



# **A Modified Technique for Repair of Triceps Avulsion Using Suture Anchors-A Case Report**

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## **Authors' contributions**

*This work was carried out in collaboration between all authors. Authors AR and AA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author VM managed the analyses of the study. Author AA managed the literature searches. All authors read and approved the final manuscript.*

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**Case Report**

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## **ABSTRACT**

The bony avulsion of the Triceps is a rare injury. The Triceps tendon injury accounts for <1% of all tendon injuries. Various surgical techniques have been described for the repair. We describe our variation of suture anchor technique for bony avulsion of Triceps injury and report its advantages.

*Keywords: Triceps; tendon injury; avulsion; suture anchor; surgical technique.*

## **1. INTRODUCTION**

As compared to other tendon injuries-Triceps injury is relatively uncommon. It can be missed when not suspecting it or if it is a partial tendon

injury [1,2]. Loss of elbow extension can have deleterious effects and hence the importance of correct diagnosis and work up [3,4]. Common modes of injury include fall on outstretched hand, weight lifting and direct trauma [2,5]. The usual

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mechanism is deceleration combined with uncontrolled Triceps contraction against a flexed elbow [5,6]. Previously reported techniques include creation of bone tunnels and use of non-absorbable sutures from the tendon passing through the tunnels to repair it [7-9] and with good outcomes [10-12]. Recent trend has been toward the use of suture anchors and various techniques have been described related to the suture anchor and the outcomes have been good [13-16].

We describe our variation of the technique for repair of a Triceps with a bony avulsion.

## 2. CASE REPORT

A 28 year old lady had a fall on the stairs and sustained injury to her elbow. She presented to the emergency room at our hospital with pain and swelling of her elbow and difficulty in using or moving her elbow. The clinical examination revealed, there was local tenderness and ecchymosis at the tip of the olecranon corresponding to the triceps insertional site.

The movements of Elbow were restricted and painful. The x-ray showed a bony avulsion from the tip of the olecranon (Fig. 1(a) & [b]). Based on the history and clinical examination, and radiological findings, an avulsion of the triceps with a bony fragment was made.



**Fig. 1. Pre Op X ray showing avulsion of bony fragment**

The operative findings were:

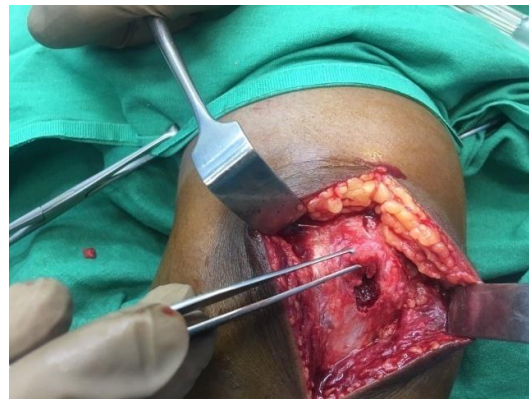
1. There was triceps tear at the Olecranon insertion site
2. There was a bony fragment measuring 10 mmx10 mm from the tip of Olecranon, the

triceps tendon was found attached to the bony fragment.

3. The fragment along with the triceps was reduced with the elbow in extension.

## 3. OPERATIVE TECHNIQUE

Patient was placed in a lateral position with a support under the distal humerus. A posterior midline incision over olecranon was placed; dissection carried out to expose the avulsed triceps with a bony fragment from the olecranon tip. The attachment of triceps to the bony fragment was intact. The bony fragment was found to be reducible to the bony bed on olecranon (Fig. 2). A metallic suture anchor was placed (cork screw 5.5 mm metal anchor-Arthrex) in the raw surface on the tip of Olecranon, till the superior surface was buried (Fig. 3). The sutures were used to anchor the bony fragment with triceps.



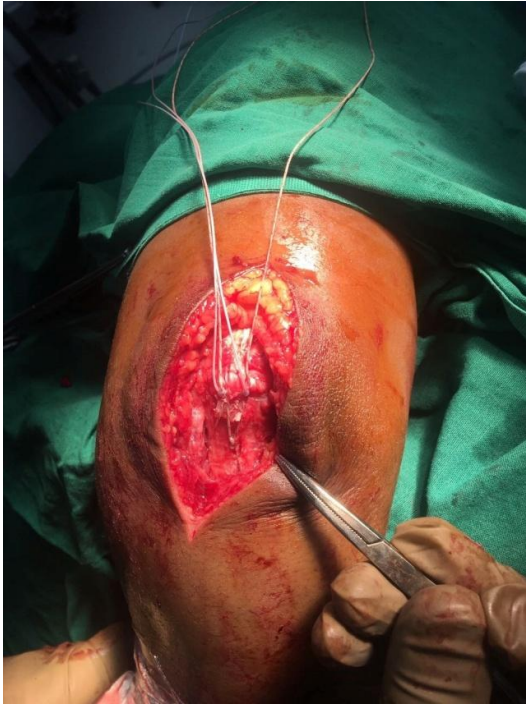
**Fig. 2. Intra op finding of avulsed fragment**



**Fig. 3. Placement on anchor at site of avulsion**

In the fragment of size 10 mm x10 mm (length x width) two holes were made using a 2 mm k wire and the two sutures were passed. The two fibre

wires were taken over the fragment in a crisscross fashion (like tension band) and sutured to one another after making a trans osseous tunnel about 8 mm distal to the raw area in the proximal ulna (Fig. 4).



**Fig. 4. Showing completed repair and placement of knots**

The remaining two sutures of the anchor were used to secure the fixation on the radial and ulnar aspect of the distal triceps, much proximal to the Olecranon.

This location of the suture knots serves two purposes. First – It avoids any prominent placement of the knots in the proximal ulna which is subcutaneous. This prevents further irritation of the knots (since they are made of non-absorbable material). Second – The placement of the second set of knots proximal to the tip of olecranon and dorsal to distal triceps avoids any proximity to the ulnar nerve, and the knots are covered with fascia and subcutaneous tissues, while closing the wound.

The elbow is taken through a range of flexion-extension and supination-pronation and the repair was found to be secure. The wound was closed in layers and a soft compressive dressing applied.

A post-operative check radiograph showed adequate reduction of the avulsed bony fragment (Fig. 5). Patient was followed at 3 months, 6 months and final follow up at 1 year. Patient had a full range of motion which was comparable to contralateral side and so was the strength. There was no extensor lag. There were no wound healing problems.



**Fig. 5. Post op X-ray showing repaired avulsion**



**Fig. 6. The picture of the elbow at 1 year Follow up**

#### 4. DISCUSSION

Triceps has 3 heads of origin and a single point of insertion-studies indicate that the point of insertion site on olecranon measures 21 mm in breadth and 13 mm from proximal to distal (widest distally) and this is the usual point of avulsion and sometimes with a bony fragment [4].

Attempts should be made to restore the anatomy. The uncommon sites of injury include mus-

culotendinous rupture and mid substance rupture of belly [14,17].

Careful clinical exam and MRI are required to avoid a missed diagnosis and its sequelae [18].

Suture anchor techniques have many advantages over the bony tunnel technique-which includes restoration of foot print, better cosmesis, good mechanical strength and ease of performing the procedure [14]. One of the first reported studies to use a validated reported outcome measures is by Bava et al. [19] who report there results on 5 patients, with all having good outcomes. They reported their observations with 4 different outcomes measures-which includes the Disabilities of the Arm, Shoulder and Hand (DASH) score; the Oxford Elbow Score; the American Shoulder and Elbow Surgeons elbow assessment form; and the Mayo Elbow Performance Index.

Our case is not the first one to be described as there are many others described before [10-16,19]. More recently Mancini et al. described their technique with a soft tissue anchor [20].

The way our techniques stands out is in the way the Knots are tied-they are tied over and above on the side of the tendon and not over the ulna. This helps in reducing prominence of the sutures in a subcutaneous area and possibly also helps in suture spitting out or delayed healing problems which can happen if the unabsorbable suture is subcutaneous.

## 5. CONCLUSION

To summarize Suture Anchors are a good armamentarium to have for repair of this rare injury but by modifying the position of knots helps in facilitating the healing.

## CONSENT

As per international standard or university standard written patient consent has been collected and preserved by the authors.

## ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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