Scapholunate Ligament Lesions Imaging

Which and when?

Kolo Frank
Lesions to scapholunate ligament (SL)

- Most frequent cause of **carpal instability**
- Traumatic tears of SL ligament = **most common ligament injury of the carpus**

- Instability = **kinematic dysfunction** including sudden loss of normal carpal alignment
  - Instability = Inability of bearing physiologic loads

- Left untreated = **degenerative arthritis**
Scapholunate ligament complex

Scapholunate stability depends on both primary and secondary stabilizers

Primary = SL ligament (Dorsal !!)

Secondary = Scaphotrapezial and Scaphocapitate
Scapholunate ligament Imaging

When?

Healing potential and prognosis rapidly decrease after 6 weeks of initial trauma

Which?

- Conventional radiography
- Ultrasonography
- Magnetic resonance imaging (MRI)
- Computed tomographic arthrography (CTA)
- Magnetic resonance arthrography (MRA)
Conventional Radiography

Posteroanterior (PA) view: wrist in neutral position / elbow 90° flexion / shoulder 90° abduction
**Conventional Radiography**

**Lateral view:** forearm in neutral position / elbow 90° flexion / shoulder in adduction

Radius, capitate, and longer finger metacarpal collinear in the sagittal plane
**Conventional Radiography**

**Lateral view**: Measurement of intercarpal angles on static view = difficult + great degree of variability.
Conventional Radiography

- SL angle > 70°
  Range: 30-60°
- Radiolunate angle > 15°
- SL diastasis > 3mm
- Scaphoid ring sign
Conventional Radiography

**Stress Radiographs**

- When carpal instability is suspected clinically but static radiographs are normal
  - **AP grip film:** axial load SL widening = most useful
    - (Lee et al. : Comparison of radiographic stress views for scapholunate dynamic instability in a cadaver model. J Hand Surgery 2011)
  - **Lateral full flexion:** scaphoid proximal pole subluxation onto dorsal radius rim
  - **Full ulnar and radial deviation:** abnormal widening of SL joint
Conventional Radiography

- AP grip film: axial load SL widening
- **Lateral full flexion**: scaphoid proximal pole subluxation onto dorsal radius rim
- **Full ulnar and radial deviation**: abnormal widening of SL joint
Conventional Radiography

**Accuracy of simple plain radiographic signs** and measure to diagnose acute **scapholunate ligament injuries** of the wrist?

Continuing **wrist pain > 3 weeks** after acute hyperextension injury, contusion

Prospective study: 72 patients consecutively enrolled

**AP view + Lateral view + Stetcher’s view** (ulnar deviation and closed fist)

**Gold standard** = Wrist arthroscopy

- **SL distance on Snetcher’s view** = **most accurate** single predictor of SL tears
  - If Cut-off of 3.7 mm: sensitivity = 80.8% / specificity = 84.1%

- **SL distance >3mm on PA view**: sensitivity = 81.5% / specificity = 81.2%

- **SL angle >66°**: sensitivity = 77.8% / specificity = 82.2%

- **RL angle >66°**: sensitivity = 77.8% / specificity = 82.2%

Jenny E. Dornberg et al. Accuracy of simple plain radiographic signs and measures to diagnose acute scapholunate ligament injuries of the wrist. Eur Radiol 2015
Conventional Radiography

Radiographs remain important instrument to screen for suspected SL ligaments tears

High accuracy of pathological SL distances and angles
Advanced Imaging Studies

- Confirming a suspected diagnosis of SL ligament injury
- Assessment of partial or complete tears (which part of SL ligament ?)
- Evaluation of cartilaginous lesions

MRI ? / MDCT arthography ? / MR arthrography (MRA) ?
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<thead>
<tr>
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<th>MRI</th>
<th>MDCT arthrography</th>
<th>MR arthrography</th>
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<tbody>
<tr>
<td>Sensitivity</td>
<td>59-77 %</td>
<td>95 %</td>
<td>68-77 %</td>
</tr>
<tr>
<td>Specificity</td>
<td>70-83 %</td>
<td>96-100 %</td>
<td>86 %</td>
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Partial tears: significantly better visualized with MDCT arthrography
MRA is intermediate between MRI and MDCTa
MRA = exquisite contrast resolution useful (ulnar tear of TFCC)

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