

# Diagnosis and Treatment of Chronic Lunotriquetral Ligament Injuries



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## KEYWORDS

• Wrist • Ligament • Lunotriquetral • Reconstruction • Arthrodesis • Ulnar shortening

## KEY POINTS

- Chronic lunotriquetral (LT) injuries are rare and often difficult to diagnose.
- Plain radiographs are often normal and ancillary studies, such as MRI, are used when working up these cases.
- Direct visualization of the LT interval remains the gold standard for evaluating ligament injuries.
- Surgical treatment options for chronic lunotriquetral injuries include reconstruction and arthrodesis.
- Ulnar-shortening osteotomy may be helpful in cases of concomitant ulnocarpal impingement.

## INTRODUCTION

The C-shaped lunotriquetral (LT) interosseous ligament works with the scapholunate (SL) interosseous ligament to stabilize the proximal carpal row. The proximal carpal row stability is associated with an equilibrium of forces on the lunate, between the extension moment of the triquetrum (transmitted through the LT ligament) and the flexion moment of the scaphoid (transmitted through the SL ligament). Unlike the SL ligament, where the dorsal aspect is the most critical, the thick volar LT ligament is associated with the ulnocapitate ligament to act as the major stabilizing force, transmitting the extension moment of the triquetrum when it engages the triquetrum.<sup>1</sup> The dorsal LT ligament is not as strong, acting to stabilize rotational forces through the proximal row. Furthermore, there are other secondary restraints to the LT complex stability, such as the radiotriquetral, radioscapulunate, and radiolunate ligaments.

LT ligament injuries are not as well understood as their counterpart SL ligament. LT ligament

injuries can occur in isolation, but often are associated with other wrist trauma, including distal radius fractures or perilunate dislocations. One proposed mechanism that induces an LT injury involves a fall on a pronated wrist with the wrist in either radial deviation or volar flexion.<sup>2</sup> Furthermore, positive ulnar variance leading to ulnocarpal impingement can alter wrist intercarpal mechanics and lead to LT ligament degeneration.<sup>3,4</sup>

## LUNOTRIQUETRAL DISSOCIATIVE INSTABILITY

The key component of the LT ligament complex is the volar aspect of the ligament. This was demonstrated by Ritt and colleagues,<sup>1</sup> where serial sectioning of the dorsal LT ligament had little effect on carpal kinematics, and sectioning the proximal and volar LT ligament led to flexion of the lunate and subsequent volar intercalated instability (VISI). Complete disruption of the LT ligament is associated with acute trauma or chronic wrist degenerative processes. If left untreated, these

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The authors have nothing to disclose.

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injuries have the potential to develop dynamic or static carpal instability. Dynamic instability occurs when the LT ligament is partially or completely torn or attenuated, but falls short of complete LT dissociation. Complete (dorsal and volar) ligament dissociation may lead to static instability that is able to be diagnosed on plain radiographs. Once the secondary restraints to the LT complex become attenuated, the balance of forces between the scaphoid and triquetrum on the lunate is disrupted, leading to volar flexion of the lunate in conjunction with the scaphoid, also known as VISI (Fig. 1). Unlike dorsal intercalated segment instability from complete SL dissociation, the natural history of this pathology and its association with degenerative changes is not well understood.

### EXAMINATION AND IMAGING

Chronic ulnar-sided wrist pain has a broad differential diagnosis.<sup>2</sup> The etiologies of chronic ulnar-sided wrist pain tend to involve one of six different categories:

1. Bony injuries: malunions/nonunions of the ulnar carpal bones (hamate, pisiform, triquetrum), base of the fifth metacarpal, ulnar styloid process, and distal ulna.
2. Degenerative joint disease: pisotriquetral, triquetrohamate, fifth carpometacarpal, or distal radioulnar. Degenerative joint disease can be accelerated by ulnar impaction syndrome.
3. Ligamentous (in addition to LT): intrinsic ligaments (capitohamate), extrinsic ligaments (triquetrocapitate or triquetrohamate), triangular fibrocartilage complex.
4. Tendinous: chronic tendinopathy of the extensor carpi ulnaris (ECU) or flexor carpi ulnaris.
5. Neurologic: ulnar nerve entrapment in Guyon canal, neuritis of the dorsal sensory branch of the ulnar nerve.
6. Other: tumors (aneurysmal bone cysts, osteoid osteomas), vascular (ulnar artery thrombosis).

Evaluation of patients with ulnar-sided wrist pain should include a complete upper extremity examination and plain radiographs. In addition, it is not uncommon to obtain advanced diagnostic modalities, such as stress radiographs, computed tomography, ultrasound, bone scan, or MRI. It is helpful to compare with the contralateral unaffected side. Because it may be difficult to discern LT pathology from other conditions that result in ulnar-sided wrist pain, corticosteroid injections in the LT articulations can also be helpful in confirming the diagnosis.

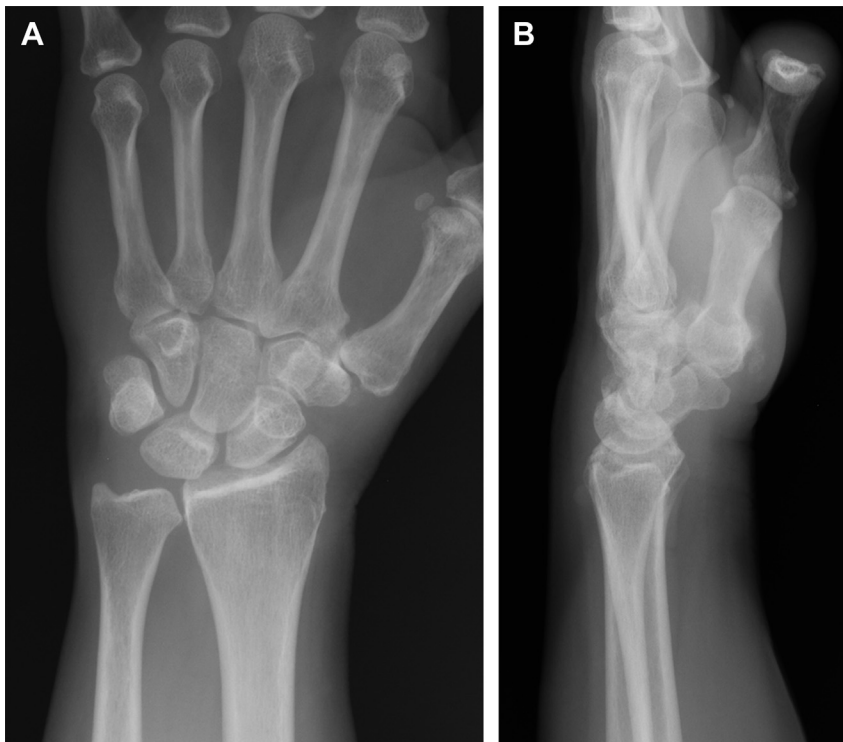


Fig. 1. (A) Posteroanterior (PA) and (B) lateral radiograph of a patient with the classic VISI.

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