TOA

Paul Crook, M.D.
Orthopaedics and Sports Medicine
ONEC1TY - Nashville
8 City Blvd. (West End/Charlotte Ave.)
Nashville, TN 37209

Tel: 615-329-6600 ext 1511

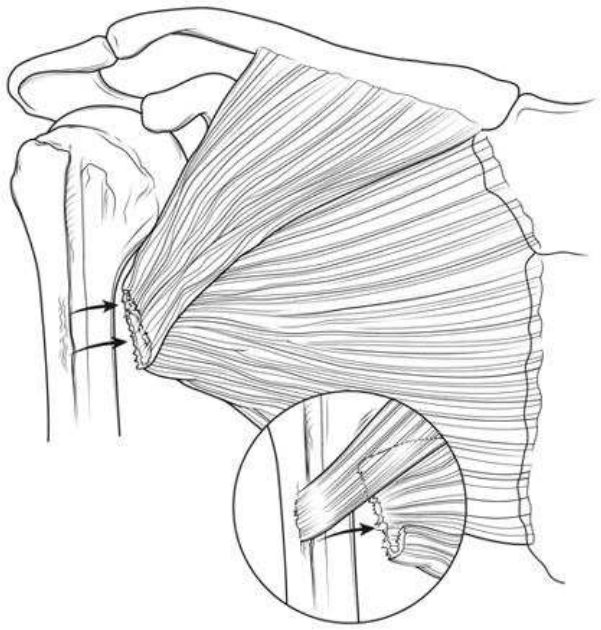
Pectoralis Major Tendon Repair

The pectoralis major is a thick, fan-shaped muscle on the chest (anterior) wall. It makes up the bulk of the chest muscles in the male and lies under the breast in the female. It has many functions including: flexion of the humerus, as in lifting a child; adduction of the humerus, as when flapping the arms; and internal rotation of the humerus, as occurs when arm-wrestling. The pectoralis major is also responsible for keeping the arm attached to the trunk of the body. The pectoralis major is comprised of two separate portions: a clavicular head arising off of the clavicle (collar bone), and the sternal head arising off of the sternum (breast bone). Both of these heads insert on the anterior or front portion of the humerus (arm bone).

While partial tears of the pectoralis major are common, complete rupture is rare and when it does occur, it most typically affects otherwise healthy individuals. Most ruptures are located at the musculotendinous junction and result from violent, eccentric contraction of the muscle, such as during bench press. A less frequent rupture site is the muscle belly, usually as a result of a direct blow. A rupture is more common in males than females and in those practicing contact sports and weight-lifting. Women are less susceptible to tears because of larger tendon-to-muscle diameter, greater muscular elasticity, and less energetic injuries. Symptoms of the injury include an audible pop in the chest or shoulder followed by significant pain, bruising and weakness of the chest wall. Both Ultrasound and MRI can be used to confirm the diagnosis, location and extent of a tear.

Partial tears as well as tears at the musculotendinous junction can often be treated non-operatively. Conservative treatment consists rest, a sling, ice, compression, and over the counter anti-inflammatories such as Ibuprofen or Advil. Physical therapy will be initiated approximately

2 weeks after injury, working to decrease symptoms and gradually restore ROM, strength and function.



Full thickness tears require surgery if function is to be preserved, particularly in the athletic population. In surgery, Dr. Crook will use suture anchors to attach the tendon back to its insertion site on the humerus. It is best if the repair is performed within several weeks of the injury. If the repair is done within 3 months it can usually be accomplished but rehab progressions may be slower. If repair is delayed, especially if beyond 3 months from injury, the tendon may retract too far and no longer be repairable. In this instance, an allograft may be used to augment or bridge the repair. Following repair of the pectoralis major tendon, most patients are able to return to activity with high patient satisfaction and only slightly reduced strength compared to pre-injury.

Rehab must be specific to the individual. The desired goals and work requirements must be taken into consideration as well as physical characteristics including age and tissue type and status.

Suggestions during rehab:

1. The RC gets a better blood supply when the shoulder is slightly away from the body; therefore, advocate the use of a towel roll under the arm when in a resting position.
2. The RC muscles are very small; therefore, we use lower intensities to isolate each muscle without recruitment from surrounding larger muscles. Focus on hypertrophy initially by high volume (V= Reps X intensity/weight). Following the hypertrophy phase, strength is the focus with lower reps and higher intensities/weight.
3. If the tear is chronic or an allograft is used Dr. Crook may recommend a slower progression through the PT protocol.

PECTORALIS TENDON REPAIR
PHASE ONE: **IMMEDIATE POST-OP PHASE (Week 1-6)**
GOALS:

- Protect the surgical procedure
- Minimize the effects of immobilization
- Diminish pain and inflammation
- Establish baseline proprioception and dynamic stabilization

IMPORTANT NOTES

- A sling will be worn for 4 to 6 weeks unless instructed otherwise by Dr. Crook; when you are at home you can remove the sling as long as you keep your arm "tucked" by your side and you have no pain; the sling can also be removed 2-3x/day to perform your home exercises.
- The sling should be worn at all times when in a crowd or walking long distances as well as when sleeping.
- You are allowed to use the hand on your involved side to perform activities such as typing or bending the elbow to touch your face as long as you keep your upper arm tucked by your side. Do not lift anything, even a cup of coffee, with the surgical arm at this time.
- You may shower but do not submerge your arm in water until your incision is completely healed.
- When performing exercises on your back, place a towel roll or pillow under the elbow to avoid stretching out the repair by hyperextending the shoulder

ROM/STRENGTH
Weeks 0-2

- Elbow/hand ROM
- Gripping exercises
- Postural exercises: shrugs, scapular retraction
- Passive ROM and active assistive ROM (L-bar/cane)
    - o Flexion to tolerance 0-90 degrees (week 1)
    - o Flexion to tolerance 0-100 degrees (week 2)
    - o ER at 30 degrees abduction scapular plane to 0 degrees (week 1)
    - o ER at 30 degrees abduction to 10-15 degrees (week 2)
- • Isometrics (sub-maximal, pain-free) ER, Abduction, Flexion, Extension

Weeks 3-4

- Gradually progress P/AAROM (cane/pulley)
    - o Flexion to 115 degrees
    - o ER at 45 degrees abduction scapular plane to 0 degrees
    - o IR at 45 degrees abduction in scapular plane to 45-60 degrees
- UBE no resistance
- Initiate light TB strengthening (No IR strengthening)
    - o ER, isometric ER walk-outs, B ER
    - o B Ext from 90° flexion to neutral
    - o Rows, shrugs

- Rhythmic stabilization drills
- Initiate AROM: Flexion, scaption, SL ER, prone rowing

Weeks 5-6

- Progress ROM as tolerance allows
    - Flexion to 160 degrees (tolerance)
    - ER/IR at 45 degrees abduction: 25-30°
    - IR to 75 degrees
- Advance TB strengthening as able
- DB flexion, scaption, SL ER, prone row
- Prone scaption, horiz abduction AROM add weight when able
- Body Blade or rhythmic stab ex
- Closed chain light therex such as DS2 or ball on wall

MANUAL THERAPY

- Soft tissue mobilization as needed
- Joint mobilization as needed
- PROM all planes

MODALITIES:

- Heat prior to tx
- Ice following tx and when needed
- Ultrasound as needed

PHASE TWO: PROGRESSIVE STRENGTHENING (Week 7-14)

GOALS

- Avoid stretching out the repair (excessive ER and horiz abduction and extension)
- Normalize arthrokinematics
- Improve muscular strength
- Enhance neuromuscular control

IMPORTANT NOTES

- Can now d/c sling unless in large crowd or area where chance of getting bumped into is high
- Avoid heavy lifting with your involved upper extremity
- Avoid reaching behind the passenger seat or any similar motion as this will pull on the repair
- Initiate LIGHT biceps and IR strengthening

ROM/STRENGTH

Week 7-8

- Progress ROM as tolerance allows
    - ER @ 90 degrees abduction to 45-50 degrees
    - IR @ 90 degrees to 70 degrees
- UBE with resistance

Week 9

- Progress ROM as tolerance allow
    - ER/IR @ 90 degrees abduction
    - ER @ 90 degrees abduction to 75-80 degrees
    - Flexion to 170 degrees
- Continue all stretching exercises
- Continue strengthening exercises
- Isotonic strengthening for entire shoulder complex
- May begin light biceps and IR isotonics

Week 10

- Progress ER @ 90 degrees abduction to 90 degrees
- Progress to full flexion

Week 11-14

- Continue all flexibility exercises
- Continue all strengthening exercises

May begin to increase weight for biceps and IR

MANUAL THERAPY

- Soft tissue mobilization as needed
- Joint mobilization as needed
- PROM all planes

MODALITIES:

- Heat prior to tx
- Ice following tx and when needed
- Ultrasound as needed

PHASE 3: ADVANCED STRENGTHENING (Weeks 16-24)

GOALS

- Normalize shoulder strength
- Initiate functional activity
- Enhance neuromuscular control of shoulder

STRENGTH (ROM should be full by this point otherwise do not progress)

- Progress strengthening program with increase in resistance and high speed repetition
- UBE high resistance for endurance
- IR/ER exercises at 90° abduction
- Progress rhythmic stabilization activities to include standing PNF patterns with tubing
- Initiate single arm plyotoss (ball toss, ball on wall)
- Eccentric RC strengthening

- Initiate light military press, bench press, flys, lat pulldowns week 20+ (do NOT let elbow extend past plane of thorax)
- Initiate sport specific drills and functional activities
- Initiate interval throwing program week 16-20 – consult with Dr. Crook first*
- Initiate light upper body plyometric program week 16-20
- Progress isokinetics to 90° abduction at high speeds

MODALITIES

- MHP as needed
- Ice 10-15 minutes