Acute Scapholunate Ligament Injuries
Arthroscopic Treatment

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KEYWORDS

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

KEY POINTS

- Anatomically, the scapholunate interosseous ligament (SLIL) has 3 distinct regions, each with a different histologic appearance and different biomechanical properties; the dorsal component of the SLIL has the highest strength to failure.
- Wrist arthroscopy allows assessment of all 3 components of the SLIL with greater accuracy than can be obtained through radiographic or MRI evaluation.
- Partial acute injuries to the SLIL are treated arthroscopically with debridement and electrothermal shrinkage with a high degree of success and patient satisfaction.
- A complete tear of the SLIL can be treated with arthroscopic reduction and fixation with a high degree of success if treated within 3 months of injury.

Videos of arthroscopic views of the proximal scapholunate (SL) ligament and dorsal SL ligament; arthroscopic examinations of Geissler SLIL injuries; arthroscopic debridement of a proximal SLIL tear; arthroscopic reduction of SL interval; arthroscopic view of second SL K-wire; and fluoroscopy video of K-wire placement across SL interval accompany this article at http://www.hand.theclinics.com/

INTRODUCTION

The early diagnosis and treatment of acute scapholunate (SL) ligament injuries continues to be a challenge. Berger[1] defined the anatomy of the SL interosseous ligament (SLIL). He described the ligament having 3 distinct regions. The central (proximal) membranous portion (**Fig. 1**, Video 1; available online at http://www.hand.theclinics.com/) is cartilaginous with a few longitudinal fibers. The dorsal portion of the interosseous ligament (**Fig. 2**, Video 2; available online at http://www.hand.theclinics.com/) is histologically a true ligament. It is composed of stout transverse fibers and is the thickest portion of the SLIL. The palmar (volar) portion of the interosseous ligament (**Fig. 3**) is also histologically a true ligament, 1 to 2 mm thick, and composed of longer oblique fibers that allow rotation in the sagittal plane.

Biomechanically the dorsal SLIL has the highest strength to failure. It is the most important portion of the SLIL for constraining rotation, translation, and distraction between the scaphoid and lunate. The palmar segment is an important constraint to rotation of the SL joint. The proximal portion provides no significant constraint to the SL joint.

However, the stability of the SL joint is not provided by just the SLIL but depends on a complex

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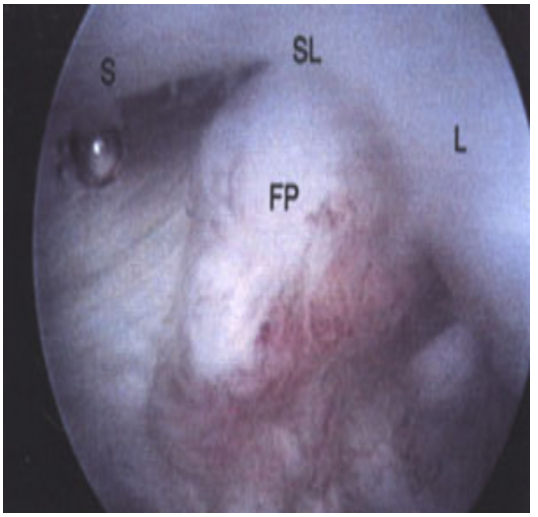

Fig. 1. Arthroscopic view of scaphoid (S), lunate (L), Scapholunate (SL) proximal ligament, and fat pad (FP).

of ligaments, each having a separate role but working together to support the carpus in proper alignment. Short and colleagues[2] determined that the SLIL is the primary stabilizer of the SL articulation and that the dorsal radiocarpal ligament, dorsal intercarpal ligament, scaphotrapezial ligaments, and radioscaphocapitate ligaments are secondary stabilizers.

Mayfield[3] showed that the SLIL can stretch up to 225% its length before eventually tearing. An isolated injury to the SLIL initially may not cause disassociation and widening on plain or stress radiographs. A combined injury to both the intrinsic and extrinsic ligaments will cause a SL diastasis. In patients with isolated SLIL injuries, plain radiograph abnormalities may not be seen initially but

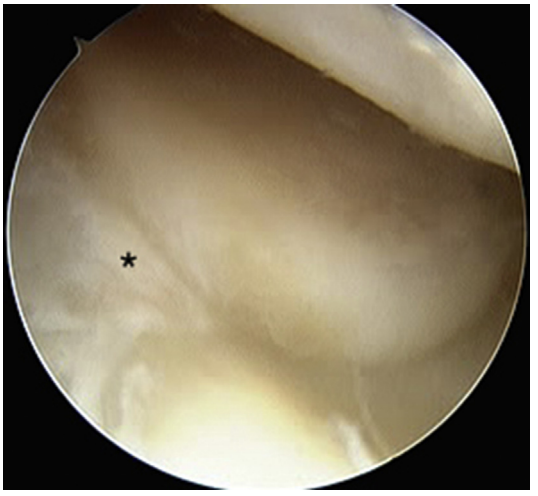

Fig. 2. Arthroscopic view of dorsal SLIL (*asterisk*).

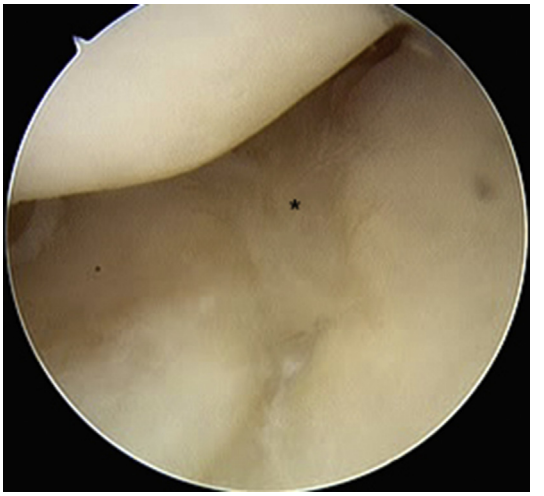

Fig. 3. Arthroscopic view of volar (palmar) SLIL (*asterisk*).

will occur over time as gradual attenuation of the extrinsic ligaments occurs.

Geissler and colleagues[4] proposed an arthroscopic grading scale to quantify the spectrum of instability resulting from injury to carpal interosseous ligaments. This classification is applicable for SLIL injuries.

Geissler arthroscopic classification of carpal instability:

- Grade I: a 1-mm hook probe can be inserted between the scaphoid and lunate (Video 3; available online at http://www.hand.theclinics.com/)
- Grade II: the probe can be rotated 90° from ligament attenuation but a tear may not be visualized (Video 4; available online at http://www.hand.theclinics.com/)
- Grade III: abnormal scaphoid flexion and lunate extension produces a midcarpal step-off at the SL joint when viewed through the midcarpal ulnar (MCU) portal (Video 5; available online at http://www.hand.theclinics.com/)
- Grade IV: a complete SLIL tear allows the arthroscope to pass from the radiocarpal to the midcarpal joint when the scope is in the 3–4 portal (Video 6; available online at http://www.hand.theclinics.com/)

Management based on the Geissler arthroscopic classification:

- Grade I: immobilization/thermal shrinkage
- Grade II: debridement/thermal shrinkage arthroscopic reduction and fixation
- Grade III: arthroscopic/open reduction fixation and repair