hand surface anatomy dorsal

hand surface anatomy dorsal refers to the detailed study of the structures found on the back (dorsal) side of the human hand. This area is essential for medical professionals, students, artists, and anyone interested in understanding the complexity of the human hand. In this comprehensive guide, we will explore the anatomy, including bones, tendons, nerves, blood vessels, and skin landmarks that make up the dorsal surface of the hand. You will learn about the specific roles each structure plays, common clinical considerations, and practical examination techniques. This article is designed to provide authoritative information in an easy-to-read, SEO-optimized format, making it ideal for both learning and reference. Whether you are preparing for exams, clinical practice, or artistic anatomy studies, this guide will offer valuable insights into the hand's dorsal surface anatomy.

Overview of Dorsal Hand Surface Anatomy

The dorsal surface of the hand is the back side, opposite the palm, and features unique anatomical characteristics. It serves as a protective area for vital structures such as tendons, nerves, and blood vessels. Understanding dorsal hand surface anatomy is crucial for diagnosing clinical issues, performing surgical interventions, and improving artistic representations of the hand. The dorsal aspect is distinguished by visible veins, tendons, and bony prominences, especially when the fingers are extended. Key anatomical elements include the metacarpal bones, extensor tendons, superficial veins, and sensory nerves. This region is less padded compared to the palmar side, making its structures more palpable and susceptible to injury.

Bony Landmarks of the Dorsal Hand

The dorsal hand is supported by a framework of bones that provide structure and attachment points for tendons and ligaments. Recognizing these bony

landmarks is fundamental for physical examination and injury assessment.

Carpal Bones

Eight carpal bones form the wrist and are partially palpable on the dorsal aspect. These bones are arranged in two rows and provide stability and movement at the wrist joint. The most notable dorsal carpal bones include the scaphoid, lunate, and triquetrum.

Metacarpal Bones

The five metacarpal bones extend from the carpal bones to the base of the fingers. Their dorsal surfaces are easily felt, especially the metacarpal heads, which become prominent when the fist is clenched. The spaces between these bones, called intermetacarpal spaces, are significant for tendon movement.

Phalanges

Each finger contains three phalanges (proximal, middle, distal), except the thumb, which has two. The dorsal aspect of the phalanges forms the knuckles, which are visible and palpable when the fingers are flexed.

- Carpal bones: scaphoid, lunate, triquetrum, others
- Metacarpal bones: five in total, forming the hand’s framework
- Phalanges: three per finger (two for thumb)

Tendons and Muscles on the Dorsal Surface

The dorsal hand is characterized by prominent extensor tendons and minimal muscle bulk. These tendons are responsible for extending the fingers and wrist, playing a crucial role in hand movements and dexterity.

Extensor Tendons

The extensor tendons are the most visible and palpable structures on the dorsal surface. They originate from the forearm extensor muscles and pass over the wrist and hand to attach to the phalanges. The main tendons include:

- Extensor digitorum: extends the four fingers
- Extensor indicis: extends the index finger

- Extensor digiti minimi: extends the little finger
- Extensor pollicis longus and brevis: extend the thumb
- Extensor carpi radialis longus and brevis: extend and abduct the wrist

Dorsal Interossei Muscles

Between the metacarpal bones lie the dorsal interossei muscles. These muscles are responsible for finger abduction (spreading fingers apart). Although they are not directly visible on the surface, their actions can be observed during hand movement.

Nerve Supply to the Dorsal Hand

The dorsal hand surface receives its sensory innervation from branches of the radial, ulnar, and median nerves. Accurate knowledge of this nerve distribution is vital for diagnosing nerve injuries and understanding loss of sensation patterns.

Radial Nerve

The superficial branch of the radial nerve supplies the dorsal aspect of the lateral three and a half fingers (excluding the fingertips) and the corresponding hand area. This includes most of the dorsum of the hand, except the area supplied by the ulnar and median nerves.

Ulnar Nerve

The dorsal branch of the ulnar nerve innervates the skin over the medial one and a half fingers (little finger and half of the ring finger) and the adjacent hand dorsum.

Median Nerve

The median nerve contributes minimally to the dorsal surface, mainly supplying the dorsal aspects of the fingertips of the index, middle, and half of the ring finger.

- Radial nerve: majority of dorsal hand and lateral fingers
- Ulnar nerve: medial side of dorsal hand
- Median nerve: dorsal fingertips

Blood Vessels of the Dorsal Hand

The dorsal hand’s vascular supply is primarily through the dorsal carpal arch, formed by branches of the radial and ulnar arteries. Prominent superficial veins are also visible and serve as landmarks for clinical procedures.

Dorsal Carpal Arch

The dorsal carpal arch is an arterial network across the back of the wrist. It gives rise to the dorsal metacarpal arteries, which supply blood to the dorsal surfaces of the hand and fingers.

Superficial Veins

The dorsal venous network is easily visible beneath the skin, especially in thin individuals. This network drains into the cephalic and basilic veins, frequently used for intravenous access and blood sampling.

Skin and Surface Landmarks

The skin on the dorsal hand is thin and mobile, allowing for the easy identification of underlying structures. Various surface landmarks help clinicians and artists accurately locate anatomical features.

Visible Tendons and Veins

Extensor tendons become prominent when the fingers are extended. The dorsal venous network is often visible, creating a roadmap for venipuncture and other medical procedures.

Knuckles and Joints

The metacarpophalangeal (MCP) and interphalangeal joints form the knuckles, which are visible and palpable on the dorsal surface. These landmarks are important for assessing joint movement and detecting deformities.

Clinical Relevance and Common Conditions

Understanding hand surface anatomy dorsal is critical in diagnosing and managing injuries, diseases, and conditions affecting the dorsal hand.

Knowledge of this anatomy aids in detecting fractures, tendon injuries, and nerve damage.

Common Injuries

The dorsal hand is prone to lacerations, fractures of the metacarpals and phalanges, and extensor tendon injuries. Dorsal hand swelling and deformity often indicate trauma.

Pathological Conditions

Conditions such as rheumatoid arthritis, osteoarthritis, and dorsal hand cysts frequently affect the dorsal structures. These conditions can cause swelling, pain, and reduced hand function.

- Metacarpal fractures
- Extensor tendon injuries
- Nerve compressions
- Arthritis and cysts

Examination Techniques for the Dorsal Hand

A thorough examination of the dorsal hand surface involves inspection, palpation, and functional assessment. These techniques help identify abnormalities and guide clinical decisions.

Inspection

Visual inspection reveals swelling, deformity, skin changes, and the prominence of veins and tendons. Careful observation during finger movement can demonstrate tendon function.

Palpation

Palpation allows for assessment of bony landmarks, joint tenderness, tendon integrity, and soft tissue swelling. Identifying precise anatomical features is essential for accurate diagnosis.

Functional Assessment

Functional tests, such as finger extension and abduction, evaluate the integrity of extensor tendons and dorsal interossei muscles. Sensory testing assesses the nerve supply and detects any loss of sensation.

Summary of Key Examination Steps

- Observe for deformity, swelling, and visible tendons/veins
- Palpate bones, joints, and tendons
- Test finger and wrist extension
- Perform sensory testing on the dorsal surface

Q: What structures are most prominent on the dorsal surface of the hand?

A: The most prominent structures on the dorsal hand surface are the extensor tendons, metacarpal bones, and dorsal venous network, all of which are visible or palpable, especially with finger extension.

Q: Which nerves supply sensation to the dorsal hand?

A: The dorsal hand receives sensory innervation mainly from the superficial branch of the radial nerve, the dorsal branch of the ulnar nerve, and a small contribution from the median nerve to the dorsal fingertips.

Q: What is the clinical significance of the dorsal venous network?

A: The dorsal venous network is clinically important for intravenous access, blood sampling, and as a landmark for certain surgical procedures due to its superficial and accessible location.

Q: How can you identify metacarpal fractures on the dorsal hand?

A: Metacarpal fractures often present with visible swelling, deformity, and tenderness over the affected metacarpal bone, sometimes accompanied by impaired finger movement.

Q: Why are extensor tendon injuries more common on

the dorsal hand?

A: The dorsal hand has minimal soft tissue coverage over the extensor tendons, making them more susceptible to injuries from cuts, trauma, or impact.

Q: What is the function of the dorsal interossei muscles?

A: The dorsal interossei muscles are responsible for finger abduction, allowing the fingers to spread apart, and they assist in fine motor control of the hand.

Q: What are the main blood vessels supplying the dorsal hand?

A: The dorsal carpal arch, formed by branches of the radial and ulnar arteries, and the dorsal metacarpal arteries are the main arterial suppliers, while the dorsal venous network handles venous drainage.

Q: Which joints are visible as knuckles on the dorsal hand?

A: The metacarpophalangeal (MCP) joints and the interphalangeal joints are visible as knuckles on the dorsal surface, especially when the fingers are flexed.

Q: How is the skin on the dorsal hand different from the palmar side?

A: The skin on the dorsal hand is thinner, more mobile, and less padded compared to the palmar side, making veins and tendons more visible.

Q: What examination techniques are crucial for the dorsal hand?

A: Key techniques include visual inspection, palpation of bones and tendons, functional movement tests, and sensory evaluation to assess the integrity of dorsal hand structures.

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