

# AI-01615 DDx Numb Hands

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Ddx numb hands. Explain the pathophysiology

## Differential Diagnosis (Ddx) of Numb Hands

Numbness in the hands can result from various causes involving the nervous system, blood flow, or systemic disease. Here's a breakdown of common differentials and their pathophysiology:

### 1. Carpal Tunnel Syndrome (CTS)

Pathophysiology:

Compression of the median nerve at the wrist (carpal tunnel). The tunnel becomes narrowed or contents swell (inflammation, fluid retention, etc.), leading to nerve ischemia and demyelination.

- Area: Palmar side of thumb, index, middle, and radial half of ring finger.
- Causes: Repetitive wrist use, hypothyroidism, pregnancy, diabetes.

### 2. Cervical Radiculopathy

Pathophysiology:

Nerve root compression in the cervical spine (commonly C6, C7) due to herniated disc or spondylosis. This disrupts sensory transmission along the dermatome.

- Area: Depends on affected root; can radiate from neck to hand.
- Clues: Neck pain, worsens with neck movement (Spurling's sign).

### 3. Thoracic Outlet Syndrome (TOS)

Pathophysiology:

Compression of brachial plexus (neurogenic TOS) or subclavian vessels (vascular TOS) between clavicle and first rib or in scalene triangle. Leads to nerve ischemia

and sensory changes.

- Area: Whole hand or ulnar side typically.
- Clues: Worsens with arm elevation, swelling or discoloration.

#### **4. Peripheral Neuropathy**

Pathophysiology:

Damage to peripheral nerves due to metabolic, toxic, or inflammatory causes. Common in diabetes—due to chronic hyperglycemia causing microvascular damage, oxidative stress, and demyelination.

- Area: Glove-like distribution.
- Clues: Bilateral, symmetrical, with burning/tingling.

#### **5. Ulnar Nerve Entrapment (Cubital Tunnel Syndrome)**

Pathophysiology:

Compression of the ulnar nerve at the elbow (cubital tunnel). Repetitive elbow flexion or resting on elbows stretches and compresses the nerve.

- Area: 4th and 5th digits.
- Clues: Weak grip, muscle wasting in severe cases.

#### **6. Multiple Sclerosis (MS)**

Pathophysiology:

Autoimmune demyelination in the central nervous system disrupts signal transmission, including sensory tracts.

- Area: Can affect one or both hands.
- Clues: Other neurological symptoms (vision, gait, bladder).

#### **7. Stroke (Ischemic or Hemorrhagic)**

Pathophysiology:

Interruption of blood flow to sensory areas of the brain (parietal lobe, thalamus). Sensory deficits usually unilateral and sudden.

- Area: Contralateral hand/arm (face may be involved).

- Clues: Weakness, aphasia, facial droop.

## **8. Raynaud's Phenomenon**

Pathophysiology:

Vasospasm of small arteries in response to cold/stress → ischemia → numbness.

- Area: Fingertips, bilateral or asymmetric.
- Clues: Color changes (white → blue → red).

## **9. B12 Deficiency (Subacute Combined Degeneration)**

Pathophysiology:

B12 deficiency causes demyelination of dorsal columns and lateral corticospinal tracts in the spinal cord → sensory and motor symptoms.

- Area: Hands and feet (stocking-glove).
- Clues: Ataxia, memory loss, anemia.

Would you like this list prioritized based on unilateral vs bilateral symptoms, chronicity, or occupation/exposure risk?