

**THE DORSAL BRANCH OF THE ULNAR
NERVE: AN ANATOMIC STUDY**

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The dorsal branch of the ulnar nerve: An anatomic study

The dorsal branch of the ulnar nerve was dissected in 24 cadavers. The nerve arose from the medial aspect of the ulnar nerve at an average distance of 6.4 centimeters from the distal aspect of the head of the ulna and 8.3 centimeters from the proximal border of the pisiform. Its mean diameter at origin was 2.4 millimeters. The nerve passed dorsal to the flexor carpi ulnaris and pierced the deep fascia. It became subcutaneous on the medial aspect of the forearm at a mean distance of 5.0 centimeters from the proximal edge of the pisiform. The nerve gave an average of five branches with diameters between 0.7 and 2.2 millimeters. A better understanding of the anatomy of this nerve may help prevent nerve injury during surgical procedures, and can help in locating the nerve for repair of lacerations or administration of local anesthetics for regional nerve blocks. (J HAND SURG 1990;15A:603-7.)

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The dorsal branch of the ulnar nerve supplies sensibility to the dorso-ulnar aspect of the hand, the dorsum of the small finger, and the dorso-ulnar aspect of the ring finger. Although mentioned in current anatomy textbooks,¹⁻⁸ its size and specific topographical course is only briefly discussed and few anatomic studies have been reported.⁹⁻¹¹ An understanding of the anatomy and course of this nerve may help prevent nerve injury during surgical procedures in this region. The purpose of this study was to more clearly delineate the course of the dorsal branch of the ulnar nerve and quantify the number and size of its branches.

Materials and methods

Twenty-four fresh adult cadaver upper extremities were dissected under $\times 3.5$ magnification. The ulnar

nerve was identified in the distal third of the forearm. The dorsal branch of the ulnar nerve was identified and dissected in a proximal-to-distal direction, noting the branch points and isolating the terminal branches. Sketches were made and photographs taken. Measurements of the size of the nerve at its origin and points of branching were obtained with electronic digital calipers (Cole-Parmer, Chicago, Ill.). Measurements were made to the nearest 0.1 mm. The distances from the point of nerve origin (off the ulnar nerve proper) to the distal end of the ulna and from the nerve origin to the proximal edge of the pisiform were measured. These bony landmarks were selected because of their ease of palpation in a clinical setting. The length of each ulna was measured to express measurements in terms of percentage of total ulnar length. The point at which the nerve pierced the deep fascia to become subcutaneous was noted, and its distance from the proximal edge of the pisiform was measured. Communication with neighboring nerves was noted. Changes in nerve position relative to the head of the ulna were observed after supination and pronation of the forearm.

Results

The dorsal branch of the ulnar nerve arose from the medial aspect of the ulnar nerve at an average distance of 6.4 cm (SD = 2.3) proximal to the distal aspect of the ulnar head and 8.3 cm (SD = 2.4) from the proximal border of the pisiform (Fig. 1). This point of nerve origin corresponded to a point located at the distal 26%

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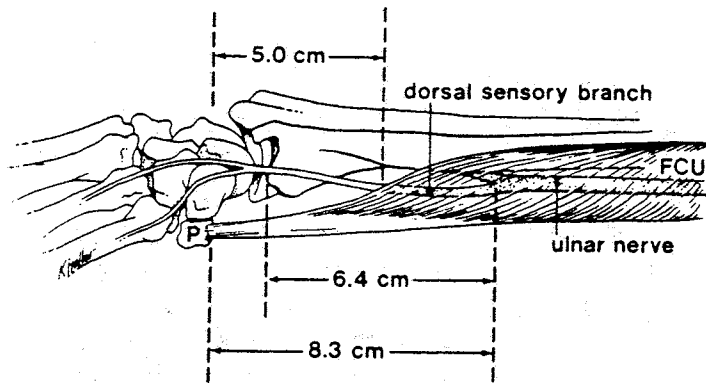


Fig. 1. The ulnar aspect of the distal forearm and carpus, showing the dorsal branch of the ulnar nerve and mean distances to palpable bony landmarks. Mean distance from the point of origin of dorsal branch to distal head of ulna was 6.4 cm. Mean distance from point of origin of dorsal branch to proximal edge of pisiform (*P*) was 8.3 cm. Mean distance from point of nerve emergence from medial aspect of flexor carpi ulnaris (where nerve became subcutaneous) to proximal edge of pisiform (*P*) was 5.0 cm. Though not depicted in this drawing, distal branching often occurred proximal to the ulnar head. *FCU*, Flexor carpi ulnaris.

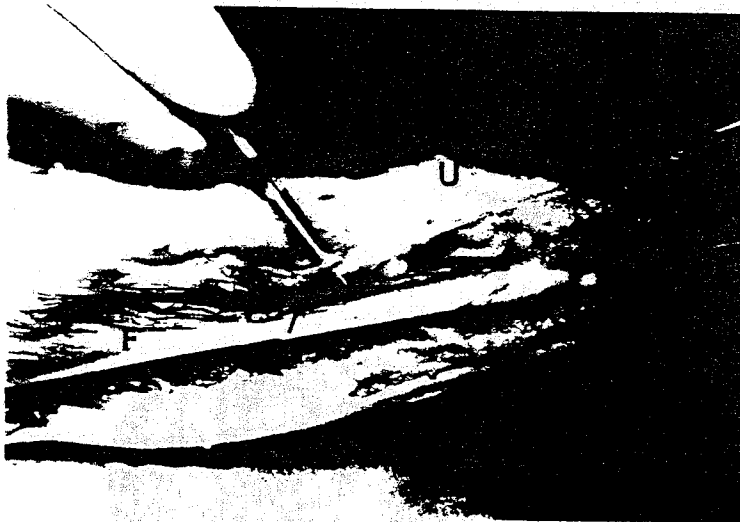


Fig. 2. Ulnar view of distal forearm and hand, showing dorsal branch of the ulnar nerve (lifted with forceps). The nerve emerged from the medial border of the flexor carpi ulnaris (*arrow*). This occurred at a point approximately 5 cm proximal to the pisiform (*P*). Forceps on the right marks the insertion of the flexor carpi ulnaris onto the pisiform, *F*. Flexor carpi ulnaris; *U*, head of the ulna.

of the total ulnar length. The cross-sectional shape of the nerve at its origin was round or slightly oval, with a mean diameter of 2.4 mm (range, 1.6 to 3.5 mm). The nerve continued distally and medially, passing dorsal to the flexor carpi ulnaris. It emerged at the dorso-medial border of the flexor carpi ulnaris at a mean distance of 5.0 cm (SD = 1.8) from the proximal edge

of the pisiform (Figs. 1 through 3.) At this point, it pierced the deep fascia and became subcutaneous on the medial aspect of the distal forearm. Proximal to the wrist, the nerve provided two to three branches. A branch piercing the capsule of the ulnocarpal joint was usually present (Fig. 4). With the forearm supinated, the nerve branches passed along the medial aspect of

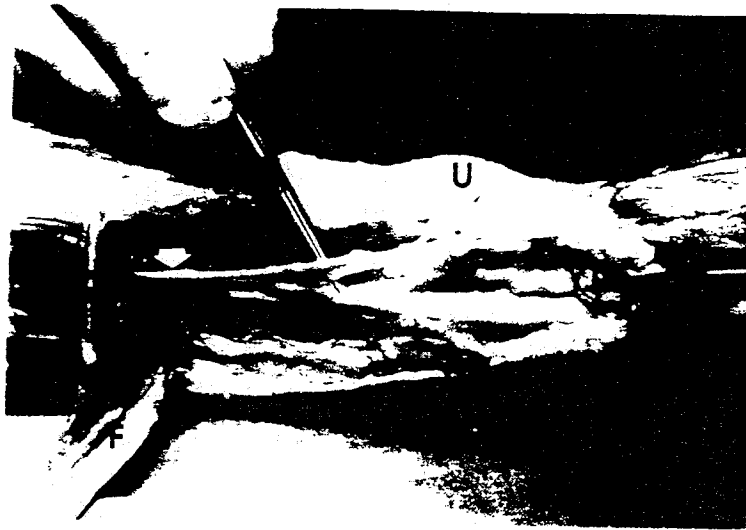


Fig. 3. Similar view as in Fig. 2, with the flexor carpi ulnaris (*F*) reflected. The dorsal branch of the ulnar nerve is demonstrated with forceps near the center of photo. The point of origin of the dorsal branch of the ulnar nerve is visible (*white arrow*), as it leaves the ulnar nerve proper. *Black arrow* shows continuation of ulnar nerve proper. The point of nerve origin occurred at an average of 8.3 cm from the pisiform (*P*). *U*, Head of the ulna.

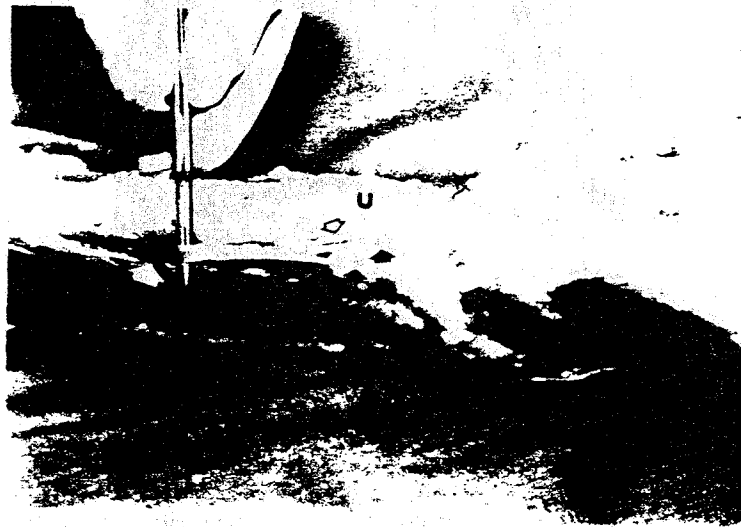


Fig. 4. Dorso-ulnar view of distal forearm and hand, demonstrating branches of the nerve on the dorsum of the wrist and hand (*black arrows*). Note branch to the ulnocarpal joint (*open arrow*). *U*, Head of the ulna. The point of emergence of the nerve from the medial edge of the flexor carpi ulnaris is demonstrated (*white arrow*). At this point the nerve pierced the deep fascia and became subcutaneous on the medial aspect of the forearm.

the head of the ulna near the widest diameter of the ulnar head (equator of the ulnar head). With the forearm pronated, the nerve branches displaced slightly palmarly to pass along the palmo-ulnar aspect of the ulnar

head. In the hand, an additional one or two branches were given off. Total number of branches averaged 5, with a range from 3 to 9. Two branches typically went to the small finger, one to the dorso-ulnar aspect of the

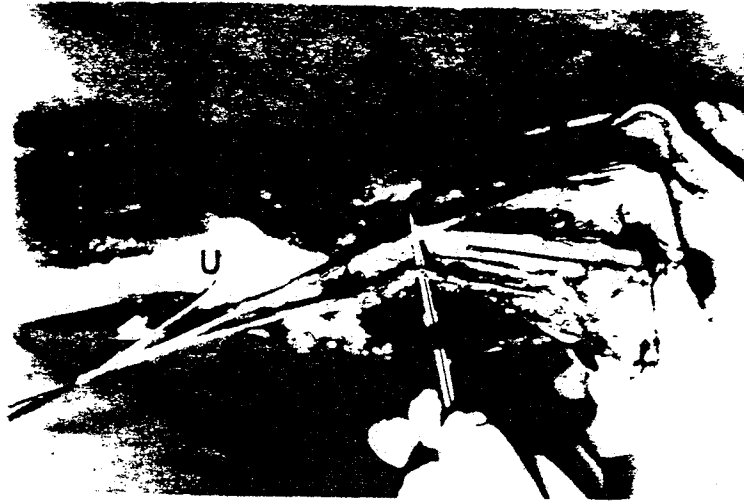


Fig. 5. Dorso-ulnar view of the wrist and hand, demonstrating branching of the dorsal branch of the ulnar nerve. Note branch to the ulnocarpal joint (white arrow). Two branches are noted extending to the digits (crossing the forceps on the right). U, Head of the ulna.

ring finger, and one or two branches to the dorso-ulnar aspect of the carpus and hand. The diameter of the branches ranged from 0.7 to 2.2 mm (Fig. 5). In one specimen, a branch communicated with a subcutaneous branch of the radial nerve on the dorsum of the hand. In one specimen, the dorsal branch of the ulnar nerve was absent. The branches were traceable to the level of the proximal interphalangeal joint (PIP), where they arborized and became too small to trace further. There were no other communicating branches identified between the dorsal branch of the ulnar nerve and neighboring nerves, including the ulnar nerve proper, the palmar cutaneous branch of the ulnar nerve,¹¹ or the nerve of Henle.¹²

Discussion

We have attempted to more clearly describe the course and size of the dorsal branch of the ulnar nerve. Few anatomic studies have been previously reported, with quantitative reference to local bony landmarks lacking.

Many open surgical procedures on the ulnar side of the wrist and hand have been described. These procedures may place the dorsal branch of the ulnar nerve at risk for injury. Arthroscopy of the wrist has recently received attention, with mention and concern for the location of this nerve during the placement of arthroscopy portals.¹³⁻¹⁶ Use of a branch of this nerve for a local nerve graft has also been described.¹⁷

A variant of the palmar cutaneous branch of the ulnar

nerve that originated from the dorsal branch of the ulnar nerve has been previously described.¹¹ This variant was not identified in our series.

A better understanding of the anatomy and course of the dorsal branch of the ulnar nerve may aid in the prevention of nerve injury during surgical procedures in its vicinity. In addition, this information may aid in locating the nerve for repair or graft, or for the administration of local anesthetics in closed regional nerve blocks.

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