Limited Carpal Fusion Using a Novel, Circular, Radiolucent Plate

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Introduction

Post-traumatic wrist arthritis is a disabling condition that has many etiologies but commonly affects patients after scaphoid nonunion or scapholunate advanced collapse (SNAC) and scapholunate nonunion advanced collapse (SNAC) have been well-described, and multiple salvage operations have been devised to treat the later stages of collapse. In earlier stages, however, limited carpal fusions have the potential to decrease pain, maintain functional range of motion and preserve carpal height. While the literature supports both proximal row carpectomy (PRC) and limited carpal fusion for SNAC and SLAC wrists, PRC is not an option in midcarpal arthritis, where the head of the capitate shows degenerative changes.

A solid capitulate fusion is the goal of limited carpal arthrodesis, creating a stable unit that links the radius and the distal carpal row. The importance of preserving the triquetrum or including it in the fusion is unknown. Other investigators have performed isolated capitulate fusions without including the hamate or triquetrum, all with comparable results in small series. Biomechanically, excision of the triquetrum has been shown to lead to better wrist motion, but this has not yet been borne out in clinical studies. Lunate position within the fusion is critical. While total arc of motion is unlikely to be affected, fusing the lunate in an extended position will allow greater flexion at the expense of extension, while the converse is also true.

Methods

Lunate and Triquetrum Excision

The plate is placed into the reamed hallow and initial screws are placed in lag fashion to bring the plate to bone. The screws are then locked into the plate and the remaining screws inserted. The lunate is reduced, the capitulate repaired, and the wound closed in standard fashion. The patient is immobilized for six weeks.

Conclusion

3-bone fusion is a reliable treatment for SLAC/SNAC wrist.

Complications:

- 6 complications (29%)
  - 1 pt with post-op infection
  - 1 pt with nonunion
  - 1 pt with non-union
  - 3 complications + grip, DASH and VAS (all excellent)

Discussion

The technique of 3-bone fusion using next-generation circular plates is reliable and shows similar results to other successful techniques for 4-corner fusion including memory staples and cannulated screws.

In our study, we have lost to follow-up, despite careful postoperative care, despite evidence of fusion on radiographs, and only long-term results will provide further information.

The XPOIDE plate from Tri-Med is a second-generation, locking, circular fusion plate that has been used both in the wrist and foot made from PEEK, a radiolucent polymer with a similar modulus of elasticity as cortical bone. The titanium screws lock into the plate at variable angles, allowing multiple screws to be placed into each bone, and the instrumentation includes a reamer that allows for full resection of the plate into the carpal fusion mass to avoid any dorsal impingement. We have been using this plate for over two years in limited carpal fusions.