

Management of a Rare Complex Elbow Injury: Anatomic Reconstruction of the Triceps Footprint Combined with Radial Head Arthroplasty - A Case Report

Nikolaos Georgiadis¹, Nikolaos Manidakis¹, Alexandros Topaloglou¹,
Konstantinos Asteriadis¹, Efstathios Kalyvas¹

Learning Point of the Article:

Complex elbow injuries involving distal triceps tendon rupture and radial head fracture require a high index of suspicion. Early diagnosis and single-stage surgical treatment with anatomic triceps footprint repair and radial head arthroplasty can restore elbow stability and provide satisfactory functional outcomes.

Abstract

Introduction: Distal triceps tendon rupture is a rare injury that may coexist with other traumatic lesions around the elbow. The combination of distal triceps tendon rupture and radial head fracture is particularly uncommon and may be difficult to diagnose and treat.

Case Report: We report the case of a 60-year-old woman who presented with pain, swelling, and inability to actively extend the left elbow after a fall onto an outstretched hand. Clinical examination showed tenderness over the radial head and a palpable gap at the triceps insertion. Radiographs demonstrated a radial head fracture and the Fleck sign, suggestive of distal triceps avulsion. Computed tomography confirmed a comminuted intra-articular Mason type III radial head fracture. The patient underwent single-stage surgical treatment consisting of knotless anatomic triceps footprint repair with intraosseous sutures and press-fit radial head arthroplasty. Post-operative rehabilitation was progressive and protected.

Conclusion: Combined distal triceps tendon rupture and radial head fracture is a rare complex elbow injury that may be overlooked. Thorough clinical and radiological assessment is essential. Single-stage treatment of all associated lesions may restore elbow stability and provide satisfactory functional outcome.

Keywords: Distal triceps tendon rupture, radial head arthroplasty, elbow injury, footprint repair.

Introduction

Distal triceps tendon rupture is rare, accounting for <1% of all tendon ruptures [1,2]. It may result from direct trauma to the posterior aspect of the elbow or, more commonly, from sudden eccentric triceps contraction after a fall onto an outstretched hand [1]. Because this mechanism is also associated with other traumatic lesions, distal triceps rupture may coexist with

fractures or ligamentous injuries around the elbow [2,3].

Combined distal triceps tendon rupture and radial head fracture is particularly uncommon [3,4,5]. The diagnosis may be missed initially because pain, swelling, and limitation of motion can mask the underlying tendon injury [3,5,6]. Clinical suspicion should be raised in the presence of inability to actively extend the elbow, a palpable gap at the triceps insertion, and the Fleck sign

Author's Photo Gallery



Dr. Nikolaos Georgiadis



Dr. Nikolaos Manidakis



Dr. Alexandros Topaloglou



Dr. Konstantinos Asteriadis



Dr. Efstathios Kalyvas

Access this article online

Website:
www.jocr.co.in

DOI:
<https://doi.org/10.13107/jocr.2026.v16.i11.8402>

¹Department of Orthopaedic Surgery and Traumatology, Sports Injuries Unit, General Hospital of Thessaloniki, Thessaloniki, Greece.

Address of Correspondence:

Dr. Nikolaos Georgiadis,
Department of Orthopaedic Surgery and Traumatology, Sports Injuries Unit, General Hospital of Thessaloniki "Agios Pavlos", Thessaloniki, Greece
E-mail: ngeorgiadis1994@gmail.com

Submitted: 11/08/2026; Review: 23/09/2026; Accepted: October 2026; Published: November 2026

DOI: <https://doi.org/10.13107/jocr.2026.v16.i11.8402>

© The Author(s). 2026 Open Access. This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<https://creativecommons.org/licenses/by-nc/4.0/>), which permits unrestricted use, distribution, and non-commercial reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated.



Figure 1: Lateral radiograph of the left elbow demonstrating the Fleck sign (red arrow), suggestive of distal triceps tendon avulsion.

on plain radiographs [3,7].

We present a rare case of distal triceps tendon rupture associated with a comminuted Mason type III radial head fracture, treated with anatomic triceps footprint repair and radial head arthroplasty in a single surgical session.

Case Report

A 60-year-old woman presented to the emergency department with diffuse pain and swelling of the left elbow after a fall onto an outstretched upper limb. She reported feeling a distinct “click” at the time of injury.

On examination, the elbow was swollen, with medial-sided effusion. The patient was unable to actively extend the elbow. Passive pronation and supination were painful. Tenderness over the radial head and a palpable gap at the triceps insertion were noted.

Plain radiographs demonstrated an intra-articular radial head fracture together with the characteristic Fleck sign, indicating distal triceps avulsion (Fig. 1) [3,7]. The elbow was initially immobilized in a cast at 90° of flexion with the forearm in a neutral position, and the patient was admitted for operative treatment.

Computed tomography confirmed a comminuted intra-articular radial head fracture with displacement >2 mm, consistent with a Mason type III injury (Fig. 2) [8,9]. Taking into account the fracture pattern, the associated distal triceps rupture, and the patient's age and functional demands, surgical treatment was planned. The operative strategy consisted of

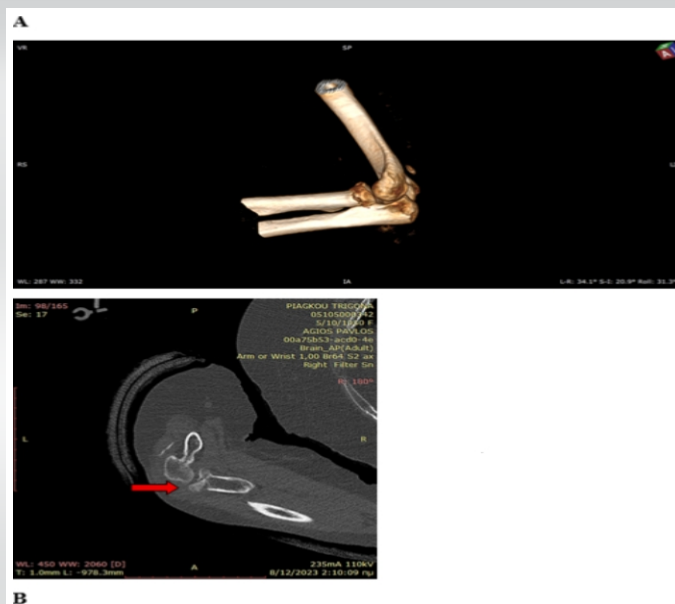


Figure 2: Computed tomography scan of the left elbow. (a) 3D view. (b) Comminuted intra-articular radial head fracture (red arrow), classified as Mason type III.

triceps tendon repair using the knotless anatomic footprint technique described by Paci et al. [10], combined with press-fit radial head arthroplasty.

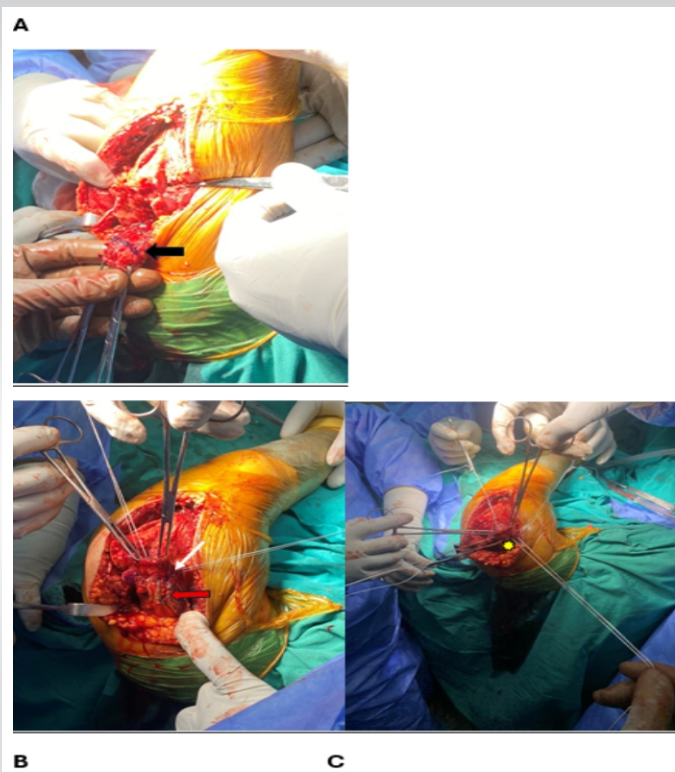


Figure 3: Triceps tendon preparation. (a) Identification and marking of the triceps footprint (black arrow). (b) Placement of medial and lateral Krackow sutures (red arrow) exiting anteriorly (white arrow). (c) Placement of FiberLoop sutures with posterior loop exit (star).

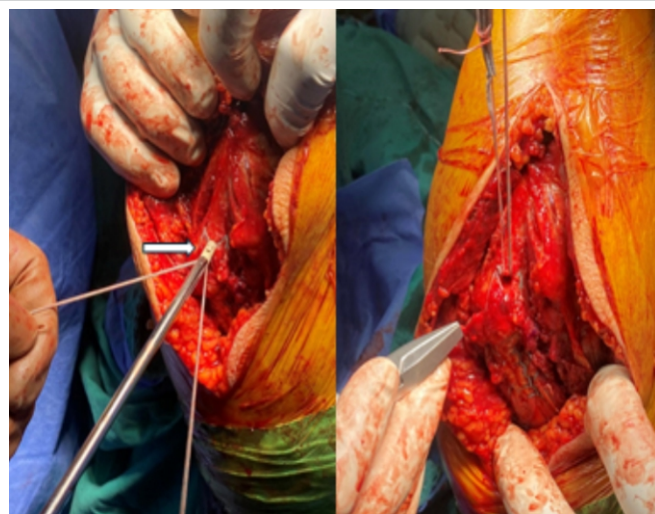


Figure 5: Final triceps tendon repair. (a) Passage of the Krackow sutures through the anchor (white arrow) (b) Final tensioning and fixation of the repair.

For the procedure, the patient was placed supine under general anesthesia with a tourniquet applied to the left arm. Through a standard posterior approach, the retracted distal triceps tendon was identified, mobilized, and debrided. The olecranon footprint was marked, and two Krackow sutures were placed, one medially and one laterally, with their limbs exiting

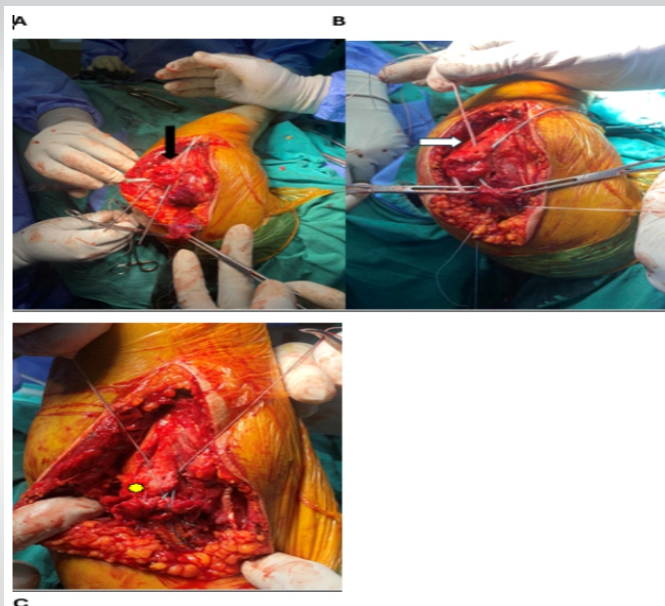


Figure 4: Olecranon preparation and suture passage. (a) Creation of two parallel bone tunnels (black arrow). (b) Passage of suture limbs through the tunnels (white arrow). (c) Creation of the "box-and-X" footprint configuration (yellow star).

anteriorly. Two FiberLoop sutures were also placed with posterior loop exit points (Fig. 3). Two parallel 2-mm transosseous tunnels were then drilled from the proximal footprint to the dorsal surface of the ulna. A pilot hole for anchor placement was created between the tunnels. The suture limbs were passed through the tunnels, and a "box-and-X" footprint configuration was created (Fig. 4). The free suture limbs were then secured with an anchor placed flush with the cortex under final tension (Fig. 5).

Attention was then directed to the radial head. Through an anterolateral elbow approach, the radial head and neck were exposed, osteotomized, and removed. The radial canal was prepared and a press-fit prosthesis was implanted under fluoroscopic guidance. Implant size and height were assessed dynamically to avoid overstuffing of the radiocapitellar joint (Fig. 6) [8,9].

Post-operatively, the elbow was immobilized in a plaster cast at 90° of flexion with the forearm in neutral rotation for 2 weeks. At 2 weeks, sutures were removed and a functional splint was applied, initially allowing motion from 90° of flexion to 30° of extension. Range of motion was progressively increased by 20° every 2 weeks, aiming for full motion by 6–8 weeks. Full active mobilization was allowed after 8 weeks. At follow-up, the patient had a stable elbow with satisfactory functional recovery.

Discussion

Combined distal triceps tendon rupture and radial head

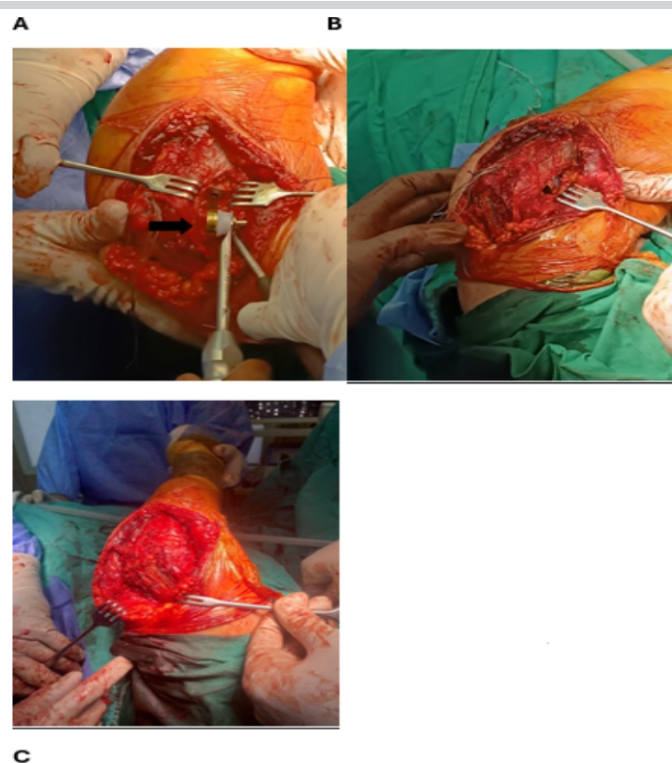


Figure 6: Radial head arthroplasty. (a and b) Exposure and preparation of the radial head-Press-fit radial head prosthesis implantation (black arrow). (c) Final intraoperative view.

fracture is an unusual injury pattern that requires a high index of suspicion [3,4,5,6]. Failure to diagnose the tendon injury may compromise elbow stability, extension strength, and overall functional outcome.

The Fleck sign is a useful radiographic clue for triceps avulsion and should prompt careful clinical assessment of the extensor mechanism [3,7]. In our patient, the inability to actively extend the elbow, the palpable defect at the triceps insertion, and the displaced comminuted radial head fracture led to recognition of the combined injury.

Anatomic footprint repair of the distal triceps has demonstrated encouraging biomechanical properties and satisfactory clinical results [7,10,11]. Compared with conventional transosseous repair, the knotless anatomic footprint technique may improve restoration of the native insertional anatomy and distribute load more effectively across the repair site [7,11]. However, it remains technically demanding and requires appropriate post-operative protection.

Radial head arthroplasty is a well-established treatment option for comminuted Mason type III fractures not amenable to stable fixation, especially in older patients or in the presence of associated instability [8, 9]. Proper implant sizing is crucial, as overstuffing of the radiocapitellar joint may lead to pain,

stiffness, and altered biomechanics [8, 9]. The most commonly reported post-operative complications include joint instability, aseptic loosening, and osteolysis [8,9].

This case emphasizes the importance of treating all associated lesions during the same surgical setting. Combined management of the distal triceps rupture and radial head fracture allowed restoration of stability and facilitated rehabilitation.

Conclusion

Distal triceps tendon rupture associated with comminuted radial head fracture is a rare and potentially underdiagnosed complex elbow injury. Thorough physical examination and careful radiographic assessment are essential for timely diagnosis. Single-stage treatment with anatomic triceps footprint repair and radial head arthroplasty may provide stable reconstruction and satisfactory functional recovery.

Clinical Message

In patients with complex elbow trauma, the triceps tendon must be carefully assessed both clinically and radiographically. Recognition and treatment of all associated injuries in a single procedure are key to restoring a stable and functional elbow.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

References

1. Dunn JC, Kusnezov N, Fares A, Rubin S, Orr J, Friedman D, et al. Triceps tendon ruptures: A systematic review. *Hand (N Y)* 2017;12:431-8.
2. Alkhalafan YH, Jha G, Verma B, Coatwala A, Mishra A, Khan TM, et al. The elbow's achilles heel: A systematic review and meta-analysis of triceps tendon rupture and repair techniques. *Cureus* 2023;15:e41584.
3. Canbora K, Ozyurek S, Gumussuyu G, Kose O. Triceps tendon avulsion and associated injuries of the elbow. *BMJ Case Rep* 2013;2013:bcr2013009460.
4. Levy M, Fishel RE, Stern GM. Triceps tendon avulsion with or without fracture of the radial head--a rare injury? *J Trauma* 1978;18:677-9.
5. Lee JH, Ahn KB, Kwon KR, Kim KC, Rhyou IH. Differences in rupture patterns and associated lesions related to traumatic distal triceps tendon rupture between outstretched hand and direct injuries. *Clin Orthop Relat Res* 2021;479:781-9.
6. Kose O, Kilicaslan OF, Guler F, Acar B, Yuksel HY. Functional outcomes and complications after surgical repair of triceps tendon rupture. *Eur J Orthop Surg Traumatol* 2015;25:1131-9.
7. Yeh PC, Stephens KT, Solovyova O, Obopilwe E, Smart LR, Mazzocca AD, et al. The distal triceps tendon footprint and a biomechanical analysis of 3 repair techniques. *Am J Sports Med* 2010;38:1025-33.
8. Jordan RW, Jones AD. Radial head fractures. *Open Orthop J* 2017;11:1405-16.
9. Al-Tawil K, Arya A. Radial head fractures. *J Clin Orthop Trauma* 2021;20:101497.
10. Paci JM, Clark J, Rizzi A. Distal triceps knotless anatomic footprint repair: A new technique. *Arthrosc Tech* 2014;3:e621-



6.
11. Clark J, Obopilwe E, Rizzi A, Komatsu DE, Singh H, Mazzocca AD, et al. Distal triceps knotless anatomic footprint repair is superior to transosseous cruciate repair: A biomechanical comparison. Arthroscopy 2014;30:1254-60.

Conflict of Interest: Nil
Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this article

How to Cite this Article

Georgiadis N, Manidakis N, Topaloglou A, Asteriadis K, Kalyvas E. Management of a Rare Complex Elbow Injury: Anatomic Reconstruction of the Triceps Footprint Combined with Radial Head Arthroplasty - A Case Report. J Orthop Case Rep. 2026 November;16(11):99-103. doi: 10.13107/jocr.2026.v16.i11.8402.

