DR. ERIK STAPLETON
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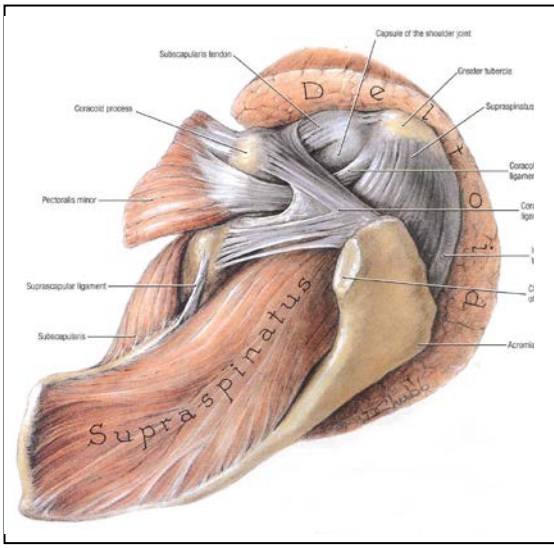
GREENBRIER PHYSICIANS

SHOULDER - TORN ROTATOR CUFF

ANATOMY AND FUNCTION

The shoulder joint is a ball and socket joint that connects the bone of the upper arm (humerus) with the shoulder blade (scapula). The capsule is a broad ligament that surrounds and stabilizes the joint. The shoulder joint is moved and also stabilized by the **rotator cuff.** The rotator cuff is comprised of four muscles and their tendons that attach from the scapula to the humerus. The rotator cuff tendons (supraspinatus, infraspinatus, teres minor and subscapularis) are just outside the shoulder joint and its capsule. The muscles of the rotator cuff help stabilize the shoulder and enable you to lift your arm, reach overhead, and take part in activities such as throwing, swimming and tennis.



ROTATOR CUFF INJURY AND TREATMENT OPTIONS

The rotator cuff can tear as an acute injury such as when lifting a heavy weight or falling on the shoulder or elbow. The shoulder is immediately weak and there is pain when trying to lift the arm. A torn rotator cuff due to an injury is usually best treated by immediate surgical repair. The rotator cuff can also wear out as a result of degenerative changes. This type of rotator cuff tear can usually be repaired but sometimes the tear may not need to be repaired and sometimes cannot be repaired. However, if the tear is causing significant pain and disability, surgery may be the best treatment to relieve pain and improve shoulder function.

If a torn rotator cuff is not repaired, the shoulder often develops degenerative changes and arthritis many years later. This type of arthritis is very difficult to treat and the longstanding tear in the rotator cuff may be irreparable.

DIAGNOSIS OF TORN ROTATOR CUFF

Symptoms of shoulder pain that awaken you at night, and weakness raising the arm are suggestive of a torn rotator cuff. Examination of the shoulder usually reveals weakness. The diagnosis can be confirmed by magnetic resonance imaging (MRI) or an x-ray taken after dye has been injected into the shoulder (arthrogram). A more sensitive test such as arthrogram MRI or arthroscopy may be needed to diagnose a small tear or a partial tear of the rotator cuff.

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ROTATOR CUFF REPAIR

Most rotator cuff tears can be repaired surgically by reattaching the torn tendon(s) to the humerus. It is not a big operation to repair a torn rotator cuff, but the rehabilitation time can be long depending on the size of the tear and the quality of the tendons/muscles.

The deltoid muscle is separated to expose the torn rotator cuff tendon(s). Sutures are attached to the torn tendons. Tiny holes are made in the humerus where the tendons were attached and the sutures are passed through the bone and tied, securing the rotator cuff tendons back to the humerus. Sometimes, suture anchors are used as well. The tendons heal back to the bone, reestablishing the normal tendon-to-bone connection. It takes several months for the tendon to heal back to the bone. During this time, forceful use of the shoulder such as weight lifting and raising the arm out to the side or overhead must be avoided.

After surgery, you will probably use a sling for 4 to 6 weeks. You can remove the sling 4 to 5 times a day for gentle pendulum motion exercises. Rarely, a large pillow that holds your arm out to the side of your body is needed for 6 weeks if the tear is very large or difficult to repair.

RESULTS OF SURGERY AND RISKS

The success of surgery to repair the rotator cuff depends upon the **size** of the tear and **how long ago** the tear occurred.. Usually, a small tear has a good chance for full recovery. If the tear is large, the extent of recovery cannot be accurately predicted until the repair and rehabilitation is completed. If the tear occurred a long time ago (several months or longer) it can be difficult or sometimes impossible to repair. Most patients achieve good pain relief following repair regardless of the size of the tear unless the tear is massive.

Shoulder pain is usually worse than before surgery for the first 2-3 weeks, but then gradually the pain lessens. This is especially true while trying to sleep at night. Dr. Stapleton recommends sleeping in a reclining chair during this time to help lessen the night pain. It can take up to a full year to regain motion and function in the shoulder. Shoulder stiffness and loss of motion are potential problems after rotator cuff repair. Re-rupture of the repaired rotator cuff is possible if too much force is placed on the repaired tendon before it is fully healed. Nerve and muscle injury and infection are infrequent complications.

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SHOULDER SURGERY TO REPAIR TORN ROTATOR CUFF

PREOPERATIVE INSTRUCTIONS

Schedule surgery with the secretary in the doctor's office.

Within one month before surgery

* Make an appointment for a **preoperative office** visit regarding surgery
* A history and physical examination will be done
* Receive instructions
* Complete blood count (CBC)
* Electrocardiogram (EKG) if over the age of 40

Within several days before surgery

* Wash the shoulder and area well
* Be careful of the skin to avoid sunburn, poison ivy, etc.

The day before surgery

* Check with Dr. Stapleton office for your time to report to the Surgical Unit
* ***NOTHING TO EAT OR DRINK AFTER MIDNIGHT***. If surgery will be done in the afternoon, you can have **clear liquids only** up to **six hours** before surgery but no milk or food.

The day of surgery

- **nothing to eat or drink**

- Please bring sling, ice machine, and imaging studies that you have obtained.

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SHOULDER - ROTATOR CUFF REPAIR
POSTOPERATIVE INSTRUCTIONS

Phase One: the first week after surgery

GOALS:

1. Control pain and swelling
2. Protect the rotator cuff repair
3. Protect wound healing
4. Begin early shoulder motion

ACTIVITIES:

Immediately After Surgery

1. After surgery you will be taken to the recovery room room, where your family can meet you. You will have a **sling** on your operated arm. Rarely, an **abduction pillow** is needed to hold the arm up in the air away from the body.
2. You should get out of bed and move around as much as you can.
3. When lying in bed, elevate the head of your bed and put a small pillow under your arm to hold it away from your body.
4. Apply cold packs to the operated shoulder to reduce pain and swelling.
5. Move your fingers, hand and elbow to increase circulation.
6. The novocaine in your shoulder wears off in about 6 hours. Ask for pain medication as needed.
7. You will receive a prescription for pain medication for when you go home (it will make you constipated if you take it for a long time).

The Next Day After Surgery

1. The large dressing can be removed and a small bandage applied.
2. Remove the sling several times a day to gently move the arm in a pendulum motion: lean forward and passively swing the arm.
3. You can be discharged home from the hospital or surgery center as long as there is no problem.

At Home

1. You can remove the bandages but leave the small pieces of tape (steristrips) in place.
2. You may shower and get the incision wet. To wash under the operated arm, bend over at the waist and let the arm passively come away from the body. It is safe to wash under the arm in this position. This is the same position as the pendulum exercise.
3. Apply cold to the shoulder for 20 minutes at a time as needed to reduce pain and swelling.
4. Remove the sling several times a day: move the elbow wrist and hand. Lean over and do pendulum exercises for 3 to 5 minutes every 1 to 2 hours.
5. **DO NOT** lift your arm at the shoulder using your muscles.
6. Because of the need for your comfort and the protection of the repaired tendon, a sling is usually necessary for 4 to 6 weeks, unless otherwise instructed by your surgeon.

.OFFICE VISIT:

Please arrange to return to Dr. Stapleton office 10-14 days after

surgery.

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Rehabilitation after Rotator Cuff Repair

Phase One: 0 to 6 weeks after surgery

Goals:
1. Protect the rotator cuff repair
2. Ensure wound healing
3. Prevent shoulder stiffness
4. Regain range of motion

Activities:
1. Sling

Use your sling most of the time. Remove the sling 4 or 5 times a day to do pendulum exercises.

2. Use of the affected arm

You may use your hand on the affected arm in front of your body but ***DO NOT*** raise your arm or elbow away from your body. It is all right for you to flex your arm at the elbow.
Also:
*No Lifting of Objects
*No Excessive Shoulder Extension
*No Excessive Stretching or Sudden Movements
*No Supporting of Body Weight by Hands

3. Showering

You may shower or bath and wash the incision area. To wash under the affected arm, bend over at the waist and let the arm passively come away from the body. It is safe to wash under the arm in this position. This is the same position as the pendulum exercise.

Exercise Program
ICE
Days per Week: 7 **As necessary** **15- 20 minutes**
Times per Day: 4-5

STRETCHING / PASSIVE MOTION
Days per Week: 7 Times per day: 4-5

Program:
Pendulum exercises
Supine External Rotation
Supine passive arm elevation
Scapular retraction
Shoulder shrug
Ball squeeze exercise
Starting at **3rd week** after surgery:
Behind the back internal rotation

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Rehabilitation after Rotator Cuff Repair

Phase two: 6 to 12 weeks after surgery

Goals:
1. Protect the rotator cuff repair
2. Improve range of motion of the shoulder
3. Begin gentle strengthening

Activities
1. Sling

Your sling is no longer necessary unless your doctor instructs you to continue using it.

2. Use of the operated arm

You should continue to avoid lifting your arm away from your body, since this is the action of the tendon that was repaired. You can lift your arm forward in front of your body but **not** to the side. You may raise your arm to the side, if you use the good arm to assist the operated arm.

3. Bathing and showering

Continue to follow the instructions from phase one and the instructions above.

Exercise Program
The exercises listed below may be gradually integrated into the rehabilitation program under the supervision of your doctor and/or physical therapist.

STRETCHING / ACTIVE MOTION
Days per week: 5-7 Times per day: 1-3

Stretching
Pendulum exercises
Supine External Rotation
Standing External Rotation
Supine passive arm elevation
Active-Assisted Arm Elevation
Behind the back internal rotation
Supine external Rotation with Abduction
External rotation @ 90º abduction
Supine Cross-Chest Stretch
Wall slide Stretch
Overhead pullies

Active Motion
Side-lying External Rotation
Prone Horizontal Arm Raises "T"
Prone row
Prone scaption "Y"
Prone extension
Active-assisted Arm Elevation progressing to:
Standing Forward Flexion (scaption) with scapulohumeral rhythm

Resisted forearm supination-pronation
Resisted wrist flexion-extension
Sub-maximimal isometric exercises: internal and external rotation at neutral with physical therapist
Rhythmic stabilization and proprioceptive training drills with physical therapist

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Rehabilitation after Rotator Cuff Repair

Phase Three: 12-18 weeks after surgery

Goals:
1. Protect the rotator cuff repair
2. Regain full range of motion
3. Continue gentle strengthening

Activities:
Use of the operated arm
You may now safely use the arm for normal daily activities involved with dressing, bathing and self-care. You may raise the arm away from the body; however, you should not raise the arm when carrying objects greater than one pound. Any forceful pushing or pulling activities could disrupt the healing of your surgical repair.

Exercise Program
The exercises below form a list that may be gradually integrated into the rehabilitation program under the supervision of your doctor and/or physical therapist. Resistance for the dynamic strengthening exercises can gradually be added starting with 1 lb and should not exceed 3 lb at this time.

STRETCHING / ACTIVE MOTION / STRENGTHENING
Days per week: 3 Times per day: 1

Stretching
Pendulum exercises
Supine external Rotation
Standing external Rotation
Supine passive arm elevation
Behind the back internal rotation
Hands-behind-the-head stretch
Supine cross-chest stretch
Sidelying internal rotation stretch
External rotation at 90° abduction stretch
Wall slide Stretch

Dynamic Strengthening
Side-lying External Rotation
Prone Horizontal Arm Raises "T"
Prone scaption "Y"
Prone row
Prone extension
Scapulohumeral rhythm exercises
Standing forward flexion (scaption)
PNF manual resistance with physical therapist
Propriocetion drills

Theraband Strengthening
External Rotation
Internal Rotation
Standing Forward Punch
Shoulder Shrug
Dynamic hug
"W"'s
Seated Row, Biceps curl

Rehabilitation After Rotator Cuff Repair

Phase 4: 18 to 26 weeks after surgery

Goals:
1. Continue to protect the repair by avoiding excessive forceful use of the arm or lifting excessively heavy weights.
2. Restore full shoulder motion
3. Restore full shoulder strength
4. Gradually begin to return to normal activity

Activities:
1. Sports that involve throwing and the use of the arm in the overhead position are the most demanding on the rotator cuff. Your doctor and sports physical therapist will provide you with specific instructions on how and when to return to golf, tennis, and volleyball, swimming and throwing.
2. For people who wish to return to training with weights, Dr. Stapleton will give you guidelines regarding the timing and advice when returning to a weight-training program.
3. The following timetable can be considered as a minimum for return to most activities:

Ski	6 months
Golf	6 months
Weight Training	6 months
Tennis	6 -8 months
Swimming	6-8 months
Throwing	6 months

Before returning safely to your activity, you must have full range of motion, full strength and no swelling or pain.

Dr. Stapleton or your physical therapist will provide you with a specific interval-training program to follow when it is time to return the above activities.

STRETCHING / ACTIVE MOTION / STRENGTHENING
Days per week: 3 Times per day: 1

Stretching

Behind the back internal rotation
Standing External Rotation / Doorway
Wall slide Stretch
Hands-behind-head stretch
Supine Cross-Chest Stretch
Sidelying internal rotation (sleeper stretch)
External rotation at 90° Abduction stretch

Theraband Strengthening

External Rotation
Internal Rotation
Standing Forward Punch
Shoulder Shrug
Dynamic hug
"W"'s

Optional for Overhead Sports:
External rotation at 90°
Internal rotation at 90°
Standing 'T's
Diagonal up
Diagonal down

Dynamic Strengthening
It is recommended that these exercises be limited to resistance not to exceed 5lb.

Side-lying External Rotation
Prone Horizontal Arm Raises "T"
Prone scaption "Y"
Prone row
Prone extension
Standing Forward Flexion
Standing forward flexion "full-can" exercise
Prone external rotation at 90° abduction "U's
Push-up progression

Weight Training

See weight training precautions

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Rehabilitation after Rotator Cuff Repair Surgery

Post-op phase	Sling	Range of Motion	Stretching Exercises	Strengthening exercises	Precautions
Phase 1 0 to 2 weeks after surgery	Sling for comfort and protection Wear for sleep Remove for pendulum exercises	Pendulum exercises	Phase 1 under supervision	No	No active flexion or abduction of the arm
Phase 1 2-6 weeks after surgery	Sling for comfort and protection Wear for sleep Remove for pendulum exercises	Supine FF as tolerated ERN as tolerated IR behind back starting week 3	Passive ROM with physical therapist is OK	No	No active flexion or abduction of the arm. Limit IR to 30 degrees and ER to 60 degrees in the scapular plane AJSM 29(6), 788-794
Phase 2 6-12 weeks after surgery	D/C	Begin active-assisted and active ROM per phase 2	Horizontal adduction, ERN, IR, Flexion.	No weights No theraband Work on scapular stability and scapulohumeral rhythm	Avoid exercises in coronal plane ABDuction
Phase 3 12-24 weeks after surgery	D/C	Gradually improve ROM all planes	All planes. Restore full ROM	Theraband exercises Scapulohumeral Rhythm exercises PRE 1-3 lb. No weight machines	Continue same as above

Post-op Phase	Stretching Exercises	Strengthening exercises	Return to Sports (Months post-op)	Precautions
Phase 4 24-52 weeks after surgery	Gradually stretch to full ROM	Weight training can begin	Ski 6 mo. Golf 6 mo. Weight training 6 mo. Throwing 6 mo. Tennis 6-8 mo. Swimming 6-8 mo.	See weight training precautions

Rehabilitation after Rotator Cuff Repair with Subscapularis Repair of the Shoulder

Post-op Phase	**Sling**	**Range of Motion**	**Therapeutic Exercise**		**Precautions**
Phase 1 0 to 6 weeks after surgery <u>Goals</u>: *Maintain ntegrity of the epairs *Do not overstress healing tissue *Gradually ncrease passive ange of motion *Diminish pain nd inflammation *Prevent muscular nhibition	Per MD instructions. Pendulum exercises several times a day	**Passive ROM only** *Flexion as tolerated <u>Weeks 0-2</u> *Flexion as tolerated *rotation with arm in scapular plane at 40º abduction: *ER to 15 º *IR to 30º *<u>Weeks 3-4</u>* *Flexion as tolerated *Abduction to 80º *ER/IR with arm in scapular plane at 40º abduction: *ER: 30 º *IR : 30 º *Limit IR behind back to beltline	Pendulum exercise Supine FF as tolerated. ERN as tolerated. Scapular retraction IR behind back may start after 2 weeks. Passive ROM with physical therapist is OK Pendulum exercise	Ball squeezes ROM for elbow, forearm, hand	*No active elevation For first 6 weeks post-op *No Lifting of Objects *No Excessive Shoulder Extension *No Excessive Stretching or Sudden Movements *No Supporting of Body Weight by Hands *Avoid ER in abduction.
Phase 2 6 to 12 weeks after surgery Goals: *Maintain ntegrity of the epairs *Do not overstress healing tissue *Gradually ncrease passive nd active range f motion to full *Re-establish dynamic houlder stability *Re-establish capulohumeral hythm	D/C	5th to 7th weeks after surgery *Flexion as tolerated *ER at 45º abduction: 50º *IR at 45º abduction: 60º *<u>At 6 weeks</u> begin light and gradual ER at 90º abduction Gentle mid-range ER in POS, gradually progress to coronal plane. Cautiously improve ERN. <u>Week 7-9</u>: *Gradually progress ROM: *Flexion to 180 º *ER at 90º abduction: 90º *IR at 90º abduction: progress to full	5th to 7th weeks after surgery ERN IR behind back Supine FF as tolerated. ER @ scapular plane Wall slide IR behind back Horizontal adduction 9th week Sidelying IR @ 90º Hands behind head starts 9th week postop Overhead pully	*Active-assisted arm elevation progressing to Active elevation with scapulohumeral rhythm. *Sub-max Isometric ER/IR *Rhythmic stabilization *Proprioceptive drills *<u>Dynamic exercises</u> Sidelying ER Sidelying scaption Prone row Prone T Prone extension Prone scaption <u>Week 8-10:</u> Standing scaption	No resisted ex Avoid exercises in coronal plane ABDuction

Post-op Phase		Range of Motion			Precautions
Phase 3 12 to 18 weeks after surgery Goals: *Progressive rotator cuff strengthening and scapular stability *Progressive functional training		Attain and maintain full ROM	ER at 90º abduction stretch ER @ 0º Wall slide IR behind back Horizontal adduction Hands behind head Sidelying IR @ 90º abduction	*<u>Theraband exercises</u>: ER, IR, forward, punch, shrug, dynamic hug, 'W's, biceps curl, seated row *<u>Dynamic exercises</u>: Continue from phase 2; limit resistance to maximum 3 lb. *Propriocetion drills *Scapulohumeral Rhythm exercises	Continue same as above. No weight training.

Post-op Phase	**Stretching Exercises**	**Strengthening exercises**	**Return to Sports**	Precautions
Phase 4 18- 26 weeks after surgery	Continue previous stretches	Continue dynamic exercises and theraband exercises from phase 3 Optional: Theraband: add 'T's, diagonal up and down Add Prone'U's	Per surgeon	Weight training per surgeon. See weight training precautions. Continue to avoid excessive force on the shoulder
Phase 5 26 weeks after surgery onward	Continue all previous stretches	Continue above Plyometric exercises: *Add rebounder throws with weighted ball, *Decelerations *wall dribbles at 90º, *wall dribble circles	Interval sports programs can begin per surgeon	Weight training precautions.