

Reverse Total Shoulder Protocol

General Information:

Reverse Total Shoulder Arthroplasty (rTSA) is designed specifically for the treatment of glenohumeral (shoulder) arthritis when it is associated with irreparable rotator cuff damage, complex fractures as well as for a revision of a previously failed conventional Total Shoulder Arthroplasty (TSA) in which the rotator cuff tendons are deficient. It was initially designed and used in Europe in the late 1980s by Grammont; and only received FDA approval for use in the United States in March of 2004.

The rTSA changes the orientation of the shoulder joint by replacing the glenoid (socket) with an artificial glenoid base plate and glenosphere ball; and the humeral head with a shaft and concave cup that both lateralizes and distalizes the humeral shaft. With the rTSA the center of the shoulder joint is moved medially and distally as compared to the normal shoulder joint, which in turn increases the deltoid lever arm and overall deltoid tension.

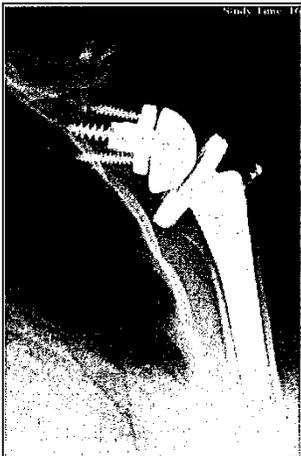


Fig. 1: x-ray of a reverse total shoulder showing the large half glenosphere, and the humeral side implants.

This design changes the biomechanics of the shoulder, thus enabling the new artificial joint to function when the rotator cuff is absent. Active humeral head depression from the rotator cuff is not required with rTSA. The deltoid compensates for rotator cuff deficiency and becomes the primary elevator of the shoulder joint. By recreating an appropriate center of rotation, functional range of motion may be restored.

The rotator cuff is either absent or minimally involved with the rTSA; therefore, the rehabilitation for a patient following the rTSA is different than the rehabilitation following a traditional TSA. The

surgeon, physical therapist and patient need to take this into consideration when establishing the postoperative treatment plan.

Important rehabilitation management concepts to consider for a postoperative physical therapy rTSA program are:

- Joint protection: There is a higher risk of shoulder dislocation following rTSA than a conventional TSA.

- o **Avoidance of shoulder extension past neutral and the combination of shoulder adduction and internal rotation should be avoided for 12 weeks postoperatively.**

- o **Patients with rTSA don't dislocate with the arm in abduction and external rotation. They typically dislocate with the arm in internal rotation and adduction in conjunction with extension. As such, tucking in a shirt with the**

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.

- Function: As with a conventional TSA, maximize overall upper extremity function, while respecting soft tissue constraints.

- ROM: Expectation for range of motion gains should be 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 expected.

The intent of this 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 by no means intended to be a 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 requires assistance in the progression of a postoperative patient who has had rTSA the therapist should consult with Dr. Herring.

The scapular plane is defined as the shoulder positioned in 30 degrees of abduction and forward flexion with neutral rotation. ROM performed in the scapular plane should enable appropriate shoulder joint alignment.

Shoulder Dislocation Precautions*:

- **No shoulder motion behind back. (NO combined shoulder adduction, internal rotation, and extension.)**

- **No glenohumeral (GN) extension beyond neutral.**

*Precautions should be implemented for 12 weeks postoperatively unless surgeon specifically advises patient or therapist differently.

Surgical Considerations:

The surgical approach needs to be considered when devising the postoperative plan of care.

- Traditionally rTSA procedure is done via a typical deltopectoral approach, which minimizes surgical trauma to the anterior deltoid. This is Dr. Herrings preferred approach unless other prior incisions do not allow this.
- Some surgeons perform this procedure via a superior approach, retracting the anterior deltoid from the anterior lateral one third of the clavicle. Upon surgical closure the anterior deltoid is sutured back to its anatomical location. In these cases early deltoid activity is contraindicated. We recommend a variation of the below protocol for patients who have had a superior approach. Patient's should use a sling for 4-6 weeks, not to begin deltoid isometrics for at least four weeks postoperatively, not to begin active range of motion (AROM) flexion for at least six weeks, and not begin deltoid strengthening for at least 12 weeks post operatively.
- The start of this protocol is delayed 3-4 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 Phase I–Immediate Post Surgical Phase/Joint Protection (Day 1-6 weeks):

Phase I Goals:

- Patient and family independent with:
 - o Joint protection
 - o Passive range of motion (PROM)
 - o Assisting with don / doff of sling and clothing
 - o Assisting with home exercise program (HEP)
 - o 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.

Phase I Precautions:

- Sling is worn for 3-4 weeks postoperatively. The use of a sling may be extended for a total of six weeks, often in a revision setting.
- While lying supine, the distal humerus / elbow should be supported by a pillow or towel roll to avoid shoulder hyperextension. Patients should be advised to "always be able to visualize their elbow while lying supine."
- No shoulder AROM.
- No lifting of objects with operative extremity.
- No supporting of body weight with involved extremity.
- Keep incision clean and dry (no soaking/wetting for 2 weeks); No whirlpool, Jacuzzi, ocean/lake wading for 4 weeks.

DAY ONE TO TWENTY-ONE:

Acute Care Therapy (Day One to Four):

- Begin PROM in supine after complete resolution of interscalene block.
 - o Forward flexion and elevation in the scapular plane in supine to 90 degrees.
 - o External rotation (ER) in scapular plane to available ROM as indicated by operative findings. Typically around 20-30 degrees.
 - o 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).

Day 5 to 21:

- Continue all exercises as above.
- Begin sub-maximal pain-free deltoid isometrics in scapular plane (avoid shoulder hyperextension when isolating posterior deltoid.)
- Frequent (4-5 times a day for about 20 minutes) cryotherapy.

3 WEEKS TO 6 WEEKS:

- Progress exercises as above.
- Progress PROM:
 - o Forward flexion and elevation in the scapular plane in supine to 120 degrees.
 - o ER in scapular plane to tolerance, respecting soft tissue constraints.
- At 6 weeks post op start PROM IR to tolerance (not to exceed 50 degrees) in the scapular plane.
- Gentle resisted exercise of elbow, wrist, and hand.
- Continue frequent cryotherapy.

Criteria for progression to the next phase (Phase II):

- Tolerates shoulder PROM and AROM 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 6 to 12):

Phase II 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 stability.

Phase II Precautions:

- Continue to avoid shoulder hyperextension.
- In the presence of poor shoulder mechanics avoid repetitive shoulder AROM exercises/activity.
- Restrict lifting of objects to no heavier than a coffee cup.
- No supporting of body weight by involved upper extremity.

WEEK 6 TO WEEK 8:

- Continue with PROM program.
- 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.
- Begin gentle GH IR and ER sub-maximal pain free isometrics.
- Initiate gentle scapulothoracic rhythmic stabilization and alternating isometrics in supine as appropriate. Begin gentle periscapular and deltoid sub-maximal pain free isotonic strengthening exercises, typically toward the end of the 8th week.
- Progress strengthening of elbow, wrist and hand.
- Gentle GH and scapulothoracic joint mobilizations as indicated (Grade I and II).
- Continue use of cryotherapy PRN.
- Patient may begin to use hand of operative extremity for feeding and light activities of daily living.

WEEK 9 TO WEEK 12:

- Continue with above exercises and functional activity progression.
- Begin AROM supine forward flexion and elevation in the plane of the scapula with light weights (1-3lbs.) at varying degrees of trunk elevation as appropriate. (i.e. supine lawn chair progression with progression to sitting/standing).
- Progress to gentle GH IR and ER isotonic strengthening exercises.

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 +)

Phase III Goals:

- Enhance functional use of operative extremity and advance functional activities.
- Enhance shoulder mechanics, muscular strength, power, and endurance.

Phase III Precautions:

- No lifting of objects heavier than six pounds (6 lbs.).
- No sudden lifting or pushing activities.

WEEK 12 TO WEEK 16:

- Continue with the previous program as indicated.
- Progress to gentle resisted flexion and elevation in standing as appropriate

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

Typically the patient is on a HEP 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.

This protocol was developed by Dr. Larry Higgins, Harvard University and his PT team.