Original Article

# There is No Difference in Return to Duty Following the Latarjet With Subscapularis Split Versus Tenotomy Technique in the Military Population

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**Purpose:** To evaluate the return to duty rates between subscapularis split versus subscapularis tenotomy approach to the Latarjet procedure in an active-duty military population. **Methods:** A total of 46 patients were identified. Thirty-six (87.8%) were able to be contacted and included in the study. Operative technique, time to return to duty, and post-operative range of motion were collected. Patients were contacted telephonically to collect information on recurrent dislocation and time to pass first physical fitness test postoperatively. The primary outcome was time to return to full-duty status designated by passing a Physical Fitness Test. Secondary outcomes were redislocations and final range of motion. **Results:** In total, 36 of 41 (87.8%) patients were able to be contacted. There was no difference in return to duty rates designated by completion of first Physical Fitness Test for both groups ($P = .23$). In the subscapularis split group, 22 of 23 patients returned to full-duty at an average of 8.0 months versus the tenotomy group, with 12 of 13 patients returned to full-duty at an average of 8.7 months. There was also no difference with re-dislocation incidence for both groups of 0.08 ($P = .45$). Both groups had one patient each who was unable to return to full duty. There were no differences in post-operative forward flexion and external rotation, but abduction was 9° higher in the split compared to the tenotomy group ($P = .03$). **Conclusions:** In the military patient with anterior glenohumeral instability, the Latarjet using the subscapularis split and subscapularis tenotomy approach demonstrate similar return to duty rates and similar duration to pass a standardized fitness assessment. There was no clinically significant difference in postoperative range of motion. Both approaches produce similar results clinically; and should be chosen based on surgeon preference. **Level of Evidence:** III, retrospective cohort study.

There is a greater instance of anterior glenohumeral shoulder instability in the military population compared with the general population. The job demands of military personnel predispose them to acute traumatic glenohumeral instability and recurrence.[1] In the military population, Waterman et al.[2] demonstrated that 13.8% of patients who undergo a Bankart repair require revision surgery. In addition, patients with subcritical bone loss have reported clinically poorer outcomes.[3]

The Latarjet procedure is used to treat recurrent shoulder instability with glenoid bone loss, and has reported good-to-excellent results.[3-6] The Latarjet provides glenohumeral stability through the "triple effect," as described by Provencher et al.[7] Stabilization is achieved though restoration of the glenoid bone, anterior capsulolabral repair, and the "sling effect."[3,8,9] The sling effect is a term used to describe the dynamic stabilization of the conjoint tendon, which provides a restraint to anterior subluxation by stretching over the intact lower subscapularis muscle belly. The "sling effect" is especially important in positions of mid- to end-range shoulder abduction.[9]

The open Latarjet can be performed through a subscapularis muscular split or through a subscapularis tenotomy. When performing the subscapularis split, the

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muscle belly of the subscapularis is split in line with its fibers at the upper two-thirds and lower one-third junction; the native tendon of the subscapularis is left intact. In contrast, when performing the subscapularis tenotomy, the upper two-thirds of the subscapularis tendon is transected and subsequently repaired at the end of the procedure. The theoretical benefit of the tenotomy is improved exposure with mobilization of the tendon; however, this requires repair and healing, which may be at risk for failure. In contrast, the subscapularis split maintains the normal integrity of the subscapularis tendon, which may allow for earlier initiation of active range of motion exercises.

There have been some studies showing demonstrating better internal rotation strength and endurance in the subscapularis split compared with subscapularis tenotomy.[5,10,11] However, it remains unclear whether there are clinical and functional differences between the 2 approaches. The purpose of this study is to evaluate the return to duty rates between subscapularis split versus subscapularis tenotomy approach to the Latarjet procedure in an active-duty military population. We hypothesized that there would be no difference the return to duty rates between the subscapularis split versus subscapularis tenotomy approaches.

## Methods

We performed a retrospective review of a consecutive series of active-duty military patients who underwent a Latarjet procedure between 2013 and 2018 for anterior shoulder instability at a single military medical center. Patients were included if they had recurrent anterior shoulder instability after not responding to a course of nonoperative management or had been identified to have glenoid bone loss greater than 13.5%. All cases were performed by 6 fellowship-trained sports or shoulder and elbow orthopaedic surgeons. For this patient cohort, 4 surgeons performed the subscapularis split versus 2 who performed the tenotomy; the technique was based on personal preference and previous training. The subscapularis split was performed in line with its fibers at the upper two-thirds and lower one-third junction to access the joint. The subscapularis tenotomy was performed by incising the upper two-thirds of the tendon, leaving a 1-cm cuff of tissue at the lesser tuberosity insertion for repair at the end of the procedure.

A chart review included the operative technique used and range of motion at last documented physical therapy session. Those patients who met the inclusion criteria were contacted by telephone to collect information on recurrent dislocation and time to pass a physical fitness test postoperatively. The time to pass a physical fitness test was used as a surrogate for return to full duty, given that when a patient passes his or her first physical fitness test postoperatively, it is safe to assume they can return to full duty and meet the minimum requirements of their occupation. The physical fitness test is a military branch—specific assessment of physical fitness with a combination of various tests that may include running, pushups, pullups, and sit ups, which determines physical readiness. There is variance in the standards and combination of exercises between branches, given the differing physical demands per branch. If a patient is unable to perform one of the tasks secondary to permanent loss of function, they are issued a "permanent profile," which limits their physical tasks that carries over from the physical fitness test to their work duties as a permanent restriction. Although patient can return to work on a permanent profile, they are often on limited duty or unable to perform their full work tasks as a result. Data on permanent profiles issued postoperatively also were collected.

### Investigational Review Board

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The Department of Clinical Investigations Institutional Review Board at Tripler Army Medical Center approved this study as institutional review board exempt (Protocol: 220007).

### Statistical Analysis

Descriptive statistics for return to active-duty, redislocations after surgery, and postoperative range of motion were determined for all patients. The primary outcome was return to full-duty status designated by requirements set forth by the military service's standardized Physical Fitness Tests. A secondary outcome was postoperative range of motion. Statistical analysis was performed using Microsoft Excel (Microsoft, Redmond, WA). Significance was established as a $P$ values less than .05.

## Results

For the designated study period, 41 patients underwent an open Latarjet for shoulder instability. Of the 41 patients, 36 of 41 (87.8%) patients were able to be contacted for follow-up with an average follow-up of 3.6 years (2.1-6.5 years). Thirty-five patients were male and 1 was female. The average age of first dislocation was 21.6 years of age (14-43 years of age). Twenty-three patients underwent a Latarjet using the subscapularis split approach, whereas 13 patients using the subscapularis tenotomy.

There was no difference in return to duty rates designated by completion of first Physical Fitness Test for both treatment groups ($P = .23$). In the

**Table 1.** Redislocation Incidence and Return to Duty Time

| Average | Subscapularis Split (n = 23) | Subscapularis Tenotomy (n = 13) | *P* Value |
|---|---|---|---|
| Follow-up interval, y | 2.7 | 3.6 | N/A |
| Redislocation incidence | 0.08 | 0.08 | .45 |
| Time to pass first Physical Fitness test, mo | 8.02 | 8.7 | .23 |

N/A, not available.

subscapularis split group, 22 of 23 patients returned to full-duty at an average of 8.0 months, whereas in the subscapularis tenotomy group, all 12 of 13 patients returned to full-duty at an average of 8.7 months (Table 1). Additionally, there was no difference in redislocation rates ($P = .45$).

A permanent profile is a physical limitation designated by a medical provider that limits a service member's physical activity guided by medical professional recommendations. The subscapularis split cohort had 3 patients each of whom received a permanent profile due to their shoulder, whereas the subscapularis tenotomy cohort had 2 patients who received a permanent limited duty profile due to their shoulder. However, these individuals were able to pass their Physical Fitness Tests within the limitations designated by their permanent profiles with their respective service's alternate test events. Both groups had one patient each who had to undergo medical separation from their respective branches as a result of their shoulder for inability to return to full duty. No patients in the subscapularis tenotomy cohort had clinical evidence of failure of tendon healing.

For range of motion, there were no difference in postoperative forward flexion and external rotation; however, there was a difference in postoperative abduction with split cohort: 165° and the tenotomy cohort: 156° ($P = .03$) (Table 2). The difference in abduction demonstrated no known clinical significance.

## Discussion

There was no difference demonstrated in return to duty rates between the subscapularis split and tenotomy; however, there was a difference in postoperative abduction, which demonstrated no clinical significance. The theoretical benefit of the subscapularis split is maintenance of the native integrity of the subscapularis tendon, thereby allowing more aggressive initial range of motion. While the subscapularis tenotomy may offer improved exposure intraoperatively, it requires tendon healing, in which aggressive initial range of motion may result in the tendon failing to heal. Ersen et al.[12] retrospectively reviewed 48 patients in whom the Latarjet was performed (split or tenotomy), and they found a difference in internal rotation durability ($P = .045$) favoring the subscapularis split group. In our study, none of our failures were found to have clinical evidence of a failed subscapularis repair; however, no follow-up imaging was undertaken to truly determine this. In addition, the subscapularis split was performed by 2 fellowship-trained surgeons and may be limited by the size of our patient cohort.

Garewal et al.[13] reported on a cohort of 32 patients who underwent Latarjet procedures with subscapularis split technique. They noticed that median external rotation was reduced on the operative side by 7.5° ($P < .01$) and 10° ($P < .001$) with the arm in 0° and 90°, respectively. A systematic review by Cowling et al.[4] showed that patient outcome was independent of surgical technique to include variation in coracoid osteotomy site, scapular fixation site, capsular repair, or subscapularis split versus tenotomy. They did, however, show there may be preservation of external rotation with the split versus tenotomy group. Overall, they concluded reported outcomes were more dependent on patient selection than surgical technique.[4] Interestingly, for our cohort, there was no difference in external rotation and internal rotation between the split and tenotomy; however, there was a difference in abduction of 9° ($P = .03$) with unknown and likely no clinical significance. Although these data were obtained retrospectively and there is margin of error in measurements of range of motion, the data were collected from physical therapy notes that use standardized goniometer measurements. This active duty patient cohort also all attended physical therapy within the military network with readily available access to their chart information. It is unclear why there was no difference in

**Table 2.** Postoperative Range of Motion

| Average | Subscapularis Split (n = 23) | Subscapularis Tenotomy (n = 13) | *P* Value |
|---|---|---|---|
| Follow up interval, y | 2.7 | 3.6 | N/A |
| External rotation, ° | 64 | 60 | .18 |
| Forward flexion, ° | 165 | 162 | .24 |
| Abduction, ° | 165 | 156 | .03 |

N/A, not available.

the postoperative internal versus external rotation in this patient cohort.

In their cohort of 65 athletes who underwent the Lataret, Frantz et al. found that preoperative American Shoulder and Elbow Surgeons Shoulder and Western Ontario Shoulder Instability Index scores, side-to-side ROM deficits >20° in any plane, or deficits in external rotation at 90° of abduction were independent risk factors in failing to meet return-to-play criteria. There was no difference in failure to achieve return to play at 6 months between the subscapularis split versus tenotomy groups ($P = .49$). The results of our study corroborate with the findings of Frantz et al.[5] Our return to full duty was similar in both groups.

### Limitations

There are several limitations to our study. We did not evaluate strength and endurance as previously mentioned in the cited studies, and it is unclear of its effect in our patient population. We also did not study muscular atrophy between the 2 surgical techniques, and the long-term sequela is unknown. We also did not obtain follow-up imaging to assess integrity of subscapularis repairs in the tenotomy group given there were no clinical signs of failure. We are limited in our mean 2-year follow-up, as review of the literature suggests that there may be changes long term subscapularis function as well as muscular atrophy between the 2 approaches, which may in turn affect overall functional outcome long term. Due to the small sample size, we are unable to rule out beta-error.

In addition, our study does not account for differences in the physical demands necessary to return duty in our patient cohort, as these are highly variable depending on the patient's rank and specific occupation. The time to pass first physical fitness test postoperatively is standardized across our patient cohort; however, these tests are not standardized across services, and military members with occupations that require higher physical demands may have lower perceived functional outcome scores than others. However, the ability of a patient to pass a physical fitness test is ultimately still a valid surrogate to determine return to full duty to meet the minimum physical requirements to perform his or her occupation.

## Conclusions

In the military patient with anterior glenohumeral instability, the Latarjet using the subscapularis split and subscapularis tenotomy approach demonstrate similar return to duty rates and similar duration to pass a standardized fitness assessment. There was no clinically significant difference in postoperative range of motion. Both approaches produce similar results clinically and should be chosen based on surgeon preference.

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