



Evaluation of Clinical & Functional Outcomes Bristow Latarjet Procedure in the Management of Recurrent Anterior Shoulder Dislocation

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Abstract

Background: Glenohumeral joint is highly susceptible to dislocation due to its wide range of movements. Recurrent anterior shoulder dislocations are common in young adults. The Bristow Latarjet procedure is one of the effective techniques for the treatment of recurrent anterior shoulder dislocation. This study aimed to assess the clinical and functional outcome of the Bristow Latarjet procedure in the management of recurrent anterior shoulder dislocation.

Material & Methods: This prospective interventional study was conducted in the Department of Orthopaedic Surgery, BSMMU, from October 2017 to September 2019. Within this period, a total of 40 cases of recurrent anterior shoulder dislocation that meet inclusion criteria were taken as a sample. Patients were evaluated both pre and postoperatively for functional outcomes according to Rowe's score for instability. A purposive non-randomized sampling technique was used in this study. All the data were compiled and sorted properly and the quantitative data were analyzed statistically by using Statistical Package for Social Science (SPSS-25). The results were expressed as frequency, percentage and mean \pm SD. Paired Student's 't' test was performed to compare pre and final postoperative follow-up. The level of significance was calculated at a confidence interval of 95% and p-value <0.05 . **Results:** In this study age of the patient ranged from 18-40 years and the mean age was 28.2 ± 6.3 . 29(72.5). Surgery was done within 4-6 months of the first dislocation in 5 patients, within 6-12 months in 21 patients and after 12 months in 14 patients. The mean (\pm SD) Rowe score for instability was significantly ($p < 0.001$) higher 6 months after the Bristow Latarjet procedure at $91.87 (\pm 9.00)$ in comparison to preoperative periods $52.62 (\pm 18.40)$. Results were excellent in 32(80%), good in 4(10%), fair in 3(7.5%) and poor in 1(2.5%) patients. 36(90%) patients were in the satisfactory group and only 4(10%) in the unsatisfactory group. Only 1(2.5%) patient developed screw migration, 2(5%) patients developed subluxation, and 1(2.5%) patient developed postoperative arthritis. **Conclusion:** It can be concluded that the Bristow-Latarjet procedure is a very effective and safe procedure with reduced complications, presenting very satisfactory functional results in the treatment of recurrent anterior shoulder dislocation.

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INTRODUCTION

As a result of a wide range of movements the glenohumeral joint is highly susceptible to dislocation, accounting for 50% of all dislocations & young men who sustain high-energy injuries to the shoulder are most affected. The main cause of shoulder instability is trauma, which accounts for 95% of all shoulder dislocations. Almost 98% being anterior subtype.^[1] In athletic patients under the age of 20 years, the recurrence rates are greater than 90%. Among patients aged 20 to 25 years, the rates are between 50 and 75%. It may be due to ligamentous and bony defects of the glenoid rim and the humeral head.^[2] Operative treatment varies but all have the purpose of reinforcing the anterior and inferior aspects of the glenohumeral joint.^[3] Anatomic repairs such as capsulo-labral repair described by Bankart and modified by Rowe et al. (1978) are one of the main techniques used to treat this condition.^[4] This procedure is done arthroscopically or in open methods. If a dislocation occurs in more than one direction and/or there is an increase in capsule volume, capsulotomy can be chosen. This technique was described by Neer and Foster and was subsequently revised by Bigliani. However, soft tissue repair alone does not seem to be an effective procedure in all cases.^[5] Isolated soft tissue repairs have exhibited failure rates as high as 56% to 67%.^[6] Non-anatomic repairs such as Putti-Platt operation. The essential feature of this repair was the overlapping of the capsule and the subscapularis tendon as 2 separate layers resulting in a "double-breasted coat with an overcoat" the humeral head being supported anteriorly by 4 overlapping layers.^[7] The surgical transfer of the coracoid process has

become a feasible option in patients suffering from chronic shoulder instability, especially in lesions accompanied by bony defects of the glenoid. The Latarjet procedure and its subsequent modifications becoming increasingly popular and are currently considered an efficient method to stabilize the shoulder primarily or after a recurrent dislocation. The procedure can be performed open or arthroscopically.^[8] In recent years arthroscopic Bankart repair followed by the Bristow Latarjet procedure has been done but it is technically demanding, costly and very limited data available regarding this procedure.^[9] The Latarjet procedure is first described by Michel Latarjet in 1954 to treat recurrent anterior shoulder instability by supporting the anteroinferior glenoid with the coracoid process. He used two screws to fix the graft. However in 1917, Eden transferred corticocancellous bone block from the tibia to the scapular neck, and Hybenette in 1932 reported the same procedure using an iliac bone graft. In 1958 AJ Helfet, one of the students of Walter Rowley Bristow modify the Latarjet procedure and was named by his teacher. He used suture materials to secure the coracoid and subscapularis muscles not sectioned completely. In 1970 May used a single screw for the fixed coracoid process. In 1983 Hovelius first mentioned the name Bristow Latarjet. Torg in 1987 used this procedure by retracting the subscapularis muscle. In 2007 Lafosse and Boileau first performed the arthroscopic coracoid transfer.^[10] The goal of the Bristow Latarjet procedure is to stabilize the humeral head in the shoulder joint in two ways: firstly by augmentation of the anteroinferior glenoid rim and secondly by dynamic stabilization due to tension of the conjoined tendons. Prerequisites

to perform this procedure are an unimpaired coracoid process as well as intact conjoined tendons.^[11] Therefore the present study has been carried out to evaluate the clinical and functional outcome of the Bristow Latarjet procedure in the management of recurrent anterior shoulder dislocation.

OBJECTIVE

General Objective

- To evaluate the clinical and functional outcome of the Bristow Latarjet procedure in the management of recurrent anterior shoulder dislocation.

Specific Objectives

- To assess instability before and after surgery.
- To observe a range of movements of the affected shoulder before and after surgery.
- To assess functional status before and after surgery.

MATERIAL AND METHODS

This prospective interventional study was conducted at the Department of Orthopaedic Surgery at BSMMU, Dhaka, Bangladesh, from October 2017 to September 2019. A total of 40 patients who attended the Department of Orthopaedic Surgery at BSMMU with recurrent shoulder dislocation within the defined period were included as the study subject. A purposive non-randomized sampling technique was used in this study. The patients were diagnosed clinically and radiologically. After taking informed consent, a detailed history and physical examination of each patient were performed. A structured case record form was used to interview and collect data. Patients were interviewed and the case record form was filled up. Outcomes of the Bristow Latarjet procedure

were measured by using the Rowe score for instability described by Rowe et al. (1978). The outcome was determined by excellent and good grades according to Rowe's score and treated as the satisfactory, fair and poor grade was treated as unsatisfactory. After the Bristow Latarjet procedure patients were followed up after 2 weeks, 6 weeks, 12 weeks and 24 weeks. The clinical complaints and their onset dates were noted and the flexion, extension, abduction, adduction and internal and external rotation ranges of the shoulders and limbs will also be recorded. The outcome of the treatment was evaluated clinically. All the data were compiled and sorted properly and the quantitative data were analyzed statistically by using Statistical Package for Social Science (SPSS-25). The results were expressed as frequency, percentage and mean \pm SD and the level of significance was calculated at a confidence interval of 95% and $p < 0.05$. A comparison of continuous variables between the two groups was made with paired Student's t-tests.

Inclusion Criteria

- Patients aged between 18 and 40 of both sexes.
- Patients having more than three episodes of shoulder dislocation.
- Patients having at least one episode of dislocation in the last six months.
- Patients who had given consent to participate in the study.

Exclusion Criteria

- Patients who had previously undergone shoulder surgery and those who had diagnoses of collagen disease
- Presence of degenerative changes

- Patients whose coracoid process is not visible in preoperative radiology.
- Fracture dislocation.
- Patients who did not give consent to participate in the study.
- Patients with medical diseases like epilepsy, convulsion etc.

RESULTS

In this study, out of 40 patients 17 (42.5%) were 18-25 years of age, 10 (25%) were 26-30years, 7 (17.5%) were 31-35 years and 6 (15%) were 36-40years old. The mean (\pm SD) age of the patients was 28.2 ± 6.3 years and the youngest and the oldest patients were 18 and 40 years respectively. [Table 1]

In 5(12.5%) cases Bristow Latarjet procedure was done to fix anterior shoulder dislocation after 4-6 months of the occurrence of the first

dislocation, 21(52.5%) cases, surgery was done after 7-12 months of the first dislocation and 14(35%) cases surgery was done after 12 months of first dislocation. [Figure 1].

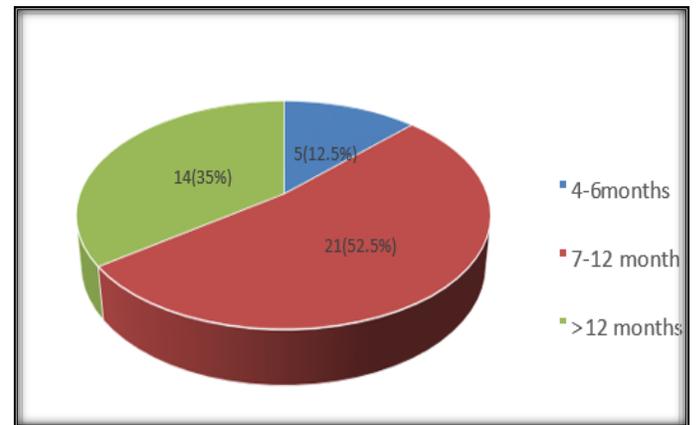


Figure 1: Distribution of study population according to the time interval between injury and surgery (N=40).

Table 1: Distribution of study population according to age (N=40).

Age (years)	N	%
18-25	17	42.5
26-30	10	25.0
31-35	7	17.5
36-40	6	15
Mean \pm SD	28.2 ± 6.3	

Table 2: Assessment of the study population by Rowe Score (Rowe et al. 1978) (N=40).

Rowe score	Preoperative	Postoperative	Mean differences between groups	95% CI	p-value
Stability	22.75 ± 10.49	47.5 ± 7.98	24.75	20.601 to 28.899	$<0.001^s$
Range of motion (ROM)	13.62 ± 4.61	18.50 ± 2.29	4.88	3.260 to 6.500	$<0.001^s$
Function	16.25 ± 7.73	27.00 ± 2.45	10.75	8.197 to 13.302	$<0.001^s$
Total Rowe score	52.62 ± 18.40	91.87 ± 9.00	39.25	33.932 to 46.828	$<0.001^s$

• Results are expressed as mean \pm SD. Paired Student's 't' test was performed to compare pre and final postoperative follow-up. The level of significance was calculated at a confidence interval of 95% and p-value <0.05 . n= study subjects, s=significant.

The pre and post-operative means (\pm SD) stability scores were 22.75 ± 10.49 and 47.5 ± 7.98 respectively. This indicated a significant difference between the two groups, with an estimated mean difference of 24.75 (95 % CI 20.601 to 28.899). Again, the pre and post-operative means (\pm SD) ROM were 13.62 ± 4.61 and 18.50 ± 2.29 respectively. This indicated a significant difference between the two groups, with an estimated mean difference of 4.88 (95 % CI 3.260 to 6.500). Moreover, the pre and post-operative means (\pm SD) functions were 16.25 ± 7.73 and 27.00 ± 2.45 respectively. This indicated a significant difference between the two groups, with an estimated mean difference of 10.75 (95 % CI 8.197 to 13.302). Again, the pre and postoperative means (\pm SD) total Rowe scores were 52.62 ± 18.40 and 91.87 ± 9.00 respectively. This indicated a significant difference between the two groups, with an estimated mean difference of 39.25 (95 % CI 33.932 to 46.828). [Table 2].

Table 3: Distribution of study population according to Rowe Score (N=40).

Rowe score	Frequency	Percentage (%)
Excellent (90-100)	32	80
Good (75-89)	4	10
Fair (51-74)	3	7.5
Poor (0-50)	1	2.5

The outcome of the subjects was graded according to Rowe score as excellent in 32 (80%), good in 4 (10%), fair in 3 (7.5%) and poor in 1 (2.5%) patients. [Table 3]

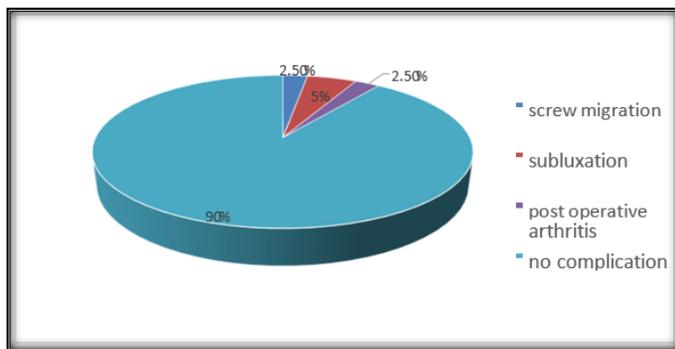


Figure 2: Distribution of study population according to complications (N=40).

In this study, during the study only 1(2.5%) patient developed screw migration, 2(5%) patients developed subluxation, and 1(2.5%)

patient developed postoperative arthritis. [Figure 2]

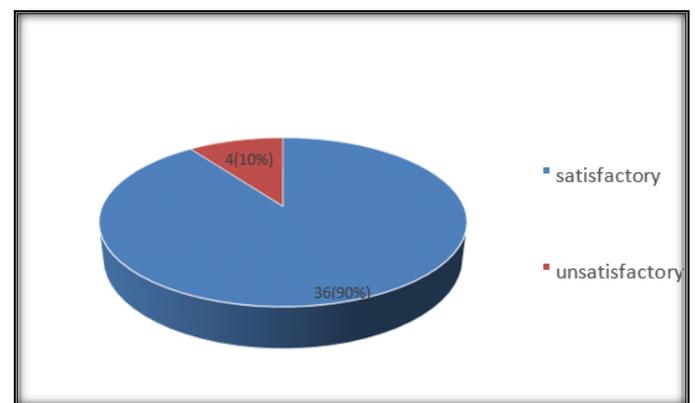


Figure 3: Distribution of study population according to functional outcome (N=40).

To determine the outcome of the study, excellent, good and fair grades were treated as the satisfactory and poor grade was treated as unsatisfactory according to constant score. So, a total number of 36(90%) patients were in the satisfactory group and only 4(10%) patients were in the unsatisfactory group. [Figure 3]

DISCUSSION

The recurrent shoulder dislocation in this study occurs in the young adult population and the mean (\pm SD) age of the patients was 28.2 (\pm 6.3) years and the youngest and the oldest patients were 18 and 40 years of age respectively. Almost similar to the findings observed by Matthes et al. (2007); Colegate-Stone et al. (2015); Motawea and Abouheif (2017).^[12,13,14] But the studies conducted by Rollick et al. (2017) showed that a relatively older population was affected by recurrent dislocation of the shoulder which is not similar to this study.^[15] All patients were treated with the Bristow Latarjet procedure. Their correction was done within 6-12 months of the occurrence of the first dislocation for most of the patients (52.5%). These findings were identical to the study conducted by Colegate-Stone et al. (2015); Longo et al. (2014) and Aydin et al. (2012).^[1,13,16] At follow-up, each patient was assessed for stability, range of motion and function by Rowe score for instability. The mean (\pm SD) Rowe score was significantly ($p < 0.001$) higher at the end of the final follow-up period of 6 months (91.87 ± 9.00) in comparison to pre-operative periods (52.62 ± 18.40). Longo et al. (2014); Tasaki et al. (2015); Hoveleus et al. (2014) and Ikemoto et al. (2011) also found similar findings in their study.^[9,16,17,18] At final follow up, Rowe score were excellent in 32(80%) patients, good in 4(10%) patients, fair in 3(7.5%) patients and

poor in 1(2.5%) patient. Almost similar findings were observed by Hoveleus et al. (2014); Ikemoto et al. (2011) and Schroder et al. (2006).^[3,17,18] In this series at the time of operation all the dislocations were closed. During the operation, strict asepsis was followed in every step and broad-spectrum intravenous antibiotic was given for three days. Initial recovery was uneventful in the cases. Only a few patients developed postoperative arthritis (2.5%), a subluxation (55) and screw migration (2.5%). These findings were in agreement with the study of Doursounian et al. (2017); Ruci et al. (2015) and Matthes et al. (2007).^[12,19,20] In the present study, the outcome was determined by excellent and good grades according to Rowe score and treated as the satisfactory, fair and poor grade was treated as unsatisfactory. The majority of the study population 36 (80%) were found in a satisfactory group and 4 (10%) were in an unsatisfactory group at the end of the final follow-up period of 6 months. Almost similar to the findings observed by Hoveleus et al. (2014) and Tasaki et al. (2015).^[9,17] A study by Moura et al (2018) showed the mean Walch-Duplay Score at the last evaluation was 91.23 ± 11.46 (range 15–100). The functional score of patients with a glenoid bone loss greater than 20% did not show a significant difference in comparison with patients with a glenoid bone loss lower than 20% (90 vs. 92, respectively). There were no dislocation recurrences and the only complications were a case of persistent instability and a screw revision. Mild glenohumeral osteoarthritis imaging signs were identified in 7.84% of the patients; however, their functional scores were not significantly different in comparison to other patients. They concluded that the modified

Bristow-Latarjet procedure is a very effective procedure with few complications in the medium term, showing very satisfactory functional outcomes in the treatment of recurrent traumatic anterior glenohumeral dislocation associated with glenoid bone injury.^[21] Rollick et al. (2017) included the arthroscopic Bankart repair, the open Bankart repair and the open Latarjet procedure in their study. The objective outcome measures evaluated were post-operative dislocation and instability rate, the Rowe score, radiographic arthritis and complications. Twenty-eight studies with a total of 1652 repairs were analyzed. Their results showed estimated re-dislocation rate was 15.1% following arthroscopic Bankart repair, 7.7% following open Bankart repair and 2.7% following Latarjet repair, with the comparison between arthroscopic Bankart and open Latarjet reaching statistical significance ($p < 0.001$). The rates of subjective instability and radiographic arthritis were consistently high across groups, with no statistical difference between groups. Estimated complication rates were statistically higher in the open Latarjet repair (9.4%) than in the arthroscopic Bankart (0%; $p = 0.002$). They concluded that the open Latarjet procedure

REFERENCES

1. Aydin A, Usta M, Topal M, Uymur EY, Tuncer K, Karsan O. Comparison of Open Bankart Repair versus Modified Bristow Operation for the Treatment of Traumatic Recurrent Anterior Dislocation and Capsular Laxity of the Shoulder. *Eurasian J Med.* 2012;44(3):157-62. doi: 10.5152/eajm.2012.37.
2. Carrazzone OL, Tamaoki MJ, Ambra LF, Neto NA, Matsumoto MH, Belloti JC. Prevalence Of Lesions Associated With Traumatic Recurrent Shoulder Dislocation. *Rev Bras Ortop.* 2015;46(3):281-7. doi: 10.1016/S2255-4971(15)30196-8.

yields the most reliable method of stabilization but the highest complication rate. There are uniformly high rates of post-operative subjective instability symptoms and radiographic arthritis at 5 years regardless of procedure choice.^[15]

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community. Moreover, the follow-up period was short in comparison to other studies.

CONCLUSIONS

This study concluded that Bristow-Latarjet surgery is a very effective and safe procedure with reduced complications and very satisfactory functional results in the treatment of recurrent anterior shoulder dislocation.

Recommendation

An interventional study can be done to compare the safety and satisfactory outcome of recurrent shoulder dislocation with other surgical procedures involving a large sample size and multiple centers.

3. Schroder DT, Provencher MT, Mologne TS, Muldoon MP, Cox JS. The modified Bristow procedure for anterior shoulder instability: 26-year outcomes in Naval Academy midshipmen. *Am J Sports Med.* 2006;34(5):778-86. doi: 10.1177/0363546505282618.
4. Rowe CR, Patel D, Southmayd WW. The Bankart procedure: a long-term end-result study. *J Bone Joint Surg Am.* 1978;60(1):1-16.
5. da Silva LA, da Costa Lima ÁG, Kautsky RM, Santos PD, do Val Sella G, Checchia SL. Evaluation of the results and complications of the Latarjet procedure for recurrent anterior dislocation of the shoulder. *Rev*

- Bras Ortop. 2015;50(6):652-9. doi: 10.1016/j.rboe.2015.09.009.
6. Giles JW, Degen RM, Johnson JA, Athwal GS. The Bristow and Latarjet procedures: why these techniques should not be considered synonymous. *J Bone Joint Surg Am.* 2014;96(16):1340-8. doi: 10.2106/JBJS.M.00627.
 7. Inui H, Nobuhara K. Modified Putti-Platt procedure for recurrent anterior shoulder instability. *Int Orthop.* 2020;44(6):1123-1129. doi: 10.1007/s00264-020-04509-w.
 8. Lädermann A, Lubbeke A, Stern R, Cunningham G, Bellotti V, Gazielly DF. Risk factors for dislocation arthropathy after Latarjet procedure: a long-term study. *Int Orthop.* 2013;37(6):1093-8. doi: 10.1007/s00264-013-1848-y.
 9. Tasaki A, Morita W, Yamakawa A, Nozaki T, Kuroda E, Hoshikawa Y, et al. Combined Arthroscopic Bankart Repair and Coracoid Process Transfer to Anterior Glenoid for Shoulder Dislocation in Rugby Players: Evaluation Based on Ability to Perform Sport-Specific Movements Effectively. *Arthroscopy.* 2015;31(9):1693-701. doi: 10.1016/j.arthro.2015.03.013.
 10. van der Linde JA, van Wijngaarden R, Somford MP, van Deurzen DF, van den Bekerom MP. The Bristow-Latarjet procedure, a historical note on a technique in comeback. *Knee Surg Sports Traumatol Arthrosc.* 2016;24(2):470-8. doi: 10.1007/s00167-015-3704-7.
 11. Schneider MM, Balke M, Koenen P, Bouillon B, Banerjee M. Avulsion fracture of the coracoid process in a patient with chronic anterior shoulder instability treated with the Latarjet procedure: a case report. *J Med Case Rep.* 2014;8(1):394.
 12. Matthes G, Horvath V, Seifert J, Ptok H, Stengel D, Schmucker U, et al. Oldie but goldie: Bristow-Latarjet procedure for anterior shoulder instability. *J Orthop Surg (Hong Kong).* 2007;15(1):4-8. doi: 10.1177/230949900701500102.
 13. Colegate-Stone TJ, van der Watt C, de Beer JF. Evaluation of functional outcomes and complications following modified Latarjet reconstruction in athletes with anterior shoulder instability. *Shoulder Elbow.* 2015;7(3):168-73. doi: 10.1177/1758573215578588.
 14. Motawaea BA, Abouheif, MM. Latarjet procedure combined with inferior capsular shift for recurrent anterior shoulder instability in patients with hyperlaxity. *Egypt Orthop J.* 2017;54(4): 306-313.
 15. Rollick NC, Ono Y, Kurji HM, Nelson AA, Boorman RS, Thornton GM, et al. Long-term outcomes of the Bankart and Latarjet repairs: a systematic review. *Open Access J Sports Med.* 2017;8:97-105. doi: 10.2147/OAJSM.S106983.
 16. Longo UG, Loppini M, Rizzello G, Ciuffreda M, Maffulli N, Denaro V. Latarjet, Bristow, and Eden-Hybinette procedures for anterior shoulder dislocation: systematic review and quantitative synthesis of the literature. *Arthroscopy.* 2014;30(9):1184-211. doi: 10.1016/j.arthro.2014.04.005.
 17. Hovelius L, Sandström B, Sundgren K, Saebö M. One hundred eighteen Bristow-Latarjet repairs for recurrent anterior dislocation of the shoulder prospectively followed for fifteen years: study I--clinical results. *J Shoulder Elbow Surg.* 2004;13(5):509-16. doi: 10.1016/j.jse.2004.02.013.
 18. Ikemoto RY, Murachovisky J, Nascimento LG, Bueno RS, Almeida LH, Strose E, et al. Results from Latarjet surgery for treating traumatic anterior shoulder instability associated with bone erosion in the glenoid cavity, after minimum follow-up of one year. *Rev Bras Ortop.* 2015;46(5):553-60. doi: 10.1016/S2255-4971(15)30411-0.
 19. Doursounian L, Debet-Mejean A, Chetboun A, Nourissat G. Bristow-Latarjet procedure with specific instrumentation: study of 34 cases. *Int Orthop.* 2009;33(4):1031-6. doi: 10.1007/s00264-008-0606-z.
 20. Ruci V, Duni A, Cake A, Ruci D, Ruci J. Bristow-Latarjet Technique: Still a Very Successful Surgery for Anterior Glenohumeral Instability - A Forty Year One Clinic Experience. *Open Access Maced J Med Sci.* 2015;3(2):310-4. doi: 10.3889/oamjms.2015.066.
 21. Moura DL, Reis ARE, Ferreira J, Capelão M, Cardoso JB. Modified Bristow-Latarjet procedure for treatment of recurrent traumatic anterior glenohumeral dislocation. *Rev Bras Ortop.* 2018;53(2):176-183. doi: 10.1016/j.rboe.2017.02.009.
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