

Arthroscopic Scapholunate Ligament Reconstruction, Volar and Dorsal Reconstruction

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KEYWORDS

• Scapholunate instability • Wrist arthroscopy • Scapholunate ligament • Carpal instability

KEY POINTS

- Patients suitable for this surgery should fulfill 3 criteria: complete tear of the scapholunate (SL) ligament, easily reducible instability, and presence of clinical symptoms.
- Contraindications for this technique are the presence of degenerative lesions or other associated ligament injuries.
- The technique reconstructs both the dorsal and volar portion of the SL ligament with a 3-mm graft from the flexor carpi radialis tendon.
- The graft is fixed to the scaphoid and lunate tunnels with interference screws.
- Early mobilization rehabilitation protocols include midcarpal motion exercise at 2 weeks, full range of motion exercise at 4 weeks, and proprioception exercises at 6 weeks after the surgery.

 Video content accompanies this article at <http://www.hand.theclinics.com/>.

INTRODUCTION: NATURE OF THE PROBLEM

Scapholunate (SL) ligament instability is the most common form of carpal instability. Patients usually have dorsal wrist pain, decreased grip strength, and impaired wrist function. Untreated SL instability can result in a predictable sequence of degenerative changes in the wrist.¹

SL instability can be treated by an arthroscopic or an open technique. Arthroscopic SL

ligament debridement, thermal shrinkage, and SL pinning were reported with the benefit of limited damage to healthy soft tissues.²⁻⁵ For SL ligament reconstruction, a wide variety of open procedures have been described.⁶⁻⁸ All of the open procedures required a wide dorsal dissection, which resulted in considerable damage to the soft tissues and a reduction in joint mobility.

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Arthroscopic SL ligament reconstruction was described in 2011^{9,10} and combined the advantages of arthroscopic (minimally invasive surgery) and open techniques (reconstruction of the ligament). It serves the 3-fold purpose of anatomic reconstruction, avoidance of open surgery and detachment of the joint capsule, and a reliable and sturdy reconstruction for early mobilization.

ANATOMIC RECONSTRUCTION

The SL interosseous ligament consists of 3 subregions: the dorsal, palmar, and proximal (listed in order of decreasing strength).^{11–13} The dorsal part was thought to be the strongest and different techniques of dorsal SL ligament reconstruction were commonly described. However, these reconstruction with only 1 dorsal fixation point between the 2 bones cannot preclude SL volar widening or sagittal rotation (Fig. 1). With an additional reconstruction on the volar side, the second strongest SL portion is also restored and 2 fixation points between the 2 bones can be created. Reconstructing both the dorsal and the volar SL portions becomes logical biomechanically and is gaining attention in recent years.^{10,14–17}

In addition to restoring the portions of the SL ligament, restoring the scaphoid alignment is

also important. Short and colleagues^{18,19} demonstrated that the scaphoid bone was not only flexed, but also pronated in SL instability. Scaphoid pronation creates a static stress at the dorsum of the wrist. It also produces a dynamic stress as the scaphoid is dorsally translated over the dorsal rim of the radius at wrist extension and radial deviation. This explains why patients with SL instability would have dorsal wrist pain, especially with wrist hyperextension or Watson's stress test, and it explains why degenerative changes begin not in a radial styloid but in the dorsum of the scaphoid fossa. This dorsal displacement over the dorsal rim of the radius can be checked arthroscopically with the arthroscopic scaphoid 3-dimensional test.²⁰ An anatomic reconstruction should not only reconstruct the SL ligament (both dorsal and volar), but also supinate the scaphoid, and prevent dorsal translation of the scaphoid over the scaphoid fossa.

AVOIDANCE OF OPEN SURGERY AND DETACHMENT OF THE JOINT CAPSULE

Arthroscopic SL reconstruction is a minimally invasive technique that obviates the need for extensive open dissection and capsulotomy (Fig. 2). Postoperative fibrosis, scarring, and stiffness are

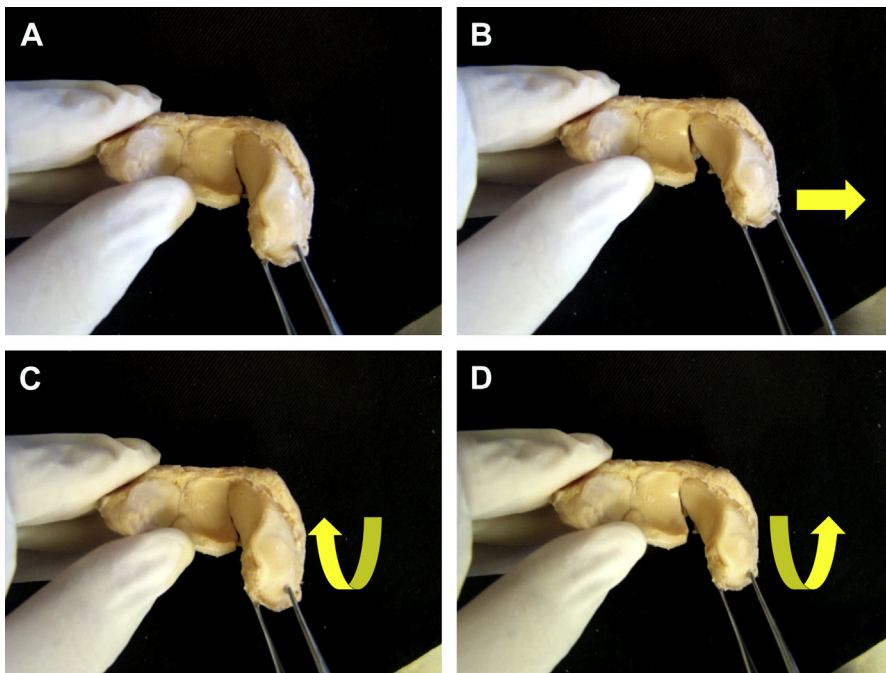


Fig. 1. (A) Right wrist specimen in which the dorsal portion of the scapholunate ligament was maintained. (B–D) With only a single connection between the 2 bones, neither volar opening nor sagittal rotation could be avoided.

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