



## Case Report

# Surgical treatment of distal biceps tendon rupture: a case report

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### Abstract

*Objectives.* Distal biceps tendon rupture affects the functional upper-extremity movement, impairing supination and flexion strength. According to age, profession and additional risks treatment might be nonoperative or surgical.

*Methods.* We describe the case of a 43 years old male patient who sustained an injury to his right distal biceps and was diagnosed with acute right distal biceps rupture. Surgical treatment was decided and biceps tendon was reinserted to the radius tuberosity using a combination of a cortical button fixation associated with an interference screw.

*Results.* Postoperative functional result was favorable with no complications and with no movement limitation after one month.

*Conclusions.* When possible, distal biceps tendon repair should be realized surgically because this permits restoring of the muscle strength to near normal levels with no loss of motion. Nerve complications are common; therefore the surgery should be realized by experienced upper extremity surgeons.

**Keywords:** tendon rupture, biceps brachii, muscle injury



## Introduction

Biceps brachii is a long two headed muscle situated superficially in the anterior part of the upper arm. Its origin is on the scapula, the long head arises from the supraglenoid tubercle and the short head from the coracoids process. Both heads converge and form a single muscle belly that attaches distally with a stronger tendon to the radial tuberosity and via the bicipital aponeurosis to the forearm fascia. Its innervation is realized by the musculocutaneous nerve, which runs under the muscle (1). Biceps brachii muscle is the principal supinator of the forearm and is also an important elbow flexor (2).

Biceps tendon rupture occurs in 97% of the cases in the proximal part usually involving the long head (1), while in rare cases (3%) occur in the distal part with rupture of the distal insertion (3). Distal biceps rupture usually affect active male patients of 30 to 60 years old. In some cases a predisposition may exist, smoking increasing the risk by 7.5 times as are also steroid injections (4). In most of the cases, ruptures involve healthy people, and occur after applying an eccentric extension load to the elbow (3). People complain a “pop” at the time of injury associated with swelling, pain and ecchymosis. Range of motion is normal with flexion of the elbow due to brachialis and brachioradialis muscles (2).

Ultrasound and MRI are used for a proper diagnostic of a complete or partial rupture. Treatment options are usually operative, due to significant loss of forearm flexion (5).

In this paper is described the case of a patient with distal biceps tendon rupture, surgically repaired through a single incision with total recovery of the flexion and supination strength.

## Case Report

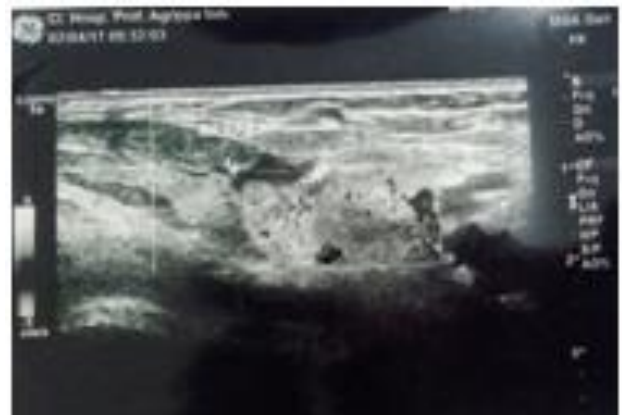
A 43 years old male patient with no associated comorbidities was admitted in our department of plastic surgery with swelling and ecchymosis of the

anterior upper arm. The previous day he sustained an injury to his right forearm and flexed elbow and he felt a sudden pain associated with a “pop”. Local examination revealed pain, swelling, ecchymosis over the antecubital fossa associated with a “Popeye” deformity on the upper arm (Figure 1). The patient had a slightly weakness of elbow flexion and supination of the forearm and the hook test was abnormal.



**Figure 1** “Popeye” deformity of the upper arm

Radiographs of the elbow were normal and an ultrasound was performed and confirmed the diagnostic of complete rupture of biceps tendon (Figure 2).



**Figure 2** Ultrasound examination with complete rupture of biceps tendon

Considering the patient’s age and occupation (soldier), surgical treatment was decided. The patient was operated under axillary block anesthesia in a supine position, using a side table, without a tourniquet. An incision was realized on the anterior part of the cubital fossa, the cubital veins were preserved, and the ruptured tendon and bicipital aponeurosis were visualized. The antebrahial lateral nerve was identified and preserved. The radial tuberosity was discovered by progressive dissection

between the lateral margin of the pronator teres and the medial margin of the brahioradialis muscle. The ruptured tendon end was freshened and the compromised tissue was debrided. The tendon was then passed through a 7 mm sizing block to be sure that it will fit the bone tunnel. The tendon was sutured with suture limbs, attached to a button. The radial tuberosity was exposed and a bicortical tunnel was realized with the elbow in extension and supination. The button with the tendon was inserted through the bone tunnel and the free suture limbs were pulled to lock the button against the radius. Once the tendon was inserted and locked, another screw was put into the bone tunnel pushing the tendon more ulnar (Figure 3). Hemostasis was realized and the wound was closed. The patient had an immobilization in 90 degrees of flexion with the forearm in supination.



**Figure 3.** Distal biceps tendon insertion; intraoperative result

The postoperative radiograph showed a good insertion of the button through the radius (Figure 4). The following day, the patient complained of increased paresthesia and numbness on the dorsal side of the thumb, index and long finger corresponding to the sensitive territory of the superficial branch of the radial nerve. After one week of treatment with vitamin B the symptoms disappeared.

Immobilization was maintained for 2 weeks and after that the patient was permitted to do active flexion

and extension, with no lifting of heavier objects for one month.



**Figure 4.** Distal biceps tendon insertion; postoperative result

## Discussions

Rupture of the distal biceps tendon occurs in 3% of the cases mostly at the tendinous insertion. Usually occur in male patients between thirty and sixty years old, in the dominant extremity, who have done an increased amount of sport activities (army forces) (2), all these characteristics being consistent with our 43 years old patient who was employed as a soldier.

The injury mechanism is most commonly an eccentric load applied to a flexed elbow. There are two theories that could explain the injury of the tendinous insertion. The first relates a poor vascular supply of the distal insertion of the biceps (posterior interosseous recurrent artery) compared with the proximal part of the distal biceps (branches of the brachial artery) (6). The other theory endorses the fact that repetitive rotation of the forearm can realize a mechanical injury on the distal biceps tendon (6).

Distal biceps tendon rupture treatment is controversial (2). Nonoperative treatment has inferior outcomes and might be used in elderly patients who do not require supination and active flexion strength or when comorbidities contraindicate surgical intervention (5). This treatment has a 40% loss of supination strength and a 30% loss of flexion strength, but rarely impacts the daily living activities (4). Nonoperative treatment involves rest and immobilization.

Surgical treatment has led to superior outcomes (7). Recent approaches in fixation techniques of the tendon include suture anchors, endo-buttons, bio-absorbable interference screws and cortical buttons. In our case was used a combination of a cortical button fixation associated with an interference screw that created a strong and anatomic repair (8).

The main complication after surgery involves nerve injuries, especially lateral antebrachial cutaneous nerve that lies superficially between the biceps and the brachialis muscle (5). In our case the patient had no injury of this nerve, but he experienced a slightly lesion of the superficial radial nerve probably due to excessive retraction in the elbow joint area where the radial nerve bifurcates. Nerve function recovered after one week with no sequelae.

Other complications include heterotopic ossification, postoperative fracture, tendon re-rupture, complex regional pain syndrome, and wound infection (9).

## Conclusions

Although rupture of the distal biceps tendon occurs rarely, may lead to severe functional impairment of the upper extremity. Treatment may be nonoperative or surgical according to the needs of every patient.

In surgical treatment nerve complications are quite common, but usually are transient and reversible. In young patients with no additional comorbidities early anatomical reattachment to the tuberosity of the radius represents a standard of care, realizing a strength restoration to near normal levels with no loss of motion.

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