Compression of the deep branch of the ulnar nerve—A case report

This is a case report of an entrapment neuropathy of the deep motor branch of the ulnar nerve as it exits from Guyon’s canal, which caused paralysis without ulnar sensory loss of all the ulnar innervated intrinsic muscles except the abductor digiti quinti. (J HAND SURG 8:72-4, 1983.)

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Signs of ulnar nerve entrapment at the wrist may be purely motor, sensory, or a mixture of both, depending on the level of compression.1 We report entrapment neuropathy of the deep motor branch of the ulnar nerve.

Case report

A 36-year-old right-handed male pipefitter sustained blunt trauma to the ulnar aspect of the right hypothenar eminence while removing packing from a pipe. Mild pain, weakness of grip, and loss of key and fine pinch were his symptoms when seen 3 months after injury. The patient did not complain of paresthesias.

Examination revealed atrophy of the interosseous muscles, particularly the first dorsal interosseous muscle. There was no atrophy of the abductor digiti quinti or thenar atrophy. There was mild clawing of the ring and small fingers. On palpation there was tenderness and a test for Tinel’s sign just distal to the hook of the hamate was positive. Two-point discrimination in all fingertips was less than 4 mm and extrinsic motor examination revealed excellent strength in the flexor carpi ulnaris as well as the profundus to the ring and small fingers. The abductor digiti quinti was normal. Tests from Froomen’s sign and Jeanne’s sign were positive. Pinch strength on the affected dominant right side was 9 pounds compared to 25 pounds on the left. Radiographs, including a carpal tunnel view, were normal.

Electromyography showed fibrillation potentials at rest in all the interossei and abductor pollicis muscles. Normal motor unit action potentials were found in the abductor digiti quinti and ulnar innervated extrinsic muscles. Clinical and electrodiagnostic studies showed entrapment of the deep motor branch of the ulnar nerve.

Surgical exploration showed that the sensory branch of the ulnar nerve and the motor branch of the abductor digiti quinti were normal and the motor branch of the ulnar nerve was

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Fig. 3. View through the operating microscope (9×) showing the pisohamate hiatus. The tendinous arch must be divided to visualize the motor branch beyond the hiatus. The branch to abductor digiti quinti arises from the deep branch proximal to the level of this photograph.

Compression of the ulnar nerve at the wrist was first described by Hunt in 1908. He attributed the palsy to occupational neuritis and the three patients he described had motor paralysis of the deep motor branch of the ulnar nerve.

The ulnar nerve enters the hand through the canal of Guyon. In transverse section, the canal is a flattened triangular space with the apex pointing radially (Fig. 1). The floor is formed by the transverse carpal liga-

ment and some fibers of the opponens digiti minimi and flexor digiti quinti. The roof is formed by the palmar carpal ligament, a continuation of the forearm fascia.

The flexor carpi ulnaris tendon, the pisiform, and the origin of the abductor digiti quinti form the ulnar border and the hamate bone the radial border. The ulnar artery, vein, and nerve are the structures within the canal (Fig. 2). The branch to the abductor digiti quinti arises from the ulnar nerve proximal to the deep branch, but variations have been reported. The deep branch innervates all other hypothenar muscles, lumbricals to the ring and small finger, all the interossei, the adductor pollicis, and the deep head of the flexor pollicis brevis. In 1969, Hayes et al. described a ligamentous band passing from the pisiform to the hook of the hamate, lying anterior to the deep motor branch of the ulnar nerve (Fig. 3). Uriburu et al. expounded on Hayes’ work. They showed that the flexor digiti quinti brevis muscle originated from the firm, concave, musculotendinous arch described earlier by Hayes. This arch and the pisohamate ligament, which lies on the floor of Guyon’s canal, are the boundaries of a narrow oblique opening through which the deep branches of the ulnar nerve and artery leave the canal and enter the deep palmar space. The deep motor branch bends dorsally...
A morphologic study of the relationship of collateral ligaments to growth plates in the digits

The precise origin and insertion of collateral ligaments to metacarpals and phalanges prior to growth plate closure is not clearly described in textbooks or journals. This study delineates such attachments by gross dissection and microscopic evaluation. Middle and distal phalangeal attachments are to epiphyses and metaphyses, whereas attachments at the metacarpophalangeal joint are almost entirely to the epiphyses of metacarpal and proximal phalanges. The clinical significance of these differences is not known. (J HAND SURG 8:74-9, 1983.)

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Study of the anatomic relationship of the digital collateral ligaments to the digital growth plates was undertaken because of an interest in fractures and epiphyseal injuries in the fingers of children. A literature search having produced no information on this subject, the study was begun.

Material and methods

Amputation specimens of the right hand of a 10-year-old boy and the left hand of a 13-year-old girl were kept frozen until time was available for dissection. They were thawed, and each collateral ligament was carefully dissected with binocular loop magnification. Each finger was then disarticulated at its

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over the pisohamate ligament and beneath the fibrous arch of the flexor digiti quinti brevis before entering the deep palmar space. The deep motor branch then turns radialeward around the hook of the hamate and passes under the origin of the flexor digiti quinti brevis and opponens digiti quinti muscles to innervate the intrinsic muscles.

Treatment of the ulnar nerve compression at Guyon's canal may require surgery and release requires division of the palmar carpal ligament and removal of any space occupying lesions. Our patient was treated by division of the fibrous arch of the flexor digiti quinti brevis and neurolysis of the deep motor branch. The result was satisfactory.