

Functional Outcome of Distal Biceps Tendon Repair using Suture Bridging with Endobutton and Suture Anchor: A Case Report

T MARI SARAVANAN¹, B VIJAY ANAND², S DEVI PRASAD³, J KEVIN DHAS⁴

ABSTRACT

Distal biceps tendon rupture is a rare injury, accounting for less than 10% of all biceps injuries, often resulting in significant loss of elbow flexion and supination strength. This reports a 40-year-old male who sustained a complete rupture of the right distal biceps tendon during heavy lifting. Surgical repair was performed using a suture bridging construct with Endobutton and suture anchor fixation. At three months postoperatively, the patient achieved near-normal range of motion (flexion 130°, supination 80°) and full muscle strength (5/5). No complications including stiffness, infection, or re-rupture, were observed, and the patient returned to work with full functional recovery. Suture bridging with Endobutton and suture anchor fixation is a reliable and reproducible technique for distal biceps tendon repair, providing excellent functional outcomes, allowing early rehabilitation, and being particularly suitable for active individuals.

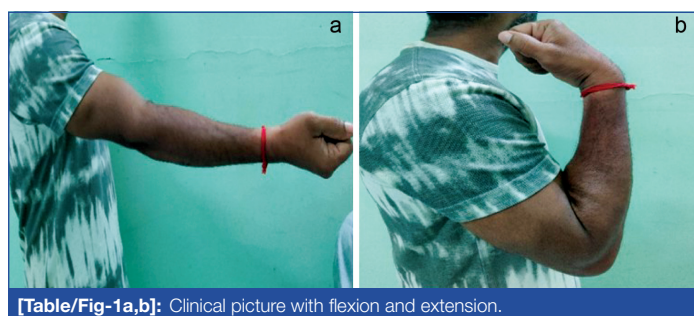
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CASE REPORT

A 40-year-old right-hand dominant male manual labourer came with acute pain and oedema in the right antecubital fossa for one week after attempting to lift a large object. He experienced a sudden “pop” sensation followed by weakness in elbow flexion and forearm supination. He was right-hand dominant and engaged in heavy manual work. No history of trauma, steroid use, or systemic illness was present.

On physical examination, the patient demonstrated local swelling and ecchymosis over the right antecubital fossa, with a palpable defect at the distal biceps’ tendon insertion. The Hook test was positive, and a visible Popeye deformity was noted due to tendon retraction. There was associated weakness in elbow flexion and forearm supination compared to the contralateral side [1].

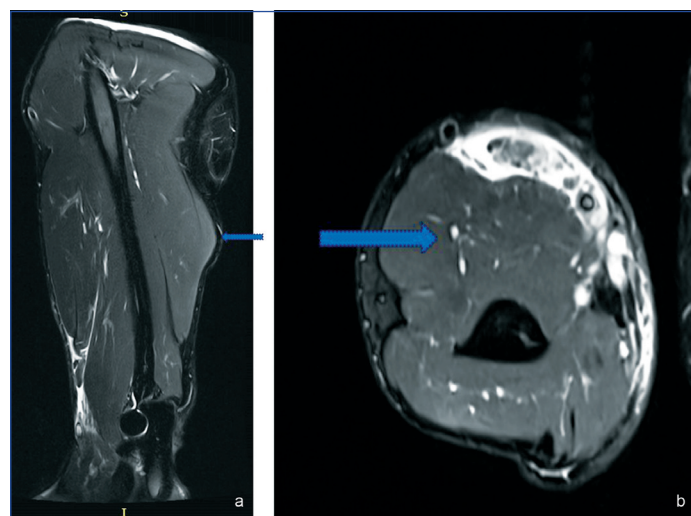
The patient’s range of motion revealed right elbow flexion of 90° compared to 130° on the left, with a 10° extension deficit on the right and full extension on the left. Forearm supination measured 40° on the right versus 85° on the left, and pronation was 60° on the right compared to 80° on the left. Muscle power, assessed by Medical Research Council (MRC) grading, demonstrated right elbow flexion of 3/5 and supination of 2/5, while the left-side was 5/5 for both movements [Table/Fig-1a,b] [2].



[Table/Fig-1a,b]: Clinical picture with flexion and extension.

Plain radiographs of the elbow revealed no indications of fracture or avulsion damage. Magnetic Resonance Imaging (MRI) verified a total rupture of the distal biceps tendon with proximal displacement from the radial tuberosity [Table/Fig-2a,b]. A diagnosis of total distal

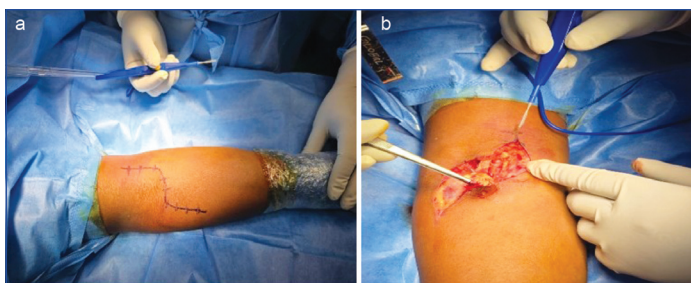
biceps tendon rupture was established based on the patient’s occupational requirements, functional limitations, and imaging results and surgical repair was scheduled.



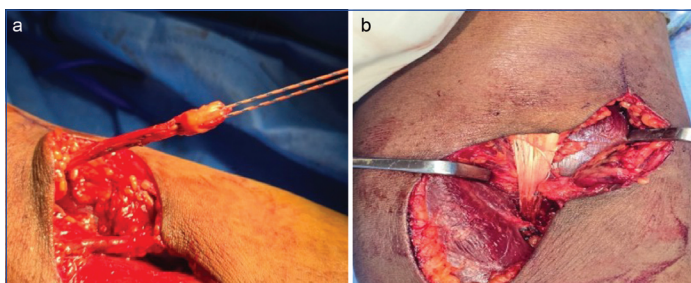
[Table/Fig-2]: A and B: MRI showing tendon rupture.

The patient was placed in a supine posture with the afflicted limb stabilised on an arm board. A single transverse anterior incision was made across the antecubital fossa, where the torn distal biceps tendon was discovered and mobilised [Table/Fig-3]. Krackow sutures were implemented utilising high-strength non-absorbable suture material. A unicortical tunnel was established at the radial tuberosity, and the sutures were threaded through a cortical button device, which was positioned under fluoroscopic guidance [Table/Fig-4,5a,b]. An extra suture anchor was inserted to establish a suture-bridging construct, ensuring compression of the tendon against the radial tuberosity. The laceration was cleansed and sutured in multiple layers.

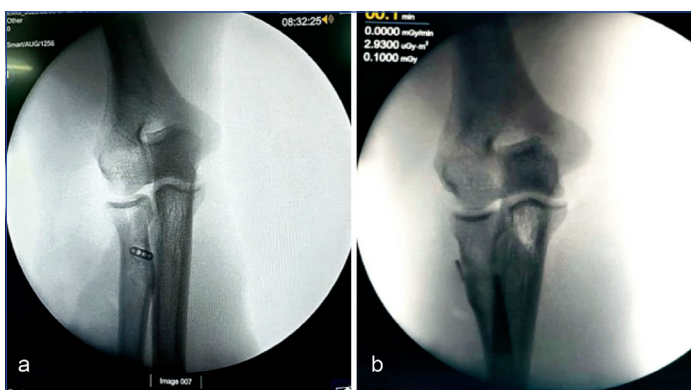
Postoperatively, the limb was immobilised in a posterior splint for two weeks. Passive range of motion was initiated at two weeks, active range of motion at four weeks, and progressive strengthening commenced after six weeks. At three months follow-up, the patient achieved flexion of 130°, full extension, supination of 80°, and



[Table/Fig-3a,b]: Intraoperative image- skin incision and tendon retrieval, respectively.



[Table/Fig-4a,b]: Intraoperative image - Endobutton fixation.



[Table/Fig-5]: a) Intraoperative fluoroscopic (C-arm) confirmation of Endobutton fixation; b) Final fluoroscopic image confirming tendon fixation at the radial tuberosity.

pronation of 75°, with muscle power of 5/5 in both flexion and supination. No complications, including infection, stiffness, or re-rupture, were observed, and the patient returned to work with complete functional recovery.

DISCUSSION

Distal biceps tendon ruptures have been extensively studied, with numerous authors comparing fixation techniques, clinical outcomes, and complication rates. Chavan PR et al., reported that surgical repair consistently provides better outcomes than conservative management, especially regarding supination strength [3]. Watson JN et al., emphasised that techniques allowing strong initial fixation produce superior functional recovery [4].

Biomechanical evaluations by Mazzocca AD et al., demonstrated that cortical button constructs exhibit the highest load-to-failure strength among common repair methods [5]. Takahashi T et al., compared Endobutton to suture anchor techniques and found that cortical button constructs withstand significantly greater cyclic loading forces [6]. Similarly, Wu Z et al., described the suture-bridge configuration and reported improved tendon compression and reduced gapping [7].

Jansen N et al., highlighted the limitations of earlier techniques such as transosseous tunnels and single-anchor repairs due to risks of heterotopic ossification and lower fixation strength [8]. Fitzgerald MJ et al., further supported the use of tension-slide and cortical button constructs for stronger tendon-to-bone healing [9]. Clinically, Amarasooriya M et al., noted lower complication rates with modern fixation constructs [10], while Tazrean R et al., emphasised early mobilisation to prevent postoperative stiffness [11].

A distal biceps tendon rupture, albeit uncommon, is a clinically important injury in active adults, leading to diminished forearm supination and decreased elbow flexion strength. The current case report, successfully treated with a suture bridging technique utilising an Endobutton and a suture anchor, highlights the effectiveness of this robust fixation method.

Non-operative management leads to significant functional deficits, including up to a 40-50% loss of supination strength and a 20-30% reduction in flexion strength [4]. For a right-hand dominant man engaged in heavy manual labour, surgical re-attachment was mandatory to restore his ability to work. The goal of surgery was not just healing, but complete functional restoration.

The suture bridging technique combines the high pull-out strength of the Endobutton with the compressive fixation of the suture anchor, enhancing fixation strength, reducing gap formation, and accelerating tendon-to-bone healing. This robust construct is particularly advantageous for allowing early, aggressive rehabilitation, preventing postoperative stiffness.

In comparison to Endobutton-only procedures, which offer superior cortical fixation strength, using a suture anchor in the hybrid construct improves footprint compression and may diminish micromotion at the tendon-bone contact [12]. Suture anchor-only repairs provide compression but exhibit inferior load-to-failure strength relative to cortical button structures. Tension-slide procedures offer robust fixation; however, they may not attain the same level of tendon footprint compression as the combined design [13].

In this particular case, a young right-hand dominant manual labourer, the hybrid suture-bridging technique was selected over a single-method repair to enhance fixation stability and facilitate early mobilisation, considering the elevated functional requirements. While the literature reports excellent outcomes with simpler structures, the chosen approach offered enhanced biomechanical stability deemed advantageous in this case. Also, possible problems related to distal biceps repair encompass nerve injury (notably posterior interosseous nerve neuropraxia), heterotopic ossification, synostosis, and re-rupture. Although the hybrid design may elevate surgical complexity and implant expenses, no problems were noted in this case.

The functional outcome achieved at three months- flexion of 130°, supination of 80°, and full muscle power (5/5)- represents an excellent recovery. The strong fixation allowed for early motion, which prevents stiffness and promotes tendon gliding. The positive clinical results noted, such as prompt strength recovery and resumption of work, are analogous to those documented in similar instances treated using cortical button or tension-slide procedures in current literature.

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CONCLUSION(S)

Suture bridging with Endobutton and suture anchor provides a reliable and reproducible method for distal biceps tendon repair. It offers a biomechanically superior and anatomically sound repair that effectively restores the insertion of the tendon to the radial tuberosity. It enables early mobilisation, restores strength, and ensures excellent functional outcomes, particularly in active individuals requiring full elbow and forearm function.

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