Original Article
Acta of Shoulder and Elbow Surgery 2019 Jan-June;3(1):13-15

Surgical treatment of shoulder instability using transsubscapularis transfer of the long biceps tendon

Yonder Archanjo Ching San Junior[1], Max RogÃcrio Freitas Ramos[1], Settings Luiz[1], Diogo Fagundes Henrique Pereira Alves[1], Paulo RogÃcrio Moritz Postigo[1]

Abstract

Objective: To describe the long bicepstendon transfer technique for the treatment of anterior shoulder instability.
Method: The long tendon of the biceps brachiiwas detached from the supraglenoid tubercle and transferred to the anterior edge of the glenoid cavity using subscapularis tenotomy, reproducing the slingeffect and increasing the anterior bone block.
Results: The technique is easy to perform and minimises the risks of coracoid process transfer.
Conclusion: Transfer of the long tendon of the biceps brachii is an option for the treatment of glenohumeral instability.
Keywords: Joint instability/pathology, Joint instability/surgery, Shoulder joint/pathology, Shoulder joint/surgery, Cadaver

Introduction

Glenohumeral instability is a very prevalent occurrence in orthopaedicpractice1. The condition affects young people in their productive years and has direct impacts on the careers of professional athletes or the work capacity of workers[1,2]. Several surgical techniques are used to treat shoulder instability. Arthroscopic labral reconstruction is the most widely used technique, but it has a high recurrence rate in patients with anterior glenoid bone loss greater than 25%[3,4,5]. In these cases, coracoid process transfer becomes the best option[5]. However, this technique is not free of complications.

One of the advantages of coracoid process transfer is tensioning of the subscapularis tendon through the conjoint tendon. This sling effect contributes to the stability of the humeral head during abduction and external rotation movements by tensioning the subscapularis tendon and causing it to act as an anterior block. Furthermore, the position of the bone block on the anterior edgeof the glenoid cavity increases bone contact during anterior translation of the humeral head, ensuring greater bone contact and preventing dislocation.

Transfer of thelong head of the biceps brachii tendon through the subscapularis tendon and its tenodesis on the anterior edge of the glenoid cavity next to the labral repair reproduces the sling effect of the subscapularistendon and allows anterior contact by means of soft tissue thickening (augmentation).

Materials and methods

Thisstudy was approved by the Research Ethics Committee of our university, under the care of the Department of Anatomy. The cadaver was placed in lateral decubitus, with the upper limb abducted to 30º. The posterior acromion anglewas identified. A posterior portal was established 2 cm below and 2 cm medial to the angle vertex.We performed arthroscopic inspection of the joint via the posterior portal using Smith&NephewRequipment (4.0 x 160.0 mm 30º direct view arthroscope, Smith&NephewR 560H camera andGeminiR 5mm fibre optic cable).

Having inspected the joint, the anterior portal was marked by inserting a Jelco nº 14 needle (outside-in) into the rotator interval, between the subscapularis tendon and the long head of the biceps brachii tendon.

A needle was then inserted at the apex of the anterior axillary fold. Under direct viewing, the needle was passed laterally to the conjoint tendon and superiorly to the subscapularis tendon. The needle was inserted into the glenoid neck at the graft site, and a 2-cm incision wasthen made in the skin. The anterolateral portal was guided by the upper edge of the subscapularis tendon.

Tenotomy of the long biceps tendon was performed through the anterior portal, from its insertion in the supra-glenoid tubercle. The tendon was then removed from the bicipital groove in the humeral head through the anterolateral portal and transferred to the extra-articular environment.

The arthroscope was transferred to the anterolateral portal. We then performed longitudinal tenotomy of the subscapularistendon via the anterior portal. The starting point of the tenotomy coincided with the inferior edge of the glenoid cavity. The biceps tendon was then transferred to the intra-articular environment via the access created in the subscapular tendon, thereby generating a band below the tendon and a band above it. The long biceps tendon was then fixed to the inferior anterior edge of the glenoid cavity, next to the labrum, thereby creating the tendon block. Two 4.9-mm metal anchors were placed on the anterior edge of the glenoid cavity. The sutures were passed through the labrum and tendon.

[1]Consultório: Av. Paisagista José Silva de Azevedo Neto, 200 - Bloco 7 (Ecology) Sala 330 - Barra da Tijuca
Clínica Le Sage: Rua da Assembléia, 10 - Sala 1215 - Centro - Rio de Janeiro

Address of Correspondence
Dr. Yonder Archanjo Ching San Junior,
Ortopedia e Traumatologia - Cirurgia do Ombro e Cotovelo
Email: yondersanjr@gmail.com

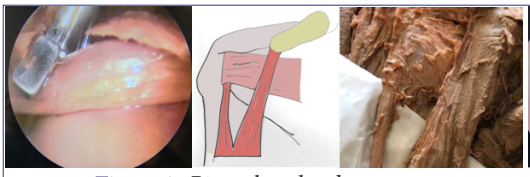

Figure 1: Biceps long head tenotomy

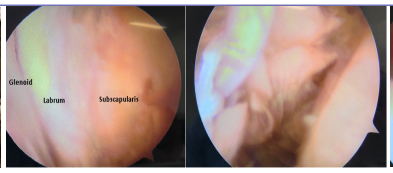

Figure 2: Subscapularis split

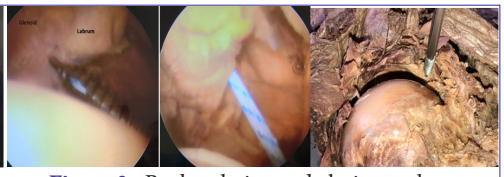

Figure 3: Bankart lesion and placing anchors

Figure 4: Bankart repair and biceps tenodesis

Results

The shoulder was positioned in abduction and external rotation, the scapula was stabilised, and a steady and progressive force was applied to the distal humerus, in the anterior-posterior direction, to reproduce the force that would lead to dislocation. Before the intervention, 50 kgf could be applied without the occurrence of dislocation. We then reproduced a Bankart lesion in the anteroinferior glenoid labrum and middle and inferior glenohumeral ligament lesions. The shoulder was then subjected to the same dislocation force. Joint congruence loss occurred after the application of 12 kgf.

We performed surgery for labral lesion repair, transsubscapularis transfer ofthe bicipital tendon with augmentation of the anterior labrum, and, finally, capsular and subscapularis tendonre-tensioning. After the procedure, the shoulder was again subjected to dislocation force, with loss of congruence occurring at a force of 21 kgf.

Discussion

The biceps brachii muscle is a flexor and supinator of the forearm. Proximally, the short head of the biceps brachii is attached to the coracoid process of the scapula. The long head of the tendon passes within the capsular ligament in the humeral head of the bicipital groove and is inserted into the scapula in the supraglenoid tubercle. The long tendon of the biceps brachii is a joint stabiliser, acting as a depressor of the humerus during abduction on the scapula plane.

Several disorders of both a traumatic or degenerative nature may affect the tendon and cause pain. Tenotomy is an appropriate treatment and does not cause clinical consequences, such as instability, chondral lesions, or humeral head ascension.

The long tendon of the biceps brachiiis considered a vestigial structure, as it functions as a secondary stabiliser in bipedal primates; its absence does not affect shoulder function.

The short tendon of the biceps brachii has its proximal anchor point in the coracoid process. Short tendon lesions have clinical repercussions. This tendon is responsible for ⅔ of the elbow flexion strength; therefore, its rupture leads to a loss of strength.

In coracoid process transfer surgery (Latarjet), the conjoint tendon is transferred along with the graft. The tendon is responsible for subscapular tensioning and formation of the anterior myotendinous block. In the event of avulsion or non-consolidation of the graft,flexion strength compromise can be expected.

Given this information, we suggest the transfer of the long tendon of the biceps brachiito the anterior edge of the glenoid cavity, through the subscapularis tendon, thus reproducing the sling effect, creating an anterior barrier and increasing the labral surface through augmentation with the tendon.

We believe that this procedure may be a viable option for patients with anterior glenohumeral instability, Bankart lesion,and mild to moderate bone loss and with an intact rotator cuff.

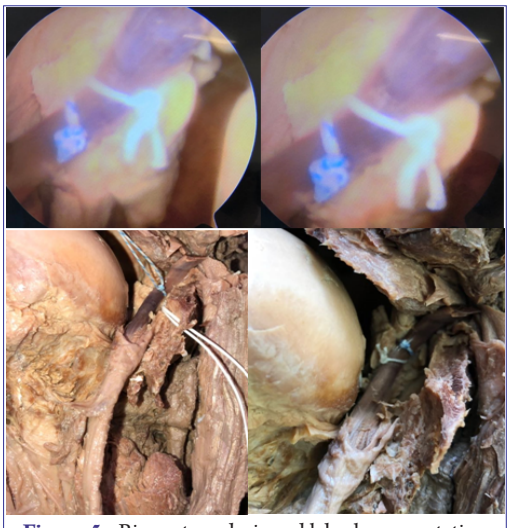

Figure 5: Biceps tenodesis and labral augmentation

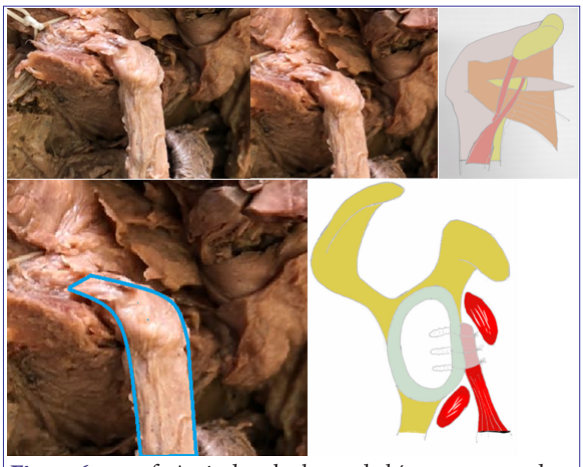

Figure 6: transferência do cabo longo do bíceps com tenodese no bordo anterior da cavidade glenoidal, gerando o efeito tirante sobre o subescapular.

References

1. Lech O, Freitas JR, Piluski P, Severo A. LuxaçãoRecidivante do Ombro: do papiro de Edwin Smith à capsuloplastiatérmica. Rev Bras Ortop 2005;40(11/12):625-37
2. Burkhart SS, DeBeer JF, Tehrany AM, Parten PM. Quantifying glenoid bone loss arthroscopically in shoulder instability. Arthroscopy 2002;18(5):488-91
3. Burkhart SS, DeBeer JF. Traumatic Glenoumeral Bone Defects and Their Relationship to Failure of Arthroscopic Bankart Repairs: Significance of the Inverted-Pear Glenoid and the Humeral Engaging Hill-Sachs Lesion. Arthroscopy 2000;16(7):677-94
4. Lo IKY, Parten PM, Burkhart SS. The Inverted Pear Glenoid: an Indicator of Significant Glenoid Bone Loss. Arthroscopy 2004;20(2):169-174
5. De Wilde LF, Berghs BM, Audenaert E, Sys G, Van Maele GO, Barbaix E. About the variability of the shape of the glenoid cavity. SurgRadiolAnat2004;26:54-59
6. Vogt S, Eckstein F, Scon M, Putz R. Preferential direction of the collagen fibrils in the subchondral bone of the hip and shoulder joint. Ann Anat1999;181:181-89
7. Fealy S, Rodeo SA, Dicarlo EF, O'Brien SJ. The developmental anatomy of the neonatal glenoumeral joint. J Shoulder Elbow Surg2000;9:217-222
8. Aigner F, Longato S, Fritsch H, Kralinger F. Anatomical Considerations Regarding the "Bare Spot" of the Glenoid Cavity. SurgRadiolAnat (2004)26:308-311
9. Huysmans PE, Haen PS, Kidd M, Dhert WJ, Willems JW. The shape of the inferior part of the glenoid: a cadaveric study. J Shoulder Elbow Surg 2006;15(6):759-763
10. JJ, Baker CL, Uribe J. The incidence of Hill-Sachs Lesions in Initial Anterior Shoulder Dislocations. Arthroscopy 1989;5(4):254-257
11. Burkhart SS, DeBeer JF, Barth JRH, Criswell T, Roberts C, Richards DP. Results of Modified Latarjet Reconstruction in Patients With Anterior Instability and Significant Bone Loss. Arthroscopy 2007;23(10):1033-1041
12. Sturzenegger, M., Béguin, D., Grünig, B. et al. Muscular strength after rupture of the long head of the biceps. Arch. Orth. Traum. Surg. 1986; 105(18): 225-29
13. Kelly, AM., Drakos, MC., Fealy, S., Taylor, SA., O'Brien, SJ. Arthroscopic Release of the Long Head of the Biceps Tendon. Am Jour Sport Med. 2005;33(2): 208-13
14. Elser, F., Braun, S. Dewing, CB. Giphart, JE., Millett PJ. Anatomy, Function, Injuries, and Treatment of the Long Head of the Biceps Brachii Tendon. Arthroscopy 2011; 27(4): 581-92
15. Karlsson J. In reparable rotator cuff tears with lesions of the long head of the biceps brachii tendon, tenotomy did not differ from tenodesis in terms of function or pain. JBJS. 2017; 99(4):351.
16. JC Garcia Jr, Nunes CV, Raffaelli MDP, Sasaki AD, Salem SH, Rowinski S, Pina M. Long Head of Biceps- a Vestigial Structure? Acta of Shoulder and Elbow Surgery Jan - June 2017;2(1):22-27
17. Taylor SA, Ramkumar PN, Fabricant PD, Dines JS, Gausden E, White A, Conway JE, O'Brien SJ. The clinical impact of bicipital tunnel decompression during long head of the biceps tendon surgery: a systematic review and meta-analysis. Arthroscopy. 2016; 32(6):1155-64.
18. Winston BA, Robinson K, Crawford D. "Monocept": A Brief Report of Congenital Absence of the Long Head of the Biceps Tendon and Literature Review. Case reports in orthopedics. 2017;2017.
19. JC Garcia Jr, AM Cardoso Jr, MB D. Mello. Arthroscopic Long Head Biceps Tenodesis in Coracoid associated with its Transfer to the Conjoined Tendon. Acta of Shoulder and Elbow Surgery Jan - June 2017;2(1):7-10

Conflict of Interest: – NIL
Source of Support: NIL

How to Cite this Article

Junior Y A C S, Ramos M R F, Luiz S, Alves D F P, Postigo P R M. Surgical treatment of shoulder instability using transsubscapularis transfer of the long biceps tendon. Acta of Shoulder and Elbow Surgery Jan - June 2019;3(1):13-15