Scapho-Lunate Ligament Repairs

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Ligaments are either:
capsular or interosseous (intra-articular)

Terms extrinsic and intrinsic are also used

The interosseous ligaments have 3 components:
1. dorsal ligament
2. central membrane
3. palmar ligament
Degenerative perforation of the SL ligament is common.

Dorsal component of SL and palmar component of LT ligaments are the strongest portions.
Strength of Carpal Intrinsic Ligaments

<table>
<thead>
<tr>
<th></th>
<th>SL Ligament</th>
<th>LT Ligament</th>
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<tbody>
<tr>
<td>Dorsal</td>
<td>300 N</td>
<td>130 N</td>
</tr>
<tr>
<td>Proximal</td>
<td>25 N</td>
<td>25 N</td>
</tr>
<tr>
<td>Palmar</td>
<td>150 N</td>
<td>230 N</td>
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Mechanical Models
Based on simplistic positions of loading

Intercalated proximal carpal row remains the standard concept

Ulnar Deviation
Proximal carpal row extends and translates radially
Lunate undergoes least motion
Proximal carpal row flexes and translates ulnarly
Lunate undergoes least motion

Radial Deviation

Extends Flexes

M Garcia-Elias

M Garcia-Elias

M Garcia-Elias
Terms
- Scapholunate dissociation
  - The dysfunction that results from the rupture of the mechanical linkage between the scaphoid and the lunate
- Rotary subluxation of the scaphoid
  - Advanced stage of SLD
  - Ligaments at both ends of the scaphoid fail
  - Scaphoid collapses into flexion and pronation

Stages of SLD
Garcia-Elias JHS (A) 2006
- Stage 1
  - Partial SL ligament injury
- Stage 2
  - Complete SL ligament injury, repairable
- Stage 3
  - Complete SL ligament injury, unrepairable, normally aligned scaphoid
- Stage 4
  - Complete SL ligament injury, unrepairable, reducible rotary subluxation of the scaphoid
Stages of SLD
Garcia-Elias JHS (A) 2006

- **Stage 5**
  - Complete SL ligament injury, unrepairable, irreducible rotary subluxation of the scaphoid, normal cartilage

- **Stage 6**
  - Complete SL ligament injury, unrepairable, irreducible rotary subluxation of the scaphoid, cartilage degeneration
**Acute SL Ligament Injury**
- Repair of acute (< 8 weeks after injury) SL ligament tears more successful than repair of chronic injuries
- How do you know there isn’t an acute on chronic injury?

**Radiographs**
- Compare to contralateral side
- Dynamic grip views
- Tip of radial styloid

**Arthroscopy**
- Assess for
  - Loss of cartilage from proximal pole of the scaphoid
  - Presence of SL ligament
Acute SL Ligament Repair

- Arthroscopically assisted percutaneous K-wire fixation
  - Bednar JM. Hand Clinic 2015
  - Arthroscopically assess injury
  - Debride partial injuries
  - More accurately reduce injury than with fluoroscopy

SL Ligament Repair

- Repair of SL ligament with Capsulodesis
  - Lavermia CL, Cohen MS, Taleisnik
  - J Hand Surg (A) 1992
  - Initially indicated for injuries less than 8 weeks old
  - Later (1998) revised to any injury with
    - Adequate ligament
    - Reducible scaphoid
    - Absence of scaphoid degenerative changes

Results

- Cohen and Talesnik 1998
  - Wrist ROM equal to other sided with exception of 15 degree loss of flexion
Results

- Outcome after Repair of the Scapholunate Interosseous Ligament and Dorsal Capsulodesis for Dynamic Scapholunate Instability Due to Trauma
  - Pomerance J
  - *J Hand Surg (A)* 2006

Materials and Method

- 17 patients
- Treated average of 22 weeks after injury (18-40)
- Method of Lavernia, Cohen and Taleisnik
- Follow-up averaged 66 months

Results

- All patients had dorsal wrist pain and lost motion compared to the contralateral side
- Grip strength 82%
- Mayo Wrist score 67 - fair result
- DASH score 31 – moderate impairment
- X-ray showed degenerative changes in 3, all at radioscaphoid joint
- Scores worse in patients with strenuous jobs
SL Ligament Repair

- New capsulodesis that does not cross the radiocarpal joint
  - Slater RR Jr, Szabo RM, Bay BK, Laubach J
  - J Hand Surg (A) 1999

Schweizer A, Steiger R. J Hand Surg (A) 2002

Schweizer A, Steiger R. J Hand Surg (A) 2002
Results

- Schweizer A, Steiger R
- J Hand Surg (A) 2002
- 22 patients, 63 month follow up
  - 13 free of pain
  - 11% loss of grip strength
  - 5 wrists with capitulunate arthritis
  - 2 wrists with radioscaphoid arthritis
Results

- Treatment of Traumatic Scapholunate Dissociation: Evidence-Based Review
  Kalainov DM, Cohen MS
  *J Hand Surg (A)* 2009

- Short to midterm follow-up:
  - Improved wrist pain
  - Loss of 10-45% of wrist motion
  - Recurrence of SL diastasis

- Long term follow-up:
  - 50% SLAC wrist changes after 5 years
Osteonecrosis of the Scaphoid After Scapholunate Interosseous Ligament Repair and Dorsal Capsulodesis: Case Report
John C. Berschback, MD, David M. Kalainov, MD, Michael S. Bednar, MD

Conclusion
- Scapholunate dissociation is more than disruption of the dorsal limb of the scapholunate ligament
- Need to differentiate acute from acute on chronic injuries
- Acute injuries appear to do the best with scapholunate ligament repair
- Results of SL ligament repair with capsulodesis are fair at best

THANK YOU