

Distal Triceps Tendon Complete Rupture in A Professional Athlete: A Case Report and Review of The Literature

Tzellios Ioannis*, Gelalis Dimitrios, Dimos Konstantinos, Gelalis Ioannis and Pakos Emilios

Orthopaedic Department, University General Hospital of Ioannina, Greece

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***Corresponding author:** Tzellios Ioannis, Orthopaedic Department, University General Hospital of Ioannina, Greece, Email: giannistzellios@gmail.com

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ABSTRACT

The distal triceps tendon rupture is a relatively rare injury, accounting for less than 1% of all tendon injuries. Several risk factors have been described. In this article, we present the case of a 34-year-old athlete with a complete rupture of the distal triceps tendon of his left arm that took place during the Cross-Fit national games. The patient presented reduced range of motion, swelling, a palpable gap over the olecranon and inability to extend his left elbow against gravity. Ultrasound and MRI revealed a complete rupture of the distal triceps tendon. Surgery was performed a week after the injury. The central stump of the tendon was reattached at his anatomic position, while the sutures were passed through 2 transosseous drill holes in the olecranon and stabilized with an anchor. A fast-track postoperative protocol including a supervised gradual strengthening program was followed. No complications were noticed during the follow up. The patient returned to full sport activity 4 months postoperatively.

Keywords: Triceps injury; Triceps complete rupture; Sport injuries; Transosseous technique; Knotless anchor

Introduction

The triceps brachii muscle is the main extensor of the elbow joint¹. Distal triceps tendon injuries are rare with an incidence of 1.1 per 100.000 person-years². There are several conditions that can predispose that type of an injury such as diabetes, chronic renal insufficiency, rheumatoid arthritis, Marfan's syndrome, enthesopathy, local steroid injections, use of anabolic steroids and hyperparathyroidism³⁻⁹. The most common mechanism of injury is fall on an outstretched hand or direct blow to posterior aspect of the elbow^{3,4,5,6}. Other mechanisms include hyperextension or hyperflexion of elbow, overuse, and weightlifting exercises^{3,4,5,9}. Physical examination usually reveals tenderness, ecchymosis and swelling on the posterior aspect of the arm, reduced extension of the elbow against gravity, while a palpable gap is present over the olecranon³⁻¹⁰. Moreover, a modified Thompson test that is

used for the Achilles tendon may be useful in the evaluation of the injury^{6,9}. Plain radiographs should be obtained to evaluate bone integrity. Rarely, an avulsed portion of bone in the posterior aspect of the distal humerus, that is pathognomonic for distal triceps rupture (flake sign), may be revealed^{2,3,5,6,9}. Ultrasound and magnetic resonance imaging (MRI) confirm the diagnosis, with the MRI being the gold standard for the discrimination of the degree of the tear and the surgical procedure planning^{3-6,9}. The treatment of distal triceps tendon tear is either conservative, mostly in partial tears, or surgical, especially in complete tears and in case of active athletes^{3-6,9}.

In the present case report, an uncommon case of distal triceps tendon complete tear is presented in a 34-year-old male CrossFit athlete with a 12-month follow-up, and a review of the available literature is provided. This case report has been reported in line with the Surgical Case Report (SCARE) criteria.

Case Report

A 34-year-old male was transferred to our emergency department with severe pain at the left elbow. He was competing in the Cross-Fit national games. He referred acute pain and sudden inability to hold the weights during the last ‘push jerk’ repetition with 120 kilograms. There was no history of trauma, tendinopathies, systemic pathologies, use of steroids or other supplementation.

The clinical evaluation revealed pain, swelling and a palpable gap over the olecranon, reduced range of motion and inability of extension of the elbow against gravity. Conventional radiographs of the elbow showed a small avulsion fracture over the olecranon (flake sign), implying a triceps tear (**Figure 1**). Ultrasound and MRI revealed a complete tear of the distal triceps tendon with its central stump being retracted about 3 centimetres from its anatomical position (**Figure 2**).



Figure 1: Flake Sign in the lateral elbow radiography.

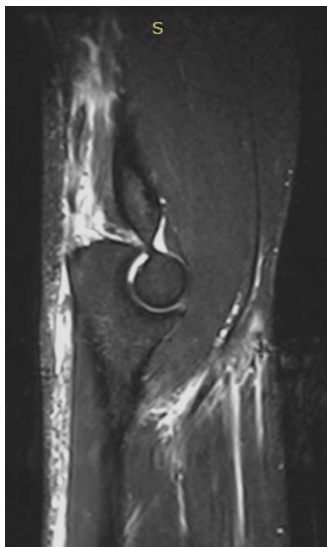


Figure 2: Sagittal T2-weighted image on MRI with high signal between the tendon and the olecranon.

Surgery was performed a week after the injury. Anaesthesia included an axillary block. The patient was positioned in lateral position with his left arm lying over a padded support that permitted full extension and flexion of the elbow. An inflatable axillary tourniquet was used for exsanguination. A posterior approach is used with a skin incision about 5 centimetres over the olecranon tip and 2 centimetres versus the ulnar metaphysis, which is deviated laterally in its center in order to avoid the ulnar nerve. The tip of the olecranon was debrided with a curette and the central tendon stump was freed of any adhesions. The tendon was secured with 2 heavy non-absorbable sutures with a locking Krackow stitch configuration on the medial and the lateral

surface of the central stump of the tendon (**Figure 3**), which were passed through 2 transosseous drill holes in the olecranon, in a double row configuration (**Figure 4**). The sutures were further stabilized with a 4,75mm Knotless SwiveLock anchor just 1 centimetre below the drill holes in the ulnar metaphysis (**Figure 5**). Subcutaneous tissue was closed using absorbable sutures (Vicryl 2.0) and the skin with an intracutaneous absorbable monofilament suture (Monocryl 3.0).



Figure 3: Locking Krackow suture configuration on the medial and the lateral surface of the central stump of the tendon.



Figure 4: Double row configuration of the sutures confers a greater repair strength.

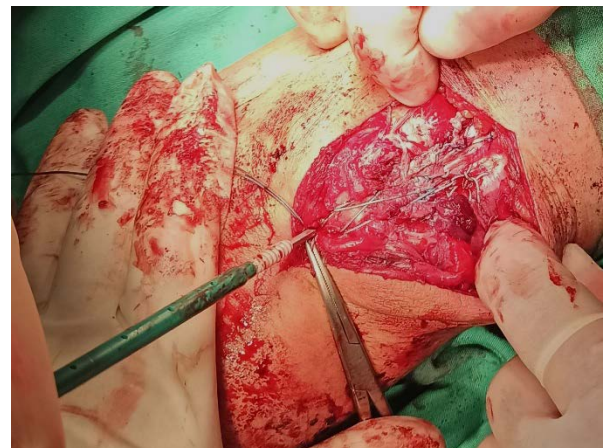


Figure 5: Position of the Swive Lock Knotless anchor.

The postoperative protocol included immobilization of the elbow in a splint in 30° of flexion for 2 weeks until the wound heals. A functional brace which permitted gradual increase of range of motion with active flexion and passive extension exercises is used for the next 4 weeks. Then, the brace was removed, and the patient followed a supervised physiotherapy program with proprioceptive and gradual strengthening exercises. No complications were noticed during the follow up. There was a flexion gap of 40° in the sixth week that resolved 2 weeks later (**Figures 6,7**). The patient returned to full sport activity 4 months postoperatively (**Figure 8**) and participated with success at the same Cross-Fit games 12 months later.



Figure 6: Full active flexion at 8 weeks post operatively.



Figure 7: Full active extension at 8 weeks post operatively.



Figure 8: Full sport activity 3 months postoperatively.

Discussion

Distal triceps tendon ruptures are quite rare injuries. In fact, Anzel et al., in their review that includes 1014 tendon ruptures,

report only 8 cases of triceps injuries, which represents less than 1% of all tendon injuries⁷. Moreover, a high index of clinical suspicion is required for an early and accurate diagnosis³. According to the literature, there is a correlation between high level weight-lift athletes and the use of steroids or steroid injections for the treatment of overuse tendinopathies. Kennedy et al. mentioned that repeated corticosteroid injections at the level of the tendon for the treatment of elbow bursitis can cause collagen necrosis that eventually leads to weakening of the tendon and as a result the tear of the tendon. The most common mechanism of injury in the athletic population is an eccentric overload of a contractive triceps that is reported during weightlifting^{2,4}. In our case, the injury was caused by an eccentric overload of the triceps with the arm in overhead extension during 'push jerk' repetitions. Due to the rarity of the cases reported in the literature, there is not a consensus on the best treatment option for this injury. Partial tears can be treated conservatively as well as there is no serious loss of function¹⁸. According to Mair et al., in athletes with partial tears there is a high possibility of recurrency to complete tears after returning to full activity, when treated conservatively⁴. Walker et al. stated that, in athletes and in active individuals, all complete triceps ruptures and partial ruptures that involve more than 50% of the tendon should be treated with early repair⁵. Various surgical techniques for the repair of the ruptured triceps have been described in the literature and include reattachment of the tendon on the olecranon footprint directly with suture anchors, through transosseous drill holes and combinations of the previous^{1,2,5,6,9,10}. We used the classical transosseous technique, but further secured the sutures with a knotless anchor 10 mm below the drill holes. We believe that the double row configuration of the sutures through the drill holes and the use of the anchor offers an excellent reattachment of the tendon on its anatomic footprint and a strong and secure fixation. In their review, Stucken et al. refer that return to sport activity is expected in more than 3 months postoperatively and weightlifting should be avoided for 4-6 months postoperatively⁶. We applied an accelerated strengthening postoperative protocol supervised by an expert physiotherapist - manual therapist, which led our patient to full sport activity 4 months postoperatively. Conti Mica and van Riet refer a re-rupture rate of 21% of all cases¹¹. Other postoperative complications include loss in range of motion (approximately 10° in extension and flexion up to 136°), olecranon bursitis, arthrofibrosis, ulnar nerve neuropathy, infection, and hardware irritation^{3,7,11}. In our case, we faced a flexion gap of 40° weeks postoperatively, that resolved 2 weeks later, and no further complications during the 12 month follow up.

Conclusion

Distal triceps tendon ruptures are rare injuries, which may be neglected and, thus, quite challenging for the orthopaedic surgeon. Surgical treatment is the 'gold-standard' in sport population. Although there is no consensus on which surgical technique is more effective, we believe that the transosseous triceps repair technique with the use of a Knotless anchor leads to an excellent functional result. A careful supervised postoperative protocol is necessary for a safe and quick return to sport activity. Given the rarity of this type of injury and the limited literature evidence, prospective randomized control studies are necessary to confirm the most effective surgical technique for the best postoperative outcome.

Disclosure: The authors declare no conflict of interest.

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