Chapter 13 Arthroscopic Lunotriquetral Arthrodesis and Head of the Hamate Resection

Introduction

Lunotriquetral arthrodesis is a controversial procedure but is sometimes proposed as a last resort for lunotriquetral instability. The standard open procedure has a nonunion rate of nearly 50% and leads to persistent pain in 50% of patients. Lunotriquetral arthrodesis is not well suited to wrists with positive ulnar variance or with a Viegas type II lunate due to changes induced in the triquetrum's biomechanics and its mobility within the first row of carpal bones.[1–3]

The minimally invasive nature of an arthroscopic procedure can improve outcomes in several ways:

- It minimizes capsule detachment, thereby sparing the local vasculature that is indispensable for fusion of the arthrodesis.
- It allows the evaluation of any chondromalacia secondary to positive ulnar variance, which can be corrected through arthroscopic distal ulnar resection (Chapter 12) during the same procedure.
- It allows other commonly associated injuries (triangular fibrocartilage complex [TFCC], hamate chondritis, synovial chondromatosis, etc.) to be treated.
- It guides dynamic analysis of the radiocarpal and midcarpal joints once the arthrodesis has been performed, which allows the surgeon to treat any impingement with the ulnar head or head of the hamate by resecting the latter structure.

Operative Technique (Fontes)

Patient Preparation and Placement

The patient is placed in the standard position with the arm secured to the table. Regional anesthesia and a tourniquet are used. Finger traps apply 5–7 kg of traction along the arm's axis.

Radiocarpal Exploration

Radiocarpal joint exploration requires use of the 3–4 portal for the arthroscope and the 6R portal for the arthroscopy instruments. Any inflamed synovial tissue is removed, and the lunotriquetral ligament is inspected for damage. The arthroscope may need to be moved to the 6R portal for a better view of the ligament. The TFCC is also inspected, and the presence of positive ulnar variance or associated ulnar impaction syndrome is determined. If found, treatment is carried out through arthroscopic resection using the standard technique (Chapter 12).

Midcarpal Exploration

The arthroscope is moved into the midcarpal joint through the radial midcarpal (MCR) portal. Lunotriquetral instability is evaluated before this procedure, which is reserved for the most advanced stages of instability (Geissler stages 3 and 4). It is often necessary to excise reactive synovial tissue, or even to carry out arthrolysis to expose the damaged interosseous space (**Fig. 13.1**). A radiofrequency probe can be useful during this step, along with a small-diameter, aggressive cutter used in the oscillating mode.

Analysis of Lunate Shape and Head of the Hamate Resection in Viegas Type II Wrists

In the next phase of the procedure, the lunate's shape must be determined based on the presence or absence

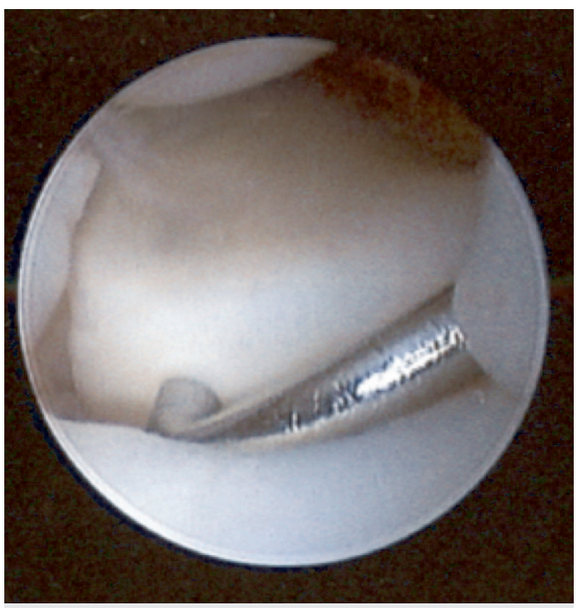

Fig. 13.1 Arthroscopic view of lunotriquetral instability. The probe passes easily between the lunate and triquetral.

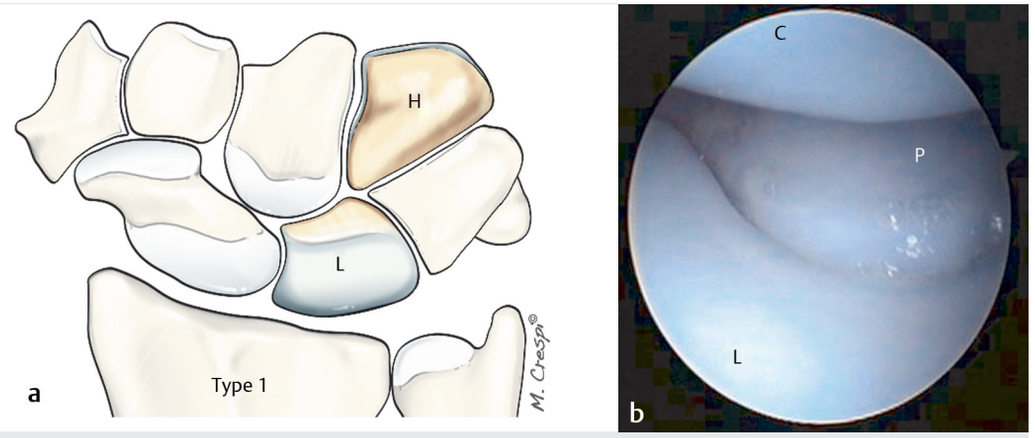

Fig. 13.2a, b Drawing (**a**) and arthroscopic view (**b**) of a Viegas type I wrist where the distal lunate is evenly rounded. C, capitate; H, hamate; L, lunate; P, triquetrum.

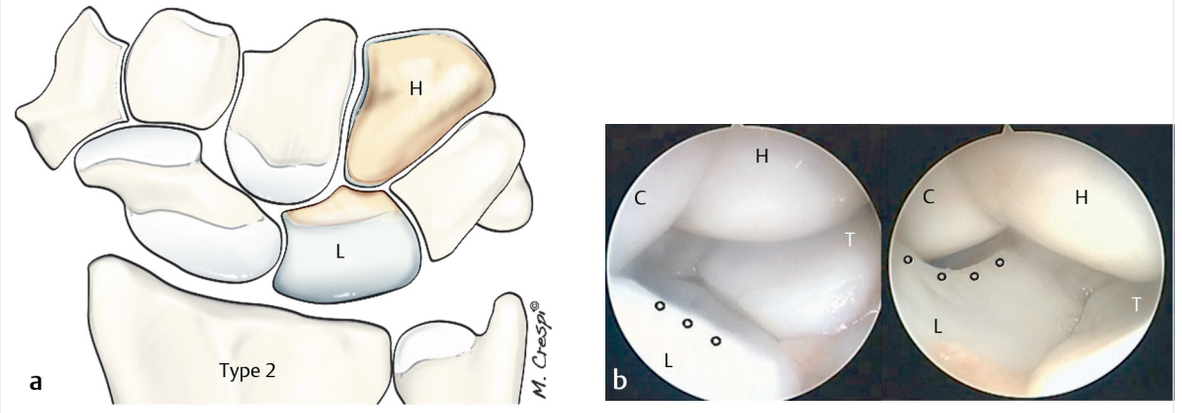

Fig. 13.3a, b Drawing (**a**) and arthroscopic view (**b**) of a Viegas type II wrist where the lunate has a distal medial facet that articulates with the head of the hamate. C, capitate; H, hamate; L, lunate; T, triquetrum.

of an articular facet for the head of the hamate[1] (**Figs. 13.2a, b** and **13.3a, b**). A type I lunate does not articulate with the hamate; as a consequence, the head of the hamate very rarely develops osteoarthritis, and its shape does not interfere with lunotriquetral arthrodesis. A type II lunate has an extra-articular facet for the hamate; as a consequence, the head of the hamate can become arthritic (this is often found in golfers) (**Fig. 13.4**). This extra facet interferes with fusion between the lunate and triquetral. The presence of lunohamate chondromalacia can also be the result of excessive pressure in the medial aspect of the wrist due to congenital or acquired positive ulnar variance. In this patient, the damaged head of the hamate must be resected using a small rotating bur inserted through the ulnar midcarpal (MCU) portal, with the scope in the radial midcarpal (MCR) portal (**Fig. 13.5**).

Systematic excision of the head of the hamate in Viegas type II wrists circumvents the need for a bone graft during lunotriquetral arthrodesis. This reduction in the transverse diameter of the first row has no effect on the midcarpal joint.

Preparation of the Lunotriquetral Joint Space

The next phase consists of exposing bleeding bone in the lunotriquetral joint space with a curet and bur by alternating the midcarpal and radiocarpal portals and sometimes combining them (scope in MCR portal and instruments in 6R portal). It can be useful during this step to release the tourniquet to ensure that the decorticated

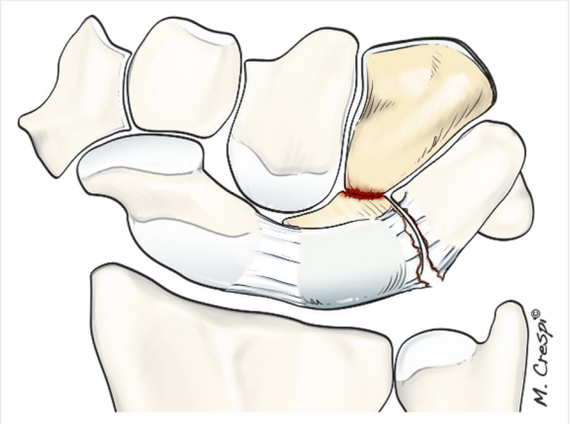

Fig. 13.4 Drawing of impingement between the head of the hamate and medial lunate facet with lunotriquetral ligament rupture.

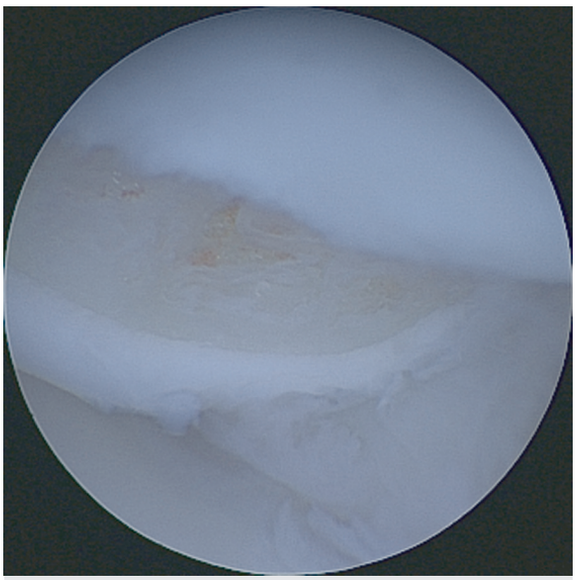

Fig. 13.5 Arthroscopic view of the resected head of the hamate.

bone slices are well vascularized (**Fig. 13.6**). An interosseous bone graft is not needed at this point due to the aforementioned resection of the head of the hamate.

Fixation of the Lunotriquetral Arthrodesis

Before fixation can be performed, any carpal misalignment induced by volar intercalated segmental instability (VISI) must be reduced. A combined arthroscopic and radiographic evaluation is needed in this patient.

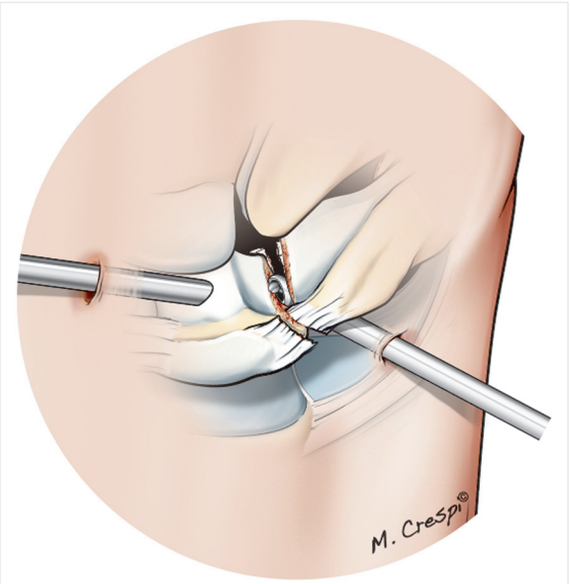

Fig. 13.6 Drawing of how bleeding bone is exposed in the lunotriquetral joint space with the scope in the radial midcarpal (MCR) portal and the bur in the 6R portal.

An external maneuver is performed with the wrist extended to reduce the lunate's VISI deformity. Radioulnar pinning is performed to immobilize the lunate, and then the wrist is straightened (**Fig. 13.7a, b**). A second K-wire is placed between the triquetral and the lunate. It will serve as a guidewire for the cannulated screw used to stabilize the arthrodesis (**Fig. 13.8**). A third K-wire is inserted at an angle between the lunate and triquetral to secure the entire construct and avoid any rotation when the compression screw is inserted (**Fig. 13.9**). A cannulated compression screw is inserted along the guidewire, and the other K-wires are removed (**Fig. 13.10**).

Postoperative Care

The skin incisions are left open or closed with Steri-Strip (3M, St. Paul, MN) bandages only. A removable brace is worn for 3 weeks. Patients then start self-rehabilitation. Formal physical therapy can be initiated at week 6, if needed.

Conclusion

Lunotriquetral arthrodesis is a rarely used procedure, but it can be valuable for treating advanced lunotriquetral instability. This arthroscopic technique preserves carpal bone vascularity, which increases the likelihood of fusion. It also allows for targeted treatment of any associated

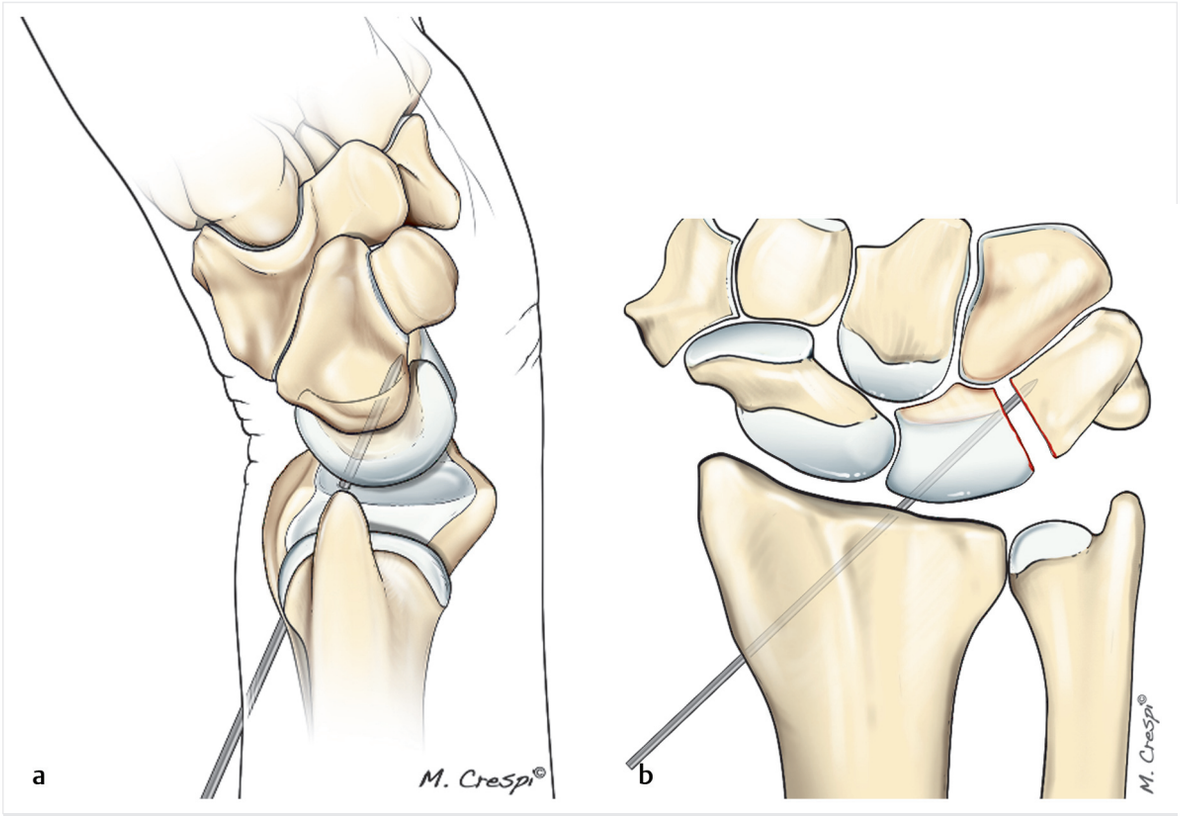

Fig. 13.7a, b Drawings (**a, b**) of how the K-wire is positioned to secure the lunate and triquetral after the volar intercalated segmental instability deformity of the lunate has been reduced.

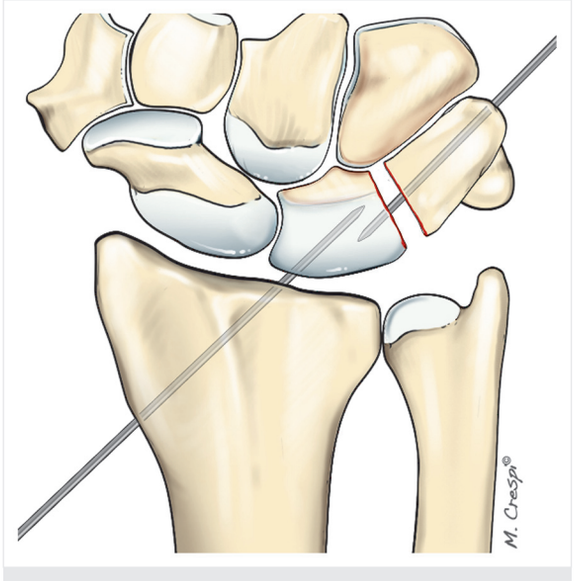

Fig. 13.8 Drawing of the position of the K-wire used to secure the triquetral to the lunate.

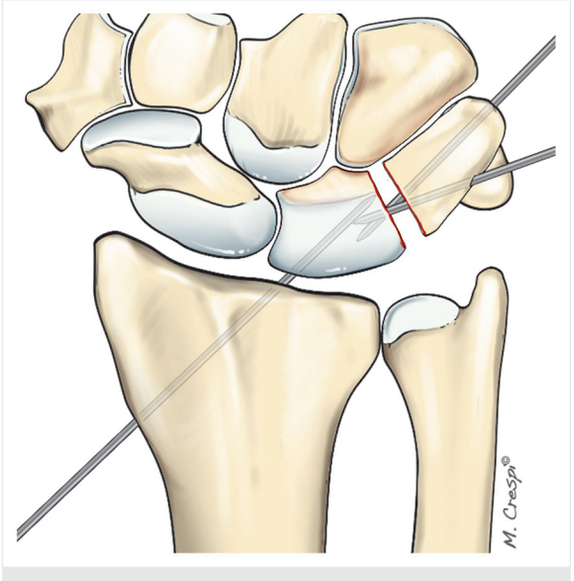

Fig. 13.9 Drawing of the position of the third K-wire used to stabilize the entire construct.

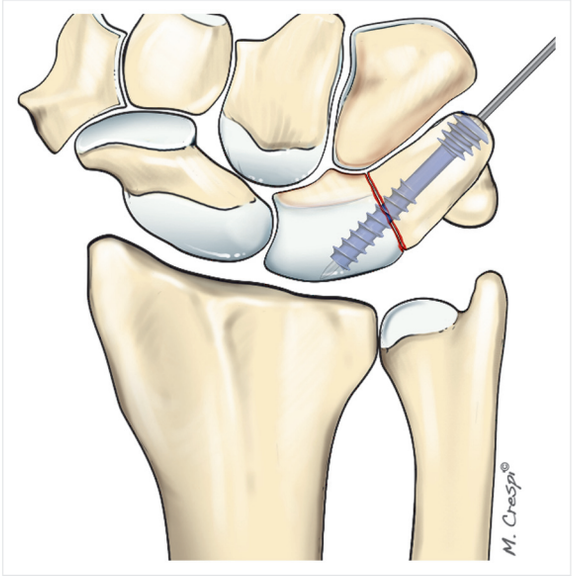

Fig. 13.10 Drawing of the lunotriquetral arthrodesis stabilized by a compression screw. The other K-wires have been removed.

injuries, such as ulnar impaction syndrome or hamate chondritis, which are often involved in poor functional outcomes.

References

1. Viegas SF, Wagner K, Patterson R, Peterson P. Medial (hamate) facet of the lunate. J Hand Surg Am 1990;15(4):564–571
2. Viegas SF. The lunatohamate articulation of the midcarpal joint. Arthroscopy 1990;6(1):5–10
3. Viegas SF. Midcarpal arthroscopy: anatomy and technique. Arthroscopy 1992;8(3):385–390