Examination of the Hand

R E Page

History 3
Examination 4
Movement 8
Features of Specific Conditions Affecting the Hand and Special Tests 8
Establish important details such as age, dominance, occupation, hobbies, social status, nature of the injury (involvement with compensation), general health including pre-existing conditions such as diabetes, gout, arthritis, collagen disease (SLE, Lupus), drugs and allergies. Allow the patient to describe the symptoms, which will be among those listed below.

There are many pathological conditions affecting the hand but it is usually possible to arrive at a provisional diagnosis early in the consultation at which point specific questions pertinent to the condition can commence.

**Specific symptoms**

**Pain**

This is a very common presenting complaint as it is a feature of infection, inflammation, arthritis, trauma and nerve compression. Unrelenting night pain causing loss of sleep is strongly suggestive of deep seated infection. Pain on movement will focus attention on joints or tendons. Pain associated with altered sensation suggests nerve entrapment.

**Swelling**

Swelling may be localised or generalised. The loose tissues on the dorsum of the hand allow for a greater degree of swelling than the palmar aspect where the skin is more tightly anchored to underlying structures (Figure 1).

**Weakness**

If this symptom is associated with pain it may be due to tendon or joint disease rather than neuromuscular disorders.

**Numbness**

Patients often have great difficulty in accurately outlining the distribution of this symptom. The lack of an anatomically compatible description does not invalidate the complaint.

**Deformity**

This will be obvious in trauma and cases suffering the various forms of arthritis.

**Instability**

Joint instability accompanies ligamentous disruption following trauma as in gamekeeper's thumb,

Examination of the Hand

![Figure 1](https://www.cambridge.org/cambridge/university-press/book/978-0-521-86241-7)

Swelling of loose dorsal tissues of the right hand as a result of a palmar space infection.
History

General

Establish important details such as age, dominance, occupation, hobbies, social status, nature of the injury (involvement with compensation), general health including pre-existing conditions such as diabetes, gout, arthritis, collagen disease (SLE, Lupus), drugs and allergies. Allow the patient to describe the symptoms, which will be among those listed below. There are many pathological conditions affecting the hand but it is usually possible to arrive at a provisional diagnosis early in the consultation at which point specific questions pertinent to the condition can commence.

Specific symptoms

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Figure 1. Swelling of loose dorsal tissues of the right hand as a result of a palmar space infection.
but may arise as a feature of osteo or rheumatoid arthritis where ligaments are destroyed or attenuated by the disease process. Occasionally non-union of a fracture may cause instability.

**Snapping tendons**

On moving the hand into flexion the patient may notice snapping of the extensor tendons over the MCP joints. It is usually due to disruption of the juncture tendons or sagittal bands.

**Stiffness**

This symptom is usually associated with arthritic change but will also be encountered after trauma and may persist in those patients suffering with post-traumatic sympathetic dystrophy. (see later)

**Loss of dexterity**

Loss of manipulative skills may be due to a number of different causes but deranged activity of the intrinsic muscles should always be considered.

**Cold intolerance**

Most patients after trauma or surgery will encounter cold intolerance for a number of years. It is manifested as an aching discomfort associated with capillary vascular changes resulting in a bluish, purple discolouration of the skin. Stiffness will also trouble the patient.

**Congenital**

It is important to ask about a family history and enquire about illnesses or drug therapy during pregnancy.

**Examination**

The basic equipment required for any hand examination should include a pin wheel, dividers for 2PD, Jamar & Pinch dynamometer and a goniometer.

**General**

The whole of the upper limb should be exposed on both sides to allow for comparison then LOOK, FEEL, MOVE. Start with the dorsal aspect of the hand including the nails, then proceed to the volar side.

**Posture**

At rest there will be a moderate degree of dorsi flexion of the wrist and some ulnar deviation. Flexion of the MCP and PIP joints increases from the index to the little fingers. The thumb will be in a slightly abducted position with the pulp lying close to the DIP joint of the index. Disease processes will alter this natural posture particularly nerve deficits, for example the "main en griffe" deformity in combined high ulnar and median nerve lesions.

**Tremor**

This may suggest anxiety or thyrotoxicosis when fine or a benign essential tremor or Parkinson's disease when coarse. Beware the hysterical tremor usually coarse in type, often seen on examining grip strength in a patient set on compensation.

**Size**

It is useful to observe the size of the hands as it has been suggested that large thick set hands respond more slowly to treatment than small thin hands. When hands appear disproportionately large then consider acromegaly.

**Swelling**

Localised swelling with redness and heat will indicate an active infective or inflammatory condition. Ganglia from any source of synovium (joint or tendon), are by far the most common cause of cystic swellings, Giant cell tumours of tendon sheath are the commonest cause of isolated solid swellings. Swelling of the whole hand is more easily detected dorsally and may be quite firm as in lymphoedema or Secretan's disease.1 (Factitious trauma to the dorsum of the hand)

**Colour**

Vascular lesions will be apparent as localised changes in skin colour. Purple-blue discolouration
Examination of the Hand

of the whole hand in association with pain and swelling would indicate post-traumatic sympathetic dystrophy. Persistent bruising in the vicinity of ligaments is strongly suggestive of rupture. Vascular integrity of the hand can be assessed using the Allen’s test. This can be performed for the whole hand or the individual digits, which is especially indicated in patients undergoing revision surgery for Dupuytren’s disease.

Nails

A wide range of medical conditions affect the nails for example, clubbing, splinter haemorrhages, beware the subungual melanoma. Mucus cysts will cause grooving of the nail. Non-traumatic destruction of the nail is usually due to tumour. Subungual glomus tumours are extremely painful when the nail is knocked and usually appear as a localised blue-purple blush in the sterile matrix.

Creases

Where joints are immobile skin creases are absent (Figure 2).

Deformity

Congenital abnormalities, arthritis and trauma are the common causes.

Muscle wasting

This is most likely to be detected in the ulnar innervated 1st dorsal interosseous, in the 1st web space or in the median innervated abductor pollicis brevis in the thenar eminence.

Sensation

Light touch should be tested in the median, ulnar and radial nerve distributions. Absent sweating detected by the biro test or skin conductance measurements is a sign of denervation. In the biro test the body of the pen runs smoothly along a dry denervated digit whereas it drags when it is run along a moist normally innervated finger. The water immersion test can be useful in children. After 5-10 minutes in warm water innervated finger pulps pucker, denervated pulps remain smooth.

Figure 2 As a result of end-stage post traumatic sympathetic dystrophy this patient has completely stiff PIP and DIP joints on the left hand. Note the lack of skin creasing over the joints.
6 Advanced Examination Techniques in Orthopaedics

*Note the Linburg Comstock sign where FPL action also initiates FDP flexion in the index finger by means of an anomalous communicating tendon.

Figure 3 (a) Flexion*

Figure 3 (b) Extension
*Note the Linburg Comstock sign where FPL action also initiates FDP flexion in the index finger by means of an anomalous communicating tendon.
Crepitus
Over tendons this will suggest tenosynovitis and over joints arthritic change.

Thrill
This may be detected in a high flow vascular malformation or in relation to an arterio-venous fistula.

Movement
The MCP joints will move from 0-90°, the PIP joint 0-110° and the DIP joint 0-90°. As the digits flex they follow an equi angular spiral (progressive spiral as described by Fibonacci). As a fist is formed the 4th and 5th CMC joints flex dropping the level of the metacarpal heads. Flexion and extension movements alone will take place at the PIP and DIP joints. The MCP joints allow abduction and adduction of the fingers, with the point of reference along the line of the middle finger. Movements of the thumb are described as abduction, adduction, extension, flexion and opposition (Figure 3). Active and passive ranges of movements should be elicited. Strength of various movements can be assessed using the MRC scale (Figure 4) or alternatively the composite movements of grip can be measured using a Jamar dynamometer and pinch with the pinch dynamometer. Joint stability is tested by stressing the collateral ligaments.

Features of Specific Conditions Affecting the Hand and Special Tests

Flexor tendon injury

History
Any laceration on the volar aspect of the hand may partially or completely divide a flexor tendon. The patient will complain of an inability to flex the digit or pain on flexion. Numbness indicates that a digital nerve has been damaged and this is often associ-
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Flexor tendon injury
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Examination
Record the zone of injury I-V. The integrity of each tendon must be established. Division of both tendons to a single digit will result in the pointing sign (Figure 6). The FPL, FCR, FCU, FDS and FDP tendons to the index all have separate muscle bellies. The FDP tendons to the middle, ring and little fingers share the same muscle belly (quadriga affect). Thus any block to the profundus flexion action in one of the ulnar 3 digits will tend to prevent the other 2 from flexing. This phenomenon can be used to separate out the sublimis action across the PIP joint and the profundus action across the DIP joint. (Figures 7 and 8). Tenderness on palpation along the flexor aspect of the digit may suggest the possibility of a partially divided tendon. When tendon movement against resistance causes pain then there may be a partial division. The sublimis tendons to the little fingers are frequently hypo-plastic and both sides should be tested.

Trigger finger / trigger thumb

History
In the neonate triggering usually involves the thumb and will be noticed as a fixed flexion deformity of the IP joint. Adults complain of pain and tenderness at the base of involved digits and a tendency for the finger to catch as the PIP joint is extended. Occasionally the finger may lock in flexion. Diabetic and rheumatoid patients are more prone to this condition.

Examination
In the child the flexion deformity of the IP joint of the thumb can sometimes be passively corrected and there is often a palpable nodule at the level of the A1 pulley. In trigger finger tenderness and occasionally crepitus is apparent at the A1
Advanced Examination Techniques in Orthopaedics

Leddy Classification of FDP Rupture

Type I – Avulsed FDP retract into palm
Type II – Tendon retracts to PIP joint level
Type III – A large bony fragment held in the distal pulley system. Lateral x-ray shows bony fragment just proximal to DIP joint

Figure 5  Leddy Classification of FDP Rupture.

Figure 6  Both flexor tendons of the index have been divided in Zone 2 resulting in the ‘Pointing’ sign.