CQ HAND + UPPER LIMB
SPECIALIST ORTHOPAEDIC SURGEON

EVIDENCE SUMMARY

# Carpal Tunnel Release

## Carpal Tunnel Release — Procedure Outcomes & Post-operative Rehabilitation (Open / Endoscopic Decompression)

**Topic scope:** post-operative rehabilitation after **surgical decompression of the median nerve at the wrist** by division of the transverse carpal ligament — **open** or **endoscopic** carpal tunnel release. This is a *decompression*, not a reconstruction: nothing is repaired or tightened, so the rehab is an **early-motion** pathway built around oedema control, scar/desensitisation work, and tendon + median-nerve gliding rather than months of protected healing.

> *Defining principle of the rehab here: carpal tunnel release **relieves nerve compression and does not create a construct that needs protection.** The divided ligament is meant to stay divided — a scar "pseudo-ligament" reconstitutes the carpal arch without re-tethering the nerve. So (unlike a tendon or ligament repair) immediate, unrestricted light use is the default, and the only deliberate restraint is a short window of heavy-load/grip/vibration avoidance while the palm and ligament edges heal. The therapy programme exists to keep the median nerve and flexor tendons **gliding** through the healing surgical bed so they do not adhere — not to immobilise. The single branch point is whether a concurrent procedure (e.g. flexor tenosynovectomy, revision with a fat-pad flap) was performed, which can extend the protected/oedema phase.*

## A. PROCEDURE OUTCOMES (open vs endoscopic)

Carpal tunnel release is one of the most reliable operations in upper-limb surgery: the great majority of patients obtain durable symptom relief, and the principal debate is over *access* (open vs endoscopic), not whether to decompress.

- **Both open and endoscopic release give equivalent long-term outcomes.** Randomised comparisons and meta-analyses find no meaningful difference in symptom relief, function or patient satisfaction at long-term

follow-up between open and single- or dual-portal endoscopic release. Endoscopic release offers a modestly **faster early recovery and earlier return to work** at the cost of a small increase in transient nerve-related events; by 5 years the two converge [HAND meta-analysis 2022; J Hand Surg 5-year RCT 2009; J Bone Joint Surg RCT 1994]. *Strong (RCTs/SR).*

- **Symptom relief is high and durable.** Night symptoms and paraesthesiae typically resolve early; numbness and thenar weakness recover more slowly and may be incomplete where compression was long-standing. Five-year and elderly-cohort series confirm sustained benefit, including in patients over 65 [J Hand Surg 5-yr follow-up; elderly cohorts]. *Moderate–strong.*
- **Division of the transverse carpal ligament alters carpal-tunnel biomechanics** (canal volume increases; the flexor tendons shift volarly), which is the anatomical basis for **pillar pain** and the transient grip-strength dip — both expected, self-limiting consequences of the decompression rather than complications [Clinical Biomechanics 2003]. *Mechanistic.*

## B. REHABILITATION / THERAPY EVIDENCE

The central rehab questions are (1) should the wrist be immobilised afterwards, and (2) does routine formal hand therapy change the outcome. The evidence answers *no* to routine splinting and *no* to mandatory protocolised therapy — while supporting a simple, early-motion, glide-based home programme.

- **Routine post-operative splinting is NOT recommended.** Moderate-quality evidence (AAOS 2024 CPG; supporting systematic reviews) finds wrist immobilisation by sling/orthosis after release does not improve pain, grip or function and may delay recovery. Early active motion is the intended default. *Moderate (CPG + SR).*
- **No single rehab adjunct has strong supporting evidence.** The Cochrane review of rehabilitation following carpal tunnel release found only **limited, low-certainty evidence** for any individual add-on — orthoses, dressings, exercise, cold/ice, multimodal hand therapy, laser, electrotherapy, scar desensitisation or arnica. Recovery is usually straightforward; the implication is to **keep the programme simple and individualise it** rather than protocolise adjuncts [Peters et al., Cochrane 2016]. *Moderate (Cochrane SR — of low-certainty primary evidence).*
- **Tendon- and nerve-gliding exercises are biologically and clinically rationalised.** The rationale is that wrist/digit motion produces longitudinal excursion of the median nerve through the surgical bed, preventing adhesion of nerve to flexor tendons; ultrasound studies confirm measurable nerve excursion during gliding exercises, and comparative-effectiveness work supports tendon/nerve gliding and neural mobilisation as low-risk adjuncts [Am J Phys Med Rehabil 2011; J Hand Therapy 2008 (excursion; neural mobilisation)]. The benefit is modest and the *adhesion-prevention* purpose is mechanistic/consensus rather than proven by hard outcome trials. *Weak–moderate (mechanism strong, outcome modest).*
- **Supervised therapy is not required for most patients.** Outcome series using a standard protocol with a single hand-therapy visit and a home programme report good patient-reported outcomes, supporting selective rather than universal formal therapy. *Moderate (cohort).*


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### RECOVERY TRAJECTORY (EXPECTED, EVIDENCE-ANCHORED)

| Phase | Window | Restraint | Hand use / therapy focus | Strength / load | Notes |
|---|---|---|---|---|---|
| **I – Early motion & oedema control** | **Week 0–1** | None routine (no splint) | Elevate above heart level; immediate active finger/thumb/wrist motion; **tendon + median-nerve glides**; desensitisation from day 1; compressive dressing/taping for swelling | Light functional use only | Less swelling → freer nerve. Grip is *expected* to be low |
| **II – Wound & ligament healing** | **Week 1–6** | Heavy-load avoidance | Continue glides; add **scar massage once wound healed**; heat before / ice after exercises | **No lifting, gripping, weight-bearing or vibrating-tool use up to 6 weeks**; driving from ~1–2 weeks (once a full fist is achievable) | Pillar tenderness peaks then settles; grip ≈ ¼ pre-op at 3 wk, ≈ ¾ by 6 wk |
| **III – Return to load & work** | **Week 6–12+** | Restrictions lifted | Progress gripping, lifting and task-specific loading | Grip back to pre-op by ~3 months, exceeding it by ~6 months; pinch recovers sooner (≈ pre-op by 6 wk) | Non-manual work median ~3 wk; manual work median ~5–6 wk, earlier on modified duties |

*(Phase windows mirror the precautions and recovery-curve figures in the patient protocol; they are typical guides, not trial-derived deadlines.)*

# C. KEY CONTROVERSIES / EVIDENCE QUALITY

1. **Open vs endoscopic.** Equivalent long-term outcomes; endoscopic buys a faster early recovery for a small transient-complication trade-off. Choice is largely surgeon/patient preference and cost. *Strong evidence of equivalence.*
2. **To splint or not.** Older practice favoured post-operative wrist splinting; current moderate-quality evidence and the AAOS 2024 CPG advise *against* routine immobilisation. This page's no-splint, early-motion default reflects the current guideline. *Moderate.*
3. **Does formal therapy change outcomes?** No rehab adjunct has high-certainty benefit (Cochrane). Gliding exercises rest on a sound *mechanistic* (adhesion-prevention, nerve-excursion) rationale but modest outcome

data. The defensible position is a simple home programme + selective therapy, not universal supervised rehab. *Weak–moderate.*

4. **Pillar pain & grip dip are expected, not failure.** Both follow predictably from dividing the transverse carpal ligament and resolve on a well-described curve; mislabelling them as complications drives unnecessary anxiety. *Strong natural-history data.*
5. **Recurrence/revision is uncommon** but real; persistent symptoms warrant assessment for incomplete release, the wrong diagnosis, or a second compression site rather than more of the same therapy [JAAOS recalcitrant-CTS review; revision-rate series]. *Moderate.*

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## D. EVIDENCE STRENGTH FLAGS (summary)

- **STRONG (RCT / SR):** equivalence of open vs endoscopic release at long-term follow-up (faster early recovery with endoscopic); high, durable symptom relief from decompression.
- **MODERATE:** AAOS 2024 CPG against routine post-operative splinting; Cochrane review (limited, low-certainty evidence for any single rehab adjunct → keep it simple); biomechanical basis of pillar pain / grip dip; uncommon but defined revision rate.
- **WEAK / CONSENSUS:** the specific **early-motion, glide-based therapy programme** (mechanistically rationalised, outcome benefit modest; surgeon/hand-therapist protocols); exact phase timings (typical, not trial-derived).

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## CITATIONS

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## CARPAL TUNNEL REHABILITATION LITERATURE (URLS)

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### PUBLISHED REHAB PROTOCOLS (PATIENT-GUIDANCE — BASIS FOR THE EARLY-MOTION PHASE STRUCTURE)


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