

Rehabilitation Guidelines for Standard Reverse Total Shoulder Arthroplasty (rTSA)

**Note: Revision surgery or cases involving bonegrafting procedures may undergo modifications to the below guideline. Additional restrictions or modifications will be listed in the last paragraph of the Operative Report and the therapy instructions.*

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- General Information
 - Total Recovery time is between 4-6 months depending on factors such as injury severity, patient sport/activity/age and type of repair.
 - Adherence to rehab protocol guidelines and restrictions is critical in avoiding re-injury or failures.
- Immobilization
 - Shoulder Abduction Immobilizer Sling should be worn for 8 weeks in uncontrolled environments (around dogs, kids, in crowds, etc.).
 - Sling should be worn while sleeping for 2 weeks.
 - Sling may be removed in controlled environments for light activity after 2 weeks.
 - Discontinue sling completely at 2 weeks.
- Personal Hygiene / Showering
 - Avoid getting incision/portal sites wet for 72 hours.
 - Ok to begin showering 72 hours after surgery (if no wound related issues).
 - Avoid baths, saunas, pools, lakes, etc. for four weeks.
 - DO NOT remove Dermabond Prineo adhesive dressing underneath primary dressing. This dressing should remain in place for a minimum of three weeks.

Expectations for outcomes

Reverse Total Shoulder Arthroplasty (rTSA) is designed for the treatment of glenohumeral (GH) arthritis when it is associated with irreparable rotator cuff tears, complex fractures, severe glenoid deformity from dysplasia or wear, or for a revision of a previously failed conventional Total Shoulder Arthroplasty (TSA).

Previous rehabilitation guidelines for rTSA limited motion particularly internal rotation for fears of instability. Newer rTSA designs along with improved accuracy of implant placement make instability after rTSA much less common and allows for more immediate, unrestricted range of motion.

The following are *general rehabilitation management concepts* to consider for a postoperative physical therapy rTSA program:

- **Joint protection:** There is still a small but higher risk of shoulder dislocation following rTSA than a conventional TSA. Patient directed motion is still key. Forced manipulation by the therapist is forbidden.
- **Deltoid function:** Stability and mobility of the shoulder joint is now dependent upon the deltoid and periscapular musculature. This concept becomes the foundation for the postoperative physical therapy management for a patient that has undergone rTSA.
- **Range of motion:** Range of motion expectation is set on a case-by-case basis depending upon underlying pathology. Normal/full active range of motion of the shoulder joint following rTSA is not always expected.

Reverse Total Shoulder Arthroplasty Biomechanics

The rTSA prosthesis reverses the orientation of the shoulder joint by replacing the glenoid fossa with a glenoid base plate and glenosphere and the humeral head with a shaft and concave cup. This prosthesis design alters the center of rotation of the shoulder joint by moving it medially and inferiorly. This subsequently increases the deltoid moment arm and deltoid tension, which enhances both the torque produced by the deltoid as well as the line of pull / action of the deltoid. This enhanced mechanical advantage of the deltoid compensates for the deficient RC as the deltoid becomes the primary elevator of the shoulder joint. This results in an improvement of shoulder elevation and often individuals are able to raise their upper extremity overhead.



Figure 1. Anterior Posterior radiograph of a left shoulder with rotator cuff arthropathy. The superiorly migrated humeral head indicates rotator cuff deficiency.



Figure 2. Reverse Total Shoulder Arthroplasty Components. The prosthesis has 5 parts: the glenoid base, the glenosphere, a polyethylene cup, humeral neck, and the humeral stem.



Figure 3. Anterior Posterior radiography of a shoulder after reverse total shoulder arthroplasty.

Reverse Total Shoulder Arthroplasty Protocol:

The intent of this rehabilitation protocol is to provide the physical therapist with a guideline/treatment protocol for the postoperative rehabilitation management for a patient who has undergone a Reverse Total Shoulder Arthroplasty (rTSA). It is not intended to substitute for a physical therapist's clinical decision making regarding the progression of a patient's postoperative rehabilitation based on the individual patient's physical exam/findings, progress, and/or the presence of postoperative complications. If the physical therapist has questions or requires assistance in the progression of a postoperative patient who has had rTSA the therapist should consult with the referring surgeon.

The scapular plane is defined as the shoulder positioned in 30 degrees of abduction and forward flexion with neutral rotation. Range of motion (ROM) performed in the scapular plane should enable

appropriate shoulder joint alignment.

Shoulder Dislocation Precautions:

- Active shoulder motion behind the back by the patient can be performed but should not be forced.
- External rotation beyond 45-60 degrees for 8 weeks.

Surgical Considerations:

- The surgical approach needs to be considered when devising the postoperative plan of care.
- Traditionally rTSA procedure is done via a typical **deltpectoral approach**, which minimizes surgical trauma to the anterior deltoid.
- The start of this protocol is intended to start 4-6 weeks following rTSA for a revision and/or in the presence of poor bone stock based on the surgeon's assessment of the integrity of the surgical repair. In the case of a delayed start to physical therapy adjust below timeframes so that day 1 is the first day of physical therapy.

Progression to the next phase is based on Clinical Criteria and Time Frames as appropriate

Phase I – Immediate Post-Surgical Phase/Joint Protection (Day 1-2 weeks):

Goals:

- Patient and family independent with:
- Joint protection
- Passive range of motion (PROM)
- Assisting with putting on/taking off sling and clothing
- Assisting with home exercise program (HEP)
- Cryotherapy
- Promote healing of soft tissue / maintain the integrity of the replaced joint.
- Enhance PROM.
- Restore active range of motion (AROM) of elbow/wrist/hand.
- Independent with activities of daily living (ADL's) with modifications.
- Independent with bed mobility, transfers and ambulation or as per pre-admission status.

Phase I Precautions:

- Sling is worn for 2 weeks postoperatively and only removed for exercise and bathing once able. The use of a sling often may be extended for a total of 6 weeks, if the current rTSA procedure is a revision surgery.
- While lying supine, the distal humerus / elbow should be supported by a pillow or towel roll to avoid shoulder extension. Patients should be advised to “always be able to visualize their elbow while lying supine.”
- No shoulder active ROM.
- No lifting of objects with operative extremity.
- No supporting of body weight with involved extremity.
- Keep incision clean and dry (no soaking/wetting for 4 weeks)
- No whirlpool, Jacuzzi, ocean/lake wading for 4 weeks.
- **Acute Care Therapy (Day 1 to 4):**
 - Begin passive ROM in supine after complete resolution of interscalene block.
 - Forward flexion and elevation in the scapular plane in supine to 90 degrees.
 - External rotation (ER) in scapular plane to available ROM as indicated by operative findings. Typically around 20-30 degrees.
 - No Internal Rotation (IR) ROM.
 - Active/Active Assisted ROM (A/AAROM) of cervical spine, elbow, wrist, and hand.
 - Begin periscapular sub-maximal pain-free isometrics in the scapular plane.
 - Continuous cryotherapy for first 72 hours postoperatively, then frequent application (4-5 times a day for about 20 minutes).
 - Ensure patient is independent in bed mobility, transfers and ambulation
 - Ensure proper sling fit/alignment/ use.
 - Instruct patient in proper positioning, posture, initial home exercise program
 - Provide patient/ family with written home program including exercises and protocol information.
- **Day 5 to 14:**
 - Continue all exercises as above (typically 2-3 times per day).
 - Begin sub-maximal pain-free deltoid isometrics in scapular plane (avoid shoulder extension when isolating posterior deltoid.)
 - Frequent (4-5 times a day for about 20 minutes) cryotherapy.
- **2 Weeks to 6 Weeks:**

- Progress exercises listed above.
- Progress PROM:
 - Forward flexion and elevation in the scapular plane in supine to 120 degrees.
 - ER in scapular plane to tolerance, respecting soft tissue constraints.
 - Gentle resisted exercise of elbow, wrist, and hand.
 - Continue frequent cryotherapy.
- **Criteria for progression to the next phase (Phase II):**
 - Tolerates shoulder PROM and isometrics; and, AROM - minimally resistive program for elbow, wrist, and hand.
 - Patient demonstrates the ability to isometrically activate all components of the deltoid and periscapular musculature in the scapular plane.

Phase II –Active Range of Motion / Early Strengthening Phase (Week 2 to 12):

Goals:

- Continue progression of PROM (full PROM is not expected).
- Gradually restore AROM.
- Control pain and inflammation.
- Allow continued healing of soft tissue / do not overstress healing tissue.
- Re-establish dynamic shoulder and scapular stability.

Phase II Precautions:

- Due to the potential of an acromion stress fracture one needs to continuously monitor the exercise and activity progression of the deltoid. A sudden increase of deltoid activity during rehabilitation could lead to excessive acromion stress. A gradually progressed pain free program is essential.
- In the presence of poor shoulder mechanics avoid repetitive shoulder AROM exercises/activity.
- Restrict lifting of objects to no heavier than a glass of milk.
- No supporting of body weight by involved upper extremity.
- **Week 6 to Week 8:**
 - Continue with PROM program.
 - At 6 weeks post op start PROM IR to tolerance (not to exceed 50 degrees) in the scapular plane.
 - Begin shoulder AA/AROM as appropriate.
 - Forward flexion and elevation in scapular plane in supine

with progression to sitting/standing.

- ER and IR in the scapular plane in supine with progression to sitting/standing.
- Initiate gentle scapulothoracic rhythmic stabilization and alternating isometrics in supine as appropriate. Minimize deltoid recruitment during all activities /exercises.
- Progress strengthening of elbow, wrist, and hand.
- Gentle glenohumeral and scapulothoracic joint mobilizations as indicated (Grade I and II).
- Continue use of cryotherapy as needed.
- Patient may begin to use hand of operative extremity for feeding and light activities of daily living including dressing, washing.
- **Week 4 to Week 12:**
 - Continue with above exercises and functional activity progression.
 - Begin gentle glenohumeral IR and ER sub-maximal pain free isometrics.
 - Begin gentle periscapular and deltoid sub-maximal pain free isotonic strengthening exercises. Begin AROM supine forward flexion and elevation in the plane of the scapula with light weights (1-3lbs. or .5-1.4 kg) at varying degrees of trunk elevation as appropriate. (i.e. supine lawn chair progression with progression to sitting/standing).
 - Progress to gentle glenohumeral IR and ER isotonic strengthening exercises in sidelying position with light weight (1-3lbs or .5-1.4kg) and/or with light resistance resistive bands or sport cords.
 - Criteria for progression to the next phase (Phase III):
 - Improving function of shoulder.
 - Patient demonstrates the ability to isotonicly activate all components of the deltoid and periscapular musculature and is gaining strength.

Phase III – Moderate strengthening (Week 12 +)

Goals:

- Enhance functional use of operative extremity and advance functional activities.
- Enhance shoulder mechanics, muscular strength and endurance.
- Precautions:
 - No lifting of objects heavier than 20 lbs with the operative upper extremity
 - No sudden lifting or pushing activities.
- Week 12 to Week 16:
 - Continue with the previous program as indicated.

- Progress to gentle resisted flexion, elevation in standing as appropriate.

Phase IV – Continued Home Program (Typically 4 + months postop):

- Typically the patient is on a home exercise program at this stage to be performed 3-4 times per week with the focus on:
- Continued strength gains
- Continued progression toward a return to functional and recreational activities within limits as identified by progress made during rehabilitation and outlined by surgeon and physical therapist.
- Criteria for discharge from skilled therapy:
- Patient is able to maintain pain free shoulder AROM demonstrating proper shoulder mechanics. (Typically 80 – 120 degrees of elevation with functional ER of about 30 degrees.)
- Typically able to complete light household and work activities.