

Case 38 A lacerated wrist

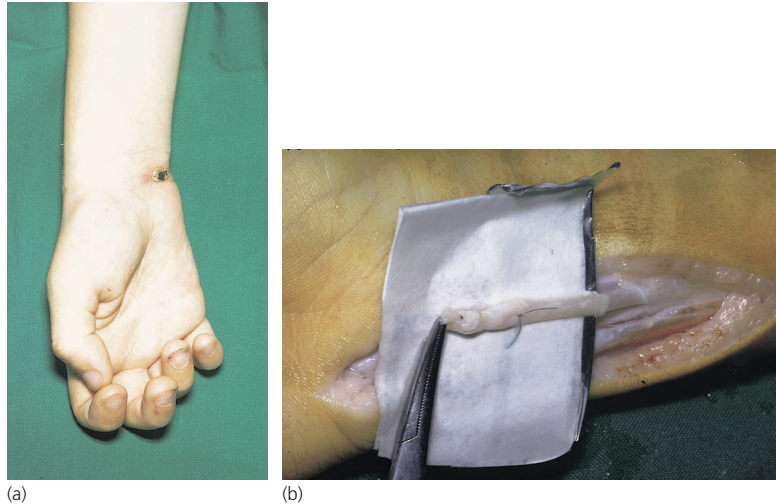


Figure 38.1

One of our laboratory technicians, a graduate aged 25 years, cut his right wrist on a fragment of broken glass that he had not noticed on the laboratory bench. He pulled out the shard of glass and realized at once that the ulnar part of his hand and his little finger were numb.

Which peripheral nerve must have been injured?

Obviously the ulnar nerve as it lies at the ulnar side of the wrist.

This is the commonest peripheral nerve to be damaged by an open wound; what is the anatomical basis of this fact?

The ulnar nerve lies quite superficially at the wrist, as it emerges to lie immediately on the radial side of the flexor carpi ulnaris tendon, which can be identified as the most ulnar of the tendons palpable and visible at the wrist. The nerve then crosses superficially to the flexor retinaculum (which protects the median nerve as this passes deep to

the retinaculum in the carpal tunnel) (Fig. 38.2). The ulnar nerve is accompanied on its radial side by the ulnar artery and its venae comitantes, which can also be lacerated in this type of injury, although fortunately not in this case.

What were the sensory and motor findings when the surgeon examined this young man's hand?

The sensory loss, both to pin-prick and light touch, comprised the ulnar border of the palmar aspect of the right hand and the palmar aspect of the little finger and ulnar border of the ring finger. The patient could not abduct or adduct his extended fingers. This was best demonstrated because he could not grip a piece of paper between any of his fingers with the hand placed flat on the table.

Describe the anatomical basis of these findings

The sensory supply to the hand comprises the following nerves (Fig. 38.3):

Part 2: Cases

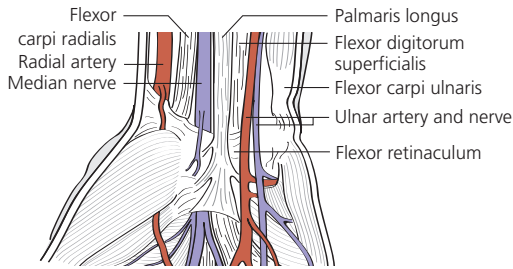


Figure 38.2 Structures on the anterior aspect of the wrist.

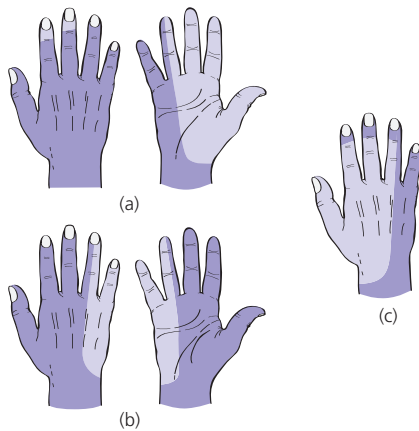


Figure 38.3 The usual cutaneous distribution (shown in pale blue) of (a) median, (b) ulnar and (c) radial nerves in the hand (considerable variations and overlap occur).

- The median nerve, which innervates the skin of the anterior aspects of the three and a half digits on the radial side.
- The radial nerve, which supplies the same distribution on the dorsal aspect.
- The ulnar nerve, which supplies the remaining one and a half digits on both their palmar and dorsal aspects. However, the branch of the ulnar nerve, which supplies the dorsal aspect of the hand and fingers (the dorsal cutaneous branch), arises from the main trunk of the nerve about a hand's breadth above the wrist, dives beneath the flexor carpi ulnaris and reaches the dorsum of the hand. This branch will escape injury, as in the present case,

when the nerve is damaged on the anterior aspect of the wrist.

On the motor side, the median nerve supplies the muscles of the thenar eminence (abductor pollicis brevis, flexor pollicis brevis and opponens pollicis) and the two radial lumbrical muscles. The ulnar nerve supplies all the remaining intrinsic muscles of the hand – the dorsal and palmar interossei, the three muscles of the hypothenar eminence, the adductor pollicis and the radial two lumbricals. (Note that the radial nerve supplies none of the intrinsic muscles of the hand.)

Figure 38.1 shows the hand in the typical deformity produced by this nerve lesion. What is this deformity called and how would you explain its anatomical basis?

Clawed hand (main en griffe). The intrinsic muscles of the fingers not only abduct and adduct the fingers, as in the clinical test described above, but also extend the interphalangeal joints. The fingers therefore lie at rest in the flexed position. However, the two radial lumbricals, supplied by the median nerve, are still functioning, so the deformity is less marked on the radial side.

The patient was operated on later the same day by a plastic surgeon with a special interest in peripheral nerve injuries. The ulnar nerve was exposed through a longitudinal incision and found to be completely divided, as shown in Fig. 38.1b. Its ends were freshened and it was repaired under the microscope using fine (9/0) nylon interrupted sutures to tack the epineural sheath together.

How are peripheral nerve injuries classified with regard to severity of the damage, and what is the rate of nerve regeneration?

The classification is into three degrees of injury:

- *Neurapraxia*: The nerve is contused but the fibres are intact; full recovery is anticipated.
- *Axonotmesis*: The axon and myelin sheath are injured without division of the perineural sheath.
- *Neurotmesis*: Complete division of the nerve, as in the present case.

Nerve regeneration takes place, under favourable conditions, at a rate of 1 mm a day. In this patient, fortunately, full recovery took place.