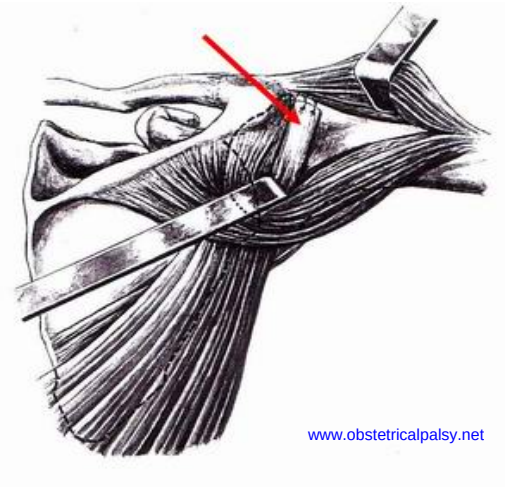
PHYSICAL THERAPY GUIDELINES FOR LATISSIMUS DORSI TRANSFER FOR IRREPARABLE ROTATOR CUFF TEAR

GENERAL GOALS:

- Restore functional range of motion without disrupting the tendon transfer
- Maximize ability to elevate the arm for light activities of daily living
- Empower the patient to safely manage their arm through the post-operative stage

GENERAL INFORMATION:



Latissimus dorsi tendon transfer is a surgery performed to reduce pain and weakness in patients with massive irreparable supraspinatus and infraspinatus tendon tears (posterolateral rotator cuff defects). During this surgery, the latissimus dorsi tendon is detached from the humerus and after it is transferred underneath the deltoid and the acromion, is secured on the greater tuberosity and sutured to the remaining rotator cuff tendons and the subscapularis. [1,2,8,10] The surgery is done to stabilize the humeral head in the glenoid and to help provide an external rotation moment allowing the deltoid to move the shoulder more efficiently into elevation [2,3,10] This is considered a salvage procedure and is done mainly to restore external rotation control with active elevation for use of the arm for light functional activities.[2] The latissimus dorsi transfer in not considered an alternative for cuff repair but as a reconstructive procedure if repair of the posterior lateral cuff defect is not possible.[3] Although pain relief and functional improvement are generally achieved by this procedure, restoration of strenuous overhead use of the arm and return to unrestricted repetitive functional use of the upper extremity are not typically expectations of this surgery.

A careful review of the operative report and good communication with the surgeon are important to discuss expected functional outcomes and treatment guidelines specific for each patient.

2. GENERAL INTERVENTION:

- Formal physical therapy is usually initiated between weeks one to three postoperatively.
- Intervention is guided by the referring physician, and is dependent upon the specifics of the surgical procedure.
- The operated arm is usually immobilized in a sling or a brace (surgeon's preference) for six weeks.
- The focus of physical therapy is to achieve functional range of movement while protecting the muscle transfer.
- Regaining normal strength particularly in lateral rotation is not typical.[3] A rotation lag may well persist postoperatively; however, restoration of external rotation control with elevation has been one of the key motivations to propose transfer of the latissimus dorsi.[2]

In general, physical therapy intervention is guided by:

- Pain
- Stage of post-operative recovery
- Associated soft tissue/articular tissue integrity and additional procedures (capsular release or reverse shoulder arthroplasty)
- Associated medical conditions

It is not clear whether how much of result of this procedure is from active recruitment of latissimus muscle and how much is actually from a tenodesis effect.[2] Retraining of the transferred muscle in rehabilitation to work out of phase as an external rotator with use of biofeedback or particular maneuvers (J Maneuver) has been advocated by a few experienced shoulder surgeons and associated rehabilitation therapists.[5,10] Historically, following tendon transfers to the hand, recruitment of the transfer was achieved through purposeful functional activities, relying on the neuroplasticity of the brain; however, it is unclear if this rapid adaptation occurs as readily in the shoulder. Thus when working with a patient who has had a latissimus tendon transfer surgery during phase II of the rehabilitation approximately 6-8 weeks, the choices for intervention strategies are to take a functional approach incorporating facilitation techniques such as PNFand/or biofeedback.

3. SPECIFIC INTERVENTION BY PHASE

The rehabilitation process is generally divided into three phases based on tissue healing:

- **PHASE I:** PROTECTED PROM phase
- **PHASE II:** AAROM/AROM phase
- **PHASE III:** LIGHT STRENGTHENING PHASE/FUNCTIONAL RE-INTEGRATION phase

The specific goals and precautions are listed for each phase. These phases and timelines are just guidelines and may be modified by the surgeon.

PHASE I: 0-6 weeks postoperatively
PROTECTED PROM

SPECIFIC GOALS:

- GRADUALLY increase joint mobility in scapular plane elevation and lateral rotation, while protecting the integrity of the muscle transfer

SPECIFIC PRECAUTIONS:

- The arm is immobilized in either a sling with abduction pillow or a Sober™ brace, depending upon surgeon preference. The brace would position the arm 45° of abduction and 30° to 40° of lateral rotation. The immobilization device, sling or brace, is to be worn at all times. Splint/brace is to be removed only for exercising by the physical therapist.
- No AROM or strengthening exercises are allowed with the involved upper extremity.
- No weightbearing on the operated arm for bed mobility and transfers until the 12th post-operative week.
- No passive shoulder medial rotation, adduction or extension beyond the limits of the brace thus avoiding excessive tensile stress of the surgical repair anchor at the greater tuberosity
- Passive lateral rotation and scapular elevation should be progressed only as comfortable from the position of immobilization in the brace

PHASE I: 0-6 weeks postoperatively
PROTECTED PROM
(continued)

PATIENT EDUCATION

- Explain to the patient the nature of their surgery and stress precautions regarding use of the operated arm. Reinforce the use of the splint/brace at all times, including at night. This is to be removed by physical therapist only or for bathing as allowed by physician.
- Outline the treatment plan and expected functional outcomes. Discuss with the patient their expectations and the realistic outcomes for their surgery.
- Discuss that advancement is dependent upon the physician's directions and emphasize the need to follow that plan.
- Instruct in upper extremity positioning for sleeping (i.e., splint/brace on).
- Discuss edema and pain control strategies
- Educate patient regarding the use of the arm for transfers. In general, weightbearing on the operated arm is not allowed until the 12th post-operative week.

JOINT MOBILITY

- Often, passive mobilization (by physical therapist only) with the operated arm our of splint/brace is started in the first pos-operative days (if cleared by physician)
- Passive elevation of the arm is done in supine in the scapular plane, and lateral rotation is done with the arm at the side. Range of motion restrictions should be set by the surgeon, but are typically 120 degrees of scapular plane elevation and lateral rotation within limits of comfort.
- Advancement of motion may be somewhat dependent of the preoperative motion that was available.
- Address limitation of range of motion in the distal upper extremity, trunk mobility and

NEUROMUSCULAR CONTROL

- Encourage good postural alignment and a normal resting position on the scapula in the splint/brace

PHASE II: 6-12 weeks postoperatively
AAROM/AROM

SPECIFIC GOALS:

- Restore functional glenohumeral joint mobility into flexion (at least 120°) and external rotation (at least 30° to 40°)
- Promote antigravity elevation of the upper extremity with the goal of reaching the top of the head
- Facilitate activation of the transferred muscle with biofeedback and/or facilitation techniques
- Facilitate use of the upper extremity for light activities of daily living

SPECIFIC PRECAUTIONS:

- No strengthening exercises
- No lifting or carrying or using operated arm for bed mobility and transfers until the 12th post-operative week.
- No forceful stretching or passive range of motion especially into internal rotation and extension.

PATIENT EDUCATION

- Discuss activity guidelines/precautions regarding use of the arm for self care activities. No weight bearing on the operated arm for transfers until 12th week postoperatively
- Encourage use of the arm for self-care activities. No carrying or lifting with the operated arm

JOINT MOBILITY

- Encourage normal arm swing during gait
- Scapular mobilization as needed
- Gentle mobilization techniques could be utilized at this point to address capsular restrictions towards the expected/allowed range of motion

PHASE II: 6-12 weeks postoperatively
AAROM/AROM
(Continued)

NEUROMUSCULAR CONTROL

- Active assisted and active elevation is begun in either supine or side lying. It is useful to ask the patient to simply elevate their arm for a focused target, such as the therapist's hand, a point on the wall of ceiling, etc.
- Keeping the forearm supinated during elevation is often helpful
- Exercising the gravity eliminated position can be progressed to antigravity movement as the efficiency of the transfer improves
- Neuromuscular re-education could be utilized, such as tapping, ice massage, vibration, and upper extremity PNF patterns. Dz seems to be often useful.
- If a biofeedback device is utilized, the electrodes are placed on the belly of the latissimus muscle and the patient is instructed to recruit the transfer while attempting antigravity elevation of the operated arm.

PHASE III: Week 12 → on postoperatively
LIGHT STRENGTHENING PHASE/FUNCTIONAL RE-INTEGRATION PHASE

SPECIFIC GOALS:

- Optimize strength and functional use of the operated arm within the constraints of the surgery with the goal of the surgery to improve functional elevation for lifting or repetitive overhead activities. Return to heavy lifting or strenuous activity at or above shoulder height is not an expectation of the surgery.

SPECIFIC PRECAUTIONS:

- No heavy lifting/carrying with the operated arm, especially with the arm in elevation for functional tasks/exercising
- No contact sports
- No use of nautilus equipment

JOINT MOBILITY

- Address joint/capsular mobility limitations that prevent gains towards functional range of motion

PATIENT EDUCATION

- Provide guidelines regarding the use of the arm for job related tasks and recreational/sports activities
- Emphasize to the patient the need to consult physician prior to returning to work/sports activities

NEUROMUSCULAR CONTROL

- Gentle strengthening exercises could be started at this point. These are started with sub maximal isometrics, using light resistive bands and then progressing to light weights (1-2 lbs.) with total body patterns.
- Patient starts in supine, gradually progressing from neutral upper extremity elevation to shoulder level and then to above the shoulder level while maintaining the palm (forearm) supinated.
- Exercises are progressed from supine to semi reclined, sitting and finally to standing position.
- Use of heavy weights and nautilus equipment or other exercise machines is to be avoided.

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