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**Outpatient Physical Therapy Management of a Patient Three Months
Following Left Shoulder Arthroscopic Repair of a Type-II SLAP Lesion:
A Case Report**

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The patient signed an informed consent allowing the use of medical information and video footage for this report and received information on the institution's policies regarding the Health Insurance Portability and Accountability Act.

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1 **Abstract**

2 **Background and Purpose**

3 Research demonstrates a drastic increase in the prevalence of type-II superior
4 labral anterior-posterior (SLAP) lesion repairs, and its surgical correction has
5 become the favored method of treatment, because of its ability to effectively
6 improve quality of life (QOL). The purpose of this case report is to document the
7 examination, evaluation, and plan of care (POC) concerning a patient who was
8 referred to physical therapy (PT) three months following the surgical correction of a
9 type-II SLAP lesion.

10 **Case Description**

11 The patient was a middle-aged male who was referred to PT for evaluation and
12 treatment following an arthroscopic repair of his left shoulder to correct a type-II
13 SLAP lesion. The POC consisted of modalities and procedural interventions that
14 were directed to decrease his pain and improve his left shoulder range of motion
15 (ROM), muscle weakness, poor postural awareness, and abnormal scapulohumeral
16 rhythm in preparation for his return to work without restrictions.

17 **Outcomes**

18 The patient reported minimal discomfort and demonstrated vastly improved left
19 shoulder ROM, strength, postural awareness, and scapulohumeral rhythm upon the
20 conclusion of his POC. According to the Upper Extremity Functional Index (UEFI),
21 which was completed throughout his POC, he had eliminated his impairments and
22 returned to his pre-injury QOL before discharge. The patient was capable of
23 returning to work free of restrictions.

24 **Discussion**

25 The patient was an excellent candidate for PT because of his perfect attendance
26 and compliance with his home exercise program. Although his impairments and
27 functional limitations were unique to him as an individual, his thoroughly
28 documented POC could be beneficial to other physical therapists, who are treating
29 an individual with a similar diagnosis.

30 **Manuscript Word Count** – 3,489

31 **Background and Purpose**

32 As the prevalence of arthroscopic repairs to correct type-II superior labrum
33 anterior-posterior (SLAP) lesions continue to rise, the importance of post-surgical
34 physical therapy (PT) following this procedure has become critical. Gamradt et al.¹
35 reported that there has been a 105 percent increase in type-II SLAP repairs, from
36 2004 to 2009, which was three times higher than expected. Lombarda and Matlick²
37 stated that the glenoid labrum, which consists of fibrocartilage tissue and surrounds
38 the glenohumeral joint, increases joint stability by limiting humeral head translation
39 and increasing concavity of the glenoid fossa. A type-II SLAP lesion consists of
40 fraying and degenerative changes to the superior labrum, in an anterior to posterior
41 direction, with the biceps tendon detached from the glenoid.² See Appendix 1 for
42 descriptions of SLAP lesion categories. Allen et al.³ reported that the etiology of this
43 injury consists of either a traumatic event or repetitive overhead activities which
44 both compress the superior labrum, or a traction injury with eccentric contraction
45 of the biceps. Research shows that men are three times more likely to receive a
46 SLAP lesion repair than women and that the highest incident of this surgical
47 procedure occurs between 20-29 and 40-49 years of age.¹

48 The typical signs and symptoms of a SLAP lesion consist of anterior shoulder
49 pain, impaired range of motion (ROM) and strength, shoulder instability, difficulty
50 with overhead activities, and complaints of catching or popping.² Although some
51 special tests may indicate a SLAP lesion, diagnostic imaging such as magnetic
52 resonance imaging (MRI) typically assist with the diagnosis, and the diagnostic gold
53 standard is an arthroscopic assessment.²

54 The evolution of surgical treatment for a type-II SLAP lesion has made the
55 surgical approach more favorable.³ The surgical routine begins with the patient
56 being placed in the modified beach chair position, with their affected extremity
57 positioned in an arm holder, and then placed under regional anesthesia before
58 testing passive range of motion (PROM) in all directions to identify instability.³ The
59 modified beach chair position consists of the patient in 45° of side-lying, the head of
60 the table elevated to 30°, and 10 pounds of longitudinal traction applied to their
61 surgical extremity that is positioned in 30° of flexion and abduction.⁴ The posterior

62 and antero-superior surgical portals are created to carry out the procedure. Once a
63 type-II SLAP lesion is identified, the surgeon will debride the superior aspect of the
64 glenoid to promote healing and anchor the labrum with suture anchors.³ The
65 anchors are placed anterior and posterior to the biceps tendon, with the number of
66 anchors variable to the lesion size, and fixation is secured with arthroscopic knot-
67 tying techniques.³ See Figure 1 for images of a type-II SLAP lesion and its surgical
68 correction.

69 Following this procedure, the patient's surgical extremity is placed in a brace
70 and PT traditionally begins immediately. The PT follows a surgical protocol that
71 consists of gradual PROM, active range of motion (AROM), and strengthening over
72 the course of six to nine months. See Appendix 2 for an example of a detailed post-
73 surgical protocol.

74 The increased prevalence of treating a patient with a type-II SLAP lesion repair,
75 and a protocol that delayed the start of PT for this patient, made this case a
76 necessary addition to the existing literature. This is a unique case since the patient
77 was not referred to PT until three months post-surgery. The purpose of this case
78 report is to document the examination, evaluation, and plan of care (POC)
79 concerning a patient that was referred to PT three months following the surgical
80 correction of a type-II SLAP lesion.

81 **Case Description**

82 **Patient History and Systems Review**

83 The patient, who will be referred to as "DB," gave his consent to participate in
84 this case report. DB, a 45 year-old male, was referred to PT for evaluation and
85 treatment following an arthroscopic repair to correct a type-II SLAP lesion within
86 his left shoulder. DB reported that he originally injured his left shoulder one-year
87 prior when lifting an object at work. He stated that he experienced pain immediately
88 following the incident and that it worsened within an hour. He was referred to PT
89 after an appointment with workplace health, and received four weeks of PT and a
90 cortisone injection with no improvements, before he underwent an MRI and surgical
91 repair approximately one-year later. DB reported that his left shoulder remained in
92 a brace for three months following the surgery and that he was not allowed to lift

93 anything. He stated that his surgeon made a referral to PT, following his three-
94 month post-surgical appointment, and allowed him to return to work under strict
95 restrictions. These consisted of no lifting more than 15 pounds, overhead lifting, or
96 pushing/pulling.

97 DB stated that he worked for a local tire company where he loaded, transported,
98 and unloaded tractor-trailer tires throughout the region. He reported that his work
99 duties were strenuous, because some tires weighed nearly 500 pounds, which made
100 it difficult to use proper lifting mechanics. DB reported that he lived at home, with
101 his wife and 16 year-old son, who have been helpful with household activities. He
102 believed that he was in generally good health. Although he did not exercise
103 regularly, he reported that his profession was physically demanding, that he did not
104 smoke, and that he quit drinking alcohol five years ago. DB reported that he enjoyed
105 spending time with his family, volunteering with the fire department, fishing, and
106 hunting. His medical history consisted of well-controlled asthma and an abdominal
107 hernia repair with no residual issues. His surgical history was not relevant to this
108 case and he reported that he did not take any medications. DB did not have any
109 notable co-morbidities that could have negatively impacted his prognosis.

110 DB reported that his chief complaints consisted of left shoulder pain, decreased
111 motion, muscle weakness, and difficulty sleeping following the surgery. He
112 described the pain as a burning and stabbing sensation throughout his left shoulder,
113 which was increased with activity, and decreased with rest and ice. He reported that
114 this pain caused difficulty with overhead activities, household chores, washing his
115 hair, getting dressed, driving, volunteering at the fire department, and returning to
116 work without restrictions. Following the systems review, it was evident that he had
117 increased left shoulder pain, decreased ROM, and muscle weakness. He also
118 demonstrated poor sitting/standing posture and an abnormal gait pattern. See
119 Table 1 for results of the systems review.

120 DB's goals were to eliminate his daily left shoulder pain, improve his ability to
121 lift objects, perform overhead activities, complete long distances drives, and return
122 to work and volunteering at the fire department without restrictions.

123 **Clinical Impression One**

124 DB's primary problems consisted of increased left shoulder pain, decreased
125 ROM, muscle weakness, poor postural awareness, and compensatory movements
126 following the arthroscopic correction of a type-II SLAP lesion within his left
127 shoulder. These impairments negatively impacted DB's functional status with self-
128 care tasks and work-related activities. There were no potential differential
129 diagnoses, since his pre-surgical MRI was indicative of a type-II SLAP lesion, and he
130 was referred to PT following its surgical correction.

131 Following the patient history and systems review, it was evident that DB would
132 benefit from further examination through specific tests and measures. There were
133 no special tests performed since his diagnosis was pre-determined. He also
134 completed the Upper Extremity Functional Index (UEFI) outcome measure during
135 his initial evaluation to help determine improvements in quality of life (QOL)
136 throughout his POC.

137 DB continued to be an excellent candidate for a case report because of his
138 positive attitude, perfect attendance, and compliance with home exercise programs
139 (HEP's) that helped him make significant progress. DB was also a good candidate
140 because of his unique situation, where he was not referred to PT until three months
141 following surgery. This delayed referral made the typical post-surgical protocol
142 obsolete, and led to a more individualized POC for DB, where he was treated with
143 interventions that could be progressed as tolerated. We anticipated DB would
144 benefit from PT to minimize these impairments, and improve his functional status
145 for self-care independence, in preparation for his return to work without
146 restrictions.

147 **Exam – Tests and Measures**

148 Upon the completion of his systems review, various tests and measures were
149 performed to determine his most severe impairments. These consisted of palpation,
150 goniometry, manual muscle testing, joint play assessment, and postural/gait
151 analysis. Special tests of his left shoulder were not performed. DB completed the
152 UEFI at his initial evaluation, re-evaluation, and before his discharge from PT to
153 determine improvements in his QOL. See Table 2 for results of tests and measures.

154 **Palpation**

155 In order to localize the pain within DB's left shoulder, specific landmarks were
156 palpated to elicit any potential trigger points or tenderness. Bron et al.⁵ performed a
157 study where three blinded raters attempted to locate 12 myofascial trigger points
158 (MTrP's), within the bilateral shoulders of 40 subjects diagnosed with shoulder
159 pain, through palpation of the infraspinatus, biceps brachii, and anterior deltoids.
160 Results of the research demonstrated acceptable inter-rater reliability with >70
161 percent pair-wise agreement for both referred pain sensation and jump sign upon
162 palpation of MTrP's.⁵

163 **Goniometry**

164 In order to determine the severity of DB's decreased ROM, goniometry was
165 performed for all bilateral shoulder and cervical motions. The comparison of
166 measurements, from his affected side to his unaffected side, helped determine
167 exactly what motion he was lacking. Norkin and White⁶ reported that the ROM of an
168 extremity, when measured using a universal goniometer, has generally shown good-
169 to-excellent reliability. DB's joint measurements were performed using the same
170 bony landmarks, goniometer, and rater throughout his POC to help maintain
171 acceptable reliability.

172 **Manual Muscle Testing (MMT)**

173 The muscle weakness that was evident throughout DB's systems review, along
174 with his poor upper body posture, led to the MMT of specific cervical, shoulder, and
175 periscapular musculature. The comparison of his MMT grades, from his affected side
176 to his unaffected side, helped determine the severity of his weakness. Cuthbert and
177 Goodheart⁷ reported that MMT attained high agreement, with inter-examiner
178 reliability of 82-97% and test-retest reliability of 96-98%, when accepting
179 plus/minus one grade. Although these were positive results, the study ultimately
180 demonstrated that MMT scores must change more than one complete grade to be
181 confident that a true change in strength occurred.⁷

182 **Joint Play Assessment**

183 DB's joint play of his bilateral shoulders was assessed, in order to determine
184 whether his ROM deficits were the result of capsular tightness, or decreased
185 strength and tight musculature secondary to disuse atrophy and pain.

186 **Postural/Gait Analysis**

187 DB's posture was assessed to determine any potential muscle imbalances
188 throughout his upper body. His gait pattern was assessed to determine the
189 mechanics of his upper body during ambulation.

190 **Visual Analog Scale (VAS)**

191 The VAS was used to determine the severity of DB's pain. It is a numerical (0-10)
192 scale, where the severity of pain increases in linear fashion, and it is commonly used
193 within the treating facility. DB reported his pain as a 2/10 during the evaluation,
194 9/10 at its worst, and 0/10 at its best.

195 **Upper Extremity Functional Index (UEFI)**

196 DB performed the UEFI during his initial evaluation, re-evaluation, and discharge
197 to help determine changes in his QOL throughout the POC. This outcome measure is
198 a 20 item self-report questionnaire, where each item is scored on a five-point Likert
199 scale, and it helps reveal specific activities that may be more difficult for the patient
200 to perform. According to Binkley et al.,⁸ the UEFI has excellent test-retest reliability
201 and internal consistency with coefficients of 0.95 and 0.94 respectively.

202 **Clinical Impression Two**

203 Upon the conclusion of the tests and measures, it was evident that DB presented
204 with left shoulder pain, decreased ROM, and muscle weakness secondary to the
205 arthroscopic correction of his type-II SLAP lesion. DB demonstrated poor postural
206 awareness and compensatory movements that negatively impacted the use of his
207 left shoulder. These impairments affected DB's functional status with household
208 chores, self-care tasks, upper body dressing, overhead reaching, volunteering at the
209 fire station, prolonged driving, and work-related lifting activities. DB continued to
210 remain under work restrictions that consisted of no lifting greater than 15 pounds,
211 overhead lifting, or pushing/pulling. DB would benefit from skilled PT to minimize

212 these impairments, and improve upon his functional status for self-care
213 independence, in preparation for his return to work without restrictions.

214 DB's PT diagnosis was Pattern 4I (Impaired Joint Mobility, Motor Function,
215 Motor Performance, and Range of Motion Associated With Bony or Soft Tissue
216 Surgery).⁹ DB had an excellent prognosis for improvement throughout PT and we
217 anticipated that he was likely to achieve the majority of his therapeutic goals. DB's
218 likelihood for success was based upon the strength and ROM of his unaffected
219 shoulder, excellent attendance throughout his POC, and compliance with HEP's.

220 The final decision was made to have DB attend two PT sessions per week for a
221 total of eight weeks. His POC originally consisted of palliative methods to reduce
222 pain, and PROM/active assisted ROM (AAROM) exercises to improve his motion,
223 before being progressed to active ROM (AROM) and strengthening exercises of
224 increased difficulty. There was no need for DB to be referred to other services at
225 that time and a re-evaluation was performed during the fourth week of PT. See
226 Table 3 for DB's short and long-term goals.

227 **Interventions**

228 **Coordination, Communication, and Documentation**

229 We coordinated and communicated with DB himself, his orthopedic surgeon,
230 and the physical therapy assistant (PTA) and athletic trainer (AT) who worked
231 within the clinic. We made sure that DB understood his diagnosis, surgical
232 correction, restrictions, and every aspect concerning his POC. The coordination and
233 communication with his orthopedic surgeon was critical, to ensure that we
234 understood the surgical procedure and any updates concerning his restrictions
235 throughout the POC. In terms of communication and coordination with the PTA and
236 AT within our clinic, we kept them up to date with DB's progress throughout his
237 POC to ensure that each treatment session consisted of the most effective
238 interventions.

239 We provided proper documentation for every aspect of DB's POC. This included
240 his initial evaluation, daily notes, progress notes, re-evaluation at four weeks, and
241 discharge note. The documentation was provided to include alterations within his
242 POC, progress towards his therapeutic goals, and changes concerning his

243 interventions. This allowed other medical professionals to remain up to date
244 concerning his progress and ensured reimbursement for his treatments.

245 **Patient/Client Related Instruction**

246 We provided proper patient/client related instruction on a regular basis. We
247 educated DB on his final diagnosis and the process of his surgical correction through
248 explanation of the shoulder anatomy. After his initial evaluation, we educated DB on
249 his specific impairments, how they resulted in his functional limitations, and how PT
250 would help him complete his therapeutic goals. Throughout his POC, we instructed
251 him on how to perform therapeutic exercises with proper technique, educated him
252 on the rationale behind the selection or alteration of specific interventions, and
253 stressed the importance of continued compliance with his HEP.

254 **Procedural Interventions**

255 With the combination of clinical judgment and evidence-based research, we
256 chose interventions that would minimize his impairments and improve his activity
257 limitations/participation restrictions. We decided that it was imperative to
258 minimize his reports of left shoulder pain before beginning more aggressive
259 interventions. We decided that it would be beneficial for DB to receive
260 phonophoresis with hydrocortisone. We theorized that the application of topical
261 hydrocortisone, with the help of ultrasound to propel it towards the desired target
262 area, would decrease inflammation and improve local circulation to eliminate DB's
263 pain and increase tissue extensibility. Sarrafzadah et al.¹⁰ reported that
264 phonophoresis with hydrocortisone (1%) was more effective than ultrasound alone
265 when attempting to alleviate latent myofascial trigger points.

266 The next two impairments addressed were DB's decreased shoulder ROM and
267 muscular tightness. DB was first instructed to perform pendulum exercises and
268 specific stretching exercises for improved ROM and posture. These stretches were
269 aimed to improve his internal rotators, upper trapezii, and pectorals. Kisner and
270 Colby¹¹ reported that static stretching is an effective and safe method to improve
271 flexibility and ROM. DB eventually progressed to AAROM exercises using the pulley
272 system for improved shoulder flexion and abduction. An involved extremity can be
273 effectively assisted throughout its ROM through the use of pulley systems when

274 taught proper techniques.¹¹ If DB entered the clinic with increased discomfort, then
275 we would perform PROM and glenohumeral distraction of his left shoulder, for
276 improved motion without pain. Gently applied distraction of a joint is capable of
277 controlling and relieving pain.¹¹

278 We addressed his muscle weakness with therapeutic exercises. We initially
279 instructed DB to perform TheraBand™[†] exercises to strengthen his shoulder
280 extensors, adductors, and internal/external rotators. TheraBand™ exercises proved
281 to be an effective intervention for improved strength in our clinical experience. He
282 was later progressed to weighted pulley exercises to strengthen the same
283 musculature. The weighted pulleys are more gravity dependent and the increased
284 resistance is an effective progression from TheraBand™ activities. DB was
285 eventually progressed to box lifting with proper mechanics once his restrictions
286 were lifted. This was performed to simulate his work-related activities in
287 preparation of his return to work.

288 In terms of DB's poor postural strength and awareness, we strengthened specific
289 musculature to improve his upper body posture. We instructed DB to perform prone
290 dumbbell exercises on a plinth that consisted of forward shoulder flexion, extension,
291 and horizontal abduction to strengthen his rhomboids and middle/low trapezii. DB
292 also performed cable machine rows and latissimus dorsi pull-downs to further
293 strengthen his posterior musculature. He was later progressed to scapular punches
294 and clocks in the supine position with dumbbells to further improve his postural
295 stability. Eventually, DB progressed to closed-chain exercises in the quadruped
296 position. The axial loading in quadruped, for increased joint congruency through
297 approximation, can ultimately improve stability.¹¹ Lastly, DB progressed to Body
298 Blade®[‡] exercises for improved postural strength and stability. Buteau et al.¹²
299 reported that the Body Blade® was a beneficial intervention, towards functional
300 strengthening of an affected extremity, with improvements of 90% on the WOSI and
301 no deficits on the SPADI upon discharge.

[†] The Hygenic Corporation – 1245 Home Ave. Akron, OH 44310

[‡] Mad Dogg Athletics – 2111 Narcissus Court Venice, CA 90291

302 DB's scapulohumeral rhythm was improved through education of proper body
303 mechanics and external cues for long-term carryover. Verbal cues were immediately
304 provided whenever DB displayed an abnormal scapulohumeral rhythm. If verbal
305 cues seemed insufficient, then tactile cues to his upper trapezii were performed for
306 muscle inhibition and prevention of shoulder shrugging. See Table 4 and Appendix 3
307 for detailed descriptions of interventions and parameters.

308 **Outcomes**

309 DB responded very well throughout his POC, minimized his impairments, and
310 eliminated his functional limitations before his discharge. Following the initial
311 evaluation, it was evident that DB experienced significant left shoulder pain,
312 decreased left shoulder ROM, weakness throughout his left shoulder and peri-
313 scapular musculature, and poor postural awareness. Upon the conclusion of PT, he
314 reported that he experienced no left shoulder pain and demonstrated improved left
315 shoulder ROM, muscular strength, postural strength and awareness, and a
316 normalized scapulohumeral rhythm. As DB continued to progress, we decreased his
317 POC to one day per week with an increased emphasis on his HEP, which was
318 updated regularly as he progressed within the clinic. Ultimately, DB reported that he
319 could return to work, volunteer at the fire station, and perform all self-care activities
320 without restrictions. He stated that his QOL had returned to its pre-injury status and
321 the UEFI that he completed before discharge reported that he had no impairments.
322 DB achieved all of his therapeutic goals before his discharge from PT. See Table 5 for
323 a detailed comparison of DB's discharge status to his original baseline upon
324 admission.

325 **Discussion**

326 In conclusion, DB was evaluated following the surgical correction of his type-II
327 SLAP lesion and his POC was thoroughly documented. As previously stated, the
328 prevalence of type-II SLAP lesion repairs has raised dramatically within recent
329 years,¹ which has increased the importance of adding to the existing literature. The
330 surgical repair of a type-II SLAP lesion has proven to be effective and the majority of
331 patients report satisfaction with their post-surgical outcomes.³ Furthermore, in the
332 case of patients like DB who suffered a traumatic event, there is an increased

333 likelihood of returning to their previous sport.³ Although DB was not an athlete, he
334 returned to his work free of restrictions.

335 Although DB presented with a more unique case, since he did not receive PT
336 until three months post-surgery, we strongly believe that this will be a beneficial
337 addition to the existing literature. Throughout his POC, DB demonstrated
338 continuous progress and achieved all of his therapeutic goals. We understand that
339 no individual case is the same, but DB's well-documented POC could be helpful for
340 therapists dealing with a similar patient population.

341 In terms of future research, it would be beneficial to determine whether or not
342 immediate post-operative PT is more beneficial than DB's delayed referral to PT. It
343 would also be beneficial to determine when it is most effective to implement closed-
344 chain exercises for improved postural stability. Lastly, it would be beneficial to
345 understand the most effective method to ensure long-term carryover for improved
346 scapulohumeral rhythm after discharge.

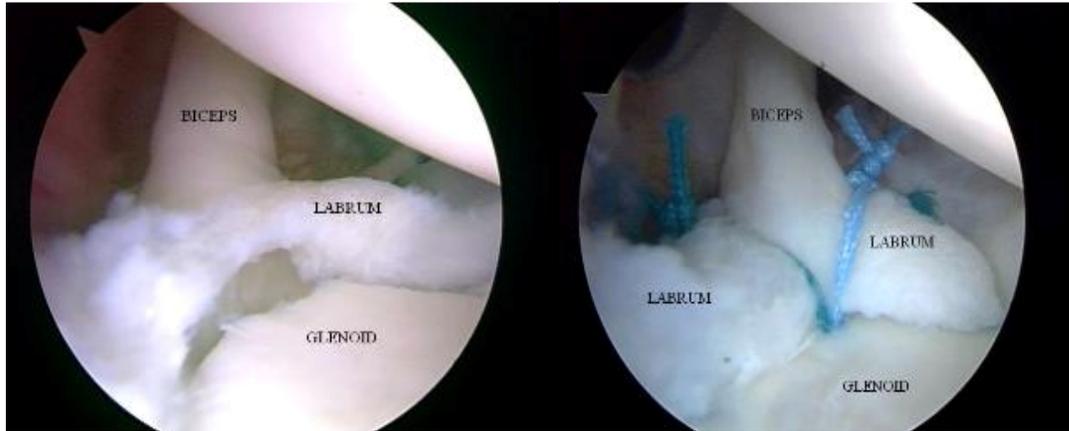
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Figures and Tables

Figure 1: Image of Type-II SLAP Lesion and Arthroscopic Correction



Left: Image of a type-II SLAP lesion where labrum and biceps are detached from the glenoid. **Right:** Image following the surgical correction of the type-II SLAP lesion. The Shoulder Center. (2014). Labrum Tear (SLAP Lesion). Retrieved From: <http://www.theshouldercenter.com/labrum-tear-slap-lesion/>

Table 1: Results of Systems Review

Cardiovascular/Pulmonary	
Not Impaired	Patient presents with blood pressure, heart rate, and respiratory rate that is all WNL Patient has no observable edema.
Integumentary	
Impaired	Patient presents with a well-healed and pliable surgical scar, on the antero-superior aspect of his left shoulder, with no signs of infection.
Musculoskeletal System	
Impaired Range of Motion	Patient presents with gross ROM impairments throughout his left-sided cervical and left shoulder motion.
Impaired Strength	Patient presents with impaired strength of his left cervical musculature, left shoulder/elbow, and periscapular musculature.
Impaired Sitting/Standing Posture	Patient presents with rounded shoulders, forward head, depressed left shoulder, and tends to guard his left shoulder into internal rotation with the arm placed across his

	body.
Impaired Gait Pattern	Patient demonstrates minimal thoracic trunk rotation and minimal bilateral arm swing during ambulation.
Neuromuscular	
Not Impaired	Patient presents with normalized sitting/standing balance and coordination.
Communication, Affect, Cognition, and Learning Style	
Not Impaired	Patient presents with intact communication, normal affect, is A&O x3, and prefers demonstrations and pictures.

Table 2: Examination (Tests and Measures)

Palpation		
Patient presents with tenderness to palpation of the left sub-acromial space. Patient presents with tightness throughout bilateral thoraco-cervical paraspinals and left rotator cuff, biceps, and deltoids.		
Goniometry - AROM		
Cervical		
Motion	Left	Right
Flexion		45 Degrees
Extension		50 Degrees
Side-Bend	40 Degrees	55 Degrees
Rotation	75 Degrees w/ Pain	80 Degrees
Shoulder		
Motion	Left	Right
Flexion	150 Degrees w/ Shrug Sign	172 Degrees
Extension	45 Degrees w/ Shrug Sign	45 Degrees
Abduction	140 Degrees	165 Degrees
External Rotation	Functional To L2 w/ Pain	Functional To T12
Internal Rotation	Functional To C4 w/ Pain	Functional To T1
Elbow		
Motion	Left	Right
Flexion	WNL	WNL
Extension	WNL	WNL
Manual Muscle Test		
Cervical		
Muscle	Left	Right
Flexion		5/5
Extension		5/5
Side-Bend	4/5	5/5
Rotation	4/5 w/ Pain	5/5
Shoulder		
Muscle	Left	Right
Flexion	4-/5	5/5
Extension	4+/5	5/5
Abduction	4-/5	5/5

Adduction	4/5	5/5
External Rotation	4-/5 w/ Pain	5/5
Internal Rotation	4/5 w/ Pain	5/5
Elbow		
Muscle	Left	Right
Flexion	4+/5	5/5
Extension	4+/5	5/5
Periscapular Musculature		
Muscle	Left	Right
Upper Trapezius	5/5	5/5
Middle Trapezius	4-/5	4/5
Lower Trapezius	4-/5	4/5
Rhomboids	3+/5	4/5
Joint Mobilization		
Direction	Left	Right
Inferior	3/6	3/6
Posterior	3/6	3/6
Anterior	3/6	3/6
Postural Analysis		
Patient presents with rounded shoulders, forward head, depressed left shoulder, and tends to guard his left shoulder into internal rotation with arm placed across his body.		
Gait Analysis		
Patient demonstrates minimal thoracic trunk rotation and bilateral arm swing during ambulation.		
Special Tests		
No special tests were performed during initial evaluation because of his referral for post-surgical left shoulder labral repair and increased pain.		
Visual Analog Scale (VAS)		
Left Shoulder (Anterior/Posterior/Superior)	Current – 2/10 Worst – 9/10 Best – 0/10	
Outcome Measures		
Outcome Measure	Score	Impairment
Upper Extremity Functional Index	19	24

AROM = Active Range of Motion and **w/** = With

Table 3: Short and Long Term Goals

	Goal	Time Duration
LTG One	Patient's upper extremity range of motion will improve to allow patient to complete upper extremity dressing (donning/doffing shirt) without restrictions.	8 Weeks
STG 1a	Patient's left shoulder flexion and abduction active range of motion will both improve to 160 degrees.	4 Weeks
STG 1b	Patient's left shoulder internal rotation active range of motion will improve to allow patient to	4 Weeks

	functionally reach to T12.	
STG 1c	Patient's left shoulder external rotation active range of motion will improve to allow patient to functionally reach C7.	4 Weeks
LTG Two	Patient's upper extremity strength will improve to allow patient to allow patient to lift 5 pounds overhead for at least 10 repetitions with normalized mechanics.	8 Weeks
STG 2a	Patient's left shoulder flexion and abduction strength will improve to 5/5 in both planes.	4 Weeks
STG 2b	Patient's left shoulder internal and external rotation strength will improve to 5/5 in both planes.	4 Weeks
STG 2c	Patient will demonstrate a normalized scapulohumeral rhythm with shoulder flexion and abduction movements without external cues.	4 Weeks
LTG Three	Patient's postural strength and awareness will improve to allow patient to complete at least 10 repetitions of shoulder flexion in the quadruped position.	8 Weeks
STG 3a	Patient will maintain proper upper body posture for an entire session without external cues.	4 Weeks
STG 3b	Patient's periscapular strength will improve to at least 4+/5 in all planes.	4 Weeks
LTG Four	Patient will be independent in home exercise program for long-term carryover.	6 Weeks
LTG Five *	Patient's strength will improve to allow patient to lift a 50-pound object from floor to waist, while demonstrating proper lifting mechanics, without restrictions.	4 Weeks
STG 5a *	Patient will be capable of lifting a 30-pound box from floor to waist, while demonstrating proper lifting mechanics, no less than 10 times.	2 Weeks

LTG = Long Term Goal and **STG** = Short Term Goal

* **LTG (5)** and **STG (5a)** were implemented within the patient's plan of care following his re-evaluation and most recent follow-up appointment with his orthopedic surgeon

Table 4: Interventions and Parameters

Weeks	Interventions and Parameters				
	Pain Alleviation (Modality/Manual)	Range of Motion	Stretching	Therapeutic Exercise	Postural Stability/Therapeutic Activity
One	Phonophoresis Sub-Acromial Space, 1.0 watts/cm ² , 8 min, 1mH (Hydrocortisone)	Pendulum Circles 1x10, Both Directions, Left UBE 3 Minutes, Level 1 (Forward/Backward) Pulley Flexion, Abduction, Scaption (AAROM) 1x10, 10 Second Hold, Left	Internal Rotation 1x3, 20 Second Hold, Left (With Towel) Upper Trapezius, Pectoral Corner, Posterior Capsule 1x3, 20 Second Hold, Left	Theraband Extension, Adduction, IR/ER, 2x10, Orange, Left Theraband Rows 2x10, Orange, Bilateral	
Two	Phonophoresis Sub-Acromial Space, 1.0 watts/cm ² , 8 min, 1mH (Hydrocortisone)	UBE 3 Minutes, Level 4 (Forward/Backward) Pulley Flexion, Abduction, Scaption (AAROM) 1x10, 10 Second Hold, Left	Upper Trapezius and Posterior Capsule 1x3, 20 Second Hold, Left	Theraband Extension, Adduction, IR/ER 3x10, Orange, Left Theraband Rows 3x10, Orange, Bilateral	Wall Push-Ups 2x10
Three	Phonophoresis Sub-Acromial Space, 1.0 watts/cm ² , 8 min, 1mH (Hydrocortisone)	UBE 4 Minutes, Level 4 (Forward/Backward) Pulley Flexion, Abduction, Scaption (AAROM) 2x10, 10 Second Hold, Left	Upper Trapezius, Posterior Capsule, and Pectoral Corner 1x3, 20 Second Hold, Left	Pulley Extension, Adduction, IR/ER 2x10, 5 Pounds, Left Hoist Machine Rows 2x10, 30 Pounds	Wall Push-Ups 3x10 Quadruped Shoulder Flexion 1x10, Bilateral

Four		<p>UBE 4 Minutes, Level 5 (Forward/Backward)</p>	<p>Upper Trapezius, Posterior Capsule, and Pectoral Corner 1x3, 20 Second Hold, Left</p>	<p>Pulley Extension/ Adduction 3x10, 7.5 Pounds, Left Pulley IR/ER 3x10, 5 Pounds, Left Hoist Machine Rows 3x10, 30 Pounds Hoist Machine LAT Pull 2x10, 30 Pounds Standing Dumbbell Shoulder Flexion 1x10, 2 Pounds, Left</p>	<p>Supine Dumbbell Serratus Punch and Scapular Clocks 1x10, 2 Pounds, Bilateral Quadruped Lateral Shifts (BOSU) 1x10 Quadruped Circles (BOSU) 1x10, Both Directions Box Lift (Floor To Waist) 1x10, 25 Pounds</p>
Five	<p>Joint Mobilization (Glenohumeral Distraction) 1x3, 30 Second Hold</p>	<p>UBE 5 Minutes, Level 5 (Forward/Backward) Shoulder Flexion/Abduction With Scapular Stabilization (PROM) 1x3, 30 Second Hold, Each</p>		<p>Pulley Extension/Adduction 3x20, 7.5 Pounds, Left Pulley IR/ER 3x10, 5 Pounds, Left Hoist Machine Rows 3x15, 50 Pounds Hoist Machine LAT Pull 2x15, 50 Pounds Standing Dumbbell Shoulder Flexion and Abduction 2x10, 3 Pounds, Left, Each Motion</p>	<p>Supine Dumbbell Scapular Clocks 3x10, 2 Pounds, Left Box Lift (Floor To Waist) 1x10, 30 Pounds</p>
Six	<p>Joint Mobilization (Glenohumeral Distraction)</p>	<p>UBE 5 Minutes, Level 5 (Forward/Backward)</p>	<p>Triceps 1x3, 20 Second Hold, Left</p>	<p>Pulley Extension/Adduction 3x20, 10 Pounds, Left</p>	<p>Body Blade (90° Shoulder Flexion and Elbow Extension, 90°</p>

	<p>1x3, 30 Second Hold Ice Massage 5 Minutes To Left Triceps</p>			<p>Pulley IR/ER 3x10, 7.5 Pounds, Left Standing Dumbbell Shoulder Flexion/Abduction 1x10, 3 Pounds, Left, Each Motion Hoist Machine Row 1x10, 100 Pounds Hoist Machine LAT Pull 1x10, 100 Pounds Pulley D2 Flexion Pattern (PNF) 2x10, 5 Pounds, Left</p>	<p>Shoulder Abduction and Elbow Extension, Neutral Shoulder and 90° Elbow Flexion) 1x2, 30 Second Hold With Oscillations, Each Position Prone Shoulder Flexion, Horizontal Abduction, Extension 1x10, 3 Pounds, Bilateral, Bilateral</p>
Seven		<p>UBE 5 Minutes, Level 5 (Forward/Backward)</p>	<p>Patient Education Continued Compliance With ... Stretching of Pectorals, Upper Trapezi, and Posterior Capsule 1x3, 20 Second Hold, Left</p>	<p>Patient Education Continued Compliance With ... Theraband Rows and LAT Pulls 3x10, Black, Bilateral Prone Shoulder Flexion, Horizontal Abduction, Extension 3x10, 3 Pounds, Bilateral</p>	<p>Quadruped Lateral Shifts (BOSU) 3x10 Quadruped Circles (BOSU) 3x10, Both Directions Quadruped With Scapular Push Ups 3x10 Box Lift (Floor To Waist) 1x10, 50 Pounds</p>

UBE = Upper Body Ergometer, **AAROM** = Active Assisted Range of Motion, **PROM** = Passive Range of Motion, **IR** = Internal Rotation, **ER** = External Rotation, **LAT** = Latissimus Dorsi, and **PNF** = Proprioceptive Neuromuscular Facilitation

Table 5: Outcomes (Admission vs. Discharge)

Palpation		
Admission		Discharge
Tenderness Upon Palpation Left Sub-Acromial Space Tightness Upon Palpation Bilateral Thoraco-Cervical Paraspinals Left Rotator Cuff, Biceps, and Deltoids		Tenderness Upon Palpation None Tightness Upon Palpation None
Goniometry - AROM		
Cervical (Left)		
Motion	Admission	Discharge
Side-Bend	40 Degrees	55 Degrees
Rotation	75 Degrees w/ Pain	80 Degrees
Shoulder (Left)		
Motion	Admission	Discharge
Flexion	150 Degrees w/ Shrug Sign	170 Degrees
Extension	45 Degrees w/ Shrug Sign	45 Degrees
Abduction	140 Degrees	160 Degrees
Internal Rotation	Functional To L2 w/ Pain	Functional To T12
External Rotation	Functional To C4 w/ Pain	Functional To C7
Manual Muscle Test		
Cervical (Left)		
Muscle	Admission	Discharge
Side-Bend	4/5	5/5
Rotation	4/5 w/ Pain	5/5
Shoulder (Left)		
Muscle	Admission	Discharge
Flexion	4-/5	5/5
Extension	4+/5	5/5
Abduction	4-/5	5/5
Adduction	4/5	5/5
External Rotation	4-/5 w/ Pain	5/5
Internal Rotation	4-/5 w/ Pain	5/5
Elbow (Left)		
Muscle	Admission	Discharge
Extension	4+/5	5/5
Flexion	4+/5	5/5
Posterior Periscapular Musculature		
Muscle	Admission	Discharge
Middle Trapezius	4-/5 (Left) and 4/5 (Right)	4+/5 (Bilateral)
Lower Trapezius	4-/5 (Left) and 4/5 (Right)	4+/5 (Bilateral)
Rhomboids	3+/5 (Left) and 4/5 (Right)	4+/5 (Bilateral)
Postural Analysis (Sitting/Standing)		
Admission		Discharge
Rounded shoulders, forward head, and depression of left shoulder that is guarded into internal rotation		Normalized posture with minimal rounded shoulders/forward head and no guarding of left shoulder

Gait Analysis		
Admission		Discharge
Abnormal gait pattern with ambulation that consists of minimal thoracic trunk rotation/bilateral arm swing		Normalized gait pattern with ambulation
Visual Analog Scale (VAS)		
Location	Admission	Discharge
Left Shoulder (Anterior/Posterior/Superior)	Current – 2/10 Worst – 9/10 Best – 0/10	All Times – 0/10
Outcome Measure (UEFI)		
Admission		Discharge
Score – 19 Impairment – 24		Score – 0 Impairment – 0

AROM = Active Range of Motion, **w/** = With, and **UEFI** = Upper Extremity Functional Index

Appendix

Appendix 1: Superior Labral Posterior-Anterior (SLAP) Categories

Type-I	Degenerative appearance and marked fraying of superior labrum. Firm attachment remains between peripheral edge of labrum and glenoid. Biceps tendon attachment remains intact with labrum.
Type-II	Similar degenerative and fraying appearance as seen with Type-I, but the superior labrum and biceps tendon attachment are stripped from the glenoid, which leads to an unstable labral-biceps anchor.
Type-III	The superior labrum demonstrates a bucket-handle tear. The central portion of the labrum is displaceable and the peripheral portion of the labrum remains attached to the glenoid and biceps tendon. The biceps tendon attachment remains intact as well.
Type-IV	The superior labrum has a bucket-handle tear similar to that seen in type-III, but the biceps tendon has a partial tear as well, which results in its displacement into the joint along with the labral flap.

Lombara A and Matlick D. (2014). Superior Labral Anterior Posterior (SLAP) Lesions. In S. Richman (Ed.), *CINAHL Rehabilitation Guide: Rehabilitation Reference Center* (July 4, 2014). Retrieved From: <http://search.ebscohost.com.une.idm.oclc.org/login.aspx?direct=true&db=rrc&AN=T709055&site=rrc-live>

Appendix 2: Post-Surgical Protocol

Phase One (0-4 Weeks)	Passive ROM and Healing of Tissue
Phase Two (4-8 Weeks)	Improve ROM and Slow Transition To Strengthening
Phase Three (8-12 Weeks)	Progressive Strengthening, Continued ROM, and Scapulohumeral Rhythm
Phase Four (12-16 Weeks)	Progress Strengthening and Daily Activities
Phase Five (16-24 Weeks)	Return To Sport and Physical Activity Preparation

South Shore Hospital Orthopedics (Spine and Sports Therapy In Clinical Collaboration With South Shore Orthopedics). SLAP Repair Protocol. Retrieved From: http://www.southshoreorthopedics.com/downloads/SLAP_Repair.pdf

Appendix 3: Explanation of Interventions

Modalities (Pain Relief)	
Phonophoresis	DB was instructed to sit in a chair with his left shoulder in slight scaption and ER. Hydrocortisone was applied to the anterior aspect of his left shoulder within the sub-acromial space. Ultrasound was performed for 8 minutes at 1.0 watts/cm ² and 1 mH.
Stretching and ROM Exercises (Improved ROM and Tissue Extensibility)	
Pendulum Exercises (AAROM)	DB was instructed to hold onto a table with his right hand and lean forward while maintaining a straight left arm. He was then instructed to use momentum to move his shoulder in a clockwise and counter-clockwise direction.
Internal Rotator Stretch	DB was instructed to place his right arm behind his head and left arm behind his back. He was then told to use the towel in his right hand to passively elevate his left arm.
Upper Trapezi Stretch	DB was instructed to place his left arm across his chest and to apply force with his right arm for increased stretch.
Pectoralis Major Stretch	DB was instructed to place his left arm across his chest and to apply force with his right arm for increased stretch.
Pulley System (AAROM)	DB was instructed to stand and grasp a pulley in each hand. He was then instructed to passively bring his left shoulder into both flexion and abduction by pulling down in the opposite direction with his non-affected right arm.
PROM	DB was instructed to lie supine on a plinth and to relax his left arm. Then, while holding his arm at mid-humerus and below the elbow, his left shoulder was gently moved throughout specific motions. These included shoulder flexion, abduction, scaption, and IR/ER.
Glenohumeral Distraction	DB was instructed to lie supine on a plinth and to relax his left arm. Then, while passively placing his elbow at 90 degrees of flexion and holding his distal humerus, a gentle distraction force was applied with his shoulder in slight flexion, abduction, and ER.
Therapeutic Exercises (General Left Shoulder Strengthening)	
Theraband Exercises	DB was instructed to remain standing and hold the theraband, which was anchored to the wall, within his left hand. He was then instructed to pull against the resistance through various shoulder motions. The included left shoulder extension, adduction, and IR/ER. He was progressed in the number of sets/repetitions before the band resistance was increased.
Weighted Pulleys	DB was instructed to remain standing and grasp the handle of the weighted pulley system. He was then instructed to pull against the resistance in the same motions as

	mentioned above for theraband exercises. He was progressed in the number of sets/repetitions before increasing the weighted resistance.
Functional Activities (Improved Functional Strength)	
Box Lifting	DB was instructed to lift a weighted box, from the floor to a table of waist height, with proper lifting mechanics. The weight of the box increased as the surgeon lifted his restrictions.
Therapeutic Exercises (Peri-Scapular Strengthening)	
Prone Dumbbell Exercises	DB was instructed to lie supine on a plinth with dumbbells in both hands. He was then instructed to move both of his shoulders into forward flexion, extension, and horizontal abduction. DB progressed in the number of sets/reps before increasing weight.
Cable Machine Rows	DB was instructed to grasp the bar with both hands in standing and to pull back in an effort to squeeze his shoulder blades together. DB was also instructed to keep his elbows close to his body throughout the motion.
Cable Machine Latissimus Dorsi Pull-Downs	DB was instructed to grasp the bar, with his arms straight at shoulder height, and to pull down towards his waist while maintaining straight arms and a neutral spine.
Scapular Punches	DB was instructed to lie supine on a table and hold a dumbbell within both hands while maintaining straight arms towards the ceiling. Then, he was instructed to thrust toward the ceiling and hold, in order to lift his shoulder blades off the table, while maintaining straight arms.
Scapular Clocks	DB was instructed to lie supine on a table and hold a dumbbell within both hands while maintaining straight arms towards the ceiling. Then, he was instructed to lift his shoulder off of the table and perform circular motions in both directions.
Body Blade Exercises	DB was instructed to grasp the middle handle of the body blade and to perform oscillations for 30-second time periods. He performed these oscillations in 90° of shoulder flexion with an extended elbow, 90° of shoulder abduction with an extended elbow, and 90° of elbow flexion with a neutral shoulder.
Quadruped Closed Chain Exercises (Improved Postural Stability and Strength)	
Forward Shoulder Flexion/Abduction	DB was instructed to assume the quadruped position on a table. Then, he was instructed to slowly lift his left arm into forward shoulder flexion and abduction, while maintaining a straight right arm and level back.
Lateral Weight Shifts	DB was instructed to assume the quadruped position on a table while placing both of his hands on a tilt board. Then, he was instructed to slowly shift his upper extremity weight

	side to side while maintaining a level back.
BOSU^{††} Ball Circles	DB was instructed to assume the quadruped position on a table while placing both of his hands on a BOSU ball. Then, he was instructed to perform clockwise and counter-clockwise motions while maintaining a level back.

ER = External Rotation, **mH** = Megahertz, **ROM** = Range of Motion, **AAROM** = Active Assisted Range of Motion, **PROM** = Passive Range of Motion, and **IR** = Internal Rotation

†† BOSU Official Global Headquarters – 1 Hedstrom Drive Ashland, OH 44805