Scapholunate ligament lesions

Mechanisms, clinical presentations and classification

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Scapholunate ligament lesions: stabilization of the carpal bones

- Intrinsic ligaments:
  - Intra-carpal
  - Proximal row – distal row

- Extrinsic:
  - Extracapsular
  - Intracapsular
Scapholunate ligament lesions: stabilization of the proximal row

- Intrinsic and extrinsic ligaments
- No muscular attachments, but high force transmission
- Bones change position in response to adjacent bones and lig attachments
- Inherently unstable with ligament disruptions
Scapholunate ligament lesions: distal row <> proximal row

- Distal row moves as one unit
- Compression of proximal row centered on lunate
- Scaphoid is « the link »
- No connexion between the capitatum and lunate
  = « intercalated segment »
Scapholunate ligament lesions:
Primary and secondary stabilisers of S-L

1. SLIL
   - Dorsal
   - Volar, membranous

2. STT, SC, RSC
Scapholunate ligament lesions: spectrum

- Volar → dorsal
- Dynamic → static
- Secondary/extrinsic contribution (early or late)
Scapholunate ligament lesions: dynamic

- Disruption of volar SL portion:
  - No carpal instability

  = dynamic SL lesion
Scapholunate ligament lesions: static

- Disruption of dorsal portion:
  - Kinematics of the carpal bones disturbed
  - Progressive SL dissociation
  - Seen on standard x-ray: diasthesis

= static SL lesion
Scapholunate ligament lesions:
Secondary stabilizers

- SLIL total rupture

→ Overall carpal dysfunction will appear progressively

= failure of the secondary stabilizers

→ Dynamic to static (= permanent)
Scapholunate ligament lesions:
Secondary stabilizers / extrinsics contribution

• Avoid horizontalization of the scaphoid

• Disruption =
  • Rotatory scaph subluxation
    = Prox scaph subluxing on dorsal rim of the radius
  • Ring sign
  • DISI
Scapholunate ligament lesions: Rotatory scaphoid subluxation

= Prox scaph subluxing on dorsal rim of the radius

Note: no DISI

Tischler, Scapholunate advanced collapse: a pictoral review; Insights Imaging 2014
Scapholunate ligament lesions: Static SL lesion

Diastasis, Ring, Loss Carpal height

Tischler, Scapholunate advanced collapse: a pictoral review; Insights Imaging 2014
### Scapholunate ligament lesions: Key radiological measurements

#### Key radiological measurements of the SLAC wrist pathological terms

<table>
<thead>
<tr>
<th>Scapholunate diastasis (PA radiograph)</th>
<th>Rotary subluxation of the scaphoid (lateral radiograph)</th>
<th>Dorsal intercalated segment instability (DISI) (lateral radiograph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Scapholunate interval &gt;4 mm (2–4 mm is suspected scapholunate diastasis)</td>
<td>1. Scapholunate angle &gt;60–80° (scaphoid tilted volarly)</td>
<td>1. Scapholunate angle &gt;80° (60–80° is suspected DISI; lunate tilted dorsally)</td>
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<tr>
<td></td>
<td>2. Radioscaphoid angle &gt;60°</td>
<td>2. Radiolunate angle &gt;10°</td>
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<td></td>
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<td>3. Capitolunate angle &gt;30°</td>
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*Tischler, Scapholunate advanced collapse: a pictoral review; Insights Imaging 2014*
Scapholunate ligament lesions: Distal row $\rightarrow$ proximal row

- Carpal collapse

$\rightarrow$ Loss of carpal height

1. Carpal height / M3 = 0.54 (+/-3)

2. Carpal height / capitate = 1.57 (+/-5)

- Alireza Saied, Intra- and interobserver reliabilities of two common radiographic methods of carpal height measurement; Eur J Orthop Surg & Trauma, 2010
- Nattrass, An alternative method for determination of the carpal height ratio; JBJS, 1994
- Youm 1978
Scapholunate ligament lesions: Decision for treatment = classification

- Clinical
- Radiological
  - Standard X-rays and arthro-CT/MRI
    - Ligament(s) torn? Which? Where? How?
  - Cartilage?
- Surgical
Scapholunate ligament lesions: Classification = 5 questions...

1. Is the dorsal SL ligament intact?
2. If the dorsal SL ligament is disrupted can it be repaired with good healing potential?
3. Is the scaphoid aligned normally with an radioscaphoid angle of 45° or less, indicating a normal STT capsule and ligaments?
4. Is the carpal malalignment easily reducible?
5. Is the cartilage at both radiocarpal and midcarpal joints normal?

- Garcia-Elias, Lluch, Three-ligament tenodesis for the treatment of SL dissociation: indications and surgical technique; JHS (Am) 2006
- Pappou, Basel, Scapholunate ligament injuries: a review of current concepts; Hand 2013
Scapholunate ligament lesions:

Classification: Garcia-Elias

Stage 1: Partial scapholunate ligament injury
Stage 2: Complete disruption with repairable ligament
Stage 3: Complete disruption with irreparable ligament but normal alignment
Stage 4: Complete disruption with irreparable ligament and reducible rotary subluxation of the scaphoid
Stage 5: Complete disruption with irreducible malalignment and intact cartilage
Stage 6: Chronic SLIL disruption with cartilage loss (SLAC)

Garcia-Elias, Lluch, Three-ligament tenodesis for the treatment of SL dissociation: indications and surgical technique; JHS (Am) 2006