

Scapholunate Interosseous Ligament Injuries: A Retrospective Review of Treatment and Outcomes in 82 Wrists

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Purpose To compare outcomes of treatment for scapholunate instability between acute (< 6 wk from injury) and chronic (> 6 wk) injuries, between complete and partial tears, and among surgical techniques; identify risk factors for surgical failure; and compare ligament reconstruction with repair with or without capsulodesis in the chronic period.

Methods We performed a retrospective chart review of 82 primary scapholunate interosseous ligament surgeries, with median follow-up of 150 days. A total of 27 patients underwent surgery in the acute period and 50 in the chronic period. (In 5 patients we were unable to determine acuity or chronicity of injury.) In the chronic period, 16 patients underwent repair with or without capsulodesis, 27 underwent ligament reconstruction, and 7 underwent other procedures.

Results Surgical intervention in the acute setting involved more complex injuries, most commonly used direct repair, and produced a significantly lower failure rate than chronic intervention. In the chronic setting, the most common technique was ligament reconstruction, which produced superior radiographic outcomes compared with repair with or without capsulodesis. Isolated scapholunate interosseous ligament injuries undergoing chronic surgical intervention composed the majority of failures. Workers' compensation status and chronic intervention were significant risk factors for failure.

Conclusions For chronic injuries, ligament reconstruction produced better radiographic outcomes than repair with or without capsulodesis. Acute intervention (within 6 wk) was preferable to chronic intervention for scapholunate interosseous ligament injuries, and a substantial number of isolated injuries failed to receive treatment in the acute period. (*J Hand Surg Am.* 2014;39(10):2020–2026. Copyright © 2014 by the American Society for Surgery of the Hand. All rights reserved.)

Type of study/level of evidence Therapeutic III.

Key words Capsulodesis, scapholunate, SLAC, tenodesis, wrist.

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SCAPHOLUNATE (SL) INSTABILITY IS THE most common pattern of carpal instability. The theorized mechanism of injury is a fall on outstretched hand with extension, intercarpal supination, and ulnar deviation,^{1,2} causing failure of the scapholunate interosseous ligament (SLIL). Secondary stabilizers may compensate for lost SLIL integrity, but these weaken with time. As this occurs, the scaphoid undergoes rotatory subluxation and the dorsal intercalated segment instability (DISI)

pattern emerges.^{3–6} Untreated, these altered loading forces are believed to cause a predictable progression of instability culminating in scapholunate advanced collapse (SLAC) arthritis.³ Acute surgical intervention before this progression is believed to result in improved outcomes, yet many SLIL injuries present in the chronic period in which surgical outcomes may be suboptimal.^{7,8}

Acute surgical management aims to reestablish stability and restore the normal relationship between the scaphoid and lunate. Common techniques include Kirschner wire fixation, intrinsic ligament repair, and/or augmentation with dorsal capsulodesis.^{9,10} Capsulodesis reinforces the action of extrinsic ligaments but may restrict flexion. Techniques such as arthroscopic debridement and/or thermal capsulorrhaphy with or without pin stabilization have also been described.¹¹

Many SLIL tears present chronically after initially being unrecognized. If arthrosis has developed, treatment options are typically limited to pain-relieving or salvage procedures.^{12–14} These procedures often relieve pain but may limit range of motion and normal kinematics.^{15–18} If chronic SL instability is diagnosed before arthrosis, surgeons can attempt reconstructive intervention to reapproximate normal kinematics, potentially halting the progression toward SLAC. Two common reconstructive techniques are capsulodesis and ligament reconstruction using tendon graft^{19,20}; others include bone–retinaculum–bone grafts or reduction-association of scaphoid and lunate.^{21,22}

Although ligament degeneration in the chronic stage often prevents direct repair, this may be appropriate in certain situations such as avulsion-type injuries.^{3,23}

The published results of reconstructive techniques in the chronic setting vary, and no technique consistently has demonstrated superior outcomes. Capsulodesis techniques more closely restore normal wrist kinematics, but long-term outcomes demonstrate impaired wrist flexion and failure to maintain radiographic improvement.^{24–26} Ligament reconstruction by tenodesis has shown comparable or improved results relative to capsulodesis in the chronic setting but does not restore full functionality or eliminate the risk of arthrosis.^{3,27,28} Lavernia et al²⁹ promoted ligament repair with capsulodesis even in the chronic setting, arguing that surgical timing was less important than injury severity in determining treatment. However, other investigators found less promising results.²² Despite these various options, some patients fail reconstructive procedures and ultimately require a salvage procedure.

We aimed to identify the role, optimal techniques, and timing for surgical treatment of SLIL injuries. We

compared outcomes from patients treated in the acute setting and those treated in the late setting to establish the preferred time of intervention. We compared the injuries seen in both the acute and delayed intervention settings in the hopes of better describing the injury types that are currently reaching the chronic period and which could therefore benefit from early diagnostic imaging and/or acute surgery. In patients who underwent treatment in the late setting, we compared the outcomes of the 2 most common procedures, repair with or without capsulodesis versus ligament reconstruction. For all patients, we identify risk factors for surgical failure.

MATERIALS AND METHODS

After we obtained institutional review board approval, we conducted a retrospective chart review of patients who underwent surgery for an SLIL injury over a 10-year period ending in August 2012. Current Procedural Terminology codes 25320 and 25670 were used as an initial screening tool. All patients who underwent a soft tissue surgical procedure for SL instability during the study period were candidates. Patients with evidence of SLAC arthritis or who had undergone prior surgeries to that same wrist were excluded. Eighty patients (82 wrists) met inclusion criteria. Patient demographics, surgical procedures, outcomes, and complications were obtained from the medical record. If patients underwent additional surgery during the study period, outcomes after that procedure were not included in our analysis. Patients were not contacted for additional evaluations.

A total of 44 wrists had complete tears (median follow-up, 19 wk), 29 had partial tears (median follow-up, 25 wk), and 9 were not definable by chart review. Twenty-seven patients were treated surgically within 6 weeks and 50 were treated later than 6 weeks after injury, and for 5 patients we were unable to determine the acuity or chronicity of injury. Patients with incomplete medical records were not used in analyses involving the missing parameters (ie, chronicity) but were retained for other analyses.

Injuries were characterized, when possible, by 3 parameters found by chart review. These were acuity of treatment (acute vs chronic), tear severity (complete vs partial), and injury complexity (isolated vs complex). Patients who underwent surgical intervention within 6 weeks of a known injury were defined as having acute injuries, whereas those undergoing surgical intervention beyond 6 weeks after known injury or with more than 6 weeks of symptoms were defined

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