

Migration of a Kirschner Wire in Kapandji Intrafocal Pinning : An Unusual Pattern

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ABSTRACT

The complication of pin migration has been well documented in the orthopaedic literature. Despite these reports, the technique of intrafocal pinning of intraarticular distal radius fractures using Kirschner wires is still commonly used. We describe an unusual pattern of pin migration in a patient with an intraarticular distal radius fracture, who was treated using Kapandji's intrafocal pinning.

INTRODUCTION

We present a case report an unusual pattern of Kirschner wire migration used in intrafocal pinning of an intraarticular fracture of the distal radius. This report describes another risk factor, which may increase the likelihood of pin migration.

CASE REPORT

The patient is a 20-year-old right-handed man, was involved in a road traffic accident and was admitted to another hospital in March 1997. He suffered an intraarticular fracture of the left distal radius. He had a previous fractured left radius and ulna seven months earlier which was treated using plates and screws. The distal radius fracture was stabilised with Kirschner wires using the Kapandji method of intrafocal pinning. The wires were cut short and buried under the skin. The superficial ends of the wires were not bent. No postoperative immobilisation was prescribed.

Upon the patient's request, he was reviewed at our hospital for subsequent follow-up. At three months, check radiographs showed that the distal radial fracture had healed (Figures 1 & 2). The patient was asymptomatic and declined removal of the implants (both the plates and the wires) at that time due to work commitments. He was then given an appointment to see us in four months. We last reviewed him seven months after the second operation. At that particular visit, he had complained of some wrist discomfort from the prominent wires on the dorsal aspect of his left wrist. The wrist movements were almost normal and painfree. However, a check radiograph showed that the dorso-ulnar wire (which was prominent on the volar surface

of the bone) had migrated up the antero-medial aspect of the left forearm (Figure 3). Closer examination of the forearm did not reveal any neurovascular deficit. The wire was not palpable through the skin. No evidence of tendon injury was present clinically.

Intraoperatively, the migrated wire was found lodged under the belly of the flexor superficialis muscle. All the implants were removed and the patient had an uneventful postoperative recovery.

DISCUSSION

Many theories have been postulated to explain the relative high incidence of pain migration in the upper limb. Among these include greater range of movement in the upper limb and a high level of muscular activity. Local resorption

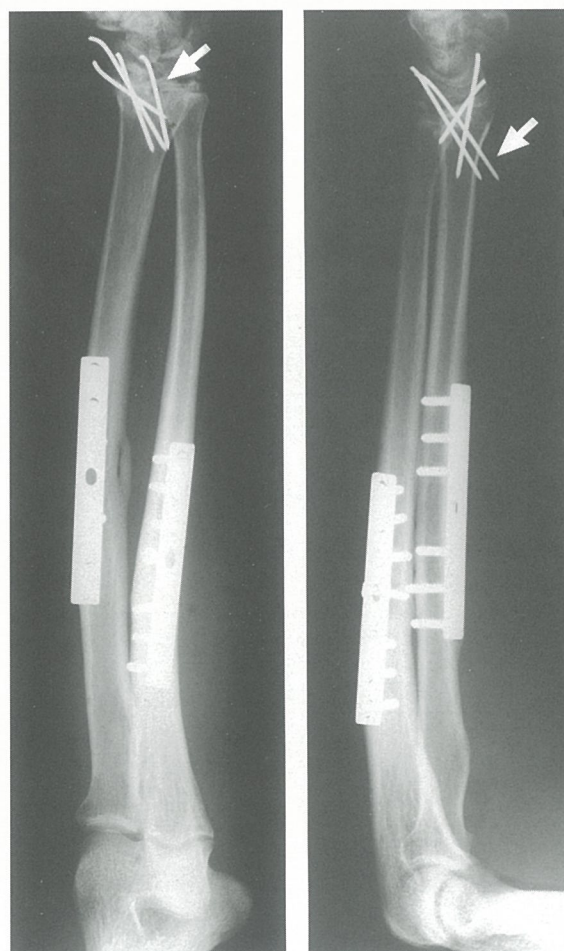


Fig. 1 - Check radiographs of the patient's left forearm at his first review three months after the second accident. The dorso-ulnar wire which eventually migrated is marked with an arrow

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of bone at the fracture site or local thermal-induced necrosis secondary to drilling may also contribute to the likelihood of pin migration. Milliez et al¹ compared two groups of patients treated with intrafocal pinning to study the effects of early mobilization and concluded that the incidence of pin migration and extensor tendon rupture was higher in the mobilised group. Greatting and Bishop² reviewed their experience using intrafocal pinning in 23 patients with 24 fractured distal radii. All the patients had their pins removed at an average of four weeks and there was no incidence of pin migration. The above studies suggest that early mobilisation and time of pin removal influences the likelihood of pin migration.

In our patient, there were a few factors, which together, could have led to the complication. Firstly, the wires were not bent at the dorsal cortex before being buried under the skin. Bending the ends not only helps prevent tendon attrition on the wires; it minimises the risk of the wire migrating through the far cortex, which unfortunately occurred in our patient. The wire migrated from its original dorso-ulnar position into the anterior compartment of the forearm. It was fortuitous that no anterior neurovascular structures were damaged during the migration process, a complication previously reported by Jou and Lai³. Secondly, the advancing tip of the wire protruded 13mm

from the anterior cortex of the distal radius. This area of the forearm is occupied by the long flexor tendons and is subjected to increased tendon traffic. With a prominent tip exposed to the tendons, the wire was gradually pulled into the anterior compartment and subsequently migrated further proximally with the tendon excursions.

Other factors that may have contributed to the pin migration are early mobilisation and delayed removal of the pins. Although Kapandji's original intrafocal technique did not include postoperative immobilisation, Milliez et al¹ showed that early mobilization of the wrist was associated with a higher incidence of complications, which included pin migration. In the study by Dowdy et al⁴, all their patients were immobilised in a short arm cast while the pins were in-situ. They removed the wires from their patients at six weeks and there was no incidence of pin migration, although there was one patient with symptomatic pin loosening which required early pin removal. In our patient, the forearm and wrist were not immobilised post-operatively. Moreover, the pins were left in-situ for about 32 weeks. In retrospect, we probably should have been more aggressive in persuading the patient to remove the implants when we reviewed him three months after the second operation.

The Kapandji technique of intrafocal pinning remains an effective method of treating unstable distal radius

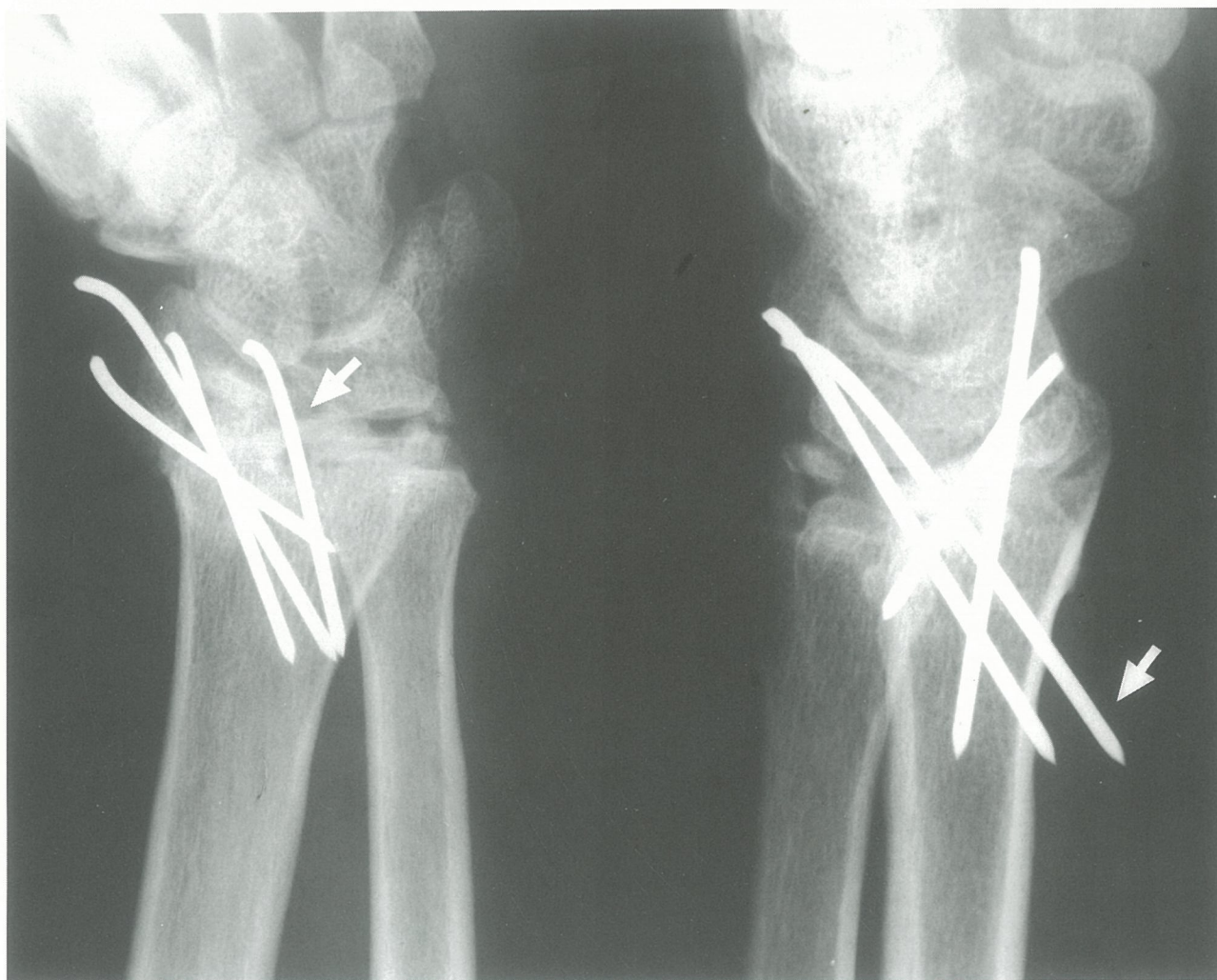


Fig. 2 - Magnified views of the initial radiograph at 3 months follow-up

fractures. Recommendations for preventing the complication of pin migration include bending the wires at the dorsal cortex before being buried under the skin. An intraoperative radiograph should be taken to ensure the tip of the wire should not protrude excessively on the far cortex of the bone where it may be caught on a tendon and dislodged. In addition, the forearm and wrist should be

immobilised in a short arm cast while the pins remain in-situ. The pins should also be removed early after the fracture has healed. It is imperative that regular patient reviews and check radiographs be conducted in order to detect potentially loose wires and remove them before this complication occurs.

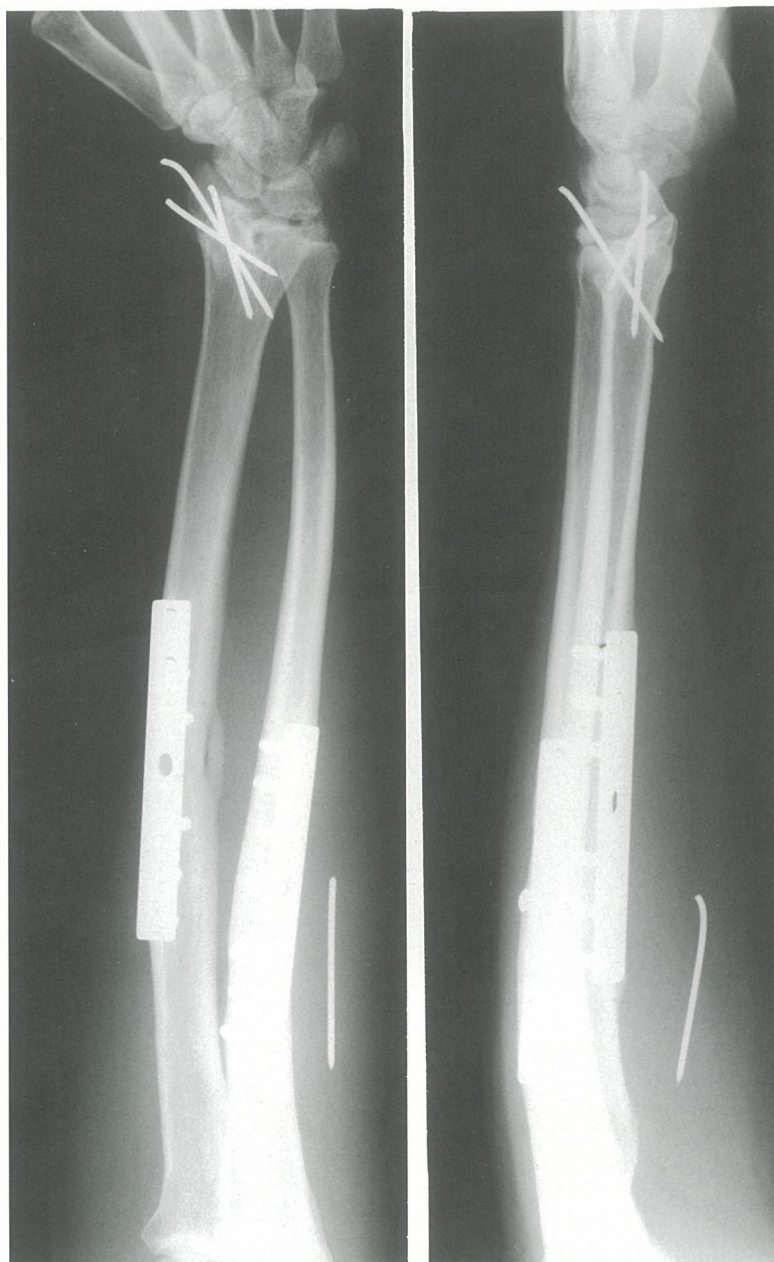


Fig. 3 - Check radiographs of the same patient seven months after the second accident.

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