



## Isolated Lunotriquetral Interosseous Ligament Tear - An Uncommon Lesion

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### Abstract

An injury of the interosseous lunotriquetral ligament is an infrequently recognized cause of pain in the ulnar side of the wrist. A partial or complete tear of it occurs by many mechanisms including traumas, sports activities, and degenerative disorders. The patient will experience ulnar-sided pain, point tenderness, painful snap, loss of strength and stability. The gold-standard test to confirm its diagnosis is arthroscopy, despite many others that may help in the investigation and exclusion of other causes that lead to the same symptoms. Treatment can be conservative or need surgery. Surgical intervention has as objective the stabilization of the lunotriquetral joint. However, its consequences have high complication rates and need of re-operation.

**Keywords:** Ligaments; Carpal Bones; Wrist Injuries; Wrist Joint; Magnetic Resonance Imaging

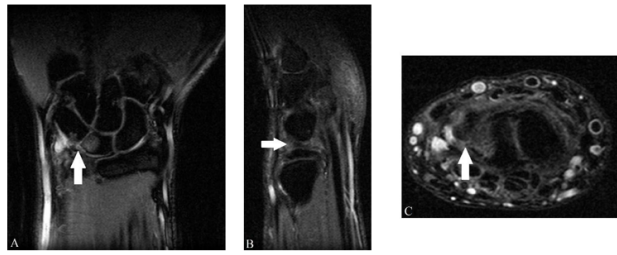
### Introduction

The lunotriquetral interosseous ligament (LTIL) is a ligament of the wrist that connects the triquetrum and lunate bones [1] which have an important role in carpal stability [1,2]. A partial or complete tear of it occurs by many mechanisms including traumas, sports activities, and degenerative disorders [1,3]. Once injured, it usually causes pain and tenderness on ulnar-sided wrist pain, weak gripping abilities, and snaps depending on the movement [1-5]. Due to many causes of wrist pain, it is important and necessary to make the diagnosis as soon as possible to direct treatment [3]. Imaging tests and provocative maneuvers can help in the investigation of the cause of wrist pain, however, arthroscopy is the gold-standard for diagnostic confirmation of LTIL injury [1,4].

We report a case of LTIL lesion with clinical and imaging characteristics that reflect this lesion.

### Case Report

A 31-year-old man, a manual labor worker, with pain in his left wrist for a year refers that is getting worse when at work. The patient denies previous surgery, trauma, and illness. He reports worsening pain and weakness when carrying weight and during repetitive movements such as using a doorknob or when brushing his teeth. On physical examination, the patient presents pain when supinating the forearm and when carrying weight, with no evidence of skin color changes or edema. Magnetic resonance imaging (MRI) shows a lesion of the lunotriquetral ligament (Figure 1). The patient was referred for physical therapy treatment with exercises, ultrasound, and shock therapy, showing improvement in symptoms.



**Figure 1:** Magnetic resonance imaging (MRI) in T2 FAT SAT sequence in the coronal section in A, sagittal in B, and axial in C, demonstrating rupture of the lunotriquetral interosseous ligament (white arrow).

## Discussion

LTIL injury is one of the many causes of wrist pain [1]. LTIL is a true ligament in its dorsal and palmar portions, which are connected directly to the bone [3]. In the proximal fibrocartilaginous region it is membranous, where it connects to the hyaline cartilage [3]. The strongest part of this ligament is the palmar one.

The LTIL and scapholunate ligament are the most important primary intrinsic ligaments of the wrist [1,2]. These are classified as intrinsic because they connect two carpal bones; their joints are commonly affected by trauma in the region [1]. They also have a great importance in carpal stability, that is, they help to maintain the stability of the wrist during different positions and actions such as grasping, squeezing, or holding something [1,2]. The LTIL is considered one of the three main stabilizers of the semilunar-pyramidal joint along the others are the palmar radial semilunar-pyramidal ligament and the dorsal radiocarpal ligament [3]. According to Coggins, *et al.* (2006) [3] injuries of at least one of these other two ligaments, besides the LTIL, are necessary to have carpal instability.

Lesions that only involve the LTIL are considered uncommon and poorly understood when compared to others that affect other ligaments of the proximal row of the carpus, including the scapholunate ligament [1,4]. The spectrum of injuries that may affect the LTIL includes a partial tear, a complete rupture, dynamic carpal instability, and static carpal instability [1,3].

There are several causes that can lead to an injury to the LTIL [1,3,4]. Common causes are related to high energy impact [1,3], sports activities [1,3] and fall with the wrist in dorsiflexion, forcing the forearm into pronation [3]. Other important causes are degenerative changes over time [1,3] a positive ulnar variation [1], an injury close to the lunate bone (whether reversed or not) [1] or a dorsal overload when in flexion [4].

When the LTIL is compromised there is a volar midcarpal palmar instability<sup>1</sup> that can lead to a greater flexion of the lunate bone [2,3]. In this context it is possible that dysfunction in carpal kinetics takes place, as well as changes in static carpal alignment beyond the proximal row of the carpal [2]. Carpal instability is categorized into dissociative and non-dissociative [5]. LTIL rupture is considered dissociative and the movement between the semilunar and the triquetrum is abnormal [5]. If there is no LTIL rupture it is classified as non-dissociative;<sup>5</sup> treatment and prognosis will vary according to this classification [5].

LTIL instability is an underdiagnosed cause of wrist pain due to its many etiologies and often normal radiography presentation [1-4]. A lesion of the scaphoid lunate ligament, as an example, it's said to be six times more frequent than the LTIL [1,3]. According to Mirza, *et al.* (2013) [4] it may occur that a patient with LTIL rupture is initially dismissed as a case of wrist sprain and would only seek for a physician again after persistent pain and motor impairment [4]. To diagnose an injury involving the LTIL it must be performed a proper anamnesis and physical examination [1,3].

Imaging can be useful to narrow down the possible differential diagnosis of ulnar-sided wrist pain [3]. Predominant methods used to investigate it are arthroscopy [2], arthrographies [2,3], computed tomography (CT) [3], MRI [3], combined arthrography's with MRI [1-3] and combined arthrography with CT [1]. Coggins (2006) [3] defends that magnetic resonance combined with arthrography allows a better assessment of LTIL, because the contrast may be seen crossing the defect in the radiocarpal direction to the midcarpal joint [3]. However, according to Avrahami, *et al.* (2010) [1] and Mirza, *et al.* (2013) [4] the confirmatory gold-standard exam still is arthroscopy [1,4]. Early diagnosis of the pathology is essential for proper treatment [2].

Borgese, *et al.* (2017) [2] reported that the distance between capitata and triquetrum bones, measured from a radiographic im-

age, could be used as a primary clinical evaluator to support the use of the gold-standard in the investigation of an LTIL lesion [2]. Furthermore, he emphasizes that radiography is widely available and is not an invasive method, making it feasible to be performed as a complementary tool [2].

The patient with LTIL lesion will present pain on the ulnar surface of the wrist [1-5], local tenderness [1,3], painful snap with ulnar and radial deviation [1,3], loss of strength to grasp objects [1] or to maintain the wrist stable under load [1]. Many individuals with LTIL injury and/or carpal instability may not present classic clinical signs [1]. Therefore, stress tests can be performed, including the lunotriquetral shear test [1,3]. Ballottement test to check LTIL instability [1,3]. Reagan's test [1] and Linscheid compression test [1]. The first two are based on applying pressure in opposite directions on adjacent carpal bones [3]. Provocative maneuvers remain physician dependent and many of these tests were more efficient in predicting the absence of the lesion than its presence [1].

The investigation of causes of wrist pain is considered difficult in many cases [3]. Most part of the structures in this region are small, and a wide variety of diagnoses is possible [3]. According to Coggins (2006) [3], a total of 44 different entities can be considered in the differential diagnosis, from which the most commons are [3]:

- Disorder of the distal radioulnar joint.
- Disorders of the extensor carpi ulnaris tendon.
- Disorders of the pisotriquetral joint.
- Ulnar wrist masses.
- Impaction syndrome.
- Tear of the triangular fibrocartilage complex.

Furthermore, as reported by Avrahami, *et al.* (2010) [1], another differential diagnosis that deserves attention is the injury of the scaphoid-lunate joint, which is six times more affected than an LTIL lesion [1,3].

Patients with pain on the ulnar side of the wrist as a result of an LTIL injury should initially receive conservative treatment [1,4] with:

- Electrotherapy.
- Strengthening exercises for the wrist and for activities that involve grasping objects.

- Immobilization.
- Corticosteroid injection.
- Modification of the activity.
- Mobilization of the peripheral joint.

When it is not responsive to this treatment [4] or in the case of a complete ligament rupture [1], surgical intervention is necessary to stabilize the lunate-triquetrum joint through ligament repair, ligament reconstruction, dorsal capsulodesis, or a semilunar-pyramidal arthrodesis [1,4]. Commonly a plaster cast is placed up to the elbow for approximately 4 weeks, followed by another plaster cast, this time smaller, for more than 2 weeks [1].

Such surgical interventions may resolve pain symptoms, however, there is a high rate of complications and need for reintervention [4]. Mirza, *et al.* (2013) [4] reported ulnar shortening osteotomy as an effective primary treatment on patients with isolated rupture of the LTIL, although refers that further studies are still needed [4].

## Conclusion

The reported case demonstrates a lesion of the lunotriquetral diagnosed by MRI. The patient was referred to physical therapy treatment with exercises, ultrasound, and shock therapy, showing improvement in symptoms.

## Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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