

Arthroscopic v-Shaped Interposition Arthroplasty in Stage II Scapholunate

Chapter 26 Advanced Collapse Wrists

Introduction

Arthritis secondary to scapholunate (SL) ligament rupture has been divided into four stages. In a stage II scapholunate advanced collapse (SLAC II) wrist, only the scaphoid fossa of the radius is arthritic (Fig. 26.1). The gold standard treatment consists of proximal row carpectomy; however, this is a fairly aggressive palliative treatment. A procedure that can prevent or delay this possibility consists of radial styloidectomy extended to the scaphoid fossa, SL joint stabilization, and interposition arthroplasty between the first and second row of carpal bones.

Operative Technique

Patient Preparation and Positioning

The procedure is performed under regional anesthesia. The patient's arm is secured to the arm board. An atraumatic hand holder is used to apply 5 to 7 kg of traction along the arm's axis.

Debridement and Exploration of the Radiocarpal Joint

The radiocarpal joint is typically affected by significant synovitis, often with accompanying bone and cartilage



Fig. 26.1 X-ray of a patient with a stage II scapholunate advanced collapse wrist secondary to scapholunate dissociation; there is a visible gap between the scaphoid and the lunate, and osteoarthritis between the scaphoid and scaphoid fossa of the radius; however, the midcarpal joint is intact.

fragments. The sheath and arthroscope are inserted through the 3–4 portal. The shaver is inserted in the 6R portal to start debriding the medial side of the radiocarpal joint. The synovectomy is completed after reversing the position of the scope and shaver. All cartilage fragments must be removed.

Expanded Styloidectomy

The scope can be placed in either or both the 3–4 and the 6R portals. The joint assessment will often reveal that no cartilage remains on the scaphoid fossa of the radius or on the proximal pole of the scaphoid (Fig. 26.2). All other cartilage surfaces will be intact.

After locating the 1–2 portal with a needle, the shaver is inserted to complete the synovectomy around the radial styloid process. A bur is used to perform the styloidectomy as in a typical arthroscopic styloidectomy procedure (Fig. 26.3) (Chapter 6). The styloid is resected at an angle while preserving the volar and dorsal attachments of the extrinsic ligaments (dorsal radiocarpal and radioscapocapitate).

The entire scaphoid fossa is then resected until vascularized subchondral bone is exposed (~2–3 mm or

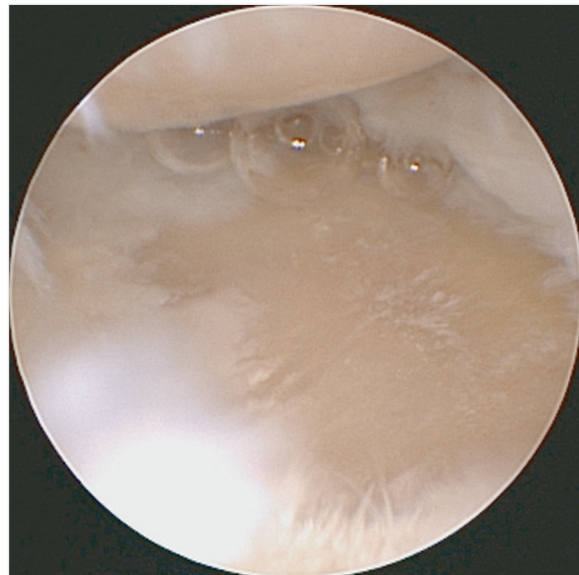


Fig. 26.2 Arthroscopic view of the radiocarpal joint showing the lack of cartilage on the proximal aspect of the proximal pole of the scaphoid and the scaphoid fossa of the radius.

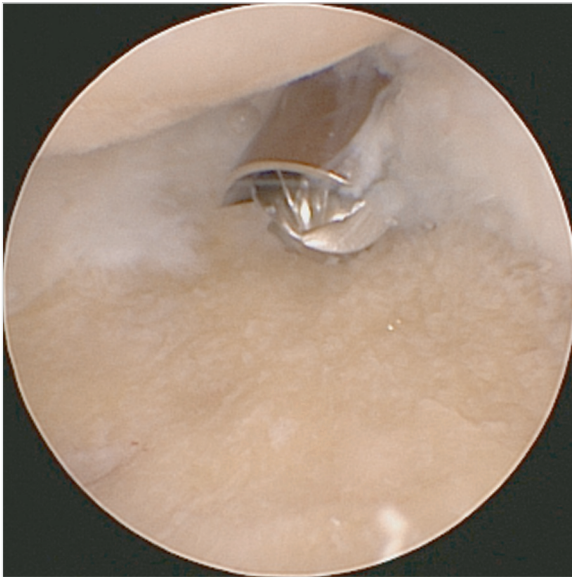


Fig. 26.3 Arthroscopic view of the bur performing the radial styloidectomy .

roughly the size of the bur). This bleeding bone will help ensure the success of the interposition arthroplasty by creating conditions favorable to fibrosis. After the styloidectomy, a suture anchor is introduced through the 1–2 portal and inserted into the tip of the styloid process under arthroscopic control (**Fig. 26.4a, b**). The anchor's sutures are externalized by the 1–2 portal and will be used to secure the tip of the v-shaped interposition implant.

Stabilization of the Scapholunate Joint

Repairing the SL ligament is unrealistic at this point; nevertheless, dorsal capsule-to-ligament suture repair (Chapter 15) can be carried out to stabilize the SL joint and avoid further damage. This is performed using the same technique as is used for SL ligament repair in less advanced SLAC patients. It is rare to find the dorsal SL ligament stump still attached to the scaphoid.

The following technical trick can be used instead. A 1.2 mm K-wire is inserted through the 3–4 portal as vertically as possible. The scope, in the 6R portal, is used to follow the dorsal recess and verify the proper K-wire position in the posterior horn of the proximal pole of the scaphoid. The K-wire creates a small bone tunnel in this proximal pole (**Fig. 26.5**). A needle with one suture is passed through the tunnel and retrieved in the midcarpal joint; the other suture is placed in the SL stump on the lunate (**Fig. 26.6**). Suturing is then carried out as typically done for SL repair. The final phase of the dorsal capsule-to-ligament repair will be carried out at the end of the procedure.

Preparation for Interposition Arthroplasty

The palmaris longus tendon is typically used in this situation, although other types of grafts (tendon or synthetic) can be used. The tendon is folded back and threaded using resorbable sutures so that it becomes v-shaped (**Fig. 26.7**). Two resorbable traction sutures are attached to the limbs

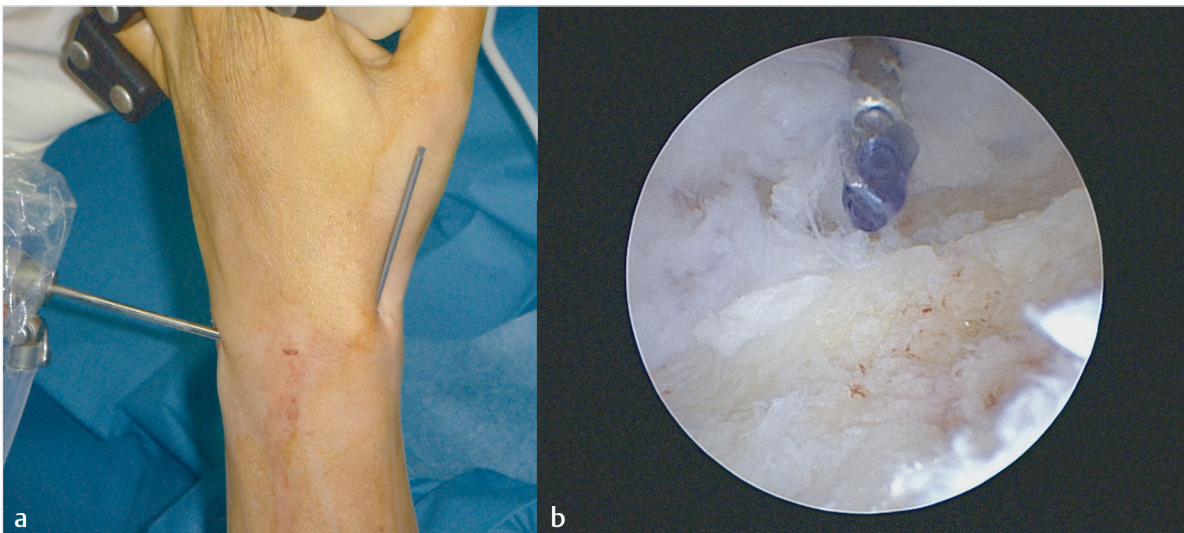


Fig. 26.4a, b Intraoperative (a) and arthroscopic (b) views of the suture anchor being inserted into the tip of the radial styloid process through the 1–2 portal.

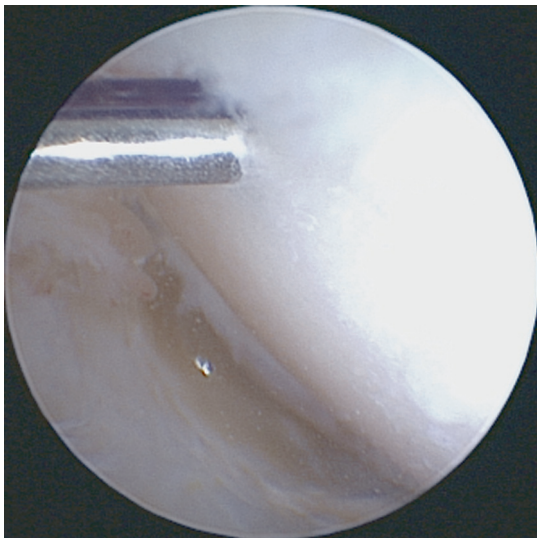


Fig. 26.5 Arthroscopic radiocarpal view of a bone tunnel being made in the proximal pole of the scaphoid, with the scope in the 6R portal.

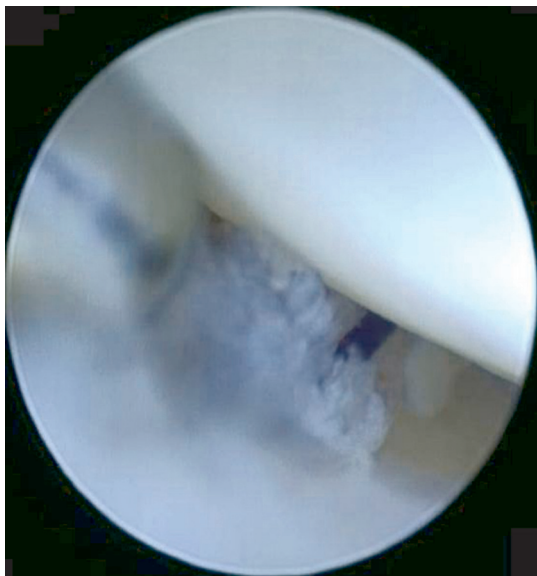


Fig. 26.6 Arthroscopic view of the midcarpal joint; the suture that had been passed in the bone tunnel of the proximal pole of the scaphoid is being retrieved.

of the v. The sutures associated with the anchor in the radial styloid process will be attached to the tip of the v.

Preparation for Implant Fixation

Implant fixation consists of securing the tip of the v-shaped graft to the anchor and securing the two limbs

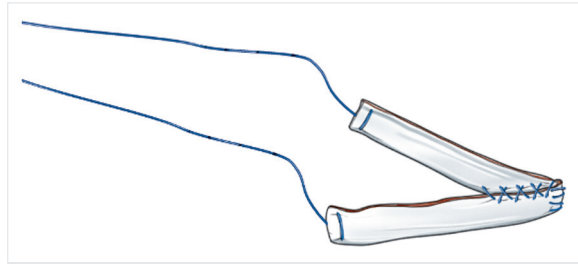


Fig. 26.7 Drawing of the v-shaped graft. One suture is placed at the end of each of the two limbs of the v.

of the graft to the volar and dorsal radial attachments of the triangular fibrocartilage complex (TFCC).

After making a distal radioulnar (DRU) portal 1–2 cm below the 6R portal, two loops of resorbable suture are inserted using two intramuscular needles. The first loop exits the radiocarpal joint at the volar radial attachment of the TFCC. The second loop exits at the dorsal radial attachment of the TFCC (**Fig. 26.8**). The two sutures are retrieved with hemostats and externalized by the 6R portal under visual control with the scope in the 3–4 portal.

The two traction sutures in the limbs of the graft are inserted in the joint through the 1–2 portal using hemostats, then retrieved and externalized through the 6R portal. The scope remains in the 3–4 portal to verify this maneuver. The two traction sutures are passed through the corresponding loops to bring these sutures through the volar and dorsal radial attachments of the TFCC (see **Fig. 26.8**). The two traction sutures are externalized through the DRU portal by pulling on the loops (**Fig. 26.9a, b**).

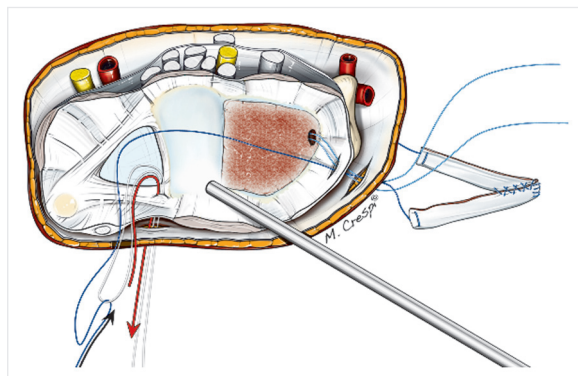


Fig. 26.8 Drawing of the sutures attached to the graft limbs being passed through the radial attachment of the triangular fibrocartilage complex (TFCC) using a loop passed through the distal radioulnar (DRU) portal and externalized through the 6R portal.

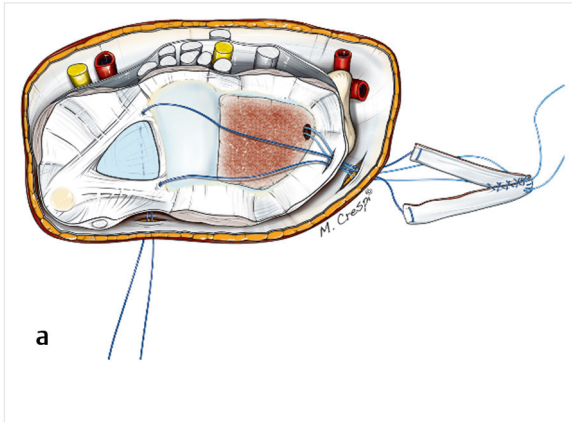


Fig. 26.9a, b Drawing (a) and intraoperative view (b) of the two sutures in the v limbs after being passed through the palmar and dorsal radial attachments of the triangular fibrocartilage complex (TFCC) and externalized through the distal radioulnar (DRU) portal.

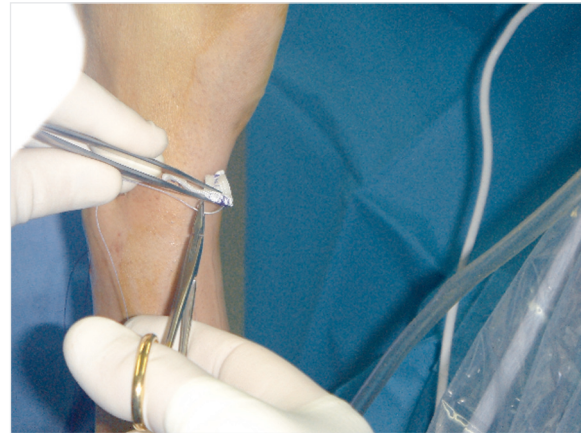


Fig. 26.10 Intraoperative view of the tip of the v being secured with one of the sutures attached to the anchor previously inserted in the radial styloid process.

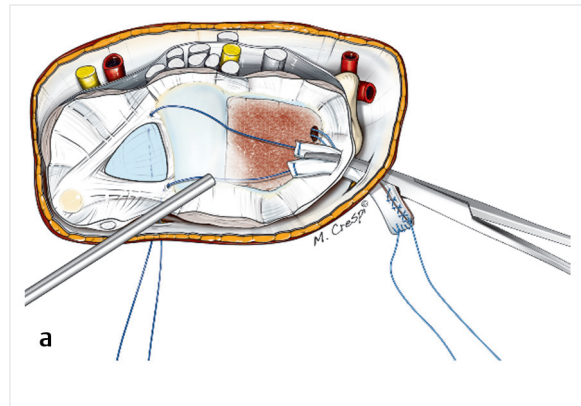


Fig. 26.11a, b Drawing (a) and intraoperative view (b) of the placement of the implant into the radiocarpal joint through the 1-2 radiocarpal portal.

Placement and Fixation of Implant

The tip of the v is secured using the sutures from the anchor in the tip of the styloid process (**Fig. 26.10**). Forceps are used to grasp the two limbs of the v and push them inside the radiocarpal joint via the 1-2 portal (**Fig. 26.11a, b**). The traction sutures are used to pull on the two limbs of the v so the volar limb can be attached to the volar radial insertion of the TFCC and the dorsal limb can be attached to the dorsal radial insertion of the TFCC. The two traction sutures are sutured together at the dorsal capsule of the distal radioulnar joint (DRUJ), as would typically be done to reattach the TFCC. In all, the three-point fixation of the implant forms a v-shaped interposition graft between the radius and the first carpal row (**Fig. 26.12a, b**).

Closure and Postoperative Care

After releasing the traction on the hand, suture stabilization of the SL ligament is performed with the wrist extended.

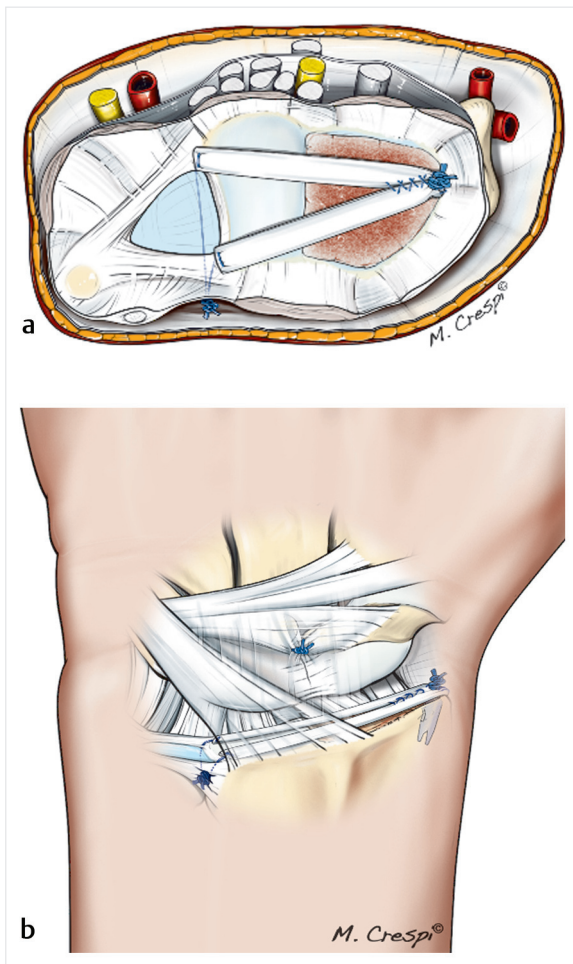


Fig. 26.12a, b Drawings (a, b) of the completed interposition arthroplasty: the implant is placed between the scaphoid and radius, with its tip secured by the anchor in the styloid process and the two limbs of the v in the triangular fibrocartilage complex (TFCC). The styloidectomy is extended to the scaphoid fossa of the radius until subchondral bone is exposed; the resulting bleeding bone contributes to the success of the interposition arthroplasty. The scapholunate joint is stabilized through dorsal capsule-to-ligament suture repair.

The incisions are typically left to heal by first intention. If the 1–2 portal was extended to insert the implant, one or two sutures may be needed to close it. An anterior splint is worn in the resting position (45–60° extension) for 45 days.

Conclusion

Arthroscopic interposition arthroplasty is a delicate technique, but it provides a straightforward solution for patients with SLAC II wrists. It does not burn any bridges for other palliative techniques, and it re-creates the radio-carpal joint space in a way that provides the patient with pain-free function (Fig. 26.13 a, b).



Fig. 26.13a, b X-rays before surgery (a) and 5 years postoperative (b) of a patient with a stage II scapholunate advanced collapse wrist.

