CQ HAND + UPPER LIMB
SPECIALIST ORTHOPAEDIC SURGEON

EVIDENCE SUMMARY

MCP Joint Replacement

Silicone (Swanson) MCP Joint Arthroplasty – Procedure Outcomes & Post-operative Rehabilitation

Topic scope: post-operative rehabilitation after **silicone (Swanson) replacement of the metacarpophalangeal (MCP) joints** – flexible silicone-elastomer spacer arthroplasty of the knuckle joints, most often for the **rheumatoid hand** with ulnar drift and volar subluxation, and less commonly for **MCP osteoarthritis**. This is a *resection-replacement with soft-tissue rebalancing*, not a simple decompression: the deforming forces that destroyed the joint (ulnar drift, extensor subluxation, intrinsic tightness) are still present, so the rehabilitation is an **active, splint-driven re-shaping programme**, not a rest-and-protect pathway.

> *Defining principle of the rehab here: a silicone MCP implant is a flexible spacer around which a new fibrous capsule ("encapsulation") forms over the first weeks – and that capsule remodels in whatever position the hand is held. The classic post-operative regime therefore uses a dynamic extension outrigger splint that holds the MCPs in extension with slight radial deviation (opposing the ulnar drift) while permitting early controlled active flexion against elastic loops. Move early, but only in the corrected position: this is what reverses the drift and builds a functional flexion arc. The single biggest branch point is the diagnosis – the rheumatoid hand drifts and recurs far more readily than the osteoarthritic hand and warrants more diligent, more prolonged radial-deviation splinting.*

A. PROCEDURE OUTCOMES (rheumatoid and osteoarthritis)

Silicone MCP arthroplasty is a **deformity-correcting, pain-relieving** operation rather than a motion- or strength-restoring one. Its great strength is reliable correction of alignment and relief of pain; its accepted

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limitations are a modest final arc, gradual implant fracture over years, and—in rheumatoid hands—a tendency to recurrent drift.

- **In rheumatoid arthritis it produces durable improvement in deformity, appearance and patient-reported function.** The multicentre prospective **SARA (Silicone Arthroplasty in Rheumatoid Arthritis)** cohort compared 70 surgical with 93 non-surgical RA patients with severe MCP deformity: the surgical group showed significant, sustained gains in the Michigan Hand Outcomes Questionnaire and in **ulnar deviation, extensor lag and arc of motion**, maintained at 1 year, at long-term (3-year) follow-up, and out to **7 years**, whereas the non-surgical cohort did not improve [Chung 2009; Chung 2012; Chung 2017]. *Moderate–strong (prospective comparative cohort; not randomised).*
- **Correction of ulnar drift and extensor lag is the headline result; arc and grip gains are modest.** Series consistently report large reductions in ulnar deviation and extensor lag with a re-centred, more functional arc (commonly a final arc on the order of ~40–50° centred nearer extension), with grip strength only modestly changed. The operation buys **alignment, pain relief and hand appearance/function**, not power [Goldfarb & Dovan 2006; Rizzo 2011; Kirschenbaum 1993]. *Moderate.*
- **For MCP osteoarthritis, long-term results are favourable and durable.** A long-term series of silicone MCP arthroplasty for OA reported lasting pain relief and satisfactory function, with better-preserved bone stock and less recurrent deforming force than the rheumatoid hand [Morrell & Weiss 2018]. *Moderate.*
- **Implant fracture accrues with time but is often clinically silent.** Long-term radiographic follow-up shows **implant fracture rates rising over the years**, yet many fractured implants remain asymptomatic and revision is driven by symptoms/instability rather than radiographic fracture alone [Koenuma 2024; Kirschenbaum 1993]. *Moderate.*
- **Revision is uncommon but defined**, most often for recurrent deformity, implant fracture/instability or infection; revision MCP arthroplasty is feasible but technically demanding with poorer results than primary surgery [Wagner 2019; Carlson Strother 2023]. *Moderate.*

B. REHABILITATION / THERAPY EVIDENCE

The central rehab questions are (1) which splint regime, and (2) does adding continuous passive motion or particular splint variants change the outcome. The evidence base is **dominated by a strong heritage regime (Swanson-style dynamic extension splinting) supported mostly by expert consensus and low-level studies**, with the few controlled comparisons failing to show benefit from add-ons. The rehabilitation is nonetheless indispensable — it is integral to the operation, not an optional adjunct.

- **The standard regime is a dynamic extension outrigger splint with early controlled motion.** Fitted within the first few days, it holds the MCPs in **extension and slight radial deviation** at rest and permits **active flexion against finger slings**, worn essentially continuously for ~6 weeks then weaned to night/rest splinting. The shared aim across published regimes is to encourage MCP flexion and extension **without recurrence of flexion contracture or ulnar deviation** while the capsule encapsulates the implant in a corrected position [Goldfarb & Dovan 2006; Massy-Westropp Cochrane 2008]. *Consensus / heritage — widely practised, low-level evidence.*

- **Adding continuous passive motion (CPM) to dynamic splinting does not help.** The Cochrane review identified a single small controlled trial (22 participants) comparing dynamic splinting ± CPM and concluded **CPM is not effective at increasing motion or strength** after MCP arthroplasty (controls actually gained more motion); it rated the evidence "silver level" and called for well-designed RCTs given wide practice variation [Massy-Westropp Cochrane 2008]. *Moderate (Cochrane SR of low-certainty primary evidence).*
- **A static-splint alternative achieves comparable correction in small studies.** A prospective series using **alternating static flexion/extension splints** (rather than a dynamic outrigger) reported improved total active arc (21.6°→47.2°) and corrected ulnar deviation (30.4°→9.7°), suggesting the *position held* and active motion matter more than the specific splint mechanism [Burr/Massy-Westropp J Hand Ther 2002]. *Weak (small prospective cohort).*
- **The specific dynamic-splint protocol has not been shown superior to simpler regimes in controlled comparison.** A randomised study found **no clear added value of dynamic splinting** over a simpler post-operative regime for MCP replacement, reinforcing that the dynamic outrigger is a sound, traditional default rather than a proven optimum [Delaney 2003]. *Weak–moderate (small RCT).*

RECOVERY TRAJECTORY (EXPECTED, EVIDENCE-ANCHORED)

Phase	Window	Splint / position	Hand-therapist focus	Strength / load	Notes
I – Dynamic extension splint + early controlled motion	**Week 0–~6**	**Dynamic extension outrigger** worn day & night; MCPs in **extension + slight radial deviation**	Controlled **active MCP flexion within the splint** (toward the surgeon's arc, often up to ~70°); **active extension** (correct extensor lag); **radial-deviation re-education**; free IP/ wrist; oedema control	Light unloaded use only; **no grip/pinch, no ulnar load**	Capsule forms now – position held = position kept. Rheumatoid hands need the most diligent radial pull
II – Wean to night/rest splint, consolidate correction	**Week ~6–12**	Wean dynamic splint → **night/resting extension splint** (longer at night in RA)	Progress active/active-assisted flexion–extension out of splint, biased to extension + radial; scar massage once healed; preserve correction	Still **no strong grip/pinch**; light functional tasks	Recurrent ulnar drift is the main late failure – guard alignment
III – Strengthening & return	**Week ~12+**	Night splint as indicated (esp. RA)	Graded **putty/ball grip and pinch**, isometric MCP	Begin grip strengthening ~8–12 wk, build gradually; coach	Most everyday activity by ~3 months; alignment/ comfort/arc

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Phase	Window	Splint / position	Hand-therapist focus	Strength / load	Notes
			control, functional/ task strengthening	non-ulnar-deviating grip	settle over several more months

(Phase windows mirror the patient protocol; they are typical, heritage-based guides — not trial-derived deadlines.)

C. KEY CONTROVERSIES / EVIDENCE QUALITY

1. **Heritage regime, modest evidence.** The Swanson-style dynamic extension outrigger with early controlled motion is **deeply established and near-universally taught**, but its supporting evidence is largely expert consensus and small/low-level studies. The defensible position is to follow the heritage regime faithfully while acknowledging its evidence tier [Goldfarb & Dovan 2006; Massy-Westropp Cochrane 2008]. *Consensus.*
2. **Which splint?** Dynamic outrigger vs alternating static splints vs simpler regimes give broadly similar correction in small studies; **CPM adds nothing**. What matters is holding the MCPs in extension + radial deviation while moving early — the mechanism of the splint is secondary [Massy-Westropp Cochrane 2008; Burr 2002; Delaney 2003]. *Weak–moderate.*
3. **Rheumatoid vs osteoarthritis.** The **rheumatoid** hand has ongoing deforming forces (tendon subluxation, intrinsic tightness, soft-tissue laxity) and **recurs**, demanding more prolonged radial-deviation/night splinting and joint protection; the **osteoarthritic** hand has better bone and soft tissue and a more durable correction [Morrell & Weiss 2018; Rizzo 2011]. *Moderate.*
4. **Realistic goals.** The operation reliably delivers **pain relief, corrected alignment and a functional arc**, not a normal or powerful hand. Mis-set expectations (large grip gains) are a common source of dissatisfaction [Chung patient-expectations 2015; SARA cohort]. *Moderate.*
5. **Implant fracture ≠ failure.** Radiographic implant fracture accrues over years but is frequently asymptomatic; revision is symptom-driven. Counsel accordingly rather than revising on imaging alone [Koenuma 2024; Wagner 2019]. *Moderate.*

D. EVIDENCE STRENGTH FLAGS (summary)

- **MODERATE–STRONG:** silicone MCP arthroplasty improves deformity, alignment (ulnar deviation, extensor lag), MHQ and arc versus non-surgical care in severe rheumatoid MCP disease, durable to 7 years (SARA prospective cohort — comparative, not randomised).
- **MODERATE:** correction-over-power outcome profile; favourable long-term OA results; time-related implant fracture (often asymptomatic); defined but uncommon revision rate; greater recurrence in rheumatoid than osteoarthritic hands.

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- **WEAK / CONSENSUS / HERITAGE:** the specific **dynamic-extension-outrigger + early-controlled-flexion + radial-deviation** rehabilitation programme (strong heritage, low-level evidence; CPM shown unhelpful; dynamic vs static vs simpler regimes not clearly differentiated); exact phase timings (typical, not trial-derived).

CITATIONS

RAG CORPUS (180,000+ ORTHOPAEDIC ARTICLES)

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MCP ARTHROPLASTY OUTCOMES & REHABILITATION LITERATURE (URLS)

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