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# Recurrent Lateral Subdislocation of the Tendon of the Long Biceps Brachii

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We described a man with recurrent lateral subdislocation of the tendon of the long biceps brachii, and discussed the pathomechanics of this extremely rare condition compared with the previously described medial dislocation. We concluded that this lateral dislocation of the long head of biceps brachii was caused by shallowness of the bicipital groove and a smaller greater tubercle with a low inclination of the lateral wall of less than 20 degrees.

## Key Words

Dislocation of biceps tendon,  
Bicipital groove,  
Diagnosis,  
Computed tomography,  
Surgical treatment.

## INTRODUCTION

Although a number of cases of spontaneous medial dislocation of the tendon of the long head of the biceps brachii muscle have been reported (1–10), lateral dislocation of this tendon has not been described previously. Several extensive descriptions of medial dislocation of the biceps brachii tendon by Meyer (4–7) reported the transverse humeral ligament to be of minor importance in retaining the long biceps tendon in the intertubercular sulcus. However, O'Donoghue (8) stated that the biceps tendon can ride up over the lesser tuberosity when the arm goes into external rotation and abduction if the

transverse humeral ligament is lax. A recent anatomic and pathomechanic study by Peterson (9) of the spontaneous medial dislocation of this tendon suggests that this occurs in connection with a full-thickness supraspinatus tendon rupture and slippage medially to the lesser tubercle under the subscapularis tendon. In the present report we describe a man with recurrent lateral subdislocation of the tendon of the long biceps brachii, and discuss the pathomechanics of this unusual condition compared with previously described medial dislocation. The groove view in arthrography has been of diagnostic value (11) and sonography (8) has been used to examine the intertubercular groove and the biceps tendon. Enhanced computed tomography was useful in our case to provide accurate information about the configuration of the intertubercular groove and the position of the biceps tendon.

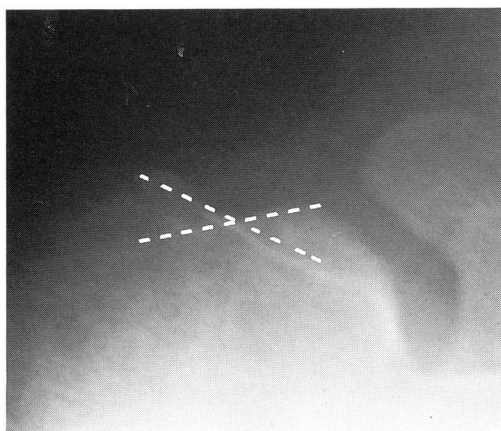
## CASE REPORT

A 33-year-old right-handed man presented with a six-month history of vague right shoulder pain. He denied any previous shoulder trauma or treatment. There was diffuse pain associated with an

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audible snapping sound when he abducted the right arm and internally rotated the

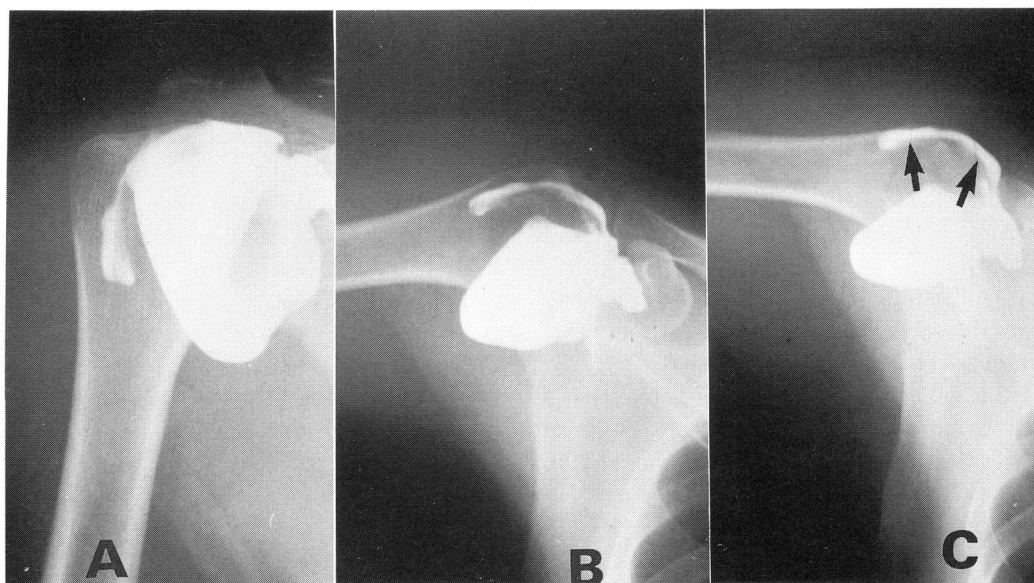


**Figure 1.** The bicipital groove view of the right shoulder. Note the shallowness of the groove with a low angle ( $20^\circ$ ) of the lateral wall.

shoulder joint with moderate rapidity. Continuous pain in the anteromedial shoulder region and the snapping sound continued from March, 1988 until he consulted our clinic in August, 1988.

Physical examination revealed a well-developed and muscular man with no swelling or muscle atrophy of the right shoulder. He complained of shoulder pain at  $70^\circ$  of abduction and  $30^\circ$  of internal rotation and beyond these, the long tendon of the biceps brachii was palpated laterally with a snapping sound over the intertubercular groove. Initial laboratory examinations included a normal haemogram, erythrocyte sedimentation rate, and blood chemistry profile.

A roentgenogram of the right shoulder showed a normal configuration including the osteochondral surface of the shoulder joint. The bicipital groove view showed shallowness of the groove with a low angle



**Figures 2A–2C.** Biceps tendon configuration in the bicipital groove in (A) neutral position, (B)  $90^\circ$  abduction, and (C) indicates the tendon of the long head of the biceps brachii dislocates over the greater tuberosity.

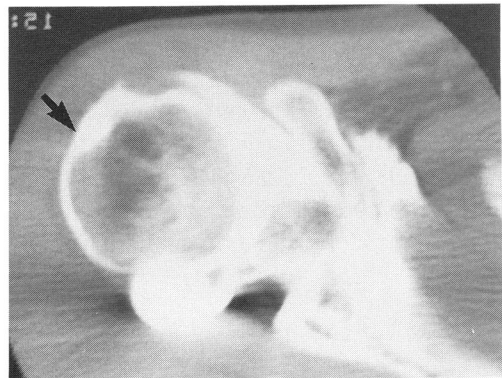
of the lateral wall (Fig 1). Arthrography did not reveal a rotator cuff lesion. However, it was observed that the tendon of the long head of the biceps brachii dislocated laterally from the groove and over the greater tuberosity beyond 90 degrees of abduction and 30 degrees of internal rotation of the shoulder and arm (Fig 2). Subsequently a CT scan was performed to more precisely observe the inter-tubercular groove. Figure 3 is a CT view of the bicipital groove in 90° of abduction and 30° of internal rotation, showing that the long biceps tendon is dislocated laterally from the groove over the greater tuberosity at this angle of the arm. All of the findings described above make the diagnosis of spontaneous lateral dislocation of the tendon of the long biceps brachii.

In order to prevent recurrent dislocation of the tendon and relieve pain, surgical exploration of the tendon of the long biceps brachii was performed. During surgery it was observed that the transverse humeral ligament was attenuated, and the tendon of the long head of the biceps brachii in the groove was thickened. When the arm was abducted and internally rotated, it was confirmed that the tendon dislocated laterally over the greater tuberosity; with the arm abducted to about 90 degrees, rotation caused the tendon of the long head of the biceps to ride backwards and forwards over the greater tuberosity. Since we did not find the tendon dislocation to be associated with other lesions about the shoulder such as a rupture of the rotator cuff, we performed a tenodesis in the intertubercular groove using the modified method described by Froimson and Oh (13) and sutured the scarred transverse ligament over it. Four weeks post-operatively the patient returned to work and has had no

recurrence of the dislocation or any pain.

## DISCUSSION

Although various causative factors of spontaneous medial dislocation of the tendon of the long biceps brachii, such as a rotator cuff tear (4–7, 9, 12), or abnormal configuration of the bicipital groove or coracohumeral ligament (10) have been described previously, lateral displacement of long head of the biceps brachii has not been reported. In our case, the tendon was easily subluxated from the groove by abducting and then rotating the arm internally. The dynamic movement of the long tendon was confirmed by arthrography and CT scan. Dislocation of the tendon was readily diagnosed from the groove view of the enhanced CT scan. As shown by our case, the relationship between the long tendon of the biceps brachii and the anatomy of the anterior



**Figure 3.** A computed tomographic view of the bicipital groove in 90° of abduction and 30° of internal rotation, indicating the long biceps tendon dislocates from the groove (arrow).

upper end of humerus, including tuberosities and the intertubercular groove, can be adequately visualized in the enhanced CT scan. It should be of diagnostic value in examining lesions of the upper end of the humerus.

The bicipital groove configuration may also be important in the spontaneous dislocation of this tendon. O'Donoghue (8) mentioned that the tendon dislocation of the long head of the biceps brachii in throwing athletes is closely related to the shallowness of the bicipital groove. The depth of the sulcus is a variable factor, depending upon the degree of development of the tubercle and the lips of the sulcus (9). The angle of the lateral wall of the groove measured on a plain film was 20 degrees in our case, suggesting that the developmental shallowness of the bicipital groove (14) was closely related to the dislocation of the tendon in our case. The relation of the tendon to its groove varies with different position of the arm (1, 6). When the shoulder is abducted and internally rotated, the tendon is forced against the lateral wall of the sulcus. Furthermore, in this position the angulation of the tendon from the sulcus to the supraglenoid tubercle changes from a right angle to an almost straight path (1). Thus the tendon could be readily displaced from its groove by medial rotation.

Although the extensive study by Meyer (4-7) showed that the transverse humeral ligament is of minor importance in retaining the long biceps tendon in the intertubercular sulcus, we found only a small fibrous remnant of the transverse ligament during surgery, suggesting an old rupture of the ligament. Furthermore, it was found that the tendon slipped laterally to the greater tubercle, riding over the supraspinatus. From the radiological and surgical findings we conclude that this unusual lateral dislocation of the long head of the biceps brachii was caused by shallowness of the bicipital groove and a smaller greater tubercle with a low inclination of the lateral wall of less than 20 degrees.

In our case the pathogenesis of the ruptured transverse humeral ligament is not completely known. However, rubbing between the tendon and the transverse ligament and minor repetitive trauma to the sulcus may have caused this lesion.

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