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## **Rehabilitation Protocol for Rotator Cuff Surgery**

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### **Repairs of Large to Massive ( $\geq 5$ cm) Rotator Cuff Tears with arthroscopic or open decompression**

*Note: This rehabilitation protocol is the result of an extensive effort of Dr. Abrahamsen and Yalcin Ekren, cert. MDT.PT, with over 40 years combined experience. This effort includes many hours of scientific review and collaboration. It is designed to assist you and your physical therapist to give you the knowledge and tools necessary for successful rehabilitation after your surgery.*

- 1. Goal:** to restore range of motion (ROM), strength, function, and confidence to the shoulder while avoiding the pain and swelling commonly caused by active use of the arm before scapulo- humeral rhythm has been restored. Also avoiding adhesions or scar tissue from prolonged immobilization. In addition, the protocol assists in education on proper arm positions and exercises as following the protocol helps avoid over-stressing the repair and promotes stronger tissue healing.
- 2. Pre-op medical evaluation:** All patients must be evaluated by their primary care physician (PCP) within 3 months prior to surgery. Please contact your family doctor or internist to arrange for a preoperative medical evaluation (pre-op clearance) to ensure the surgery does not carry an undue risk. Diabetics should have their blood sugars under control (hemoglobin A1C levels  $< 6.9\%$ ). Patients with inflammatory arthritis (e.g. rheumatoid arthritis) should contact their rheumatologist or PCP about reducing or discontinuing immunosuppressive medications several weeks before and after surgery.
- 3. Personal preparation for surgery:** If you are a smoker, stopping for a few weeks before and after surgery will lessen risk of complications such as blood clots or pneumonia. Dental work and kidney or bladder problems and procedures should be taken care of prior to the knee replacement if possible, as these procedures can cause a temporary bacteremia (bacteria

in the bloodstream). Addressing these conditions prior to knee replacement lessens risk of infection after surgery.

4. **Facts:** The *supraspinatus* or “rotator cuff” muscle is normally weak, temporarily, following arthroscopic surgery to relieve impingement and repair the rotator cuff. Normal function of the supraspinatus muscle is necessary for pain free use of the arm when reaching, throwing, or lifting above waist level. Supraspinatus function can be restored with minimal pain or discomfort by ensuring that the elbow is supported and shoulder (trapezius) relaxed during range of motion and strengthening exercises—this is best accomplished in the supine position until supraspinatus strength is **at least 3+/5**. EMG evidence has shown that scaption resistance exercises strengthen all parts of the deltoid muscle—anterior, middle, and posterior.
  
5. **Precautions: Trapezius spasm and dysfunction** leads to superior placement of the arm against the underside of the acromion and delays recovery. **Strengthening exercises** are most successful when they are performed with no pain with submaximal effort, thereby promoting organized collagen fiber repair, while avoiding disorganized and stiff scar formation. Strengthening exercises also protect the rotator cuff repair when done with the elbow supported, shoulder in 30 degrees flexion and 30 deg abduction, then moving no further than to 30 degrees internal rotation and to 0 degrees external rotation in the 1<sup>st</sup> 2 phases of rehabilitation. **Range Of Motion:** Extremes of internal rotation and adduction are to be avoided in the 1<sup>st</sup> 10 weeks as they can put undue stress on the repair. There is less stress on the rotator cuff when forward elevation exercises are done in 30 degrees of abduction and 30 degrees internal rotation, beginning in 30 degrees forward elevation (and proceeding upward in the plane of the scapula). **Pain** is usually sign of muscle dysfunction or stress on the repair (especially once the inflammatory phase of healing subsides 3-4 weeks post-op); it is best addressed by changing the speed, force, range, or direction of rehabilitation exercises, or by addressing trapezius takeover or spasm. **Abduction exercises are to be done in external rotation (thumb pointing up, or “filling can”); abduction exercises in internal rotation (“thumb down, or emptying can”) are to be avoided, as they are usually painful.** **“Walking the wall”** exercise is, in our opinion, counterproductive for most patients. It is to be avoided because it is often done improperly by patients at home resulting in scapular substitution and pain.

#### REMINDER:

When the patient agrees to undergo arthroscopic shoulder surgery they willingly commit to a 3 to 4 month, vigorous, structured, rehabilitation program. They should

understand that the end-result depends to a great extent on their discipline, motivation, and perseverance in performing their exercise program between therapy sessions. Without their commitment and energy, the surgery is assured to fail to meet their expectations. With their cooperation and dedication they have an excellent chance to regain the strength, motion, and confidence in their shoulder to participate in a wide variety of activities, including throwing and racquet sports, lifting overhead, and repetitive use of the arm at shoulder level or above.

Following repair of a large to massive rotator cuff tear, physical therapy typically begins 4-8 weeks post-op. A physical therapist's treatment and supervision is recommended for optimal results. Physical therapy visits are typically 2-3 times a week in the 1<sup>st</sup> 4 weeks, then 2-3 times a week for the 2<sup>nd</sup> 4 weeks. The following exercise program should be followed **daily on your own, closely following your physical therapist's instructions**, to achieve the goals expected at the end of each time interval. This detailed protocol has been designed as a reference specifically for you and your physical therapist.

#### **TIMING OF POST-SURGICAL VISITS:**

1. WEEK 1 (dressing change, suture removal, & x-rays)
2. WEEK 5 (ROM check)
3. WEEK 9 (strength check)
4. WEEK 13 (functional level check)

### **REHABILITATION PROGRAM**

- References:** 1. *Rehabilitation of the Rotator Cuff: An Evaluation-Based Approach;*  
*J Am Acad Orthop Surg, Vol 14, No 11, October 2006, 599-609.*  
 2. *Clinical Orthopaedic Rehabilitation, 2nd edition (2003)*  
*By Steven B. Brozman, MD and Kevin E. Wilk, PT.*  
 3. *Champ L. Baker, MD, et. al., Arthroscopic Rotator Cuff Repair,*  
*Journal of Surgical Orthopaedic Advances 12(4):175-190, 2003*  
 4. *Orthopaedic Physical Assessment, 4th edition (2006)*  
*by David J. McGee, RPT, PhD*

#### ***IMMEDIATELY POST-OP***

1. **ACTIVITY:** A ***shoulder abduction brace*** (sling with a strap and cushion to keep the arm immobilized but away from the body) is provided for comfort, to protect the repair, and to remind the patient they are not to attempt to reach with the operated arm until the doctor or physical therapist gives the "OK". It may be removed if the patient leans and dangles the arm away from the body or supports the arm away from the body. ***Sitting up*** in bed or chair is usually the most comfortable position, even to sleep. Put a bag of ***ice*** on the shoulder, covering the dressing with a towel to keep it dry. Change it every 4 hours. . Gel pads or frozen vegetables rotated in the freezer or ice from a convenience store are both good alternatives. Ice is important for 3 days after surgery to keep swelling and pain to a minimum. Prescription pain pills are provided and should be taken

- every 4 hours in the first 24 hours to prevent muscle spasm and subsequent pain that can be difficult to control without hospitalization. You will have a doctor's visit 1-3 weeks after surgery to check the wounds and to make arrangements to start physical therapy.
2. **RANGE OF MOTION:** The patient should open and close their fist several times each hour while awake to prevent swelling and stiffness of the hand. If comfortable, they may begin removing the shoulder immobilizer the day after surgery to dangle their arm and straighten and bend the elbow, **provided the patient leans to the operated side and dangles the arm away from the body.** This may be done twice a day until the brace is discontinued.
  3. **WOUND CARE:** It is important to not get the dressing or incision wet. You may shower 48 hours after surgery if you cover your dressing with a plastic bag (or plastic wrap such as Saran Wrap or Glad Press'N'Seal), and waterproof tape. Please do not remove or change the dressing unless it gets soaking wet—it will be changed the 1<sup>st</sup> office visit or by a home health nurse.
  4. **GOAL:** The goal in the first 3 days after surgery is comfort. A good night's sleep is essential. Prescription sleeping pills are provided and should be used if necessary.

***WEEKS 4-8—Begin Physical Therapy, Phase 1 (Protect Repair—Passive & AAROM, no forceful end range stretch)***

1. **PAIN & SWELLING:** It is important to reduce pain and swelling throughout rehabilitation with the use of specific modalities, such as, ice pack, electrical stimulation, ultrasound, and mobilizations, as recommended by your physician or physical therapist. After 3 days ice is no longer necessary day and night and can be used as needed for pain control. If you have a shoulder immobilizer that comes with synthetic ice bags, the part of the immobilizer that holds the ice bags can be removed after 3 days. In general, *heat* helps with muscle spasm, especially *before* exercise; *ice* helps with pain & swelling, especially *after* exercise.
2. **ACTIVITY:** You may use the hand at brace level with the brace supporting the arm. Do not reach for anything until the doctor or therapist gives the OK. You may slowly raise your arm if your hand is touching your chest up to the level of your ear or face; do this laying flat on your back, not sitting up nor when standing.
3. **RANGE OF MOTION:** The shoulder immobilizer is for the patient's comfort and to protect the repair. They may stop using it 6-8 weeks after surgery. Two-3 weeks after surgery, begin active assisted and passive motion using counter top or thigh slides and rotation with the elbow supported, within the tolerance of comfort. Some pain during ROM exercises is acceptable, but **pain should subside within 20-30 minutes after each therapy or exercise session.** Tell your therapist if you are experiencing pain longer than 30 minutes after a PT session. ROM exercises may include pendulum, scaption, and external rotation to neutral (and extension in the 2<sup>nd</sup> half of Phase 1), but internal rotation behind the

- back and adduction should be avoided in the early phase of rehabilitation as they stress the rotator cuff repair and can compromise healing. The patient's elbow should be supported and the elbow anterior to the coronal plane of the shoulder during passive stretching.
4. **STRENGTHENING:** Strengthen the shoulder using yellow or red theraband and isometric exercises that the physical therapist shows you (e.g. scapular adduction, shoulder extension, and arm curls with free weights with elbow slightly abducted to avoid substitution). ***Forward flexion or scaption resistive exercises are to be avoided until Phase 3.*** The goal of strengthening in the early phase of rehabilitation is to center the humeral head in the glenoid fossa. The rotator cuff is protected during rotational resistance exercises by flexing and abducting the arm 30 degrees to the scapular plane and performing isometrics with manual resistance ("rhythmic stabilization"). ***Resistance exercises should be done in a mid range and should cause no pain.***
  5. **WOUND CARE:** You may get the incisions wet, in a shower, 5 days after surgery, if there is no drainage. Do not soak the shoulder in a bathtub, hot tub, or swimming pool until at least 3 weeks after surgery. Don't be surprised if bruising develops 3 to 7 days after the operation in the upper arm or even to the elbow.
  6. **GOALS:** Initial focus is on educating the patient on HEP and proper positioning for optimal tissue healing and to protect the repair. Begin early ROM exercises to avoid adhesions and promote healthy (linear, longitudinal) collagen formation resulting in strong, extensible scar tissue. Focus on minimizing load across the repair, decreasing pain, restoring function (keeping the hand close to the front of the body and avoiding substitution). By the end of this phase, the shoulder should move to 80-100 degrees flexion (scaption), and to 0 to 10 degrees external rotation when arm is abducted 20-30 degrees in the supine position, but may still be sore, stiff, and swollen. Do not be discouraged if some swelling persists.

***WEEKS 9-12 Phase 2 (Begin AROM, submaximal isometrics, rhythmic stabilization, & PNF exercises in supine position with gravity eliminated)***

1. **PAIN & SWELLING:** Continue to use necessary modalities as needed to promote healing and progress complete recovery.
2. **RANGE OF MOTION:** Increase ROM using the exercises your therapist recommends. Improve extension-adduction moving the hand behind the back toward the opposite buttock. Avoid pain after this motion by avoiding end stretch and humeral elevation ("substitution"). Moving the hand across the back, rather than up the middle of the back, avoids substitution during this phase.
3. **STRENGTHENING:** Continue with twice a day theraband exercises, cane press, free weight (not against gravity), and gain 3+ /5 strength with no substitution. Strengthening exercises should be done in pain free, mid-range. Introduce scapular stabilization exercises and closed kinetic chain exercises for muscle re-education. Also introduce isometric inferior glide exercise, avoiding superior glide between reps by bending the elbows if necessary in between reps.
4. **GOAL:** By the end of Phase 2 PROM of the shoulder should be 120-140 deg flexion (scaption) and 20-60 deg external rotation (in 20-40 deg abduction,

supine). It is not unusual to still have some discomfort in the shoulder, which may limit motion. It is also not unusual to still have difficulty reaching behind the back (internal rotation/ extension), though the goal should be (PROM) thumb to middle of lower back. Not only should glenohumeral motion be re-established, but also glenohumeral-scapulothoracic rhythm (1 deg ST motion for every 2 deg GH motion). Histologically, the goal in this phase is to organize new collagen tissue to promote strong tendon healing by applying slight tension to the repair and to avoid disorganized collagen (scar) with early protected ROM.

5. **ACTIVITY:** You may use the arm for personal hygiene as your comfort permits.

### ***WEEKS 13-16 Phase 3 (Begin Resistive Exercises)***

1. **PAIN:** Continue to use modalities as needed. You should be tapering your use of prescription pain pills and discontinuing their use by the end of Phase 3.
2. **RANGE OF MOTION:** Continue to increase AROM to improve quality of shoulder movement and eliminate substituted shoulder movement. Work on end-range movement and regain fully functional range (e.g. dressing & personal hygiene maneuvers returned to normal).
3. **STRENGTHENING:** Water exercises are encouraged in the 1<sup>st</sup> ½ of this phase. In the 2<sup>nd</sup> ½ of this phase you may use any exercise equipment available to you in your home, gym, and health club, such as pulleys or Nautilus-type machines, provided you use light weights and have your therapist's or doctor's OK. In the 2<sup>nd</sup> ½ of this phase isokinetic exercises may be begun by the physical therapist, as well as plyometric or activity-specific strengthening exercises. Avoid resistive exercises overhead (keep elbow below shoulder level). Use lower weight and a higher number of repetitions (20 to 30) to build endurance. Repetitions should be done slowly, and in a controlled fashion, until you are certain you can do the exercise comfortably. Try to exercise 1 hour a day (breaking it up into comfortable intervals), at least 3 to 5 times per week. We do not recommend "empty can" abduction or any other exercise that causes pain, stiffness or swelling. Initial focus should be on rotator cuff (peri-articular) and anterior deltoid strengthening (concentric and eccentric, pain-free range); as the patient progresses, closed chain exercises are beneficial. At the end of this phase the focus turns to advancing proprioceptive and neuromuscular activities necessary for specific activities or sports that the patient plans to resume.
4. **GOAL:** By the end of Phase 3, the range of motion of the shoulder should equal the normal side and feel well enough to resume light activities such as reaching. Do not attempt to lift anything heavy overhead. When lifting, don't reach and lift (keep the object close to your body), and check the weight before lifting to make sure it doesn't feel too heavy. You should have full ROM including reaching behind the back by the end of Phase 3.
5. **ACTIVITY:** You may use the arm to reach but not lift anything away from the body or above waist level until the doctor or therapist gives the OK (no substitution when raising the extended arm against gravity). You may swim, but no overhead

stroke until the doctor or therapist says OK. Try using a heating pad at home to reduce pain and loosen tight muscles before exercise.

### ***WEEKS 17-24 Phase 4 (Activity Specific Training)***

1. **PAIN:** Use non-narcotic pain pills such as Tylenol or Advil or Aleve as needed.
2. **STRENGTHENING:** Continue to use any exercise equipment available to you in your home, gym, and health club. Stay with light weight and resistance on the exercise machines, using slow speed reps. Throwing and racquet sports are discouraged unless your physical therapist and doctor feel they are safe; power must be kept sub-maximal so that the activity is pain-free. It's usually safe to begin unrestricted use of the arm at home and work by the end of this phase provided lifting above waist level is restricted to the weight deemed safe by the therapist or doctor.
3. **GOAL:** By 6 mos, the shoulder should feel well enough to resume many activities including reaching and light lifting, as long as you don't experience pain during and after the activities. Most patients will be given some lifting restrictions, especially above waist level; do not reach and lift more than 4lbs. (e.g. a ½ gallon of milk) until the therapist or doctor gives the OK.
4. **COMMENT:** It may take between 6 months and a year to regain full confidence in the operated shoulder. Confidence can only be regained by using the shoulder and subjecting it to the demands of the activities that you have been allowed to return to.

## **ANSWERS TO COMMON QUESTIONS**

### **How long will I be in the hospital?**

Surgery is usually performed as an outpatient, though patients who require open surgery for massive tears often are encouraged to stay in the hospital 1 or 2 nights for pain control. Outpatients go home 3-4 hours after surgery when they can eat and are comfortable.

### **How long does the surgery take to perform?**

The surgery usually requires 1-2 hours to perform. Often there are spurs under the acromioclavicular joint that cause impingement, requiring an extra 15 minutes to remove a small portion of the end of the collar bone.

### **When can I drive a car?**

When you feel safe and confident behind the wheel so you can avoid getting into an accident. Generally, driving is resumed within the first 2-4 weeks after surgery, but may take longer if you require pain medication frequently. Do not drive when you are taking pain pills.

### **When can I return to work or school?**

Motivated people who have a sitting or desk job can usually be back at work by 2-4 weeks after surgery. Construction workers take 4-6 months.

**What is the success rate of the surgery?**

Over 90% of patients will have relief of pain and function in most light and medium activities.

**Can I re-injure the shoulder?**

Remember that the operation removes bone spurs that impinge on the rotator cuff and repairs tears in the rotator cuff but does not replace worn parts. Yet if you pay attention to discomfort in your shoulder you should be able to tell when you are overdoing it without re-injuring the shoulder.

**Can my therapist watch the operation?**

Yes, the therapist can call 724-6169, ext. 203, and let our medical assistant know that they would like to observe the surgery. It is a hospital policy that non-medical personnel are not permitted in the operating room; this includes family and friends.

**If you have any more questions, please write them down in the space below and ask your physical therapist. Or you may call 724-6169 for our medical assistant, or ask Dr. Abrahamsen at your next office visit.**