

## Reverse Total Shoulder Arthroplasty

The intent of this guideline is to provide clinicians with general recommendations of the post-operative rehabilitation of patients after undergoing a Reverse/Inverse Total Shoulder Arthroplasty. This guideline is not intended to mandate the course of patient care including if there are concerns regarding the patient's clinical presentation post operatively. Please consult with the referring surgeon and consider patients past medical history (PMH) as well as intraoperative findings when adjustments to the guideline are necessary.

Reverse or Inverse Total Shoulder Arthroplasty (rTSA) is designed primarily for the treatment of glenohumeral (GH) arthritis when associated with an irreparable rotator cuff. Because of this, the mechanics of the GH joint have been altered and therefore the post-operative course will differ from that of an anatomic total shoulder replacement (TSA). The referring surgeon, physical therapist and patient must take this into consideration when establishing the post-operative treatment plan.

Important rehabilitation considerations with a rTSA include yet are not limited to:

- **Joint Protection:** There may be a higher risk of dislocation post-operatively following a rTSA when compared to an anatomic TSA and native shoulder. Dislocation precautions include:
  - Avoid shoulder extension beyond neutral as well as the combination of shoulder adduction, extension, and internal rotation. Recommend patient adhere to these precautions for a minimum of 10-12 weeks post-operatively.
- **Deltoid function:** Stability and mobility of the reversed shoulder joint are now primarily dependent upon the deltoid and periscapular musculature. This concept becomes the foundation for the post-operative physical therapy management for this population.

- **Tendon transfers:** In the setting of a rTSA with a deficient teres minor, the surgeon may opt to perform a tendon transfer during the surgery to provide the patient with a shoulder external rotation (ER) moment during functional activity. The type of tendon utilized is dependent on whether the patient is having a primary rTSA or a non-primary (secondary) rTSA. A primary rTSA is defined as a shoulder with no past surgical history while a non-primary or secondary rTSA is defined as a shoulder that has had previous surgical interventions that have ultimately failed. While the post-operative course of treatment will not change drastically based on the type of tendon used, it is important to consult with the patient's surgeon prior to treatment. Neither tendon transfer will provide the patient with a powerful ER moment, it is performed to allow functional movement of the shoulder complex post operatively.
  - Latissimus Dorsi transfer (LDT): This is used in the setting of a primary rTSA with a deficient teres minor; the surgeon may perform a concomitant LDT to assist with shoulder ER during shoulder elevation.
  - Lower Trapezius transfer (LTT): This is used in the setting of a non-primary rTSA with a deficient teres minor; the surgeon may perform a concomitant LTT to assist with shoulder ER during shoulder elevation.

The start of physical therapy may be delayed per surgeon recommendations following a rTSA for many reasons, some being in the presence of a revision and/or with poor bone stock/quality where grafting may be necessary.

## Phase I –Post-Surgical Phase (Day 1-6 weeks)

### Goals:

- Joint protection
- Reduce acute pain and inflammation (cryotherapy)
- Patient education: donning/doffing sling, positioning, activity restrictions, dislocation precautions
- Home Exercise Program (HEP)
- Restore active range of motion (AROM) of elbow, wrist, and hand
- Independent with basic activities of daily living (ADLs), bed mobility, transfers, and ambulation
- Begin gentle passive (PROM) and active assisted range of motion (AAROM) of the shoulder
  - This goal should be implemented closer to the 6<sup>th</sup> week and may be delayed in the presence of a tendon transfer and/or a subscapularis repair during surgery to avoid stressing any soft tissue repair.

### Precautions:

- Shoulder sling/immobilizer to be worn 4-6 weeks post-operatively (generally 4 weeks with isolated rTSA and up to 6 weeks with associated tendon transfer or subscapularis repair). Sling/immobilizer to be worn at all times except with HEP and bathing.
- Positioning: While in supine the humerus/elbow complex should be supported by a pillow or towel roll to avoid shoulder extension. Patient shoulder be advised to “always be able to visualize your elbow while on your back”



### Things to Avoid:




- No shoulder AROM
- No lifting post-operatively with the operative upper extremity
- No supporting of body weight with operative upper extremity (i.e., do not use arm on chair when transitioning in sit to stand)
- Keep incision clean and dry. No soaking incision for 2 weeks, no swimming, jacuzzi, or wading for 4 weeks.

### Interventions/Education:



- Activity modification
- Postural education
- Cryotherapy
- A/AAROM (pain-free) of elbow, wrist, and hand
- If indicated, discuss medical management (NSAID or analgesic medications) with referring surgeon

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<p><b>Shoulder hang:</b> 2-3x/day 5-10 repetitions</p> <p><b>ONLY WITH ISOLATED rTSA: do not perform if patient has concomitant tendon transfer or subscapularis repair</b></p> <p><b>Setup</b></p> <ul style="list-style-type: none"> <li>Begin in a standing position with your trunk bent forward, one arm resting on a table or counter surface for support and your other arm hanging toward the ground.</li> </ul> <p><b>Action.</b></p> <ul style="list-style-type: none"> <li>Allow your arm to hang (no motion) while in this position and do not incorporate movement.</li> </ul> <p><b>Tip</b></p> <ul style="list-style-type: none"> <li>This position will allow a gentle distraction at the joint.</li> </ul>	
<p><b>Isometric Scapular Retraction:</b> 2-3x/day 5-10 repetitions</p> <p><b>Setup</b></p> <ul style="list-style-type: none"> <li>Begin in sitting or in a standing upright position with your arms resting in your lap or at your sides. May be performed with sling/immobilizer on</li> </ul> <p><b>Movement</b></p> <ul style="list-style-type: none"> <li>Gently squeeze your shoulder blades together, then relax them and repeat.</li> </ul> <p><b>Tip</b></p> <ul style="list-style-type: none"> <li>Avoid shrugging your shoulders during the exercise. Try to keep your neck relaxed.</li> </ul>	

<p><b>Supine Shoulder Flexion Extension AAROM with Dowel/Stick: 2-3x/day 5-10 repetitions</b></p> <p><b>ONLY WITH ISOLATED rTSA: do not perform if patient has concomitant tendon transfer or subscapularis repair</b></p> <p><b>Setup</b></p> <ul style="list-style-type: none"> <li>Begin lying on your back. Hold a cane, dowel, or stick in both hands.</li> </ul> <p><b>Movement</b></p> <ul style="list-style-type: none"> <li>Use the cane, dowel, or stick to move your arms up over head and back down in a vertical direction.</li> </ul> <p><b>Tip</b></p> <ul style="list-style-type: none"> <li>Make sure to allow your non-operative arm to guide the motion with the dowel. Do not move through pain or arch your back.</li> <li>You will likely not move as far overhead as picture indicates</li> </ul>	 <div data-bbox="906 655 1555 850" style="border: 1px solid black; padding: 5px;"> <p>Please note, if supine AAROM shoulder flexion is too challenging for a patient or they are not ready for this activity, then it is recommended the patient does a counter forward bow exercise or a tabletop / counter slide as described below.</p> </div>  <div data-bbox="1144 907 1490 1339" style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> <li>• Standing with hands on a counter.</li> <li>• Gradually walk backwards till you feel a comfortable stretch in your shoulder.</li> <li>• Hold about 10 seconds.</li> <li>• Walk back to the counter.</li> <li>• 2-3 x / day; 5-10 repetitions</li> </ul> </div>
<p><b>Seated Elbow Flexion and Extension AROM: 2-3x/day 5-10 repetitions</b></p> <p><b>Setup</b></p> <ul style="list-style-type: none"> <li>Begin sitting upright in a chair with one arm straight at your side.</li> </ul> <p><b>Movement</b></p> <ul style="list-style-type: none"> <li>Bend your elbow upward as far as is comfortable, then straighten it and repeat.</li> </ul> <p><b>Tip</b></p> <ul style="list-style-type: none"> <li>Make sure to keep your movements slow and controlled.</li> </ul>	

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<p><b>Seated/Standing Shoulder Flexion Towel Slide at Tabletop/Counter: 2-3x/day 5-10 repetitions</b></p> <p><b>ONLY WITH ISOLATED rTSA: do not perform if patient has concomitant tendon transfer or subscapularis repair</b></p> <p><b>Setup:</b></p> <ul style="list-style-type: none"><li>• Begin sitting facing a table or stand facing a countertop with your hand resting flat on a towel.</li></ul> <p><b>Movement</b></p> <ul style="list-style-type: none"><li>• Slowly lean forward to slide your hand and towel across the table. Return to the starting position and repeat.</li></ul> <p><b>Tip</b></p> <ul style="list-style-type: none"><li>• Try to avoid shrugging your shoulder during the exercise and make sure your hand stays on the table.</li></ul>	 
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Criteria for progression to the next phase:

- Good understanding and compliance with dislocation precautions
- Progressing shoulder AA/PROM (in isolated rTSA)
- Good understanding of activity limits and necessary modifications
- Independence with HEP

## Phase II – Active Range of Motion/Early Strength Phase (7-12 weeks)

Goals:

- Joint protection
- Continue to address pain and inflammation (cryotherapy).
- Ensure functional AA/PROM are progressing with isolated rTSA and begin AA/PROM with rTSA with concomitant tendon transfers and/or subscapularis repair.
- Tolerates progressive active range of motion (AROM.)
- Patient will demonstrate the ability to gently and isometrically activate all components of the deltoid as well as scapula musculature.

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Precautions:

- Continue to comply with dislocation precautions

Things to Avoid:

- Avoid over-utilization/strengthening of deltoid complex secondary to potential risk of stressing the deltoid and acromion.
- In the presence of poor shoulder mechanics, avoid repetitive shoulder AA/AROM exercises/activities. Restrict lifting objects >1-2lbs. **NO resistance with rTSA that has concomitant tendon transfer or subscapularis repair until week 12 post-operative.**
- Avoid jerking, pushing, pulling activities.
- No supporting body weight with surgical arm.

Interventions/Education:

- Continue with previous exercises in phase I
- Continue with activity modification as appropriate and indicated
- Postural and positioning education
- Cryotherapy as needed
- A/AAROM (pain-free)

**AA/AROM Shoulder Supine Lawn Chair Progression: 2-3x/day 5-10 repetitions**

**Setup**

- Begin lying on your back starting with cane, stick or dowel as in phase 1, progressing to a towel then to active with no assist.

**Movement**

- Raise stick, towel or no device overhead keeping your elbows straight.

**Tip**

- Make sure to allow your supportive arm to guide the motion with the dowel. Do not move through pain or arch your back.



**Supine Shoulder Flexion Extension Range AROM: 2-3x/day 5-10 repetitions**

**Setup**

- Begin lying on your back with your knees bent and arms at your side.

**Movement**

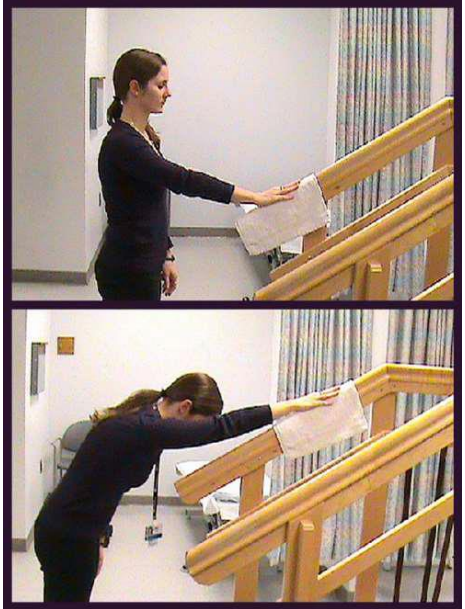

Keeping your elbow straight and thumb up, gently bring your arm up overhead.

**Tip**

- Make sure to keep your movements slow and controlled. Do not move through pain or arch your back.





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<p><b><u>Standing Rail Slide/Dusting: 2-3x/day 5-10 repetitions</u></b></p> <p><b>Setup</b></p> <ul style="list-style-type: none"> <li>• Begin standing with surgical arm on a towel on railing with elbow extended.</li> </ul> <p><b>Movement</b></p> <ul style="list-style-type: none"> <li>• Keeping your elbow straight, lean forward to slide your arm up the railing.</li> </ul> <p><b>Tip</b></p> <ul style="list-style-type: none"> <li>• Do not push into a painful range of motion.</li> </ul>	
<p><b><u>Seated Shoulder External Rotation AAROM with Cane and Hand in Neutral</u></b></p> <p><b>Setup</b></p> <ul style="list-style-type: none"> <li>• Begin sitting upright with a towel roll tucked under your involved arm, elbow bent at 90 degrees, holding a cane with your involved hand holding the handle.</li> </ul> <p><b>Movement</b></p> <ul style="list-style-type: none"> <li>• Using your uninvolved arm to move the cane, slowly rotate your involved arm outward, then bring it back to the starting position and repeat.</li> <li>• If subscapularis was repaired, be gentle/mindful to avoid overstressing repair during shoulder ER.</li> </ul> <p><b>Tip</b></p> <ul style="list-style-type: none"> <li>• Make sure to keep your elbow bent and let the movement come from your uninvolved arm.</li> </ul>	

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<p><b><u>Isometric Shoulder Flexion at Wall: 2-3x/day 5-10 repetitions with 5 second hold.</u></b></p> <p><b>Setup</b></p> <ul style="list-style-type: none"><li>• Begin in a standing upright position with your elbow bent 90 degrees, and a small towel between your fist and a wall.</li></ul> <p><b>Movement</b></p> <ul style="list-style-type: none"><li>• Push your arm directly into the wall, then relax and repeat.</li></ul> <p><b>Tip</b></p> <ul style="list-style-type: none"><li>• Make sure to keep your back straight during the exercise. There should be little to no movement.</li><li>• Do not shrug your shoulders.</li></ul>	
<p><b><u>Isometric Shoulder Adduction: 2-3x/day 5-10 repetitions with 5 second hold.</u></b></p> <p><b>Setup</b></p> <ul style="list-style-type: none"><li>• Begin in a standing upright position with your elbow bent at 90 degrees and a towel roll tucked in between your elbow and your body.</li></ul> <p><b>Movement</b></p> <ul style="list-style-type: none"><li>• Gently press your elbow into your side and hold.</li></ul> <p><b>Tip</b></p> <ul style="list-style-type: none"><li>• Make sure to keep your back straight during the exercise.</li></ul>	

**Standing Isometric Shoulder Abduction: 2-3x/day 5-10 repetitions with 5 second hold.**

**Setup**

- Begin in a standing upright position in the center of a doorway or next to a wall with your involved arm bent and a towel between your arm and the doorframe or wall.

**Movement**

- Gently press your arm out to the side into the towel. Hold, then relax and repeat.

**Tip**

- Make sure to maintain good posture and do not shrug your shoulder. There should be little to no movement during the exercise.



Criteria for progression to the next phase:

- Patient demonstrates improving functional use of shoulder.
- Patient can isometrically activate all segments of the deltoid and periscapular musculature.

## Phase III – Progressive Functional Phase (week 12+)

**Please Note: If a patient is struggling to achieve greater than 90 degrees of AROM shoulder forward flexion / elevation by 12 weeks, then it is advised that the patient's rehabilitation program be shifted to a Levy / Deltoid Lawn chair Progression Protocol.**

Goals:

- Enhance functional use of operative shoulder with advancement of functional activities specific to individual patient goals.
- Continue to educate importance of implementing appropriate shoulder mechanics, muscle strength and endurance.
- Continue with previous exercises.
- Progress AROM shoulder
- Initiate resistance exercises with rTSA with concomitant tendon transfers.
- Independence with a progressive HEP.

Precautions:

- Continue to be mindful of dislocation precautions.


Things to Avoid:


- No lifting of objects heavier than 2-6lbs (will vary per patient; consult surgeon for individual restrictions).
- Continue to avoid jerking, pushing, and pulling activities.

Interventions/Education:

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- Continue with previous exercises
- Continue with activity modification as appropriate
- Postural and positioning education
- Progress A/AAROM (pain-free)

<p><b><u>Standing Wall Slide/Dusting: 2-3x/day 5-10 repetitions</u></b></p> <p><b>Set up:</b></p> <ul style="list-style-type: none"> <li>• Begin standing with surgical arm on a flat wall surface hand on a towel.</li> </ul> <p><b>Movement:</b></p> <ul style="list-style-type: none"> <li>• Slowly slide your arm up the wall slowly until gentle stretch is felt, then slide down to starting position.</li> </ul> <p><b>Tip:</b></p> <ul style="list-style-type: none"> <li>• Make sure to maintain good posture and do not shrug your shoulder or arch back.</li> </ul>	
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<p><b><u>Seated Single Arm Shoulder Flexion: 2-3x/day 5-10 repetitions</u></b></p> <p><b>Setup</b></p> <ul style="list-style-type: none"> <li>• Begin sitting in an upright position.</li> </ul> <p><b>Movement</b></p> <ul style="list-style-type: none"> <li>• Slowly raise your arm in front of your body with your elbow straight and thumb facing forward. Slowly lower back down and repeat.</li> </ul> <p><b>Tip</b></p> <ul style="list-style-type: none"> <li>• As you raise your arm above shoulder height, do not to arch your back or shrug your shoulder.</li> <li>• Initially you may use your non-involved arm to assist with ascent and allow involved arm to descend independently (eccentric control).</li> </ul>	
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Criteria for progression to the next phase:

- Patient can maintain a pain-free shoulder AROM, demonstrating proper/modified shoulder mechanics with typical forward elevation 90-120 degrees.
- Able to demonstrate independence with HEP

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

Typically, patients following a reverse TSA require only functional strengthening activities. If other strengthening is indicated, the therapist should consult with the referring surgeon.

Goals/Criteria for discharge from skilled physical therapy:

- Patient can return to light household and work activities
- Patient can return to recreational activities within the limits identified by the patient's rehabilitation process and outlined by the surgeon and physical therapist.
- Patient is independent with HEP

Precautions:

- Continue to be mindful of dislocation precautions.

Things to Avoid:

- No lifting of objects heavier than 2-6 lbs. (will vary per patient surgeon and physical therapist, determined on individual patient basis).
- Continue to avoid jerking, pushing, and pulling activities.

**Is a BWH clinical competency associated with the document: Yes**

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### Reviewers

Reg B. Wilcox III, PT      May 2022  
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### Reverse Total Shoulder Arthroplasty Guideline

## Frequently Asked Questions

1. What are the dislocation precautions following an rTSA?
  - A combination of shoulder extension, adduction, and internal rotation.
2. In general, how long should a patient implement dislocation precautions following a rTSA?
  - Generally, 12 weeks, however PMH and intraoperative findings may alter this time frame. It is also recommended that the patient always be mindful of dislocation precautions beyond 12 weeks after surgery.
3. Why might a patient be delayed from beginning physical therapy after a rTSA?
  - Therapy may be delayed with patients that have had a rTSA for a failed TSA, a non-union fracture, PMH consistent with shoulder instability or per surgeon recommendation secondary to intraoperative findings.
4. Is it important to optimize muscle performance of the remaining rotator cuff musculature after a rTSA?
  - Yes! Focus is placed on strengthening any remaining rotator cuff musculature often including subscapularis and teres minor.
5. Following a rTSA, which muscle group becomes the primary elevator of the shoulder?
  - Deltoid complex
6. Given the specific dislocation precautions following a rTSA, what are a few common ADLs that must be avoided post operatively?
  - Any activities behind the back including tucking in a shirt, reaching into a back pocket, and using arms/hands to push up from a chair/seated position.
7. Functional active range of motion following an inverse shoulder replacement will be dependent on the integrity of which muscle groups?
  - Deltoid complex and teres minor
8. When is it appropriate to begin shoulder AA/AROM after a rTSA?
  - Begin AA/AROM at approximately 4-6 weeks post-operatively based on PMH, surgical procedure, intraoperative findings, and surgeon recommendations.
9. If subscapularis muscle is repaired during a rTSA, what shoulder motions must be restricted or progressed slowly with respect to positioning and PROM during Phase I post-operative guideline?
  - Avoid pure shoulder abduction and slowly progress shoulder ER depending on intra-operative findings/tissue integrity.
10. What would necessitate a patient to have a rTSA with a concomitant tendon transfer?
  - A tendon transfer (latissimus dorsi or lower trapezius) is performed when teres minor is deficient or absent to assist with transverse plane motion during elevation.
11. What is the difference between a primary and a non-primary/secondary rTSA?
  - Primary rTSA is defined as a shoulder that has not undergone any previous surgical interventions.
  - Non-primary or secondary rTSA is defined as a shoulder with a history of prior surgical interventions that ultimately have failed.

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## References

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