

Latissimus Dorsi Transfer

1. Defined
 - a. Transfer of the latissimus dorsi from its insertion anteriorly on the proximal humeral shaft to a superior and posterior insertion on the humeral head in the subacromial space.
 - b. Latissimus dorsi tendon transfer is a well-established method for the treatment of massive irreparable posterosuperior defects of the rotator cuff.
 - c. Remember this is a salvage procedure and final expectations to function are dependant on past medical history and joint integrity.
2. Goals
 - a. Protect healing tissue
 - b. Control post-operative pain and swelling.
 - c. Improve post-operative range of motion.
 - d. Improve functional strength, stability, and neuromuscular control.
 - e. Retrain latissimus dorsi as an external rotator
 - f. Restore rotator cuff force couple.
3. Rehabilitation Principles
 - a. Be aware of compromised deltoid, posterior cuff and transferred tissue of newly posteriorly placed latissimus.
 - b. Healing tissue should never be overstressed but appropriate levels of stress are beneficial.
 - i. Inflammatory phase days 1-3.
 - ii. Tissue repair with proliferation phase days 3-20.
 - iii. Scar tissue most responsive to remodeling 21-60 days but occurs from 1 to 8 weeks.
 - iv. Final maturation taking as long as 360 days.
 - c. Tissue reactivity of the shoulder and tissue healing will dictate the rehabilitation process. Reactivity is determined by the clinical exam.
 - i. Level I Reactivity
 1. Resting pain, pain before end range.
 2. Aggressive stretching is not indicated.
 3. Grade I-II mobilization for neurophysiological effect.
 - ii. Level II Reactivity
 1. Pain onset occurs with end range resistance.
 2. Grade III and IV mobilization appropriate per patient tolerance.
 - iii. Level III Reactivity

1. Engagement of capsular end feel with little or no pain.
 2. Pain occurs after resistance.
 3. Grade III and IV mobilization and sustained stretching is appropriate.
- d. Eliminate inflammation as the cause of pain and neuromuscular inhibition.
 - e. Ensure return of appropriate joint arthrokinematics.
 - f. Apply techniques in the loose pack position and apply unidirectional movements to minimize the strain on the soft tissue and articular structures.
 - g. As mobility increases and reactivity decreases, initiate more multi-directional techniques.
 - h. Re-establish voluntary and pain-free control of the deltoid and residual rotator cuff musculature. Progress by the following principles:
 - i. Isometrics (submax/non-painful) intended for neuromuscular education and fluid decongestion.
 - ii. Isotonics “Downstairs” (<90 degrees) “Gravity Eliminated” elevation in a controlled fashion.
 - iii. Isotonics “upstairs” (>90 degrees)
 - i. Improve and or maintain scapular mobility and stabilization.
 - j. Facilitate performance of complex skills with proprioceptive and kinesthetic techniques: Low to high, sagittal to frontal, bilateral to unilateral, stable to unstable, slow to fast, fixed to unfixd surface
 - k. Encourage life-long activity modification with the use of safe zone principles.
 - l. Factors that affect the rehab process
 - i. Tissue quality (appearance, temperature, texture)
 - ii. Presence of concomitant bicipital/deltoid/scapular pathology
 - iii. Age of patient
 - iv. Presence and severity of osteoporosis
 - v. Activity level
 - vi. Pre and intra-operative range of motion
 - vii. Pain and sensitivity levels
 - viii. Cognitive abilities
4. Post op functional guidelines
 - a. Functional Activities dependent upon: (will assist in decision to return to functional activity)
 - i. Glenohumeral ROM
 - ii. Pain
 - iii. Tissue healing restraints
 - iv. Rotator cuff and deltoid strength
 - v. Scapular strength and stability
 - vi. Proprioceptive/reflex control
 - vii. Quality of tissue and degree of discomfort
 - b. Driving-8-12 weeks dependent upon:
 - i. Automatic Transmission
 - ii. Ability to maintain arm in a safe, functional position.

- iii. Alleviation of sharp pains/muscle spasms.
- iv. No dependency on pain medications
- v. Car insurance restrictions on driving after surgery.
- vi. Adequate confidence to handle car in challenging situations.
- c. Work dependent upon:
 - i. Sedentary job- no earlier than 6-8 weeks
 - ii. Physical job- no earlier than 12 weeks
- d. Life long adherence to shoulder safe zone principles
- 5. Post-operative equipment guidelines
 - a. Sling with abduction pillow at all times (includes night) except bathing and exercises for 4-6 weeks

6. Rehabilitation

- a. **Phase I** (1-3 weeks) *Protective ROM*
 - i. Goal: Protect the latissimus dorsi transfer and decrease tissue reactivity. Maintain joint integrity. Reduce pain.
 - ii. RX:
 1. Inspect incision sites for any significant drainage, odors, or discoloration that would necessitate MD contact.
 2. Hand/finger/elbow AROM exercises
 3. Scapular setting-without pain increases.
 4. Shoulder PROM (initiate in plane of the scapula and progress based on tissue tolerance)
 5. Grade I-II mobilizations-avoid pain, guarding.
 6. Postural education-initiate for brief periods, emphasize less kyphosis.
 7. Encourage trapezius/levator stretches in cervical region if needed.
 8. “Fav 4” AAROM exercises (flex to 90, ER, Shrugs, table slides with contralateral assistance. (must first demonstrate safety and competence in clinic)
 9. Incorporate “core strengthening” as appropriate within framework of rehab.
 - iii. **Limitations/ Precautions**
 1. **Sling use at all times**
 2. **Sleep in recliner until MD clears for bed use.**
 3. **No AROM (no lifting or reaching back)**
 4. **No resisted or active ER**
 5. **No PROM for IR**
 - iv. Rx/Clinical Expectations
 1. Reduction in guarding with PROM
 2. 90 degrees flexion PROM
 3. 30 degrees ER PROM (plane of scapula)
- b. **Phase II** (3-6 weeks) *Protective PROM and AAROM- “gravity reduced”*
 - i. Goal: Protect transfer, increase PROM and decrease tissue reactivity. Reduce pain.

ii. RX:

1. AAROM flexion/scaption (if patient demonstrates independent competence)
2. Verbal and tactile cueing for proper performance of home program.
3. Scapular exercises (no resistance)
4. Continue PROM (within restrictions)
5. Grade I-III mobilizations
6. Start elbow strengthening (while minimizing stress on shoulder)
7. Initiate upper extremity progressive weight bearing in an upright position with hands in “downstairs” position (avoid pain and encourage proper long axis closed chain mechanics)
8. Encourage trapezius/levator stretches in cervical region if needed.
9. Isometrics (submax/ subpain) Avoid ER.
10. Gentle soft tissue massage for alleviation of muscle spasm/fibrosis.
11. Incorporate “core strengthening” as appropriate within framework of rehab.

iii. **Limitations/ Precautions**

1. **Sling use at all times**
2. **Sleep in recliner**
3. **No AROM (no lifting or reaching back)**
4. **No resisted or active ER**
5. **No PROM for IR beyond hand to stomach**

iv. Rx/Clinical Expectations

1. No guarding with PROM.
2. Tolerates AAROM, isometric program
3. 120 degrees flexion PROM
4. 45 degrees ER PROM (plane of scapula at 30 degrees of abduction)

c. **Phase III** (6-8 weeks) *Active ROM & Latissimus Re-education*

- i. Goal : Re-educate latissimus as an external rotator, reduce pain, increase AAROM, increase to or maintain full PROM.

ii. RX:

1. Continue PROM and AAROM techniques
2. Continue scapular strengthening techniques
3. Continue isom. with gradual increase in force
4. Biofeedback and estim to latissimus for external rotation
5. Begin “gravity reduced” AROM, then progress to seated/standing positions (with elbow flexed initially to reduce lever arm)
6. Theraband and resisted cuff exercise in shoulder safe zone except no ER

7. Grade I-IV mobilizations
 8. Encourage trapezius/levator stretches in cervical region if needed.
 9. Progress, upper extremity progressive weight bearing in an upright position with hands in “downstairs” position; progress complexity (follow proprioception principles)
 10. Incorporate “core strengthening” as appropriate within framework of rehab.
 11. Postural education.
- iii. Limitations/ Precautions**
1. **No resisted ER**
 2. **No functional IR stretching (behind back)**
 3. **Avoid shoulder level and overhead activity.**
- iv. RX/Clinical Expectations
1. Achieves full flexion PROM
 2. Achieves full ER PROM
 3. No guarding with PROM
 4. No shoulder hike with active ROM
 5. IR ROM demonstration gradual steady increase
 6. Able to actively externally rotate gravity eliminated plane
- d. **Phase IV** (8-14 weeks) *Strengthening*
- i. Goal: Functional AROM and scapulohumeral rhythm, neuromuscular control.
 - ii. RX:
 1. Isotonic rotator cuff exercises to initiate ER (no substitution or hiking)
 2. Continue with biofeedback and estim for lat re-education
 3. Scapular resistance may require gravity reduced positions initially.
 4. Initiate closed chain work at shoulder height (follow proprioception principles)
 5. Initiate sustained stretching
 6. Encourage trapezius/levator stretches in cervical region if needed.
 7. Progress IR PROM with a slow introduction of functional behind the back stretching.
 8. Controlled bicep/tricep strengthening, while minimizing stress on shoulder.
 9. Cervical stabilization
 10. Incorporate “core strengthening” as appropriate within framework of rehab.
 11. Continued postural education
- iii. Limitations/Precautions**
1. **No activities outside the safe zone**
 2. **No activities requiring sustained upper extremity activity (light bulbs, screwdrivers)**

3. No frequent overhead activity

iv. RX/Clinical Expectations

1. No guarding with PROM
2. Achieves 60 degrees IR PROM (plane of scapula at 30 degrees of abduction in supine)
3. Able to actively elevate shoulder against gravity with proper mechanics to 120 degrees.
4. Able to actively externally rotate against gravity and resistance.
5. Understanding of “safe zone” principles with ADL’s