Hand Injuries and their Assessment

Hand injury is a very common presentation both in primary care and in the accident and emergency department. Sporting injuries are particularly common and their incidence has increased in young people over the period of three decades.\(^1\) They may result in significant short-term and long-term impairment in function. One study found that patients who had sustained an acute hand injury were complaining of pain and cold sensitivity ten years after the event.\(^2\) It is essential that all hand injuries be assessed in a systematic manner and treated appropriately, in order to minimise the risk of permanent disability.

See also separate Wrist Fractures and Carpal Fractures and Dislocations articles.

Initial steps in assessing a hand injury

Step 1. History
A full history should be taken with particular reference to:

- The event which caused the injury.
- Whether the patient is left-handed or right-handed.
- Any previous history of damage/disease/surgery in the affected hand.
- Occupational history - eg, musician.
- Drug history - eg, warfarin.
- Tetanus vaccination status.
- Any other illnesses - eg, diabetes.

Step 2. Observation of the hand
Observe the affected hand prior to taking hold of it up to examine it. Look for:

- Jewellery: identify any jewellery liable to cause constriction if swelling develops - eg, rings.
- Symmetry and position in which the hand is held: with the patient's hand in the resting position, look for fingers that are flexed, suggesting damage to an extensor tendon, or extended, suggesting damage to a flexor tendon.
- Colour: look for cyanosis, pallor, bruising, blistering. If part or all of a finger is a different colour, pale or very red, this may suggest a digital nerve injury.
- Swelling of the hand.

Step 3. Vascular examination of the hand\(^3\)
Check the vascular status of the hand by feeling for the radial and ulnar pulses and assessing capillary refill.

Step 4. Sensory assessment of the hand\(^4\)
Damage to nerves is common and therefore potential damage to the three major nerves that supply the hand should be looked for, ie the radial nerve, the median nerve and the ulnar nerve. Testing of sensation using two-point discrimination (eg, with a bent paper clip) in three locations will allow for rapid testing of these nerves:

- The ulnar nerve - the fifth finger.
- The median nerve - the palmar aspect of the web space between the thumb and the first finger.
- The radial nerve - the dorsal surface of the proximal part of the first and second fingers.
Step 5. Motor assessment of the hand

To screen for nerve damage producing impairment of motor function:

- Ask the patient to hold the end of a pen using the tips of the fingers and the thumb together in a circle.
- Ask the patient to spread the fingers widely.
- Ask the patient to give you the ‘thumbs up’.

It is not possible to perform all these three tasks unless the ulnar, median and radial nerves are all intact. Any evidence of nerve damage will require specialist assessment and repair by a specialist surgeon if required.

Assessing potential tendon injuries

Check for flexion and extension of each finger at each joint. To check flexion, ensure that both deep and superficial flexor tendons are tested by holding the proximal interphalangeal joint still whilst asking the patient to flex the distal interphalangeal joint. Extension should be tested by asking the patient to place their palm on the table and lift each finger up one at a time. Tendon injuries should be referred to an appropriate specialist for repair.

Step 6. Assessment of bones and joints

Due to the exposed location and relatively small muscle bulk in the hand, injuries to the bones and joints of the hand are relatively common. Such injuries will include accidental amputation, fractures and dislocation injuries.

- Amputation injuries:
  - Amputation injuries account for approximately 5% of all hand injuries and many will be successfully re-implanted to allow for relatively normal function of the affected digit.
  - Any amputated digit should be quickly cooled as this will prolong its viability. Ideally, the digit should be wrapped in a saline-soaked swab, sealed in a plastic bag and placed on ice.
  - Amputated digits should not be frozen, or placed directly in any solution.

- Dislocation injuries:
  - Dislocations occur commonly in association with tendon injuries or fractures and therefore any suspected dislocation injury should be fully assessed and X-rayed before any attempt at reduction of the dislocation.

- Fractures:
  - Fractures to the hand, of all types (phalangeal fractures, metacarpal fractures and fractures to the small bones of the hand) are commonly seen.
  - Metacarpal fractures comprise 18-44% of all hand fractures; the fifth metacarpal is most commonly affected.
  - If a tendon injury or dislocation is suspected, X-ray examination of the hand should be performed to rule out associated fractures.
  - The scaphoid bone is the most commonly fractured bone of the wrist, frequently broken by falling on to an outstretched hand. Pain to palpation in the area of the ‘anatomical snuff box’ (ask the patient to abduct and extend the thumb; the scaphoid is situated in the ‘gutter’ created by the extensor pollicis longus tendon) suggests a scaphoid fracture. See the separate Wrist Fractures article.

Step 7. Immediate management

- Remove rings as soon as possible, as they may become stuck if the hand swells.
- Remove any foreign bodies.
- Locate any soft tissue injury or bleeding.
- Explore the wound, identifying the extent of damage to deeper structures - eg, tendons, vessels and nerves. Identify any foreign bodies.
- Clean, superficial lacerations may be debrided and sutured, taking care not to injure superficial extensor tendons. If the wound is contaminated, it may be preferable to clean it as much as possible, pack with fine mesh gauze and delay suturing for 3-5 days to prevent infection from developing.
- In suspected scaphoid fracture, pronation and supination of the wrist should be prevented in any patient with a suspected fracture, by splinting the wrist with a long arm cast or thumb spica splint.

Further reading & references

- Hand Menu; Wheeless’ Textbook of Orthopaedics
- Examinations of the Injured Hand: Electronic Textbook of Hand Surgery
- Diagnosis And Management Of Hand Injuries In The ED; EB Medicine