MUSCULOSKELETAL · NEURO

NGN NCLEX 2026 · VISUAL STUDY LIBRARY

Carpal Tunnel Syndrome

Median nerve compression neuropathy · Repetitive strain injury · Most common entrapment neuropathy in adults

Source note: *This topic was not present in the uploaded personal notes. Content drawn from standard NGN NCLEX 2026 references (Saunders, ATI, Lippincott) and aligned with the 2026 test plan.*

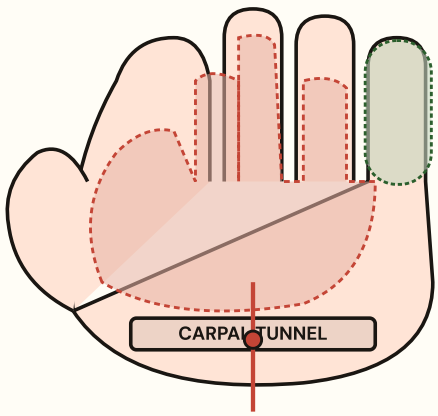
1 Definition / Overview

- **Compression of the median nerve** as it passes through the carpal tunnel at the wrist — a rigid space bounded by the transverse carpal ligament and carpal bones.
- **Most common entrapment neuropathy.** Affects 3–6% of adults; more common in women, often bilateral.
- **Risk factors:** repetitive wrist motion (typing, assembly), pregnancy, diabetes, hypothyroidism, rheumatoid arthritis, obesity, fluid retention.

2 Pathophysiology

1. **Repetitive wrist flexion/extension** or systemic edema (pregnancy, hypothyroidism)
2. Inflammation & swelling of **tendons and synovium** within the carpal tunnel
3. ↑ Pressure inside the **rigid bony-ligamentous tunnel**
4. Compression of the **median nerve** → ischemia, ↓ conduction
5. Sensory loss & motor weakness in **thumb, index, middle, radial half of ring finger**

Anatomy: Median Nerve Distribution & Carpal Tunnel



Median Nerve Territory

Sensory loss & weakness in CTS

AFFECTED — Median Nerve
Thumb · Index · Middle · ½ Ring finger

SPARED — Ulnar Nerve
Pinky + ulnar ½ of ring finger

CARPAL TUNNEL
Rigid passage — site of compression

Bedside Tests

Tinel's: Tap over median nerve → tingling
Phalen's: Flex wrists 60 sec → symptoms reproduce
Durkan's: Direct compression over tunnel
Flick sign: Shaking hand relieves symptoms

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Signs & Symptoms

EARLY

- **Numbness/tingling (paresthesia)** — thumb, index, middle, radial half of ring finger
- **Nocturnal symptoms** 🌙 — pain wakes patient at night (classic finding)
- **Flick sign** — patient shakes hand to relieve numbness
- Burning or aching pain at wrist, may radiate up forearm
- Worse with sustained gripping (driving, holding phone, reading a book)

LATE / SEVERE 🚨

- **Thenar atrophy** — wasting at base of thumb (apes-hand appearance)
- **Weak grip / dropping objects** — pen, coffee cup, keys
- Loss of fine motor coordination (buttoning shirts, picking up coins)
- Persistent numbness — no longer intermittent
- **Permanent nerve damage** if untreated

🚨 RED FLAG

Thenar muscle atrophy and constant numbness signal advanced nerve damage — surgical referral is urgent. Pinky involvement = NOT carpal tunnel; consider ulnar neuropathy or cervical radiculopathy.

4 Priority Nursing Interventions

CONSERVATIVE / PREOP

- **Assess** — pain scale, sensation, motor strength, 2-point discrimination, neurovascular checks bilaterally
- **Splint wrist in NEUTRAL position** — especially at night (NEVER flexed — that worsens compression)
- **Rest the wrist** — limit repetitive flexion/extension; modify activity
- **Cold packs** 15–20 min for inflammation; warm packs for chronic stiffness
- Administer NSAIDs or corticosteroid injection as ordered
- Teach **ergonomic positioning** and stretching

POST-OP (CARPAL TUNNEL RELEASE)

- **Elevate hand ABOVE heart** for 24–48 hr to ↓ edema
- **Neurovascular checks** — color, warmth, capillary refill, sensation, movement of all fingers
- Monitor dressing for bleeding/swelling; assess for compartment syndrome
- Encourage **finger ROM** immediately; wrist ROM as ordered
- Pain management; ice as ordered
- Avoid heavy lifting 4–6 weeks; teach incision care

5 Pharmacology

Drug / Class	Action	Nursing Considerations
NSAIDs ibuprofen, naproxen	↓ inflammation & pain at nerve compression site	Give with food; monitor for GI bleed, renal dysfunction, ↑ BP
Corticosteroid injection methylprednisolone, triamcinolone	Potent local anti-inflammatory directly into the carpal tunnel	Temporary relief (weeks–months); limit injections to avoid tendon weakening
Oral corticosteroids prednisone (short course)	Systemic anti-inflammatory	Monitor glucose; do not stop abruptly; ↑ infection risk
Acetaminophen	Analgesic — no anti-inflammatory effect	Max 3 g/day; caution with liver disease & alcohol use
Vitamin B6 (pyridoxine)	Adjunct (evidence limited)	Do not exceed 100 mg/day — risk of *peripheral neuropathy* with overdose

6 NCLEX Test Traps ⚠️

✗ WRONG: Splint the wrist in flexion at night
✓ RIGHT: Splint in NEUTRAL position — flexion ↑ pressure on median nerve

✗ WRONG: Numbness in pinky = carpal tunnel
✓ RIGHT: Pinky is ULNAR nerve territory; median spares the little finger

✗ WRONG: Keep hand at heart level post-op
✓ RIGHT: Elevate ABOVE heart × 24–48 hr to reduce edema

✗ WRONG: Wait until symptoms severe before treating
✓ RIGHT: Early intervention prevents thenar atrophy & permanent damage

✗ WRONG: Phalen's test = tapping the nerve
✓ RIGHT: PHALEN = FLEX (60 sec); TINEL = TAP (over median nerve)

✗ WRONG: B-complex vitamins are always safe in any dose
✓ RIGHT: B6 over 100 mg/day causes peripheral neuropathy

7 Patient Education

- **Wear wrist splint at night** — keeps wrist neutral while sleeping (the position most likely to compress the nerve)
- **Ergonomic workspace** — keyboard at elbow height, wrists straight, feet flat, monitor at eye level
- **Take frequent breaks** — every 30–60 min; stretch wrists/fingers
- **Avoid repetitive wrist motions** when possible; alternate hands for tasks
- **Tendon-gliding & nerve-gliding exercises** as prescribed
- Manage underlying conditions: **diabetes, hypothyroidism, RA, obesity**
- Report worsening numbness, thumb weakness, or muscle wasting immediately
- Post-op: keep dressing dry & intact; no driving until cleared; expect tingling for weeks as nerve heals

8 Memory Boosters

TIM
MEDIAN DISTRIBUTION
Thumb · **I**ndex · **M**iddle (+ ½ ring) — Pinky escapes!

PT
BEDSIDE TESTS
Phalen = **FLEX** 60 sec
Tinel = **TAP** the nerve


CLASSIC CLUE
Night pain + "flick sign" (shaking hand for relief)


POST-OP RULE
Elevate ABOVE heart for 24–48 hrs to ↓ swelling

Risk-factor mnemonic — "PRAGMATIC": **P**regnancy, **R**heumatoid arthritis, **A**cromegaly, **G**out, **M**yxedema (hypothyroid), **A**myloidosis, **T**umors, **I**diopathic, **C**ushing's/diabetes — anything that swells the tunnel.

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NCJMM Clinical Judgment Scenario

Scenario: *A 42-year-old female assembly-line worker presents to the clinic with a 3-month history of bilateral wrist pain and numbness in her thumbs, index, and middle fingers. She reports symptoms wake her at night and she "shakes her hands" to relieve them. She has type 2 diabetes (A1C 7.8%) and a BMI of 32. On exam: positive Tinel's bilaterally, positive Phalen's at 45 seconds, mild thenar flattening on the right. Vitals stable. The nurse is planning care.*

STEP 1

Recognize Cues

Bilateral wrist pain · paresthesia in **median distribution** (thumb/index/middle) · **nocturnal symptoms** · positive flick sign · positive Tinel's & Phalen's · **thenar flattening** (right) · risk factors: repetitive work, diabetes, obesity, female.

STEP 2

Analyze Cues

Cluster fits **carpal tunnel syndrome** — median nerve compression. Right-side thenar wasting = **motor involvement** (advanced). Diabetes and obesity perpetuate edema in the tunnel; A1C 7.8% indicates poor glycemic control accelerating neuropathy.

STEP 3

Prioritize Hypotheses

1° CTS with motor involvement (urgent — risk of permanent damage). Rule out: cervical radiculopathy, diabetic peripheral neuropathy, ulnar neuropathy (pinky involvement would point here). Highest priority: **prevent further nerve damage**.

STEP 4

Generate Solutions

Neutral wrist splints (especially night) · NSAID trial · ergonomic & activity modification · corticosteroid injection consult · **surgical referral** given thenar atrophy · optimize diabetes (A1C goal) · weight management · nerve conduction study to confirm.

STEP 5

Take Action

Fit bilateral **neutral-position wrist splints** · teach night-time use · administer ordered NSAID · refer to **orthopedic/hand surgery** for evaluation · diabetes-education referral · coordinate workplace ergonomic assessment · schedule EMG/nerve-conduction study.

STEP 6

Evaluate Outcomes

Expected: ↓ nocturnal pain within 2–4 weeks · improved grip strength · no progression of thenar atrophy · A1C trending toward goal. Concerning: continued numbness, worsening weakness, dropping objects → escalate to surgeon. Reassess at 4–6 weeks.