

## TRANSOSSEOUS REATTACHMENT FOR DISTAL RUPTURE OF THE BICEPS TENDON WITH ENDOBUTTON: 7 CASES REPORT

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### INTRODUCTION

Distal rupture of biceps tendon is a rare disease, it concerns only 1,2 patient per 100000 in one year,<sup>[1]</sup> and 3% of distal rupture of biceps brachii,<sup>[2]</sup> it is especially found in male between the age of 30 and 50 with strong physical activity.<sup>[2,3,4,5]</sup> to explain this rupture some theories indicate : fragilization of the tendon by the frictions during the motion,<sup>[6]</sup> hypovascularisation.<sup>[7]</sup> There is no doubt that the surgical treatment represents the best functional outcome.<sup>[8]</sup> There are many technics, non-anatomical one is the tenodesis of biceps brachii with the anterior brachialis, and the anatomical one is the transosseous reattachment and the reattachment with anchoring on the radial tuberosity or with an endobutton. We choose the transosseous reattachment with endobutton to treat our patients.

### MATERIELS AND METHODS

Our study includes 7 patients, operated between 2000 and 2017. All the patients presented distal rupture of biceps tendon of brachialis muscle. The surgical treatment consisted on anatomical reattachment of distal tendon.

**KEYWORDS:** Distal biceps - tendon rupture – surgical treatment.

The patients under locoregional anesthesia, were placed in dorsal position, upper limbs on table and arms in supination with the tourniquet placed in limb-root, the incision went from the bicipital groove then laterally to reach the flexion crease of the elbow, with previous spotting of the antebrachial cutaneous nerve.

**Title:** surgical approach of biceps brachii tendon.

**Legend:** unique anterior incision go from bicipital groove, shifts laterally in flexion fold of elbow, the image presents also bicipital brachii tendon.

Once the primitive path found, we did a tendon lacing then we exposed the radial tuberosity with a forced supination and drill a tunnel. We sutured the tendon with backward and forward moves next the area in touch with the cortical bone.



Figure 2:

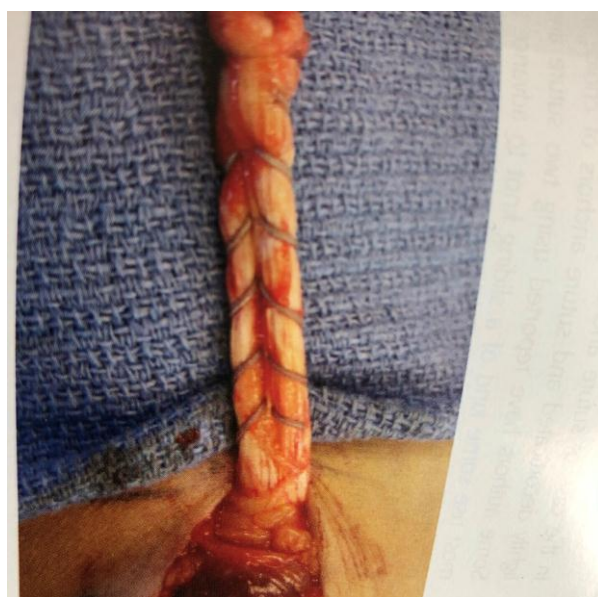


Figure 3:

**Title:** biceps brachii tendon.

**Legend:** lacing of biceps brachii tendon.

In the operating rooms, an immobilization with a splint at 90° was done for all the patients for 6 weeks, with the wrist in pronation-supination. The passive re-education started from the 5th week, and the active reeducation started from 7th week.

We looked back at our patients for a clinical evaluation of:

### Objective signs

**Joint amplitude:** flexion et supination, measured with a goniometer and expressed in degree of deficit compared to contralateral side.

Strength in flexion et supination, measured with a dynamometer and compared to the contralateral side. The corrected values were done referring to the dominant side.<sup>[3]</sup>

**Subjective signs:** According to the pain and job discomfort we had classed our patients by their satisfaction: good, average or bad.

### RESULTATS

All of our patients were male. The mean age was between 32 and 55.

They all presented a distal rupture of the biceps brachii tendon in his dominant side because of a work or sport related accident. There was no particular medical history, especially no corticoids or quinolones treatment were taken before the rupture.

The diagnosis was clinically established and confirmed radiologically by an ultrasound. If doubt, the confirmation will be done with MRI. 6 patients were operated in less than 15 days from the accident, only one patient was taken over in 45 days.



**Figure 1:**

**Title:** longitudinal section MRI of elbow.

**Legend:** Rupture of distal tendon of brachii biceps

As complications, we noticed four antebrachial cutaneous nerve paresthesia which were spontaneously resolved, and a case of algoneurodystrophy resolved after 4 months of medical treatment.

### Clinical evaluation

- The strong flexion of the aggrieved side compared to contralateral side is an average of 96% (80 – 110).
- The average of supination strength of aggrieved side compared to contralateral side is 88% (80 – 100).
- Flexion amplitude was recovered completely to all patients.
- Supination amplitude was complete with 4 patients and loss with three others -5° -10° -15°.
- All patients joined their works, satisfaction was good to 4 patients, average to 2 patients and bad to one patient.



**Figure 4:**

**Title:** per operative control of superior edge of radius.

**Legend:** per operative control of front and side of superior edge of radius after the use of endobutton.

### DISCUSSION

The mean age reported in literature was between 30 and 50. Most patients demanded considerably their biceps brachii muscle, whether for sportive activities or professional ones.<sup>[2,3,4,5]</sup> Seleir and al,<sup>[7]</sup> divided the tendon into three zones to help explain the injury: proximal and distal well vascularized and an average of 2.4cm medial segment is under-vascularized and represents a fragile zone. Hovelius,<sup>[6]</sup> explained the injury by the decrease of 50% of tendon passage in pronation between bicipital radial tuberosity and lateral edge of the ulna because of ulna abduction.

Diagnosis is essentially clinical, but should systematically be confirmed by ultrasonography.<sup>[9,10,11]</sup> MRI is sometimes ordered if there is still a doubt,<sup>[11]</sup>

The superiority of the outcome of surgical treatment compared to orthopaedical one is obvious.<sup>[12,13,14]</sup> In a study realized in 2015 by PAVELKA and al,<sup>[8]</sup> about 206 patients, 30 were treated orthopedically, and the outcomes of surgical treatment were way more satisfying in comparison with the orthopedical treatment. Surgery should so be considered as the most suitable therapy, especially in young active patients. Morrey and al,<sup>[2]</sup> confirmed thus.

The non-anatomical reintegration of biceps brachii tendon on brachii anterior tendon presents less complications.<sup>[15]</sup> with more acceptable postoperative outcomes.<sup>[16,2,17]</sup>

The transosseous reintegration with double way presents more complications, particularly « radio-ulnar synostosis, and radial nerve injury,<sup>[18,5,19]</sup> probably due to the double way first opening of transosseous membrane and the use of retractor that might compress the deep branch of radial nerve,<sup>[20]</sup> the mini-invasive technique reduces the complications of this technique.<sup>[21]</sup>

Compared to anchors, the fixation with endobutton.<sup>[22]</sup> allows an earlier reeducation, but when the healing is complete, mechanical resistance is equal,<sup>[23]</sup> the main risk like we've showed is the nerve injury.<sup>[24,25]</sup> Woods da and Hoy G,<sup>[25]</sup> requested the use the arthroscopy to avoid this complication, the risk of retrenchment of the endobutton is rare but exist with Peeters and Al,<sup>[26]</sup> but removed in a study done in 31 patients with MRI outcomes, which showed the quality of the tendon healing on cortical bone, and also searching for intra-tendinous ossifications facing to integration zoned. With 46%, its was with no stir except for the cases who present a distal ossification preventing the touch with radial tuberosity.

No matter the technique, the delay between the injury and the treatment is the major factor to condition the outcomes. In our experience, the only patient who presented a bad outcome consulted 45 days after his rupture. It might be related to amyotrophy and tendinous retraction,<sup>[26]</sup> a delay of 15 days can be enough for good outcomes.

## CONCLUSION

Despite the fact that our study is about few patients, we can affirm the efficacy of the surgical one-way technique with a low rate of complication.

Surgical treatment outcomes stay superior than orthopedical treatment.

We estimate that the optimal delay for treatment to have good functional outcomes is within the 15 days after the rupture.

## Consent

The patient has given their informed consent for the case to be published.

## Competing interests

The authors declare no competing interest.

## Authors' contributions

All authors have read and agreed to the final version of this manuscript and have equally contributed to its content and to the management of the manuscript.

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