

Rotator Cuff Repair - More than 1cm

Timescales are general guidelines only and are dependent on individual patient factors and pre-operative status/history. PLEASE SEE POSTOP NOTES FOR ANY INDIVIDUAL VARIATIONS.

All exercises should be completed in the tolerance of pain. Sharp pain should be avoided. Use the traffic light system to guide patients i.e. Do not go beyond Amber during exercise or within a 24 hour period post exercise.

Summary of Rehabilitation Phases					
Phase 1 Week 0-4	Phase 2 Week 4-6	Phase 3 Week 6-8	Phase 4 Week 8-12	Phase 5 12 weeks +	Phase 6 4-6 months
<p>Aim to immobilise operated arm. Maintain elbow, wrist and hand range of movement.</p> <ul style="list-style-type: none"> - Personal care performed as advised - Short lever, passive-assisted pendular swings in plane of wedge (flexion, abduction, circumduction). 	<p>Aim to assist the operated arm as much as possible during each exercise.</p> <ul style="list-style-type: none"> - Active assisted short lever in plane of wedge flexion, abduction and external rotation -Assisted table slides (flexion and abduction) -Elbow, wrist and hand mobility exercises. - Operated side hand (ball squeeze). - Avoid hand behind back - Isometrics of non-operative side as able. 	<p>Aim to gradually reduce the assistance of the non-operated arm.</p> <ul style="list-style-type: none"> - Continue with active assisted, but with a long lever into flexion, abduction, external rotation. -Progress to short lever active ROM if symptoms remain acceptable and there is good control with active assisted movements. -Consider involving the kinetic chain to optimise load transfer. 	<p>Aim to regain full active range of movement in all planes including internal rotation.</p> <ul style="list-style-type: none"> -Establish optimal control of the cuff and scapula muscles through range -Consider the kinetic chain -Isometric strengthening of flexion, abduction, extension, internal and external rotation once full PROM in all planes is achieved. 	<p>Aim to establish optimal control of the cuff and scapula muscles through range if not yet achieved.</p> <ul style="list-style-type: none"> -If the above is achieved combined movements can be introduced -Isotonic strengthening for flexion, abduction, internal and external rotation if the patient has full passive ROM and a minimum of 75% or more of full active range in all planes with good control. -Restore full functional range of movement. -Consider kinetic chain 	<ul style="list-style-type: none"> - Continue to restore full controlled AROM in all planes and combined positions - Continue to increase load in all positions provided criteria to start isotonic loading in phase 4 has been achieved. -Progress to optimise function, specific power and endurance for sport and individual activity once isotonic strength in all planes and combined positions is comparable to the other side.

Sling use, Clinic Appointments and Investigations:

Sling	Clinic appointments	Post-op Investigations
4 weeks unless stated differently in the op notes.	3 weeks, 3 months, 6 months	Nil unless indicated

Timeframes

Driving	Swimming	Work	Rowing/racquet sports	Heavy resistance training	Contact Sport
8 weeks To be able to do an emergency stop and swerve	12 weeks	Manual 6 months Non Manual 4-6/52	From 6 months	6 months controlled. Ease way back in.	9 months

Pre-operatively

Patients will be issued with their patient journey and post-operative exercise booklet at the point of listing for surgery.

Factors affecting progression rate to discuss with patient:

- Pre-operative status/ stiffness
- Age
- Tissue quality
- Smoking /diet
- Pre-existing medical conditions e.g. diabetes

Phase 1 (0-4 weeks)

Clinic appointment:

Patients will be seen at SGH in the post-operative shoulder physio specialist clinic at 3/52 to check for signs of infection or nerve damage, pain management, wound care, sling use and axillary hygiene.

Sling:

This will be worn for 4 weeks, unless otherwise indicated in the op notes. Post-op sling guidelines may vary between patients; this will be stated in the op notes. **The sling is to protect the repair and for comfort.** An abduction splint will usually be applied before the patient wakes up from surgery. This should not be removed or any attempt made to lift the arm off the wedge on day 1. After day 1 the sling can be removed for axillary hygiene and when completing post-operative exercises.

The patient will be provided with a sling diary in their post-operative exercise booklet to encourage them to record all times out of the sling. This will be reviewed at their first clinic appointment.

Wound Care video link: <https://www.stgeorges.nhs.uk/service/musculoskeletal-outpatient-physiotherapy/resources-for-patients-start-your-recovery-today/post-operative-information/>

Sling use video link: <https://www.stgeorges.nhs.uk/service/musculoskeletal-outpatient-physiotherapy/resources-for-patients-start-your-recovery-today/post-operative-information/>

Washing and dressing video link: <https://www.stgeorges.nhs.uk/service/musculoskeletal-outpatient-physiotherapy/resources-for-patients-start-your-recovery-today/post-operative-information/>

Goals:

- Protect the integrity of the repair
- Optimise tissue healing
- Minimise pain and inflammation, ensure the patient is taking the correct medication as prescribed.

Avoid:

- **NO UNSUPPORTED RANGE OF MOVEMENT**

Rehabilitation (to be commenced Day 2):

All exercises should be completed in the tolerance of pain. Sharp pain should be avoided. Use the **traffic light system** to guide patients i.e. do not go beyond Amber during exercise or within a 24 hour period post exercise.



Phase 1 Exercises

Neck, elbow, wrist and hand and non-operative side exercises

- Use assistance of non-operated arm to fully bend and straighten the elbow and wrist
- Active fist clenching of operative arm e.g. ball squeezes
- Neck range of movement exercises and stretches
- Postural awareness and movement pattern correction
- Shoulder shrug
- Short lever, passive-assisted pendular swings (flexion, abduction and circumduction)
- Isometrics of the **NON-OPERATIVE** arm

Phase 2 (4-6 weeks)

Formalised Physio to start at 4 weeks postop

Goals:

- On-going protection of repair and optimise tissue healing
- Prevent compensatory movement patterns that may compromise recovery
- Understand post-operative exercise programme and expected outcomes
- Understand application and removal of the sling

Avoid:

- **NO UNSUPPORTED RANGE OF MOTION, NO ACTIVE RANGE OF MOTION, NO RESISTANCE**

Treatment note: The following are suggestions for exercise inclusion. These can be incorporated into 2-4 key exercises. Clinical reasoning of the patient's key problems should inform which factors are priorities. The prescription of too many exercises has been shown to impact adherence. **Always check the post-operative notes for any individual limitations to post-op rehabilitation.**

Treatment note: Directly following the surgery the repair relies essentially on the sutures. Remodelling repair tissue does not reach maximal tensile strength for a minimum of 12-16 weeks post repair.

Aim for the patient to assist their operated arm as much as possible during each exercise.

Operated shoulder exercises. The arm must stay out to the side as if it was in the sling during these exercises. The wedge can be left in place to help achieve this.	First position	Second position
Assisted table slides into flexion	Sitting in line with wedge	Standing in line with wedge
Assisted table slides into abduction	Sitting	Standing
Short lever active assisted flexion	Supine	Sitting then standing
Short lever active assisted abduction	Supine	Sitting then standing
Short lever active assisted external rotation	Supine	Sitting then standing

Suggested exercise prescription level:
Gradually increase reps as pain allows up to 2 sets of 10 reps in each direction twice a day.

Video link for exercises - <J:\Files\Physio\TEAMS\Musculoskeletal Outpatients\Clinical\APP\Shoulder Physio Practitioner\Protocols\New Protocols 2019\RCR\RCR Exercise Videos\RCR Repair 0-4 Weeks>

Treatment note:

Research demonstrates;

- Patients who engage with the hand of the **operated** arm have better pain and functional outcomes. Any activities with this hand must be unloaded and pain free.
- Patients who exercise their **non-operative** arm have a better outcome. Cross-education can be used early in rehabilitation. Isometrics targeting the rotator cuff of the **un-operated** arm e.g. external rotation with arm supported at 30 degrees of abduction in the scapula plane will help facilitate muscle activation patterns and cortical activation together with small strength gains in the **operated** limb.
- **The risk of re-tear** is greatest in the first 12 weeks following surgery. Groups with greater risk of re-tear include older patients, smokers, diabetics, BMI, physical activity level, those with minimal post-operative symptoms, type and chronicity of tear and those with tears > 3cm.
- **The risk of stiffness** is greatest in younger patients (<50), those having an associated labral repair, single tendon repairs.

Troubleshooting:

- Pain: Optimise pain control via GP or pharmacist
- Signs of infection: Immediate referral to A&E. Inform shoulder unit team
- Frank neural impairment: Inform shoulder unit team
- Signs of DVT: e.g. upper limb redness, swelling, heat. Immediate referral to A+E and inform shoulder unit
- Stiffness: Give early reassurance about active assisted movement. Early identification of movement avoidance. Early introduction to shoulder girdle control and movement.

Criteria for Progression:

- Well controlled pain
- Absence of significant compensatory movements
- Full active assisted short lever range of movement for flexion, abduction and external rotation in neutral

Phase 3 (6-8 weeks)

Goals:

- Preserve integrity of surgical repair
- Wean out of sling gradually if haven't already done so
- Restoration of full active assisted range of movement
- Progress to active ROM if symptoms remain acceptable and there is good control with long lever active assisted movements and full PROM
- Re-educate cuff recruitment and scapula control through range
- Prevent compensatory movement patterns that may affect recovery
- Normalise quality of shoulder movements

Avoid:

- No resistance exercises or activities e.g. lifting, carrying, isometric, resistance band
- No internal rotation
- No end of range forced movements

Treatment note: Patients who progress quickly with minimal end range pain must be reminded to avoid early loading. A lack of symptoms can indicate increased risk of re-tear due to poor scar deposition. These patients should progress more slowly.

Rehabilitation:

- Start Physio lead capsular mobilisations except internal rotation, no combined positions.
- Consider the incorporation of slings and kinetic chain when moving the arm and shoulder
- Maintain and build abdominal and lower limb strength
- Correct movement patterns
- Progress cuff and scapula recruitment through range
- Exercises are guided by symptom response, use the traffic light system described above. The movement is expected to be uncomfortable, but acceptable to the patient

Phase 2A: Use some assistance from the non-operated arm for all movements

Active assisted movement	Low	Intermediate	High
Flexion	Supine long lever	Sitting long lever	Standing long lever +/- step
Abduction	Supine long lever	Sitting long lever	Standing long lever +/- step
Neutral External rotation	Supine	Sitting supported	Unsupported standing +/- backward 2step
Table slide into flexion and Abduction	Sitting	Standing with step	Standing with lunge forwards gradually using less assistance of the other arm

Video link for exercises - <J:\Files\Physio\TEAMS\Musculoskeletal Outpatients\Clinical\APP\Shoulder Physio Practitioner\Protocols\New Protocols 2019\RCR\RCR Exercise Videos\RCR Repair 4-6 Weeks>

Suggested exercise prescription level:

Commence with 1 set of 10 reps in each direction twice per day, increasing to 2 sets of 10 reps in each direction twice a day after 2 days, if symptom response is acceptable, then again increasing to 3 sets after 4 days again if the symptom response remains acceptable

Criteria for progression:

Begin from day 7 of starting Phase A exercises, if symptoms remain acceptable, there is good control with long lever active assisted movements, and there is full PROM.

Phase 2B

AROM Movement	Low	Intermediate	High
Flexion	Short lever supine	Short lever seated	Short lever standing +/- with step
Abduction	Short lever supine	Short lever seated	Short lever standing +/- with step
Neutral External rotation	Supine	Supported in sitting	Unsupported standing +/- with lunge backwards
Continue table slides if needed			

Suggested exercise prescription level:

Commence with 1 set of 10 reps in each direction twice per day, increasing to 2 sets of 10 reps in each direction twice a day after 2 days, if symptom response is acceptable, then again increasing to 3 sets after 4 days again if the symptom response remains acceptable

Troubleshooting:

- Pain: Consider complication e.g. infection, trauma, muscle spasm, fear avoidance
- Stiffness: Consider thoracic mobility, ? frozen shoulder onset
- Movement patterning: Common to have altered pattern at this stage e.g. pecs overuse and upper traps dominant. Ensure postural awareness (mirror and taping). Ensure exercise's don't reinforce bad movement patterns.
- Weakness: Normal to be profoundly weak at this stage and struggle with gravity resisted movements. Sets and reps are dependent on patient ability.

Criteria for progression:

- Full PROM in all planes
- Good control of rotator cuff and scapula muscles through a functional range, with acceptable levels of pain.

Phase 4 (8-12weeks)

Goals

- Preserve integrity of surgical repair
- Full active ranges of movement including internal rotation
- Initiate cuff isometric strengthening **if full PROM in all planes is achieved.**
- Optimise load transfer with functional tasks, without loading the shoulder.
- Optimise cuff recruitment and scapular control through range
- Prevent compensatory movement patterns
- Symptom response management – respecting the traffic light system
- Prevent capsular stiffness

Avoid

- Combined abduction/ external rotation
- Forced end range mobilisation especially ext rotation with arm by side
- Avoid lifting / loading in this phase other than isometric strengthening
- Weight bearing through the operated arm e.g. getting out of a chair
- Forced hand behind back/ extension

Treatment note: Patients who progress quickly with minimal end range pain must be reminded to avoid early loading. A lack of symptoms can indicate increased risk of re-tear due to poor scar deposition. These patients should progress more slowly.

Monitor for fear avoidance and any psychosocial factors that may be compromising their progression.

Rehabilitation

- Continue to regain full AROM in all planes **including internal** rotation
- **Isometric strengthening** of flexion, abduction, extension, internal and external rotation **if full PROM in all planes of movement.**
- Practise load transfer with functional tasks, without loading the shoulder
- Cuff and scapular control through range

Movement	Low	Intermediate	High
AROM Flexion	Long lever supine	Long lever seated	Long lever standing +/- with step
AROM Abduction	Long lever supine	Long lever seated	Long lever standing +/- with step
AROM neutral External rotation	Unsupported with reverse lunge	Opposite side lying	-
Internal rotation	Active assisted	Gradually reduce assistance of other arm	AROM
Isometric flexion, abduction, extension, internal and external rotation if full PROM	30% MVC	50% MVC	70% MVC

Video link for exercises - <J:\Files\Physio\TEAMS\Musculoskeletal Outpatients\Clinical\APP\Shoulder Physio Practitioner\Protocols\New Protocols 2019\RCR\RCR Exercise Videos\RCR Repair 6-8 Weeks>

Suggested exercise prescription level:

Commence with 1 set of 10 reps in each direction and on off hold twice per day, increasing to 2 sets of 10 reps in each direction and on off hold twice a day after 2 days, if symptom response is acceptable, then again increasing to 3 sets after 4 days again if the symptom response remains acceptable.

Troubleshooting:

- As the patient starts to increase active movements look out for long head of biceps pain or AC joint pain, due to poor movement patterning.
- Ensure patients are using the traffic light system to monitor their exercise prescription level and with their isometric loading.

Criteria for progression:

- 75% or more of full AROM in all planes, with good control for all movements
- Established optimal control of scapular and rotator cuff muscles through range
- An acceptable symptom response to isometric strengthening

Phase 5 (12+weeks)

Goals:

- Continue to restore full active range of movement
- Where able, start to optimise function specific isotonic power, strength and endurance
- Restore optimal cuff and scapula control in closed chain through range and under load
- Transfer movement pattern correction and cuff/scapula control to functional task
- Begin to work on combined movements unloaded

Avoid:

- Combined movements under load

Rehabilitation:

- Facilitate regaining optimal range of movement in combined positions
- Enhance neuromuscular control through range and incorporate with kinetic chain
- Closed kinetic chain exercises with increased load
- Function specific strengthening and endurance exercises
- Strengthen rotator cuff and scapula musculature through range

Treatment note: The patient must be able to maintain good upper quadrant control and be essentially pain free before the introduction of functional strengthening. Do not ignore loss of scapula control or compensatory patterns.

Movement	Low	Intermediate	High
Isotonic Flexion, Abduction, and Extension. Bilateral with step or squat when ready.	Yellow TB	Red TB	Do not progress beyond a red band for resistance
Isotonic Ext rot neutral. Bilateral with lunge back when ready.	Yellow TB	Red TB	Do not progress beyond a red band for resistance
Isotonic Int rot neutral. Bilateral with lunge forwards when ready	Yellow TB	Red TB	Do not progress beyond a red band for resistance
Combined AROM Int rot/ Ext rot in Abd	Supported 45 degrees	Supported 90 degrees	Unsupported 45 degrees progressing to 90 degrees
Table or wall slide dependant on control with TB loop, if has reduced posterior cuff activation/strength	-	-	-
Sleeper stretches / cross body stretch	-	-	-
Wall walk with stretch at top	-	-	-
Pec stretches	-	-	-
Abd/Ext rot stretch	-	-	-

Video link for exercises - <J:\Files\Physio\TEAMS\Musculoskeletal Outpatients\Clinical\APP\Shoulder Physio Practitioner\Protocols\New Protocols 2019\RCR\RCR Exercise Videos\RCR Repair 8-12 Weeks>

Suggested exercise prescription level:

Begin with yellow theraband x 1 x 10 in each direction twice per day increasing to x2 sets after 2 days and then 3 sets after 4 days. Progress reps if symptom response is acceptable.

Troubleshooting:

- As the patient starts to increase loading look out for long head of biceps pain or AC joint pain, due to poor movement patterning and overloading.
- Ensure patients are using the traffic light system to monitor their exercise prescription level and with their isotonic loading.

Criteria for progression:

- Pain free with activities of daily living
- Tolerate late stage loaded exercises without pain or loss of control
- Able to perform movement through full range without loss of scapula control

Phase 6 (4-6 months)

Goals:

- Return to normal level of function with optimal control and fatigue resistance
- Return to sport and high level function if required.
- Functional assessment undertaken (work, sport, or ADL's) specific exercises prescribed to restore required function.
- **Physiotherapy should continue until the patient has reached their goals**

Rehabilitation:

- Sports / function specific rehabilitation N.B non-contact 3/12 contact 6/12
- Through range strengthening rotator cuff and scapula musculature
- Endurance based exercises to improve fatigue resistance
- Maximise tensile strength-function specific
- Assess psychological readiness for return to sport using either or both the Western Ontario Shoulder Instability Index (WOSI) and Oxford Shoulder Instability Score
- Consider functional return to sport tests
- Load bearing proprioceptive exercises once has good strength and control
- Consider speed and power needs of the patient
- Challenge ability of cuff in graded open chain exercises

Exercise suggestions for 4-6 months dependant on patient progress and goals.

Higher level exercise suggestions if required.	Sport specific	Function specific
Squat press	Overhead athlete, throwing athlete, contact sports.	Lower level patient goals – reach top shelf, brush hair, carry children, care for family member.
Lunge and press	Speed of shoulder movements, loads through shoulder, conditions in which shoulder operates.	Identify the patient's specific functional and goal. Incorporate the full body movement needed to complete this task.
Step back with ext rot at 90	Some tasks require speed and power and force – reintroduce this slowly but aim to fully recreate their functional needs.	Some tasks require speed and power and force – reintroduce this slowly but aim to fully recreate their functional needs.
Wood chop / reverse wood chop	Rugby player: pass rugby ball, hand off movements.	Reaching top shelf: break down the movement and work on each phase.
Ext rot brace and load	Tennis player: mimic different shot types, with racquet, with resistance bands.	Carrying child: mimic the movement with ever increasing weight.
Med ball lift press with squat or lunge/ throw catch/ slam (light to heavy load)		
Press up wall / 45/ press-up position		
Press up on unstable surface		
Stepping hand to hand push ups on unstable surfaces at hands or feet then both		
Bounce ball on wall above head		
Up / down plank		

Video link for exercises - <J:\Files\Physio\TEAMS\Musculoskeletal Outpatients\Clinical\APP\Shoulder Physio Practitioner\Protocols\New Protocols 2019\RCR\RCR Exercise Videos\RCR Repair From 12 Weeks>

Troubleshooting:

Pain

- The patient should not be in much pain at this point. If pain continues consider analgesics and liaise with shoulder physio team
- Consider biopsychosocial model factors to pain
- Identify painful movement pattern. Attempt to modify painful movement. Attempt shoulder symptom modification techniques. Attempt cuff activation and retest painful movement pattern
- Common secondary pain sites include, Long Head Biceps Tendon and ACJ. This could be due to the patient increasing in loading too quickly

Stiffness

- Should be a priority to address any stiffness
- Manual techniques
- Consider thoracic mobility
- Focus on home stretching plan
- Ax GIRD / GERD – consider posterior capsule stretching.

Movement Patterning

- Poor movement control can lead to secondary pain and symptoms postoperatively
- Important to establish normalised movement patterning
- Dynamic humeral head control
- Scapular humeral rhythm