MUSCULOSKELETAL NEUROLOGICAL NGN NCLEX 2026

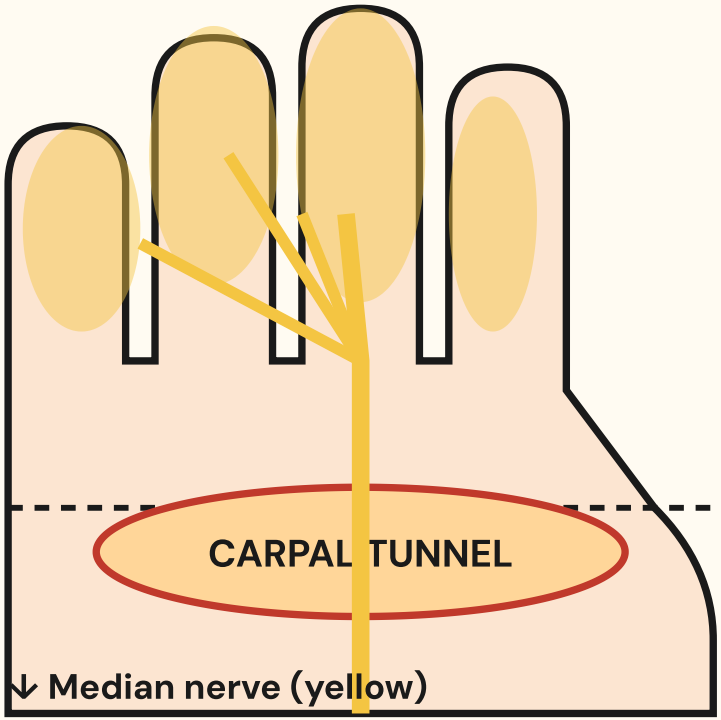
Carpal Tunnel Syndrome

Median Nerve Compression at the Wrist — Recognition, Priority Care & Surgical Management

1 Definition & Overview

Carpal Tunnel Syndrome (CTS) is the most common **peripheral compression neuropathy**, caused by entrapment of the **median nerve** as it passes through the carpal tunnel of the wrist.

- The carpal tunnel is a narrow passageway formed by **carpal bones** (floor & sides) and the **transverse carpal ligament** (roof).
- Contains the **median nerve** + **9 flexor tendons** — any swelling raises pressure and pinches the nerve.
- 3× more common in **women**; peak age 40–60.
- **Risk factors:** repetitive wrist motion (typing, assembly line), pregnancy (fluid retention), **diabetes**, **hypothyroidism**, **rheumatoid arthritis**, obesity.



MEDIAN NERVE supplies (yellow):

- Thumb
- Index finger
- Middle finger
- Lateral half of ring finger

⚠ **PINKY = SPARED**

(Pinky = ulnar nerve)

Anatomy of the carpal tunnel — note the median nerve distribution covers the thumb, index, middle, and half of the ring finger. The pinky is supplied by the ulnar nerve.

2 Pathophysiology — Step-by-Step

Inflammation or swelling within the rigid carpal tunnel raises tissue pressure, compressing the median nerve and producing ischemia, demyelination, and eventually axonal damage.

1. Repetitive motion / trauma / fluid retention / inflammation
2. Swelling of synovium & flexor tendons inside tunnel
3. ↑ Pressure inside fixed, narrow carpal tunnel
4. Median nerve compression → ischemia & demyelination
5. Sensory + motor deficits → thenar atrophy if untreated

3 Signs & Symptoms

🟢 EARLY (Sensory)

- **Numbness & tingling** in thumb, index, middle, lateral half of ring finger
- **Worse at night** — wakes patient from sleep (classic!)
- Relieved by **shaking the hand** ("flick sign")
- Pain may radiate **up the forearm**
- Burning, "pins & needles" sensation

🔴 LATE (Motor) — RED FLAGS 🚨

- **Thenar muscle atrophy** (flat base of thumb)
- **Weak grip** — dropping objects
- Inability to **oppose the thumb** to pinky
- Loss of fine motor skills (buttoning shirts, writing)
- Permanent nerve damage if untreated

📋 Diagnostic Bedside Tests

🔨 Tinel's Sign

Tap over the median nerve at the wrist.
POSITIVE: tingling/electric shock sensation in median nerve distribution.

🙏 Phalen's Test

Flex wrists at 90° (back-of-hands together) for **60 seconds**.
POSITIVE: numbness/tingling reproduced.

Definitive test: **Nerve conduction studies (NCS) + Electromyography (EMG)** — confirm slowed median nerve conduction.

4 Priority Nursing Interventions

CONSERVATIVE (First-Line)

- ✓ **Wrist splint in NEUTRAL position** — wear especially **at night** (most symptomatic time)
- ✓ Apply **cold/ice** 15–20 min for inflammation
- ✓ Activity modification & **ergonomic** assessment
- ✓ Frequent **rest breaks**, hand/wrist stretches
- ✓ Treat **underlying conditions** (DM control, thyroid replacement, RA management)
- ✓ Monitor neurovascular: **CMS** (Color, Motion, Sensation) of digits

SURGICAL (Carpal Tunnel Release)

- ✓ **Pre-op:** baseline neurovascular check, mark surgical site, NPO status
- ✓ **Post-op:** elevate hand **ABOVE heart level** for 24–48 hr (↓ edema)
- ✓ Assess **circulation, sensation, movement** of fingers q1–2 hr initially
- ✓ Encourage **finger ROM** immediately to prevent stiffness
- ✓ Keep dressing **clean & dry**; monitor for bleeding/infection
- ✓ Heavy lifting restricted **4–6 weeks**; numbness may persist for months

5 Pharmacology

Drug / Class	Mechanism	Side Effects	Nursing Considerations
NSAIDs Ibuprofen, Naproxen	Inhibit COX → ↓ prostaglandins → ↓ inflammation & pain	GI bleeding, peptic ulcer, renal impairment, ↑ BP	Give **WITH food**; assess for black tarry stools; check renal function; avoid in PUD/CKD
Corticosteroid Injection Methylprednisolone, Triamcinolone	Local anti-inflammatory injected directly into carpal tunnel	Hyperglycemia, infection at site, tendon weakening with repeat use	Monitor blood glucose (esp. diabetics); limit to **2–3 injections/yr**; sterile technique
Local Anesthetic Lidocaine	Sodium channel blocker — blocks pain transmission	Local irritation; rarely systemic toxicity (CNS depression, arrhythmia)	Used pre-injection or surgery; check for **allergy**
Oral Corticosteroids Prednisone (short course)	Systemic anti-inflammatory; reserved for severe cases	↑ Glucose, ↑ infection risk, mood changes, fluid retention, osteoporosis	Give **with food**; **never stop abruptly** — taper; monitor weight & BP
Vitamin B_6 (Pyridoxine)	Coenzyme in nerve function; *controversial* evidence	Peripheral neuropathy if > 100 mg/day chronically (paradoxical!)	Limit to recommended doses; not first-line

6 NCLEX Test Traps ⚠️

TRAP #1 — The Pinky Trick

If symptoms include the **pinky/little finger**, it is **NOT carpal tunnel**. That's **cubital tunnel syndrome** (ulnar nerve). Median nerve = thumb, index, middle, ½ of ring.

TRAP #2 — Splint Timing

Splints are worn **primarily at NIGHT** in a **neutral position** — not just during the day. Sleeping with a flexed wrist worsens compression.

TRAP #3 — Tinel vs. Phalen

Tinel = **TAP**. Phalen = **FLEX** (Phalen rhymes with bend-len). Don't mix them up!

TRAP #4 — Post-op Position

After carpal tunnel release, hand is **ELEVATED ABOVE HEART** — NOT at heart level, NOT dependent. Goal: ↓ edema.

TRAP #5 — Surgery is LAST

Surgery is **not** first-line. Expect splints, NSAIDs, activity modification, and steroid injections *before* surgical release on prioritization questions.

TRAP #6 — Pregnancy Trap

CTS in pregnancy is usually **self-limiting** — resolves after delivery as fluid retention decreases. Conservative care preferred; **avoid surgery** during pregnancy.

TRAP #7 — "I'll just sleep on it"

Patient says symptoms wake them at night. The **correct nursing action** is to teach *shake the hand* & ensure splint is being worn — not "elevate the arm above the head."

TRAP #8 — Ice vs. Heat

Acute inflammation = **ICE**. Heat can worsen swelling and nerve compression in active CTS. Save heat for chronic muscle stiffness only.

7 NCJMM Clinical Judgment Framework

Apply the Next-Generation Clinical Judgment Measurement Model to a patient with suspected/diagnosed CTS:

STEP 1

Recognize Cues

Night-time numbness in thumb/index/middle finger; positive Tinel's & Phalen's; weak grip; pregnancy or repetitive job history.

STEP 2

Analyze Cues

Distribution = median nerve only (pinky spared); cluster of cues + risk factors → probable CTS, not stroke or cervical radiculopathy.

STEP 3

Prioritize Hypotheses

#1 CTS (median compression) > cubital tunnel (ulnar) > cervical radiculopathy > peripheral neuropathy from DM.

STEP 4

Generate Solutions

Wrist splint at night, NSAIDs, activity modification, ergonomic eval, steroid injection, surgical release if conservative fails.

STEP 5

Take Actions

Apply neutral wrist splint; teach hand exercises; administer NSAIDs with food; pre-op & post-op care if surgical; elevate hand post-op.

STEP 6

Evaluate Outcomes

↓ Numbness/tingling; improved grip strength; restored thenar bulk; absent thenar atrophy; patient sleeping through the night.

8 Patient & Family Education

🛠️ Self-Care & Workplace

- ✓ Wear the **splint every night** — even when symptoms improve
- ✓ Keep wrist in a **neutral position** when typing (no upward bend)
- ✓ Take **5-min stretch breaks** every 30 min of repetitive activity
- ✓ Use **ergonomic keyboard, mouse pad** with wrist rest
- ✓ Avoid sleeping on the affected hand or with wrist flexed

📞 When to Call the Provider

- ⚠️ New **thenar atrophy** (muscle wasting at thumb base)
- ⚠️ Constant numbness — no longer comes and goes
- ⚠️ Loss of grip / dropping objects frequently
- ⚠️ Post-op: signs of infection (redness, fever, drainage), uncontrolled pain, ↓ circulation, or ↓ sensation
- ⚠️ Symptoms that don't improve after 4–6 weeks of conservative care

9 Memory Boosters & Mnemonics

📌 "TIM ½" — Median Nerve Distribution

- **T** — Thumb
- **I** — Index finger
- **M** — Middle finger
- **½** — Lateral **half** of ring finger (Pinky = SPARED)

📌 "MEDIAN" — Risk Factors

- **M** — Motion (repetitive)
- **E** — Edema (pregnancy / fluid retention)
- **D** — Diabetes
- **I** — Inflammation (rheumatoid arthritis)
- **A** — Acromegaly & weight gain (obesity)
- **N** — Hypothyroidism (**low thyroid** → fluid retention)

📌 "Tap = Tinel | Flex = Phalen"

- **T**inel = **T**ap on the median nerve
- **P**halen = back-of-hands together & **P**ress (flex 60 sec)
- Both reproduce **numbness/tingling** when positive

📌 "SHAKE IT OUT" — Classic Patient Statement

"I wake up at night with my hand numb, and I have to **shake my hand** to make it feel better."

→ This **"flick sign"** is one of the most specific findings for CTS on NCLEX.

📌 Post-Op Mantra: "ABOVE THE HEART"

After carpal tunnel release surgery, always **elevate the operative hand above heart level** for 24–48 hours to minimize edema and promote venous return.

Diane's NGN NCLEX 2026 Study Series

Carpal Tunnel Syndrome • Musculoskeletal & Neurological • Designed for Clinical Judgment Mastery