Ulnar nerve

The ulnar nerve is a nerve which runs near the ulna bone.

The ulnar collateral ligament of the elbow joint is in relation with the ulnar nerve.

The nerve is the largest unprotected nerve in the human body (meaning unprotected by muscle or bone), so injury is common. This nerve is directly connected to the little finger, and the adjacent half of the ring finger, supplying the palmar side of these fingers, including both front and back of the tips, perhaps as far back as the fingernail beds.

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This nerve can cause an electric shock-like sensation by striking the medial epicondyle of the humerus from posteriorly, or inferiorly with the elbow flexed. The ulnar nerve is trapped between the bone and the overlying skin at this point. This is commonly referred to as bumping one's "funny bone". This name is thought to be a pun, based on the sound resemblance between the name of the bone of the upper arm, the "humerus" and the word "humorous".

Alternatively, according to the Oxford English Dictionary, it may refer to "the peculiar sensation experienced when it is struck".

Branches

As it courses through the upper limb, it gives off several branches that serve different functions, including motor innervation to muscles and sensory innervation to the skin.

1. Muscular (Motor) Branches In the Arm:

The ulnar nerve does not supply any muscular branches in the arm itself (upper arm region).

In the Forearm:

Muscular branches to the flexor carpi ulnaris (FCU): This muscle flexes and adducts the wrist.

Muscular branches to the medial half of the flexor digitorum profundus (FDP): This muscle flexes the distal interphalangeal joints of the ring and little fingers. 2. Palmar Cutaneous Branch This branch arises in the forearm but does not cross the wrist. It provides sensory innervation to the skin of the medial side of the palm, which means it supplies the skin on the hypothenar eminence (the fleshy prominence on the palm's ulnar side). 3. Dorsal Cutaneous Branch This branch arises near the wrist and passes underneath the flexor carpi ulnaris tendon. It innervates the skin on the dorsal side (back) of the hand and gives sensory branches to the ulnar side of the dorsum of the hand, including the dorsum of the little finger and the ulnar half of the ring finger. 4. Superficial Branch of the Ulnar Nerve Cutaneous branches: Provide sensory innervation to the palmar aspect of the little finger and the medial half of the ring finger. Muscular branches: In some individuals, it can provide motor innervation to the palmaris brevis muscle, a small muscle in the hypothenar region. 5. Deep Branch of the Ulnar Nerve This is primarily a motor branch that innervates several muscles in the hand, including: Hypothenar muscles: Abductor digiti minimi, flexor digiti minimi brevis, and opponens digiti minimi. Interossei muscles: Both the dorsal and palmar interossei, which are involved in the abduction and adduction of the fingers. Lumbricals: Specifically the medial two lumbricals (associated with the ring and little fingers). Adductor pollicis: This muscle adducts the thumb. Part of the flexor pollicis

brevis: Only the deep head of this muscle is innervated by the ulnar nerve, with the superficial head typically innervated by the median nerve. Clinical Relevance The anatomy of the ulnar nerve and its branches is particularly important in surgeries involving the elbow, wrist, and hand. Conditions such as cubital tunnel syndrome (compression of the ulnar nerve at the elbow) and ulnar tunnel syndrome (compression at the wrist) can affect these branches, leading to sensory and motor deficits. Awareness of the branching patterns is crucial for surgeons to avoid nerve injury and ensure effective decompression procedures.

Anatomical studies

Majid et al. from Pennsylvania State University College of Medicine, Hershey, performed a cadaveric dissection of 48 elbow specimens as if performing a cubital tunnel release. They assessed the presence of the crossing motor branch of the ulnar nerve and measured the distance from the medial epicondyle to the branch takeoff and its target of innervation.

Of 48 specimens, 34 (71%) were noted to have a crossing motor branch at the compression area by the deep flexor carpi ulnaris muscle fascia (common aponeurosis). On average, the distance from the medial epicondyle to the branch originating from the ulnar nerve was 18.2 mm, and to the target muscle innervation was 28.4 mm.

Identifying this branch is important for performing a cubital tunnel release, and awareness of this anatomy during ulnar nerve decompression procedures may help avoid injury to this motor branch ¹⁾

Function

This nerve is mainly responsible for movement of the hand; despite passing through the forearm, it is only responsible for one and a half muscles there. Its primary role is to provide nerve function to the hand.

Ulnar nerve entrapment

Ulnar nerve entrapment.

Ulnar nerve neuroma

Ulnar nerve neuroma

Ulnar nerve transfer

see Ulnar nerve transfer.

Majid SS, Patel NT, Mrowczynski OD, Goldman E, Rizk EB, Harbaugh KS. The Crossing Motor Ulnar Nerve Branch at Elbow. Oper Neurosurg (Hagerstown). 2024 Apr 16. doi: 10.1227/ons.00000000001155. Epub ahead of print. PMID: 39222350.

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