

## Proximal and Distal Rupture of the Biceps of the Arm in Athletes

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### Summary:

**Objectives:** To help become familiar to all Sports Professionals with this type of injuries in athletes. Remarking the difficulty to realize the clinical and imaging diagnosis. Emphasizing arthroscopy as an essential tool for the diagnosis in proximal lesions. And to offer the current modalities of management and in the distal injury to suggest one incision and the utilization of biodegradable material as fixation devices

**Conclusions:** The injuries of the biceps tendon are primarily diagnosed with clinical and auxiliary imaging devices, but it is often necessary the arthroscopic corroboration in proximal lesions. The current techniques for fixation of the long head are various, but alike the distal injuries, the early fixation with biodegradable screws give an option biomechanically stable and promote the integral rehabilitation of the athlete.

**Keywords:** Biceps, Tendon injuries, Athletes.

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### 1. INTRODUCTION

One of the more important and disturbing questions of an athlete with a biceps injured is: what is the percentage of the tear? And what will be the deficiency if I do not have a surgical reconstruction?. The answer to these questions by the treating physician is controversial and imprecise including those using sophisticated imaging studies. (1, 2, 7, 10, 11, 14, 18, and 19).

An adequate arthroscopic inspection of the affected shoulder, is one of the more important steps for the diagnosis and treatment of chronic tendinitis in the proximal insertion of the biceps tendon, which can evolve to a partial rupture, or the absence of the insertion of the long head in the glenoid. (2, 10, and 15).

At the other end of the extremity, the distal tendon rupture of the biceps is an uncommon reported lesion, but there is a general consensus that it will leave sequel in the sports practitioner if it is not managed surgically (4,5, 16). Avoiding this kind of reconstructions by some surgeons for their potential complications reported previously in the literature (9, 12, 16, 19).

The objective of these case presentations is to provide a clear idea of the usefulness of arthroscopy for the proximal injury in athletes, as a diagnostic and therapeutic tool, and at the same time the current modalities in their management. Related to the distal pathology, to offer a simple and effective approach for the sports people with this lesion. And concluding that if they are treated adequately, the athletes can return to their sports at the same level before their injuries.

### 2. CASE 1

A 38 year male tennis player and weight lifter, felt a “cracking” in his right dominant shoulder, with no previous pain at all, this event occurred after weight lifting in the “preacher” bench curl. After that, he noticed a difference in volume of his arms (Fig 1). At office consultation an imprecise ultrasound diagnosis was presented, and we decided to realize an arthroscopic procedure, where we found a complete rupture of the long head of the biceps reflected by an absence of the insertion of the tendon in the glenoid (Fig. 2).



Figure 1. 38 Years Tennis Player

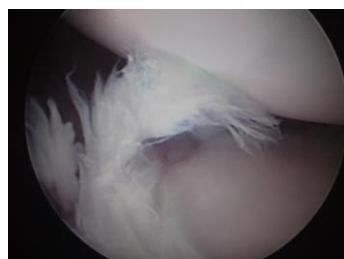
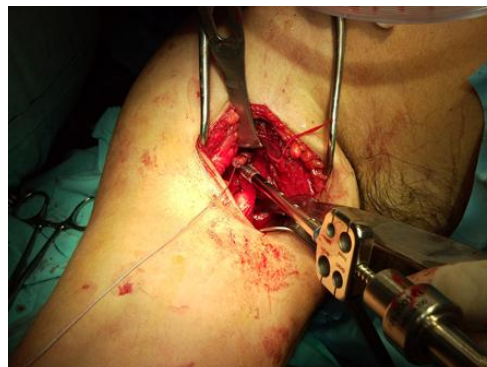


Fig2. Arthroscopic Findings

In the same surgery we proceed to reconstruction of the biceps by a sub pectoral incision, where we found the biceps stump (Fig. 3). The biceps was fixed to the humerus with biodegradable bionodesis screw (Fig. 4).



**Fig3.** *Surgical Findings. Subpectoral Approach*



**Fig4.** *Fixation with Biodegradable screw*

The patient is totally recovered to his sports including weight lifting with the arms, 2.8 years after the surgery (Fig. 5). The UCLA classification was 31 points (20).



**Fig5.** *2.8 Years after the Surgery. Playing Tennis and Lifting Weights*

### **3. CASE 2**

A 60 year old right handed swimmer, with an average swimming of 2 Km. 4 times a week during 40 years, started with pain in the left shoulder 1 year before consultation. Three months before her office appointment the pain was present during all day and required constant analgesic administration. She noticed a “deformation” of the arm (Fig. 6), limitation of the arc of motion and crepitation during abduction.



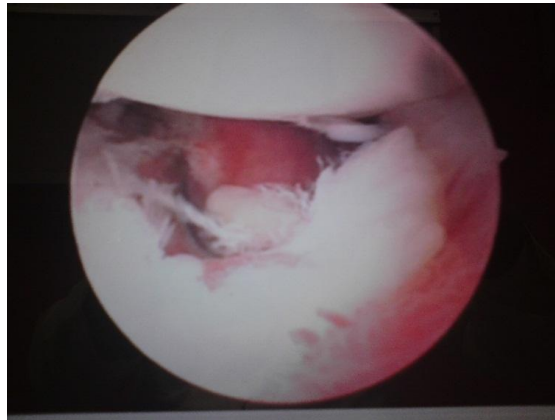
**Fig6.** *A 60 Year Old swimmer, Long Head Biceps Rupture*

At physical examination we found pain in the ventral portion of the left shoulder, corresponding to the intertubercular groove of the humerus, positive “Popeye” and Speed signs, and negative “bear hug sign” (10, 11).

The MRI reported: Injuries of the subscapular and long head of the biceps, without mentioning the supraspinatus tendon.

## Proximal and Distal Rupture of the Biceps of the Arm in Athletes

At arthroscopy the findings were: Partial rupture of the subscapular tendon, and a complete rupture of the long head of the biceps at the glenoid insertion (Fig. 7). In the sub acromial space, a complete rupture of the supraspinatus tendon was found.



**Fig7.** Arthroscopic Findings of the Female Swimmer

A sub acromialarthroplasty was performed for a grade III acromion. And a biotendodesis of the long head of the biceps was performed with a biodegradable screw at the intertubercular groove level of the proximal humerus. The supraspinatus tendon was repaired with a “mini-open” incision with two metal anchors. 2.6 years after the surgery she is swimming again at the same level previous to her ailments (Figure 8). UCLA classification: 33 points



**Fig8.** 2.6 Years after the Surgery

### 4. CASE 3

A 48 year, Male boxer and “weight lifter”, presented with a history of been fighting and when he hit the contrary on his pelvis, felt a sudden pain in his left arm, followed by edema and ecchymosis in the elbow (Fig. 9). After a sonographic examination a “partial injury of the biceps” was reported in the “musculo-tendinous” portion.



**Figure9.** 48 Year Boxer with a Complete Distal Biceps Rupture. Left Arm

At the operating room, a complete rupture of the distal biceps tendon was found, with integrity of the aponeurotic expansion (Fig. 10). A repair of the tendon to the radial tuberosity was done with a biotendodesisbiodegradable screw, utilizing a single ventral incision.



**Figure10.** *Aponeurotic Expansion of the Biceps*

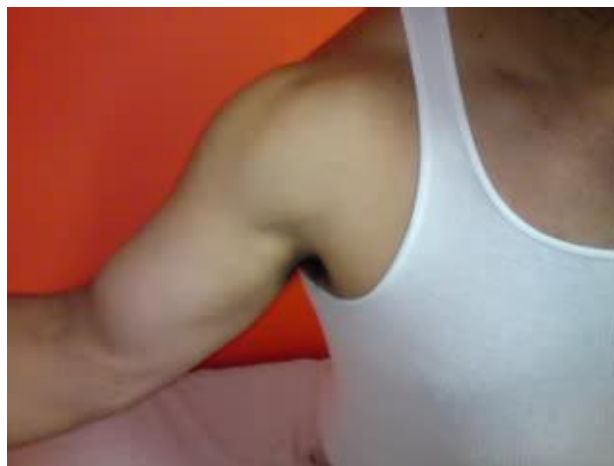
The patient was reintegrated *to all* sports at 4 months after the surgery, including boxing.

Two years after the surgery he presented a new complaint but this time in the right arm, and clinically and arthroscopically a complete rupture of the proximal portion of the right biceps was diagnosed, and fixed subpectorally with a biodegradable biotenesis screw .

After 3 years of the surgerieshe is doing well in all his athletic performances, including “cross-fit“(Fig. 11 and 12). And was classified with anUCLA score of 35 points of the right shoulder.



**Figure11.** *Distal Left Biceps 3 Years after the Surgery Left Arm*



**Figure12.** *Same Patient in Figure 11 with the Right. Proximal Biceps tendon repaired with subpectoral technique. Years after the surgery*

## 5. DISCUSSION

The complaints of the “shoulder” are common in athletes that use frequently the arms for their respective sports. This broad anatomic area is full of pathologic conditions, which etiology is in the

majority of cases an “abuse” of the joints, with the development of “fatigue” and the loss of the appropriate biomechanics of the long head of the biceps which acts as a depressor of the humeral head and also being primordial in the acceleration and deceleration movements of the arm. (3, 6).

The correct diagnosis is not easy to realize, mainly in partial injuries where the false negatives studies are reported (21). The lesions located at the “entrance” of the intertubercular groove are difficult to diagnose including those studied with a “high resolution” MRI. (1, 7, 10, 11, 14, 18).

The only precise diagnostic tool for the ruptured long head of the biceps is the “arthroscope”, but must be handled by “expert orthopedic arthroscopic surgeons” (10).

The surgeon must have enough dexterity and experience to inspect adequately the long head of the biceps including the extra-articular portion in the “entrance” at the intertubercular groove and be prepared during the same surgical procedure to handle any kind of injury, e.g. :tenotomy, biceps fixation to the humerus, including a sub pectoral incision if this is necessary, mentioning the literature this last option as the safest for athletes (2,3,6,17).

Talking about the distal biceps, the diagnosis is neither easy as in the proximal injury. Some authors recommend the Hook test, but we found it difficult to elicit in the acute injured athlete because of the presence of pain and edema in the area (22). We trusted more in the history of the patient, with an eccentric extension load applied to the elbow (16), pain in the injured area and the presence of ecchymosis at the forearm (Figure 9). Because of these positive clinical signs we decide to take the patients to the operating room despite the diagnosis of “partial” tear made by the sonographic radiologic reports(19).

We found the trend from people attending athletes to suggest “not repair these distal lesions”, maybe based on the uncommon of the injury and also thinking about the complications reported in the literature, e.g: the iatrogenic injury of the median and musculocutaneous nerves (9).

Nonetheless, no matter the controversial issues related to these problems of the distal biceps , the current approach in sports people is to repair as soon as possible these lesions in athletes, with an anatomic fixation, to offer the patient the maximum muscular strength, avoiding also a lack of flexion or supination in the future (4,8,12)

The utilization of biodegradable materials provides the athlete the advantage of enough biomechanic strength of the biceps tendon implant, without the disadvantages of the “metallic screws” or other kind of non-degradable materials. The current biodegradable screws allow the athlete to obtain an integral rehabilitation because of the early mobilization of the injured arm. (5, 19).

In conclusion if we diagnose and treat adequately these athletes we can return them to their previous levels in their sports with minimum morbidity and these results are maintained in the long term follow up.

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