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Case Report
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A Common Shoulder Arthroscopy Suture Cutter Used as Autograft Tendon Harvester in Scapholunate Reconstruction: A Case Report

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Abstract

Case: A 64-year-old female with a Scapholunate Ligament (SLL) injury underwent SLL reconstruction. Upon Extensor Carpi Radialis Brevis (ECRB) tendon exposure for autograft harvest, the specialized tendon stripper was found to be unavailable. Instead, a commonly used shoulder arthroscopy knot cutting instrument was used. 14 cm of autograft was harvested using this novel technique, allowing for successful reconstruction.

Conclusion: In this case report, we exemplify how a shoulder arthroscopy knot cutting instrument can be successfully used as a graft harvesting alternative when an ECRB tendon autograft needs to be obtained, ideally when that autograft is less than 2.5 mm in diameter.

Introduction

As the most commonly injured carpal ligament, Scapholunate Ligament (SLL) tears affect a wide range of patients [1]. Over time, these injuries alter the mechanic of the wrist joint leading to a predictable pattern of wrist arthritis [1,2]. Treatment is aimed at arresting the degenerative process by restoring ligament continuity and stabilizing carpal mechanics [1,3]. Several different techniques have been described in the literature to address SLL injuries prior to the development of wrist arthritis, many of which require the use of tendon autografts in order to reconstruct the injured ligament.

During harvest of the tendon autograft, a specialized tendon stripper is often used to harvest the autograft. Unfortunately, due equipment breakage, sterility failure, or supply limitations, surgeons may find themselves without proper equipment. In this setting, three options are available: The case can be aborted, the surgeon can wait to see if a new instrument can be found, or the surgeon can attempt to apply alternative instruments in novel ways.

Novel application of alternative instrumentation is fairly common in orthopedic surgery; however, the surgeon should always be cautious as off-label use of products can sometimes lead to unintended consequences and increased morbidity. With that said, this case report exemplifies how an Extensor Carpi Radialis Brevis (ECRB) tendon autograft can safely be harvested for SLL reconstruction by using a common knot cutting instrument used in shoulder arthroscopy.

Case Presentation

A 64-year-old right hand dominant female sustained a fall at work where she landed on her outstretched right hand. In clinic 2 weeks after her original injury, she complained of continued pain about the base of her thumb near the radial wrist. She had no relevant past medical, family, or surgical history. Upon examination, she was tender to palpation at the anatomic snuffbox, distal pole of the scaphoid, and Lister's tubercle. She experienced pain with Watson's shift test, however, no frank subluxation was appreciated. Radiographically, there were mild arthritic changes at the thumb Carpometacarpal (CMC) joint in addition to widening of the Scapholunate (SL) articulation (Figures 1-3). At follow-up 4 weeks later, she had failed a trial of non-operative management with a wrist brace. An MRI confirmed SLL injury. Treatment options were reviewed including non-operative management, primary SLL repair and SL reconstruction. The decision was made to proceed with right scapholunate ligament reconstruction.

A 10 cm incision was made over the dorsum of the hand between the 3rd and 4th dorsal compartments. Full-thickness skin flaps were elevated down to the level of the extensor retinaculum.

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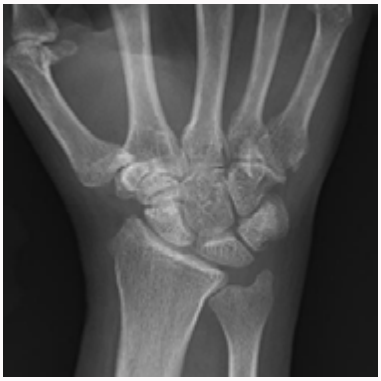

Figure 1: Preoperative posteroanterior X-ray.

Figure 2: Preoperative lateral X-ray.

Figure 3: Preoperative posteroanterior ulnar deviation X-ray demonstrating scapholunate dissociation concerning for scapholunate ligament tear.

The extensor retinaculum was then incised in a Z-fashion, opening the fourth, third, and second dorsal compartments. The extensor tendons were retracted and an inverted T capsulotomy was performed. The patient was noted to have full-thickness tearing of her dorsal and intramembranous portion of her scapholunate ligament.

Next, a 2 mm slip of the ECRB was taken off its insertion on the third metacarpal base. A 2-0 fiber-wire suture was used to whip-stitch the tendon end for tendon manipulation. Tenotomy scissors were then used to split the grossly exposed tendon in line with its fibers. At this time, the specialized tendon stripper was found to be unavailable, so a shoulder arthroscopy knot cutting instrument was used (Figure 4, 5). The tendon slip was passed through the eye of the suture cutter

Figure 4: Tendon stripper.

Figure 5: Shoulder arthroscopy suture cutter.

Figure 6: 1-year postoperative posteroanterior X-ray demonstrating diastasis of the SL interval and early development of SLAC wrist.

Figure 7: 1-year postoperative lateral X-ray.

and gentle axial load with internal and external rotation was applied through the shoulder arthroscopy suture cutter, in line with the fibers of the tendon until roughly 14 cm of graft was obtained.

Next, the flexion deformity of the scaphoid was corrected as well as the gapping between the scaphoid and the lunate by manipulating the two carpal bones with 1.6 mm K-wires. After reduction of the deformity was performed, guidewires were placed in the center of the lunate, the proximal pole of the scaphoid, and the distal pole of the scaphoid to ensure proper placement of anchor holes prior to drilling. A cannulated drill was then used to drill over the guidewires and the wires were subsequently removed.

Once the anchor tunnels were drilled, the ECRB autograft was loaded onto a 3.5 mm SwiveLock anchor with a free piece of SutureTape. The graft and SutureTape were then placed into the predrilled hole in the proximal pole of the scaphoid. Next, another 3.5 mm SwiveLock anchor was dropped into the predrilled hole within the lunate and the graft was tensioned appropriately. Lastly, a third 3.5 mm SwiveLock anchor fixed to the graft and SutureTape were placed into the predrilled hole in the distal pole of the scaphoid.

Fluoroscopic images demonstrated correction of the Dorsal Intercalated Segment Instability (DISI) deformity and reduction of the space between the scaphoid and the lunate. Lastly, a 1.6 mm K-wire was then passed from the scaphoid into the capitate between the 2 anchors to be removed at a later date. Final fluoroscopic images demonstrated adequate placement of the K-wire in the scaphoid and capitate.

The incision for the percutaneous K-wire was closed with 3-0 nylon suture. The subcutaneous tissue of the dorsal incision was closed with 2-0 Vicryl suture and skin was closed with 3-0 nylon suture. The wounds were then dressed sterilely. The patient was placed in a thumb spica splint.

The patient's postoperative course has been uneventful. Her initial visit was 2 weeks after surgery, where her splint was taken down, sutures were removed, and new dressings along with a thumb spica splint were applied. She returned 6 weeks postoperatively where her pin was removed and she exhibited no significant tenderness to her wrist with full thumb and finger range of motion. At her 3-month visit her Range of Motion (ROM) was limited to 10 degrees of flexion and 10 degrees of extension. X-rays at this time demonstrate mild diastasis of the SL interval (Figure 6, 7). Currently, at one-year post-op, she is doing well with improving pain and motion. She is weight bearing as tolerated through her right upper extremity at home, while maintaining a 20-pound weight limit at work to prevent re-injury.

Discussion

Over the last decades, many researchers and practitioners have conducted studies to deal with the issue of managing surgical supplies and instruments [4-6]. Now, with the growth of outpatient surgery and the shortening of hospital stays, further stress has been placed on this issue and managing the flow of instrumentation has not been optimized. Whether due to contamination, instrument breakage, or mismanagement of resources, these situations cause operative delays and stress in the operating room, which can lead to additional risks for the patients. Understanding other commonly performed orthopedic procedures and the instrumentation required to perform those surgeries allows surgeons to consider alternative instruments when proper instrumentation is unavailable.

Tendon autograft harvesting often requires specialized equipment. When off-label use of orthopedic equipment is attempted, the provider should do their best to find similar characteristics between devices. In our case, the tendon stripper is an elongated tool with a handle, a long slender neck and a tip having a coiled eyelet with a stripping edge and a side entry slot (Figure 4). The tendon is engaged with the eyelet *via* passage through the side entry slot. Firm counter pressure is maintained while advancing the tendon stripper until the tendon is released at the desired length. Similarly, shoulder arthroscopy suture cutters are long, open-ended instruments that allow for passage of the free end of the tendon graft. Once the desired length is passed through the instrument, gentle axial load with internal and external rotation is applied to harvest the graft (Figure 5).

In this case, we have highlighted an option that is readily available and does not cause increased morbidity. A 14 cm of healthy tendon autograft was harvested using a shoulder arthroscopy knot cutter. This technique can be applied to any situation where a small <2.5 mm tendon graft needs to be obtained. Shoulder sets and knot cutters are generally in surplus at most surgery centers and hospitals making this an easy reproducible technique.

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