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*Modified from the protocol developed at Boston Shoulder Institute by the Massachusetts General Hospital and Brigham & Women's Hospital Shoulder Services.*

## **Reverse Shoulder Arthroplasty (RSA) Protocol:**

### **General Information:**

Reverse or Inverse Total Shoulder Arthroplasty (RSA) is designed specifically for the treatment of: glenohumeral (GH) arthritis when it is associated with irreparable rotator cuff damage or with glenoid morphology that precludes implantation of a conventional or anatomic Total Shoulder Arthroplasty (TSA); complex fractures; revision of a previously failed TSA in which the rotator cuff tendons are deficient or glenoid bone stock is inadequate for implantation of an anatomic glenoid component.

The rotator cuff is either absent or minimally involved with the RSA function; therefore, the rehabilitation for a patient following the RSA is different than the rehabilitation following a traditional TSA. The surgeon, physiotherapist 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 RSA program are:

- Joint protection. There is a higher risk of shoulder dislocation following RSA than a conventional TSA.
- Avoidance of shoulder extension past neutral and the combination of shoulder adduction and internal rotation should be avoided for 12 weeks postoperatively.
- Patients with RSA 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 or performing bathroom / persona hygiene with the operative arm is an especially dangerous activity particularly in the immediate peri-operative phase.
- 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 who has undergone RSA.

- 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 RSA is not typically expected

The intent of this protocol is to provide the physiotherapist with a guideline of the post-operative rehabilitation course of a patient who has undergone a reverse shoulder arthroplasty (RSA). It is by no means intended to be a substitute for one's clinical decision-making regarding the progression of a patient's post-operative course based on their physical exam findings, individual progress, and/or the presence of post-operative complications. If a physiotherapist has a query or concern regarding the progression of a post-operative patient, he or she 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. 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 (GH) extension beyond neutral.
- \*Precautions should be implemented for 12 weeks postoperatively unless the surgeon specifically advises patient or therapist differently.

#### Surgical Considerations:

- The surgical approach needs to be considered when devising the postoperative plan of care.
  - Traditionally the RSA procedure is done via a typical deltopectoral approach, which minimizes surgical trauma to the anterior deltoid.
  - Some surgeons perform this procedure via a superior approach, retracting the anterior deltoid from the anterior lateral one third of the clavicle. This allows for superior exposure to the GH joint between the retracted anterior deltoid and the clavicle. Upon surgical closure the anterior deltoid is sutured back to its anatomical location. In these cases early deltoid activity is contraindicated. A variation of the below protocol is recommended for patients who have had a superior approach. These patients should use a sling for 4-6 weeks, should not begin deltoid isometrics for at least four weeks postoperatively, should not begin active range of motion (AROM) flexion for at least six weeks, and should not begin deltoid strengthening for at least 12 weeks post operatively.

**The start of this protocol is delayed 3-4 weeks following RSA 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 based on Clinical Criteria and/or Time Frames as appropriate.**

### **Phase I – Immediate Post Surgical Phase/Joint Protection (Day 1-6 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 4 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 RSA 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 AROM.
- No lifting of objects with operative extremity.
- No supporting of body weight with involved extremity.
- Keep incision clean and dry (no soaking for 2 weeks)

#### **Acute Care Therapy (Day 1 to 4):**

- Active/Active Assisted ROM (A/AAROM) of cervical spine, elbow, wrist, and hand
- 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 28:**

- Continue all exercises as above
- Begin pendulums at 2 weeks
- Begin PROM in supine at 3 weeks
  - 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) range of motion
- Frequent (4-5 times a day for about 20 minutes) cryotherapy.

#### **Week 5 to 6:**

- Begin sub-maximal pain-free deltoid isometrics in scapular plane (avoid shoulder extension when isolating posterior deltoid.)
- 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.
- Demonstrates the ability to isometrically activate all components of the deltoid and periscapular musculature in the scapular plane.

#### **Phase II –Active Range of Motion Phase (Week 6 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.

##### 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 progressive, pain-free programme is essential.

- 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 programme.
- 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 9 to Week 12:**

- Continue with above exercises and functional activity progression.
- Begin gentle glenohumeral IR and ER sub-maximal pain free isometrics.

#### 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 - Early/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 2.7 kg (6 lbs) with the operative upper extremity
- No sudden lifting or pushing activities.

**Week 12 to Week 16:**

- 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 0.5-1.4 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 0.5-1.4kg) and/or with light resistance resistive bands or sport cords.
- Progress to gentle resisted flexion, elevation in standing as appropriate.

**Phase IV – Continued Home Program (Typically 4 + months post-op):**

- 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 physiotherapist.

Criteria for discharge from supervised therapy:

- 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.