

Radial Tunnel Release

Radial Tunnel Release – Evidence Brief & Post-operative Rehabilitation

Topic scope: post-operative rehabilitation after **surgical decompression / neurolysis of the posterior interosseous nerve (deep branch of the radial nerve) in the radial tunnel** of the proximal forearm, performed for **radial tunnel syndrome (RTS)**. This is an **elbow / proximal-forearm** topic – anatomically and clinically distinct from carpal-tunnel and cubital-tunnel decompression. Like other nerve decompressions it is an **early-motion** pathway (early elbow/forearm/wrist motion, radial-nerve glides, oedema and scar care). The scope deliberately foregrounds the **diagnostic controversy** and the **more variable, lower success rates** that distinguish RTS release from the better-validated carpal-tunnel and cubital-tunnel operations.

Defining principle of the rehab here: a decompressed nerve does not create a healing construct that needs months of protection – it needs early, gentle movement to stop it adhering to the operative bed and to restore its glide. So the rehab is an early-motion programme: light functional hand use from day 1, radial-nerve sliders, graded desensitisation and (once healed) scar massage; heavier loading deferred to ~6 weeks. But two honesty caveats sit over the whole topic. First, RTS is a contested diagnosis – there is no confirmatory imaging or electrodiagnostic test, it is a diagnosis of exclusion, and a substantial body of opinion regards it as a variant of recalcitrant lateral epicondylitis. Second, outcomes after release are more variable and on average lower than carpal- or cubital-tunnel release – good results cluster around two-thirds overall, and fall further with co-existing tennis elbow, multiple compression sites, or a workers' compensation context. Patient expectations should be set accordingly.

A. THE DIAGNOSTIC CONTROVERSY (read first – it frames everything)

RTS is among the most contested entities in upper-limb surgery, and the rehab brief is incomplete without it:

- **No confirmatory test.** Electromyography and nerve-conduction studies are characteristically **normal** in RTS (compression is intermittent/dynamic and predominantly of a motor nerve carrying few pain fibres), and **MRI is frequently negative** – denervation oedema in supinator/extensors is suggestive but inconsistent, and a normal scan does not exclude the diagnosis. RTS is therefore a **clinical diagnosis of exclusion**, resting on point tenderness ~4 cm distal to the lateral epicondyle (over the radial tunnel rather than the epicondyle), pain on resisted supination / resisted long-finger extension, and – for some surgeons – **temporary relief from a diagnostic local-anaesthetic block** at the radial tunnel.
- **Overlap with lateral epicondylitis (tennis elbow).** The two coexist frequently and share the lateral-elbow pain territory. A recognised school of thought holds that “RTS” is often **severe, recalcitrant lateral epicondylitis** rather than a discrete compression neuropathy. Importantly, **routine PIN release added to lateral-epicondylitis surgery has not been shown to improve outcomes**, so the diagnosis should be secure before a decompression is planned.
- **Practical consequence.** Surgery is a **last resort** after prolonged failed conservative care (activity modification, splinting, anti-inflammatories, sometimes a steroid injection), and is best reserved for patients with proximal-forearm pain and no better explanation. This uncertainty is the single most important reason post-operative expectations must be framed honestly.

B. RELEASE OUTCOMES (variable – and why)

- **Headline success ~two-thirds.** Across the older long-term series, roughly **67% good, 15% fair, 18% poor** after radial tunnel decompression – markedly more variable than carpal- or cubital-tunnel release. A 2008 long-term series (Lee, Azari, Jones) and a 1999 series (Sotereanos et al.) both document this spread; the Sotereanos cohort reported good/excellent results in only **~39% by objective assessment** (though ~64% by patient self-rating), underscoring how outcome depends on the metric used.
- **Co-existing lateral epicondylitis lowers success.** Success falls to roughly **40%** when tennis elbow coexists, versus far higher with isolated RTS.
- **Multiple compression sites and workers'-compensation context lower success** – reported ~58% success in compensation cases vs ~73% without. These are the same modifiers named in the patient protocol.
- **2025 systematic review (Raymond et al., HAND).** 11 studies, 401 limbs (381 patients). Outcomes were heterogeneous; a **dorsal approach between ECRB and EDC** was associated with the most favourable Roles-and-Maudsley scores and satisfaction. The review's central message is that the **overall evidence is low-grade (observational), the diagnosis non-standardised, and the effectiveness of conservative treatment essentially untested** – a “tendency” toward benefit rather than proof.

- **Resorption-style “spontaneous improvement” does not apply** here – unlike calcific tendinitis, RTS does not self-resolve through a biological cycle; conservative care manages symptoms rather than curing a deposit.

C. SURGICAL APPROACH (shapes the early rehab)

- **What is done.** Complete neurolysis of the radial nerve at its bifurcation, decompressing the deep branch (PIN) and superficial sensory branch, releasing the **arcade of Frohse** (the proximal supinator edge), the leash of Henry (radial recurrent vessels), the ECRB fascial edge, and the distal supinator border. Any constrictive bands or vessels are divided.
- **Approaches.** Dorsal (Thompson, between ECRB/EDC or the brachioradialis–ECRL interval), volar/ anterior (Henry), or transmuscular. Anatomical studies map the trade-offs; the dorsal ECRB–EDC interval performed best in the 2025 review. The **superficial radial branch matters** – it is a recognised source of post-operative dysaesthesia if irritated.
- **Rehab implication.** A muscle-splitting/dorsal exposure through the extensor mass means early **gentle** forearm rotation and wrist motion are encouraged but heavy resisted supination/extension is deferred; the incision sits over a mobile, frequently sensitive area, so **desensitisation and scar care carry real weight** here.

D. POST-OP THERAPY ROLE (nerve/tendon glides, oedema, scar)

The decompressed nerve must **glide**, not adhere. The mechanical rationale is well quantified: the radial nerve **translates and stretches a measurable amount** across the elbow and wrist during ordinary arm motion (Wright et al. 2005), so early motion is what keeps it free of the healing bed.

- **Early motion, immediately.** Early active elbow, forearm and wrist movement within pain limits from the first post-op days; most protocols use **no rigid splinting** (or a removable splint for comfort/night only).
- **Radial-nerve glides – favour “sliders” over “tensioners”.** Sliding (slider) neurodynamic techniques achieve substantially greater nerve excursion at much lower nerve **strain** than end-range tensioners – preferable around a freshly decompressed nerve. Neural-mobilisation evidence across neuromusculoskeletal conditions is **supportive but of variable certainty**, so progression is **symptom-guided** and essentially pain-free; mechanism work (e.g., the MONET protocol) is still maturing.
- **Oedema and desensitisation.** Graded desensitisation (tapping/rubbing over the dressing) from day 1 normalises touch and pre-empts a sensitive scar – particularly relevant given superficial- radial-branch proximity.
- **Scar management once healed.** Massage, pressure, and silicone are advocated to loosen skin–tissue adhesions and aid remodelling, started once the wound is closed/sutures out.

- **Strengthening deferred.** Light functional ADL use throughout; resisted strengthening of wrist/ elbow and fine-motor work introduced from ~6 weeks. Heavy work and vibration tools avoided to ~6–8 weeks.

PHASED POST-OP TIMELINE (MAPS TO THE PATIENT PROTOCOL PHASES)

Phase	Window	Splint	Motion / nerve work	Load / strengthening	Notes
I – Protect & glide	Day 0–2 wk	None, or removable for comfort/night	Early pain-free active elbow/forearm/wrist ROM; radial-nerve sliders; desensitisation from day 1	Light functional ADL use only (self-care, feeding, dressing, writing, typing)	Stop the nerve adhering; settle the wound. No lifting/gripping/weight-bearing/vibration tools. Driving limited first 1–2 wk
II – Restore motion	2–6 wk	Off	Progress full active + gentle assisted ROM; continue sliders; scar massage once healed	Still no resisted loading; ADL use continues	Sensitivity/dysaesthesia common and usually settles; keep glides gentle
III – Strengthen & return	~6 wk onward	Off	Full ROM goal; sliders as needed	Begin graded wrist/elbow strengthening + fine-motor work from ~6 wk; advance work/heavy tasks thereafter	Vibration tools/heavy work resume ~6–8 wk. Pain relief is often gradual and may be partial – counsel accordingly

E. COMPLICATIONS / DOWNSIDES

- **Incomplete or no pain relief** – the dominant “complication,” tied directly to diagnostic uncertainty; relief is frequently **gradual and sometimes partial**.
- **Superficial-radial-branch dysaesthesia / scar sensitivity** – recognised; desensitisation and careful technique mitigate it.
- **Transient PIN weakness** (finger/thumb extension) from retraction – usually recovers.
- **Adhesion/recurrence of symptoms** if early glide is neglected.
- **Standard wound risks** (infection, haematoma) – uncommon.

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F. KEY CONTROVERSIES / EVIDENCE QUALITY

1. **Does RTS exist as a discrete entity?** Genuinely contested. No confirmatory test; substantial opinion equates much of it with recalcitrant lateral epicondylitis. This is *the* defining controversy and must shape consent and expectation-setting. *Unresolved – expert opinion divided.*
 2. **Patient selection drives outcome more than technique.** Isolated RTS does best; coexisting tennis elbow, multiple compressions, and compensation context predict worse results. *Moderate (consistent across cohorts).*
 3. **Approach choice.** A dorsal ECRB–EDC interval was favoured in the 2025 SR, but the evidence is observational and confounded by diagnostic heterogeneity. *Weak–moderate.*
 4. **The rehab protocol itself is consensus/expert** – drawn from surgeon and hand-therapy guidance (early motion, sliders, desensitisation, scar care), not from a rehab RCT. Phase timings are typical, not trial-derived. *Weak / consensus.*
 5. **Conservative-treatment efficacy is essentially untested** – the 2025 SR notes no usable trials of non-operative care, so “failed conservative management” before surgery rests on practice convention. *Weak.*
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G. EVIDENCE STRENGTH FLAGS (summary)

- **STRONG:** the **mechanical rationale for early nerve glide** – quantified radial-nerve excursion/ strain across elbow and wrist (Wright et al. 2005); slider-vs-tensioner excursion/strain physiology.
 - **MODERATE:** patient-selection modifiers of outcome (lateral epicondylitis, multiple compressions, workers’ compensation lower success); ~two-thirds overall good-result rate from long-term cohorts; dorsal-approach signal from the 2025 systematic review (low-grade studies).
 - **WEAK / CONSENSUS:** the **existence and diagnostic criteria of RTS** (no confirmatory test; overlap with lateral epicondylitis); the **post-operative rehabilitation protocol** (surgeon/ hand-therapy guidance, no rehab RCT); neural-mobilisation certainty (supportive but variable); efficacy of conservative care (essentially untested).
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CITATIONS

RAG CORPUS (180,000+ ORTHOPAEDIC ARTICLES)

- Posterior Interosseous Nerve Compression in the Forearm, AKA Radial Tunnel Syndrome. *HAND*. 2022. DOI: 10.1177/15589447221122822
 - Radial Tunnel Syndrome: Emphasis on the Superficial Branch of the Radial Nerve. *J Hand Surg Eur*. 2009. DOI: 10.1177/1753193408099832
 - Anatomical Study of the Surgical Approaches to the Radial Tunnel. *J Hand Surg Am*. 2015. DOI: 10.1016/j.jhsa.2015.03.009
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Dr Kieran Hirpara – Specialist Orthopaedic Surgeon
Suite 2, Level 1, Mater Private Hospital Rockhampton, 31 Ward Street, The Range, QLD 4700
Phone 07 4863 6556 · office@cqupperlimb.com.au · cqupperlimb.com.au

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- Radial Nerve Excursion and Strain at the Elbow and Wrist Associated With Upper-Extremity Motion. *J Hand Surg Am*. 2005. DOI: 10.1016/j.jhssa.2005.06.008
- Evidence and Techniques in Rehabilitation Following Nerve Injuries. *Hand Clin*. 2013. DOI: 10.1016/j.hcl.2013.04.012
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RADIAL-TUNNEL LITERATURE (URLS)

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- The Epidemiology of Radial Tunnel Syndrome and Its Overlap With Lateral Epicondylitis. *J Hand Surg Am*. 2023. [https://www.jhandsurg.org/article/S0363-5023\(23\)00138-7/abstract](https://www.jhandsurg.org/article/S0363-5023(23)00138-7/abstract)
- Lee JT, Azari K, Jones NF. Long-term results of radial tunnel release – the effect of co-existing tennis elbow, multiple compression syndromes and workers’ compensation. *J Plast Reconstr Aesthet Surg*. 2008. <https://www.sciencedirect.com/science/article/abs/pii/S1748681507004044>
- Sotereanos DG, et al. Results of surgical treatment for radial tunnel syndrome. *J Hand Surg Am*. 1999. <https://pubmed.ncbi.nlm.nih.gov/10357537/>
- Interventions for treating the radial tunnel syndrome: a systematic review of observational studies (DARE). <https://www.ncbi.nlm.nih.gov/books/NBK75403/>
- Radial Tunnel Syndrome (StatPearls). <https://www.ncbi.nlm.nih.gov/books/NBK555937/>
- Orthopedic Management of Radial Tunnel Syndrome: A Diagnostic and Treatment Dilemma. *PMC*. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10081130/>
- Radial Tunnel Syndrome: Case Report and Comprehensive Critical Review of a Compression Neuropathy Surrounded by Controversy. *PMC*. <https://pmc.ncbi.nlm.nih.gov/articles/PMC9896270/>

PUBLISHED REHAB PROTOCOLS (PATIENT-GUIDANCE – BASIS FOR THE PHASE STRUCTURE)

- Radial Tunnel Release post-op protocol (Santa Barbara Orthopedic / Mencias). <https://www.sbortho.com/wp-content/uploads/2023/09/radial-tunnel-release-new.pdf>
- Radial Tunnel Syndrome – conservative and post-operative rehabilitation. Physiopedia. https://www.physio-pedia.com/Radial_Tunnel_Syndrome

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Dr Kieran Hirpara – Specialist Orthopaedic Surgeon
 Suite 2, Level 1, Mater Private Hospital Rockhampton, 31 Ward Street, The Range, QLD 4700
 Phone 07 4863 6556 · office@cqupperlimb.com.au · cqupperlimb.com.au

- Basson A, et al. The effectiveness of neural mobilization for neuromusculoskeletal conditions: a systematic review and meta-analysis. *J Orthop Sports Phys Ther.* 2017. <https://pubmed.ncbi.nlm.nih.gov/28704626/>
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