



Arthroscopic Rotator Cuff Repair Frequently Asked Questions:

Are there differences between an arthroscopic and open rotator cuff repair?

- While the incision sites look smaller with an arthroscopic procedure, it is important to remember that the same tissues were still repaired and thus the same post-operative precautions regarding tissue-healing time for repaired muscle/tendon are observed.

Are there any patients that should be considered for an early range of motion postop operative rehab course?

Many Surgeons may choose to have patients that have the following clinical situations start PT and ROM sooner to avoid the potential for post operative stiffness.

- Coexisting calcific tendonitis
- Coexisting adhesive capsulitis
- PASTA tears
- Concomitant labral repair
- Acute single tendon cuff repair

- Denard et al. Arthroscopy 2011.
- Huberty et al. Arthroscopy 2009.
- Koo et al. Arthroscopy 2011.
- Oh et al. Arthroscopy 2008.

- Stiffness risk minimized with early protected external rotation and an unweighted slide into forward elevation.

How should I manage my surgical site, dressing and steri-strips?

- Change your dressing every other day as needed.
- Allow the steri-strips to fall off on their own. If necessary, sutures will be removed at your first post-operative visit.
- You may shower with a watertight bandage in two days, but keep the incisions dry until the sutures are removed in seven to ten days. Try not to let the direct spray of water from the showerhead hit the incision.

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Do I need to wear a sling/immobilizer? If so, how long do I wear it and when can I take it off during the day?

- You will be instructed by your surgeon to wear your sling from four to six weeks depending upon the size of your tear and thus the extent of the rotator cuff repair, and the sling should be worn at all times.
- You may have a small foam cushion between your arm and your body. This should be left in place at all times while wearing the sling.
- While in the sling, the elbow should be bent at a right angle, and the hand should be level with your elbow or slightly higher. The elbow should be resting slightly in front of your body.
- You may remove the sling for exercises as prescribed by the surgeon/therapist, icing, dressing, and showering.

What are my precautions regarding movements and positions after surgery? What positions should I rest my arm in? What positions should I avoid?

- Do not actively move your arm away from your body for four to six weeks following surgery. In addition, do not lift any object even if you are just bending your elbow.
- Follow your surgeon/therapist's directions regarding rotating your forearm away from your body to protect repaired tendon and muscles.
- When lying on your back we recommend you put a towel roll under your elbow to support arm.
- Many patients find that lying on a 30 degree incline wedge in bed is more comfortable than lying flat. Some patients find sleeping in a recliner more comfortable during the first few weeks after surgery.
- Initially after surgery you should not reach behind your back with your operated arm.

May I use my involved arm for dressing, bathing, driving, and other daily activities? How should I manage my arm in the shower?

- You may use your wrist, hand, and elbow for daily activities. This includes eating, shaving, dressing, as long as you do not move your operated arm away from your body and it does not increase your pain.
- Do not use your arm to push up/off the bed or chair for six weeks after your surgery.
- When using your keyboard and mouse, do not move your arm away from your body.

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- When showering, you may wash under the involved arm pit by bending forward to let the involved arm hang freely and reaching under with the opposite arm
- Do not actively move your arm away from your body.

When should I begin formal physical therapy? How often do I need to go?

- Physical therapy can usually be initiated within the first six weeks following surgery and your surgeon will refer you when the time is appropriate. This includes physical therapy sessions at the clinic, in addition to a home exercise program for range of motion and postural exercises. You will eventually be prescribed strengthening exercises. For very large tears, physical therapy may be delayed to promote rotator cuff healing up to 6 weeks postoperatively.
- Frequency of treatment will be determined by your specific needs together with the physician and physical therapist recommendations.

When may I start strengthening?

- Typically, strengthening does not begin until twelve weeks after surgery.

Are there any medications that I should not take during my recovery/rehabilitation?

- You should not take any anti-inflammatory (alleve, ibuprofen, and naproxen) medications for at least 12 weeks after surgery as may interfere with tendon healing. You can take Tylenol or any of the pain medications your surgeon prescribes. In addition, the use of frequent (3-4 times per day) icing of your shoulder will assist in pain management.

When may I return to sports and recreational activities?

- Return to sports and recreational activities are specific to the particular activity, but generally no sooner than four to six months.
- Always seek permission from your surgeon and therapist prior to starting any sports related activity.

Can I smoke following surgery?

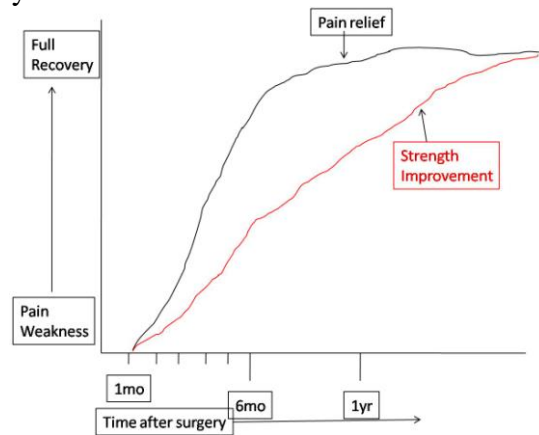
- You should not smoke after surgery as it interferes with tendon healing.

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Will I progress just like my friend who had rotator cuff repair surgery?

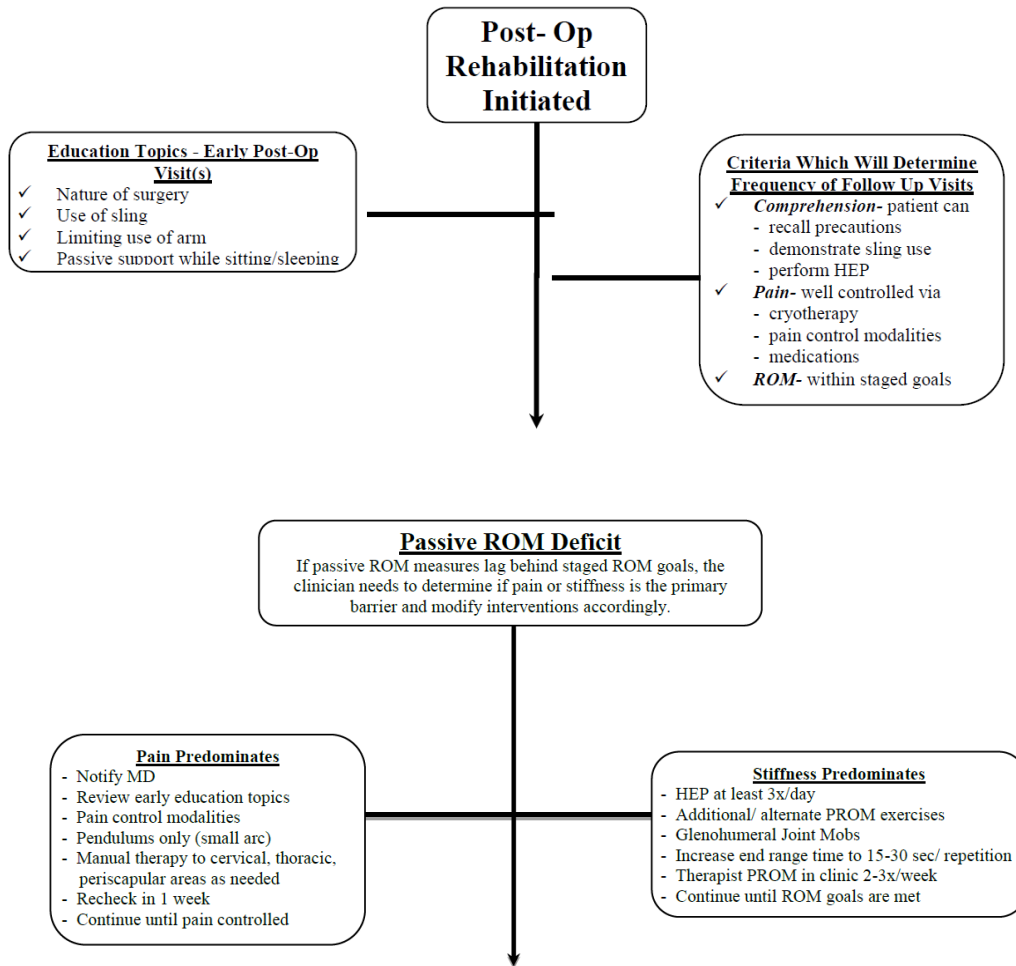
- There are many patient specific variables that impact everyone differently. Hence, your recovery is individually based not only on tear size and tissue quality but also on a bell-shaped curve (see below) which takes into account function, relief of pain, and recovery of power. Typically it will be at least 6 months before you feel real good and you are ready to return to pre injury/surgery activities. Some individuals take up to 1 year before they fully recover.



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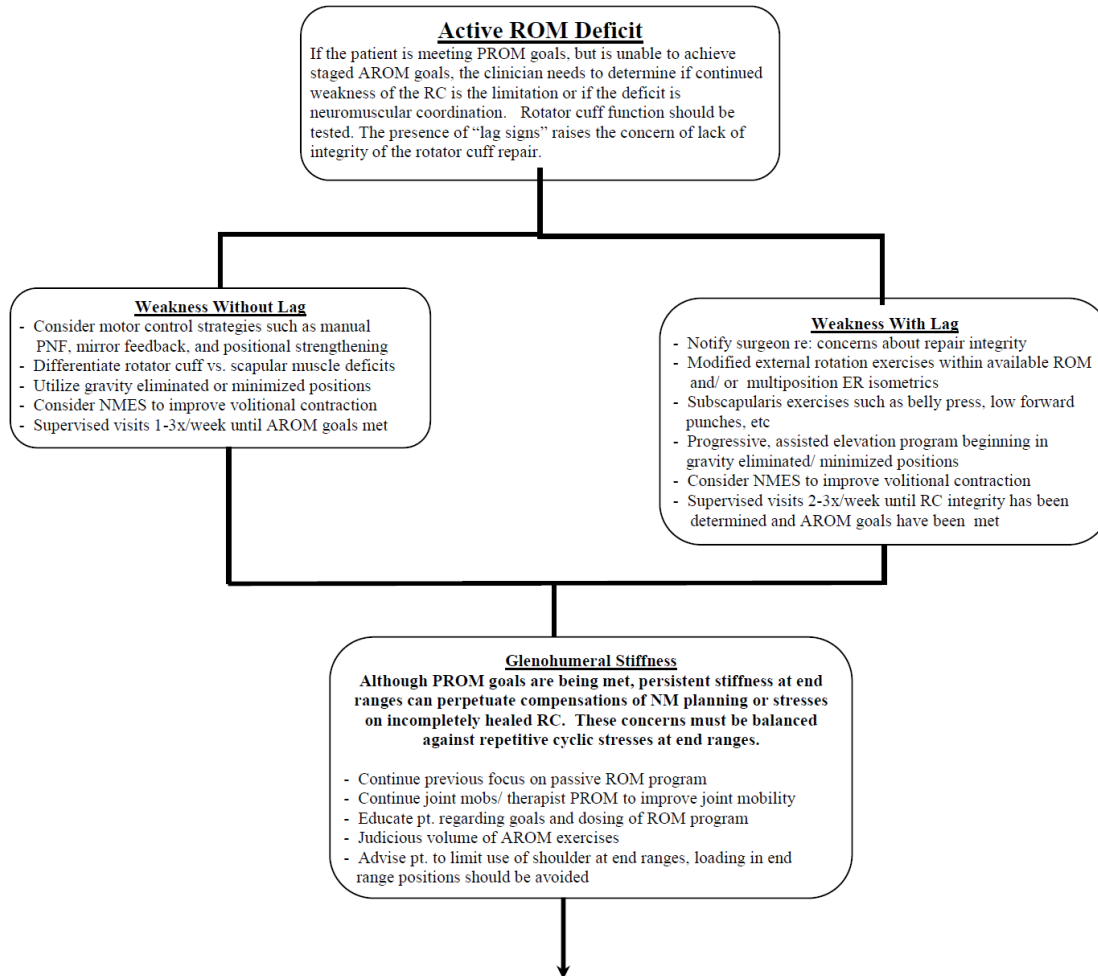
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Decision Making Algorithm for the treatment of a Patient following Arthroscopic Rotator Cuff Repair.
Please see separate document.



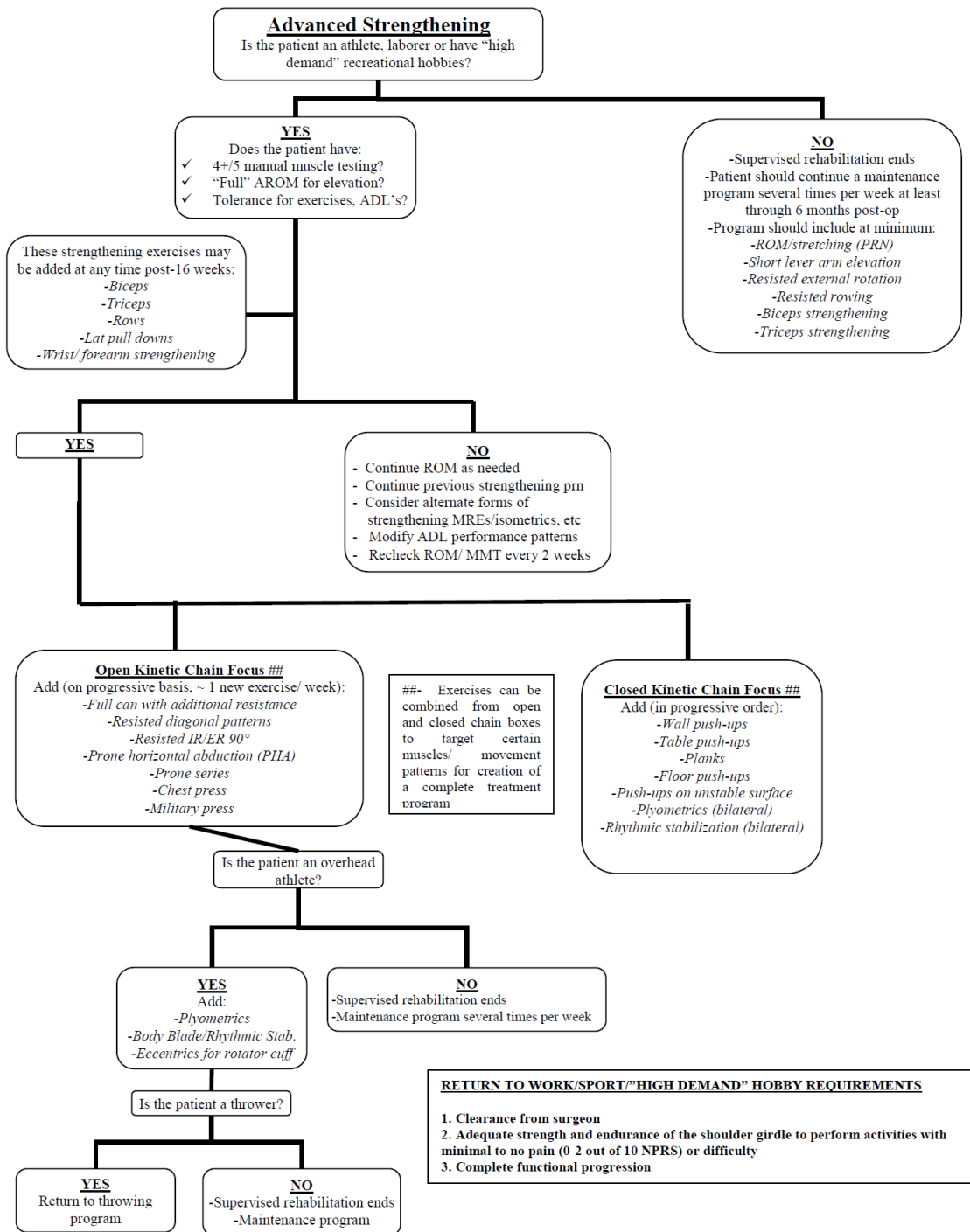
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Algorithm from: Thigpen, Charles A., Shaffer, Michael A., Gaunt, Bryce W., Leggin, Brian G., Williams, Gerald R., Wilcox, Reg B. *The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following arthroscopic rotator cuff repair*. Journal of Shoulder and Elbow Surgery. 2016; 4: 521-535.

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Arthroscopic Rotator Cuff Repair Postoperative Guidelines:

The intent of this guideline is to provide both the patient and treating therapist with a framework of the post-operative rehabilitation course following arthroscopic assisted/mini-open rotator cuff repair. 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 therapist requires assistance in the progression of a post-operative patient they should consult with the referring Surgeon.

Progression to the next phase based on Clinical Criteria and/or Time Frames as Appropriate.

This protocol is designed for the patient following arthroscopic rotator cuff repair. **Those patients who have good rotator cuff tissue integrity, a one to two tendon repair, with a tear 3 centimeters or less will typically be progressed on the quicker end of these time frames. Those patients with poor rotator cuff tissue integrity, tear of 2 complete tendons, and those with a tear (>3 cm) will need to be progressed at a slower, more conservative rate to respect tissue healing.**

The scientific basis for postoperative rehabilitation is clear and the recommendations which follow take into account the expected timeline for clinical healing based on this information. Many references are available in the literature; however, our recent work summarizes the available data:

- [Millett, Peter J., Wilcox, Reg B., O'Holleran, James D., Warner, Jon J.P. *Rehabilitation of the Rotator Cuff: An Evaluation-Based Approach*. Journal of the AAOS. 2006; 14 \(11\): 599-609.](#)

For further detail regarding arthroscopic rotator cuff repair postoperative guidelines, please refer to this link:

- [Thigpen, Charles A., Shaffer, Michael A., Gaunt, Bryce W., Leggin, Brian G., Williams, Gerald R., Wilcox, Reg B. *The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following arthroscopic rotator cuff repair*. Journal of Shoulder and Elbow Surgery. 2016; 4: 521-535.](#)

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Suggested shoulder exercises categorized by time of initiation and phase of postoperative rotator cuff rehabilitation.

Table II Suggested shoulder exercises categorized by time of initiation and phase of postoperative rotator cuff rehabilitation

	Postoperative weeks 1-6	Postoperative weeks 6-12	Postoperative weeks 8-16	Postoperative weeks 12-20	Postoperative week 20 and later
Initiation phase	Phase 1	Phase 2	Phase 2-3	Phase 3-4	Phase 4
EMG activity level	≤15%	≤15%	16%-29%	30%-49%	≥50%
Exercise goal	PROM	AAROM or AROM	AROM or resisted	Endurance	Strengthening
Exercises*	Pendulum ^{30,69,74} Forward bow ¹¹³ Therapist-assisted FE ^{30,74} CPM in FE ³⁰ Self-assisted supine FE ^{30,74,113} ER/IR self-assisted with stick ^{30,74}	Towel slide or horizontal dusting ^{36,113} AAROM supine washcloth press-up ¹¹³ AROM supine press-up ¹¹³ Side-lying supported active elevation ³⁶ AROM reclined wedge press-up ¹¹³ Supine elastic band FE ³⁶ Aquatic FE slow speed ⁵⁵	Pulley FE ^{30,36,74} Incline dusting ¹¹⁵ Ball roll on wall ¹³⁶ Upright wall slide ^{36,74,115} FE with upright T-bar AAROM elevation ^{36,74} Upright T-bar AAROM FE, active lowering ³⁶ Upright active FE with no weight ^{36,113} Upright active FE 1 lb ¹¹³ Aquatic FE fast speed ⁵⁵ Side-lying dumbbell ER at 0°, resistance of 25% MVI ³ Prone dumbbell ER at 0°, resistance of 25% MVI ³ Elastic resistance ER, IR, and forward punch ^{21,47,84,†}	High, middle, and low scapular rows ^{47,84} Standing dumbbell ER at 0° abd, 10-rep max ⁹³ Standing dumbbell ER in scapular plane, 10-rep max ⁹³ Elastic resistance shoulder flexion ⁸⁴ Elastic resistance throwing accelerate ⁸⁴ Elastic IR at 90° ⁸⁴	Upright FE 3-4 lb, 10-rep max ^{93,84,108} Side-lying dumbbell ER at 0°, 10-rep max ⁹³ Prone horizontal abd, 10-rep max ^{93,84} Prone ER at 90° abd, 10-rep max ⁹³ Seated military press ¹¹ Elastic resistance ER at 90° ⁸⁴ Elastic resistance throwing decelerate ⁸⁴ Standing dumbbell ER at 90° abd, 10-rep max ⁹³

AAROM, active-assistive range of motion; abd, abduction; AROM, active range of motion; CPM, continuous passive motion; EMG, electromyographic; ER, external rotation; FE, forward elevation; IR, internal rotation; max, maximum; MVIC, maximum voluntary contraction; PROM, passive range of motion; rep, repetition.

* Exercises were grouped based on published supraspinatus EMG activity.

† Mean EMG activity levels for these exercises span from <15% to >50%, with the study by Hintermeister et al⁴⁸ being the only study showing mean values <15%. However, the maximum EMG activity level in their study ranged from 25%-48%; thus, these exercises are best categorized in the 16% through ≥50% categories depending on the resistance level.

- Table II from: Thigpen, Charles A., Shaffer, Michael A., Gaunt, Bryce W., Leggin, Brian G., Williams, Gerald R., Wilcox, Reg B. *The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following arthroscopic rotator cuff repair*. Journal of Shoulder and Elbow Surgery. 2016; 4: 521-535.

Phase 1: Passive Range of Motion Phase (Post op week # 1 to approximately Post op week # 6)

General Information / Goals:

- This is the “Healing phase”. The strength of the repair is initially only the strength of the sutures and anchors attaching it to the bone.
- At 4 weeks post op the strength of the tendon repair is about 20% of a “normal” tendon attachment. Hence, prior to 6 weeks post op no active motion of the arm is permitted, as it may pull on the repair and disrupt the attachment of the tendon to the bone.
- The goal of this phase of recovery is to protect the tendon repair while gently gaining motion and preventing formation of adhesions (scar tissue) which might limit motion.
- Another goal during this phase is to reduce inflammation and pain.
- The sling/abduction pillow keeps the arm in a position that takes tension off the repaired tendon.

Activities to Avoid:

- No active range of motion (AROM) of your shoulder, even if you have minimal to no pain or other symptoms.
- Avoid pushing yourself up from a lying or seated position with your arm.

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- Avoid aggressive and painful passive range of motion (PROM) or stretching that provokes muscle guarding / spasm.

What you should be doing during this phase:

- You can go about your normal daily activities around the house and your work as long as you keep your arm in your sling.
- We want you to ice your shoulder regularly during this phase 3-4 times per day for up to 20 minutes at each session. You can use your cryocuff or an ice pack.
- Your surgeon will refer you to physical therapy sometime in the first six weeks following your surgery. The timing of the start of your physical therapy will be determined by the size of your tear, tissue quality of your rotator cuff, and whether or not you had any other structures repaired.
- Your therapist will have you work on activities that enhance the mobility of your shoulder joint, shoulder blade, elbow, wrist and hand.
- When lying on your back keep a pillow or towel under your elbow to keep your upper arm in slight flexion/in line with your trunk. You should always be able to see your elbow. No shoulder extension at this time. **This will also assist with reducing pain.**
- You need to keep your arm in your sling/immobilizer, and remove it only for bathing and your exercises. You may loosen it so that your elbow can straighten (but keep palm up). Immobilization of the shoulder joint is typically up to 4 weeks, followed by a gradual weaning from the sling in controlled environments from your 4th thru 6th weeks following surgery. **(Specific timeframes are adjusted based on size of tear, integrity of tissue and repair, and surgeon preference.)**
- By the end of week 6 you can begin with light waist level activities.
- You shower with a waterproof dressing 2 days after surgery. Keep your forearm at your side against your hip bone (prevents internal rotation). You may get your shoulder wet without dressings by your 7th day after surgery.
- You may sit on a stationary bicycle in order to get some aerobic exercise. No running at this point.

Once you start therapy:

1. You will do your shoulder home exercises up to 3 times per day. Your therapist will give you guidance regarding frequency of your home exercises based on your overall shoulder soreness level and your morning discomfort.
2. You will typically have in clinic PT appointments 1-3 times per week, depending upon how your motion is progressing.
3. You may use heat prior to therapy and cold (cold therapy unit or ice pack) after therapy.
4. Your therapist may use some local modalities to assist in reducing pain and inflammation when you are in the PT clinic (i.e. ice, heat, electrical stimulation)
5. You will be doing some passive range of motion (PROM) exercises with your therapist for your arm at this point. This is where your shoulder muscles are

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- relaxed and not active. Your therapist may teach a family member of yours to assist you with PROM at home.
- a. Supine passive elevation range of motion up to 100 degrees. (see next page)
 - b. Sitting external rotation up to 30 degrees with external assist (see next page).
 - c. No internal rotation at this time.
6. All of your initial exercises should be started while you are lying on your back. In this position your shoulder blade is well supported and your shoulder muscles are more relaxed as gravity is minimized. This allows for appropriate range of motion without activating your rotator cuff too much.
 7. You may begin pendulum hangs, but we do not want you to actively move your arm. (see page 8)
 8. You should start shoulder blade pinches and rolls. (see page 8)
 9. PROM for elbow if you had any surgical work done to your biceps tendon (tenodesis or tenotomy)
 10. Active range of elbow curls if you did not have any surgical work done to your biceps. No weight.
 11. You can begin active exercises for your wrist and hand, including ball squeezes.

Passive forward elevation with an assistant

Your therapist (or instructed family member) will raise your arm to a certain position over head. Typically 90-100 degrees at this stage of recovery. You need to keep your muscles relaxed. Do not force any painful motion. Hold 5-10 seconds. Repeat 10-15 times. Eventually your therapist will assist you in gaining further range of motion as in picture 2.

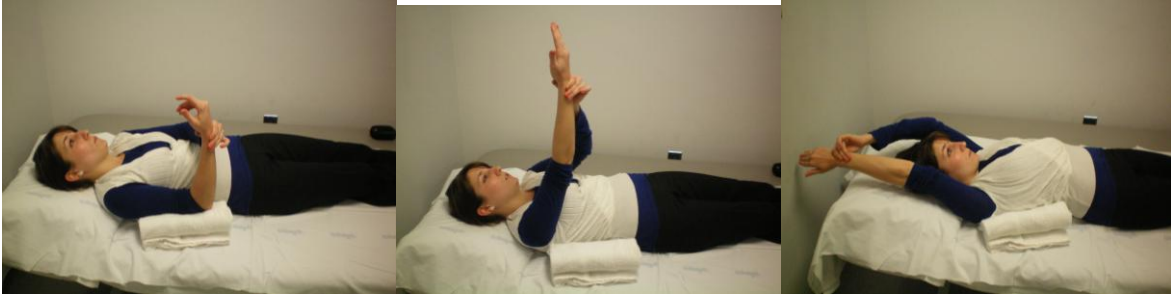


Self passive elevation on your back

Lie on your back with your elbow resting on a towel roll and your elbow bent. Use your opposite hand to hold your wrist or elbow. Keep your operated shoulder muscles relaxed and assist your operative arm straight up. Hold there for a few seconds. Then assist your arm up over your head. Only move through a comfortable range of motion. Initially you will just go to about 90 degrees of motion, as in picture 2 below. Eventually your therapist will advise you to go through further range of motion, as in picture 3 below. Hold this position for 2-3 seconds. Return to straight up position. Hold 2-3 seconds, then bend your elbow and assist yourself back to the starting position with your elbow on a towel roll. Repeat about 10 times.

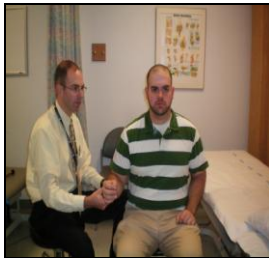
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Passive External Rotation with an assistant

Sitting with a family member sitting beside you; your family member holds your elbow with one hands and your wrist with their other hand. Your thumb should be up and your elbow is at 90 degrees. Your family member will gently rotate your arm out to the side until they feel some tightness. Hold 10 seconds then your family member will bring your arm back to the starting position. Repeat 10 times. You should keep your shoulder muscles relaxed during this exercise. Typically your family member can rotate your arm up to 30 degrees at this time. Your surgeon or therapist will let you know when you can rotate your arm out further.



Pendulum Hang

Stand holding your kitchen counter with your non involved arm. Place one foot in front of the other. Bend over at the waist. Gradually let gravity assist your arm to hang straight down. Do not actively use your shoulder muscles. Let your arm hang up to a minute. Then repeat 10 times.



Shoulder Shrugs & Shoulder Blade Pinches

Standing with your hand supported with your opposite hand or sitting with your hand supported on your lap gently shrug your shoulders upward. Hold 5 seconds and repeat 10 times. Then gently pinch your shoulder blades together as if you were sticking your chest out. Hold 5 seconds and repeat 10 times. You should do these 2 exercises periodically though out the day. (You can also do them with your arm resting comfortably in your sling.)

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Things you should achieve before you progress to Phase II:

- Appropriate healing of surgical repair.
- Good adherence to precautions and immobilization guidelines.
- Adequate ROM gained, both in terms of quantity and quality, as determined by your surgeon and PT. Typically 120-140 degrees of passive forward elevation and 30-60 degrees of passive external rotation with your arm at your side.
- Inflammation and pain controlled (minimal pain within allowed ROM)

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Additional therapist instructions, Phase I:

First 3 weeks of therapy

- Patient education: posture, joint protection, positioning, and hygiene
- Pendulum hangs, no active movement of shoulder
- Elbow, wrist, and hand active range of motion (AROM), no weights
 - Only PROM of elbow if concomitant biceps tenodesis/tenotomy performed.
- Passive forward elevation (PFE) in the plane of scapula to 90 -100 degrees
- Passive external rotation (PER) with elbow 'near' the side of the body to 30 degrees. May be adjusted base on location of the tear and intraoperatively determined 'safe zone' of ER.
- Early PROM activities should include only those activities with low RC EMG activity. (i.e. no pulleys, cane ther ex, or self PROM at this time.)
- Begin active and manual scapula strengthening exercises

Weeks 3 and 4 of therapy

- Progress Pendulum Hangs to Pendulum mobility, discomfort to be the guide
- Progress scapula strengthening
- Progress PFE and PER to tolerance
- May begin joint mobilizations grade I & II for pain relief / relaxation as indicated for all shoulder girdle joints (GH, SC, AC, ST)
- May allow aquatic therapy for active assisted range of motion (AAROM), if incisions well healed, no swimming strokes.

Additional recommendations regarding pain/inflammation management:

- Activity modification/restriction
- Proper use of sling
- Scar management
- Modalities PRN
- MD prescribed or over the counter medications
 - We do not advise NSAIDS for at least 12 weeks post operatively, as it may diminish healing of the rotator cuff. (This is currently being investigated)

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Phase II: Active Range of Motion Phase
(Approximately postop week 6 to post op week 12)

General Information / Goals:

- **You still need to allow for healing. After 4 weeks postop the tendon repair is greater than 20% of a normal shoulder which is sufficient to allow you to do assisted and active motion. This is the “active range of motion” period. We want you to normalize your motion and activities of daily living during this period.**
- **After 8 weeks the tendon will be about 40% as strong as a normal tendon.**
- **After 12 weeks the tendon is 60% as strong as a normal tendon.**

Activities to Avoid:

- No lifting or activities that require ROM beyond what you can do comfortably
- No supporting of body weight by hands and arms
- No excessive behind the back movements
- No sudden jerking motions

What you should be doing during this phase:

1. You can actively use of your arm for daily living: bathing, dressing, driving, typing on a computer, eating and drinking
2. No lifting anything heavier than a cup of water
3. You may use an elliptical machine but do not support your body weight with your operated arm. No running yet.
4. You will do your shoulder home exercises up to 2 times per day. Your therapist will give you guidance regarding frequency of your home exercises based on your overall shoulder soreness level and your morning discomfort.
5. You will typically have in clinic PT appointments 1-3 times per week, depending upon how your motion is progressing.
6. You may use heat prior to therapy and cold (cold therapy unit) after therapy.
7. Your therapist may use some local modalities to assist in reducing pain and inflammation when you are in the PT clinic (i.e. electrical stimulation)
8. Your therapist will help you with supine passive range of motion (Pillow behind elbow keeps arm in slight flexion. No extension permitted):
 - a. Forward Elevation: to tolerance
 - b. External rotation, at multiple angles: to tolerance
 - c. Scapular plane abduction: to tolerance
9. Water (pool) therapy (if available):
 - a. Standing in water with float under arm, lower body into water to help stretch into flexion
 - b. Standing in water with float under arm, lower body to side to help with external rotation

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10. Active-assisted range of motion exercises, typically starts by 6 weeks postop (see examples below)

- a. Elevation: lying on your back, then sitting, then standing

Assisted elevation on your back

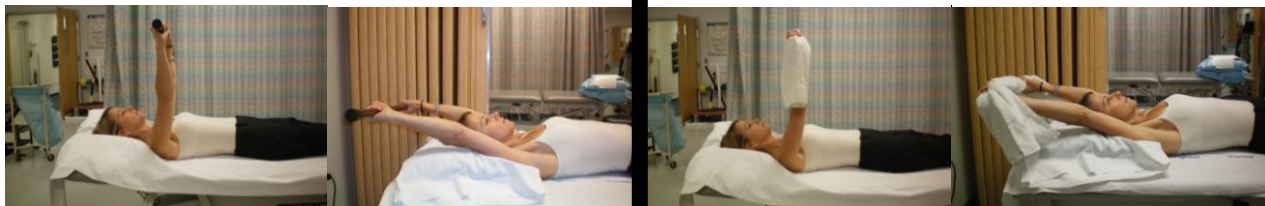
This is very similar to your previous self passive elevation exercise. However, you can now do a little of the work with your operated shoulder muscles as discomfort allows. Lie on your back with your elbow resting on a towel roll and your elbow bent. Use your opposite hand to hold your elbow or wrist. Assist your operative arm straight (see below). Hold there for a few seconds. Then assist your arm up over your head. Only move through a comfortable range of motion. Hold this position for 2-3 seconds. Return to straight up position. Hold 2-3 seconds, then bend your elbow and assist yourself back to the starting position with your elbow on a towel roll. Repeat about 10 times. When this becomes easy progress to doing it with a cane, then a small towel, and then without assist (see pictures below).

With opposite arm assist



With cane assist

With towel assist



Without assist



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Sitting assisted forward reach

You will progress to this when the previous exercises on your back have become easy. Sitting in a chair at your kitchen table place a towel under your hand. Gently slide the towel forward as if you were dusting the table. Reach a comfortable distance slowly. Hold 2-3 seconds, and then return to the starting position. Then repeat about 10 times. When this becomes easy then do the same motion/exercise without the table and towel. You can do it either sitting or standing.

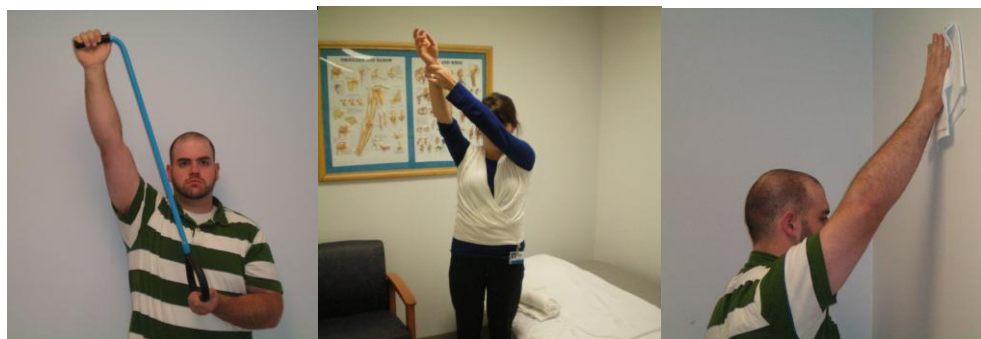


Sitting or standing unassisted forward reach



Standing assisted elevation

This can be done a few different ways. You could use a cane, your opposite hand, and/or a pillowcase and the wall. Your therapist will assist you in determining when you should start these exercises and which one is best for you. You should not force any painful motion and you must do these exercises with good mechanics without cheating with your neck or back muscles. Start with your arm at your side and thumb upward. Use the cane, opposite hand or pillowcase & wall to assist your arm to a comfortable end elevation range of motion, hold 2-3 seconds and then slowly return your arm to your side. Repeat 10 times.



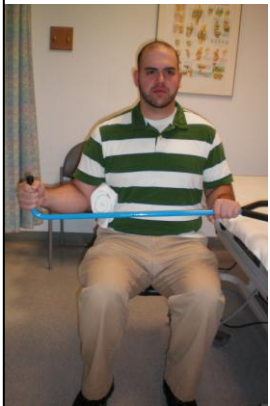
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Assisted External rotation with a cane

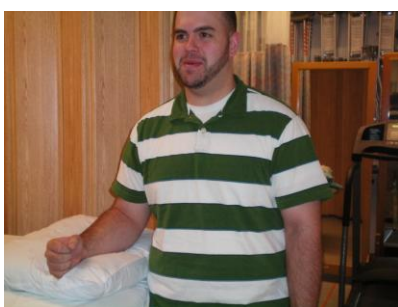
Sitting and lying on your back with your elbow resting on a towel and your elbow bent to 90 degrees. Use a cane in the opposite hand to assist your operated arm to rotate outwards. Hold 10 seconds, relax, then repeat up to 15 times. Your therapist will advise you which position(s) and how far to go for your shoulder based on the specifics of your tear and repair.

b. External rotation: on your back, sitting, standing (multiple angles)



Assisted external rotation standing

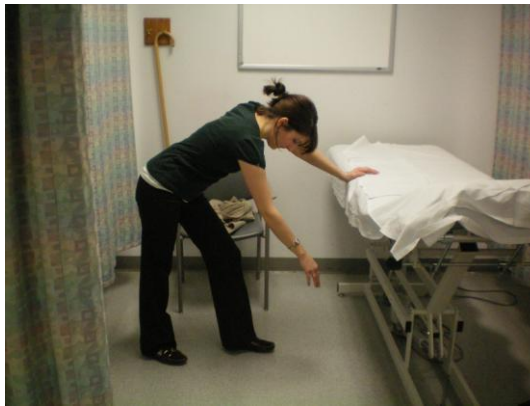
Bend your elbow to 90 degrees. Rest your forearm on a pillow on your kitchen counter. Your elbow should be resting comfortably at your side. Keep your arm still and gently take some small steps with your feet to rotate your body away from your arm till you feel a comfortable stretch. Your therapist will advise you how far you should go. Do not force any painful motion. Hold 10-20 seconds, and then take small steps to rotate your body back toward your arm. Rest, and then repeat 10 times.



c. Pendulum mobility exercise

Pendulums

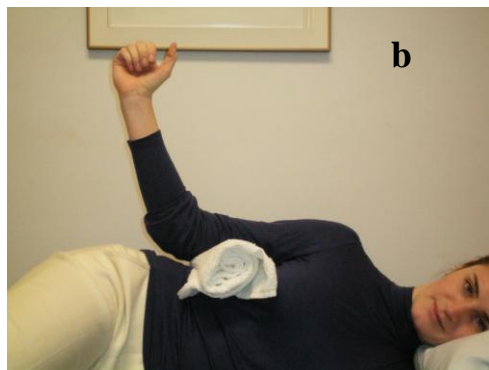
Bend over at the waist and let your arm hand down. Using your body to initiate the motion, swing the arm gently forward and backward in a circular motion.



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11. Active range of motion, typically 6-8 weeks postop (see below)
 - a. Forward elevation in the plane of the scapula
 - b. External rotation, multiple positions and angles



Active Range of Motion Exercises (pictures above)

- (a) Full can exercise – Standing facing a mirror with your thumb upward/forward. Keep your shoulder blade ‘set’ and your elbow straight, raise your arm forward and upward with a slight 20 degree outward angle. Hold for 3 seconds then slowly lower and repeat.
- (b) External rotation exercises – With your elbow supported (either on your waist with a towel or on your kitchen table) rotate your arm out to the side as far as you can. Hold for 3 seconds then slowly return your arm to the starting position.
- (c) Your therapist will progress you to other active range of motion exercises in other planes of movement when your shoulder is ready to begin these (i.e. pure flexion, pure abduction, cross body adduction, etc.)

12. When appropriate (i.e. good AROM mechanics and pain free) initiate base strengthening program for deltoid, non repaired segments of the rotator cuff, and scapula musculature. **Typically 10-12 weeks post op for small tears, delayed up to 16 weeks for large to massive tears.**

- Light resistive band exercises in pain free range of motion (see next page)
- Scapula strengthening program
- Begin low level closed chain program

Things you should achieve before you progress to Phase III:

- Adequate ROM in all planes without pain or substitution patterns, as determined by your MD and PT. Typically greater than 140 degrees of passive forward elevation, greater than 115 degrees of active forward elevation, normal external rotation at 0 degrees of abduction.
- Appropriate shoulder blade positioning at rest and with shoulder activity.
- Completion of current rehabilitation program / exercise without pain or difficulty.
- Minimal pain.

External Rotation Strengthening

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Tie band around sturdy object or close it in a door at about the height of your elbow. Place a small towel roll under your elbow if instructed by your therapist. Hold the band as starting position picture shows. Keep your shoulders back and your elbow bent at 90 degrees as you slowly rotate your forearm away from your stomach. Move to the end of your comfortable range of motion. Hold this position for 2-3 seconds. Return to starting position and repeat for 3 sets of 10-15 repetitions (up to 30 to 45 reps total). Your therapist may show you an alternative method of doing this exercise with a pulley and light weight.



Internal Rotation Strengthening

Tie band around sturdy object or close it in a door at about the height of your elbow. Place a small towel roll under your elbow if instructed by your therapist. Hold the band as starting position picture shows. Keep your shoulders back and your elbow bent at 90 degrees as you slowly rotate your forearm towards your stomach. Move to the end of your comfortable range of motion. Hold this position for 2-3 seconds. Return to starting position and repeat for 3 sets of 10-15 repetitions (up to 30 to 45 reps total) Your therapist may show you an alternative method of doing this exercise with a pulley and light weight.



Row with Resistance Band

Start with band tied around sturdy object or close it in a door. Begin with your shoulder blades back and your arms extended. Keep shoulder blades squeezed together as you pull the band back as shown. Don't let your elbows go behind your body. Hold 2-3 seconds and return to starting position. Repeat 3 sets of 10-15 repetitions (up to 30 to 45 reps total) Your therapist may show you an alternative method of doing this exercise with a pulley and light weight.



Rowing alternatives
 If appropriate for you, your therapist will show you some additional exercises with resistance band for upper back strengthening.

- ‘W’s
- ‘T’s
- ‘Y’s
- ‘I’s

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Rotator Cuff Stretching

The intensity and frequency of stretching that one needs is variable. Your surgeon and therapist will advise you which stretches and how intense you should stretch based on how your shoulder is progressing.

Behind the back internal rotation

Standing, place your operated arm behind you at the waistline. Use your opposite hand to assist your hand higher towards your shoulder blade. Hold this position for 10-30 seconds. Return to starting position and repeat for up to 10 times. Your therapist will advise you if you need to be more aggressive with this stretch and use a towel.



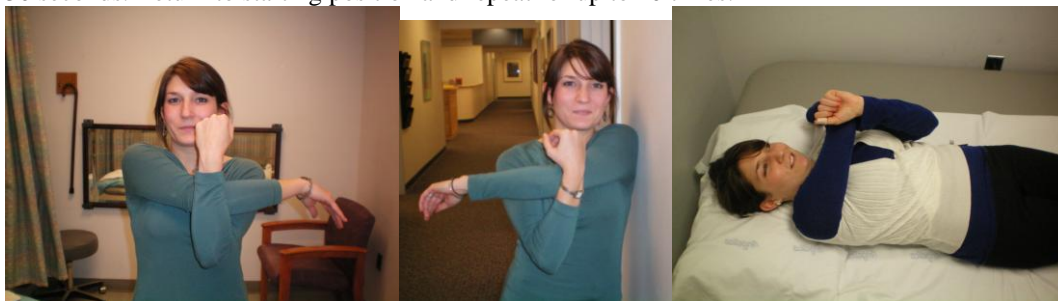
Sidelying internal rotation stretch

Lie on your side with your arm positioned so that the arm is at a right angle to your body and the elbow is bent to 90 degrees. Keeping the elbow at a right angle, rotate your arm forward as if you were going to touch the table with your palm. Apply a gentle stretch. Hold this position for 10-30 seconds. Return to starting position and repeat for up to 10 times.



Cross body stretch

This can be done standing, standing leaning against a wall or lying on your back. Support your elbow with your opposite hand/arm. Gently bring your elbow toward the opposite shoulder across your body. Hold this position for 10-30 seconds. Return to starting position and repeat for up to 10 times.



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Doorway external rotation stretch

This is done standing. Bend your elbow to 90 degrees. Place your hand on a door frame or outward corner in your home. Your elbow should be comfortably placed at your side. Keep your arm still and gently take some small steps with your feet to rotate your body away from your arm till you feel a comfortable stretch. Your therapist will advise you how far you should go. Do not force any painful motion. Hold 10-20 seconds, and then take small steps to rotate your body back toward your arm. Rest, and then repeat 10 times.



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Additional therapist instructions, Phase II:

Week 6 thru 12 of therapy:

1. P/AA/AROM as needed to normalize ROM.
2. Establish basic rotator cuff and scapula neuromuscular control within available ROM.
3. Introduction of light waist level functional activities

Patient Education:

- Continue education regarding avoiding heavy lifting or quick sudden movements.
- Counsel about using the upper extremity for appropriate ADL's in pain free ROM; starting with waist level activities, progressing to shoulder level activities, then overhead activities.

ROM:

- Continue previous exercises in Phase I as needed
- Progress passive ROM PFE and PER
- Progress joint mobilizations to grades III & IV to address capsular restrictions as indicated for all shoulder girdle joints (GH, SC, AC, ST)
- Begin PROM in other planes (be careful to minimize direct passive tension on the repair)
 - Horizontal adduction
 - Functional Internal Rotation only PRN
 - ER at multiple angles of abduction (45, 75, 90 degrees)
- Progress to AAROM as tolerated (focus on proper mechanics).
 - Forward elevation
 - If using pulleys then ensure adequate shoulder ROM and mechanics present (i.e. > 120 degrees of forward elevation)
 - Flexion
 - Abduction in the scapular plane
 - ER
- Progress AAROM program to AROM with emphasis on good shoulder mechanics
- Begin musculature activation exercises, which activate the shoulder girdle musculature without creating significant muscular force. (i.e. supported AROM activities, then unsupported AROM activities, then on to light resistance, including resistance to the scapula musculature)
- Scapular/glenohumeral joint mobilization as indicated to regain full passive ROM
- Initiate posterior capsule stretching cross body adduction stretching as indicated
- Address scapulothoracic and trunk mobility limitations. Ensure normal cervical spine ROM and thoracic spine extension to facilitate full upper extremity ROM.
- When appropriate (i.e. good AROM mechanics and pain free) initiate base strengthening program for deltoid, non repaired segments of rotator cuff, and scapula musculature
 - Light resistive band exercises in pain free range of motion
 - Scapula strengthening program
 - Begin low level closed chain program

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Phase III: Strengthening Phase
(Approximately postop week 12 to postop week 16)

General Information / Goals:

- **After 12 weeks the tendon is 60% as strong as a normal tendon**
- **After 16 weeks the tendon is 70% as strong as a normal tendon**
- **At 32 weeks the tendon repair is 80% as strong as a normal tendon**
- This is the initial strengthening phase of rehabilitation.
- You should have full range of motion by this point with good shoulder stability
- During this phase you will gradually restore your shoulder strength, power, and endurance
- You will return to normal functional activities of dialing living, full work and modified recreational activities during this phase.

Activities to Avoid:

- No lifting of objects heavier than 5 lbs.
- No sudden lifting or pushing activities
- No sudden jerking motions
- No uncontrolled movements
- Do not perform straight arm lateral raise (long lever arm abduction) strengthening exercises as this will place too much load on the repaired tissue
- Do not perform arm raises with your arm with your thumbs down (empty can) at any stage of rehabilitation due to impingement and stress on the cuff repair.
Always do arm raises with your thumb up (full can)

What you should be doing during this phase:

- You will typically be doing your home exercises 1 time per day and eventually be weaned down to an every other day basis when you are doing more strenuous/advanced strengthening exercises. You will typically have in clinic PT appointments 1-2 times per week, depending upon how your motion and strength is progressing.
- Heat prior to therapy, cold after therapy.
- More aggressive stretching of shoulder, if needed.
- Continue water therapy in pool (if available)
- Progress strengthening with elastic bands with increasing resistance
- Can begin light free weights (1-4 lbs at this point)

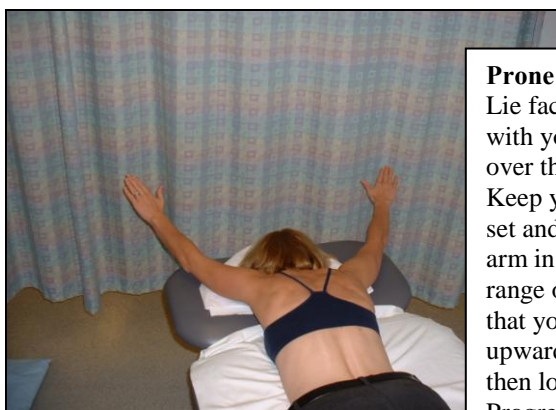
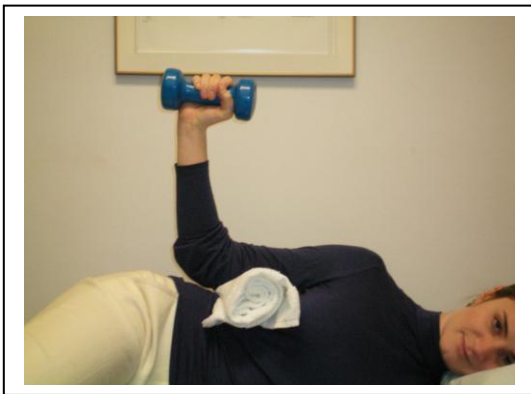
- Examples of some exercises that are begun in this phase (next page)
 - ER Sidelying with towel
 - Full Can in Scapular Plane (avoid empty can abduction exercises at all times)
 - Prone Scaption, Prone Rowing, Prone Horizontal abduction, Prone Extension

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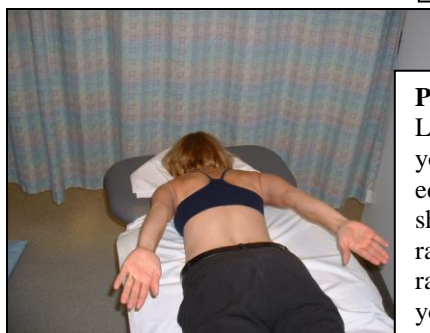
Sidelying external rotation

Lying on your non operated side, bend your elbow to a 90 degree angle and keep the operated arm firmly on a towel on your body. Rotate your arm upward, toward the ceiling through a comfortable range motion. Hold for 3 seconds, then lower your arm and repeat.



Prone scaption ('Y's)

Lie face down on your bed with your arms hanging over the edge of your bed. Keep your shoulder blade set and slowly raise your arm in a comfortable range of motion upward so that your thumb is facing upward. Hold 3 seconds then lower your arm. Progress to light weights (1-3 lb.) if you can do 30 without pain.



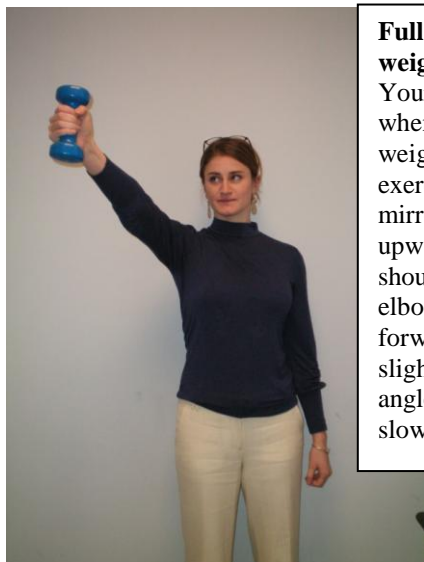
Prone extension ('I's & 'T's)

Lie face down on your bed with your arms hanging over the edge of your bed. Keep your shoulder blade set and slowly raise your arm in a comfortable range of motion upward so that your thumb is facing upward. Hold 3 seconds then lower your arm. Progress to light weights (1-3 lb.) if you can do 30 without pain.



Full Can exercise with weight

Your therapist will advise you when it is time to start using a weight. (1-3 lbs.) Full can exercise – Standing facing a mirror with your thumb upward/forward. Keep your shoulder blade 'set' and your elbow straight, raise your arm forward and upward with a slight 30 degree outward angle. Hold for 3 seconds then slowly lower and repeat.



Prone Rows

Lie face down on your bed with your arms hanging over the edge of your bed. Your elbow is bent to 90 degrees. Keep your shoulder blade set and slowly raise your arm in a comfortable range of motion upward so that you are rowing. Hold 3 seconds then lower your arm. Progress to light weights (1-3 lb.) if you can do 30 without pain.

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Progressed strengthening for the subscapularis muscle

- Diagonals with resisted band (operative arm only)
- Push up plus from kitchen counter
- Dynamic Hug (both arms)
- IR at 90 degrees of abduction

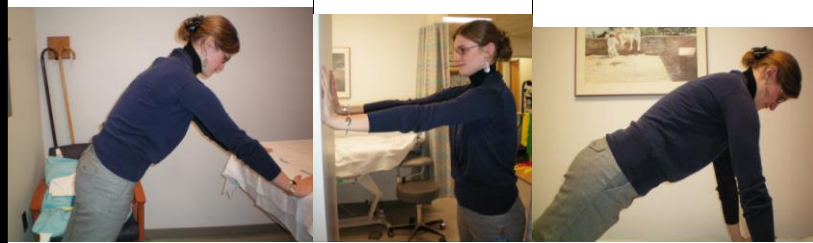
Diagonal

With band attached at shoulder height behind you. Start with your arm in a throwing type position. Pull the band down and across your body so your hand is in front of your opposite shoulder. Hold 3 seconds then repeat.



Pushup Plus

Standing with your feet shoulder width apart and your hands on our kitchen counter. Do a gentle pushup motion. When your elbows are completely straight, then round your shoulders as if you were bringing your shoulder blades forward. Hold 3 seconds then repeat. If too hard then do it standing from at a wall. If too easy then do it kneeling on the floor.



Dynamic Hug

The band is attached at shoulder height behind you and is in both hands. Pull the band forward and slightly downward in a hugging type motion. Hold 3 seconds then repeat.



IR @ 90 Degrees

Stand with the band attached above your head behind you. Keep your arm elevated to 90 degrees and the elbow bent to 90 degrees. Rotate your arm slowly downward / forward. Hold 3 seconds then repeat.

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Standing Forward Punch

Attach the band at waist level to a solid object or close it in a door jam. Grab the band in your hand and step forward till you feel that the band is taut. Begin with your arm at waist level with your elbow bent. Slowly punch forward. Your hand should reach approximately the level of your shoulder. Hold this position for 2-3 seconds. Return to starting position and repeat for 3 sets of 10-15 repetitions (up to 30 to 45 reps total)



- Progressed strengthening for the posterior cuff (infraspinatus/teres minor)

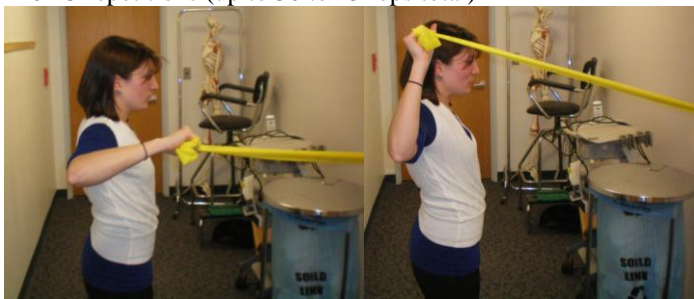
Sitting External Rotation – Supported at 90 degrees

Sitting with your arm resting on your kitchen table so that your shoulder is at 90 degrees or slightly lower from your body. With a light weight in your hand keep your elbow on the table and rotate your hand and weight upward to a comfortable position. Hold this position for 2-3 seconds. Return to starting position and repeat for 3 sets of 10-15 repetitions (up to 30 to 45 reps total)



External Rotation – Unsupported at 90 degrees

Attach the band at shoulder level to a solid object or close it in a door jam in front of you. Grab the band in your hand and step backward till you feel that the band is taut. Keeping your arm elevated to 90 degrees and the elbow at 90 degrees, rotate your arm slowly backward. Hold this position for 2-3 seconds. Return to starting position and repeat for 3 sets of 10-15 repetitions (up to 30 to 45 reps total)



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Biceps curls

Hold a light weight in your hand. Keeping your elbow close to the side of your body, slowly bend the arm at the elbow and curl towards the shoulder. Hold 3 seconds then straighten your elbow. Repeat for 3 sets of 10-15 repetitions (up to 30 to 45 reps total)

**Things you should achieve before you progress to Phase IV:**

- Able to tolerate the progression to functional activities.
- Demonstrate return of strength and shoulder stability to tolerate a progression to higher demanding work/sport specific activities.

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Additional therapist instructions, Phase III:

Week 12 of therapy and on:

Patient Education:

- Counsel in importance of gradually increasing stress to the shoulder while returning to normal ADL's, work, and recreational activities including lifting, repetitive and overhead activities.

Neuromuscular Re-education:

- Dynamic stabilization exercises
- Light PNF for cuff /deltoid/scapula (rhythmic stabilization or slow reversal hold)
- Open chain kinesthetic awareness drills (ROM replication, etc..)
- Closed chain activity progression

Strength/ Endurance/ Power:

- Initiate balanced rotator cuff strengthening program
 - Initially performed in a position of comfort with low stress to the surgical repair in the plane of the scapula (band or light weights)
 - Exercises should be progressive in terms of muscle demand / intensity
 - Exercises should also be progressive in terms of shoulder elevation
 - Nearly full elevation in the scapula plane should be achieved before elevation in other planes
 - Rehabilitation activities should be pain free and performed without substitutions or altered movement patterns
 - Program should focus on high repetitions (30-50 reps) and relatively low resistance (1-3 lbs.)
 - Progressive resisted exercises are needed to match/equal functional demands
- Progress to advanced strengthening program (ASP) PRN
 - Not all patients need to progress to an ASP
 - Criteria to begin advanced strengthening
 - MMT at least 4/5
 - Painfree with basic ADLs and initial strengthening program
 - Full AROM elevation
 - Goal of returning to sports, heavy labor, or repetitive overhead activity
 - Use to following principles to develop exercises to gradually progress patient from current level of functioning to desired goals
 - Decrease amount of external stabilization provided to shoulder girdle
 - Integrate functional patterns
 - Increase speed of movements
 - Integrate kinesthetic awareness drills into strengthening activities
 - Decrease in rest time to improve endurance
 - *Sample Exercises*
 - T-band standing PNF patterns
 - T-band 90/90 ER/ IR w/ or w/out arm support
 - T-band batting, golf, or tennis forehand / backhand simulation
- Repetitions and increase weight over the course of 6-8 weeks

Pain Management:

- Modalities as needed
- Ensure appropriate use of upper extremity during ADL's
- Ensure appropriate level of therapeutic exercises

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**Phase IV: Preparation for Return to Sports Phase
(Approximately postop week 16 to postop week 24)**

General Information/Goals:

- During this phase you need to continue with your ROM and stretching program to maintain your motion.
- You will be working on conditioning exercises for enhanced functional use of your arm.
- Your rehabilitation activities will prepare you to return to higher level functional activities (i.e. sports and/or occupation).
- Your therapist will help you design a program that you will continue with on your own following formal therapy.

Things to Avoid:

- No lifting of objects heavier than 10 lbs.
- No sudden lifting or pushing activities
- No progression into activities that are painful and/or you do not have adequate ROM and strength to do

Rehabilitation activities you will be doing during this final phase of rehab:

- Daily home stretching program
- 3 day per week home strengthening program
- Progressive strengthening and endurance exercises. Continue progression of shoulder strengthening, transition to general upper extremity strengthening program. Progressive return to weight lifting program emphasizing larger, primary upper extremity muscles
- Activity specific progression; sport, work, hobbies

MILESTONES TO RETURN TO FULL SPORT, WORK, HOBBIES:

- Clearance from surgeon and therapist
- Minimal to no complaints of pain
- Restoration of sufficient ROM for task completion
- Adequate shoulder girdle endurance for desired activity
- Regular completion of an independent strengthening program at least 3 days per week.

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General Overview for the Treating Therapist

Surgical Procedure/Cuff Tears:

- Familiarity with the surgical procedure and understanding its effects on rehabilitation is vital. Multiple surgical techniques are employed by surgeons to repair a torn rotator cuff. It is important for the treating therapist to have an understanding of the surgical techniques their referring surgeons use.
- There are multiple variables that need to be considered when a surgeon plans operative intervention and a therapist plans the rehabilitation program for a given patient. These variables include: age of the individual, activity level of an individual, duration of symptoms, extent of the tear (Rotator cuff tears are typically classified into 4 categories: small (< 1cm), medium (1-3 cm), large (> 3-5 cm), and massive (> 5 cm) or a complete 2 tendon tear), location of tear, number of tendons involved, overall rotator cuff tissue quality, presence of muscle atrophy, as well as the presence or absence of other pathology within the shoulder complex.
- It is important for the therapist to have an appreciation for typical outcomes following arthroscopic rotator cuff repair. In terms of postoperative outcomes many factors have been reported on. Younger individuals have shown to have done better.¹ It has been reported that the older an individual is when they have a rotator cuff repair the likelihood of cuff healing diminishes.² Increased postoperative strength and decreased pain has been correlated with early surgical repair.^{3,4} Patients with smaller tears have had better outcomes.^{5,6} Most rotator cuff repair studies have reported correlation's between size of the tear and/or type of tear and functional outcome.⁷⁻¹⁰ However, it has been reported that with the exception of massive tears there was not a correlation between the size of the cuff tear and functional outcome.¹¹
- The biomechanical strength of the repaired RC has been reported to be dependent upon tissue quality, surgical technique, and materials used.¹²⁻¹⁴

Structures Which Require Protection during Rehabilitation:

- Due to the arthroscopic nature of surgery the deltoid is not significantly disturbed. Therefore, the deltoid does not have to be protected for 6 plus weeks postoperatively like with an open rotator cuff repair.
- However, sutures, suture anchors, the rotator cuff and associated capsule need significant protection from undue stress for a period of time (typically up to 12 weeks) to facilitate appropriate healing. The timeframe varies based on a number of variables including age of the individual, activity level of an individual, duration of symptoms, extent of the tear, location of tear, number of tendons involved, overall rotator cuff tissue quality, presence of muscle atrophy, as well as the presence or

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absence of other pathology within the shoulder complex. Each variable should be considered when formulating a postoperative therapy plan, and it is important for surgeons and therapists to recognize that the strength of rotator cuff repairs can vary substantially.^{13,14}

- *Therefore close communication with the surgeon is vitally important* to discuss associated pathology, tissue quality, method and integrity of the repair to plan an individualized rehabilitation program. Based upon this information, range of motion and strengthening activities will be appropriately progressed during rehabilitation to ensure adequate healing and enhancement of function.

Critical Rehabilitation Principles:

- The age of the patient, size of the tear, quality of rotator cuff tissue, and the ease of tendon mobilization all may influence a surgeon's decision to delay range of motion exercises. Higher rates of retear have been associated with increased age and size of the tear. Poor quality rotator cuff tissue may benefit from a prolonged immobilization period to allow adequate healing to bone. A retracted tendon requiring a repair under tension should be protected from motion. Typically, motion will be delayed for up to 6 weeks post-operatively.
- During the first 2 to 4 weeks after tendon repair, loads across the repair site must be minimal. The weak fibrin clot gives way to a loosely organized type III collagen callus, neither of which can withstand physiologic loads. The gradual introduction of tensile stress during the maturation process may assist in the proper orientation of mature type I collagen fibers. Numerous clinical series have described the benefit of early passive motion. The type of motion employed in the early rehabilitation period is crucial to ensure proper tendon gliding and healing, but no clear guidelines exist. Passive ROM exercises should be performed within a safe (ie, low load) ROM. Pressure at the end of the range (stretching) should be avoided for the first 6 weeks.
- The treating clinician needs to recognize that there is not a definitive point between PROM, AAROM, AROM, and strengthening exercises. Exercise selection and progression should be based on the tension placed on the repair by rehabilitation and functional activities (both active and passive). Tension is affected by many factors such as EMG activity level, plane of motion, cyclic loading, the weight and length of an individual's upper extremity. Every patient's progression will likely be different based on these factors.
- Balancing the speed of P/AAROM gains is vitally important to adequately protect the surgical repair and to assure ROM is not gained too quickly or too slowly. Gaining range of motion too slowly is a more common problem following rotator cuff repair and may result in residual stiffness, warranting further surgical intervention. Some believe gaining range of motion too quickly following rotator cuff repair may have an impact

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on healing. Balancing the speed of P/AAROM gains can be accomplished through the use of staged range of motion goals. The optimal speed of P/AROM gains is different for each patient and based on the above mentioned factors. Patients and therapists should be encouraged to exercise to the patient's tolerable level of discomfort.

- Isolated repair of the subscapularis requires a limitation of external rotation range of motion during the first 6 post-operative weeks. Surgeons will provide range of motion limitations. However, if these limitations are not provided, external rotation should be limited to less than 30° during this time period.

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