

## Original Article

# Poor Psychological Readiness Inhibits Return to Play Following Operative Management of Superior-Labrum Anterior-Posterior Tears

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**Purpose:** The purposes of this study were to determine why athletes did not return to play (RTP) following operative management of superior-labrum anterior-posterior (SLAP) tears, compare these athletes to those who did RTP, and evaluate the SLAP-Return to Sport after Injury (SLAP-RSI) score to assess the psychological readiness of athletes to RTP after operative management of SLAP tears. **Methods:** A retrospective review of athletes who underwent operative management of SLAP tears with a minimum of 24-month follow-up was performed. Outcome data, including visual analog scale (VAS) score, Subjective Shoulder Value (SSV), American Shoulder & Elbow Surgeons (ASES) score, patient satisfaction, and whether they would undergo the same surgery again was collected. Additionally, the rate and timing of return to work (RTW), the rate and timing of RTP, SLAP-RSI score, and VAS during sport were evaluated, with subgroup analysis among overhead and contact athletes. The SLAP-RSI is a modification of the Shoulder Instability-Return to Sport after Injury (SI-RSI) score, with a score  $>56$  considered to be a passing score for being psychologically ready to RTP. **Results:** The study included 209 athletes who underwent operative management of SLAP tears. A significantly higher percentage of patients who were able to return to play passed the SLAP-RSI benchmark of 56 compared to those who were unable to return (82.3% vs 10.1%;  $P < .001$ ), and the mean overall SLAP-RSI scores were also significantly higher among those capable of returning to play (76.8 vs 50.0;  $P < .0001$ ). Additionally, there was a significant difference between the two groups in every component of the SLAP-RSI score ( $P < .05$  for all). Fear of reinjury and the feeling of instability were the most common reasons for not returning to play among contact athletes. Residual pain was the most common complaint among overhead athletes. A binary regression model predicting return to sports was performed, which demonstrated ASES score (odds ratio [OR]: 1.04, 95%; (confidence interval [CI]: 1.01–1.07;  $P = .009$ ), RTW within 1 month after surgery (OR: 3.52, 95%; CI: 1.01–12.3;  $P = .048$ ), and SLAP-RSI score (OR: 1.03, 95%; CI: 1.01–1.05;  $P = .001$ ) were all associated with greater likelihood of return to sports at final follow-up. **Conclusion:** Following the operative management of SLAP tears, patients who are unable to RTP exhibit poor psychological readiness to return, which may be due to residual pain in overhead athletes or fear of reinjury in contact athletes. Lastly, the SLAP-RSI tool in combination with ASES proved to be useful in identifying patients' psychological and physical readiness to RTP.

## Introduction

When athletes suffer an injury, there are emotional and behavioral complexities that they must navigate in order to optimize their recovery and

subsequently return to play (RTP).<sup>1</sup> Clement et al. highlighted the emotional impact an athlete endures after an injury.<sup>2</sup> In the acute setting, athletes express negative emotions directly linked to their

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understanding of the severity of their injury and the amount of time they must refrain from sport.<sup>2</sup> During physical rehabilitation, these reactions are more ambivalent, with frustration as the main underlying feeling. Finally, as an athlete returns to play there is excitement; however, there is also an underlying fear and anxiety of reinjuring themselves or an inability to return back to the same preinjury level of play.<sup>2</sup> Webster et al. developed a questionnaire, the Anterior Cruciate Ligament-Return to Sport after Injury (ACL-RSI) to quantify the psychological readiness of athletes to RTP following ACL reconstruction.<sup>3</sup> Similarly, Gerometta et al. validated the Shoulder Instability Return to Sport after Injury (SI-RSI) tool, quantifying the psychological readiness to RTP following traumatic shoulder instability with either conservative or surgical management.<sup>4,5</sup> Thus, a similar tool may be of value in those with SLAP tears.

Superior labrum anterior-posterior (SLAP) tears were initially described and classified by Andrews et al. in 1985, with Type II SLAP tears being the most common SLAP tear variant with reported rates between 6 and 26%.<sup>6,7</sup> The incidence of Type II SLAP tears is twice as high in athletes as in the general population.<sup>8</sup> In the literature, several studies have demonstrated moderate rates of return to play (RTP) among patients who undergo either biceps tenodesis (BT) or SLAP repair (AR).<sup>8-12</sup> However, RTP is not only reliant on physical recovery; the psychological state of an athlete also plays a central role in this process.<sup>1,13-15</sup> Furthermore, it is unclear why athletes are unable to RTP following operative management of SLAP tears.

The purposes of this study were to determine why athletes did not return to play (RTP) following operative management of superior-labrum anterior-posterior (SLAP) tears, compare these athletes to those who did RTP, and evaluate the SLAP-Return to Sport after Injury (SLAP-RSI) score to assess the psychological readiness of athletes to RTP after operative management of SLAP tears. Our hypotheses were that fear of reinjury would be the most common psychological factor influencing RTP, and that the SLAP-RSI score could identify athletes unable to RTP.

## Methods

### Patient Selection

After approval from our Institutional Review Board (IRB Protocol: i20-01027), a retrospective review was carried out to identify all self-identified athletes (at various different stages of competition ranging from high school, college, semi-professional, professional, and recreational) under the age of 50 years who underwent SLAP repair or BT for SLAP tears between 2011 and 2019. We included all patients who underwent either SLAP repair or BT and were of age >16

years old and <50 years old at the time of surgery, had an isolated SLAP tear involving the biceps-labral anchor, were skeletally mature, and had a minimum follow-up of 24 months. Patients who presented with anterior or posterior instability were excluded.

## Surgical Technique

### Arthroscopic SLAP Repair

A standard arthroscopic SLAP repair was performed as has been previously described.<sup>16</sup> All patients underwent an interscalene nerve block and were positioned either in the lateral decubitus or beach chair position per surgeon preference. A standard posterior and high anterosuperior arthroscopic portals were created, a diagnostic arthroscopy was performed, and the SLAP tear involving the biceps-labral complex was confirmed. A cannula was inserted into the anterosuperior portal, and an arthroscopic shaver was used to lightly decorticate the superior glenoid surface. A curved suture-shuttling device was then used to pass a high-strength suture immediately posterior to the biceps-labral anchor and either shuttled through the same portal or through an additional Wilmington or low anterosuperior portal. Fixation was achieved using knotless suture anchors. The median number of anchors was 2 (range: 1-4), in 71 patients—knotless anchors were used, in 22 patients—knotted anchors were used, and in 13 patients, a combination of the two was used. Postoperatively, the patient was maintained in a sling for 4 weeks. Full passive range of motion was allowed as tolerated. Biceps loading was avoided. At 4 weeks postoperatively, the patient began full active range of motion, and at 6 weeks, the patient progressed to resistance training. Once full strength had been restored and the patient was pain free—typically after 4-5 months—unrestricted return to sports was permitted.

### Biceps Tenodesis

A standard mini-open subpectoral BT was performed, as has been previously described.<sup>17</sup> Patients underwent an interscalene nerve block and were positioned in the lateral decubitus or beach chair position per surgeon preference. Standard posterior and anterosuperior arthroscopic portals were created, and a diagnostic arthroscopy was performed. After confirming the SLAP tear with biceps-labral complex involvement, a biceps tenotomy was performed. In the case of lateral decubitus positioning, the arm was removed from traction and inserted into an impervious sleeve to maintain sterility. The shoulder was then abducted and externally rotated, and an axillary-based incision along the inferior border of the pectoralis major muscle was used. Blunt dissection was performed down to the clavicular fascia, which was incised sharply. The LHB tendon was then identified and retrieved out of the incision. A

looped high-strength suture was then passed in a retrograde fashion through the tendon starting just distal to the musculotendinous junction and locked proximally. A cortical button construct was used for fixation in all cases. Postoperatively, the operative extremity was immobilized in a sling for 2 weeks with full active and passive range of motion beginning immediately. Patients were restricted from performing resisted elbow flexion maneuvers for at least 6 weeks after surgery. Overhead strengthening and heavy lifting were delayed for ~3 months.

### Data Collection and Clinical Outcomes

Data on patient characteristics and preoperative demographics were collected, with intraoperative and postoperative complications recorded. Evaluation of postoperative patient-reported outcomes was carried out following telephone survey, including visual analog scale (VAS) score, Subjective Shoulder Value (SSV), American Shoulder & Elbow Surgeons (ASES) score, patient satisfaction, and whether they would undergo the same surgery again. Additionally, the rate and timing of return to work (RTW), the rate and timing of RTP, SLAP-Return to Sport after Injury (SLAP-RSI) score, and VAS during Sport were evaluated, with subgroup analysis among overhead and contact athletes. The SLAP-RSI is a modification of the Shoulder Instability-Return to Sport after Injury (SI-RSI) score, where pain rather than instability was considered (Are you confident that your shoulder will be pain free while playing your sport?), with a score >56 was considered a passing score for being psychologically ready to RTP.<sup>4,5,18</sup> All patients unable to RTP were stratified, according to SLAP-RSI score, ASES score, and reason given for not returning to play. Return to play was defined as returning to patient's dedicated sport season and the ability to participate in greater than 75% of competition at the same or higher level of play.

### Statistical Analysis

All statistical analysis was performed using SPSS (IBM, version 25). For all continuous and categorical variables, descriptive statistics were calculated. Continuous variables were reported as weighted mean and estimated standard deviation, whereas categorical variables were reported as frequencies with percentages. Categorical variables were analyzed using Fisher's exact or chi-squared test. The independent or paired *t*-test for normally distributed variables, or the nonparametric Mann-Whitney *U*-test or Wilcoxon signed-rank test was performed to compare continuous variables. A binary logistic regression evaluating subject return to sports was performed using age, gender, SLAP versus BT, time to return to work, SLAP-RSI score, and the ASES score as variables. A value of  $P < .05$  was considered to be statistically significant.

**Table 1.** Patient Demographics

	RTP	DNR	<i>P</i> Value
<i>N</i>	164	45	
AR	84	22	.7818
BT	80	23	
Age (years)	34.2 ± 8.4	34.3 ± 8.9	.994
Gender (male %)	137 (83.5)	41 (91)	.2504
Operative extremity (% Right)	77 (50.1)	25 (56.6)	.3432
Dominant arm affected (% yes)	86 (52.4)	25 (56.6)	.741
Follow-up (months)	60.7 ± 24.9	57.8 ± 28.4	.4487

AR, arthroscopic repair; BT, biceps tenodesis; DNR, did not return; RTP, returned to play.

## Results

### Patient Demographics

Overall, 209 athletes were followed-up, with 164 (78.5%) returning to play. Thus, 45 athletes (21.5%) did not RTP. Overall, 85.1% of athletes were male and the mean age of the overall cohort was 34.2 years with a mean follow-up of 60.1 months. In total there were 127 (61%) recreational athletes, 6 (3%) high school athletes, 59 (28%) college athletes, 11 (5%) semi-professional, and 6 (3%) professional athletes. There was no significant difference in the rate of patients that were able to RTP with either AR or BT ( $P = .78$ ). There were no significant differences in demographics between the groups, which are further illustrated in [Table 1](#).

### Comparison of Outcomes

In the total cohort of patients 164 (79%) were able to RTP, compared to 45 (22%) who did not RTP ([Table 2](#)). In total, 134 patients able to RTP passed the SLAP-RSI threshold of 56 with an overall sensitivity of 82% and specificity of 67%, compared to 30 (18.3%) patients who were able to RTP but did not pass the 56 SLAP-RSI threshold.

Additionally, there was a significant difference between the two groups in every component of the SLAP-RSI score ( $P < .05$  for all; [Table 3](#)). When comparing the techniques of arthroscopic SLAP repair versus biceps tenodesis, there was no significant difference in mean SLAP-RSI score ( $75.8 \pm 21.3$  vs  $77.4 \pm 22.0$ ;  $P = .64$ ) or rate of passing the SLAP-RSI threshold of 56 (75.5% vs 71.8%;  $P = .64$ ) among those athletes that were able to RTP. On average our BT cohort returned to play 2 months sooner than our SLAP repair cohort ( $7.83 \pm 3.3$  vs  $9.85 \pm 4.5$ ;  $P = .01$ )

When specifically looking at our overhead cohort—there were 29 (20%) overhead athletes in the cohort of patients who did not RTP compared to 119 (80%) of overhead athletes that were able to RTP ([Table 2](#)). In overhead athletes who did not RTP, 13.3% passed the SLAP-RSI threshold of 56, with a mean

**Table 2.** Sport Involvement and Ability to Return to Play

	RTP N (%)	DNR N (%)	Total N
Golf*	13 (100)	0	13
Weightlifting/Powerlifting/CrossFit	25 (86.2)	4 (13.8)	29
Swimming*	17 (85.0)	3 (15)	20
Baseball*	32 (82.1)	7 (18.0)	39
Rock climbing*	8 (80.0)	2 (20)	10
Tennis*	16 (76.2)	5 (23.8)	21
Mixed martial arts	12 (75.0)	4 (25.0)	16
Basketball*	28 (73.6)	10 (26.3)	38
Volleyball*	5 (71.4)	2 (28.5)	7
Football/Rugby	7 (58.3)	5 (41.7)	12
Hockey	1 (20.0)	4 (80.0)	5
Total	164	45	209

DNR, did not return; RTP, returned to play.

\*Overhead athletes.

overall score of  $50.0 \pm 28.0$ . This was significantly lower than those who did RTP as 82.3% passed the SLAP-RSI threshold of 56 with a mean overall score of  $76.8 \pm 21.3$  ( $P < .0001$  for comparison of both percentages passed SLAP-RSI threshold and mean SLAP-RSI score).

As depicted in Table 4, in the overall cohort inclusive of both AR and BT, ASES, VAS, SSV, and satisfaction scores were statistically significantly favorable in the RTP subgroup compared to those athletes that did not RTP. However, there was no significant difference in willingness to undergo surgery again if required (87.8% vs 77.8%;  $P = .089$ ).

Table 5 highlights the important differences in work activity requirements and mean time required in order to return to work.

### Reasons for Not Returning to Play

Of those athletes that underwent SLAP repair, the most common primary reasons for not returning to play

were the following: 10 athletes had changed their lifestyle, 8 had fear of reinjury, 2 had a feeling of instability, 1 had residual pain, and 1 lacked confidence in their performance. Of those athletes that underwent BT, the most common primary reasons for not returning were the following: 9 patients had residual pain, 6 had fear of reinjury, 5 patients reported a change in lifestyle, 2 had a feeling of instability, and 1 had another injury not related to their SLAP tear. The SLAP-RSI and ASES scores, stratified according to the reasons for not returning to play, are reported in Table 6. Fear of reinjury and the feeling of instability were the most common reasons for not returning to play among contact athletes including 4 (80%) hockey players, 5 (41.7%) football/rugby players, 4 (25%) mixed martial artists, and 4 (13.8%) CrossFit/powerlifters. However, residual pain was the most common complaint among overhead athletes including 5 (13%) basketball players, 3 (14.2%) tennis players, and 2 (10%) swimmers. In the cohort of patients that stated "lifestyle" change as their reasoning for not RTP: 5 (33%) patients reported busy work schedules, 2 (13%) patients reported pregnancy, 2 (13%) patients reported family obligations, 3 (20%) patients reported finishing their college careers, and 3 (20%) patients reported starting graduate school.

### Multivariate Analysis Evaluating Return to Play

A binary regression model predicting return to sports was performed accounting for 30% (Nagelkerke  $R^2$ ;  $P < .001$ ) of the variance observed correctly predicting 78% of the cases. ASES score (odds ratio: 1.04, 95% confidence interval: 1.01–1.07;  $P = .009$ ), time to return to work (odds ratio [OR]: 3.52, 95% confidence interval [CI]: 1.01–12.3;  $P = .048$ ), and SLAP-RSI score (OR: 1.03; 95% CI: 1.01 – 1.05;  $P = .001$ ) were all associated with greater likelihood of return to sports at follow up (Table 7).

**Table 3.** SLAP-RSI Score

	RTP	DNR	P Value
Are you confident that you can perform at your previous level of sports participation?	82.5 $\pm$ 24.4	51.1 $\pm$ 36.0	<.001
Do you think you are likely to reinjure your shoulder by participating in sport?	75.9 $\pm$ 29.1	55.4 $\pm$ 31.6	<.001
Are you nervous about playing your sport?	52.2 $\pm$ 41.5	38.6 $\pm$ 34.0	.04
Are you confident that your shoulder will be pain-free while playing your sport?*	81.6 $\pm$ 24.3	59.1 $\pm$ 31.0	<.001
Are you confident that you could play your sport without concern for your shoulder?	78.9 $\pm$ 28.3	52.6 $\pm$ 33.1	<.001
Do you find it frustrating to have to consider your shoulder with respect to your sport?	71.8 $\pm$ 34.4	52.6 $\pm$ 33.1	<.001
Are you fearful of reinjuring your shoulder by playing your sport?	74.2 $\pm$ 32.8	49.4 $\pm$ 34.2	<.001
Are you confident about your shoulder holding up under pressure?	81.1 $\pm$ 26.3	55.3 $\pm$ 32.0	<.001
Are you afraid of accidentally injuring your shoulder by playing your sport?	75.5 $\pm$ 30.1	53.9 $\pm$ 32.8	<.001
Do thoughts of having to go through surgery and rehabilitation prevent you from playing your sport?	83.1 $\pm$ 29.0	50.4 $\pm$ 38.0	<.001
Are you confident about your ability to perform well at your sport?	82.8 $\pm$ 22.3	54.0 $\pm$ 33.3	<.001
Do you feel relaxed about playing your sport?	83.5 $\pm$ 24.6	47.5 $\pm$ 36.5	<.001

DNR, did not return; RTP, returned to play; SLAP-RSI, SLAP-Return to Sport after Injury.

\*Modification of the SI-RSI, which instead of instability the SLAP-RSI focuses on pain (Q4).

**Table 4.** Clinical Outcomes

	RTP	DNR	P Value
SLAP-RSI (mean)	76.8 ± 21.3	50.0 ± 28.0	<.001
SLAP-RSI Passed (%)	82.3%	10.1%	<.001
ASES	93.6 ± 14.3	79.5 ± 21.7	<.001
VAS	0.7 ± 1.8)	2.5 ± 3.2	<.001
SSV	85.9 ± 19.1	66.4 ± 27.2	<.001
Patient satisfaction	91.1 ± 19	69.3 ± 32.3	<.001
Surgery again?	87.8%	77.8%	.089
Time to RTP (months)	8.8 ± 3.99		
Time to RTW (months)	1.0 ± 2.9	4.0 ± 7.8	.005

DNR, did not return; RTP, returned to play; RTW, return to work; SLAP-RSI, SLAP-Return to Sport after Injury; SSV, subjective shoulder value; VAS, visual analog scale.

## Discussion

The most important finding of this study was that, following operative treatment of SLAP tears, patients who were unable to RTP exhibited poor psychological readiness to return. Fear of reinjury and the feeling of instability were the most common reasons for not returning to play among contact athletes. Whereas, residual pain was the most common complaint among overhead athletes. Our study also demonstrates that RTW within 1 month of surgery correlated to a higher likelihood of being able to RTP. Lastly, the SLAP-RSI tool in combination with ASES proved to be useful in identifying patients' psychological and physical readiness to RTP.

For an athlete, successful RTP is the most important criteria in deciding whether to undergo surgical management. Warth et al. showed that the main expectation of 95.5% of patients between 18 and 78 years old who undergo shoulder arthroscopy is to RTP.<sup>19</sup> Recommendations as to the right time point for a RTP vary in the literature, ranging from 5 to 12 months after SLAP repair and BT.<sup>19,20</sup> Others advocate full range of motion, minimal pain, adequate strength, and dynamic stability, and an appropriate rehabilitation progression as indicators signaling the ability to RTP.<sup>20</sup> However, some may argue RTP is less reliant on surgical management and postoperative functional outcomes, and more on the psychological state of an athlete.<sup>21</sup>

In a large systematic review, including nearly 1,000 athletes, Ardern et al. demonstrated that the most significant negative psychological factor associated with failure to RTP was "fear of reinjury".<sup>1</sup> This correlates closely with our study in which nearly one-third of those who did not RTP reported fear of reinjury. More specifically, "fear of reinjury" and the feeling of "instability" were the most common reasons for not returning to play among contact athletes in our cohort of patients. Furthermore, in a case series of 25 athletes who underwent arthroscopic Bankart repair, Tjong et al. demonstrated over a 2-year period that physical and psychological readiness to RTP after an injury does not always coincide and, as such, the fear of reinjury may prevent RTP even when an athlete has resolution of symptoms and physical impairments.<sup>22</sup> Our study corroborates the findings of Tjong et al.<sup>22</sup> In our cohort of contact athletes who did not RTP, there was a clear disconnect between being physically ready to return to play and mentally ready to return to play. This is evident from the dichotomy between the group's average ASES score (90 at 2 years postoperation) and the SLAP-RSI score (only 43.5).

Fear remains a prominent emotion at the time athletes are actually returning to sport and, as such, has important clinical implications and may have effects on performance in those who do RTP.<sup>13,15,23,24</sup> In a prospective study following 30 male athletes, Crossman et al. monitored the emotional responses to injury and found that while 13% of injured athletes experience fear during rehabilitation, 40% reported significant fear upon return to competition.<sup>25</sup> Negative psychological responses are common after an athletic injury with many athletes reporting periods of low self-esteem, anxiety, and even depression during the course of rehabilitation.<sup>2,16</sup> Results from the current study suggest that these internal drivers may have a large effect on the decision to RTP after operative management of SLAP tears and potentially may be identified postoperatively and addressed. Gerometta et al.,<sup>4,5</sup> Webster et al.,<sup>1</sup> and Tjong et al.<sup>22,26</sup> demonstrated the usefulness of a psychological questionnaire as an adjunct in deciding when an athlete is ready to RTP. Unlike Tjong

**Table 5.** Occupational Demands and Time to Return to Work

	Number able to RTP (n)	Mean Time to RTW (months) (Mean ± SD)	Number DNR (n)	Mean Time to RTW (months) (Mean ± SD)
Occupational Physical Demands				
Professional (doctor, lawyer, dentist, accountant, architect)	39	0.7 ± 1.23	5	0.55 ± 0.32
Very active occupation (Broadway actor, police officer, military officer, plumber, electrician, carpenter, roofer, mechanic)	46	2.4 ± 4.27	9	4.83 ± 3.06
Moderately active occupation (student, grocery clerk, hospital staff)	50	1.14 ± 1.62	13	0.75 ± 0.29
Sedentary occupation (desk job)	29	0.4 ± 0.61	18	0.4 ± 0.51

**Table 6.** Reasons for Not Returning to Play

	N	SLAP-RSI Score	ASES
Residual pain	10	31 ± 20.9	54.3 ± 16.3
Lifestyle	15	75.7 ± 17.8	89.7 ± 17.0
Instability	4	41.5 ± 19.6	71.0 ± 25.2
Fear of reinjury	14	43.5 ± 23.3	90.0 ± 11.0
Lack of confidence	1	21.4 ± N/A	95.0 ± NA
Other injury	1	92.5 ± N/A	81.0 ± NA

ASES, American Shoulder & Elbow Surgeons; N/A, not applicable; SLAP-RSI, SLAP-Return to Sport after Injury.

et al.,<sup>22,26</sup> who found discordance between functional outcomes and the psychological state of athletes, we demonstrated concordance and statistical significance in ASES, VAS, SSV, patient satisfaction, and the positive predictive value of those individuals who achieved a passing SLAP-RSI score and were able to RTP. Our study's findings are similar to the recent Level II study by Rossi et al., who demonstrated the usefulness and positive predictiveness of utilizing a psychological readiness questionnaire (SI-RSI) in conjunction with other clinical variables in determining when an athlete is able to return to play.<sup>18</sup>

The utilization of SLAP-RSI tool immediately post-operation and again at 6 weeks, 3 months, and again at 6 months provides a perspective in an athlete's psychological postoperative recovery—allowing clinicians to identify those with potentially maladaptive psychological responses to injury and implement strategies to address these issues. Cupal and Brewer demonstrated that by using psychological interventions, such as relaxation, modelling, and imagery techniques, underlying fear of reinjury anxieties can be addressed and enhanced recovery may be achieved.<sup>27</sup> This is further supported by Maddison et al., who found that preinjury “modelling” with a patient who has completed ACLR rehabilitation showed earlier functional outcomes at 6 weeks postoperatively.<sup>28</sup> Similarly, Podlog et al. found self-talk as a powerful tool for an athlete to overcome fearful anxieties in their RTP, as well as change negative thoughts.<sup>21</sup> Lastly, Evans and Hardy et al. found goal setting as a powerful tool that provided athletes with direction, specific, measurable goals, and perception of increased treatment effectiveness.<sup>29</sup> Ultimately, this study highlights the need to address these psychological components in both the prehabilitation and rehabilitation protocols, so as to optimize patient outcomes.

Boileau et al. described BT as an alternative to repair of SLAP lesions.<sup>30</sup> Since then, BT has been gaining popularity as a primary surgical option for symptomatic Type II SLAP tears.<sup>7,8,31,32</sup> In a prospective comparative study, Boileau et al. demonstrated that of the patients who underwent BT, 87% were able to RTP, whereas only 20% of patients in the SLAP repair group were unable to do so, secondary to pain.<sup>30</sup> However, the

majority of patients in their study were older with a mean age of 52 in the BT cohort versus 37 in the SLAP repair group.<sup>30</sup> In the current study, we demonstrated a stark difference in our BT versus SLAP repair cohort that was not able to RTP—nearly 20% of those that underwent a BT reported pain as the main reason for not returning to play. More specifically, residual pain was the most common complaint among our cohort of overhead athletes, including 5 basketball players, 3 tennis players, and 2 swimmers, who were unable to RTP. These findings are interesting, as one would think that anterior shoulder pain would be mitigated in the BT cohort, as the nerve-dense biceps tendon pulling traction on the disrupted superior labrum is no longer a source of pain.

One advantage of BT over SLAP repair is the possibility for accelerated rehabilitation, as BT does not require the same level of protection as a labral repair. Denard et al. and Ek et al. reported delayed restoration of full range of motion and RTP in their SLAP repair groups.<sup>33,34</sup> Similarly, in our SLAP repair group, on average, those that were able to RTP did so at least 2 months later than the BT cohort because of a longer postoperative regimen (7.83 ± 3.3 vs 9.85 ± 4.5; *P* = .01). These findings may give us insight into why more patients in the SLAP repair cohort that did not RTP reported lifestyle factors as the main reason. These findings correlate closely to the work by Tjong et al., where he demonstrated that time away from sport as a result of an injury and after rehabilitation contributed to a shift in priorities for a number of patients.<sup>22</sup>

The single most important extrinsic influence identified in this study was competing lifestyle factors, with 53% reporting work or school schedule constraints and 26% reporting family commitments as important causes of failure to RTP. On the basis of this study, more patients fail to return to play because of social factors than residual shoulder pain. This correlates closely with the work by Tjong et al., in which 9 patients interviewed who did not return to the same level of play placed greater importance on spending time with family and

**Table 7.** Binary Regression Predicting Return to Sports

	P Value	Odds Ratio	95% Confidence Interval	
Age	.40	0.97	0.92	1.0
Gender	.16	0.39	0.11	1.5
BT	.40	1.5	0.59	3.8
AR	.43	1.8	0.44	7.1
ASES Score	<b>.009</b>	<b>1.04</b>	<b>1.01</b>	<b>1.07</b>
RTW within one month	<b>.048</b>	<b>3.52</b>	<b>1.01</b>	<b>12.3</b>
SLAP-RSI	<b>.001</b>	<b>1.03</b>	<b>1.01</b>	<b>1.05</b>

AR, arthroscopic repair ASES, American Shoulder & Elbow Surgeons; BT, biceps tenodesis; RTW, return to work; SLAP, superior labrum anterior posterior; SLAP-RSI, SLAP-Return to Sport after Injury.

working than returning to their sport.<sup>22</sup> Unlike Tjong et al., who demonstrated older age as a significant factor for those who did not RTP, older age was not a factor in our cohort of patients.<sup>22</sup> However, while age was not significant between both of our cohorts, we did see a trend that as patients progress through adulthood, there was a transition from rugby, football, basketball, baseball toward more cardio-intensive training like swimming, running, and biking. Interestingly, when we examined the effects of patients' surgery on time to return to work, we found a significant discrepancy on the average time-frame to RTW in both our RTP cohort versus our cohort unable to RTP. More specifically, our RTP cohort was able to RTW on average 3 months earlier. Furthermore, our study demonstrates that RTW within 1 month of surgery correlated to higher likelihood of being able to RTP.

### Limitations

The current study is subject to all disadvantages common to retrospective studies. There were several potential limitations and sources of bias, which included the heterogeneity of sports played, the mixture of professional, semiprofessional, college, high school, and recreational athletes. Furthermore, there was no control group or comparison included.

### Conclusion

Following the operative management of SLAP tears, patients who are unable to RTP exhibit poor psychological readiness to return, which may be due to residual pain in overhead athletes or fear of reinjury in contact athletes. Lastly, the SLAP-RSI tool, in combination with ASES, proved to be useful in identifying patients' psychological and physical readiness to RTP.

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