Using a curved Kirschner wire for fixation of unstable distal radius fractures in children

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Introduction

Displaced metaphyseal and diaphyseal fractures of the distal radius are common in children. Using a plate-screw construct necessitates open reduction and a second operation to remove the metal work. Using a percutaneous Kirschner (K) wire can be attempted closed with an added advantage of a relatively minor procedure to remove the wire after fracture healing. However, using a straight wire may often be challenging due to the shallow angle the K wire needs to pass in order to engage the proximal fragment. Skin pressure and necrosis may also result at the insertion point. Rigidity of the K wire may result in ulnar deviation of the distal fragment and engaging the proximal fragment with a straight wire often necessitates starting the entry point at the tip of the radial styloid and thereby having to transgress the radial epiphysis (Figure 1).

Materials and Methods

We describe a technique of using a curved K wire shaped intraoperatively for fixation of unstable fractures at the junction of radial metaphysis and diaphysis. Our definition of unstable fracture is the fractures that are completely displaced so by definition not having volar or dorsal periosteal sleeves intact with associated ulnar fractures with a very high probability of further displacement in a plaster. We have used this technique on five patients with both radius and ulna fractures without any peri-operative or post-operative complications. All patients achieved union between 3-5 weeks after the operation with full range of movement of the wrist.

After closed or open reduction of the unstable radial fracture in a 8 year old girl (Figures 2,3) a stout 2.0 mm K wire is bent in to a gentle *c* at its blunt end and using the point of a mosquito clip as an awl a percutaneous entry point is started just proximal to the distal radial epiphysis.

The wire is held with a plier and introduced with a rocking to and fro movement across the

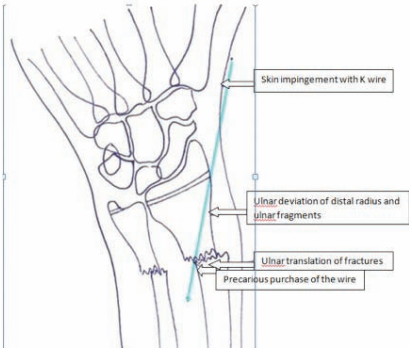

Figure 1. Possible difficulties with a straight K wire.

Figure 2. Pre-operative, lateral rontgenograms of the unstable radius and ulna fracture.

Figure 3. Pre-operative, AP rontgenograms of the unstable radius and ulna fracture.

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Key words: unstable, distal radius fracture, K wires.

Received for publication: 13 June 2011.
Accepted for publication: 19 September 2011.

Licensee PAGEPress, Italy
Surgical Techniques Development 2011; 1:e24
doi:10.4081/std.2011.e24

Figure 4. Post-operative, AP rontgenograms with the curved K wire fixation.

Figure 5. Post-operative, lateral rontgenograms with the curved K wire fixation.

fracture site and then firmly hammered in till it engages the lateral cortex of the proximal fragment giving three point fixation (Figures 4,5).

A below elbow backslab/plaster is applied for 3-5 weeks after which the wire can be removed either in the clinic or operation theatre under sedation.

Advantages of the technique: i) Avoiding the radial styloid process as an entry point and thereby avoiding transgressing the distal radial epiphysis; ii) Avoiding skin pressure and as a result, skin necrosis at the K wire entry point; iii) Avoiding ulnar deviation of the distal radial fragment which results in anatomical reduction of the fracture; iv) Substantive intramedullary hold of the wire in the proximal fragment; v) Three point fixation of the fracture; vi) There is a remote possibility of epiphyseal damage with straight K wires; however, our technique avoids this very small risk as the curved wire does not pass through the epiphysis.