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Simultaneous, Ipsilateral Distal Biceps and Distal Triceps Rupture in Healthy Weight Lifter: A Case Report

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A Case Report

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Abstract

Case: A 38-year-old weight lifter presented with a complete distal biceps rupture with retraction and a near complete ipsilateral distal triceps tear sustained during the bench press exercise. The tendons were fixed operatively using a simultaneous posterior and anterolateral approach to the elbow.

Conclusion: Simultaneous, ipsilateral distal biceps and distal triceps tendon injury is a rare occurrence that leads to significant functional loss. Repair of distal biceps rupture using a single-incision technique with a cortical button and distal triceps using a double-row suture anchor repair was successful in restoring functional anatomy to our patient.

Distal biceps ruptures frequently present in middle-aged men during a forceful eccentric contraction[1]. Nonoperative treatment of these injuries can lead to a decrease in both supination and flexion strength and endurance[2]. Treatment strategy typically involves reanchoring the ruptured tendon back to its anatomic insertion.

Distal triceps ruptures are less common, accounting for a small percentage of overall tendinous injuries[3]. In weight lifters, these injuries are typically sustained during the bench press exercise[4]. Surgical repair is recommended for individuals with either a complete or a partial tear of the triceps tendon in active individuals who demonstrate significant extension weakness[5].

Although treatment of both biceps and triceps tears is well described, there are no reported outcomes on patients who suffered from ipsilateral, simultaneous biceps and triceps tears. The following case examines a patient who was found to have a complete distal biceps rupture and a near full-thickness distal triceps rupture in the same extremity.

The patient was informed that data concerning the case would be submitted for publication, and he provided consent.

Case Report

The patient is a 38-year-old avid weight lifter who presented 8/29/2017 with pain in the right elbow. He was found to have a right distal biceps rupture that underwent repair and uncomplicated recovery with return to weight lifting. He presented back to our clinic on 6/4/19 with complaints of new left elbow pain. His BMI on presenting to the clinic was 34.57 kg/m^2. He was doing a dumbbell bench press exercise with 90 pound weights when he felt a pop in the left elbow and had subsequent, sharp elbow pain and weakness. Injury occurred in a single repetition of the exercise after 2, full warmup sets. The injury was the result of a concentric contraction of the triceps and eccentric contraction of the biceps. Unusually, the patient did not have any risk factors for tendon rupture. He denied any antecedent elbow pain or history of steroid use. Endocrinopathy was suspected; however, our workup found no such pathology. In addition, the patient did not report using quinolone antibiotics.

On physical examination, the patient had tenderness at both the distal biceps and triceps insertions. There were swelling and ecchymosis in the antecubital fossa, and the patient had weakness to elbow flexion, extension, and supination, with a negative hook test. X-rays at his first clinic visit demonstrated an osseous avulsion from the triceps insertion with 1.8 cm of retraction. In addition, there was a palpable defect over the triceps insertion. Magnetic resonance imaging (MRI) showed a full-thickness tear of the distal biceps tendon with 2 to 3 cm of retraction and a near full-thickness tear of the distal triceps insertion (Figs. 1 and 2). After review of these findings with the patient, we elected to proceed with operative repair of both the distal biceps and triceps tendons, 31 days after injury.

Intraoperatively, the patient was positioned supine with the left arm extended over a hand table. An upper arm tourniquet was inflated. We began with a 6-cm longitudinal incision on the posterior aspect of the olecranon. A near full-thickness tear

Disclosure: The **Disclosure of Potential Conflicts of Interest** forms are provided with the online version of the article (http://links.lww.com/JBJSCC/B550).
Keywords: distal Biceps, distal triceps, simultaneous, shoulder & elbow

Fig. 1

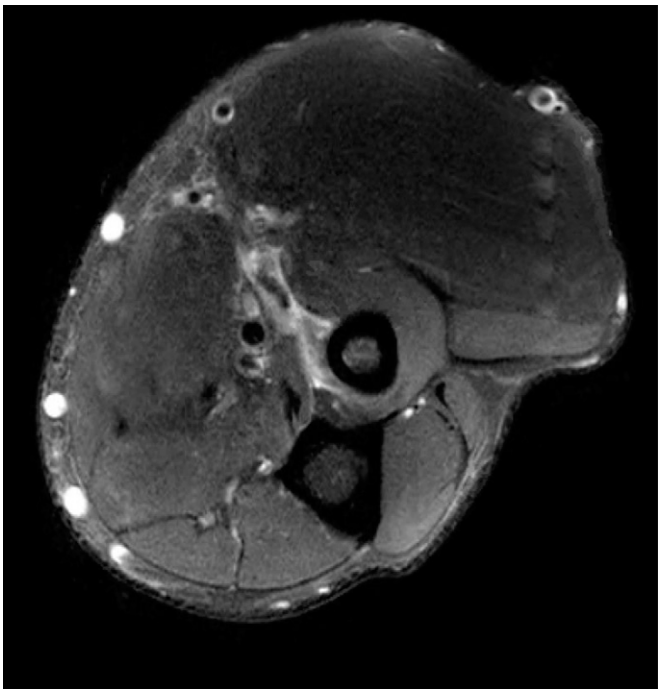

Fig. 2

Fig. 1 Sagittal T2 magnetic resonance imaging of the elbow demonstrating avulsion of the triceps tendon from the olecranon with tendon retraction.
Fig. 2 Axial T2 magnetic resonance imaging of the elbow demonstrating avulsion of the distal biceps from the biceps tuberosity with edema and tendon retraction.

of the triceps tendon was identified, and edges were debrided to healthy tendon. No chronicity of the triceps injury was noted. The tendon was secured with #2 suture tape in a Krackow fashion. The triceps footprint on the olecranon was prepared, and two 1.8 mm suture anchors were placed 15 mm distal to the olecranon process. The sutures from the anchors were passed as a horizontal mattress in the proximal tendon to recreate the footprint. The sutures were then split and combined with the suture tape to create a double-row construct with two 2.9 mm anchors (Fig. 3). At this point, we were satisfied with the triceps repair and closed the wound, turning our attention to the distal biceps repair.

We used the anterolateral approach to the elbow between the brachioradialis and pronator teres. The biceps tuberosity on the radius was exposed. The proximal stump of the biceps tendon was easily retrieved and released with blunt dissection. The tendon was tubularized with #2 fiberloop. A 5.5 mm reamer was used to create a tunnel for the biceps tendon. The tendon was then fixated into the tunnel using a suspensory cortical button (Fig. 4). The elbow was taken through a range of motion with extension to 10, flexion 120, pronation 70, and supination 90. The arm was placed into a posterior mold in 70° of extension.

Postoperatively, the patient was kept non–weight bearing in the splint. One week postoperatively, the patient was placed into a hinged elbow brace restricted from 30° to 90°. He was started in physical therapy on 7/5/19 where passive range of motion exercises were performed for the first 4 weeks with a 5 lbs lifting restriction. At his 6-week follow-up appointment, the patient had 0/10 pain, had regained full range of motion of the elbow, and discontinued his brace (Fig. 2). At that point, he was instructed to continue with a structured and gradual return to exercise physical therapy program including active movements without weight and submaximal isometric strengthening. At his 3-month postoperative appointment, the patient reported continued full range of motion and graded 4+/5 motor strength in active elbow flexion and extension. He was released to begin active, weighted strengthening. At 1 year postoperatively, patient reported pain to be 0/10. Subjectively, his elbow felt 100% of normal during regular activity, and 80% to 90% of normal during strenuous athletic activity, such as weight lifting (compared with the contralateral elbow) (Fig. 5).

Discussion

The presentation of simultaneous tendon injuries in patients is rare and uncommon. Often when they present, patients present with comorbidities such as renal or inflammatory joint disease that predisposes multiple tendons to pathologic attritional wear. Our case is unique not only because 2 tendons were simultaneously injured but also because they were coupled tendons across the same joint. An eccentric loading mechanism

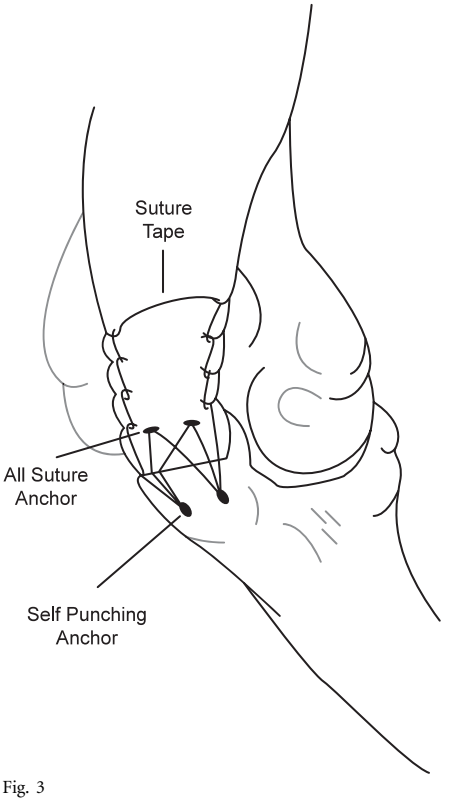

Fig. 3

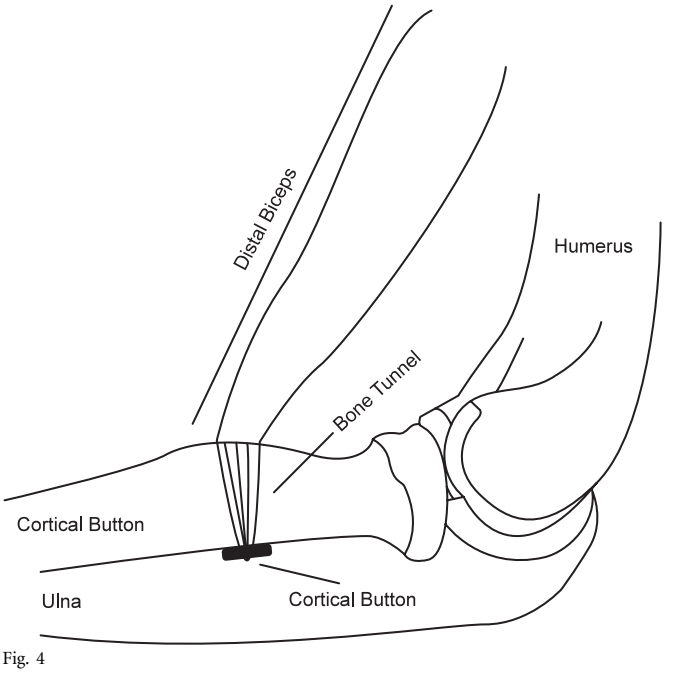

Fig. 4

Fig. 3 Diagram of the triceps repair. **Fig. 4** Diagram of the biceps repair.

led to the rupture of both the distal biceps and distal triceps tendons. A review of the literature yielded no reports of this injury pattern. Current studies focus on the management of isolated distal biceps or isolated distal triceps ruptures.

These injuries are seldom treated nonoperatively, especially in the young athletic population. Our patient, an avid weight lifter in his 40s, would have significant long-term disability with nonoperative treatment of either injury. Several risk factors have

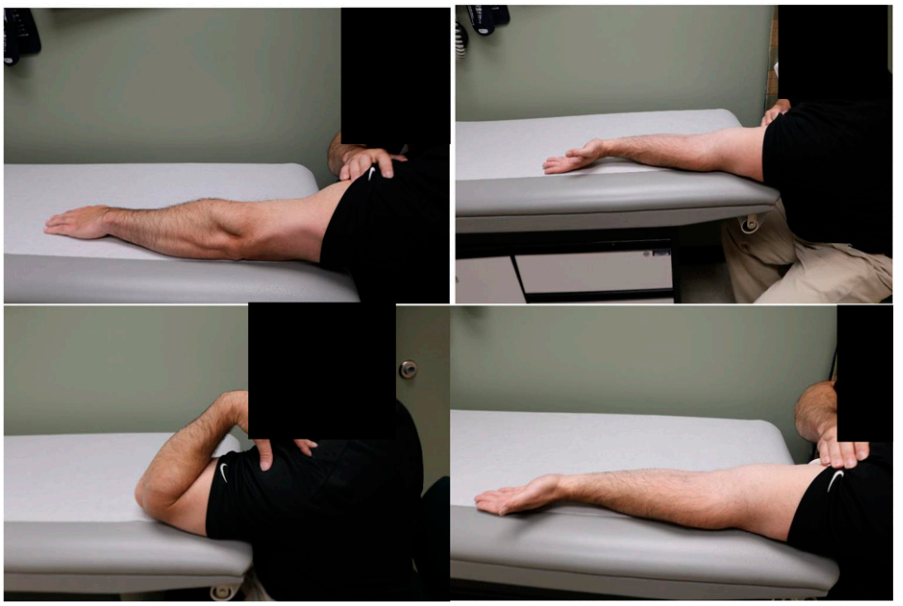

Fig. 5

Clinical photographs of the patient 1 year after surgery demonstrating full extension, flexion, supination, and pronation.

been identified in sustaining biceps and triceps tendon ruptures, including male gender, smoking, anabolic steroid use and bodybuilding, renal disease, type 1 diabetes, rheumatoid arthritis, and olecranon bursitis[5-7]. Our patient did not present with any of these pre-existing findings despite being an avid weight lifter. It is prudent to mention that he had sustained a previous distal biceps rupture with repair on the contralateral extremity approximately 21 months before this injury. Interestingly, the hook test was negative in the presence of an MRI-confirmed, full-thickness tear of the distal biceps. We attribute these contradictory findings to an intact lacertus fibrosus.

Triceps tendon tears are classically encountered in the weight-lifting population and are often treated surgically. Various methods for tendon fixation have been described with the most common methods involving transosseous bone tunnels or suture anchor fixation. Clinical studies have demonstrated no functional differences between suture anchor and transosseous fixation methods[8]. However, a recent biomechanical study demonstrated that suture anchor fixation with double-row configuration results in the least displacement compared with isolated suture anchors or transosseous bone tunnels[9]. Suture anchors was our preferred method of fixation to minimize displacement while emphasizing the need to restore range of motion early in the postoperative period.

Injuries of the distal biceps tendon typically occur during eccentric extension of the elbow, as was the case with our patient. Much like triceps tendon ruptures, fixation of distal biceps ruptures is also indicated in young healthy individuals. Operative management yields 30% and 40% greater strength in flexion and supination, respectively[10]. The cortical suspensory button technique has been shown to demonstrate the maximum amount of load to failure compared with other transosseous fixation techniques including interference screw[6,7,11].

Postoperative outcomes for these injuries are generally favorable. Postoperative stiffness is a concern around the elbow, and therefore, early range of motion is encouraged. Relying on strong fixation techniques facilitates the early return to active range of motion. Triceps reruptures can occur in up to 21% of cases. On average, patients lose up to 10° of extension but will report up to 136° of active flexion by 1 year. Moreover, they can expect 80% to 90% of their strength compared with the uninjured side[12]. Typical return to heavy activities is roughly 3 to 5 months postoperatively. The biceps postoperative course is similar in that early range of motion is encouraged. Postoperative stiffness and strength are closer to the uninjured side that compared with triceps injuries, never the less anticipated time for return to sport is also 3 to 5 months[7]. Again early motion is encouraged without compromising outcomes. Cheung et al. demonstrated no deleterious effects on strength and healing with early range of motion after distal biceps repair[13]. ■

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