Diagnosis and immediate care of wrist and hand

David Warwick

BACKGROUND

About a fifth of injuries presenting to the accident and emergency department involve the hand or wrist. In this article, the more common injuries, and the rarer ones which should not be missed, are presented.

BASIC MANAGEMENT

Elevation: All injured hands should be elevated in a Bradford sling or roller towel to reduce swelling and pain.

Tetanus: Status should be checked.

Washout and dressings: All open wounds should be washed out with copious volumes of saline, under local anaesthetic if necessary. Betadine-soaked dressings will keep the wound clean enough until definitive surgery. A Polaroid photograph or digital picture will avoid unnecessary removal of dressings.

Remove rings: Use gel, a wrapped-around suture or even a ring cutter. Never leave a ring on: if it is tight now, it will be even tighter when the hand swells.

Amputations: The part should be placed in a plastic bag. This bag is put into another bag which contains crushed ice.

Examination: The vessels, nerves, tendons, joints and bones should be systematically examined.

Splint: A resting splint should be used when there is doubt about the diagnosis or when definitive treatment is likely to be delayed. A volar forearm cast is used, with the wrist extended to 30°, the metacarpophalangeal joints flexed to 90° and the interphalangeal joints straight. Specific splints should be tailored to the injury – a volar cast for a Smith's fracture, a dorsal cast for a Colles' fracture, neighbour strapping or aluminium/foam splints for displaced phalangeal fractures and so on.

Mr David Warwick is Consultant Hand Surgeon in the Department of Orthopaedics, Southampton University Hospitals, Southampton SO16 6HU

Surgery: Wounds which are deeper than the skin and beneath which a deeper injury cannot be excluded despite meticulous examination must be explored in the operating theatre.

THINGS NOT TO DO

- Do not blindly clip off bleeding vessels – nerves lie very close by and damage from the clip will preclude microvascular repair.
- Do not use tourniquets to stop bleeding – pressure will suffice.
- Do not use elastoplast spicas for thumb injuries. They offer minimal support, are very painful to remove and can cause a nasty allergic reaction.
- Do not pull out foreign bodies – nearby structures can be damaged.

INJURIES THAT SHOULD NOT BE MISSED

High pressure injection: The wound can look innocuous, with only a small puncture. However, the history – injection from a pressurized paint or grease gun – warns of a potentially very serious injury, with widespread necrosis. Urgent exploration and debridement is essential.

Punch injury to the knuckle joint: There is a small entry wound over the back of the metacarpophalangeal joint. The patient will often deny that he/she has punched someone. However, the wound always communicates with the joint and if the patient is discharged, he/she will reattend 1 or 2 days later with a septic arthritis. Intravenous augmentin should be administered, followed by exploration and washout of the wound and joint.

Flexor sheath infections: There is usually a history of a penetrating wound over the palmar surface of the finger. The finger is very swollen, held in a gently flexed posture, exquisitely tender over the flexor sheath, and very painful on passive extension. The sheath must be washed out copiously as soon as possible to avoid irretrievable stiffness.

Central slip injury: A small cut over the back of the interphalangeal joint is often associated with division of the central slip, the small tendon which extends the interphalangeal joint. When examined in the accident and emergency department, the joint will still straighten because the lateral bands will act as secondary extensors. However, over the next few days or weeks, the lateral bands slip sideways and palmarwards, leading to a 'boutonniere' deformity, which is very difficult to correct. All cuts over the proximal interphalangeal joint should be explored urgently.

Ruptured flexor digitorum profundus: This usually involves the ring finger of a sportsman whose fingertip has been caught on an opponent's shirt. The distal interphalangeal joint cannot be actively flexed. Treatment is surgical exploration and reattachment within the first few days of injury. If delayed, then a very complex (and often unsatisfactory) two-staged tendon graft is needed.

Scaphoid fracture: Because the fracture is usually in a straight plane, it can be missed on radiographs because of parallax error. If there is clinical suspicion, then the wrist is splinted and radiographs are repeated 2 weeks later, by which time the great majority of fractures should be obvious.

Scapholunate ligament rupture: This can be mistaken for a scaphoid injury because of a similar site of tenderness. Radiographs show widening of the scapholunate gap (*Figure 1*), especially on a clenched-fist anteroposterior view. Early repair is needed.

Lunate dislocation: Plain radiographs can be easily misread. The clue is that the lunate looks triangular rather than quadrilateral on the posteroanterior view, and the normal co-linear con-

Figure 1. Scapholunate dissociation.

Figure 2. Lunate dislocation.

gruity of the distal radius, lunate and capitate on the lateral view is lost (*Figure 2*). The lunate should be reduced as a matter of urgency to minimize the chance of avascular necrosis and median nerve damage.

Nail avulsion: The nail can be pulled from under the nail 'hood', often in association with a distal phalanx fracture in children. The nail should be carefully reduced into its socket under local anaesthetic; the fracture is then held with a thermoplastic splint.

COMMON INJURIES

Tendon

Mallet finger (avulsion of the extensor tendon) is treated with a thermoplastic splint, with the distal interphalangeal joint extended and the interphalangeal joint free. Those with bone fragments are treated for 6 weeks, those without bone fragments for 8 weeks constantly and then 4 weeks at night.

Extensor tendon injuries are explored and repaired. Splintage for 4 weeks followed by hand therapy usually produces a satisfactory result.

Flexor tendon injuries, particularly within the flexor sheath of the finger, need prompt treatment from an experienced surgeon and hand therapist to assure the best outcome.

Bone

All suspected fractures and dislocations should be radiographed before reduction. The precise treatment depends on the precise injury, and space precludes a full description in this article. If in doubt, a provisional reduction followed by a resting splint and referral to the hand clinic is the safest treatment.

Skin

Fingertip injuries, even quite severe ones, will often heal remarkably well by secondary intention beneath a semi-permeable dressing (Opsite, Smith & Nephew, Hull), which is changed only weekly. Exposed bone, or inadequate progress by secondary intention, may need a special skin flap. There is precious little spare skin in the hand, especially the back. Avoid the temptation to excise flaps of skin and then close tightly. A formal flap or skin graft is preferable.

Nerve

Injuries to the digital nerves or main nerve trunks are potentially very disabling. Any cut over the wrist or hand can cause a nerve injury. Unless meticulous clinical examination confidently excludes an injury, surgical exploration and microsurgical repair is required. Normal two-point discrimination (5–6 mm at the fingertip) means that an injury is unlikely.

Joint

A fall on the pronated-extended wrist can lead to many injuries – scaphoid, scapolunate, distal radius. The triangular fibrocartilage can be torn, presenting with tenderness over the ulnocarpal joint and a painful click on passive rotation. HM

KEY POINTS

- Some important injuries can be easily overlooked unless they are considered and unless the hand is meticulously examined.
- Simple splintage will keep the hand safe.
- Wounds deeper than the skin usually need exploration.

Further reading

American Society for Surgery of the Hand (2000) *Hand Surgery Update.* American Society for Surgery of the Hand, Rosemount

Smith PJ (2001) *Lister's The Hand – Diagnosis and Indications.* Churchill Livingstone, Edinburgh

Solomon L, Warwick D, Nayagem D (2001) *Apley's System of Orthopaedics.* Arnold, London