Establishing Clinical Significance for Patients Undergoing Arthroscopic Repair of Type II SLAP Lesions

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Background: Type II superior labrum anterior to posterior (SLAP) lesions may be treated with either arthroscopic repair or biceps tenodesis. There are no previous reports of measures of clinically significant improvement after arthroscopic repair of SLAP lesions.

Purpose: To establish the minimal clinically important difference (MCID), Patient Acceptable Symptom State (PASS), and substantial clinical benefit (SCB) for patients undergoing arthroscopic repair for type II SLAP lesions.

Study Design: Case series; Level of evidence, 4.

Methods: A total of 69 arthroscopic repair procedures for isolated type II SLAP lesions were performed in a military population. The mean age was 28.1 ± 4.7 years, 97.1% were male, and the mean follow-up was 99.5 ± 19.7 months. The MCID, PASS, and SCB were calculated for each patient-reported outcome measure, consisting of the American Shoulder and Elbow Surgeons (ASES) score, Single Assessment Numeric Evaluation (SANE), and visual analog scale (VAS) for pain, using anchor- and distribution-based models. Factors associated with achieving a clinically relevant improvement were also determined.

Results: The MCID, PASS, and SCB for each measure were as follows: 7.7, 70, and 34 for the ASES score, respectively; 10.4, 80, and 45 for the SANE, respectively; and 1.0, 4, and 6 for the VAS pain, respectively. At least 85% of patients achieved the MCID for each measure; however, PASS rates were lower, with 50.7% for the SANE and 69.6% for both the ASES score and VAS pain. The ASES score had the highest percentage of patients achieving the SCB at 44.9%, followed by the SANE (26.1%) and VAS pain (10.1%). Greater forward flexion at final follow-up was associated with achieving the MCID and PASS for both the ASES score and SANE. Internal rotation stiffness at final follow-up was negatively associated with achieving the PASS for the VAS pain. Combat arms military occupational specialty was associated with a lesser likelihood of achieving the SCB for the ASES score.

Conclusion: Clinical metrics of improvement were defined for the ASES score, SANE, and VAS pain using the MCID, PASS, and SCB for patients undergoing arthroscopic repair of type II SLAP lesions. Better final range of motion was positively associated with achieving improvement, while high-intensity military duty was negatively associated.

Keywords: shoulder; biceps tendon; glenoid labrum; shoulder instability; labral tear; SLAP tear; SLAP repair

The superior labrum and biceps anchor act as secondary stabilizers of the shoulder.[20] Tears of this anatomic complex were originally described by Andrews et al[1] in 1985 as superior labrum anterior to posterior (SLAP) lesions. High physical demands and intense training requirements make SLAP lesions a common cause of shoulder pain and disability among both athletes and members of the military.[17,20] The active-duty military population has been identified as an at-risk population for SLAP tears[17] and experiences a higher incidence of SLAP tears compared to civilians. Moreover, the annual incidence of SLAP lesions in the US military is increasing.[39] An initial classification system for SLAP tears was proposed by Snyder et al[34] in 1990 and was later expanded by Maffet et al.[21] The type II subtype, characterized by disruption of the superior labrum and biceps anchor from the glenoid, is the most common variant of SLAP tears. Historically, in patients aged <35 years, arthroscopic repair has been the standard of care for type II SLAP tears, defined as detachment of the biceps tendon from the superior labrum,[34] that are refractory to nonoperative

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management.[4,11,15] Several recent studies, however, have supported biceps tenodesis as an alternative treatment option for type II SLAP lesions in this young patient population, with some studies highlighting much lower rates of secondary surgery for patients who are initially managed with biceps tenodesis versus SLAP repair.[12,27,40]

Outcome reporting after the surgical treatment for type II SLAP tears relies heavily on patient-reported outcome measures (PROMs), including the Single Assessment Numeric Evaluation (SANE), the American Shoulder and Elbow Surgeons (ASES) score, and the visual analog scale (VAS) for pain.[5,14,27,31] Given the frequency with which these instruments are used to evaluate surgical outcomes, it is imperative that the clinical relevance of these measures be understood. Commonly used thresholds for assessing the clinical significance of PROMs include the minimal clinically important difference (MCID), substantial clinical benefit (SCB), and Patient Acceptable Symptom State (PASS). The MCID constitutes the change in the outcome score representing the smallest clinical improvement after surgery that can be appreciated by the patient.[16] The SCB indicates further improvement described by the patient as being "considerable."[7] Finally, the PASS defines the postoperative outcome score threshold for patient satisfaction.[29,37] These values have been reported for a variety of shoulder procedures, including biceps tenodesis,[7,18,25,26,29,32,35,36] but remain undefined for arthroscopic repair of type II SLAP lesions.

The purpose of this study was to define the MCID, SCB, and PASS values for the VAS pain, SANE, and ASES score after arthroscopic repair of isolated type II SLAP lesions in patients aged <35 years. The secondary purpose was to determine the preoperative factors associated with reaching a clinically significant improvement. It was hypothesized that patients who experience a full recovery in shoulder range of motion and those with lower military job demands would have a higher likelihood of achieving clinically significant outcomes.

METHODS

Study Design

All active-duty military patients who underwent arthroscopic repair of SLAP tears by a single surgeon (N.P) between January 2010 and December 2020 were retrospectively screened for possible inclusion. Some of these patients' outcomes have previously been reported in a study investigating the outcomes of biceps tenodesis versus arthroscopic repair for type II SLAP tears in patients aged <35 years.[27] Excluded from the study were patients who had previous shoulder surgery, any capsulolabral abnormality other than a type II SLAP tear, concomitant glenohumeral cartilage injuries, calcific tendinitis or rotator cuff tears, and habitual or psychogenic voluntary shoulder subluxations. All patients had at least 3 months of unsuccessful nonoperative treatment, including nonsteroidal anti-inflammatory drugs, physical therapy, and home exercises, before being considered for surgery. On physical examination, all patients reported a reproduction of their symptoms with superior labral provocative testing (O'Brien active compression test)[24] and denied biceps tendon tenderness to palpation in the proximal groove. All patients underwent magnetic resonance arthrography, with arthrograms reviewed along with arthroscopic images and operative reports. The decision to perform superior labral repair as opposed to biceps tenodesis was based on the condition of the long head of the biceps tendon (LHBT). In patients who had type II SLAP tears with an otherwise anatomically normal LHBT, superior labral repair was performed. In all cases, 2 anchors were used for repair, with one placed in line with the anterior edge of the biceps tendon and the other placed posteriorly at the 10:30 to 11-o'clock position. Institutional review board approval was obtained before beginning the study. All patients provided informed consent.

Outcome Measures

Preoperatively and at final follow-up, all patients completed shoulder-specific PROMs including the ASES score and the SANE. In addition, patients graded their pain level from 0 to 10 utilizing a VAS for pain. Presurgical and postsurgical factors were collected and analyzed to identify predictors of achieving clinical significance, including time since surgery, tobacco use, patient age at the time of surgery, dominant arm involvement, and military occupational specialty (MOS).

Calculation of Thresholds

To determine the clinically significant threshold that corresponded to meaningful outcome achievement, the MCID, SCB, and PASS were calculated for the ASES score,

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SANE, and VAS pain utilizing either an anchor- or distribution-based method. As many patients undergoing SLAP repair achieve some degree of improvement, the MCID for the ASES score, SANE, and VAS pain was calculated utilizing a distribution-based method, using one-half of the standard deviation for the overall change in each outcome score across the entire cohort. Patients were classified as surpassing the MCID if their improvement in the outcome score was greater than the calculated MCID value.

The PASS was calculated using an anchor-based method. At final follow-up, patients were asked the following anchor question: "Taking into account all activities you have done during your daily life, your level of pain, and also your functional impairment, do you consider that your current state is satisfactory?"[5] PASS values were then determined through receiver operating characteristic (ROC) curve analysis. The PASS threshold was determined by selecting the cutoff that maximized the Youden *J* statistic (defined as sensitivity + specificity − 1). Patients were classified as meeting the PASS if the value of the outcome score in question at final follow-up met or exceeded the cutoff score as calculated above.

Calculation of the SCB was also performed using an anchor-based method. Prior evidence has demonstrated that both pain- and physical function-related questions are acceptable as anchor questions to identify clinically meaningful improvements in pain and function. To determine the SCB for the functional outcome measures (ASES score, SANE), at final follow-up, patients were asked the following anchor question: "Since your surgery, how would you rate your overall physical activity?" To determine the SCB for the VAS pain, at final follow-up, patients were asked the following anchor question: "Since your surgery, how would you rate your overall shoulder pain?" Patients answering "much improved" were classified as the substantially improved group, while those answering "improved" or "slightly improved" were classified as the improved group. Patients answering "no change," "slightly worse," "worse," or "much worse" were classified as the unimproved group. Using a similar ROC curve analysis methodology as was employed to calculate the PASS, the SCB threshold was computed by selecting the absolute cutoff that maximized the Youden *J* statistic to determine the difference between patients in the unimproved group and the substantially improved group. Patients were classified as achieving the SCB if the change in the outcome score from preoperatively to final follow-up met or exceeded the cutoff score as calculated above.

Statistical Analysis

All statistical analyses were performed with RStudio (Version 2023; Posit). Continuous data were reported as means ± standard deviations, whereas frequencies and proportions were reported for categorical variables. The paired-samples *t* test was used to compare preoperative and postoperative outcome scores. Statistical significance was set at alpha level of <.05. Nonparametric ROC and area under the curve (AUC) analyses were utilized to calculate the PASS and SCB based on the anchor method. The degree of association was considered acceptable if the AUC was >0.7 and excellent if >0.8. These values were then used to determine which patients in the cohort achieved the MCID, PASS, and SCB.

Univariate analysis was performed with respect to each patient and preoperative variable using the chi-square or Student *t* test for categorical and continuous variables, respectively. Multivariate logistic regression analysis was performed on variables that achieved a *P* value of <.15 on univariate analysis. Variables were considered significant predictors of achieving clinical significance if the final *P* value was <.05. Odds ratios (ORs) and 95% confidence intervals were calculated for each patient and preoperative variable with respect to achieving the MCID, PASS, and SCB.

TABLE 1
Patient and Surgical Data[a]

	Value (n = 69)
Follow-up, mo	99.5 ± 19.7
Time from symptom onset to surgery, mo	97.2 ± 20.8
Sex, n (%)	
Male	67 (97.1)
Female	2 (2.9)
Age, y	28.1 ± 4.7
Arm involvement, n (%)	
Dominant	33 (47.8)
Nondominant	36 (52.2)
Combat arms MOS,[b] n (%)	51 (73.9)
Tobacco use, n (%)	19 (27.5)

[a]Data are expressed as mean ± SD unless otherwise indicated. MOS, military occupational specialty.
[b]Defined as infantry, artillery, or military police occupations.

TABLE 2
Preoperative and 5-Year Postoperative Outcome Scores[a]

	Preoperative	Postoperative	Change	*P*
SANE	44.1 ± 18.4	78.3 ± 18.4	34.2 ± 20.8	<.001
ASES	47.9 ± 13.3	80.5 ± 16.2	32.5 ± 15.4	<.001
VAS pain	6.8 ± 2.0	2.6 ± 2.4	−4.2 ± 2.1	<.001

[a]Data are expressed as mean ± SD. ASES, American Shoulder and Elbow Surgeons; SANE, Single Assessment Numeric Evaluation; VAS, visual analog scale.

RESULTS

During the study period, a senior surgeon performed 69 isolated arthroscopic repair procedures for type II SLAP tears. The mean patient age was 28.1 ± 4.7 years, and the cohort was predominantly male (67/69 [97.1%]). Patient and surgical data are summarized in Table 1. A statistically significant increase was noted in all

TABLE 3
MCID, PASS, and SCB Values[a]

	MCID			
	Value			
ASES	7.7			
SANE	10.4			
VAS pain	1.0			
	PASS			
	Value	Sensitivity	Specificity	AUC
ASES	70	0.942	0.882	0.941
SANE	80	0.808	0.941	0.925
VAS pain	4	0.882	0.885	0.917
	SCB			
	Value	Sensitivity	Specificity	AUC
ASES	34	0.741	0.667	0.733
SANE	45	0.741	0.944	0.853
VAS pain	6	0.600	0.974	0.852

[a]ASES, American Shoulder and Elbow Surgeons; AUC, area under the curve; MCID, minimal clinically important difference; PASS, Patient Acceptable Symptom State; SANE, Single Assessment Numeric Evaluation; SCB, substantial clinical benefit; VAS, visual analog scale.

TABLE 4
Rates of Patients Achieving Clinically Significant Improvement at Final Follow-up[a]

	MCID	PASS	SCB
ASES	64 (92.8)	48 (69.6)	31 (44.9)
SANE	59 (85.5)	35 (50.7)	18 (26.1)
VAS pain	62 (89.9)	48 (69.6)	7 (10.1)

[a]Data are expressed as n (%). ASES, American Shoulder and Elbow Surgeons; MCID, minimal clinically important difference; PASS, Patient Acceptable Symptom State; SANE, Single Assessment Numeric Evaluation; SCB, substantial clinical benefit; VAS, visual analog scale.

postoperative outcome scores. Furthermore, the VAS pain score improved significantly at final follow-up (Table 2).

The calculated MCID, PASS, and SCB values for the ASES score, SANE, and VAS pain, in addition to the sensitivity, specificity, and AUC for the respective ROC curves, are summarized in Table 3. The frequencies with which patients in our cohort achieved clinically meaningful improvement based on the various outcome scores and values are summarized in Table 4.

For achieving the MCID, greater forward flexion at final follow-up was found to be a positive predictor for both the ASES score (OR, 1.017; $P = .014$) and SANE (OR, 1.014; $P = .003$), and a higher preoperative SANE score (OR, 0.993; $P = .002$) was found to be a negative predictor for the SANE (Table 5).

For achieving the PASS, greater forward flexion at final follow-up was found to be a positive predictor for both the ASES score (OR, 1.017; $P = .004$) and SANE (OR, 1.014; $P = .016$). In addition, tobacco use was found to be a positive predictor for the ASES score (OR, 1.354; $P = .007$). For the VAS pain, a higher preoperative ASES score (OR, 1.040; $P < .001$) and higher preoperative VAS pain score (OR, 1.111; $P = .035$) were found to be positive predictors, and internal rotation stiffness at final follow-up (OR, 0.933; $P = .018$) was found to be a negative predictor (Table 6).

For achieving the SCB, combat arms MOS (OR, 0.759; $P = .041$) was found to be a negative predictor for the ASES score. Furthermore, a higher preoperative SANE score (OR, 1.011; $P < .001$) was found to be a positive predictor for the SANE, and a higher preoperative VAS pain score (OR, 1.084; $P = .016$) was found to be a positive predictor for the VAS pain (Table 7).

DISCUSSION

This study defined the MCID, SCB, and PASS for the ASES score, SANE, and VAS pain after arthroscopic repair of type II SLAP tears in patients aged <35 years. The study findings also supported our hypothesis regarding factors affecting the likelihood of achieving clinical significance, highlighting the importance of restoring normal shoulder range of motion postoperatively. Postsurgical stiffness with internal rotation was found to be associated with lower odds of achieving the PASS for the VAS pain, while greater forward flexion at final follow-up was a positive predictor for achieving the PASS and MCID for the ASES score and SANE. Furthermore, patients with a combat arms MOS were less likely to achieve the SCB for the ASES score.

We found high rates of achieving the MCID for each measure (92.8%, 85.5%, and 89.9% for the ASES score, SANE, and VAS pain, respectively). The PASS was achieved by a smaller percentage of patients, ranging from 50.7% to 69.6%. Interestingly, the single-question SANE had the lowest rate of achieving the PASS, although it had the highest calculated value compared to the other metrics, with a score of 80. The SCB was achieved by a more modest proportion of patients for each metric, ranging from a high of 44.9% for the ASES score to a low of 10.1% for the VAS pain. This may have been limited by a floor effect, as the mean preoperative VAS pain score was 6.8 and the SCB required an improvement of 6 points. Similarly, the mean preoperative SANE score was 44.1, with the SCB representing an increase of 45 points.

Historically, arthroscopic repair has been the standard of care for type II SLAP tears with symptoms refractory to nonoperative management.[4,11,15] Unsatisfactory outcomes after repair of type II SLAP lesions in patients aged >35 years, however, have prompted surgeons to search for alternative treatment options for this injury. Biceps tenodesis for patients in this age range was found to result in higher levels of subjective patient satisfaction and higher rates of return to previous levels of sporting

TABLE 5
Logistic Regression of Variables Associated With Achieving MCID[a]

	P		
	Univariate Regression	Multivariate Regression	OR (95% CI)
ASES			
Forward flexion at final follow-up	**.045**	**.014**	**1.017 (1.010-1.023)**
SANE			
Preoperative SANE score	**.005**	**.002**	**0.993 (0.989-0.998)**
Forward flexion at final follow-up	**.076**	**.003**	**1.014 (1.005-1.023)**
VAS pain			
Dominant arm involvement	.094	N/A	1.146 (0.995-1.320)

[a]Bold font denotes multivariate $P < .05$. ASES, American Shoulder and Elbow Surgeons; MCID, minimal clinically important difference; N/A, not applicable; OR, odds ratio; SANE, Single Assessment Numeric Evaluation; VAS, visual analog scale.

TABLE 6
Logistic Regression of Variables Associated With Achieving PASS[a]

	P		
	Univariate Regression	Multivariate Regression	OR (95% CI)
ASES			
Time to surgery	.143	.172	1.003 (0.999-1.008)
Tobacco use	.114	**.007**	**1.354 (1.093-1.678)**
Preoperative ASES score	.003	.088	1.015 (0.998-1.031)
Preoperative SANE score	.019	.971	0.999 (0.992-1.008)
Preoperative VAS pain score	.004	.726	0.984 (0.901-1.075)
Forward flexion at final follow-up	.046	**.004**	**1.017 (1.006-1.028)**
SANE			
Time to surgery	.112	.127	1.004 (0.999-1.009)
Preoperative ASES score	.001	.316	1.008 (0.992-1.025)
Preoperative SANE score	.003	.480	1.003 (0.995-1.011)
Preoperative VAS pain score	.001	.362	0.959 (0.877-1.048)
Forward flexion at final follow-up	.116	**.016**	**1.014 (1.003-1.026)**
VAS pain			
Time to surgery	.011	.083	1.005 (0.999-1.010)
Preoperative ASES score	.001	**<.001**	**1.040 (1.021-1.058)**
Preoperative SANE score	.019	.067	0.992 (0.983-1.000)
Preoperative VAS pain score	.028	**.035**	**1.111 (1.010-1.222)**
Internal rotation stiffness at final follow-up	.126	**.018**	**0.933 (0.881-0.987)**

[a]Bold font denotes multivariate $P < .05$. ASES, American Shoulder and Elbow Surgeons; OR, odds ratio; PASS, Patient Acceptable Symptom State; SANE, Single Assessment Numeric Evaluation; VAS, visual analog scale.

activity compared to suture anchor fixation techniques for SLAP repair.[3,8] The literature furthermore shows that the current trend in the treatment of SLAP tears is a shift away from arthroscopic repair in patients aged >35 years, with recent studies identifying a significant reduction in the rate of arthroscopic repair in this patient population with a concordant rise in the utilization of biceps tenodesis.[6,38]

Although repair is associated with less favorable outcomes in older patients compared to tenodesis, evidence has historically supported the utilization of arthroscopic SLAP repair in a variety of younger patient populations.[9] In young active-duty military patients, however, the results are less satisfying, with descriptions of residual pain, stiffness, high rates of failure, and poor rates of return to preinjury levels of performance.[27] Consistent with this, our study found relatively low rates of achieving the PASS and SCB for each metric evaluated after SLAP repair. Several studies have also suggested that overtensioning the biceps anchor and the superior labrum during SLAP repair may lead to alterations in biceps biomechanics, which in turn may lead to further biceps tendon injuries after repair.[2,22] Secondary to these concerns, there are multiple recent studies that have identified biceps tenodesis as an attractive alternative to SLAP repair in young athletes and active-duty military patients, with patients exhibiting high rates of return to sport and military duty while experiencing low complication and revision

TABLE 7
Logistic Regression of Variables Associated With Achieving SCB[a]

	P		
	Univariate Regression	Multivariate Regression	OR (95% CI)
ASES			
Combat arms MOS	**.010**	**.041**	**0.759 (0.587-0.983)**
Tobacco use	.019	.207	1.185 (0.913-1.534)
Preoperative SANE score	.032	.835	0.999 (0.990-1.008)
Preoperative ASES score	.007	.142	0.991 (0.979-1.003)
SANE			
Preoperative ASES score	.001	.045	0.094 (0.977-0.991)
Preoperative SANE score	**.150**	**<.001**	**1.011 (1.001-1.021)**
VAS pain			
Preoperative VAS pain score	**.012**	**.016**	**1.084 (1.017-1.155)**
Preoperative ASES score	.063	.316	1.005 (0.995-1.014)
Forward flexion at final follow-up	.140	.146	1.006 (0.998-1.014)

[a]Bold font denotes multivariate $P < .05$. ASES, American Shoulder and Elbow Surgeons; MOS, military occupational specialty; OR, odds ratio; SANE, Single Assessment Numeric Evaluation; SCB, substantial clinical benefit; VAS, visual analog scale.

rates.[13,27] Despite these studies, many surgeons have concerns with sacrificing the biceps tendon in young patients and will often attempt to repair type II SLAP tears as opposed to performing biceps tenodesis. There may also be a role for a longer duration of nonoperative treatment in athletes and patients with high physical demands before proceeding with surgery, as has been reported in professional baseball pitchers, with similar return-to-play rates between operative repair and prolonged rehabilitation.[10]

In a previous study, Parnes et al[27] compared the outcomes after repair of type II SLAP tears with those after biceps tenodesis in military patients aged <35 years. While there was significant improvement in both patient groups at long-term follow-up, patients who underwent biceps tenodesis had more predictable improvement in pain, better functional outcomes, and lower failure rates. Similar outcomes were noted by Ridley et al,[30] who reported improved outcomes after repair of type II SLAP tears in young active patients when adding biceps tenodesis to the procedure. However, these studies were limited by relying on clinical significance thresholds derived from procedures performed after surgical repair of other glenohumeral abnormalities, thus leading to difficulties with the interpretation of these outcomes.

While previous studies have reported clinically significant thresholds after biceps tenodesis (including as treatment for type II SLAP tears), the current study is the first to report these values for isolated repair of type II SLAP lesions. Puzzitiello et al[29] examined 123 patients who underwent isolated biceps tenodesis and calculated the MCID, SCB, and PASS thresholds for the ASES score to be 11.0, 16.8, and 59.6, respectively. For the SANE, the MCID, SCB, and PASS were calculated to be 3.5, 5.8, and 65.5, respectively. Our values deviate somewhat from those reported after isolated biceps tenodesis, which may be attributable to the inherent differences between tenodesis and superior labral repair. We found similar MCID values but considerably higher SCB values (34 for ASES score and 45 for SANE). Additionally, differences in statistical analysis such as using an anchor-based model in the study by Puzzitiello et al[29] versus a distribution-based model in our study, the significantly longer mean follow-up in our study, and our younger patient population may also contribute to discrepancies between threshold values. Furthermore, the active-duty military status of our cohort may also contribute to the differences between these values. The higher SCB and PASS values in the current study, however, could be extrapolated to indicate that a much larger change in outcome scores after SLAP repair is required to achieve the SCB and PASS compared to after biceps tenodesis. Ultimately, while large prospective studies with concrete follow-up time points are needed to further refine clinical significance thresholds, the findings of this study provide a much needed framework for interpreting PROMs after repair of type II SLAP lesions.

The secondary aim of this study was to identify variables associated positively or negatively with the odds of achieving clinically significant improvements on PROMs, with the findings highlighting the correlation between the restoration of shoulder range of motion and patient satisfaction after repair of type II SLAP lesions. Greater forward flexion at final follow-up was found to be positively associated with achieving the MCID and PASS for both the ASES score and SANE, while internal rotation stiffness at final follow-up was found to be negatively associated with meeting the PASS for the VAS pain. The correlation between stiffness after repair of type II SLAP lesions and poor patient satisfaction and remnant pain has been well documented in prior studies.[19,33] In a study of the surgical treatment for isolated type II SLAP tears, Ek et al[9] reported postoperative stiffness in 20% of patients in their young cohort. Furthermore, Schrøder et al[33] reported that in a cohort of 107 patients who had undergone SLAP repair, 13.1% had shoulder stiffness and residual pain. A cadaveric investigation performed by McCulloch et al[22] demonstrated that knotted anchor

placement anterior to the biceps anchor had a small but statistically significant effect on potentially limiting external rotation because of overtensioning of anterior tissue, which may be detrimental to overhead athletes who require external rotation for optimal performance. In the current study, all anchors were placed posterior to the LHBT, and a postoperative external rotation deficit did not affect the likelihood of achieving clinically significant improvements on PROMs. Notably, a recent study by Murphy et al[23] found that early postoperative stiffness was associated with improved functional outcomes in the long term for patients undergoing SLAP repair. The findings of our study contradict those of Murphy et al[23] and suggest that postsurgical shoulder stiffness correlates with increased levels of pain and less patient satisfaction. Another negative association that was found in our study was a combat arms MOS. This finding is intuitive, given the functional demands required in military combat arms units. Not only do these high physical demands increase the risk of sustaining SLAP tears, but they may also explain the inferior outcomes of arthroscopic SLAP repair in these patients compared to patients with noncombat arms specialties and to civilian populations.[17,28]

Limitations

This study's main limitations are its relatively small sample size, the predominantly male cohort, and its retrospective nature. Additionally, all procedures were performed by a single shoulder and elbow fellowship-trained surgeon in an exclusively active-duty military patient population, potentially limiting the generalizability of our findings to broader populations. Outcome data utilized in this analysis were collected at a mean time point postoperatively rather than during a predefined window. Regarding our statistical analysis, a variety of methods were employed in the calculation of the MCID, SCB, and PASS, possibly resulting in different threshold values. Further studies in other patient populations utilizing different calculation methods are warranted to provide a conclusive definition of clinically meaningful improvement in patients undergoing repair of type II SLAP lesions. Finally, our analysis did not account for additional variables that may influence postoperative outcomes and satisfaction, such as mental health, patient expectations, and other social and environmental factors.

CONCLUSION

This study is the first to define the MCID, SCB, and PASS for the ASES score, SANE, and VAS pain in patients undergoing arthroscopic repair of type II SLAP lesions. Furthermore, we found that postsurgical stiffness and a combat arms MOS were associated with lower odds of achieving a clinically significant improvement. The findings of the current study will enable surgeons to better understand the clinical significance of the outcomes after repair of type II SLAP lesions as well as assist them in counseling patients appropriately regarding postoperative expectations.

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