(PROTOCOL #18) REVERSE TOTAL SHOULDER ARTHROPLASTY PROTOCOL

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The following is a set of general guidelines. It is important to remember that each patient is different. The progression of the patient depends on many factors including age and medical health of the patient and physician preferences. Any Bracing is discontinued **ONLY UPON DIRECTION OF PHYSICIAN.**

General Information:

Reverse or Inverse Total Shoulder Arthroplasty (rTSA) is designed specifically for the treatment of glenohumeral (GH) 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 1980's by Grammont; and only received FDA approval for use in the United States in March of 2004.

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.

SHOULDER DISLOCATION PERCAUTIONS:

- **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 surgeon specifically advises patient or therapist differently.

Joint Protection: THERE IS A HIGHER RISK OF SHOULDER DISLOCATION FOLLOWING rTSA 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.**
- **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 or performing bathroom / personal hygiene with the operative arm is a particularly dangerous activity particularly in the immediate peri-operative phase.**

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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. Typically patients achieve double the AROM from pre-op level.
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.**

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 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.

Phase I Precautions:

- Sling is worn for 3-6weeks postoperatively. The use of a sling often may be extended for a total of 6 weeks, if the current rTSA procedure is a revision surgery or Tendon Transfer Procedure.
- 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/wetting for 2 weeks); No whirlpool, Jacuzzi, ocean/lake wading for 4 weeks.

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PHASE	FUNCTIONAL PROGRESSION/ACTIVITIES	GOALS/RESTRICTIONS
Post op to 4 days	OT elbow/hand ROM Putty and ADL modifications Begin PROM 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 Active/Active Assisted ROM (A/AAROM) of cervical spine, elbow, wrist and hand. Begin periscapular sub-maximal pain-free isometrics in the scapular plane. Frequent (4-5 times a day for about 20 minutes) cryotherapy. Continuous cryotherapy for the first 72 hours postoperatively, then frequent application (4-5 times a day for about 20 minutes).	DASH baseline and every 4 weeks Insure patient is independent in bed mobility, transfers and ambulation. Insure 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.
4 days to 3 weeks	Begin sub-maximal pain-free deltoid isometrics in scapular plane	Avoid shoulder extension when isolating posterior deltoid.

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PHASE	FUNCTIONAL PROGRESSION/ACTIVITIES	GOALS/RESTRICTIONS
3 weeks to 6 weeks	Progress exercises listed 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. 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 plan.
4 weeks	Gradually restore AROM Begin shoulder AA/AROM as appropriate. o 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.	Control pain and inflammation. Allow continued healing of soft tissue / do not overstress healing tissue. Re-establish dynamic shoulder and scapular stability. Patient may begin to use hand of operative extremity for feeding and light activities of daily living including dressing, washing.

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Phase II – Active Range of Motion / Early Strengthening Phase (Week 6 to 12):

PHASE	FUNCTIONAL PROGRESSION/ACTIVITIES	GOALS/RESTRICTIONS
6 weeks to 8 weeks	Continue progression of PROM (full PROM is not expected). Begin gentle glenohumeral IR behind back and ER sub-maximal pain free isometrics. Start PROM IR to tolerance (not to exceed 50 degrees) in the scapular plane. 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 glenohumeral and scapulothoracic joint mobilizations as indicated (Grade I and II). Continue use of cryotherapy as needed.	**BRACING DISCONTINUED UPON THE DIRECTION OF THE PHYSICIAN.** Continue with PROM program. **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.

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PHASE	FUNCTIONAL PROGRESSION/ACTIVITIES	GOALS/RESTRICTIONS
9 weeks to 12 weeks	Continue with above exercises and functional activity progression. Begin AROM supine forward flexion and elevation in the plane of the scapula with light weights (1-3 lbs of .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 (1-3 lbs or .5-1.4 kg) and /or with light resistance resistive bands or sports cords.	Criteria for progression to the next phase (Phase III): o Improving function of shoulder. o Patient demonstrates the ability to isotonically activate all components of the deltoid and periscapular musculature and is gaining strength.

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Phase III – Moderate strengthening (Week 12+)

PHASE	FUNCTIONAL PROGRESSION/ACTIVITIES	GOALS/RESTRICTIONS
12 weeks to 16 weeks	Continue with the previous program as indicated. Progress to gentle resisted flexion, elevation in standing as appropriate.	○ Enhance functional use of operative extremity and advance functional activities. ○ Enhance shoulder mechanics, muscular strength and endurance. **Precautions:** ○ No lifting of objects heavier than 6 lbs with operative upper extremity ○ No sudden lifting or pushing activities. **Activities**: Gradually increase activity **Golf**: pitching wedge to start in approx 6 months **Bowling**: **NOT RECOMMENDED** **Tennis**: same start slow gradually increase activity **Driving**: able to drive, monitor meds, steer with other arm following post-op **Shower**: usually after first dressing with watertight dressing **Throwing**: 6 months **Running**: 3 months

Refer to enclosed table for suggested exercises which optimize muscle function based on EMG activity.

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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.

Approved By:

Physician reserves the right to adjust these protocols for each patient.

Signature: _____ Date: _____
Robert M. Doane, M.D., P.C.

Signature: _____ Date: _____
Balu Pisupati, PT