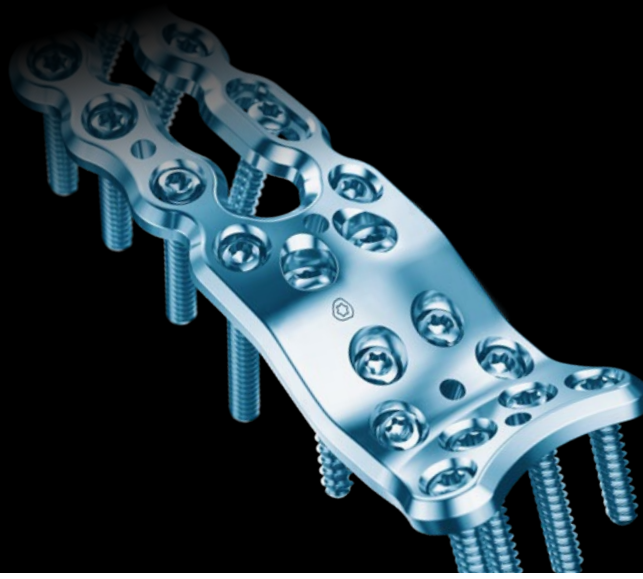


CASE REPORT



Treatment of scapholunate advanced collapse and lunate fracture with partial proximal row carpectomy and short bend 2.5 Trilock Wrist Fusion Plate

The Surgeons

Mr. Darren Roberts

Mr Darren Roberts has been a consultant hand and upper limb surgeon at the Queen Alexandra Hospital in Portsmouth since 2015. He was the first Wessex surgeon to be awarded the British Hand Diploma. During his BSSH fellowship in Birmingham, he was exposed to the sequelae of soldiers' injuries from the Afghanistan conflict. He has researched several topics including major upper limb amputations and has presented his work internationally to the Association of Military Surgeons of the United States in Washington DC. More recently he has been researching the Touch replacement and chaired the first UK expert meeting in 2025. In his spare time, he sets thematic crosswords for national newspapers and won the Ascot Gold Cup for The Times Listener crossword setter of the year in 2015 and 2022.

Introduction

Scapholunate advanced collapse is a degeneration in specific areas of the carpus as a result of scapholunate ligament insufficiency and altered carpal mechanics. The standard treatment options in later stages most frequently include a proximal row carpectomy or scaphoidectomy and limited carpal fusion (e.g. with the Medartis TriLock Four Corner Fusion Plate). The aim is to preserve some motion whilst reducing pain. In this situation the lunate fossa is preserved. However, if widespread degeneration occurs then the only option remaining may be a wrist fusion. This option will maintain pronosupination and enable stability with restoration of function and grip. The 2.5 Trilock wrist fusion plate (available in long and short bend), avoids the necessity to fuse the third carpometacarpal joint. In addition, the implant is contoured and has a low profile to reduce the risk of extensor tendon irritation and need for subsequent removal.

The Case



Patient Profile

A 40-year-old right-hand-dominant gentleman was working on a tractor one year earlier when, as he was pulling on some straps, a metal buckle fell and hit him directly onto the radial aspect of his right wrist. This caused immediate pain, with worsening swelling over the following few weeks. He did not seek any medical intervention at that time as the swelling eventually settled. However, the pain and weakness impacted function and activities of daily living despite wearing a splint.



Preoperative Clinical Findings

On examination he had reduced range of movement of the right wrist, particularly in flexion and ulnar-radial deviation. Tenderness mainly in the radial aspect of the wrist but also across the wrist itself in keeping with an element of synovitis. Negative Kirk-Watson test although this is not surprising given the stiffness of the wrist. Radiographs showed a widened scapholunate interval of 5.5 mm, flexed scaphoid with ring sign, extended lunate, and narrowing of the radial styloid suggestive of scapholunate advance collapse. Further radiographs taken in radial and ulnar deviation confirmed the likelihood of a fixed scaphoid, indicating that his case was now beyond the remit of ligament reconstruction and likely salvage surgery (Figure 1). A CT scan was undertaken to stage the progression, revealing an unusual finding of a lunate fracture (Figure 2) and the presence of lunocapitate osteoarthritis (Figure 3). If reduction of the fracture had been possible then scaphoidectomy and four-corner lunocapitate fusion would have been the treatment of choice.



Figure 1
Widened scapholunate interval, flexed scaphoid (despite taken in ulnar deviation), extended lunate and radial styloid degeneration



Figure 2
CT slice showing lunate fracture



Figure 3 CT
showing lunocapitate degeneration



Surgical Treatment

Dorsal midline approach overlying the carpus and distal radius. Skin flaps raised off the extensor retinaculum to preserve cutaneous nerves and veins. Third extensor compartment released and extensor pollicis longus (EPL) tendon retracted. Second and fourth compartments elevated from dorsal and capsular ligaments. Distally based flap preserving the dorsal radiocarpal ligament (proximal aspect of Berger-Bishop flap). This approach was chosen in case a partial wrist fusion was appropriate. Once a fusion is deemed appropriate a further midline flap can be incorporated in order to gain coverage of the distal end of the plate.

The scaphoid, lunate, lunate fossa and capitate base were exposed to confirm the degree of osteoarthritis (alternatively a preceding arthroscopy can be undertaken). However, this single approach can be used and the definitive procedure adjusted accordingly depending on the degree of degeneration, thereby reducing tourniquet time.

Unfortunately, surgery was delayed due to personal reasons and by the time surgery was performed the progression of degeneration and the avascular nature of the lunate fragment meant that a wrist fusion was now the only option.

The lunate was therefore excised along with the triquetrum and proximal aspect of the scaphoid. The capitate was prepared as well as the scaphoid and lunate fossae of the distal radius. This allows a large surface area to achieve union rather than performing an entire proximal row carpectomy. Furthermore, the excised carpal bones can be used as autologous bone graft rather than using allograft or iliac crest bone graft.

As carpal height was reduced, the 2.5 short bend Trilock wrist fusion plate was chosen. Screws were inserted into the capitate and distal scaphoid and into the distal radius to achieve a stable construct (Figure 4). The capsule and extensor retinaculum were closed, and the EPL tendon partially restored with a layer of retinaculum between the tendon and the plate.



Figure 4
short bend 2.5 Trilock Medartis wrist fusion plate. Distal pole of scaphoid remains visible to facilitate union.



Figure 5
Progression towards union at 8 weeks with incorporation of bone graft from removed carpal bones. The contour of the plate ensures slight extension to facilitate grip strength recovery



Postoperative Treatment

A temporary dorsal cast and sling are applied for 2 weeks to allow for swelling to settle and full range of movement of all digits. After 2 weeks a full cast is applied for a further 4 to 6 weeks with follow-up radiographs taken to ensure progression towards union. At this stage, a removable splint is used to improve grip strength, although heavy manual work should be avoided for at least 3 months.



Conclusion

The option of a short-bend wrist fusion plate is ideal in circumstances where carpal height is reduced or when anatomy is smaller. The addition of locking screws distally allows for stable fixation. It also negates the need to fuse the third CMC joint and the contour permits early tendon glide, which may help to reduce the rate of tendinopathy.

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