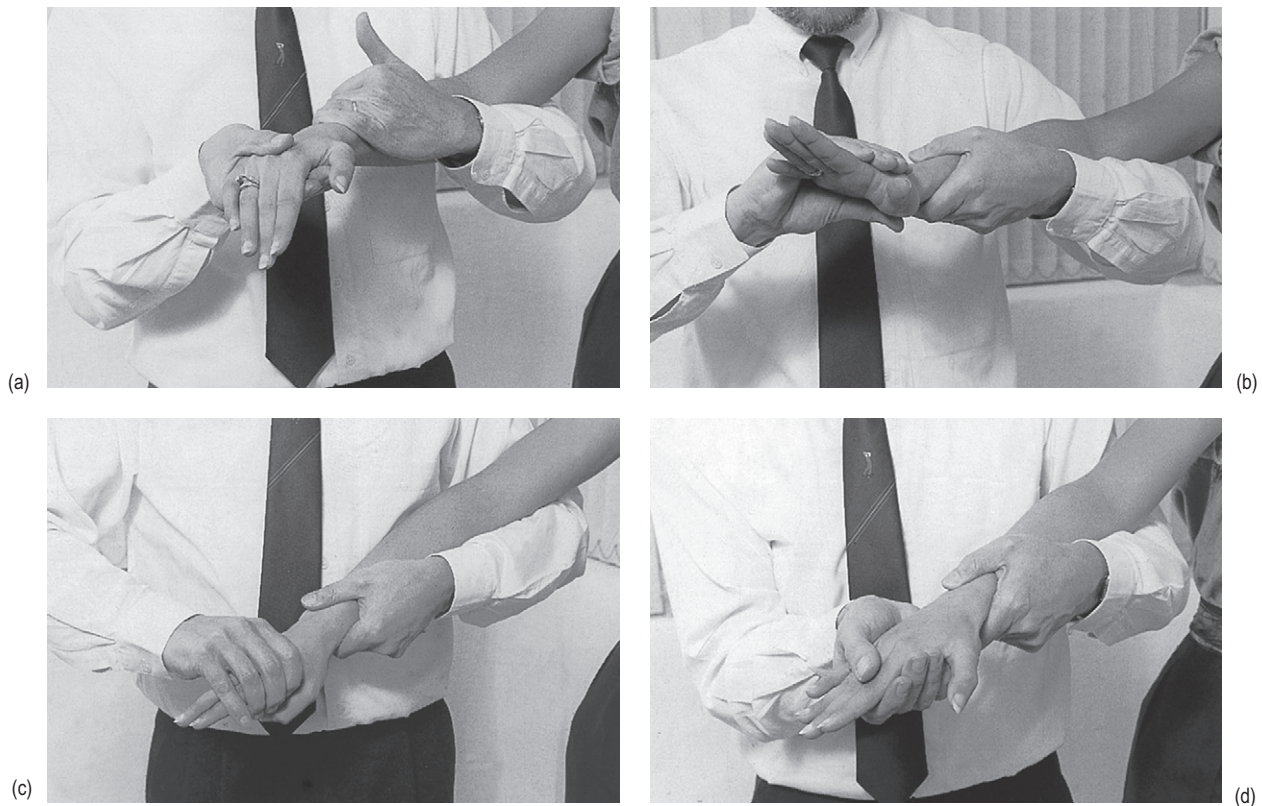
(c)



(d)

**Fig 20.2** • Passive movements of the wrist: (a) flexion; (b) extension; (c) radial deviation; (d) ulnar deviation.





**Fig 20.3** • Resisted movements of the wrist: (a) flexion; (b) extension; (c) radial deviation; (d) ulnar deviation.

### Resisted movements

For the resisted tests (Fig. 20.3) the patient's elbow is kept in extension. This puts more stress on the contractile structures of the wrist and makes it possible to detect even the slightest tendinous and muscular lesions.

#### *Resisted flexion*

The patient's hand is held in the neutral position. The examiner's contralateral arm is passed under the patient's in order to hold the patient's elbow in extension and fixes the forearm with the hand. The other hand is placed under the patient's hand and creates resistance at the palmar aspect.

This test examines the flexors of the wrist and fingers – the flexor carpi radialis, flexor carpi ulnaris, flexor digitorum superficialis and profundus (Fig. 20.3a).

#### *Resisted extension*

Fixation of the patient's forearm is as in the previous test. The examiner creates resistance at the dorsal aspect of the patient's hand.

This tests the extensors of the wrist and fingers – the extensor carpi radialis longus, extensor carpi radialis brevis, extensor carpi ulnaris, extensor digitorum communis, extensor indicis proprius and extensor digiti minimi (Fig. 20.3b).

#### *Resisted radial deviation*

Resistance is applied at the radial aspect of the patient's hand – the thumb is not involved – and tests the radial deviators of

the wrist – the extensor carpi radialis longus and brevis and flexor carpi radialis (Fig. 20.3c).

#### *Resisted ulnar deviation*

Resistance to ulnar deviation is applied at the ulnar aspect of the hand and tests the ulnar deviators of the wrist – the extensor carpi ulnaris and flexor carpi ulnaris (Fig. 20.3d).

## The thumb

### Passive movement

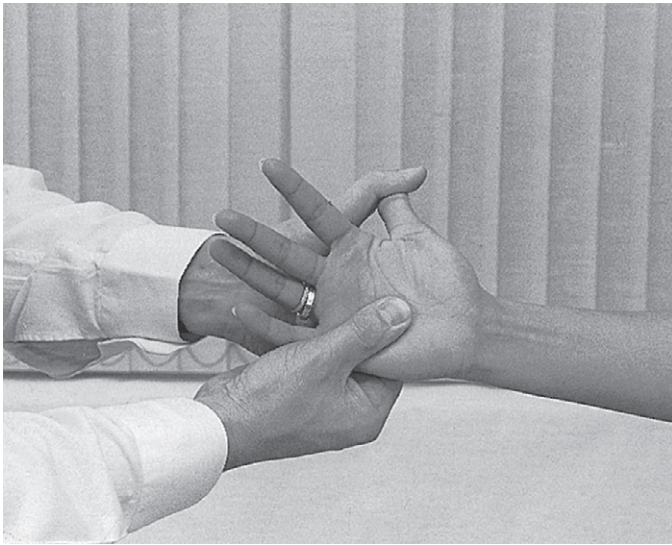
#### *Backwards movement during extension*

The patient flexes the elbow to a right angle and presents the hand with the palm upwards. The examiner takes hold of it with the ipsilateral hand and fixes it. With the other hand the thumb is brought into extension. Then the thumb is moved backwards so as to stretch the anterior part of the capsule of the trapezium–first metacarpal joint (Fig. 20.4).

### Resisted movements (Fig. 20.5)

#### *Resisted extension*

The patient presents the hand with the thumb upwards and it is fixed by the examiner's contralateral hand. Resistance is then applied with the thumb of the other hand at the dorsal aspect of the distal phalanx. Extension tests the extensors of the



**Fig 20.4** • Passive movement of the thumb.

thumb – the extensor pollicis longus and extensor pollicis brevis (Fig. 20.5a).

#### *Resisted flexion*

Resistance is applied to the palmar aspect of the distal phalanx of the patient's thumb and tests the flexors of the thumb – the flexor pollicis longus and brevis (Fig. 20.5b).

#### *Resisted abduction*

Resistance is applied to the distal part of the first metacarpal bone and tests the abductors of the thumb – the abductor pollicis longus and brevis (Fig. 20.5c).

#### *Resisted adduction*

This movement tests the adductor of the thumb – the adductor pollicis (Fig. 20.5d).



(a)



(b)



(c)



(d)

**Fig 20.5** • Resisted movements of the thumb: (a) extension; (b) flexion; (c) abduction; (d) adduction.



## The intrinsic muscles of the hand: dorsal and palmar interossei

### *Squeezing with the index and middle fingers*

The patient presents the hand in the horizontal position with the dorsal aspect upwards. The examiner puts an index finger between the patient's index (II) and middle (III) fingers and asks the patient to squeeze it, so testing the palmar interosseus of the index finger and the dorsal radial interosseus of the middle finger (Fig. 20.6a).

### *Squeezing with the middle and ring fingers*

The examiner's finger is squeezed between the patient's middle (III) and ring (IV) fingers. The examiner carries out the test as before, with the finger between the patient's middle and ring fingers, so testing the dorsal ulnar interosseus of the middle finger and the palmar interosseus of the ring finger (Fig. 20.6b).

### *Squeezing with the ring and little fingers*

The examiner's finger is squeezed between the patient's ring (IV) and little (V) fingers. The dorsal interosseus of the ring finger and the palmar interosseus of the little finger are tested (Fig. 20.6c).

### *Resisted separation of the index and middle fingers*

The examiner resists the separation of the patient's fingers at the distal phalanges, which tests the dorsal interosseus of the index finger and the dorsal ulnar interosseus of the middle finger (Fig. 20.7a).

### *Resisted separation of the middle and ring fingers*

This assesses the dorsal radial interosseus of the middle finger and the dorsal interosseus of the ring finger (Fig. 20.7b).

### *Resisted separation of the ring and little fingers*

This tests the palmar interosseus of the ring finger and the abductor of the little finger in the hypothenar, abductor digiti minimi (Fig. 20.7c).

## Palpation

Palpation with the joints at rest helps to find the exact localization of lesions in ligaments, tendons or muscles. Palpation is also performed for warmth, swelling and synovial thickening.

Palpation during movement may reveal crepitus. Fine creaking during movement of a tendon in its sheath indicates roughening of the gliding surfaces, the result of overuse. This is quite common in the tendons or muscle bellies of the structures that pass through the first and third tunnels: namely, the abductor and extensors of the wrist. Coarser crepitus can indicate tuberculosis or advanced rheumatoid disease.

## Accessory tests

These tests (Fig. 20.8) are not part of the standard examination. They are only done when there is a need for more information about the patient's problem.



(a)



(b)



(c)

**Fig 20.6** • Squeezing the fingers: (a) II–III; (b) III–IV; (c) IV–V.

### *Resisted extension of the wrist with the fingers held actively flexed*

The patient is asked to flex the fingers and to press the fingertips in the palm of the hand. In this position resisted extension of the wrist is repeated (Fig. 20.8a).

### *Resisted extension of each finger separately*

Resistance is applied at the distal phalanx (Fig. 20.8b).



**Fig 20.7** • Resisted separation of the fingers: (a) II–III; (b) III–IV; (c) IV–V.

### Resisted flexion of each finger separately

Resistance is applied at the distal phalanx (Fig. 20.8c).

### Tests for carpal tunnel syndrome

These are described in the online chapter *Nerve lesions and entrapment neuropathies of the upper limb*.

The clinical examination of the wrist, thumb and hand is summarized in Box 20.2.

## Examination of the fingers

This examination (summarized in Box 20.3) is performed only when the patient clearly presents with a problem in the fingers.

### Passive movements

Passive movements are performed at the metacarpophalangeal joints of thumb and fingers, at the interphalangeal joint of the thumb, and at the proximal and distal interphalangeal joints of the fingers. There are four tests for each joint:

- *Flexion*: with one hand the examiner fixes the proximal bone and with the other at the distal bone the joint is brought into flexion.
- *Extension*: with one hand the examiner fixes the proximal bone and with the other at the distal bone the joint is brought back to the starting position. Extension is usually not possible, except in very mobile or hypermobile individuals.
- *Rotation in one direction*: with one hand the examiner fixes the proximal bone. The other takes hold of the distal bone, brings the joint into slight flexion and rotates it in one direction. Very little movement is possible.

- *Rotation in the opposite direction*: the same manoeuvre is performed but this time the rotation goes in the opposite direction.

There are two tests for the collateral ligaments:

- *Radial deviation*: the proximal bone is fixed with one hand; with the other the joint is kept in extension and forced into radial deviation, thereby using the distal bone as a lever.
- *Ulnar deviation*: the same technique is used but now the joint is forced into ulnar deviation.

## Resisted movements

Resisted movements test the tendinous structures in the fingers – the long flexor and extensor tendons. There are two tests; in both, resistance is applied at the distal phalanx.

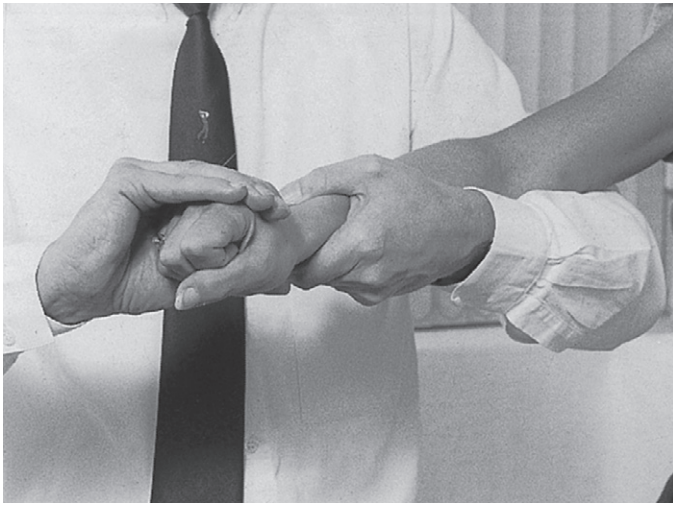
- *Flexion*: with one hand the examiner takes hold of the patient's wrist and hand; the other is used to supply resistance against the patient's attempt to flex the finger. Resistance is supplied at the palmar aspect of the distal phalanx.
- *Extension*: the examiner again fixes the patient's wrist and hand. With the other hand at the distal phalanx the patient's attempt to extend the finger is resisted.

## Palpation

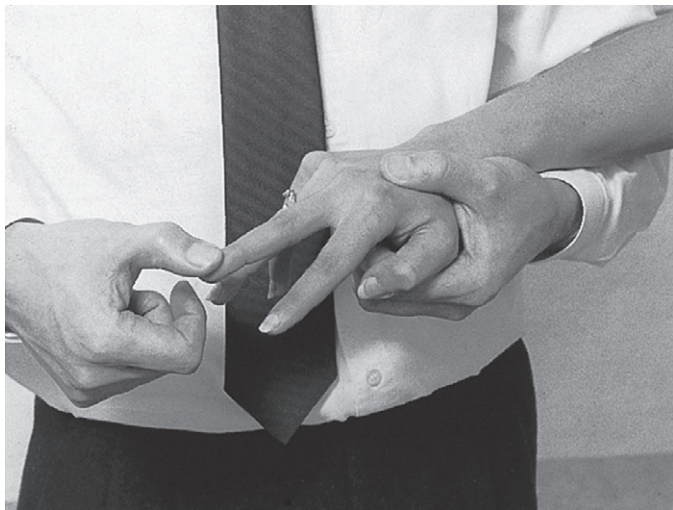
Palpation can be done at the level of the different joints and seeks to detect:

- *Fluid* which may be found in joint or ligamentous disorders.
- *Synovial thickening* which accompanies rheumatoid-type arthritis. It is best palpated at the level of the collateral ligaments.





(a)



(b)



(c)

**Fig 20.8** • Accessory tests: (a) resisted extension of the wrist, with fingers flexed; (b) resisted extension of one finger; (c) resisted flexion of one finger.

## Box 20.2

### Summary of the clinical examination of the wrist, thumb and hand

#### History

#### Inspection

#### Functional examination

- Lower radioulnar joint
  1. Passive pronation
  2. Passive supination
- Wrist joint
  3. Passive flexion of the wrist
  4. Passive extension of the wrist
  5. Passive radial deviation of the wrist
  6. Passive ulnar deviation of the wrist
- Wrist muscles and tendons
  7. Resisted flexion of the wrist
  8. Resisted extension of the wrist
  9. Resisted radial deviation of the wrist
  10. Resisted ulnar deviation of the wrist
- Trapezium – first metacarpal joint
  11. Passive backward movement during extension
- Thumb muscles and tendons
  12. Resisted extension of the thumb
  13. Resisted flexion of the thumb
  14. Resisted abduction of the thumb
  15. Resisted adduction of the thumb
- Intrinsic hand muscles
  16. Squeeze II and III
  17. Squeeze III and IV
  18. Squeeze IV and V
  19. Spread II and III
  20. Spread III and IV
  21. Spread IV and V

#### Palpation

#### Accessory tests

## Box 20.3

### Summary of the functional examination of the fingers

#### Passive movements

1. Passive flexion
2. Passive extension
3. Passive rotation in one direction
4. Passive rotation in the opposite direction
5. Passive radial deviation
6. Passive ulnar deviation

#### Resisted movements

7. Resisted flexion
8. Resisted extension

#### Palpation

9. For fluid
10. For synovial thickening