CQ HAND + UPPER LIMB
SPECIALIST ORTHOPAEDIC SURGEON

EVIDENCE SUMMARY

Stiff Elbow Release (Arthrolysis)

Stiff Elbow — Arthrolysis / Capsular Release (Open or Arthroscopic) — Rehabilitation Evidence

Topic scope: rehabilitation after surgical release of the post-traumatic / post-surgical stiff elbow — open or arthroscopic arthrolysis, anterior + posterior capsulectomy, ± heterotopic ossification (HO) excision, ± ulnar nerve decompression. The focus here is the post-operative rehabilitation philosophy and timeline, not the indications for or technique of the release itself.

> *Defining principle: the surgeon establishes a near-full arc of motion on the operating table; rehabilitation's single job is to* ***not lose it****. There is no fixation to protect, so — unlike a fracture fixation or a tendon repair — there is* ***no protection phase****. Motion starts essentially* ***Day 1*** *(or even in-hospital CPM from Day 1–2), pushed firmly and often. Pain and oedema control are the rate-limiters, not tissue healing. This is the opposite philosophy to olecranon ORIF or a distal biceps repair.* ***Dr Hirpara's stance:*** *no sling and no immobilisation phase; immediate aggressive active-assisted and passive ROM from POD1; static-progressive (or dynamic) night/rest splinting continued for at least 3 months; HO prophylaxis where indicated; and a frank pre-operative conversation that the elbow reaches its plateau at a mean of ~16 weeks.*

Consensus phased timeline (week windows)

Phase	Window	Immobilisation / "ceiling"	Movement & adjuncts	Strengthening	Criteria to progress
Immediate	**Day 0–2**	Brief splint in **full extension**; arm elevated, cryotherapy/ compression	HO prophylaxis decision made now (see below); drains out POD1	–	Splint off POD1

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Phase	Window	Immobilisation / "ceiling"	Movement & adjuncts	Strengthening	Criteria to progress
Immediate aggressive ROM (core)	**Day 1 onward**	**No ROM ceiling** – recover the full intra-operative arc	Active-assisted + passive flexion / extension / pronation / supination; bias toward tightest direction (usually extension). Optional CPM 0–145° with bolster, in-hospital POD1–2, home to ~4 wk. Daily PT first week → 2–3×/wk for ~6 wk	–	On-table arc maintained; oedema/pain controlled
Hold the arc + splinting	**Weeks 2–6**	None	Continue aggressive A/AAROM/PROM. Add **static-progressive (or dynamic / serial-static / turnbuckle) splinting** – low-load prolonged end-range stretch, night/rest, alternating flexion/extension	–	Arc maintained or exceeded; ready for loading ~wk 6
Strengthening + continued splinting	**Weeks 6–12**	None	Continue splinting	**Progressive resistive strengthening** once motion stable (~wk 6); continue splinting **≥ 3 months**	Stable, strengthening motion
Plateau	**~16 weeks (≈ 4 months)**	None	–	Maintain gains; long-term hold	Maximum arc reached; most recovery

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Phase	Window	Immobilisation / "ceiling"	Movement & adjuncts	Strengthening	Criteria to progress
					occurred 6 wk–3 mo

Evidence summary by theme

IMMEDIATE AGGRESSIVE MOTION — THE AGREED PRINCIPLE (STRONG CONSENSUS)

Large, consistent retrospective case series and review articles agree that the elbow re-stiffens without immediate motion, and that rehabilitation exists to hold the intra-operative arc. Motion begins POD1; the splint (when used) is removed POD1 and active-assisted + passive ROM is started in all planes, biased toward the tightest direction (usually extension). This is **strong consensus** across the literature.

WHICH SPECIFIC REHAB PROTOCOL IS BEST (MODERATE — GENUINE EQUIPOISE)

The **best specific rehab protocol is genuinely unknown.** No completed RCT shows superiority of CPM vs PT vs delayed PT — the SET-Study (Stiff Elbow Trial) was designed precisely because this question is unresolved, with three real-world arms (in-hospital CPM + early PT / in-hospital early PT / outpatient PT from POD7–10). CPM is cited in protocols (home use to ~4 weeks) and one arthroscopic- release series reports very good 3-year outcomes with a 4-week CPM rail plus PT, but CPM has **never been shown superior to supervised PT alone**. So: **strong consensus on aggressive early motion; weak/equipoise evidence on which adjunct.**

SPLINTING MODALITY (MODERATE — NO CLEAR WINNER)

Static-progressive, dynamic, serial-static and turnbuckle splinting all deliver low-load prolonged end-range stretch. The **Lindenhovius RCT found no difference between dynamic orthoses and static-progressive splinting** (similar DASH). Static-progressive (inelastic, patient-adjusted incremental torque) is the favoured modality for elbow flexion contractures. Reviews recommend the splinting program run for **at least ~3 months** post-operatively for optimal final ROM. Bracing alone can rival surgery for non-osseous stiffness with far lower neurovascular risk.

HO PROPHYLAXIS (CONSENSUS — EXTRAPOLATED EVIDENCE)

Indomethacin (commonly 25 mg TID, or 75–100 mg/day, for 3–6 weeks) ± single-dose perioperative radiotherapy is widely used after release, especially with HO excision or high-energy trauma. Most HO-prophylaxis RCT evidence is **extrapolated from acetabular/hip surgery**, not elbow-specific. Recurrent HO / arthrofibrosis responds to repeat excision + release.

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RECOVERY TRAJECTORY AND PLATEAU (MODERATE — COHORT DATA)

Published series report patients reach their **maximum arc of motion at a mean of ~16 weeks**, with **most recovery occurring between 6 weeks and 3 months**, and maintained gains at ~15-month follow-up in large cohorts. Growth-mixture modelling found **no pre-operative ROM threshold or factor reliably predicted the recovery trajectory** — so all patients are counselled on the same ~16-week timeline pre-operatively.

ULNAR NERVE (CONSENSUS)

As flexion improves post-release, the **ulnar nerve sees increased stress** — there should be a low threshold for review, and for concomitant ulnar nerve decompression/transposition at the time of surgery. Tobacco use predicts poorer outcomes and higher complication rates after open arthrolysis.

Evidence strength flags (summary)

- **STRONG (consensus across case series/reviews):** immediate aggressive active-assisted + passive motion from POD1 to hold the intra-operative arc — no protection phase.
- **MODERATE (RCT/cohort, equipoise):** *which* adjunct is best — CPM vs PT vs delayed PT (SET-Study, no completed superiority data); splinting modality (Lindenhovius RCT: no difference dynamic vs static-progressive); ~16-week plateau and maintained gains (growth-mixture-modelling and large open-release cohorts).
- **CONSENSUS / EXTRAPOLATED:** HO prophylaxis (indomethacin ± single-dose RT; most evidence extrapolated from acetabular/hip surgery); ≥ 3-month splinting program duration.

Overall topic flag: MODERATE — strong consensus on the principle (aggressive early motion + adjunct splinting + HO prophylaxis), weak/equipoise evidence on the specific adjunct.

CITATIONS

RAG CORPUS (180,000+ ORTHOPAEDIC ARTICLES)

- Sun Z, Wang W, Fan C. Tobacco use predicts poorer clinical outcomes and higher post-operative complication rates after open elbow arthrolysis. *Arch Orthop Trauma Surg*. 2019.
- Open elbow release for post-traumatic stiffness — growth-mixture-modelling cohort: maximum arc of motion at a mean of ~16 weeks, most recovery between 6 weeks and 3 months.
- 103-patient open capsular release series — significant, maintained flexion/extension and supination/pronation arc gains at a mean of 15 months.
- Papatheodorou LK, Sotereanos DG (University of Pittsburgh) — elbow contracture release techniques review.

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- Lindenhovius et al. RCT — no difference between dynamic orthoses and static-progressive splinting (cited within a retrieved review).
- Retrieved technique text: indomethacin 25 mg TID for ~6 weeks for HO prophylaxis; CPM continued at home up to 4 weeks, full range 0–145° with a bolster behind the elbow.
- Northwestern series — HO excision + contracture release: ROM gains and complications.
- Arthroscopic release + 4-week CPM rail series — very good ROM, function and quality of life at a mean of 3 years.

PUBLISHED PROTOCOLS / REVIEWS (URLS)

- Papadopoulos et al. Elbow contracture release. *Annals of Joint* (PT from POD1; flexion bias the first 2 weeks then full ROM over 2–3 months; dynamic / static-progressive splinting ≥ 3 months; CPM optional). https://aoj.amegroups.org/article/view/6083/html
- SET-Study (Stiff Elbow Trial) protocol — CPM vs PT vs delayed PT RCT; documents that the best rehab protocol is unknown. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5700741/
- Analysis of Long-Term Outcomes Following Surgical Contracture Release of the Elbow — immediate splint in full extension, splint off POD1, AAROM started POD1, OT/PT-guided self-directed program, no CPM. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8152451/

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