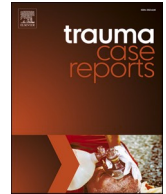




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Female patient with bilateral distal biceps tendon reconstruction: A case report

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ABSTRACT

This is a case of a 57-year-old healthy woman with traumatic bilateral distal biceps tendon rupture with tendon retraction requiring reconstruction. The functional outcomes were recorded pre-operatively and at 3 months, 6 months, 1 year and 2 years postoperatively.

Conclusion: Distal biceps tendon rupture usually occurs in male patients; however, this injury may occur in females. Delay in treatment may result in tendon degeneration precluding repair. Distal biceps tendon reconstruction with Achilles allograft yielded favorable outcome in a middle-aged female patient who sustained bilateral distal biceps tendon rupture.

Introduction

Distal biceps tendon ruptures usually occur following excessive eccentric tension to a flexed elbow that is forced into extended position [1]. These injuries typically present in the dominant elbow of men in their fourth decade of life and have been associated with smoking and anabolic steroid use [2]. National incidence is 2.55 per 100,000 patient-years, with 95 % occurring in males [3]. In the current literature there are only 5 reports of complete distal biceps tendon ruptures in females [2,4–9]. Approximately 8 % of patients with a distal biceps tendon rupture may experience rupture of the contralateral side [9]. While there have been rare reports of bilateral distal bicep tendon ruptures in females there are currently no reports of complete bilateral distal biceps tendon ruptures in females [2,4–9]. Surgical options for the management of distal biceps tendon rupture include repair or reconstruction procedures, depending on the severity of the injury and patient characteristics such as age and level of physical activity. In acute cases, distal biceps tendon ruptures can be repaired primarily, while chronic tears, usually complicated by tendonous retraction and scar tissue formation, can require reconstruction with a graft. This case report presents a female patient with traumatic bilateral distal biceps tendon rupture, treated with staged (5 months between left and right sided operations), bilateral distal biceps tendon reconstruction with Achilles tendon allograft.

Statement of informed consent

The patient was informed that the presentation and management of her injury would be submitted for publication, and she provided consent.

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Fig. 1. Representative T1 & T-2 Weighted MRI images of the patient's right elbow demonstrating distal biceps tendon rupture with retraction and degeneration (Left to right: Axial, Sagittal, Coronal).



Fig. 2. Representative T1 & T-2 Weighted MRI images of the patients left elbow demonstrating distal biceps tendon rupture with retraction and degeneration (Left to right: Axial, Sagittal, Coronal).

Case report

A 57-year-old healthy female, who worked as police officer, presented with moderate, bilateral elbow pain for four months. No history of smoking, inflammatory or autoimmune disease, or collagen disorders noted. While playing softball the patient felt a “pop” in her right elbow after swinging a bat. Six weeks later, she experienced the same popping sensation in her left elbow after catching a ball. The patient reported persistent, bilateral elbow pain and weakness in elbow flexion and supination. The patient was initially evaluated by two outside orthopedic surgeons who do not perform this operation and was therefore referred.

After approximately 4 months, the patient was referred to our clinic. The physical examination was similar in bilateral upper extremities; patient had a reverse Popeye sign bilaterally, with a palpable muscle defect to her distal upper arms as well as positive a Hook sign and weakness with forearm supination against resistance. The range of motion in elbow flexion-extension was 0° to 130° bilaterally. Bilateral elbows were stable to varus, valgus stress examination, without signs of rotational instability. The remainder of the physical exam was unremarkable.

Magnetic resonance imaging (MRI) of the right elbow demonstrated complete disruption of the distal biceps tendon with a 7 cm gap between the retracted torn tendon and the radial tuberosity (Fig. 1). MRI of the left elbow demonstrated complete tear of the distal biceps tendon with a 13 cm gap between the retracted torn tendon and the radial tuberosity (Fig. 2). Bilateral MRI was obtained prior to the patient arriving at our facility. Due to the desire of the patient to return to physical activity surgical management was elected. The delayed presentation of patient to out clinic (~ 4-month post injury) favored distal biceps tendon reconstruction with Achilles allograft over repair, with intraoperative evaluation of the biceps tendon stump ultimately dictating procedural choice. The patient underwent right distal biceps tendon reconstruction with Achilles allograft first, followed by left distal biceps tendon reconstruction 5 months later.

The patient was placed supine on a standard operating table and sedated using general anesthesia. The Achilles allograft was prepared (Video 1). A Chevron incision was made on the distal arm and was dissected down to fascia. The biceps tendon was found to be retracted, scarred and without significant usable tendon in both the right and left upper extremity. The lateral antebrachial cutaneous nerve, median nerve and brachial artery were protected. Dissection was carried down to radial tuberosity, where a pin was placed, which was then overdrilled with a size 6 reamer. An Achilles tendon allograft was trimmed to 6 mm, whipstitched and placed in the button. The tension slide technique was used to bring the tendon into the unicortical socket and the suture limbs were tied and backed up with an additional knot stack. A slit in the fan-like Achilles graft was created more proximally and placed the tendon stump of the biceps through the Achilles graft and sutured the 2 together in 60–90 degrees of flexion to tension the biceps (Video 2). Postoperatively, the patient was placed in a posterior elbow splint for the protection of reconstruction site, followed by gradually increased range of motion in the elbow using a hinged elbow brace.

Patient outcomes

Functional assessment was performed using the Visual Analog Pain Scale (VAS) of 0, American Shoulder and Elbow Surgeons Shoulder Score (ASES); Kerlan-Jobe Orthopedic Clinic Shoulder and Elbow Score (KJOC); Single Assessment Numeric Evaluation

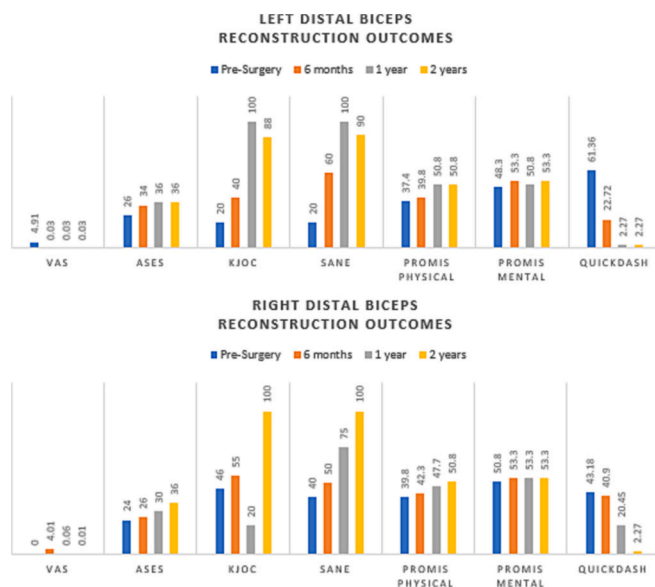


Fig. 3. Visual Analog Score (VAS); American Shoulder and Elbow Surgeons (ASES) score; Kerlan-Jobe Orthopedic Clinical Shoulder and Elbow Score (KJOC); Single Assessment Numeric Evaluation (SANE); Patient Reported Outcomes Measurement Information System (PROMIS) Physical/Mental; Abbreviated version of the Disabilities of the arm, shoulder, and hand (QuickDASH).

(SANE) and Patient-Reported Outcomes Measurement Information System (PROMIS) Physical/Mental that were recorded preoperatively and at 3 months, 6 months, 1 year and 2 years postoperatively for bilateral upper extremities (Fig. 3). At 3 months after the 2nd procedure (left distal biceps reconstruction) patient achieved full, painless elbow range of motion bilaterally (Video 3) and she was able to perform heavy household chores without difficulty. Patient was cleared to return to sport activity after her bilateral elbow surgery and she was able to throw a ball without experiencing pain or weakness on any of her elbows. At this point, patient elected to undergo rotator cuff repair surgery due to a symptomatic tear on her left shoulder that she had prior to her elbow injuries, and she felt that it would optimize her overall postoperative sports participation. The shoulder operation was performed by the same surgeon. At 2-year follow up after the latest elbow procedure (left side), patient was still in the rehabilitation process of her left shoulder (uncomplicated) with the goal to return to physical activity when she met the return to sport criteria. In terms of outcome scores at 2 years of follow up, the patient showed improvement in all reported measures throughout the study and reached MCID in regard to SANE with improvements of 60 bilaterally at 2 years [10]. Overall, the patient's bilateral elbow and shoulder postoperative course of rehabilitation had been uneventful, and patient was expected to return to softball when she met the sport participation clearance criteria based on her left shoulder recovery.

Discussion

Delayed treatment of distal biceps tendon ruptures makes primary repair challenging due to tendon retraction and atrophic degeneration placing the patient at risk for re-rupture and elbow extension deficits postoperatively. Various techniques using palmaris longus, flexor carpi radialis, fascia lata, semitendinosus, and Achilles grafts have been reported for distal biceps tendon reconstruction [11,12]. Achilles tendon allografts are favored due to excellent mechanical and physical properties, with the aponeurosis permitting secure suturing to host biceps [13].

To our knowledge, there are no previous reports of bilateral distal biceps tendon reconstructions with Achilles allograft in female patients. Two previous case series showed excellent midterm outcomes in male patients undergoing distal biceps tendon reconstruction using Achilles allograft based on the Mayo elbow performance score [13,14]. Rokito et al. described a male weightlifter with bilateral distal biceps tendon ruptures, directly repairing the right side, while surgically reconstructing the left with Achilles allograft. The patient had symmetric post-operative function on physical exam and subjective equal strength bilaterally [15].

In this case report, a 57-year-old female patient underwent staged (5 months between the left sided and right sided operation) bilateral distal biceps tendon reconstruction with Achilles allograft following traumatic injuries causing severe functional limitations and the outcome was successful. Within 4 months after her 2nd elbow surgery, patient was able to perform activities of daily living and was clear to participate in softball (Video 3). Patient elected to proceed with left rotator cuff repair by the same surgeon due to a tear that was present prior to her bilateral elbow injuries, and she felt that this would benefit her overall recovery. At 2 year-follow up, patient experienced significant functional improvement in bilateral upper extremities, and she performed heavy household tasks without difficulty. Patient's sport participation was only limited due to her being in the rehabilitation process for her L shoulder rotator cuff repair.

Distal biceps tendon rupture more commonly presents in male patients; however, this injury may occur in females. Delay in treatment may result in tendon degeneration and retraction precluding repair. Distal biceps tendon reconstruction with Achilles allograft yielded favorable outcome in a middle-aged female patient who sustained bilateral distal biceps tendon rupture during sport participation and patient experienced full, painless elbow ROM and strength in bilateral elbows.

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.tcr.2023.100870>.

Declaration of competing interest

Alexander E. Weber has received educational support from Arthrex and Smith & Nephew, nonconsulting fees from Arthrex, and hospitality payments from Stryker. No funding was provided for this particular study.

All other authors have no conflicts of interest.

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