OUTPATIENT REHABILITATION FOR A PATIENT WITH A SUSPECTED SUPERIOR LABRAL ANTERIOR TO POSTERIOR LESION OF THE LEFT GLENOHUMERAL JOINT

A Doctoral Project
A Comprehensive Case Analysis

Presented to the faculty of the Department of Physical Therapy
California State University, Sacramento

Submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHYSICAL THERAPY

by
Daniella Petraitis

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Department of Physical Therapy
Abstract of
OUTPATIENT REHABILITATION FOR A PATIENT WITH A SUSPECTED SUPERIOR LABRAL ANTERIOR TO POSTERIOR LESION OF THE LEFT GLENOHUMERAL JOINT
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Daniella Petraitis

A patient with a suspected superior labral anterior to posterior tear of the left glenohumeral joint was seen for physical therapy treatment for seven sessions from 04/16/15 to 05/07/15 at the orthopedic pro bono clinic located at California State University, Sacramento. Treatment was provided by a student physical therapist under the direct supervision of a licensed physical therapist.

The patient was evaluated at the initial encounter with an upper quarter musculoskeletal examination which included the crank test, jerk test, Jobe Relocation test, Disabilities of the Arm, Shoulder, and Hand, and Neck Disability Index, and a plan of care was established. Main goals for the patient were to improve scapular musculature strength, glenohumeral range of motion, muscle length of the levator scapula, motor control of the scapula, pain control, cervicothoracic joint dysfunction, and posture in order to improve standing tolerance, lifting items overhead, and gym tolerance. Main interventions utilized
over the course of treatment included manual therapy to the cervicothoracic spine, strengthening exercises, flexibility tasks, motor control exercises, and postural education. The patient was discharged with a home exercise program that addressed specific impairments including decreased range of motion, decreased muscle length, scapular muscle weakness, cervicothoracic dysfunction, and postural deficits in order to improve the patient’s activity limitations and participation restrictions.

______________________, Committee Chair
Lois Boulgarides, PT, DPT, MS

______________________
Date
ACKNOWLEDGEMENTS

I would like to acknowledge the California State University, Sacramento Doctor of Physical Therapy program for providing an enriching learning experience with an outpatient orthopedic patient. I would also like to acknowledge my parents for all of the encouragement and support they have provided me in every aspect of life.
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Chapter 1

General Background

The glenohumeral (GH) joint, one of the most complex and mobile joints in the body, is highly sensitive to trauma.\textsuperscript{1,2} One fairly common but difficult to identify injury affecting the GH joint is a superior labrum anterior-posterior (SLAP) lesion. Depending on the population, the incidence of SLAP lesions varies from 6-35\%.\textsuperscript{2-4} According to the literature, SLAP lesions are more common in athletic and active populations which may include athletes performing overhead movements, rugby players, and military personnel.\textsuperscript{5-7}

The glenoid labrum, which is composed of fibrocartilaginous tissue, is firmly attached to the supraglenoid tubercle and the glenoid rim surrounding the glenoid fossa. The purpose of the glenoid labrum is to provide stability to the highly mobile shoulder joint by doubling the depth of the glenoid fossa, from 2.5mm-5.0mm, preventing abnormal translation of the humeral head.\textsuperscript{2,5,8,9} Loosening or detachment of the superior aspect of the glenoid labrum tissue may be classified as a SLAP lesion. According to Snyder et al. (1995), a SLAP lesion is an injury originating at the superior labrum, and extending from anterior to posterior. Using arthroscopy, a SLAP lesion can be classified as one of four types.\textsuperscript{3} A type I SLAP lesion indicates the superior labrum demonstrates a frayed and/or degenerative attachment with an intact biceps tendon, a type II SLAP lesion is an avulsion of the superior biceps-labral complex attachment from the glenoid rim, a type III SLAP
lesion is a bucket-handle tear of the labrum with an intact biceps anchor, and a type IV SLAP lesion is a bucket-handle tear of the labrum with a tear extending into the biceps tendon. Injury to the superior labrum is more common than injury to the inferior labrum as the superior labrum is loosely attached to the glenoid rim, mobile, and “meniscal-like” while the inferior labrum is more rounded and firmly attached to the glenoid ultimately reducing the risk for injury.

Diagnosis of SLAP lesions is difficult due to the complex nature of the injury and the likelihood of concomitant pathologies. According to Andrews et al. (1985), 45% of those with a SLAP lesion presentation had rotator cuff involvement. Though it is difficult to accurately identify a SLAP lesion, a detailed physical examination can play a significant role. Using arthroscopy as the gold standard, a study comparing the sensitivity and specificity of magnetic resonance imaging (MRI) to a physical examination in predicting the presence of a SLAP lesion determined that the physical examination was a more accurate predictor in identifying a SLAP tear. Thus, it is important for clinicians to perform a thorough clinical examination and evaluation in patients with a suspected SLAP lesion in order to determine the appropriate course of action and mitigate healthcare costs by eliminating the need for unnecessary diagnostic imaging studies.

Clinical signs and symptoms that may be present in a SLAP lesion include: loss of GH internal rotation range of motion (ROM), pain with overhead activities, decreased strength and muscular endurance of the rotator cuff muscles, loss of
strength and stability of scapular musculature, sensations of painful locking, clicking, or catching with shoulder movement, the inability to rest in a sidelying position on the painful shoulder, secondary impingement signs, and scapular dyskinesis as defined by a variation in the normal position and motion of the scapula during coupled scapulohumeral movements.\textsuperscript{2,13}

There are multiple mechanisms of injury causing SLAP lesions including traumatic events as well as repetitive microtraumas. Traumatic injury mechanisms include but are not limited to: falling on an outstretched arm, a direct blow to the shoulder, bracing oneself during a motor vehicle accident (MVA), and forceful traction of the upper extremity (UE).\textsuperscript{10}

In addition to recognizing the potential mechanism of injury, existing non-modifiable and modifiable risk factors that may predispose an individual to a SLAP lesion should also be considered. Non-modifiable risk factors for a SLAP lesion include increasing age, male gender, and being of Caucasian race.\textsuperscript{6} Modifiable risk factors for a SLAP lesion include decreased internal rotation in passive range of motion (PROM), decreased horizontal adduction in PROM, and scapular dyskinesis.\textsuperscript{14,15}
Chapter 2

Case Background Data

Examination - History

The patient was a 21-year-old male barista who presented with symptoms indicating a possible SLAP lesion of the left UE. The chief complaints, intermittent left-sided pain at the lower cervical and upper thoracic spine, medial border of the scapula, superomedial shoulder, and near the proximal axillary line, began after a MVA eight weeks prior to examination. The patient, who was a passenger in the back seat of the car, was holding onto a handle above the window with his left hand when the vehicle was struck head on by another vehicle which may have caused excessive anterior translation of the left humerus on the glenoid upon impact. One to two days after the MVA, the patient reported experiencing pain in the left side of the body at the lower cervical and upper thoracic spine, medial border of the scapula, superomedial shoulder, and near the proximal axillary line. In addition, the patient reported the sensation of painful clicking and popping deep within the left shoulder joint upon GH abduction. The patient was seen by a physician with a radiograph of the left shoulder taken which was negative for bony pathology.

Various aggravating factors were reported. Standing for a prolonged period of time (approximately three hours) brought on intermittent pain, 8/10 on the Numeric Pain Rating Scale (NPRS), near the medial border of the left scapula. Abduction of the left GH joint caused intermittent sharp pain located at the proximal
end of the axillary line, 5/10 on NPRS, and pain over the left superomedial shoulder proximal to the left scapula, 6/10 on NPRS. Pushing with the left UE resulted in intermittent sharp pain over the left superomedial shoulder, 5/10 on NPRS, and in the lower cervical and upper thoracic region, 5/10 on NPRS.

Some of the problems that the patient faced due to his injury were inability to perform some work tasks as a barista, inability to exert maximal effort as a Marine Core Reserve, and inability to attend the gym.

The patient’s treatment goals were to be pain-free, measured by having 0/10 pain on the NPRS, and to be able to go to the gym on a daily basis.

**Systems Review**

The patient’s cardiopulmonary system was not impaired: blood pressure was 110/72 mm/Hg, heart rate was 74 beats per minute rhythmical and consistent, and respiratory rate was 12 breaths per minute. The integumentary system was not impaired based on observation and patient report. The neuromuscular system was not impaired based on physical examination and patient history. The musculoskeletal system was impaired based on patient complaint of pain, decreased range of GH abduction, and weakness of the scapular musculature.

**Examination - Medications**

Table 1

<table>
<thead>
<tr>
<th>MEDICATION</th>
<th>DOSAGE</th>
<th>REASON</th>
<th>SIDE EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibuprofen</td>
<td>800mg, orally</td>
<td>Relieve mild to moderate pain, reduce inflammation</td>
<td>Constipation, diarrhea, gas or</td>
</tr>
<tr>
<td></td>
<td>Flexeril</td>
<td>Relax muscles and relieve pain and discomfort</td>
<td>Dizziness, drowsiness, dry mouth, upset stomach, irregular HR, chest pain, seizures, fever</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------------</td>
<td>-----------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Dosage not available at time of evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trigger point injections</td>
<td>Decrease pain</td>
<td>Pain at injection site, chest pain, bruising, difficulty breathing, spasms</td>
</tr>
<tr>
<td></td>
<td>Two injections to Thoracic Spine and left shoulder</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chapter 3

Examination – Tests and Measures

The International Classifications of Functioning, Disability and Health (ICF) Model was utilized to group the patient’s deficits into the following categories: body function and structure impairments, activity limitations, and participation restrictions. Goniometry, manual muscle testing (MMT), the finger-width space from the base of the spine of the scapula to the vertebral column, the distance from the superior angle of the scapula to the transverse process of C1, manual pre-positioning and maintenance of the left scapula in upward rotation during GH abduction, the NPRS, and special tests of the glenoid labrum were measures used to assess the patient’s body function and structure impairments. The Disabilities of the Arm, Shoulder, and Hand (DASH), the Neck Disability Index (NDI), patient report, the NPRS, and time were measures used to assess the patient’s activity limitations. Patient report, the DASH, and the NDI were used to assess the patient’s participation limitations.

Goniometry, used to quantify ROM restrictions, is a standardized measure classified at the body structure and function level of the ICF model. Range of motion can range from 0 degrees to 180 degrees of flexion and abduction and sometimes beyond 180 degrees depending on the mobility of the joint being tested. The reported minimal-detectable change (MDC) for goniometry of the GH joint is 4-7 degrees.\textsuperscript{17}
Manual muscle testing, used to quantify muscle weakness, is a standardized measure classified at the body structure and function level of the ICF model. MMT scores are based on a five point ordinal scale and can range from 0/5 (lowest score possible) indicating that there is no palpable muscle contraction to 5/5 (highest score possible) indicating that the therapist cannot break the position of the limb against gravity and with maximal resistance. MMT has adequate to excellent test-retest reliability (ICC=0.65-0.99) as well as adequate to excellent interrater reliability of the upper extremity muscles (ICC=0.62-0.98).\(^{18}\) MMT has also demonstrated high correlation with dynamometry (r=0.768, p<0.001).\(^{18}\) There are currently no MDC or minimal clinically important difference (MCID) values established for MMT.

The DASH outcome measure, used to track patient response to treatment, is a standardized outcome measure classified at the body structure and function, activity, and participation level of the ICF model. This 30-item measure is a self-report questionnaire designed to assess and quantify the presence of musculoskeletal disorders of the upper extremities. Scores for the DASH range from zero to 100. A higher score indicates a greater level of disability and severity. The DASH is a valid and reliable tool used to detect change in a patient’s condition.\(^{19}\) The MDC and the MCID at the 95% confidence interval are 10.8 and 10.2, respectively.\(^{20,21}\) With a change in score greater than or equal to 10.8, one can be 95% confident that a true change in function has occurred and is not due to measurement error. For this patient case, the MDC, instead of the MCID, was utilized to track changes in the
patient’s condition as it reports the larger change in score needed to signify that a true change has occurred.

The NDI outcome measure is utilized at the body structure and function, activity, and participation level of the ICF model. This is a 10-item self-report questionnaire assessing how neck pain affects a patient’s daily function. The lowest and highest scores possible are zero and 50, respectively. A score of zero indicates no disability whereas a score of 50 indicates maximal disability due to neck pain. The NDI is sensitive in detecting change in a patient’s health condition. The MDC and MCID at the 95% confidence interval for the NDI are 8.4 and 3.5, respectively. A change in score greater than 8.4 on the NDI indicates a true change has occurred that is not attributed to measurement error.

The crank test was a test used to test the hypothesis of a SLAP lesion. A meta-analysis analyzing six high-quality studies examining the diagnostic utility of clinical tests for the identification of SLAP lesions determined the crank test to be the second best diagnostic test, following the active compression test, in ruling in a SLAP lesion. A study not included in the meta-analysis but that demonstrated high applicability to this patient case reported the following psychometric properties for the crank test: a LR+ of 7.0, LR- of 0.10, a positive predictive value (PPV) of 94%, and a negative predictive value (NPV) of 91%. The LR+ and LR- indicate that a positive crank test would result in a moderate increase in probability of a SLAP lesion while a negative crank test would result in a moderate decrease in probability.
of a SLAP lesion. Based on the PPV and NPV, a positive crank test would indicate that there is a 94% probability the patient has a SLAP lesion and a negative crank test would indicate that there is a 91% probability the patient does not have a SLAP lesion.

A clinical prediction rule for the prognosis of shoulder pain was used as the prognostic measure in this patient case. In a study conducted by Kuijpers et al. (2006), a longer duration of symptoms, a higher severity of pain, and gradual onset of shoulder complaints were associated with a poorer prognosis as indicated by persistent symptoms at 6 weeks. At the six week follow-up period, the odds ratio (OR) for longer duration of symptoms (7-12 weeks), severity of pain, and gradual onset of symptoms are 2.3, 1.3, and 1.8, respectively (p<0.001). If a patient had symptoms that lasted greater than eight weeks and were of high severity (8/10 on NPRS), the patient would be approximately 1.3-2.3 times more likely to suffer from chronicity of symptoms (p<0.001) than if symptoms were less severe and of shorter duration.

Table 2
Examination Data

<table>
<thead>
<tr>
<th>Measurement Category</th>
<th>Test/Measure Used</th>
<th>Test/Measure Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROM</td>
<td>Goniometry, Observation, NPRS</td>
<td>AROM/PROM GH Abduction 0-168°/0-180° 144° ĉ pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LEFT 0-135°/0-180° 144° ĉ pain, 6/10 on</td>
</tr>
</tbody>
</table>

** **
### Compensation of Lumbar Spine (↑ Lordosis):

<table>
<thead>
<tr>
<th></th>
<th><strong>RIGHT</strong></th>
<th><strong>LEFT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand 2” from table</td>
<td>Hand 4” from table</td>
<td></td>
</tr>
</tbody>
</table>

### Muscle Length

**Observation, Tape measure, Palpation, NPRS**

**Muscle length of the left levator scapula:**

- Approximate distance of superior angle of scapula to transverse process of C1 during passive contralateral rotation, contralateral lateral flexion, cervical flexion and shoulder depression:
  - **RIGHT** 6 ½ inches
  - **LEFT** 5 ½ inches

- Left levator scapula associated with pain, 4/10 on NPRS. Relief of pain with shoulder shrug during AROM of R cervical lateral flexion

### Strength

**MMT**

<table>
<thead>
<tr>
<th></th>
<th><strong>RIGHT</strong></th>
<th><strong>LEFT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid Trap</td>
<td>4/5</td>
<td>4-/5</td>
</tr>
<tr>
<td>Lower Trap</td>
<td>4/5</td>
<td>3+/5</td>
</tr>
<tr>
<td>Rhomboids</td>
<td>5/5</td>
<td>4+/5</td>
</tr>
<tr>
<td>Serratus Ant</td>
<td>4+/5</td>
<td>4/5</td>
</tr>
</tbody>
</table>

### Scapular Position at Rest

**Space from the base of the spine of the scapula to the vertebral column**

<table>
<thead>
<tr>
<th></th>
<th><strong>RIGHT</strong></th>
<th><strong>LEFT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>3 finger-widths</td>
<td>5 finger-widths</td>
<td></td>
</tr>
</tbody>
</table>

### Scapular Coordination

**Manual pre-positioning and maintenance of the left scapula in upward rotation during GH Abd**

- Eliminate pain and increase in GH Abd AROM to 180°
- Pt initially required 50% verbal cues to correct scapular dyskinesis of L scapula during GH ROM

### Special Tests of the Glenoid Labrum

**Crank test, Jerk test, Jobe relocation**

- Positive findings with the left UE

### Cervicothoracic Joint Mobility

**Palpation, NPRS, Goniometry**

- C5 left UPA – hypomobility with pain in left superomedial shoulder, 3/10 on NPRS, pain and resistance close
- T1 left UPA – hypomobility with pain in left superomedial shoulder, 4/10 on NPRS, resistance dominant joint
- T2 left UPA – hypomobility with pain near medial border of the left scapula, 6/10 on NPRS, pain dominant joint
- Immediately post cervicothoracic joint mobilization, GH Abd resulted in decreased pain in superomedial shoulder, 2/10 on NPRS, and an increase in ROM, 0-160°
<table>
<thead>
<tr>
<th>ACTIVITY LIMITATIONS</th>
<th>Test/Measure Used</th>
<th>Test/Measure Results</th>
</tr>
</thead>
</table>
| Functional tasks at work | Patient report, NPRS/time, NDI, DASH | • Lifting full milk carton with L arm just past shoulder height caused pain at the left proximal axillary line, 5/10 on NPRS, and at the left superomedial shoulder, 6/10 on NPRS  
• Standing for approx 3 hours caused pain at the left medial border of the scapula, 8/10 on NPRS  
• NDI: 13/50  
• DASH: 22.5/50 |

<table>
<thead>
<tr>
<th>PARTICIPATION RESTRICTIONS</th>
<th>Test/Measure Used</th>
<th>Test/Measure Results</th>
</tr>
</thead>
</table>
| Gym attendance | Patient report/NPRS, NDI, DASH | • Unable to attend gym due to pain, 8/10 on NPRS  
• NDI: 13/50  
• DASH: 22.5/100 |

** - Comparable pain; ° - Degrees; ¢ – with; NDI – Neck Disability Index; GH – Glenohumeral; ROM – Range of Motion; AROM – Active Range of Motion; NPRS – Numeric Pain Rating Scale; PROM – Passive Range of Motion; MMT – Manual Muscle Test; UE – Upper Extremity; # - Number; DASH – Disabilities of Arm, Shoulder, and Hand; UPA – Unilateral Posterior to Anterior glide
Chapter 4

Evaluation

Evaluation Summary

The patient was a 21-year-old male barista and active member of the Marine Core Reserves with an eight week history of intermittent left-sided pain at the superomedial shoulder, lower cervical and upper thoracic region, medial border of the scapula, and proximal axillary line. The patient demonstrated impairments including decreased range of motion, assessed by goniometry; decreased muscle length, determined by the distance from the superior angle of the scapula to the transverse process of C1; muscle weakness, quantified by manual muscle testing (MMT); abnormal position of the scapula at rest, quantified by measuring the finger-width space from the base of the spine of the scapula to the vertebral column; motor control deficits including scapular dyskinesia, assessed by observation and manual pre-positioning and maintenance of the left scapula in upward rotation during GH abduction; cervicothoracic joint dysfunction including hypomobility and pain provocation, determined by palpation and the NPRS; and a suspected SLAP lesion, determined by positive findings on the crank, jerk, and Jobe relocation tests. These impairments partially limited his ability to tolerate standing for prolonged periods of time, lift items overhead, carry-out duties as a member of Marine Core Reserves, and continue his daily gym regimen.
Diagnostic Impression

The patient presented with signs and symptoms consistent with a left superior labrum anterior to posterior lesion. The patient, who had a positive crank, jerk, and Jobe relocation test, demonstrated decreased ROM, scapular muscle weakness, postural deficits including impaired motor control of the scapula, cervicothoracic joint dysfunction, decreased muscle length of the levator scapula, and pain which resulted in the patient’s partial inability to perform various activities and execute some of his work duties efficiently and effectively, and prevented his participation in his usual gym fitness program.

G-Codes

Current with modifier: G8984 + CJ: Carry current status

- Based on the pre-treatment DASH score of 22.5/100

Goal with modifier: G8985 + CI: Carry goal status
## Chapter 5

### Plan of Care-Goals and Interventions

Table 3

Evaluation and Plan of Care

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>Short Term Goals (4th visit)</th>
<th>Long Term Goals (7th visit)</th>
<th>Planned Interventions</th>
</tr>
</thead>
</table>
| Decreased ROM and decreased muscle length | • Increase left GH abduction AROM from 135° to 140° with 4/10 pain on NPRS | • Increase left GH AROM from 135° to 168° (L=R) with 0/10 pain on NPRS | Therapeutic exercises to increase soft tissue extensibility of shortened upper quarter musculature including PNF Hold-Relax technique, HEP including flexibility program.  
1. LS stretch:  
   a. PNF Hold-Relax to left LS, 6 sec contract / 30 sec relax x 3  
   b. LS self-stretch, 30 sec x 1  
      i. Progressed to 2 sets  
2. Lat stretch:  
   a. Child’s Pose Lat stretch, 30 sec x 2  
   b. PNF Hold-Relax to left Lat in child’s pose position, 6 sec contract/50 sec relax x 3  
3. Pectoralis Major stretch:  
   a. Doorway Pec stretch, 30 sec x 2  
   b. Foam Roll Pec stretch x 2min  
4. Tennis Ball self-mob to C-T junction x 2 min |
| BODY FUNCTION OR STRUCTURE IMPAIRMENTS | • Increase GH flexion in hook lying position as indicated by L hand 2” from table (L=R) | • Increase muscle length of left levator scapula, as measured by an increase in distance from the superior angle of the scapula to the transverse process of C1, from approx 5½ | (E) Patient education on method and importance of stretching and self-mobilization of lower cervical and upper thoracic region to reduce symptoms and improve function |
Approx 5 ½ inches to 6 inches when put on stretch decreases in pain, 0/10 on NPRS

| Muscle weakness | Increase strength in the following muscles: | Increase strength in the following muscles: | Upper quarter progressive resistance exercises to increase strength in weakened muscles bilaterally including Middle Trapezius, Lower Trapezius, Rotator Cuff musculature, and Serratus Anterior muscles. Began with low frequency and light intensity due to high severity, but progressed frequency, intensity, time, type (FITT) when able.
---|---|---|---
| • L MT from 4-/5 to 4/5 | • L MT from 4-/5 to 5/5 |
| • L LT from 3+/5 to 4/5 | • L LT from 3+/5 to 4+/5 |
| • L SA from 4/5 to 4+/5 | • L SA from 4/5 to 5/5 |
| • L Rhomb from 4+/5 to 5/5 | |

Abnormal position of L scapula at rest:
Decrease abnormal positioning of scapula at rest as indicated by decrease space from base of spine of L scapula to vertebral column from:
• 5 to 4 finger widths

Motor control of scapula regimen including patient education regarding abnormal position of left scapula, HEP incorporating scapular depression and retraction exercises, progressive resistance ther-ex into proper scapula position, taping of left scapula in depressed and adducted position for tactile augmented feedback
1. (E) Patient education regarding current position and optimal position of L scapula. Patient encouraged to be aware of scapula position during functional tasks.
2. Scapular retraction, 5 sec hold x 10
| Cervicothoracic joint dysfunction | Decrease VCs regarding position of scapula during ther-ex from 50% to 25% | Decrease VCs regarding position of scapula during ther-ex from 50% to 0% | 3. Manual stabilization of left scapula into scapular retraction and depression via taping  
   a. 1 strip of tape from L coracoid process to inferior angle of L scapula  
   b. x 3 treatment sessions  
4. PNF repeated contraction to L scapula into scapular depression x 10  
   a. Repeated contraction: concentric→isometric→eccentric  
5. Maintaining proper position of scapula & GH movement  
   i. wall walks  
   ii. 10 x daily  
6. Proper position of L scapula emphasized during all ther-ex in clinic  
|   C5 left UPA – decrease pain in left superomedial shoulder from 3/10 to 1/10 on NPRS |   C5 left UPA – decrease pain in left superomedial shoulder from 3/10 to 0/10 on NPRS |  
| T1 left UPA – decrease pain in left superomedial shoulder from 4/10 to 2/10 on NPRS | T1 left UPA – decrease pain in left superomedial shoulder from 4/10 to 0/10 on NPRS |  
| T2 left UPA – decrease pain near medial border of left scapula from 6/10 to 4/10 on NPRS | T2 left UPA – decrease pain near medial border of left scapula from 6/10 to 0/10 on NPRS |  
| Functionally, be able to perform GH abduction | Functionally, be able to perform GH abduction |  
| Manual Therapy techniques including passive accessory intervertebral movements (PAIVMs) to lower C/S and upper T/S:  
1. C/S & T/S UPA’s, 30 sec bouts x 3  
   a. C5: L UPA, grade IV  
   b. T1: L UPA, grade IV  
   c. T2: L UPA, grade I  
   i. Progressed to grade IV |  
Due to success of treatment in clinic, self-mob included in HEP to continue with progress.  
2. Self-mobilization with tennis balls to C-T junction, 2’ x 2x/day |
immediately post cervicothoracic joint mobilizations ĉ decrease in pain from 6/10 to 4/10 on NPRS and increase GH abd AROM from 0-135° to 0-142°

immediately post cervicothoracic joint mobilizations ĉ decrease in pain from 6/10 to 0/10 on NPRS and increase GH abd AROM from 0-135° to 0-168° (L=R)

<table>
<thead>
<tr>
<th>ACTIVITY LIMITATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty performing some functional tasks at work</td>
</tr>
<tr>
<td>• Be able to lift full milk carton overhead ĉ pain in proximal axillary line decreased from 5/10 to 3/10 and pain in superomedial shoulder decreased from 6/10 to 4/10 on NPRS</td>
</tr>
<tr>
<td>• Be able to stand at work for approx 4 hours ĉ 6/10 pain on NPRS</td>
</tr>
<tr>
<td>• Improve ability to function with everyday tasks and participate in social activities as indicated by improvement with NDI score from 13/50 to 6/50 and</td>
</tr>
<tr>
<td>• Be able to lift milk carton overhead ĉ 0/10 pain on NPRS</td>
</tr>
<tr>
<td>• Be able to stand during entire shift ĉ 0/10 pain on NPRS</td>
</tr>
<tr>
<td>• Improve ability to function with everyday tasks and participate in social activities as indicated by improvement with NDI score from 13/50 to 4/50 and DASH score from 22.5/100</td>
</tr>
</tbody>
</table>

Program addressing flexibility, weakness, motor control deficit of L scapula, cervicothoracic joint dysfunction, and pain by including stretching, manual techniques, strengthening, motor control techniques, and modalities aimed at reducing pain:

1. Hydroculator Pack ĉ cover + 2 towels to L shoulder x 8 -10 min post treatment

Included task-specific exercises that simulated functional movement patterns as well as corrected improper movement patterns of the L scapula to improve patient’s ability to perform job duties as a barista. See body structure and function interventions above for flexibility, strength, motor control program, manual therapy at the cervicothoracic spine, and functional exercises.
| HEP | Patient will be independent on a HEP | Patient will understand the importance of continuing a HEP | HEP, to be performed 3x/wk, included exercises addressing flexibility limitations, motor control deficits of L scapula, weakness of scapular musculature, pain, and posture and mobility of low cervical, upper thoracic spine

1. Flexibility  
   a. Levator Scapulae stretch  
      i. 2x30sec daily  
   b. Doorway Pec stretch  
      i. 2 x 30sec daily  
   c. Lat stretch – Child’s Pose  
      i. 2 x 30 sec  

2. Motor Control of L Scapula  
   a. Shoulder squeezes  
      i. 10 sec x 10 daily  
   b. Maintaining proper position of scapula è GH movement – wall walks  
      i. 10 x daily  

3. Strengthening of the scapular musculature  
   a. Prone rows, Y, T  
      i. 2x10, progressing è resistance  

4. Pain control  
   a. Self-mob to C-T junction  
      i. 2min x 2 daily  
   b. Heat  
      i. 10min x 2-3x/day  

| PARTICIPATION RESTRICTIONS | Unable to participate in daily workout regimen at gym | Be able to go to gym 3x/wk, performing light to moderate resistance training | Be able to go to gym 5x/wk, performing moderate resistance training | Incorporated a program that addresses patient’s pain, limited flexibility, weakness, cervicothoracic dysfunction, abnormal posture and position of L scapula and scapular dyskinesis in order to ease patient back into regular workout routine without exacerbating symptoms. See interventions for BF & S impairments and Activity Limitations |
GH - Glenohumeral; ° - Degrees; NPRS - Numeric Pain Rating Scale; L - Left; R - Right; LS - Levator Scapula; Abd - Abduction; PNF - Proprioceptive Neuromuscular Facilitation; HEP - Home Exercise Program; Sec - Second; Pec - Pectoralis; Min - Minute; Lat - Latissimus Dorsi; Mob - Mobilization; C-T - Cervicothoracic; MT - Middle Trapezius; LT - Lower Trapezius; Rhomb - Rhomboids; SA - Serratus Anterior; ER - External Rotation; IR - Internal Rotation; UE - Upper Extremity; # - Number; ĉ - With; C/S - Cervical Spine; T/S - Thoracic Spine; UPA - Unilateral Posterior to Anterior glide; DASH - Disabilities of the Arm, Shoulder, and Hand; BS & F - Body Structure and Function; NDI - Neck Disabilities Index; PAIVMS - Passive Accessory Intervertebral Movements; VCs – Verbal Cues; "- inches
Prognostic Considerations

The prognosis for this patient was good despite the patient meeting some of the CPR criteria that suggests chronicity of symptoms. Addition evidence for prognosis of shoulder disorders and other positive prognostic variables justify the patient’s good rehab potential. Factors supporting a good prognosis included: young age, a sudden onset of symptoms, a lack of concomitant psychosocial complaints, a high prior level of function, and increased motivation to return to the prior level of function. Factors limiting the patient’s prognosis included: an initial high pain rating on the NPRS and a long duration of symptoms (> 1 month), indicating he was approximately 1.3 to 2.3 times more likely to have persistent shoulder symptoms.

Plan of Care – Interventions

See Table 3.

Overall Approach

The overall treatment approach for this patient presenting with signs and symptoms indicating a SLAP lesion was a manual therapy approach combined with therapeutic exercise with emphasis on correcting abnormal positioning of the left scapula at rest and during GH movement. The aim of this rehabilitation approach was to improve the patient’s various impairments including: pain, decreased ROM, decreased levator scapula muscle length, scapular muscle weakness, abnormal position of the left scapula at rest and during movement, and decreased mobility in the cervicothoracic spine in order to allow the patient to return to his prior level of function.
**PICO question:**

For a young and active patient presenting with signs and symptoms indicating a SLAP lesion (P), is a manual therapy approach at the cervical spine (I), when compared to usual conservative treatment of the shoulder joint (C), more effective in reducing shoulder symptoms and improving overall function as measured by the DASH and/or NDI (O)?

In a randomized controlled trial (level of evidence: 1b; Pedro score = 8/10), Bergman et al. (2004) investigated the effects of cervical spine manipulation, in addition to usual care, to determine if patients presenting with shoulder pain and dysfunction would benefit from this treatment approach. Patients were randomly divided into either the intervention group, manipulative therapy and usual care, or the control group, usual care only. Manipulative therapy included various mobilizations and manipulations to the cervicothoracic spine. Usual care consisted of patient education, pharmaceutical intervention, and physical therapy if the symptoms persisted. The patients who received manipulative therapy and usual care, compared to patients who received usual care only, had significantly greater improvements in subjective outcome measures including patient-perceived recovery rated on a 7-point ordinal scale, pain rating quantified by the NPRS, and shoulder disability measured by the Shoulder Disability Questionnaire (p< 0.05) which resulted in an expedited recovery time.28

In a randomized pilot study (level of evidence: 1b; Pedro score = 6/10), McClatchie et al. (2009) examined the effects of manual therapy to the cervical spine
on shoulder dysfunction. Twenty-one participants who were suffering from shoulder pain and dysfunction with an asymptomatic cervical spine were divided into two groups. Both groups attended two treatment sessions and received a) cervical spine lateral glide; and b) placebo treatment at each therapy visit. The cervical spine lateral glide was standardized for each patient (performed in sitting) and included small amplitude mid-to-end range movements (grade IV+), and was isolated to the lower cervical spine (C5-C7). The placebo treatment included similar placement of the examiner’s hands on the patient’s lower cervical spine but excluded an external force. Range of motion of the painful arc and pain intensity were assessed pre- and post-treatment. Immediately following the manual therapy intervention, patients reported significant reductions in pain, as measured by the Visual Analog Scale (VAS) (p<0.001), and demonstrated significant reductions in the arc of pain, as assessed with a digitized kinematic evaluation during GH abduction (p=0.002) when compared to before the interventions. Results indicated that in the presence of shoulder symptoms, treatment of the cervical spine can accelerate recovery.29

The subjects’ symptomatic presentation in both of the studies did not exactly match the patient used for this case study. The samples of the studies had pain limited to the shoulder whereas in this case study, the patient had more diffuse symptoms targeting the shoulder, cervicothoracic region, medial border of the scapula, and proximal axillary line.
## Chapter 6

### Outcomes

Table 4

<table>
<thead>
<tr>
<th>OUTCOMES</th>
<th>BODY FUNCTION OR STRUCTURE IMPAIRMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome</td>
<td>Initial</td>
</tr>
<tr>
<td>ROM: AROM/PROM</td>
<td>GH Abd: Right 0-168°/0-180°</td>
</tr>
<tr>
<td></td>
<td>Left 0-135°/0-144°</td>
</tr>
<tr>
<td></td>
<td>GH Flexion in hook-lying: Right Hand 2” from table</td>
</tr>
<tr>
<td></td>
<td>Left Hand 4” from table</td>
</tr>
<tr>
<td>Muscle length</td>
<td>Levator Scapula: Right 6 ½ inches from superior angle of scapula to transverse process of C1 during stretch</td>
</tr>
<tr>
<td></td>
<td>Left 5 ½ inches from superior angle of scapula to transverse process of C1 during stretch; pain near medial border of scapula, 4/10 on NPRS</td>
</tr>
<tr>
<td>Manual muscle testing</td>
<td>Right</td>
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<td>-----------------------</td>
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<tr>
<td></td>
<td>MT:</td>
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<tr>
<td></td>
<td>4/5</td>
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<tr>
<td></td>
<td>LT:</td>
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<td></td>
<td>4/5</td>
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<tr>
<td></td>
<td>Rhomb:</td>
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<tr>
<td></td>
<td>5/5</td>
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<tr>
<td></td>
<td>SA:</td>
</tr>
<tr>
<td></td>
<td>4+/5</td>
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<tr>
<td>Left</td>
<td>MT:</td>
</tr>
<tr>
<td></td>
<td>4+/5</td>
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<tr>
<td></td>
<td>LT:</td>
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<td>3+/5</td>
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<td>Rhomb:</td>
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<td>4+/5</td>
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<tr>
<td></td>
<td>SA:</td>
</tr>
<tr>
<td></td>
<td>4/5</td>
</tr>
<tr>
<td>Scapular position at rest- downward rotation</td>
<td>Right</td>
</tr>
<tr>
<td></td>
<td>3 finger-widths from base of R spine of scapula to vertebral column</td>
</tr>
<tr>
<td></td>
<td>Left</td>
</tr>
<tr>
<td></td>
<td>5 finger-widths from base of spine of L scapula to vertebral column</td>
</tr>
<tr>
<td>Scapular coordination</td>
<td>• Pt required 50% VCs to correct scapular dyskinesis during GH ROM</td>
</tr>
<tr>
<td>Cervicothoracic joint mobility</td>
<td>• C5 left UPA – hypomobility ᵉ pain in left superomedial shoulder, 3/10 on NPRS, pain and resistance close</td>
</tr>
<tr>
<td></td>
<td>• T1 left UPA – hypomobility ᵉ pain in left superomedial shoulder, 4/10 on NPRS, resistance dominant joint</td>
</tr>
<tr>
<td></td>
<td>• T2 left UPA – hypomobility ᵉ pain near medial border of left</td>
</tr>
<tr>
<td>Outcome</td>
<td>Initial</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Performance of functional tasks at work</td>
<td>• Only able to lift full milk carton 6 L UE to 100° due to pain, 5-6/10 on NPRS</td>
</tr>
<tr>
<td></td>
<td>• Unable to stand ≥ 3 hrs due to pain, 8/10 on NPRS</td>
</tr>
<tr>
<td></td>
<td>• NDI: 13/50</td>
</tr>
<tr>
<td></td>
<td>• DASH: 22.5/100</td>
</tr>
</tbody>
</table>

**PARTICIPATION RESTRICTIONS**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Initial</th>
<th>Follow-up</th>
<th>Change</th>
<th>Goal Met (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gym attendance</td>
<td>Unable to attend gym daily</td>
<td>Unable to attend gym daily</td>
<td>No change</td>
<td>N</td>
</tr>
</tbody>
</table>

AROM/PROM= Active Range of Motion/Passive Range of Motion; GH= Glenohumeral; Abd= Abduction; °= Degrees; MDC= Minimal Detectable Change; Y=Yes; N= No; MMT= Manual Muscle Test; UT= Upper Trapezius; MT= Middle Trapezius; LT= Lower Trapezius; Rhomb= Rhomboids; SA= Serratus Anterior; R= Right; L= Left; Verbal Cues= VCs; DASH= Disabilities of Shoulder, Arm, and Hand; NDI= Neck Disability Index; NPRS= Numeric Pain Rating Scale; UPA= Unilateral Posterior to Anterior glide; °-inches
**Discharge Statement:** The patient was seen two times per week for four weeks for conservative treatment of a possible SLAP lesion associated with abnormal position of the left scapula at rest, scapular dyskinesis, decreased GH ROM, scapular muscle weakness, decreased muscle length of the levator scapula, cervicothoracic joint dysfunction, and pain in the left side of the body at the lower cervical and upper thoracic spine, medial border of the scapula, superomedial shoulder, and near the proximal axillary line. The patient received postural education, therapeutic exercises, and manual therapy to the cervical and thoracic spine aimed at improving pain, strength, flexibility, mobility of the cervicothoracic joints, motor control of the scapula, and abnormal position of the scapula at rest. During the episode of care, the patient received a home exercise program (HEP) designed to improve impairments in order to decrease activity and participation limitations.

**DC G-Code with modifier:** G8986 + CI: Carry discharge status

- Based on the post-treatment DASH score of 2.5/100
Chapter 7

Discussion

Management of the patient in this case study proved to be effective as indicated by the majority of the goals being met and the patient’s perception of the resulting functional improvement. In this patient case, manual therapy to the cervicothoracic spine resulted in an immediate and significant improvement in shoulder pain and GH abduction ROM. In addition, therapeutic exercises, flexibility tasks, motor control exercises, postural correction, and pain control contributed to improved function. Some goals were not entirely met including: significantly increasing strength of scapular musculature, increasing the length of the left levator scapula, and being able to attend the gym daily. Lack of fulfillment of these goals may be due to a limited duration of the episode of care and the patient’s perception of not being physically ready to return to regular gym workouts. During the course of treatment, the patient was provided with a modified gym workout. Although not objectively quantified by the Fear Avoidance Belief Questionnaire (FABQ), it is possible that fear avoidance behavior prevented the patient from performing the modified gym workout. More patient education may have helped him to make the transition to gym participation.

Management of patients presenting with generalized shoulder symptoms may benefit from cervicothoracic manual therapy which can reduce shoulder symptoms and accelerate recovery. Further research is warranted for specific pathologies of the shoulder, particularly SLAP lesions, that may benefit from this treatment protocol.
Despite the limitations of the available evidence, my clinical experience has shown me that manual therapy interventions targeting the cervical and thoracic joints and muscles can be effective adjuncts to treatment of patients presenting with generalized shoulder symptoms.

One limitation to this case study was not utilizing all possible tests with highest diagnostic utility for a SLAP lesion. One diagnostic test shown to be effective for ruling in a SLAP lesion is the active compression test. A study that had a subject sample applicable to this patient reported a LR+ of 33.3, LR- of 0 for the active compression test. In future cases, both the crank test and the active compression test will be used to rule in/out a SLAP lesion. In addition, for a similar patient case, reassessment of both the crank and active compression tests at the conclusion of the episode of care may be useful in order to determine if the patient’s positive labral tests were still present after impairment-based interventions. An additional limitation to this case study was using an objective measure with limited accuracy to quantify the distance from the base of the spine of the scapula to the vertebral column. In future cases, a more accurate and reliable measure will be utilized, such as a tape measure, to quantify such distances.

Unfortunately, re-assessment of the patient’s comparable sign was not performed after each intervention, including the PNF exercises and flexibility tasks, limiting the justification of using each of those interventions throughout the course of care. In future cases, re-assessment of the patient’s comparable sign will be performed after each intervention to determine the immediate effectiveness of the treatment used.
According to Reed et al. (2014), the presence of a painful arc and abnormal scapula positioning were elements of a CPR that was predictive of patients requiring surgical repair of the glenoid labrum. That CPR, designed for patients presenting with a SLAP lesion, is used to determine the likelihood of recovery following a structured rehabilitation protocol. The patient did not have a painful arc motion but did present with abnormal scapula positioning. Being aware of this information, physical therapy was continued to determine if symptoms could be alleviated and function could be restored with a conservative treatment approach. If the patient demonstrated lack of significant improvement with his impairments and functional limitations, referral to a physician would have followed.
References


21. Angst F, Schwyzter HK, Aeschlimann A, Simmen BR, Goldhahn J. Measures of adult shoulder function: Disabilities of the Arm, Shoulder, and Hand Questionnaire (DASH) and its short version (QuickDASH), Shoulder Pain and Disability Index (SPADI), American Shoulder and Elbow Surgeons (ASES) Society standardized shoulder assessment form, Constant (Murley) Score (CS), Simple Shoulder Test (SST), Oxford Shoulder Score (OSS), Shoulder Disability Questionnaire (SDQ), and Western Ontario Shoulder Instability Index (WOSI). *Arthritis Care & Res*. 2011;63(S11):S174-S188.


