

Rehabilitation Protocol for Reverse Shoulder Arthroplasty

This protocol is intended to guide clinicians and patients through the post-operative course after a reverse shoulder arthroplasty. Specific interventions should be based on the needs of the individual and should consider exam findings and clinical decision making. If you have questions, contact the referring physician.

There are a few significant differences in post-operative guidelines between a total shoulder arthroplasty (TSA) and reverse shoulder arthroplasty (RSA) primarily due to rotator cuff arthropathy. Deltoid function and periscapular strength become primary sources of shoulder mobility and stability.

Considerations for the Reverse Shoulder Arthroplasty Rehabilitation Program

Many different factors influence the post-operative reverse shoulder arthroplasty rehabilitation outcome, including surgical approach, concomitant repair of the rotator cuff, arthroplasty secondary to fracture, arthroplasty secondary to rheumatoid arthritis or osteonecrosis, revision arthroplasty, and individual patient factors including co-morbidities. It is recommended that patients meet all rehabilitation criteria in order to progress to the next phase and clinicians collaborate closely with the referring physician throughout the rehabilitation process.

Post-operative Complications

If you develop a fever, unresolving numbness/tingling, excessive drainage from the incision, uncontrolled pain, unresolving tenderness over the acromion or any other symptoms you have concerns about you should contact the referring physician.

PHASE I: IMMEDIATE POST-OP (2-3 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Protect surgical repair • Reduce swelling, minimize pain • Maintain UE ROM in elbow, hand and wrist • Gradually increase shoulder PROM • Minimize muscle inhibition • Patient education
Sling	<ul style="list-style-type: none"> • Neutral rotation • Use of abduction pillow in 30-45 degrees abduction • Use at night while sleeping
Precautions	<ul style="list-style-type: none"> • No shoulder AROM • No shoulder AAROM • No shoulder PROM in to IR • No reaching behind back, especially in to internal rotation • No lifting of objects • No supporting of body weight with hands • Place small pillow/towel roll under elbow while lying on back to avoid shoulder hyperextension
Intervention	<p><i>Swelling Management</i></p> <ul style="list-style-type: none"> • Ice, compression <p><i>Range of motion/Mobility</i></p> <ul style="list-style-type: none"> • PROM: ER in the scapular plane to tolerance, Flex/Scaption \leq 120 degrees, ABD \leq 90 degrees, seated GH flexion table slide, pendulums, seated horizontal table slides • AAROM: none • AROM: elbow, hand, wrist
Criteria to Progress	<ul style="list-style-type: none"> • Gradual increase in shoulder PROM • 0 degrees shoulder PROM in to IR • Pain $<$ 4/10 • No complications with Phase I

PHASE II: INTERMEDIATE POST-OP (4-6 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Continue to protect surgical repair • Reduce swelling, minimize pain • Gradually increase shoulder PROM • Initiate shoulder AAROM/AROM • Initiate periscapular muscle activation • Initiate deltoid activation (avoid shoulder extension when activating posterior deltoid) • Patient education
Sling	<ul style="list-style-type: none"> • Use at night while sleeping • Gradually start weaning sling over the next two weeks during the day
Precautions	<ul style="list-style-type: none"> • No reaching behind back, especially in to internal rotation • No lifting of objects heavier than a coffee cup • No supporting of body weight with hands • Place small pillow/towel roll under elbow while lying on back to avoid shoulder hyperextension
Intervention <i>*Continue with Phase I interventions</i>	<p><i>Range of motion/Mobility</i></p> <ul style="list-style-type: none"> • AAROM: Active assistive shoulder flexion, shoulder flexion with cane, cane external rotation stretch, washcloth press, seated shoulder elevation with cane • AROM: supine flexion, salutes, supine punch <p><i>Strengthening</i></p> <ul style="list-style-type: none"> • Periscapular: scap retraction, standing scapular setting, supported scapular setting, low row, inferior glide • Deltoid: isometrics in the scapular plane
Criteria to Progress	<ul style="list-style-type: none"> • Gradual increase in shoulder PROM, AAROM, AROM • 0 degrees shoulder PROM in to IR • Palpable muscle contraction felt in scapular musculature • Pain < 4/10 • No complications with Phase II

PHASE III: INTERMEDIATE POST-OP CONTD (7-8 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Minimize pain • Gradually progress shoulder PROM, initiate shoulder PROM IR in the scapular plane • Gradually progress shoulder AAROM • Gradually progress shoulder AROM • Progress deltoid strengthening • Progress periscapular strengthening • Initiate motor control exercise • Patient education
Sling	<ul style="list-style-type: none"> • Discontinue
Precautions	<ul style="list-style-type: none"> • No reaching behind back beyond pant pocket • No lifting of objects heavier than a coffee cup • No supporting of body weight with hands • Avoid shoulder hyperextension
Intervention <i>*Continue with Phase I-II interventions</i>	<p><i>Range of motion/Mobility</i></p> <ul style="list-style-type: none"> • PROM: Full in all planes, gradual PROM IR in scapular plane < /=50 degrees • AAROM: incline table slides, wall climbs, pulleys, seated shoulder elevation with cane with active lowering • AROM: seated scaption, seated flexion, supine forward elevation with elastic resistance to 90 deg <p><i>Strengthening</i></p> <ul style="list-style-type: none"> • Periscapular: Row on physioball, serratus punches • Deltoid: seated shoulder elevation with cane, seated shoulder elevation with cane with active lowering, ball roll on wall <p><i>Motor control</i></p> <ul style="list-style-type: none"> • IR/ER in scaption plane and Flex 90-125 (rhythmic stabilization) in supine <p><i>Stretching</i></p> <ul style="list-style-type: none"> • Sidelying horizontal ADD, triceps and lats

Criteria to Progress	<ul style="list-style-type: none"> • ROM goals**: <ul style="list-style-type: none"> ○ Elevation \leq 140 degrees ○ ER \leq 30 degrees in neutral ○ IR \leq 50 degrees in scapular plane or back pocket ○ **PROM and AROM expectations are individualized and dependent upon ROM measurements attained in the OR post-operatively • Minimal to no substitution patterns with shoulder AROM • Pain $<$ 4/10
-----------------------------	---

PHASE IV: TRANSITIONAL POST-OP (9-11 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Maintain pain-free ROM • Progress periscapular strengthening • Progress deltoid strengthening • Progress motor control exercise • Improve dynamic shoulder stability • Gradually restore shoulder strength and endurance • Return to full functional activities
Precautions	<ul style="list-style-type: none"> • No lifting of heavy objects ($>$ 10 lbs)
Intervention <i>*Continue with Phase II-III interventions</i>	<p><i>Range of motion/mobility</i></p> <ul style="list-style-type: none"> • PROM: Full ROM in all planes <p><i>Strengthening</i></p> <ul style="list-style-type: none"> • Periscapular: Resistance band shoulder extension, resistance band seated rows, rowing, robbery, lawnmowers, tripod, pointer • Deltoid: gradually add resistance with deltoid exercise <p><i>Motor control</i></p> <ul style="list-style-type: none"> • IR/ER and Flex 90-125 (rhythmic stabilization) • Quadruped alternating isometrics and ball stabilization on wall • Field goals • PNF – D1 diagonal lifts, PNF – D2 diagonal lifts
Criteria to Progress	<ul style="list-style-type: none"> • Performs all exercises demonstrating symmetric scapular mechanics • Pain $<$ 2/10

PHASE V: ADVANCED STRENGTHENING POST-OP (12-16 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Maintain pain-free ROM • Initiate RTC strengthening with a concomitant repair • Improve shoulder strength and endurance • Enhance functional use of upper extremity
Precautions	<ul style="list-style-type: none"> • No lifting of objects ($>$ 15 lbs)
Intervention <i>*Continue with Phase II-IV interventions</i>	<p><i>Strengthening</i></p> <ul style="list-style-type: none"> • Periscapular: Push-up plus on knees, “W” exercise, resistance band Ws, prone shoulder extension, Is, dynamic hug, resistance band dynamic hug, resistance band forward punch, forward punch, T and Y, “T” exercise • Deltoid: continue gradually increasing resisted flexion and scaption in functional positions • Elbow: Bicep curl, resistance band bicep curls, and triceps • Rotator cuff: internal external rotation isometrics, side-lying external rotation, Standing external rotation w/ resistance band, standing internal rotation w/ resistance band, internal rotation, external rotation, sidelying ABD \rightarrow standing ABD <p><i>Motor Control</i></p> <ul style="list-style-type: none"> • Resistance band PNF pattern, PNF – D1 diagonal lifts w/ resistance, diagonal-up, diagonal-down, wall slides w/ resistance band
Criteria to Progress	<ul style="list-style-type: none"> • Clearance from MD and ALL milestone criteria have been met • Maintains pain-free PROM and AROM • Performs all exercises demonstrating symmetric scapular mechanics • QuickDASH • PENN

Contact

Please email MGHSportsPhysicalTherapy@partners.org with questions specific to this protocol

References

- Angst F, Goldhahn J, et al. Responsiveness of six outcome assessment instruments in total shoulder arthroplasty. *Arthritis & Rheumatism*. 2008. 59 (3): 391-398.
- Boudreau S, Boudreau E, Higgins LD, Wilcox III R.B. Rehabilitation following reverse total shoulder arthroplasty. *JOSPT*. 2007. 37 (12): 734-744.
- Garcia GH, Taylor SA, et al. Patient activity level after reverse total shoulder arthroplasty: what are patients doing? *Am J of Sports Med*. 2015. 43 (11): 2816-2821.
- Gaunt BW, McCluskey GM, Uhl TL. An electromyographic evaluation of subdividing active-assistive shoulder elevation exercises. *Sports Health*. 2010. 2 (5): 424-432.
- Hughes M, Neer II CS. Glenohumeral joint replacement and postoperative rehabilitation. *Physical Therapy*. 1975. 55(8): 850-858.
- Kibler WB, Sciascia, AD, Uhl, TL, et al. Electromyographic analysis of specific exercises for scapular control in early phases of shoulder rehabilitation. *The American Journal of Sports Medicine*. 2008. 36(9): p. 1789-1798.
- Knesek M, Brunfeldt A, et al. Patterns of strain and the determination of the safe arc of motion after subscapularis repair-a biomechanical study. *Journal of Orthopaedic Research*. 2016. 34: 518-524.
- Piasecki DP, Nicholson GP. Tears of the subscapularis tendon in athletes-diagnosis and repair techniques. *Clin Sports Med*. 2008. 27: 731-745.
- Uhl TL, Muir TA, et al. Electromyographical assessment of passive, active assistive, and active shoulder rehabilitation exercises. *PM R*. 2010. 2: 132-141.
- Wolff AL, Rosenzweig L. Anatomical and biomechanical framework for shoulder arthroplasty rehabilitation. *Journal of Hand Therapy*. 2017. 30: 167-174.
- Wright T, Easley T, et al. Shoulder arthroplasty and its effect on strain in the subscapularis muscle. *Clinical Biomechanics*. 2015. 30: 373-376.

Quick DASH

Please rate your ability to do the following activities in the last week by circling the number below the appropriate response.

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. Open a tight or new jar	1	2	3	4	5
2. Do heavy household jobs (e.g. wash windows, clean floors)	1	2	3	4	5
3. Carry a shopping bag or briefcase	1	2	3	4	5
4. Wash your back	1	2	3	4	5
5. Use a knife to cut food	1	2	3	4	5
6. Recreational activities which require you to take some force or impact through your arm, shoulder or hand (e.g. golf, hammering, tennis etc)	1	2	3	4	5

	NOT AT ALL	SLIGHTLY	MODERATELY	QUITE A BIT	EXTREMELY
7. During the past week, to what extent has your arm, shoulder or hand problem interfered with your normal social activities with family, friends, neighbours or groups? <i>(circle number)</i>	1	2	3	4	5

	NOT LIMITED AT ALL	SLIGHTLY LIMITED	MODERATELY LIMITED	VERY LIMITED	UNABLE
8. During the past week, were you limited in your work or other regular daily activities as a result of your arm, shoulder or hand problem? <i>(circle number)</i>	1	2	3	4	5

Please rate the severity of the following symptoms in the last week <i>(circle number)</i>	NONE	MILD	MODERATE	SEVERE	EXTREME
9. Arm, shoulder or hand pain	1	2	3	4	5
10. Tingling (pins and needles) in your arm, shoulder or hand	1	2	3	4	5

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	SO MUCH DIFFICULTY THAT I CAN'T SLEEP
11. During the past week, how much difficulty have you had sleeping because of the pain in your arm, shoulder or hand? <i>(circle number)</i>	1	2	3	4	5

QuickDASH DISABILITY/SYMPTOM SCORE = $\frac{[(\text{sum of } n \text{ responses}) - 1]}{n} \times 25$ (where n is the number of completed responses)

A QuickDASH score may not be calculated if there is greater than 1 missing item.

WORK MODULE (OPTIONAL)

The following questions ask about the impact of your arm, shoulder or hand problem on your ability to work (including home-making if that is your main work role).

Please indicate what your job / work is: _____

I do not work (you may skip this section).

Please circle the number that best describes your physical ability in the past week.

Did you have any difficulty:	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. Doing your work in your usual way?	1	2	3	4	5
2. Doing your usual work because of arm, shoulder or hand pain?	1	2	3	4	5
3. Doing your work as well as you would like?	1	2	3	4	5
4. Spending your usual amount of time doing your work?	1	2	3	4	5

SPORTS/PERFORMING ARTS MODULE (OPTIONAL)

The following questions relate to the impact of your arm, shoulder or hand problem on playing *your musical instrument or sport or both*. If you play more than one sport or instrument (or play both), please answer with respect to that activity which is most important to you.

Please indicate the sport or instrument which is most important to you: _____

I do not play a sport or an instrument. (You may skip this section).

Please circle the number that best describes your physical ability in the past week.

Did you have an difficulty:	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. Playing your instrument or sport in your usual way?	1	2	3	4	5
2. Playing your musical instrument or sport because of arm, shoulder or hand pain?	1	2	3	4	5
3. Playing your instrument or sport as well as you would like?	1	2	3	4	5
4. Spending your usual amount of time practising or playing your instrument or sport?	1	2	3	4	5

Scoring the optional modules: add up the assigned values for each response; divide by 4 (number of items); subtract 1; multiple by 25.

An optional module score may not be calculated if there are any missing items.

The Penn Shoulder Score: Function Subscale

Please circle the number that best describes the level of difficulty you might have performing each activity	No difficulty	Some difficulty	Much difficulty	Can't do at all	Did not do <u>before</u> injury
1. Reach the small of your back to tuck in your shirt with your hand	3	2	1	0	X
2. Wash the middle of your back/hook bra	3	2	1	0	X
3. Perform necessary toileting activities	3	2	1	0	X
4. Wash the back of opposite shoulder	3	2	1	0	X
5. Comb hair	3	2	1	0	X
6. Place hand behind head with elbow held straight out to the side	3	2	1	0	X
7. Dress self (including put on coat and pull shirt off overhead)	3	2	1	0	X
8. Sleep on affected side	3	2	1	0	X
9. Open a door with affected arm	3	2	1	0	X
10. Carry a bag of groceries with affected arm	3	2	1	0	X
11. Carry a briefcase/small suitcase with affected arm	3	2	1	0	X
12. Place a soup can (1-2 lb) on a shelf at shoulder level without bending elbow	3	2	1	0	X
13. Place a one gallon container (8-10 lb) on a shelf at shoulder level without bending elbow	3	2	1	0	X
14. Reach a shelf above your head without bending your elbow	3	2	1	0	X
15. Place a soup can (1-2 lb) on a shelf overhead without bending your elbow	3	2	1	0	X
16. Place a one gallon container (8-10 lb) on a shelf overhead without bending your elbow	3	2	1	0	X
17. Perform usual sport/hobby	3	2	1	0	X
18. Perform household chores (cleaning, laundry, cooking)	3	2	1	0	X
19. Throw overhand/swim/overhead racquet sports (circle all that apply to you)	3	2	1	0	X
20. Work full-time at your regular job	3	2	1	0	X

SCORING

Total of columns = ____ (a)

Number of Xs \times 3 = ____ (b), $60 -$ ____ (b) = ____ (c) (if no Xs are circled, function score = total of columns)

Function Score = ____ (a) \div ____ (c) = ____ \times 60 ____/60