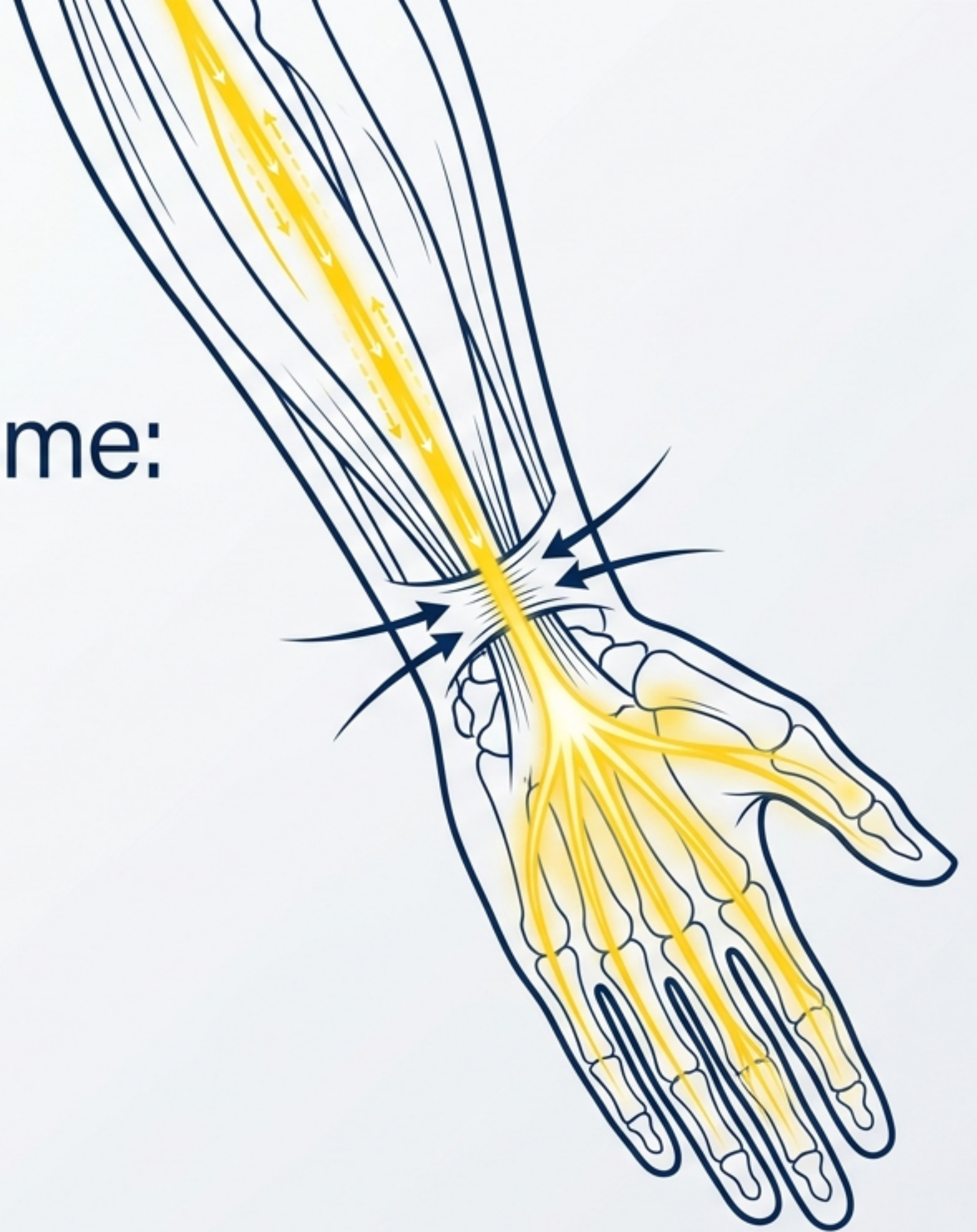
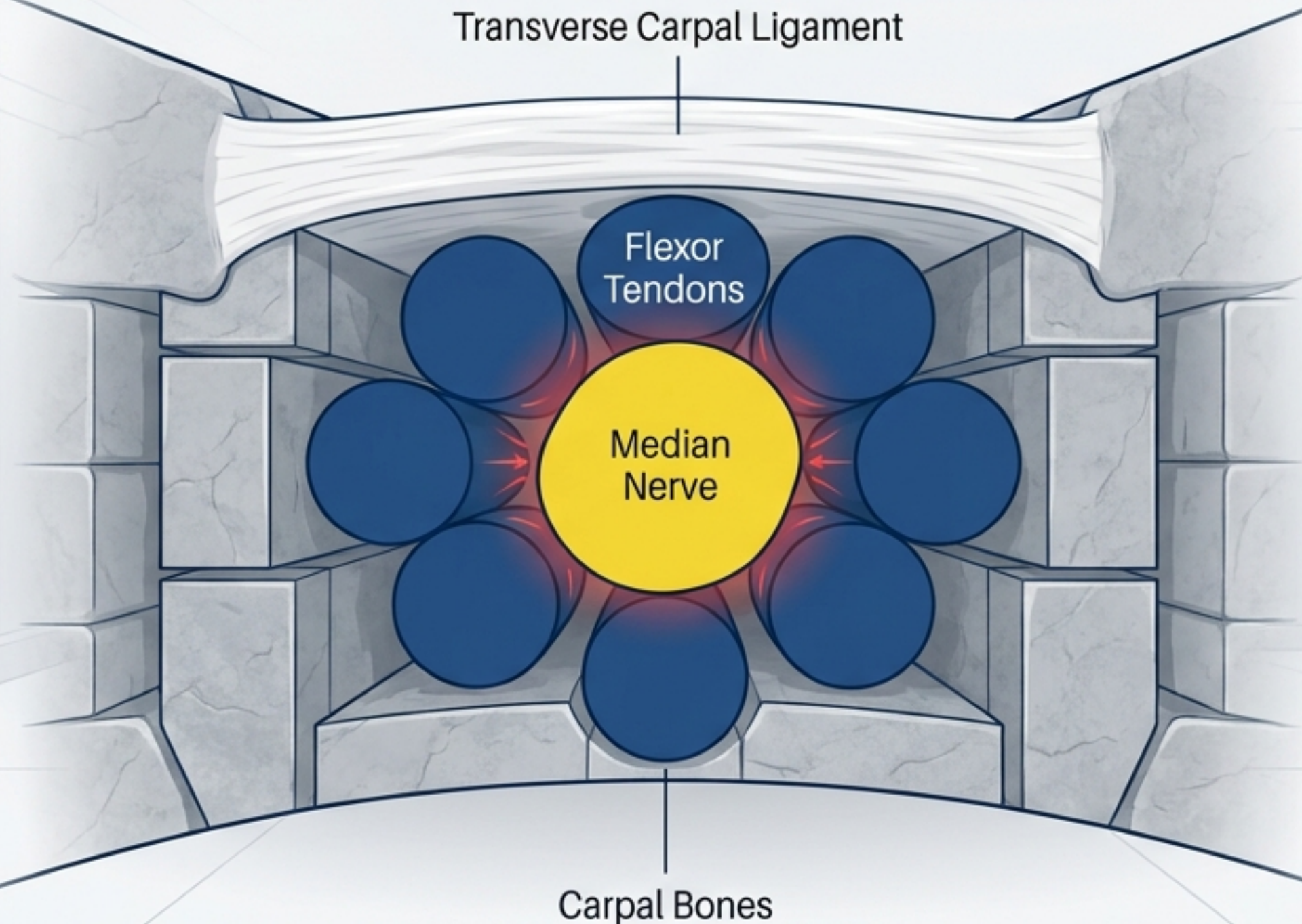


Carpal Tunnel Syndrome: The Clinical Pathway

An evidence-based rapid-reference guide covering diagnosis, imaging, and stepped management for Australian clinical practice.



The anatomical bottleneck driving the most common entrapment neuropathy



Australian Epidemiology Snapshot



Prevalence: 3–6% lifetime prevalence in Australian adults.



Demographics: 3:1 female-to-male ratio; peak incidence occurs between ages 40–60.



Impact: A leading cause of work-related musculoskeletal disorder (per AIHW), specifically tied to repetitive flexion, forceful grip, and vibration.

Categorizing the drivers of increased carpal tunnel pressure

All pathways lead to increased volume inside a fixed space.



Anatomical (Smaller Tunnel)

- Female sex
- Colles' wrist fractures
- Dislocations
- Acromegaly



Physiological (Fluid Retention)

- Pregnancy
- Menopause
- Hypothyroidism
- Renal failure (dialysis amyloidosis)
- Obesity



Inflammatory (Tissue Swelling)

- Rheumatoid arthritis
- Gout
- Diabetes mellitus (endoneurial oedema)



Occupational (Mechanical Stress)

- Repetitive wrist flexion/extension
- Forceful grip
- Use of vibrating tools

Mapping the sensory and motor deficits of the median nerve



Clinical Red Flags

Urgent neurological evaluation and NCS required to exclude cervical radiculopathy or polyneuropathy if:

- Thenar atrophy is present
- Constant numbness
- Significant weakness
- Symptoms outside the median territory

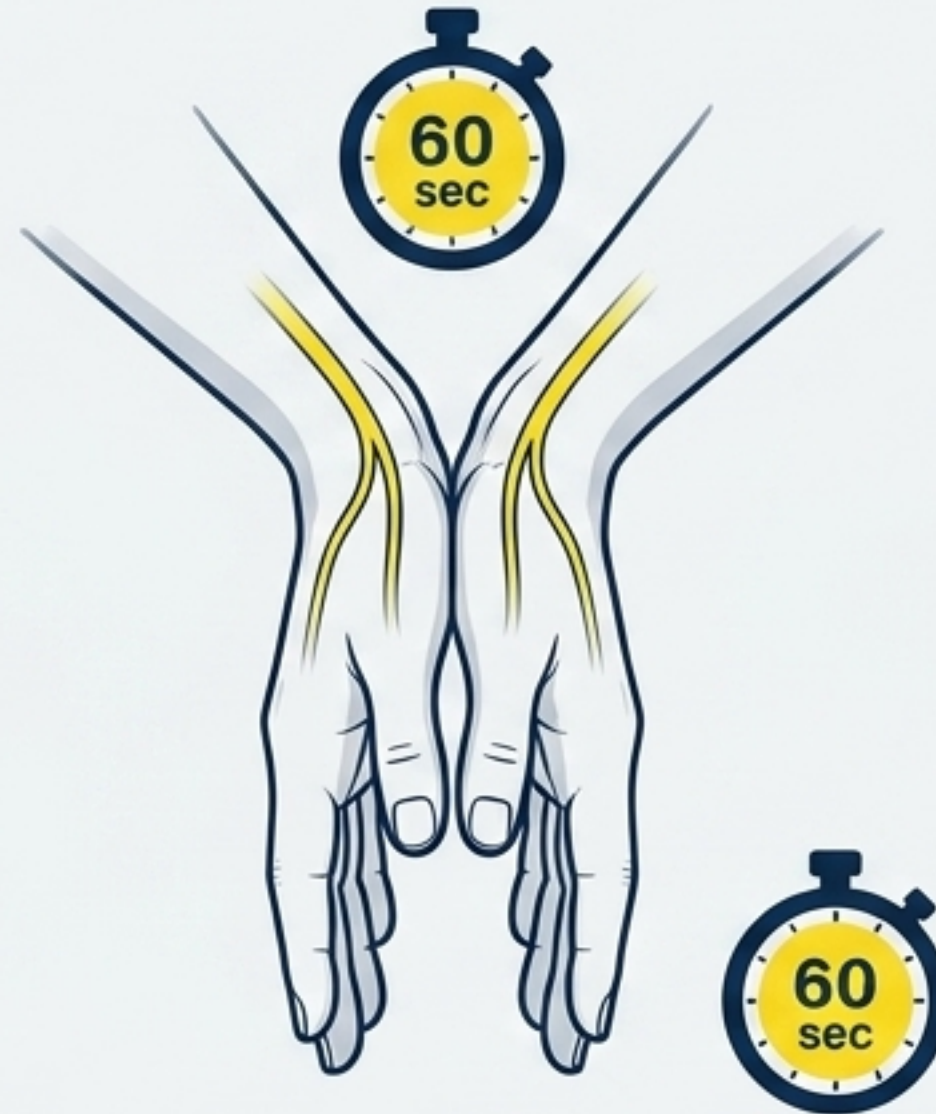
Provocative physical testing to reproduce intracarpal pressure

Tinel's Sign



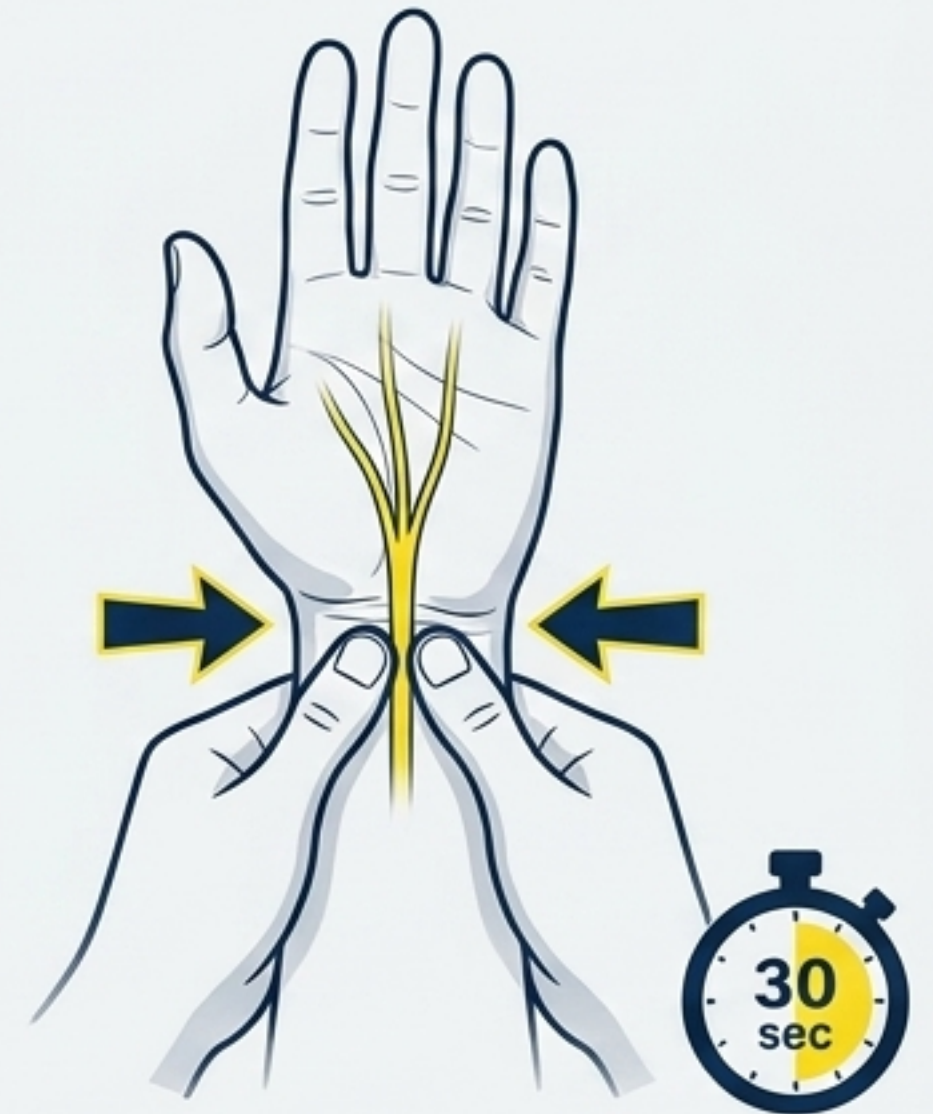
Sensitivity ~50% | Specificity ~77%

Phalen's Test



Sensitivity ~68% | Specificity ~73%

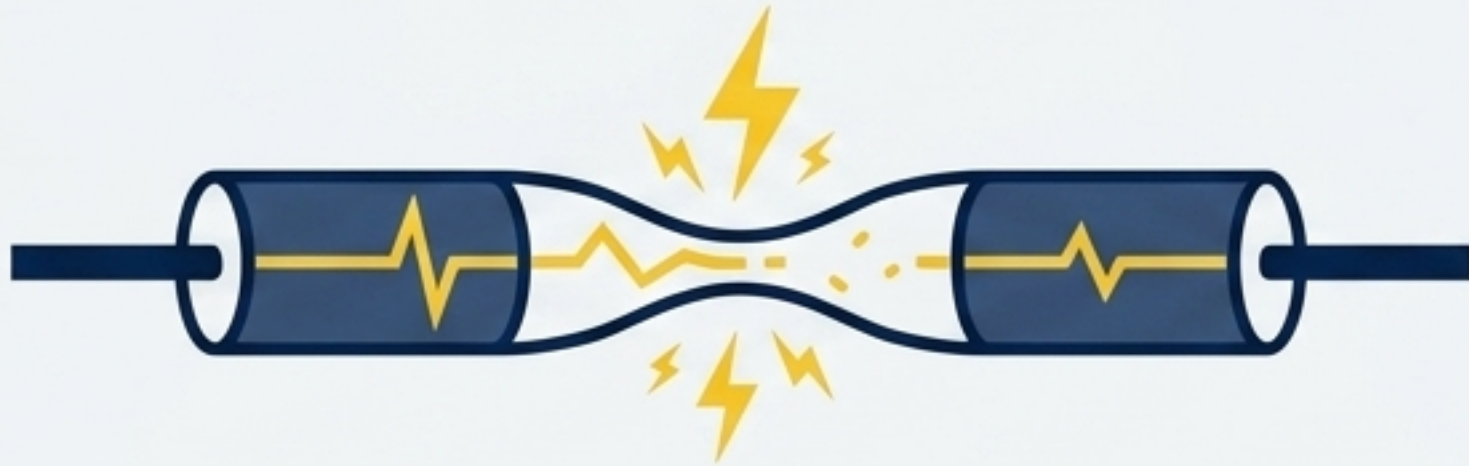
Carpal Tunnel Compression Test



Highest Sensitivity (~89%)

The diagnostic showdown: measuring function versus structure

Nerve Conduction Studies (NCS)



- **Modality:** Functional / Physiological (The Gold Standard)
- **Key Findings:** Prolonged sensory/motor distal latency, reduced SNAP/CMAP amplitudes.
- **Indications:** Diagnostic uncertainty, grading severity, pre-surgical baseline.

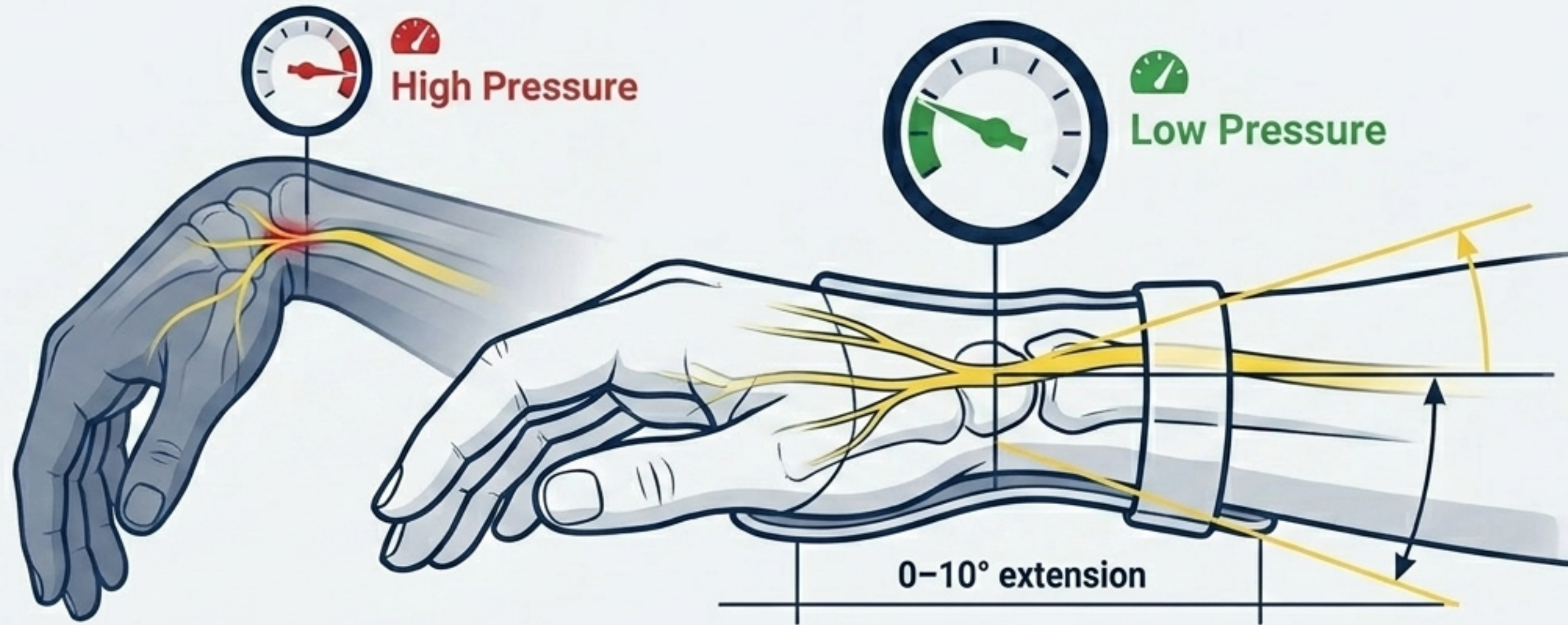
MBS Access: Item 11000 (standard neuropathy) or 11003 (with F-wave/H-reflex). Requires GP referral.

Ultrasound Diagnosis (US)



- **Modality:** Structural / Anatomical
- **Key Findings:** Cross-Sectional Area (CSA) $>10-12 \text{ mm}^2$ at pisiform level, bowing of flexor retinaculum, hyperaemia on Doppler.
- **Advantages:** Non-invasive, visualizes cysts/tenosynovitis, guides injections.
- **Limitations:** Operator-dependent, lacks physiological conduction data.

Step 1: Neutralizing pressure through targeted splinting



Clinical Protocol

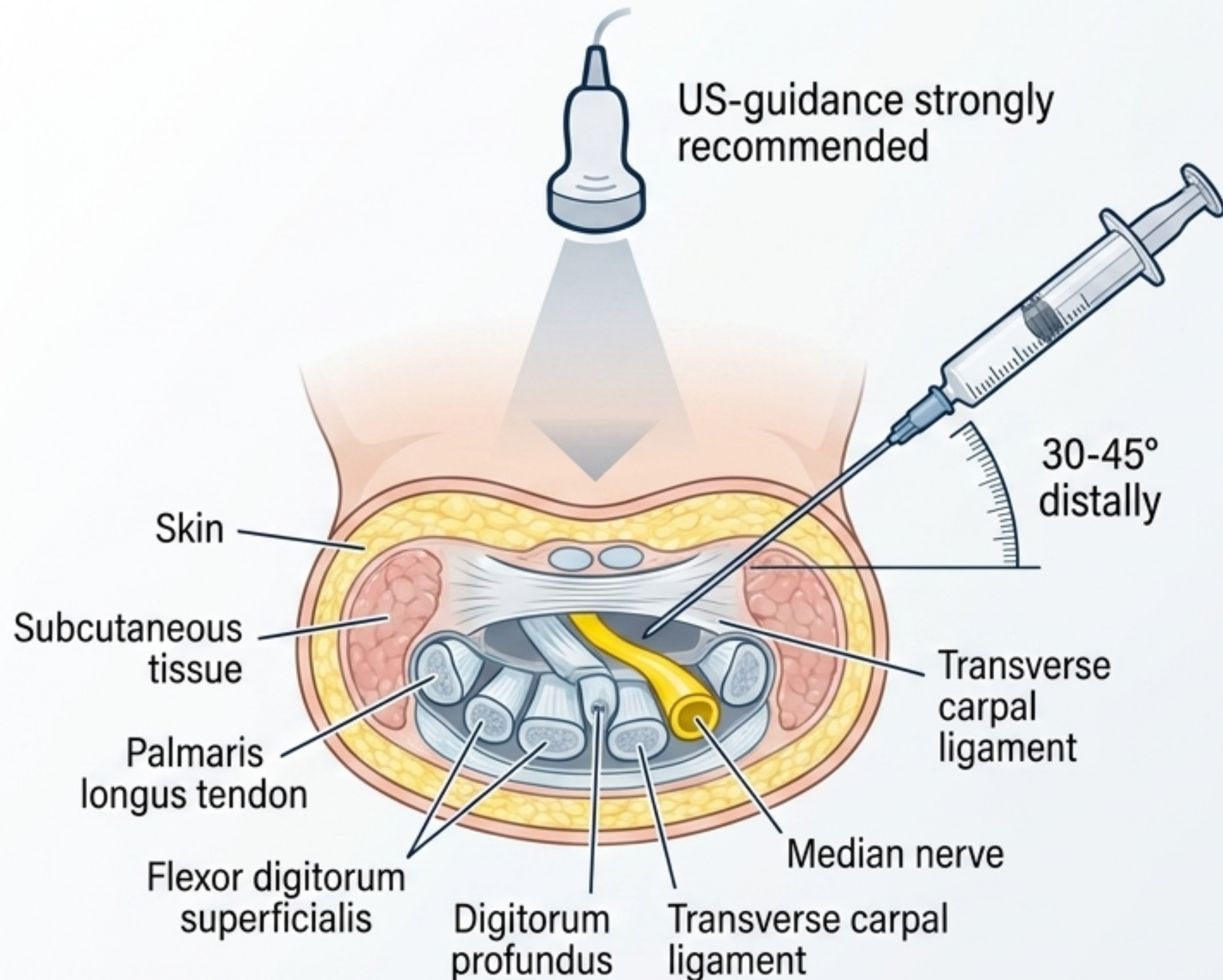
Modality:
Rigid volar splint.

Timing:
Primarily worn at night to prevent unconscious nocturnal flexion; adaptable for aggravating daytime activities.

Duration:
Minimum 4-6 week continuous trial.

Sourcing:
Over-the-counter prefabricated or custom-moulded by a physiotherapist/OT.

Step 2: Targeted anti-inflammatory relief via corticosteroid injection



Pharmacotherapy Quick-Reference

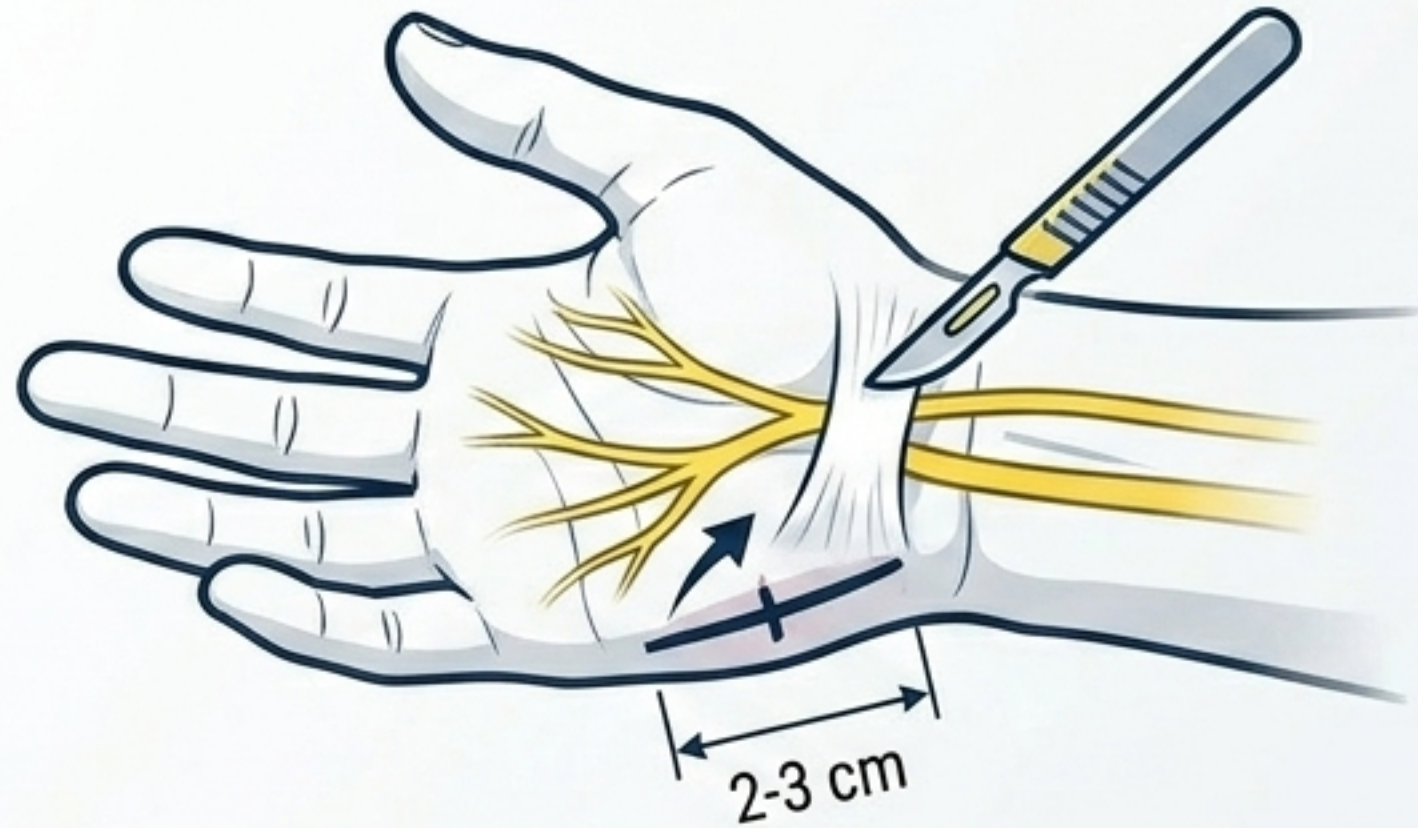
- **Drug:** Methylprednisolone Acetate (Depo-Medrol®)
- **Dose:** 40 mg (1 mL) single injection
- **Route:** Local infiltration (US-guidance prevents intraneural injury)
- **Frequency:** Maximum 2-3 injections per year (risk of tendon/fat atrophy)
- **Status:** PBS General Benefit

Efficacy Profile

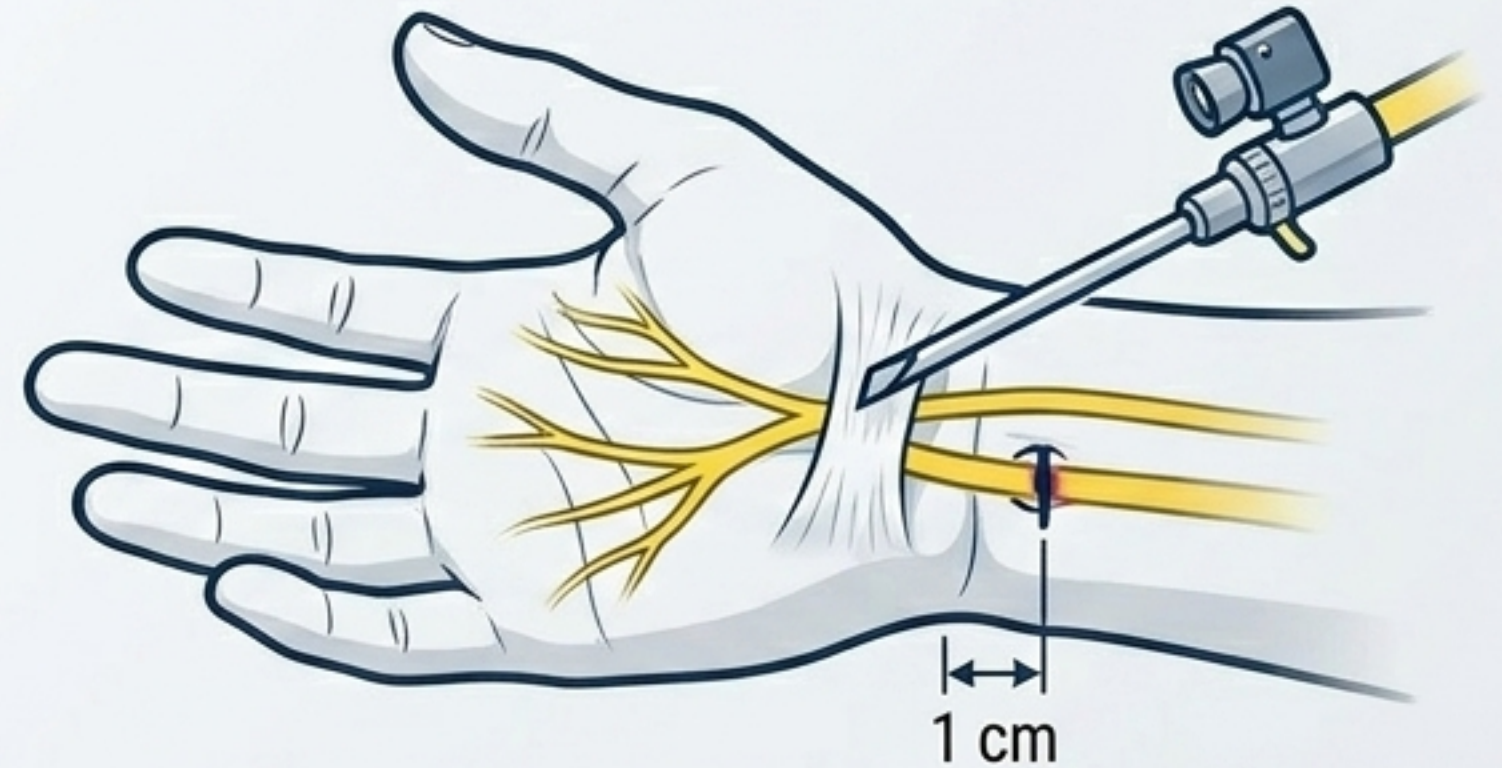
70-80% of patients experience **significant improvement at 8 weeks**. Effect wanes over 3-12 months. Positive response strongly predicts favorable surgical outcomes.

Step 3: Surgical decompression of the transverse carpal ligament

Open Split: Traditional Gold Standard.



Endoscopic Split: Faster return to function.

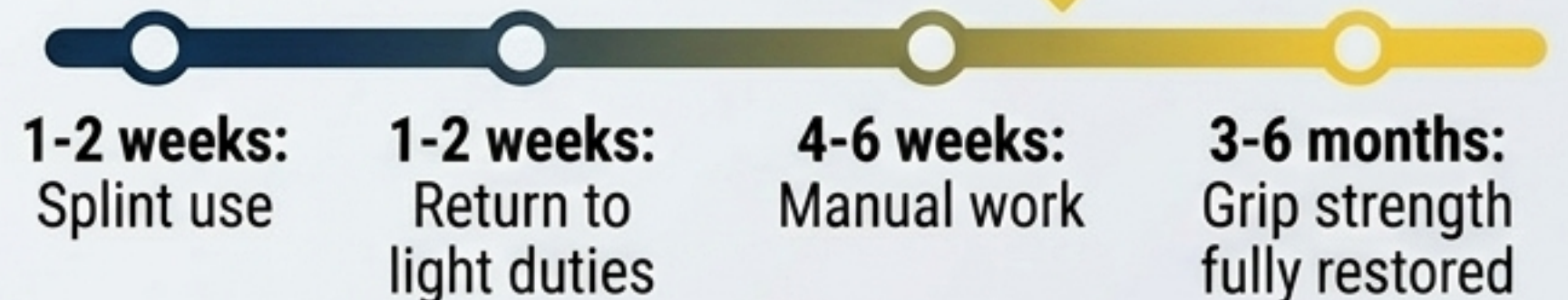


Surgical Referral Criteria





- ✓ Failure of 3-6 months of conservative management
- ✓ Presence of thenar atrophy or profound weakness
- ✓ Severe electrophysiological abnormalities on NCS

Recovery Timeline

>90% Success Rate



Adjusting management pathways for special clinical populations

Population	Mechanism	Management Nuance
 Pregnancy	2 nd /3 rd trimester fluid retention	Resolves postpartum. Strictly conservative (splints). Local injection only in severe 3 rd -trimester cases. Surgery deferred.
 Diabetes Mellitus	Endoneurial oedema and increased compression susceptibility	NCS essential to differentiate from diabetic polyneuropathy. Optimization of glycaemic control is mandatory.
 Elderly	Degenerative joint changes	Atypical presentation (less nocturnal pain). Rule out cervical spondylosis. Surgery remains highly effective and well-tolerated.
 Rheumatoid Arthritis	Synovial proliferation inside the tunnel	Aggressive systemic RA management with DMARDs required first. Surgery (synovectomy/release) if medical therapy fails.

Considerations for Aboriginal and Torres Strait Islander health

Three-Pillar Framework



Elevated Risk Profiles

Higher population rates of Type 2 Diabetes, obesity, and renal disease compound both the risk and severity of CTS in the community.



Access & Telehealth

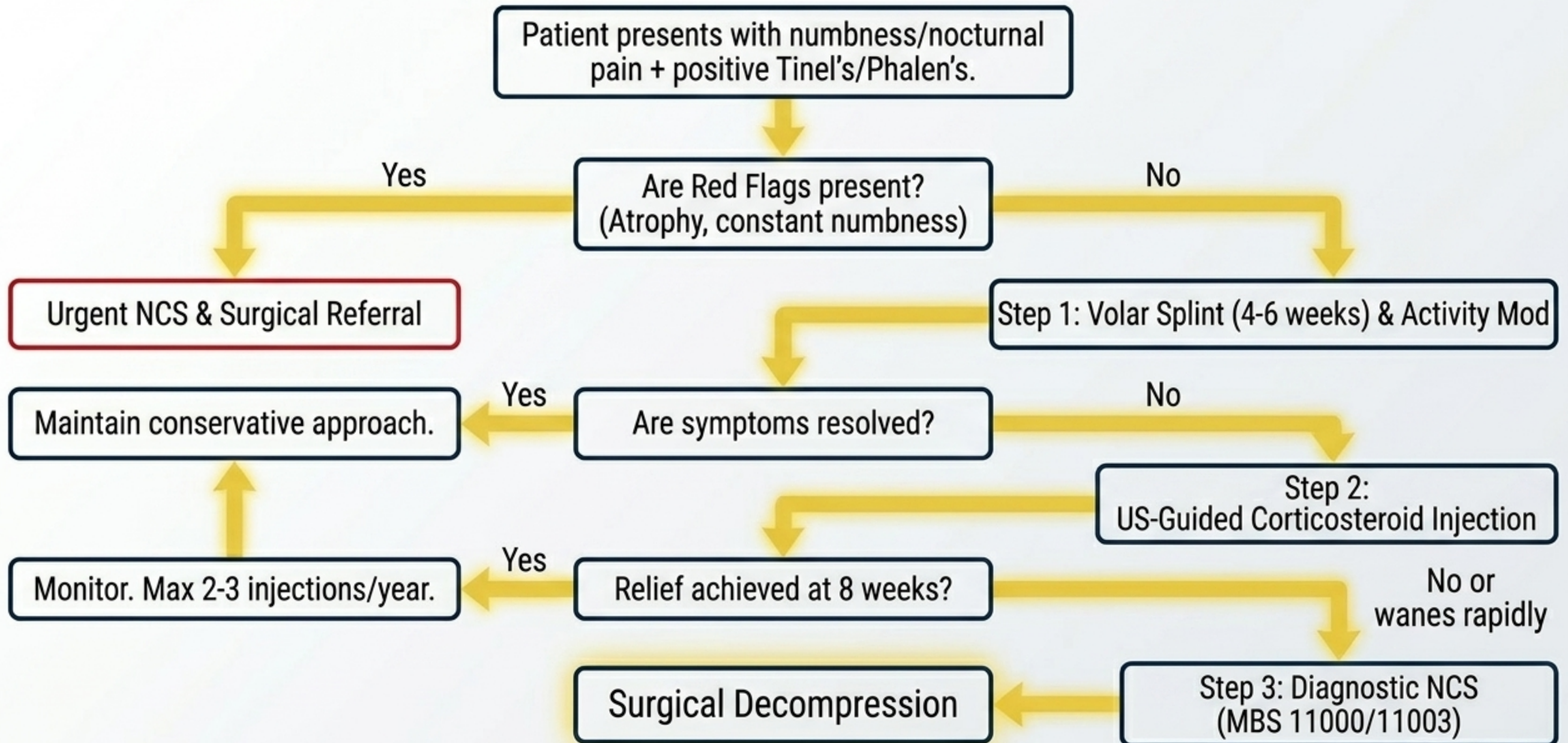
Geographical remoteness frequently delays NCS and surgical access. Telehealth should be rigorously utilized for early clinical identification and specialist review.



Cultural Safety & Pathways

Integrate Aboriginal Health Workers. Ensure clear communication on splint/injection availability at local clinics, and expedite surgical referral to prevent permanent disability.

The CTS Care Continuum: An algorithmic approach to management



Source evidence and clinical guidelines

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- The Royal Australian College of General Practitioners (RACGP). Management of peripheral nerve disorders. 2020.
- Australian Institute of Health and Welfare (AIHW). Musculoskeletal fact sheet. 2023.
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