The Stickshift K-Wire Reduction Technique For Lunate And Perilunate Dislocations Of The Wrist: Report Of 2 Cases

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Citation

Abstract
Manipulation of carpal bones, open or closed, may be facilitated by a kirschener wire used like a car gear lever or "stickshift".

CASE 1
A 41-year-old male injured his non-dominant left wrist following a fall on to his outstretched hand. Physical examination revealed a swollen, tender wrist. Range of motion was restricted and painful. There was paraesthesia in the median nerve distribution of the left hand. Radiographs of the left wrist revealed a perilunate dislocation without any associated fractures (Fig 1a).

Attempts at closed reduction under general anaesthesia were unsuccessful. Hence after preparing and draping, a K-wire was inserted into the dorsum of the lunate under image intensification. The K-wire was then used as a lever to reduce the lunate successfully – “dorsal stickshift” (Fig 1b). The flexed scaphoid was reduced using thumb pressure and by deviating the wrist ulnarswards. The scaphoid was then transfixed to the lunate with another K-wire to control the scapholunate dissociation. A below elbow cast was then applied.

The median nerve paraesthesia completely resolved over two weeks. The K-wire was removed at four weeks but plaster immobilization continued for a further two weeks. At six weeks wrist mobilisation was commenced. At three months, the patient had a reasonable range of movements but x-rays revealed an increased scapholunate interval. The patient has since then undergone a scapholunate ligament reconstruction augmented by dorsal capsulodesis.

Figure 1
Figure 1a: Antero-posterior and lateral radiograph of the wrist showing peri-lunate dislocation.
CASE 2

A 22-year-old male was brought to the casualty department after a fall from a height of 25-30 feet sustaining multiple injuries. He also had marked swelling and tenderness of the right wrist. Radiographs revealed a transscaphoid volar lunate fracture-dislocation with intra-articular distal radius fracture (Fig 2a).

Under general anaesthesia an open reduction was carried out through a volar approach. Reduction of the lunate was achieved using a K-wire inserted into it from the volar aspect and used as a lever arm - “volar stickshift”. The scaphoid fracture was reduced and fixed with two K-wires. The scaphoid was then transfixed to the lunate using another K-wire. Ligament reconstruction was not performed. The distal radius fracture was stabilised with a T-plate. A scaphoid type cast was applied.

The K-wires and plaster were removed at six weeks and gentle wrist mobilisation commenced. At 2 years after surgery, the patient had no pain or limitation of activity. Palmar flexion of the wrist was 70%, while dorsiflexion and grip strength was 100% of the opposite side. Radiographs revealed that the fracture had healed, scapholunate interval was maintained with no dissociation, and there were no degenerative changes in the carpus (Fig 2b).
DISCUSSION
Lunate and perilunate dislocations are comparatively uncommon and constitute about 10% of all carpal injuries. Mouchet and Tavernier first described the pathomechanics resulting in a perilunate dislocation in 1919. The mechanism they described was one of hyperextension. In 1980, Mayfield et al. studied the pathomechanics and specific pattern of ligament disruption in progressive perilunar instability that led to first a dorsal perilunate dislocation and subsequently a volar lunate dislocation. They described not only hyperextension but also forced intracarpal supination as being involved in the pathomechanics of these injuries.

Fracture-dislocations of the wrist are, fortunately, unusual injuries. If not properly treated, they may result in persistent wrist instability with severe functional handicap. Various treatment options exist, including closed reduction and plaster immobilisation, open reduction and internal fixation plus/minus ligament repair, trapeziolunate external fixation, limited wrist arthrodesis, and even primary carpectomy of the proximal row.

Whatever the chosen treatment option, whether closed or open, anatomical reduction of the scaphoid and lunate is of paramount importance. In cases of difficult reduction, the stickshift K-wire technique is a simple but effective method to achieve reduction and can be used both from volar or dorsal aspect as the case may be. The use of K-wires in wrist injuries has been casually mentioned in past literature, but no one has formally described a reduction technique using them.

However, even after successful relocation of the perilunate injury, the scapholunate dissociation may remain as the residual problem, as was evidenced in the first case. Scapholunate ligament reconstruction augmented by dorsal capsulodesis is the recommended treatment in such cases.

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