

Management of Complications of Ligament Injuries of the Wrist



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KEYWORDS

• Complications • Scapholunate ligament • Lunotriquetral ligament • Carpal instability • SLAC

KEY POINTS

- Early accurate diagnosis of intrinsic carpal ligament injuries (scapholunate [SL], lunotriquetral [LT]) provides for best outcomes.
- Delayed diagnosis of SL and LT injuries has been shown to lead to arthritis within 10 years of injury if not treated.
- Conservative management of SL and LT injuries is inadequate with poor outcomes; operative intervention is indicated to manage pain, dysfunction, and delay the natural history of disease.
- Despite improvements in our knowledge of these injuries, and a variety of surgical techniques, no single treatment has proven superior; treatment should be individualized.
- Complications of treatment and general surgical risks are common and must be minimized by careful selection of surgical technique and prevention.

Intrinsic ligament injuries are common and often underdiagnosed in the wrist. Both scapholunate (SL) and lunotriquetral (LT) injuries are routinely missed acutely. Complex combined injuries are much less common, but also often unrecognized. The complex biokinematics of wrist motion are affected by these injuries and complications are common. In this article, we review the available literature surrounding the prevention and treatment of complications resulting from injury to the SL and LT ligaments.

SCAPHOLUNATE LIGAMENT

Avoiding complications in SL ligament injuries is best done by making an accurate early diagnosis. The acute “wrist sprain” should be considered an SL tear or scaphoid fracture until proven otherwise. Close examination of the SL interval in patients with more obvious carpal injuries is crucial because SL

tears can be associated with carpal and distal radius fractures.^{1,2} Diagnosis relies on an accurate history, clinical suspicion, and appropriate radiographs (**Fig. 1**). Often clenched fist images, contralateral wrist x-rays and even cineradiography are included for thorough assessment.³ MRI has recently been found to have low sensitivity but high specificity in detection.⁴ Additionally, MR arthrography can improve detection rates.⁵ These studies can be even more difficult to interpret when patient presentation is delayed and symptoms are mild.

Failure to identify an SL injury acutely can result in progression to SL advanced collapse (SLAC).⁶ Although an isolated SL injury alters the forces across the radioscaphoid joint, it is not until the secondary stabilizers, including the scaphotrapezoid-trapezium joint, the volar radiocarpal ligaments, and the dorsal intercarpal ligament, are injured that the wrist is prone to pancarpal disease

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Hand Clin 31 (2015) 267–275

<http://dx.doi.org/10.1016/j.hcl.2015.01.003>

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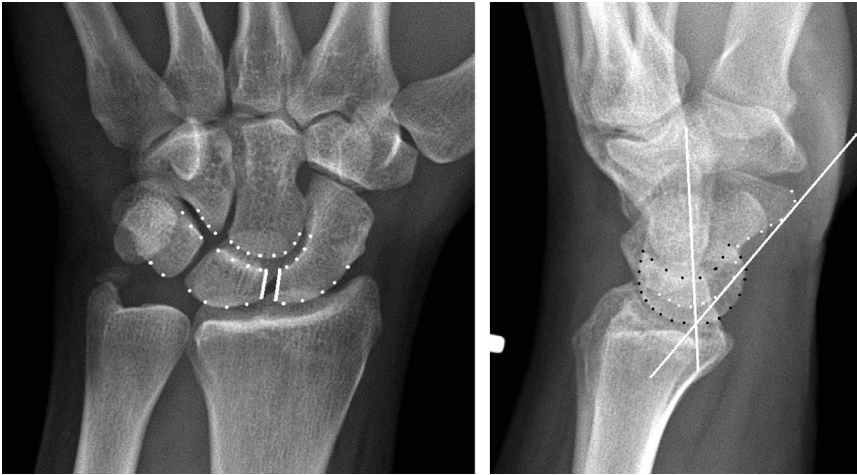


Fig. 1. Wrist posteroanterior (*left*) and lateral (*right*) radiographs. Posteroanterior smooth carpal alignment (*dotted lines*) of Gilula's lines and scapholunate (SL) interval (normal, <4 mm). The lateral-SL angle is normally 30° to 60°.

owing to altered biomechanics of the wrist.⁷⁻¹⁰ Although the natural history and timeline of this degenerative progression is variable, most agree that changes occur within 10 years and severe changes are present by 15 to 20 years after the ligament tear.^{11,12} Nonoperative treatment has never been shown to alter the natural history and, as a result, surgical management of these injuries is accepted. The management and complications of SL injuries before arthritis are described, followed by a discussion of SL injuries in the presence of arthritis.

Casting

Results from casting alone in the management of acute SL injuries have been poor. Tang and co-workers¹³ followed 20 patients for 1 year after a concomitant distal radius and SL injury treated with casting and found uniformly poor results. SL distances did not change (3.4 mm initial and 3.8 mm at 1 year) and 8 of the 20 patients required operative intervention at 1 year.¹³ The literature does not document results of casting isolated SL tears, but the general consensus is that treatment of complete SL tears, if diagnosed early, should be operative. Unfortunately, there is no consensus on the appropriate treatment options.

Closed Reduction and Pinning

Given the difficulty in assessing the SL interval, even on good quality plain films, it is not surprising that intraoperative fluoroscopic views are often less than optimal. The technical challenges inherent in a closed reduction and pinning have resulted in some suggestion of concomitant wrist arthroscopy. Whipple treated 40 patients with

this technique and reported 83% success in acute (<3 month) minimally displaced (<3 mm) injuries.¹⁴ Patients not fitting these criteria had poor results at 1 year both radiographically and symptomatically.¹⁴ Similarly, Darlis and associates¹⁵ followed 11 patients for approximately 3 years after arthroscopic pinning and debridement. At the time of surgery, these patients were greater than 3 months from injury and had suboptimal results. Complications included the requirement of further surgery (fusions, capsulodesis) in 3 patients and persistent SL widening on radiographs at final follow-up. Overall, closed reduction and percutaneous pinning is technically challenging and does not afford the ability to heal the SL ligament itself. If anatomic positioning of the SL interval can be achieved, long-term maintenance of the joint interval is likely reliant on stability based on fibrous tissue rather than a functional SL ligament.

Arthroscopy Alone

Debridement procedures have been attempted to improve pain, although reports are limited. Lee and colleagues¹⁶ followed a group of 14 patients (16 wrists) with partial intrinsic ligament tears (6 SL and 10 LT) treated with arthroscopic debridement and thermal shrinkage for 4 years. These patients noted statistically significant improvement in both pain scores and grip strength without signs of carpal collapse or widening of the affected joint interval. It is important to note this group had no static or dynamic radiographic instability but rather arthroscopic identification of only grade 1 and 2 tearing (**Table 1**). A similar pediatric population with arthroscopic debridement of grade 2 SL tears had generally successful results at 30 months of follow-up.¹⁷

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