CQ HAND + UPPER LIMB
SPECIALIST ORTHOPAEDIC SURGEON

EVIDENCE SUMMARY

Distal Radius Fracture (ORIF)

Distal Radius Fracture (ORIF) — Post-operative Rehabilitation Evidence Brief

Topic scope: post-operative rehabilitation after **open reduction and internal fixation (ORIF) of a distal radius fracture** with a **volar locking plate**. This brief backs an **early-motion-but-protected** hand/wrist pathway delivered with hand therapy, where wrist motion begins early while bone-dependent loading (weight-bearing, heavy lifting, contact sport) is deferred until ~12 weeks. It does **not** cover the indications for surgery vs casting, nor fragment-specific/dorsal/bridge-plate constructs (which carry their own loading rules).

> *Defining principle of the rehab here: a volar locking plate is a fixed-angle construct stable enough to permit immediate wrist motion — the screws lock to the plate and hold the articular reduction independent of the cast. So (unlike a cast-treated fracture, and unlike a tendon or ligament repair) the wrist does not need weeks of immobilisation to protect the reduction: the rehab is an early-movement pathway — finger/forearm/wrist active motion and oedema control from day one, splint for comfort only, isometric then progressive strengthening from ~weeks 4–6. The one timeline that is not negotiable is bone healing: union takes ~6–12 weeks regardless of how the wrist feels, which is why weight-bearing, heavy lifting and impact are held to 12 weeks even once motion is comfortable.*

A. PROCEDURE & CONSTRUCT — what the rehab is protecting

Volar locking plate fixation is the dominant operative construct for displaced distal radius fractures and is the reference standard against which other techniques are compared. Key surgical-outcome facts that shape the rehab:

- **Volar locking plates restore and hold articular reduction reliably**, and across randomised comparisons give equivalent or better functional outcomes than non-operative care and competing fixation methods

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(dorsal plating, intramedullary nailing, fragment-specific), with most differences favouring early function rather than final endpoint [JAAOS controversies review 2014; *Hand Clinics* plate-fixation review 2021; IM-nail-vs-volar-plate RCTs].

- **The fixed-angle construct is the rationale for early motion.** Because the locking screws hold the subchondral fragments rigidly, the plate — not a cast — maintains the reduction, so wrist motion can start before union without displacing the fracture [*Hand Clinics* 2021; accelerated-rehab RCT, JBJS 2014].
- **In older patients the operative-vs-conservative outcome gap is small.** A 3-year RCT in patients >70 found volar plating and non-operative care converged on similar patient-reported function — context that keeps post-operative rehab pragmatic and patient-centred rather than aggressive [BMC Musculoskelet Disord 2022; *Hand Clinics* geriatric review 2021].
- **Recovery is gradual.** Range, grip and patient-reported scores improve steadily over the first 3–6 months; the construct permits early motion but does not accelerate the biology of healing or the return of grip strength.

B. REHABILITATION / HAND-THERAPY EVIDENCE

The central rehab questions for this construct are (1) **when to start wrist motion**, (2) **how much supervised therapy is needed**, and (3) **what the strengthening timeline should be**. The evidence is clear on the first, nuanced on the second, and consensus-driven on the third.

- **Early motion is safe and gives a short-term advantage.** Multiple RCTs and a systematic review show that starting wrist motion early after volar plating improves short-term ROM, grip and comfort without compromising the radiographic reduction [accelerated-rehab RCT, JBJS 2014; early-vs-late motion RCT, HAND 2018; *Hand Therapy* systematic review 2020]. This is the direct warrant for the day-1 finger/forearm/wrist program in this protocol.
- **"Early" need not mean "immediate," and the advantage washes out by 3–6 months.** The landmark trial comparing wrist mobilisation at ~2 weeks vs ~6 weeks found the two groups equivalent by 3–6 months [Lozano-Calderón / JBJS 2008]. So there is a genuine early benefit but no penalty for a measured, comfort-led progression — which is exactly why this protocol can be unhurried.
- **Routine supervised physiotherapy adds little over a coached home program for most patients.** Systematic reviews and RCTs repeatedly find that a structured **home exercise program preceded by instruction/coaching** performs as well as formal supervised therapy for uncomplicated cases, and that prescribed exercise programs add limited benefit over advice for impairment/activity outcomes [HEP-vs-supervised SR, *J Hand Ther* 2014; *J Physiother* SR 2017; *Hand Clinics* "is therapy needed?" 2021; *Arch Orthop Trauma Surg* 2020]. This supports a **home-program-first** model with hand-therapy review, escalating supervision for stiffness, oedema or slow progress — the structure of this protocol.
- **Oedema control and scar/tendon-glide management are standard therapy elements.** Elevation, retrograde massage, manual oedema mobilisation and (early) compression are the evidence-informed oedema toolkit [edema-management SR, *J Hand Ther* 2017]; scar massage to keep the flexor tendons gliding under the volar incision is consensus hand-therapy practice rather than RCT-derived.

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PHASED POST-OP TIMELINE (VOLAR LOCKING PLATE, EARLY-MOTION PATHWAY)

Phases match this topic's `synthesis.md`. Timings are **post-operative weeks**; the 12-week loading limit is referenced to the **fracture** (injury) date.

Phase	Window	Splint	Motion / use	Strengthening	Notes
I – Protect & move	**Days 1–4**	Comfort only, not routine	Active finger (six-pack), wrist, forearm, elbow & shoulder ROM from day 1; light ADL < **1–2 kg** within pain limits	–	Surgical bandage to day 3, then redress. Oedema control + elevation. No weight-bearing, gripping or lifting
II – Active range & oedema	**Week 2–4**	Comfort/ work only (no driving while splinted)	Continue **active** wrist ROM (no passive yet); six-pack stops once fingers full	**Isometric** wrist activation begins	Sutures out day 10–14; start scar massage once healed. Watch for CRPS. PRWE/ DASH baseline
III – Passive range & light load	**Week 4–6**	Off	Add **gentle passive** wrist stretches at 4–6 wk *if x-ray satisfactory & fixation stable*	Finger strengthening (low resistance) from wk 4; upgrade isometrics	Movement still prioritised over strength
IV – Graded strengthening & return	**Week 6–8**	Off	Restore/maintain full active & passive ROM	Wrist strengthening with **0.5–1.0 kg / light theraband**, progress as tolerated	Graded return over ~3 wk. **No weight-bearing, heavy lifting or contact sport until 12 weeks post-fracture.** Discharge on full ROM + functional return

The phase structure mirrors published surgeon/hand-therapy ORIF protocols (early ROM → scar + oedema → passive range + light resistance → progressive strengthening, with heavy load/sport held to ~12–16 weeks) [Physiopedia Colles' ORIF protocol; institutional ORIF rehab guidelines].

C. KEY CONTROVERSIES / EVIDENCE QUALITY

1. **How early to mobilise.** Early motion (immediate–2 wk) gives a real short-term ROM/grip/comfort advantage that **equalises by 3–6 months** vs starting at ~6 weeks. The evidence therefore supports early

motion but does **not** mandate aggression — a measured progression is fully defensible. *Moderate–strong (multiple RCTs + SR).*

2. **Supervised therapy vs coached home program.** For uncomplicated fractures the best available evidence finds **no consistent benefit** of routine formal physiotherapy over a well-instructed home program; supervision is best **targeted** to stiffness, oedema, CRPS risk or slow progress. *Moderate (SRs/RCTs), but heterogeneous.*
3. **Strengthening and return-to-load timing.** The week-by-week strengthening ramp and the 12-week loading hold are **construct- and biology-based consensus**, drawn from surgeon/hand- therapy protocols rather than a strengthening-timing RCT. *Weak/consensus.*
4. **Whether the wrist needs any immobilisation at all.** Some trials report that omitting post-op immobilisation does not worsen outcomes after volar plating, supporting the "splint for comfort only" stance here. *Moderate.*

D. EVIDENCE STRENGTH FLAGS (summary)

- **STRONG / MODERATE–STRONG (RCT / SR):** early wrist motion after volar plating is safe and improves short-term ROM/grip/comfort without loss of reduction (accelerated-rehab RCT JBJS 2014; early-vs-late RCT HAND 2018; *Hand Therapy* SR 2020); ~2-wk vs ~6-wk mobilisation equivalent by 3–6 months (Lozano-Calderón JBJS 2008).
- **MODERATE:** volar locking plate is a reliable fixed-angle construct with equivalent/favourable outcomes vs alternatives (JAAOS 2014; *Hand Clinics* 2021); operative-vs-conservative outcomes converge in the elderly (BMC 2022); coached home program ≈ supervised therapy for uncomplicated cases (*J Hand Ther* 2014; *J Physiother* 2017; *Hand Clinics* 2021); evidence-based oedema management (*J Hand Ther* 2017).
- **WEAK / CONSENSUS:** the **detailed strengthening ramp and 12-week loading limit** (surgeon & hand-therapy protocols; biology- and construct-based, not trial-derived); scar/tendon-glide massage practice.

CITATIONS

RAG CORPUS (180,000+ ORTHOPAEDIC ARTICLES)

- Accelerated rehabilitation compared with a standard protocol after distal radial fractures treated with volar open reduction and internal fixation. *J Bone Joint Surg Am*. 2014. DOI: 10.2106/jbjs.m.00860
- Wrist mobilization following volar plate fixation of fractures of the distal part of the radius. *J Bone Joint Surg Am*. 2008. DOI: 10.2106/jbjs.g.01368
- Early versus late motion following volar plating of distal radius fractures. *HAND*. 2018. DOI: 10.1177/1558944718787880

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- A systematic review of how daily activities and exercises are recommended following volar plating of distal radius fractures and the efficacy and safety of early versus late mobilisation. *Hand Therapy*. 2020. DOI: 10.1177/1758998320967032
- AAOS/ASSH Clinical Practice Guideline Summary: Management of Distal Radius Fractures. *J Am Acad Orthop Surg*. 2022. DOI: 10.5435/jaaos-d-21-00719
- Controversies in the management of distal radius fractures. *J Am Acad Orthop Surg*. 2014. DOI: 10.5435/jaaos-22-09-566
- Plate fixation of distal radius fractures. *Hand Clinics*. 2021. DOI: 10.1016/j.hcl.2021.02.008
- Non-operative treatment or volar locking plate fixation for dorsally displaced distal radius fractures in patients over 70 years – a three-year follow-up of a randomized controlled trial. *BMC Musculoskelet Disord*. 2022. DOI: 10.1186/s12891-022-05394-7
- Distal radius fracture: HEP versus supervised therapy – a systematic review. *J Hand Ther*. 2014. DOI: 10.1016/j.jht.2013.08.017
- Prescribed exercise programs may not be effective in reducing impairments and improving activity during upper limb fracture rehabilitation: a systematic review. *J Physiother*. 2017. DOI: 10.1016/j.jphys.2017.08.009
- Is therapy needed after distal radius fracture treatment – what is the evidence? *Hand Clinics*. 2021. DOI: 10.1016/j.hcl.2021.02.012
- Rehabilitation after distal radius fractures: is there a need for immobilization and physiotherapy? *Arch Orthop Trauma Surg*. 2020. DOI: 10.1007/s00402-020-03367-w
- Management of complications of distal radius fractures. *Hand Clinics*. 2015. DOI: 10.1016/j.hcl.2014.12.002
- A comparison of the accuracy of two sets of diagnostic criteria in the early detection of complex regional pain syndrome following surgical treatment of distal radial fractures. *J Hand Surg Eur Vol*. 2012. DOI: 10.1177/1753193412469142

DISTAL RADIUS / REHABILITATION LITERATURE (URLS)

- AAOS/ASSH Clinical Practice Guideline Summary: Management of Distal Radius Fractures (full summary). PMC. https://pmc.ncbi.nlm.nih.gov/articles/PMC9196973/
- Practical application of the 2020 distal radius fracture AAOS/ASSH clinical practice guideline: a clinical case. PMC. https://pmc.ncbi.nlm.nih.gov/articles/PMC9035062/
- Rehabilitation for distal radial fractures in adults (Cochrane-style review). PMC. https://pmc.ncbi.nlm.nih.gov/articles/PMC9250132/
- Rehabilitation after distal radius fractures: opportunities for improvement. PMC. https://pmc.ncbi.nlm.nih.gov/articles/PMC10569825/
- Rehabilitation following surgically treated distal radius fractures: do immobilization and physiotherapy affect the outcome? PMC. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8343619/

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PUBLISHED REHAB PROTOCOLS (SURGEON / HAND-THERAPY — BASIS FOR THE PHASE STRUCTURE)

- British Society for Surgery of the Hand / British Association of Hand Therapists — Distal Radius Fractures Working Group rehabilitation guidance (2024). https://www.hand-therapy.co.uk/_userfiles/pages/files/distal_radius_fractures_working_group_2024.pdf
- Colles' Fracture Post-Operative Rehabilitation Protocol. Physiopedia. https://www.physio-pedia.com/Colles%E2%80%99_Fracture_Post_Operative_Rehabilitation_Protocol
- Distal Radius ORIF Rehabilitation Guidelines. University of Virginia Department of Orthopaedic Surgery. https://med.virginia.edu/orthopaedic-surgery/wp-content/uploads/sites/242/2024/09/Distal-radius-ORIF.pdf
- Distal Radius ORIF Rehabilitation. Jared Lee, MD. https://jaredleemd.com/pdf/distal-radius-orif-rehabilitation/

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