Segmental Radius and Ulna Fracture with Epiphyseal Involvement
A Case Report

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Abstract
Segmental fractures of the radius and ulna are relatively common in adults, often occurring after high energy trauma. Segmental forearm fractures in children have not previously been reported, and their optimal management is unclear. We report a child of eight years of age who underwent fixation of these injuries with a good outcome.

Fractures of the forearm are common in both adults and children. Simple closed fractures that are deemed to be relatively stable in both groups can be managed by closed reduction under appropriate analgesia or anesthesia and external immobilization.

In adults, unstable forearm fractures, such as segmental fractures of the ulna and radius are commonly managed with open reduction and plate fixation to reduce the incidence of non-union, malunion, and subsequent loss of function. However, in children these injuries are less common, and therefore their management can be more controversial.

Children’s ability to remodel bone along with their excellent bone healing often means that internal fixation is unnecessary. Forearm fractures in children that cannot be reduced or held in the reduced position can be managed by compression plating, external fixation, or Kirschner wire stabilization.

Case Report
An 8-year-old boy presented to the emergency department having fallen 8 feet from a tree on to his left forearm. Clinical examination revealed a grossly deformed left forearm with no neurovascular compromise.

Plain radiographs revealed a radially and dorsally displaced Salter Harris II lesion of the distal radius. There was also a displaced fracture of the midshaft of the radius and a displaced segmental ulna fracture (Fig. 1).

The patient was prepared for the operating room and the fracture manipulated under general anesthesia. The diaphyseal fractures of the radius and ulna could not be reduced closed. The Salter Harris II lesion was reduced closed and held with two Kirschner wires.

Open reduction of the fracture of the proximal ulna was carried out. A large sleeve of periosteum was found within the fracture site, preventing closed reduction. The radius was exposed using Henry’s approach. The fracture was reduced and held with a four-hole semi-tubular plate. The ulna was then plated with a four-hole semi-tubular plate. Finally, the distal ulna fracture was reduced under direct vision and held with a single Kirschner wire (Fig. 2).

The patient was immobilized in an above-elbow Plaster of Paris cast until removal of the Kirschner wires at four weeks. Removal of the plates was carried out at 6 months (Fig. 3). Recovery has been uneventful, and the patient has regained full flexion and extension of the wrist and elbow and full pronation and supination of the forearm. On manual strength testing one year following removal of the plates, there was no detectable strength...
deficit in flexion and extension of the wrist and elbow and pronation and supination of the forearm, when compared to the uninjured contralateral arm.

**Discussion**

Segmental fractures of the radius and ulna in children are uncommon.\(^3\) Accurate reduction of these injuries is essential to reduce the risk of potential complications such as non-union, malunion, and cross union. If closed reduction is unsuccessful, then open reduction and internal fixation is necessary.

Several methods could be used in the management of fractures of the forearm in children. A possibility would be to perform retrograde intramedullary Kirschner wiring of the radius and antegrade intramedullary Kirschner wiring of the ulna.\(^10\) This method, although less invasive than the one we elected to use, allows less stability than plating of the midshaft. However, we acknowledge that, had we used it, another formal operation for removal of metalwork would not have been necessary. Indeed,
removal of metalwork following forearm fracture fixation can be difficult and recent evidence suggests that it should be undertaken before cortical assimilation of the implant takes place.\textsuperscript{11}

In our setting, plating of forearm fractures in children is performed routinely with excellent clinical outcome and we therefore recommend this approach in these rare injuries.

References