The Distal Ulnar Tunnel

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The distal ulnar tunnel was described by anatomist and urological surgeon Felix Guyon in 1861 based on his anatomical dissections investigating the unique and small protrusion of fatty tissue into the distal forearm noted when pressure was applied to the hypothenar eminence (“Ollier phenomenon”).¹ The triangular-shaped “loge” contained the ulnar nerve and artery with accompanying veins; Guyon postulated that this space may be a potential site of compression for the ulnar nerve, although this concept was presented more formally by others such as Hunt (1908),² Grantham (1966),³ and, subsequently, by McFarlane et al through their considerations of the pisohamate tunnel.⁴

The distal ulnar tunnel, or the Guyon canal, is ~4–4.5 cm in length and begins at the proximal edge of the volar carpal ligament in the volar-ulnar forearm and ends at the fibrous arch of the hypothenar muscles. The distal ulnar tunnel is defined by the flexor carpi ulnaris, the pisiform, and the abductor digiti minimi as its medial wall and by the transverse carpal ligament and the hamate as its lateral margin. The floor of the tunnel consists of the flexor digitorum profundus tendons in the distal forearm, the transverse carpal ligament, the pisohamate and pisotriquetral ligaments, and the opponens digiti minimi. The roof of the tunnel includes the volar carpal ligament, palmaris brevis muscle, and hypothenar fat (►Figure 1).⁵

Clinically, the distal ulnar tunnel has been divided into three zones.⁵ Zone 1 begins at the proximal aspect of the volar carpal ligament, ~2 cm proximal to the pisiform, and ends at the bifurcation of the ulnar nerve, ~1 cm distal to the pisiform. Nerve pathology typically involves combined motor and sensory deficit. Zone 2 follows the deep motor branch to the fibrous arch of the hypothenar intrinsic muscles, and Zone 3 involves the sensory branch of the ulnar nerve, which provides sensation to the small finger and (typically) to the ulnar aspect of the ring finger as well as providing motor innervation to the palmaris brevis muscle. Compressive nerve pathologies in Zone 2 and Zone 3 involve motor and sensory deficits, respectively.

References

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Figure 1 Close-up, distal view of the distal ulnar artery and ulnar nerve to demonstrate the relationship of the distal ulnar tunnel and the carpal tunnel. The ulnar nerve (un) is dorsal and ulnar to the ulnar artery (ua); both structures course volar to the transverse carpal ligament (TCL) and are dorsal to the volar carpal ligament (*). (© 2004 Leversedge FJ, Goldfarb CA, Boyer MI. Reprinted with permission: Leversedge FJ, Goldfarb CA, Boyer MI. *A Pocketbook Manual of Hand and Upper Extremity Anatomy – Primus Manus*. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins, 2010:103.)

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