

Case Report

OSSIFIED BRODIE'S LIGAMENT

R. Siva Chidambaram ^{*1}, Neelee Jayasree ², Soorya Sridhar ³.

^{*1,3} Post Graduate, ² Professor and Head.

Department of Anatomy, Narayana Medical College, Nellore, Andhra Pradesh, India.

ABSTRACT

The transverse humeral ligament (THL) or Brodie's ligament is a narrow sheet of connective tissue fibers that runs between the lesser and the greater tubercles of the humerus. Together with the intertubercular groove of the humerus, the ligament creates a canal through which the long head of the biceps tendon and its synovial sheath passes. The ossification of transverse humeral ligament is a rare interesting anatomical variation, which has been identified as one of the predisposing factor for biceps tendonitis and tenosynovitis. In the present study of 100 humerus bones, we found a right side humerus with completely ossified transverse humeral ligament which extended from the lateral margin of lesser tubercle to the medial margin of greater tubercle of the humerus. The Length and breadth of the ossified ligament were 8 mm and 6 mm respectively. Such an ossified ligament may damage the biceps tendon and its synovial sheath during biomechanical movement of the arm leading to anterior shoulder pain. It may also complicate the use of bicipital groove as a landmark for orientation of the humeral prosthesis in complex proximal humeral fractures. Hence, the anatomical knowledge of ossified transverse humeral ligament is important for the radiologist and orthopedic surgeon in diagnosis and planning the treatment for patient with anterior shoulder pain.

KEY WORDS: Brodie's ligament, Transverse humeral ligament, Ossification, Biceps tendonitis, Humeral prosthesis.

Address for Correspondence: Dr. R.Siva Chidambaram, Postgraduate, Department of Anatomy, Narayana Medical College, Nellore, Andhra Pradesh, India. Mobile no. +919994473699

E-Mail: drsivavinns@gmail.com

Access this Article online

Quick Response code



DOI: 10.16965/ijar.2015.169

Web site: International Journal of Anatomy and Research
ISSN 2321-4287
www.ijmhr.org/ijar.htm

Received: 30 Apr 2015	Accepted: 21 May 2015
Peer Review: 30 Apr 2015	Published (O):31 May 2015
Revised: None	Published (P):30 June 2015

INTRODUCTION

Bicipital groove or Intertubercular sulcus is present in the anterior aspect of proximal part of the humerus between the greater and the lesser tubercles and extends for almost 5-6cm over the shaft of the humerus. Superiorly the transverse humeral ligament (THL) or Brodie's ligament bridges the groove into a canal for the passage of tendon of long head of biceps brachii muscle, its synovial sheath and ascending branch of anterior circumflex humeral artery [1]. The transverse humeral ligament contributes to the stability of the biceps tendon during biomechanical movement of arm.

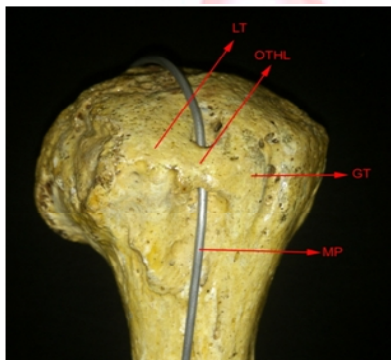
Ossification of THL may injure the biceps tendon and its synovial sheath leading to tendonitis and tenosynovitis with anterior shoulder pain [2]. In the presence of ossified THL, the bicipital groove may not act as a useful landmark to restore humeral head retroversion while treating a complex proximal humeral fracture with arthroplasty [3, 4]. Literature regarding the clinical importance of ossified THL is therefore essential for radiologist and orthopedic surgeons in evaluating the management of anterior shoulder pain and complex proximal humeral fracture.

In the present case, we describe a right side humerus with completely ossified transverse humeral ligament and its clinical relevance.

CASE REPORT

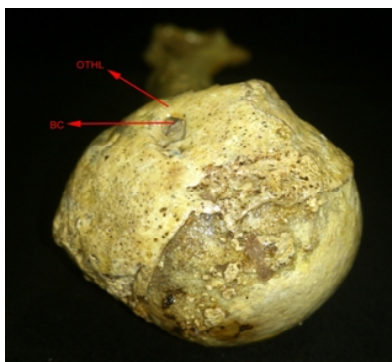
During osteology teaching programme for undergraduate medical students of Narayana medical college, Nellore, Andhra Pradesh, India. Out of 100 humerus we found one right humerus, that showed complete ossification of THL. It bridged the bicipital groove from lateral margin of lesser tubercle to medial margin of greater tubercle of the humerus and converting the groove into a canal. The length and breadth of the ossified ligament were 8 mm and 6mm respectively. The vertical and transverse diameters of the bicipital canal were measured at the superior aspect of the humerus and was found to be 2mm and 3mm respectively (Fig.2). The area of interest was photographed (Fig.1,2) and the clinical importance of the ossified ligament was studied in detail.

Fig. 1: Anterior view of proximal part of the right sided humerus showing ossified transverse humeral ligament.



[GT-Greater tubercle, LT-Lesser tubercle, OTHL-Ossified transverse humeral ligament, MP-Metal probe].

Fig. 2: Superior view of proximal part of the right sided humerus showing narrowed bicipital canal.



[BC-Bicipital canal, OTHL-Ossified transverse humeral ligament].

DISCUSSION

The transverse humeral ligament (THL) was first described in 1889 by Charles Gordon Brodie, a Scottish anatomist and surgeon, as a broad band of trapezoidal fibrous tissue between the greater and lesser tubercle of the humerus.

The Transverse humeral ligament is not a part of capsule of the shoulder joint, but a separate ligament between the two tubercles. It lies between the synovial membrane and fibrous capsule as these extend downward between the tubercles over the long tendon of the biceps brachii muscle. The THL acts as a powerful retinaculum for the stabilization of long tendon of biceps brachii muscle. Recent literatures suggest that THL acts as a sling formed mainly by the tendons of subscapularis, supraspinatus and coracohumeral ligament [5, 6].

In the present study, the right side humerus showed complete ossification of THL with a narrowed groove. Narrowing of the canal may be due to the ossification of THL because of either calcium metabolism disorder or repetitive stress on the THL resulting in microtrauma followed by calcification.

Clinical relevance of ossified THL: Normally when the arm is suddenly abducted and externally rotated, the long head of biceps brachii tendon is forced medially against the lesser tubercle and superiorly against THL of the humerus. This ligament contributes to the stability of the biceps tendon and prevents its subluxation from the groove [7]. Ossification of THL can traumatize the long head of biceps brachii tendon and its synovial sheath by constantly rubbed over the bony bridge, leading to tenosynovitis, tendinosis, gradual delamination, pre-rupture and progressive degeneration of the biceps brachii tendon [8].

The situation of bicipital groove has been used as a reference for humeral stem orientation in total shoulder arthroplasty to recreate humeral head retroversion [3]. It is also considered as a reasonable landmark for positioning the lateral fin of the humeral prosthesis in complex proximal humeral fracture [4, 9, 10]. The ossification of transverse humeral ligament may render its use for prosthetic orientation problematic during surgical intervention around this region.

CONCLUSION

The present study suggests that the ossified THL may be one of the predisposing causes for anterior shoulder pain in a patient with repeated overhead action of arm. It also interferes in restoring the humeral head retroversion when treating complex proximal humeral fracture. In the presence of ossified THL, the bicipital groove may not be used as a landmark for orientation of the humeral prosthesis in reconstructing the proximal humeral fracture. Hence, the knowledge of ossified THL is essential for radiologist and orthopedic surgeons in the management of anterior shoulder pain and for positioning the humeral prosthesis in complex proximal humeral fracture.

Acknowledgements:

The authors sincerely wish to thank Mr. Devi K Shankar Assistant Professor department of Anatomy of Narayana Medical College, Nellore for the great help received. The author also wishes to acknowledge the scholars whose articles cited and included in references of this manuscript. Authors are grateful to IJAR editorial board members and IJAR team of reviewers who have helped to bring quality to this manuscript.

Conflicts of Interests: None

REFERENCES

- [1]. Standring S, editor. Grays anatomy: the anatomical basis of clinical Practice. 39th ed. Spain: Churchill Livingstone. 2006;p823–32.
- [2]. Singh R. Analysis of bony bridge over bicipital groove. O A Case Reports 2013 Oct 1;2(13):124.
- [3]. Jeff W. Johnson, Jeff Thosteson MS, Larry Suva, S. Ashfaq Hasan. Relationship of Bicipital Groove Rotation with Humeral Head Retroversion: A Three-Dimensional Computed Tomographic Analysis. J Bone Joint Surg Am, 2013 Apr 17; 95(8):719-724.
- [4]. José Hernández Enriquez, Xavier A. Duralde and Antonio J. Pérez Caballer (2012): Shoulder Hemiarthroplasty in Proximal Humerus Fractures, Recent Advances in Arthroplasty, Dr. Samo Fokter (Ed.); 2012, ISBN: 978-953-307-990-5.
- [5]. Snow B, Narvy S, Omid R, Vangsness C. Anatomy and Histology of the Transverse Humeral Ligament. Orthopedics. 2013;36:e1295-e1298.
- [6]. Gleason PD, Beall DP, Sanders TG, Bond JL, Ly JQ, Holland LL, et al. The transverse humeral ligament: a separate anatomical structure or a continuation of the osseous attachment of the rotator cuff? Am J Sports Med. 2006 Jan; 34(1):72–7.
- [7]. W. Henry Hollinshead. Anatomy for surgeons: vol 3. The back and limbs. 1958;276-277.
- [8]. Anthony F. DePalma MD, FACS. Surgical anatomy of the rotator cuff and the natural history of degenerative periarthritis. Clin Orthop Relat Res. 2008;466:543–551.
- [9]. Kontakis GM1, Damilakis J, Christoforakis J, Papadakis A, Katonis P, Prassopoulos P: The bicipital groove as a landmark for orientation of the humeral prosthesis in cases of fracture. J Shoulder Elbow Surg. 2001Mar–Apr;10(2):136–9.
- [10]. R. John Naranja, Jr, MD, and Joseph P. Iannotti, MD, PhD. Displaced Three- and Four-Part Proximal Humerus Fractures: Evaluation and Management. J Am Acad Orthop Surg. 2000 Nov-Dec;8(6):373-382.

How to cite this article:

R. Siva Chidambaram, Neelee Jayasree, Soorya Sridhar. OSSIFIED BRODIE'S LIGAMENT: A CASE REPORT. Int J Anat Res 2015;3(2):1084-1086. DOI: 10.16965/ijar.2015.169