CQ HAND + UPPER LIMB
SPECIALIST ORTHOPAEDIC SURGEON

EVIDENCE SUMMARY

Total Shoulder Arthroplasty

Anatomic Total Shoulder Arthroplasty — Post-operative Rehabilitation

Topic scope: Post-operative rehabilitation after **anatomic total shoulder arthroplasty (aTSA)** for glenohumeral arthritis. (Reverse total shoulder arthroplasty has a different rehab logic — see the reverse-shoulder-arthroplasty protocol; the early in-hospital phase of either is covered by the inpatient-shoulder-replacement protocol.)

> *Defining principle of this rehab — PROTECT THE SUBSCAPULARIS: to reach the joint in an anatomic TSA the surgeon usually takes down and then repairs the **subscapularis** (by tenotomy, peel, or a lesser-tuberosity osteotomy). That repair is the structure rehabilitation must protect. So the early plan is the mirror image of a frozen-shoulder release: **external rotation is limited, and active/resisted internal rotation is delayed**, to avoid pulling the subscapularis repair apart — while **early passive forward elevation is encouraged** so the shoulder does not stiffen. This subscapularis-protection logic is the key difference from reverse arthroplasty (which usually has no subscapularis repair to guard) and the reason aTSA rehab is more measured.*

A. THE PROCEDURE (what is being protected)

Anatomic TSA resurfaces the arthritic joint with a metal humeral head and a plastic glenoid, restoring the normal ball-and-socket mechanics — which depends on an **intact, balanced rotator cuff** (the indication that distinguishes it from reverse arthroplasty). The **subscapularis management** is the rehab-defining variable:

- **Subscapularis tenotomy / peel with tendon-to-tendon or transosseous repair**, or
- **Lesser-tuberosity osteotomy (LTO)** — repaired bone-to-bone.

Either way, the repair governs the early external-rotation limit and the delay before active and resisted internal rotation. The **specific ER ceiling and the IR-loading timeline are surgeon-set** (they depend on repair quality and tissue) — the patient protocol follows the surgeon's chosen limits, and the phase table below reflects them.

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B. POST-OPERATIVE PHASED TIMELINE (subscapularis-protective)

Consistent with the protocol's phases (Protection → Intermediate → Transitional → Advanced). Sling supports the arm; passive elevation early; ER capped and active/resisted IR withheld until the subscapularis has healed.

Phase	Window	Sling	ROM	Strengthening	Notes
I – Protection	**Week 0–3**	Full-time (off for hygiene + exercises)	**Passive** elevation + gentle ER **to the surgeon's limit only**; pendulums; hand/elbow free	None	Protect subscapularis repair; no active shoulder motion; no behind-the-back / forced ER
II – Intermediate	**Week 4–6**	Weaning	Progress passive → active-assisted elevation; ER advanced within limit	Scapular setting / isometrics as allowed	Subscapularis still protected – no resisted internal rotation
III – Intermediate continued	**Week 7–8**	Off	Active ROM all planes progressing toward full	Begin gentle cuff (incl. graded IR) + scapular work	Subscapularis repair healing – IR loading introduced cautiously
IV – Transitional	**Week 9–11**	Off	Full active ROM goal	Progressive resistance, low load → higher	–
V – Advanced strengthening	**Week 12–16**	Off	Full, incl. rotation at 90° abduction	Advanced strength/ endurance; overhead stability	Return to sport/heavy use on surgeon clearance, individualised

C. KEY CONTROVERSIES / EVIDENCE QUALITY

1. **Subscapularis management** – tenotomy vs peel vs lesser-tuberosity osteotomy. Healing and functional-IR recovery drive the ER-restriction and IR-loading timeline; biomechanical and clinical data inform but do not settle the choice. *Moderate (biomechanical + cohort).*
2. **Early vs delayed / immobilisation** – a single-blind RCT comparing early rehabilitation versus immobilisation after shoulder arthroplasty found broadly comparable outcomes, supporting a measured but

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not ultra-conservative early plan; subscapularis protection remains the governing constraint. *Moderate (RCT).*

3. **The phase timeline itself is consensus/expert** (institutional protocols — MGH, BWH — and surgeon practice), not a defining rehab RCT. Phase weeks are typical, surgeon-adjustable. *Weak/consensus.*

D. EVIDENCE STRENGTH FLAGS (summary)

- **MODERATE (RCT / biomechanical / cohort):** early-rehab-vs-immobilisation after shoulder arthroplasty (RCT); subscapularis repair-technique biomechanics; durability/outcome of aTSA.
- **WEAK / CONSENSUS:** the specific subscapularis-protective phase structure and ER/IR restriction timings (institutional protocols + surgeon preference; no defining rehab RCT).
- **CONTEXT:** the protocol's measured early phase is appropriately keyed to subscapularis healing rather than the calendar.

CITATIONS

RAG CORPUS (180,000+ ORTHOPAEDIC ARTICLES)

- A randomized single-blinded trial of early rehabilitation versus immobilization after shoulder arthroplasty. *J Shoulder Elbow Surg*. 2020. DOI: 10.1016/j.jse.2019.10.005
- A biomechanical evaluation of three surgical techniques for subscapularis repair. *J Shoulder Elbow Surg*. 2007. DOI: 10.1016/j.jse.2007.04.016
- Deltoid fatigue part 2: a longitudinal assessment of anatomic total shoulder arthroplasty. *J Shoulder Elbow Surg*. 2021. DOI: 10.1016/j.jse.2021.07.019

PUBLISHED REHAB PROTOCOLS (BASIS FOR THE PHASE STRUCTURE)

- Massachusetts General Brigham Sports Medicine. Rehabilitation Protocol for Total Shoulder Arthroplasty and Hemiarthroplasty (rev. Dec 2018). https://www.massgeneral.org/assets/MGH/pdf/orthopaedics/sports-medicine/physical-therapy/rehabilitation-protocol-for-total-shoulder-arthroplasty-and-hemi.pdf
- Brigham and Women's Hospital. Total Shoulder Arthroplasty / Hemiarthroplasty Protocol. https://www.brighamandwomens.org/assets/bwh/patients-and-families/pdfs/shoulder–total-shoulder-arthroplasty-protocol.pdf

> *Note on the rehab evidence: there is no single defining RCT for the anatomic-TSA rehab protocol. The phase structure is the originating-institution / surgeon consensus, and the external-rotation ceiling and internal-*

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rotation loading timeline are deliberately keyed to ***subscapularis repair healing*** *– a surgeon-set, tissue-dependent decision. Treat phase weeks as typical, surgeon-adjustable defaults.*

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