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## **Shoulder Instability (Latarjet)**

The shoulder joint is comprised of the humerus and glenoid socket. The large head and small socket gives the shoulder joint excellent range of motion. This range of motion however comes at the cost of stability. A traumatic external force such as a football tackle may cause the shoulder joint to dislocate or sublunate (almost dislocate).

The labrum is a cartilaginous structure that acts as a bumper or lip to maintain the shoulder joint in place. A dislocation will tear the labrum off the glenoid surface and stretch associated ligaments. This type of labral tear is called a “Bankart tear”.

After the first dislocation the patient is at an increased risk for subsequent dislocations. The events that cause further dislocations need not be as forceful as the original. Imagine trying to balance a golf ball on a T that only had half of its top in place. Simple activities such as moving in bed or putting on a book bag may cause shoulder subluxation or dislocation. In order to restore stability to the shoulder a surgical procedure is typically recommended, which can be broken down to a soft tissue procedure or a bone procedure.



### **Shoulder Instability – Soft Tissue:**

Surgical reconstruction targeting the glenohumeral joint's soft tissues for shoulder instability, typically involves labral repairs, the most common being the Bankart repair. A Bankart lesion typically occurs from an anterior-inferior dislocation of the humerus, tearing the labrum from its attachment to the glenoid, thereby detaching the inferior gleno-humeral ligament (IGHL). Surgical management of this revolves around labral repair to reattach the IGHL under appropriate tension. This may be accomplished either arthroscopically or through an open approach. Most traumatic glenohumeral dislocations may not only cause a Bankart lesion, but may create impression fractures in the postero-superior humeral head termed Hill-Sachs lesions. An adverse effect from this procedure includes suturing the capsule too tightly, causing a shortening of the capsule, and thus decreasing the external rotation allowed at the glenohumeral joint. Other complications are extremely rare, but may include axillary nerve damage, subscapularis rupture (seen only in open repairs performed with subscapularis detachment and repair), and recurrent instability. If there is bony deficiency in the glenoid, which represents 20% or more of the antero-inferior glenoid, it is biomechanically impossible to restore the same stability and is therefore more prone to recurrent instability and failure.

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### **Shoulder Instability – Bony Deficiency:**

In cases where significant bony deficiency is present (where greater than 20% of the glenoid's surface area is missing) addressing only the soft tissue issues during the surgical procedure may lead to eventual recurrence of instability. Bony deficiency can result from congenital deformity, trauma, or recurrent dislocation. These lesions are not well visualized on plain films and are best seen on 3-dimensional CT scan. When bony lesions reach critical dimensions, reconstruction of this deficit using autograft bone yields the best surgical results. The Latarjet procedure is the most popular and highly effective, transferring the distal coracoid into the bony defect.

### **Results and Risks of Surgery:**

There are several possible complications that could occur after a Latarjet procedure. Considering the coracoid osteotomy, there is a risk for non-union of the transferred coracoid process, which occurs typically in 3% of patients. Despite the bony union (healing), a small percentage of patients continue to experience discomfort years post-operatively and underwent another procedure to extract the screws. Screw loosening and screw breakage are other possible reasons a patient may undergo a screw removal procedure. Other complications, including musculocutaneous or axillary nerve palsy and subscapularis dysfunction, are reported but rare events.

Following a Latarjet procedure, the most functional limitation reported is a decrease in external rotation range of motion. Although some patients may return to overhead throwing sports, most do not regain full external rotation. According to Hovelius and colleagues, the mean loss of external rotation was 7.4 degrees in adduction and 8 degrees in abduction, both are minimal in every day activities. The complications of rotator cuff tendonitis and limitation in external rotation can be reduced with proper progression in rehabilitation.

### **Surgery:**

The length of a Latarjet will take up to 2 hours depending on the complexity shoulder. Your nurse will bring you into the pre-op area where you will have an IV placed and met with your anesthesiologist. General anesthesia is utilized to assure a comfortable surgery. This means that you will be "asleep" and completely unaware of the surgery until you wake up in the recovery area. Most patients will have a small tube placed in their windpipe, formal intubation may not be required. Local blocks are also available to supplement pain control. Your anesthesiologist will discuss this with you prior to surgery. Like any surgical procedure, there are risks. These risks are extremely rare and consist of nerve injury, infection and shoulder stiffness or instability.

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### **Post-Surgery:**

After the surgery is completed, you will awaken in the operating room and be moved to the recovery area. Most patients generally recover smoothly and have minimal pain due to local pain medication that is used at the completion of the surgery. Family members and guests are permitted to visit in the recovery area once the patient is fully awake and feeling comfortable; this may take up to 2 hours after the surgery is completed.

- A pain medication prescription will be provided prior to discharge. You may take the prescribed medication as directed. You should expect to experience moderate shoulder discomfort for several days and even weeks following the surgery. Patients often only need prescription narcotics for a few days following surgery and then can switch to over-the-counter medications Tylenol or Ibuprofen. Ice should be applied to the shoulder up to three times a day for 20 minutes until swelling subsides
- At the completion of surgery, you will have a sling placed on your arm. Wear the sling at all times with the exception of exercises, showering and dressing. You may also remove the sling to participate in computer work or watching TV for instance. The purpose of the sling is to protect the repair. Excessive arm movement during the first few weeks of recovery may put unwarranted strain on the repair. Particularly avoid external rotation or rotation away from the body for at least 6 weeks.
- Special cooling devices (called Cryo/Cuffs) are also available for patients to purchase thru our office. This can be used in the place of the ice bags.
- If the bandage is draining, reinforce it with additional dressings for the first 48 hours. After 48 hours remove the bandage and place band aids over the incision sites. Showering is acceptable at this time. Do not scrub the shoulder.
- There is an exercise sheet at the end of this packet. Conduct exercises three times daily until further directions are provided. Physical therapy will start 4-6 weeks after surgery.
- Eat a regular diet as tolerated and please drink plenty of fluids.
- You are unable to drive a car as long as you need to utilize a sling.
- Call office for Temperature >102 degrees, excessive swelling, pain or redness around the incision sites.
- Plan at least a week away from work or school. Utilize this time to decrease swelling and participate in your home exercise program. You may be able to resume work (depending on type of work and setting; very variable) once the pain and swelling resolves.
- The above are guidelines and only intended as generalities.

**OFFICE VISIT:** Please arrange to come back to Dr. Nelson's office 7-14 days after surgery for examination and further instructions

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## **Rehabilitation after Latarjet**

One must recall that the purpose of the Latarjet procedure is to reinstate anterior stability to the glenohumeral joint. While this is primarily a bony procedure, specific attention must be directed towards the soft tissues which play a critical role in maintaining stability. Early post-operative therapy must protect the repair of the subscapularis as well as the developing bony union of the coracoid process.

Since it will take approximately 6-8 weeks to form an osseous union of the newly reconstructed glenoid, the biceps and coracobrachialis attachment to the coracoid needs to be protected during the initial postoperative period. Aggressive shoulder extension and combined extension and external rotation stretching is not indicated. Once strengthening commences, a gradual progressed program of biceps and coracobrachialis strengthening needs to be followed to minimize undue stress and tension on their muscular origins.

In addition, isolated external rotation range of motion needs to be gradually regained after surgery to allow the anterior capsule and subscapularis to heal appropriately.<sup>7</sup> For that reason, external rotation range of motion is advanced in a protected fashion, with early emphasis on external rotation work being done in an open packed position (i.e. scapular plane at about 45 degrees of abduction) and then progressed to positions that gradually tension the subscapularis (i.e. full adduction and then at 90 degrees of abduction and above). Please refer to protocol below for more detail. (In the case of a subscapularis take down and repair, external rotation gains need to be progressed slower and one should avoid aggressive external rotation stretching and internal rotation strengthening until the subscapularis is well healed. In these cases it is helpful to get a 'safe zone' of initial external rotation range of motion from the referring surgeon, as determined from intraoperative inspection from either the operative note or discussion with surgeon.)

Due to the surgical technique and early immobilization required to promote healing, the subscapularis may not only be impacted in terms of length, but in terms of force production and proprioception. Hence, specific subscapularis proprioception and strengthening needs to be incorporated to enhance subscapularis function postoperatively. The clinician needs to tailor the rehabilitation program to address the unique structure of the subscapularis to enhance both the upper and lower subscapularis fibers. This is warranted due to the fact that the subscapularis is innervated by both the upper and lower subscapular nerves, along with the presence of two different muscular fiber alignments; hence, its action has been described as being like that of two different muscles depending upon the functional activity.<sup>8</sup> The upper fibers are primarily aligned in a horizontal fashion and the lower fibers are arranged in more of an oblique alignment. One must therefore be selective in the rehabilitation protocol to maximally stimulate the appropriate portion of the subscapularis with the correct exercise.

*The intent of this protocol is to provide the clinician with a guideline of the post-operative rehabilitation course of a patient that has undergone a Latarjet procedure for anterior stabilization. It is no means intended to be a substitute for one's clinical decision making regarding the progression of a patient's post-operative course based on their physical exam/findings, individual progress, and/or the presence of post-operative complications. If a clinician requires assistance in the progression of a post-operative patient they should consult with the referring Surgeon.*

### **Return to Activities**

Computer	After 2 weeks
Golf	12 weeks (chip & putt only)
Tennis	16 weeks (no overhead)
Contact Sports	6 months

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### **Rehabilitation after Latarjet procedure**

#### **Phase I – Immediate Post Surgical Phase (approximately Weeks 1- 3)**

##### Goals:

- Minimize shoulder pain and inflammatory response
- Protect the integrity of the surgical repair
- Achieve gradual restoration of passive range of motion (PROM)
- Enhance/ensure adequate scapular function

##### Precautions/Patient Education:

- No active range of motion (AROM) of the operative shoulder
- No excessive external rotation range of motion (ROM) / stretching. Stop at first end feel felt
- Remain in sling, only removing for showering. Shower with arm held at side
- No lifting of objects with operative shoulder
- Keep incisions clean and dry

##### Activity:

- Arm in sling except when performing distal upper extremity exercises
- (PROM)/Active-Assisted Range of Motion (AAROM)/ (AROM) elbow and wrist/hand
- Begin shoulder PROM (do not force any painful motion)
  - Forward flexion and elevation to tolerance
  - Abduction in the plane of the scapula to tolerance
  - Internal rotation (IR) to 45 degrees at 30 degrees of abduction
  - External rotation (ER) in the plane of the scapula from 0-25 degrees; begin at 30-40 degrees of abduction; respect anterior capsule tissue integrity with ER range of motion; (seek guidance from intraoperative measurements of external rotation ROM)
- Scapular clock exercises progressed to scapular isometric exercises
- Ball squeezes
- Sleep with sling supporting operative shoulder, place a towel under the elbow to prevent shoulder hyperextension
- Frequent cryotherapy for pain and inflammation
- Patient education regarding posture, joint protection, positioning, hygiene, etc.

##### Milestones to progress to phase II:

- Appropriate healing of the surgical repair
- Adherence to the precautions and immobilization guidelines
- Achieved at least 100 degrees of passive forward elevation and 30 degrees of passive external rotation at 20 degrees abduction
- Completion of phase I activities without pain or difficulty

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### **Phase II – Intermediate Phase/ROM (approximately Week 4-9)**

#### Goals:

- Minimize shoulder pain and inflammatory response
- Protect the integrity of the surgical repair
- Achieve gradual restoration of (AROM)
- To be weaned from the sling by the end of week 4-5
- Begin light waist level activities

#### Precautions:

- No active movement of shoulder till adequate PROM with good mechanics
- No lifting with affected upper extremity
- No excessive external rotation ROM / stretching
- Do not perform activities or strengthening exercises that place an excessive load on the anterior capsule of the shoulder joint (i.e. no pushups, pec flies, etc..)
- Do not perform scaption with internal rotation (empty can) during any stage of rehabilitation due to the possibility of impingement

#### **Early Phase II** (approximately week 4):

- Progress shoulder PROM (do not force any painful motion)
- Forward flexion and elevation to tolerance
- Abduction in the plane of the scapula to tolerance
- IR to 45 degrees at 30 degrees of abduction
- ER to 0-45 degrees; begin at 30-40 degrees of abduction; respect anterior capsule tissue integrity with ER range of motion; seek guidance from intraoperative measurements of external rotation ROM)
- Glenohumeral joint mobilizations as indicated (Grade I, II) when ROM is significantly less than expected. Mobilizations should be done in directions of limited motion and only until adequate ROM is gained.
- Address scapulothoracic and trunk mobility limitations. Scapulothoracic and thoracic spine joint mobilizations as indicated (Grade I, II, III) when ROM is significantly less than expected. Mobilizations should be done in directions of limited and only until adequate ROM is gained.
- Begin incorporating posterior capsular stretching as indicated
- Cross body adduction stretch
- Side lying internal rotation stretch (sleeper stretch)
- Continued Cryotherapy for pain and inflammation
- Continued patient education: posture, joint protection, positioning, hygiene, etc.

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**Late Phase II** (approximately Week 6):

- Progress shoulder PROM (do not force any painful motion)
- Forward flexion, elevation, and abduction in the plane of the scapula to tolerance
- IR as tolerated at multiple angles of abduction
- ER to tolerance; progress to multiple angles of abduction once  $\geq 35$  degrees at 0-40 degrees of abduction
- Glenohumeral and scapulothoracic joint mobilizations as indicated (Grade I-IV as appropriate)
- Progress to AA/AROM activities of the shoulder as tolerated with good shoulder mechanics (i.e. minimal to no scapulathoracic substitution with up to 90-110 degrees of elevation.)
- Begin rhythmic stabilization drills
- ER/IR in the scapular plane
- Flexion/extension and abduction/adduction at various angles of elevation
- Continue AROM elbow, wrist, and hand
- Strengthen scapular retractors and upward rotators
- Initiate balanced AROM / strengthening program
  - o Initially in low dynamic positions
  - o Gain muscular endurance with high repetition of 30-50, low resistance 1-3 lbs)
  - o Exercises should be progressive in terms of muscle demand / intensity, shoulder elevation, and stress on the anterior joint capsule
  - o Nearly full elevation in the scapula plane should be achieved before beginning elevation in other planes
  - o All activities should be pain free and without substitution patterns
  - o Exercises should consist of both open and closed chain activities
  - o No heavy lifting or plyometrics should be performed at this time
    - Initiate full can scapular plane raises to 90 degrees with good mechanics
    - Initiate ER/IR strengthening using exercise tubing at 0° of abduction (use towel roll)
    - Initiate sidelying ER with towel roll
    - Initiate manual resistance ER supine in scapular plane (light resistance)
    - Initiate prone rowing at 30/45/90 degrees of abduction to neutral arm position
- Continued cryotherapy for pain and inflammation
- Continued patient education: posture, joint protection, positioning, hygiene, etc.

**Milestones to progress to phase III:**

- Passive forward elevation at least 155 degrees
- Passive external rotation within 8-10 degrees of contralateral side at 20 degrees abduction
- Passive external rotation at least 75 degrees at 90 degrees abduction
- Active forward elevation at least 145 degrees with good mechanics
- Appropriate scapular posture at rest and dynamic scapular control with ROM and functional activities
- Completion of phase II activities without pain or difficulty

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### **Phase III - Strengthening Phase (approximately Week 10 – Week 15)**

#### Goals:

- Normalize strength, endurance, neuromuscular control
- Return to chest level full functional activities
- Gradual and planned buildup of stress to anterior joint capsule

#### Precautions:

- Do not over stress the anterior capsule with aggressive overhead activities/strengthening
- Avoid contact sports/activities
- Do not perform strengthening or functional activities in a given plane until the patient has near full ROM and strength in that plane of movement
- Patient education regarding a gradual increase to shoulder activities

#### Activity:

- Continue A/PROM as needed/indicated
- Initiate biceps curls with light resistance, progress as tolerated
- Initiate gradually progressed strengthening for pectoralis major and minor; avoid positions that excessively stress the anterior capsule
- Progress subscapularis strengthening to focus on both upper and lower segments
  - o Push up plus (wall, counter, knees on the floor, floor) o Cross body diagonals with resistive tubing
  - o IR resistive band (0, 45, 90 degrees of abduction
  - o Forward punch

#### **Milestones to progress to phase IV:**

- Passive forward elevation WNL
- Passive external rotation at all angles of abduction WNL
- Active forward elevation WNL with good mechanics
- Appropriate rotator cuff and scapular muscular performance for chest level activities
- Completion of phase III activities without pain or difficulty



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**Phase IV - Overhead Activities Phase / Return to activity phase (approximately Week 16-20)**

Goals:

- Continue stretching and PROM as needed/indicated
- Maintain full non-painful AROM
- Return to full strenuous work activities
- Return to full recreational activities

Precautions:

- Avoid excessive anterior capsule stress
- With weight lifting, avoid tricep dips, wide grip bench press, and no military press or lat pulls behind the head. Be sure to “always see your elbows”
- Do not begin throwing, or overhead athletic moves until 4 months post-op or cleared by MD

Activity:

- Continue all exercises listed above
  - Progress isotonic strengthening if patient demonstrates no compensatory strategies, is not painful, and has no residual soreness
- Strengthening overhead if ROM and strength below 90 degree elevation is good
- Continue shoulder stretching and strengthening at least four times per week
- Progressive return to upper extremity weight lifting program emphasizing the larger, primary upper extremity muscles (deltoid, latissimus dorsi, pectoralis major)
  - Start with relatively light weight and high repetitions (15-25)
- May do pushups as long as the elbows do not flex past 90 degrees
- May initiate plyometrics/interval sports program if appropriate/cleared by PT and MD
- Can begin generalized upper extremity weight lifting with low weight, and high repetitions, being sure to follow weight lifting precautions.
- May initiate pre injury level activities/ vigorous sports if appropriate / cleared by MD

Milestones to return to overhead work and sport activities:

- Clearance from MD
- No complaints of pain or instability
- Adequate ROM for task completion
- Full strength and endurance of rotator cuff and scapular musculature for task completion
- Regular completion of continued home exercise program

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<b>Dr. Nelson's Latarjet Rehabilitation Protocol</b>														
<b>Diagnosis:</b>														
<b>Procedure date:</b>	<b>S/P:</b>													
	<b>WEEK</b>										<b>MONTH</b>			
	1	2	3	4	5	6	7	8	9	10	3	4	5	6
<b>PHASE 1 EXERCISES (continue sling)(week 1-3)</b>														
Pendulum	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ball squeeze	•	•	•	•	•	•	•	•	•	•	•	•	•	•
supine PROM (forward elevation to tolerance, internal rotation at 30 degrees abduction to 45, ER to neutral)	•	•	•											
scapular clock progress to scapular isometrics	•	•	•	•	•	•								
<b>PHASE 2 (weeks 4-9) Early week 4</b>														
Elevate to tolerance, Abd in scap plane to tolerance IR 45 @ 30 abd, ER 0-45 degrees at 30-40 abd.				•	•	•	•	•	•	•	•	•	•	•
GH mobilization PRN if motion less than predicted				•	•	•	•	•	•	•	•	•	•	•
Address Scapthorax and trunk mobility				•	•	•	•	•	•	•				
Begin to incorporate posterior capsular stretch (Cross body adduction, gentle sleeper stretch)				•	•	•	•	•	•	•				
<b>Late phase II ~week 6</b>														
PROM continue above plus ER to 45						•	•	•	•	•	•	•	•	•
AAROM activities of shoulder with good mechanics						•	•	•	•	•	•	•	•	•
Rhythmic stabilization and proprioceptive drills						•	•	•	•	•	•	•	•	•
Strengthen scapular retractors						•	•	•	•	•	•	•	•	•
Balanced AROM/strengthening (low dynamic positions initially, see above for full details)						•	•	•	•	•	•	•	•	•
<b>PHASE 3 (weeks 10-15) continue previous plus</b>														
Continue A/PROM as needed/indicated										•	•	•	•	•
Initiate Biceps curls with light resistance										•	•	•	•	•
Initiate progressed for pec major and minor (avoid positions that stretch anterior capsule)										•	•	•	•	•
Progress sub scapulars strengthening (cross body diagonals with tubing, IR resistive band, etc)										•	•	•	•	•
<b>PHASE 4 weeks 16-20</b>														
Continue all above											•	•	•	•
Strengthen overhead if ROM and strength below 90 good											•	•	•	•
Continue shoulder stretch and strength 4x week											•	•	•	•
Progress return to upper extremity weight lifting program Focus (deltoid, lat, pec)											•	•	•	•
May do pushups elbows don't flex more than 90											•	•	•	•
Initiate plyometrics/interval sports program											•	•	•	•
May initiate pre injury level activities with clearance by Dr. Nelson											•	•	•	•
Return to play typically 5-6 months contact and throwing athletes														
Call or email Dr. Nelson with any concern														
<b>Additional Instructions:</b>														