

## Glenohumeral instability associated with Buford complex

Fernando Canillas del Rey ·  
Diego García-Germán Vázquez ·  
Daniel Nieto López

Received: 27 March 2009 / Accepted: 8 July 2009  
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**Abstract** Buford complex is described as a normal anatomical variant of the anterosuperior part of the glenoid consisting of the absence of the anterosuperior labrum with the presence of a cord-like middle glenohumeral ligament. Traditionally, reattachment to the glenoid has been discouraged. We present a case of a Buford complex associated with glenohumeral instability. The patient was operated for recurrent instability without a preoperative diagnosis of Buford complex. The diagnosis was made during shoulder arthroscopy and reattachment to the glenoid was performed with a satisfactory outcome. Here, we discuss the relationship of the Buford complex with intra-articular pathology and the surgical treatment in cases when this variant is associated with instability.

**Keywords** Buford complex · Shoulder instability · Arthroscopic surgery

### Introduction

With the increasing popularity of shoulder arthroscopy, the normal and pathological anatomy of the superior glenoid labrum has become better defined. Variations include sublabral foramen, superior sublabral recess and the Buford

complex. These could be part of a single spectrum of variants of the anterior labrum anatomy.

The Buford complex is an anatomical variant of the anterosuperior part of the glenoid labrum with an incidence of 1.5–6.5% [6, 20]. In most of the cases it appears as a casual finding in shoulder MRI or during intra-articular part of a shoulder arthroscopy and could be bilateral [6]. This variation, described originally by Williams et al. [20], is considered a normal variant of labrum anatomy and its reattachment to the glenoid is discouraged. To our knowledge, although Buford complex is being now related to some of the shoulder pathologies, it has not been previously related to glenohumeral instability.

We present a case of a Buford complex associated with glenohumeral instability. The patient was operated for recurrent instability without a preoperative diagnosis of Buford complex. The diagnosis was made during shoulder arthroscopy. We report the outcomes of this case and discuss treatment options if this association is found in the course of shoulder arthroscopy for the treatment of shoulder instability.

### Case report

A 29-year-old male was seen at our clinic complaining of recurrent shoulder instability. No systemic pathologies or co-morbidities were present. He was a recreational athlete involved in soccer and tennis. He sustained a first episode of instability during a tackle in a soccer match, the exact position of the arm could not be recalled by the patient but it resulted in an anterior-inferior dislocation. He had had multiples episodes of instability during sport activity but he now complains of instability during normal daily living activities with abduction-external rotation of the shoulder.

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**Electronic supplementary material** The online version of this article (doi:10.1007/s00167-009-0882-1) contains supplementary material, which is available to authorized users.

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F. C. del Rey · D. G.-G. Vázquez (✉) · D. N. López  
Orthopaedic Surgery Service, Hospital Central de la Cruz Roja  
San José y Santa Adela, Avda. Reina Victoria 22-26,  
28003 Madrid, Spain  
e-mail: diegogerman@gmail.com

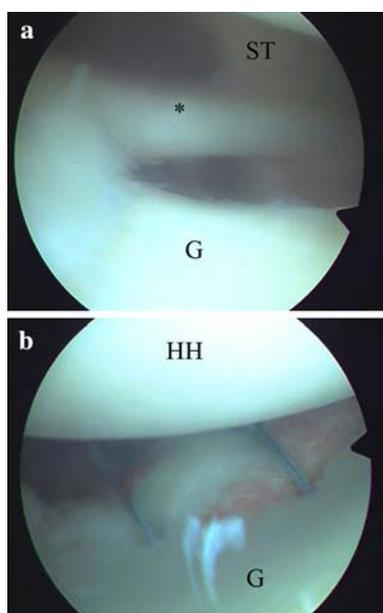
He had been treated non-operatively with rotator cuff strengthening unsuccessfully.

He presented a positive apprehension and anterior drawer test with a negative sulcus test. MRI showed an insufficient anterior labrum and an associated Hill–Sach lesion. Treatment options were discussed with the patient and arthroscopic surgery was decided.

The patient was operated under general anaesthesia in a lateral decubitus position with the arm held at 10° anterior flexion and 30° of abduction using 5 kg of traction. 3+ anterior translation of the humeral head (complete dislocation) was observed during exploration under anaesthesia prior to the operation. A standard posterior viewing portal was established. The intraarticular arthroscopic exploration revealed an absent anterior labrum with a cord-like structure directed anterior and inferior towards the subscapularis tendon, description consistent with a Buford complex (Fig. 1a). The labrum was absent down to the 3 o'clock position. We found some tissue on the neck of the glenoid below the 3 o'clock position (Fig. 2). This tissue could resemble a Bankart lesion of the anteroinferior labrum remnant.

With the intraoperative diagnosis of a Buford complex in a patient being operated for instability and not pain, we decided to reattach the cord-like middle glenohumeral ligament (MGHL) to the glenoid rim.

Two anterior working portals were established in an out-in fashion. The anterior glenoid rim was abraded until bleeding bone was observed. Reattachment of the cord-like structure was performed by 3 Bio-Suture Tak anchors with



**Fig. 1** a Arthroscopic image of the Buford complex (G glenoid, ST subscapularis tendon, asterisk cord-like MGHL). b Reattachment of the cord-like MGHL. G Glenoid, HH humeral head



**Fig. 2** Tissue remnant on the neck of the glenoid below the 3 o'clock position

non-absorbable sutures (Arthrex Inc, Naples, FL, USA). We tried to reattach the MGHL and capsule, as well as the tissue remnant found below the 3 o'clock position, as far as we could using our anterior-superior working portals, being this around the 5 o'clock position. We did not use an additional 5 o'clock portal. The glenoid labrum was thus reconstructed and regained a normal appearance (Fig. 1b). Glenohumeral stability and range of motion were tested before ending the procedure. 1+ anterior translation and full external rotation were present. At 24-month follow-up the patient is symptom-free, has fully resumed sporting activity and no new instability episode has occurred.

## Discussion

Buford complex was first described by Williams et al. in 1994 [20]. It was described as a normal anatomical variant of the anterosuperior shoulder anatomy consisting of an absent anterosuperior labrum with the presence of a cord-like structure, the MGHL, that inserting at the superior labrum at the base of the biceps tendon, directs inferior and anterior towards the subscapularis tendon and attaches to the humerus. The anteroinferior portion of the labrum is present. Subsequent studies addressing labral deficiencies have assumed that this is a normal anatomical variation [4, 5, 8, 13, 18].

Williams et al. [20] describe one single case, apparently not operated initially by the authors, in which the cord-like structure was reattached to the glenoid rim with two absorbable tacks resulting in stiffness and pain and thus discouraged reattachment of the Buford complex. The patient needed two mobilizations before the stiffness was corrected, although the Buford complex was detached during the first procedure in which severe synovitis was described during arthroscopy previous to the mobilization.

The description of this case has led to the general belief that Buford complex is a non-pathological finding, and based on this single case various authors have advised against performing a surgical attachment [12, 18, 20]. Most

of the studies published on anterosuperior labral variation have focused on anatomy [4, 5], radiological findings [1, 8, 11, 13, 16, 18–20] and arthroscopic correlation [9, 12, 20], and not on patients' main complaint, symptoms, treatment or outcomes.

Recent studies have pointed out the clear relation between the presence of Buford complex and intraarticular pathology. Bents and Skeete [2] and Ilahi et al. [6] found a statistically significant positive correlation between Buford complex and SLAP lesion. Rao et al. found that intra-articular abnormalities, including anterosuperior and posterolateral labral fraying as well as subscapularis tendon tears, were more prevalent in these patients [12]. The absence of anterior superior labrum would concentrate forces in the superior labrum and the area of insertion of the biceps tendon which would predispose the patient to a SLAP lesion [17]. Although widely described as a normal variant, the Buford complex and the sublabral foramen could predispose patients to develop intraarticular lesions.

To our knowledge no studies have related the Buford complex to glenohumeral instability. Some studies addressing anterosuperior labral variations actually exclude patients that present instability [20]. Furthermore, Ilahi et al. [6] showed a negative correlation between instability and the presence of a Buford complex. Only 9% of the patients who underwent surgery for instability in his study presented a cord-like MGHL, the authors do not describe the surgical procedure that followed. Rao et al. [12] do not comment on the surgical procedure in the 25 cases in their series that presented instability and anterosuperior labral variants. No guidelines have been published on the treatment of patient in whom this association is found.

Absence of the anterior labrum has been related to a reduced effective depth of the concavity, reduced concavity compression stability and reduced resistance to translating forces in the glenohumeral joint [7]. A Bankart lesion allows increased translation of the humeral head but does not allow the humeral head to dislocate [14]. The labrum provides a point of attachment for the soft tissue stabilizers, the glenohumeral ligaments and capsule [12].

Most of the patients referring instability will have a detached or absent labrum involving the anteroinferior quadrant [10]. The same MRI images could be described as pathological tears or normal variants depending if they extend, or not, below the anterior glenoid notch [15]. In the study by Tuite et al. [17], in 19% of the patients presenting an anterosuperior labral variation the labral abnormality also extended below the midpoint or midsection. The aetiology of anterior-inferior instability is multifactorial and successful treatment requires dealing with the variety of lesions found [3].

Although with knowledge of the variations of the anterior labrum and the recommendations against reattachment of

the Buford complex stated by different authors we decided to reattach the MGHL. These recommendations do not include patients with instability or anterior labral deficiency, and we needed to correct the gross anterior instability the patient presented. We were aware of the potential limitation in external rotation reattaching the MGHL could produce, so we were careful in assuring that external rotation was properly maintained before ending the procedure.

In conclusion, we present a case of a Buford complex associated with anterior glenohumeral instability in which arthroscopic reattachment of the cord-like MGHL was performed with excellent outcome. The statement advising against fixing the Buford complex is questioned. The role of anterior labral variants in glenohumeral stability still needs to be clarified.

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