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Does immediate elbow mobilization after distal biceps tendon repair carry the risk of wound breakdown, failure of repair, or patient dissatisfaction?

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Background: Rehabilitation protocols after distal biceps repair are highly variable, with many surgeons favoring at least 2 weeks of immobilization. Is this conservative approach necessary to protect the repair?
Methods: This was a consecutive series of 22 distal biceps tendon repairs in which a cortical button system was used. Patients were encouraged to mobilize their elbow actively from the day of surgery. Physiotherapy commenced at 3 weeks, with strengthening exercises when full range of movement (ROM) was achieved. The primary outcome measured was the clinical integrity of the repaired tendon. Secondary outcomes comprised wound or nerve complication, elbow ROM, and patient-reported outcome measures (the 11-item version of the Disabilities of Arm, Shoulder and Hand, Mayo Elbow Performance Index, and Oxford Elbow Score).
Results: All patients were male, and the dominant arm was repaired in 60%. Mean age was 40.6 years (range, 27-62 years), and mean time to surgery was 17 days (range, 5-99 days). Mean follow-up was 16.6 months (range, 3.8-29 months). All tendons were clinically intact at time of review. No wound breakdown occurred. Mean extension was −6° (range, −10° to 10°), and flexion was 144° (range, 135°-150°). All patients achieved full pronosupination. ROM was equivalent to the uninjured arm ($P = .7$). The mean 11-item version of the Disabilities of Arm, Shoulder and Hand score was 2.7 (range, 0-15.9), the Mayo Elbow Performance Index was 97.8 (range, 70-100), and the Oxford Elbow Score was 46.9 (range, 43-48) at the latest follow-up. One-third of patients experienced a transient sensory neurapraxia.
Conclusion: Immediate mobilization after biceps tendon repair with a cortical button is possible, and in this series was not associated with failure of the repair, wound breakdown, or patient dissatisfaction. However, this series emphasizes the high incidence of nerve complication that can be associated with the single transverse incision technique.
Level of evidence: Level IV; Case Series; Treatment Study

Keywords: Biceps; tendon; ToggleLoc; cortical button; single anterior incision; immediate mobilization

Rupture of the distal biceps tendon is a commonly encountered condition around the elbow, with an incidence of 1.2/100,000 persons per year[24] and affecting mostly men in their fifth decade of life.[3,4,13,19,26] Conservative management of this injury can result in flexion and supination weakness

Ethical Review Board approval was not required for this study because all data were collected as part of a normal standardized clinical investigation.

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or fatigue.[2,11,20] With the increasing availability of tendon repair instrumentation and a relatively low surgical complication rate, reattachment of the tendon to the radial tuberosity is becoming the accepted treatment. Various techniques, using transosseous suture, bone anchors, and cortical buttons, have been described.[1,3,4,7,9,10,17,19,22,23,28]

Despite good biomechanical evidence that the cortical button–tendon construct can withstand similar forces to the intact tendon,[5,12,14,16,18,27] many surgeons still favor at least 2 weeks of immobilization after surgery[1,3,7,9,19,28] for fear of construct failure or wound complication. Two case series have reported favorable outcomes after immediate mobilization after biceps repair.[10,22] We report our results using a cortical button technique and immediate postoperative mobilization.

Materials and methods

Between September 2012 and October 2014, 22 distal biceps tendon repairs were performed in 20 patients. Retrospective review of medical records identified patient demographics at the time of surgery and the interval between injury and surgery. One patient (bilateral repair) did not attend follow-up appointments after the initial 2-week wound check period and was classified as lost to follow-up owing to the lack of data. All patients' demographic data were used for the study, but only the remaining 20 repairs were monitored for outcome scoring. The primary outcome was defined as clinical integrity of the tendon at the final follow-up. Secondary outcomes included clinician-based and patient-reported outcome measures (PROMs). Clinician-based outcomes were elbow range of movement (ROM), wound complication, and neurologic complication. Motor nerve function was recorded using the Medical Research Council scale, and sensation was measured used a 0 to 10 analog scale. PROMs recorded were the 11-item version of the Disabilities of Arm, Shoulder and Hand (QuickDASH), Mayo Elbow Performance Index (MEPI), and Oxford Elbow Score (OES), and time taken to return to work.

In our practice, distal biceps tendon rupture is a clinical diagnosis. If the history is suggestive, our clinical examination includes observation of the attitude of the biceps muscle belly, presence of a bruise in the proximal ulnar aspect of the forearm, lack of movement of the biceps with supination, and the O'Driscoll hook test.[21] This simple test is sufficient to diagnose a complete rupture of the biceps tendon. The same clinical examination is performed during the follow-up to assess the integrity of the tendon. We do not routinely use magnetic resonance imaging preoperatively to diagnose or assess the integrity of the tendon. Likewise, postoperative radiographs were not routinely used for assessment unless clinically indicated after the examination.

Statistical analysis was performed using SPSS 22 software (IBM Corp, Armonk, NY, USA). The distribution of data against normal was checked using the Kolmogorov-Smirnov test. A paired Student *t* test was used to evaluate any difference in ROM, using the uninjured contralateral arm of each patient as a control (a bilateral repair was appropriately excluded from this calculation). Correlation between any outcome measure and time to follow-up was tested using the Pearson correlation coefficient (r). A P value of $<.05$ was considered significant.

Operative technique

The cortical button system used was the ToggleLoc with ZipLoop sliding suture (Biomet, Warsaw, IN, USA; Fig. 1). Operations were performed or directly supervised by the senior author (R.A.). Under a general anesthetic, patients are positioned supine with the affected arm resting on a hand table. Intravenous prophylactic antibiotic is administered according to hospital protocol. The limb is cleaned with aqueous chlorhexidine before formal skin preparation to remove any gross contamination. The limb is then prepared with chlorhexidine and draped in a sterile fashion.

A 3- to 5-cm transverse incision is made 2 finger breadths distal to the elbow crease, mostly positioned over the ulnar aspect of the mobile wad. The lateral antebrachial cutaneous nerve is identified and protected. The retracted distal end of the biceps tendon is identified with a finger sweep, and any adhesions are carefully released. The tendon is delivered from the wound, and any macerated or scar tissue is sharply dissected. A No. 2 MaxBraid (Biomet) is used to secure the cortical button system to the tendon, with a double row,

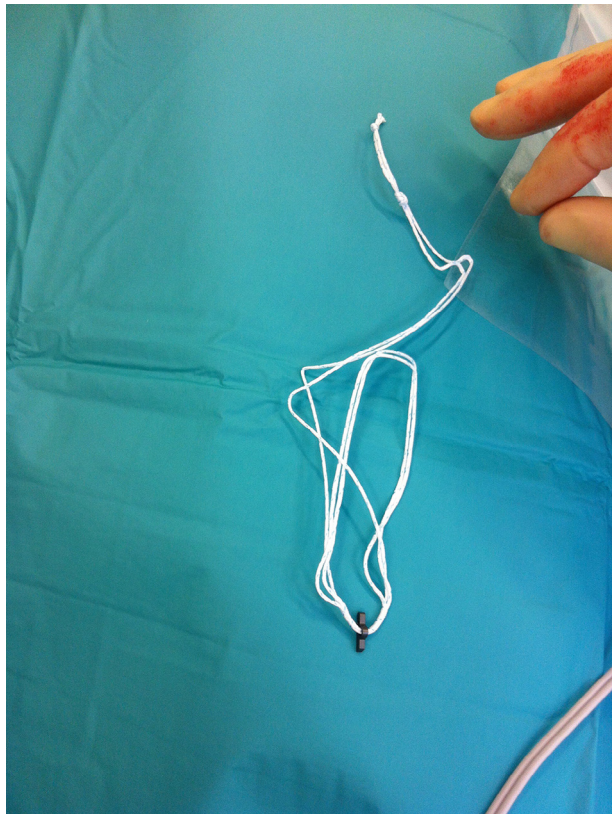

Figure 1 ToggleLoc with ZipLoop (Biomet, Warsaw, IN, USA).