Distal Biceps Tendon Rupture in a Female Patient

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Distal biceps tendon ruptures have been reported to represent only 3% of all biceps tendon ruptures.[1] Such an injury can have substantial functional and financial consequences if the patient's profession requires physical activity.[2] Compared to proximal biceps tendon tears, a complete distal biceps tendon rupture is more likely to cause chronic weakness in both supination and flexion.[1] This injury most often occurs in active, middle-aged men, and it is usually caused by an unexpected heavy load that is associated with an eccentric contraction (i.e., the elbow is forced into extension as the biceps muscle is contracting concentrically). This can occur during weightlifting or an activity involving an attempt to catch a heavy object (e.g., moving heavy furniture with another person who suddenly drops his or her portion of the load).[3] Patients may report having heard a pop at the time of injury. After injury they may report aching, swelling, and discoloration on the medial aspect of the forearm.[4] Distal biceps tendon rupture is rare among females, which may be attributable to samller cross-sectional muscle area compared to males and differing sport activity demands.[5,6] Orthopaedic literature contains only 5 reports of complete distal biceps tendon ruptures in females.[3,4,6-8]

Key Points

- Most biceps tendon ruptures are proximal; only 3% are distal.
- Acute distal biceps tendon tears rarely occur in females.
- Surgical intervention is an appropriate treatment for patients under 50 years of age who are physically active.

Distal biceps tendon rupture can be managed non-operatively, but there will be a resultant decrease in flexion range of motion and supination strength.[6] Surgical treatment is recommended for young, active patients (physically active individuals under the age of 50, such as laborers, electricians, and athletes), which has been reported to be a safe and effective approach for management of the condition.[1,9]

Case Report

A healthy, 43-year-old, right hand dominant female presented pain in the antecubital region of her right arm. The patient reported that she had sustained a hyperextension injury while playing ice hockey two days earlier. She described the injury as having occurred when another player ran into her. At the moment of impact, her elbow was flexed (holding holding her hockey stick). The flexed elbow was suddenly and unexpectedly forced into extension, and she felt a pop.

Mild ecchymosis was evident on the medial aspect of the elbow. Passive extension of the elbow elicited pain, but she did exhibit a full range of motion (see Figure 1). Manually resisted motion revealed a small deficiency in supination strength compared

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to the uninjured contralateral extremity, and a 20° loss of active extension range of motion. The patient did not have a palpable distal biceps tendon. Plain radiographs were unremarkable, but MRI confirmed a complete distal biceps tendon rupture, with 8.5 cm of retraction of the tendon from its insertion point (see Figure 2). The patient was scheduled for surgical repair of the tendon within 2 weeks of the injury date.

Surgical repair was performed using a modified Boyd-Anderson 2-incision approach.[4] Two titanium suture anchors (Super Anchors, DePuy Mitek; Raynham, MA) were used to reattach the tendon to the radial tuberosity (see Figure 3).

Immediately after surgery, the patient's arm was placed in a custom posterior splint that maintained the elbow in 90° of flexion and a neutral wrist position. The patient was encouraged to do wrist and finger range of motion exercises immediately after surgery, and physical therapy was initiated at 1 week after surgery. At 10 days postsurgery, the posterior splint was replaced with a prefabricated hinged elbow orthosis with an adjustable-position locking mechanism (Wright & Filippis, Rochester Hills, MI).

Figure 1 **Medial side of the elbow two days postinjury.**

The first 6 weeks of rehabilitation focused on decreasing swelling and achieving full range of motion. Within 2 weeks postsurgery, she was working on restoration of active extension and passive flexion range of motion. Extension was limited to 10–20° for the first 2 weeks of rehabilitation. Within 4 weeks, she could achieve full extension, with a sensation of tension at the site of the surgical repair. The upper arm was supported on a table, with the forearm hanging over its edge, for performance of active elbow extension exercises. Restoration of flexion range of motion was limited to passive movement. Full passive elbow flexion was achieved within 3–4 weeks, but active elbow flexion exercises were not initiated until 6 weeks postsurgery. Strengthening exercises were intiated at 12 weeks postsurgery, which involved the shoulder, elbow, wrist, and hand of the involved extremity. She returned to vigorous activities at 6 months postsurgery, and she was instructed to continue strengthening for a year.

At one year postsurgery, the patient's elbow range of motion nearly symmetric. She had a visual analog pain scale score of 0 and a Disabilities of the Arm, Shoulder, and Hand score of 0.8. The circumference of her biceps at 10 cm superior to the lateral epicondyle, with the elbow in extension, was 34 cm for the involved extremity and 35.5 cm for the uninvolved extremity. Elbow flexion strength measured with a hand-held dynamometer (JTech Medical; Salt Lake City, UT) was slightly less for the involved extremity (see Figure 4).

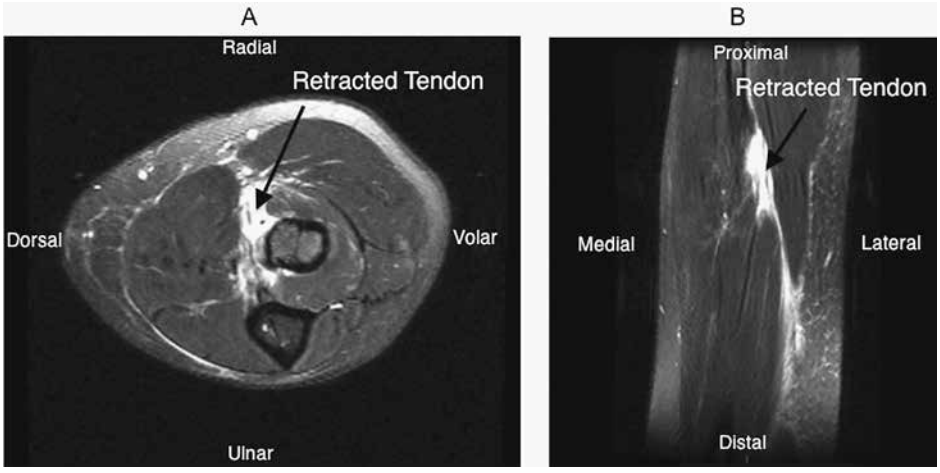

Figure 2 **(A) Axial plane MRI image, T2 weighted with fat suppression demonstrating the torn distal biceps tendon. (B) Coronal plane MRI image, T2 weighted with fat suppression showing the torn distal biceps tendon retracted approximately 8.5 cm from its insertion.**