Case reports

COMPLETE REMODELLING OF DISPLACED FRACTURES OF THE NECK OF THE PHALANX

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Fractures of the neck of the phalanx of the finger are uncommon, but problematic, injuries in children. Displaced fractures may heal with malunion leading to loss of movement or angular deformity. Remodelling of the phalangeal neck is reported to be minimal because of the distance of the fracture from the physis. We report three displaced fractures in two children who presented late. The fractures were treated conservatively and remodelled completely. Both patients regained full movement of the fingers.

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In the child's finger, the physis is at the proximal end of the phalanx. Remodelling of displaced fractures of the neck of the phalanx in children is reported to be minimal because of the distance of the fracture from the physis.¹⁻³ If left unreduced, these fractures may heal with angular deformity and a bony block to flexion. Many authors therefore recommend surgical reduction and fixation.¹⁻⁵ Unfortunately, there is often a delay in presentation. A fracture initially seen two or more weeks after injury is already partly healed. Treatment of the fracture at this time requires excision of callus, osteotomy and pinning. Such late treatment carries the risk of avascular necrosis of the condyle of the phalanx and stiffness.

We report two children who presented late with three displaced fractures of the neck of a phalanx. The fractures remodelled completely after conservative treatment and the fingers recovered a full range of movement.

Case reports

Case 1. A four-year-old boy was seen three weeks after sustaining an injury to his left index finger. A window frame had closed on the finger resulting in a displaced fracture of the neck of the proximal phalanx. The parents thought that the child had simply sprained the finger, hence the delay in presentation and treatment. The chief complaint at presentation was persistent swelling and inability to flex the proximal interphalangeal (PIP) joint. Radiographs showed a fracture of the neck of the proximal phalanx with complete dorsal displacement and early formation of callus (Fig.

1). Because of the late presentation, observation only was advised. Follow-up with serial clinical examinations and radiographs demonstrated complete remodelling of the fracture and recovery of movement of the PIP joint at 14 months (Figs 1 and 2).

Case 2. A three-year-old girl was seen three weeks after sustaining an injury to her right hand. Radiographs at a primary care clinic showed displaced fractures of the neck of the middle phalanx of the ring and little fingers (Fig. 3). The primary-care physician applied a splint and ice to the hand. The parents did not speak English and there was a delay in referral. Examination in the orthopaedic clinic three weeks later showed stiff, but minimally tender, distal interphalangeal joints (DIP) of the ring and little fingers. Radiographs showed the formation of callus and persistent displacement of the fractures. Because of the late presentation, the patient was observed and followed up clinically and radiographically for 22 months. There was complete remodelling of the fractures and full recovery of movement of the DIP joints.

Discussion

The fractures in these two patients were treated by observation because of the late presentation. Three weeks after injury, we felt that the surgical risks of avascular necrosis of the condylar fragment and joint stiffness were too great. Complete remodelling and full recovery of movement occurred in all three fingers despite reports that such fractures may show minimal remodelling.¹⁻³ The time taken for complete remodelling was 14 months in the first patient and 22 months in the second.

To our knowledge, Mintzer, Walers and Brown⁶ have reported the only other example of spontaneous remodelling of a displaced fracture of the neck of a phalanx. Their patient was seven years old and remodelling was observed over a period of 14 months. Our first case is, to our knowledge, the only reported example of spontaneous remodelling of a fracture of the neck of the proximal phalanx. Theoretically, malunion of such a fracture could result in greater morbidity than a similar fracture in the middle phalanx because loss of movement at the PIP joint is more disabling than that at the DIP joint.⁶

Subcondylar reconstruction of the fossa has been recommended for late deformity in malunited fractures of the neck of the phalanx in order to improve movement. Simmons and Peters⁷ reported three fingers which required this procedure because of a block to flexion. The procedures were undertaken at four, eight and 11 months after injury. The three girls were 14, eight, and nine years of age and the time from injury to surgery was less than one year in all three. The 14-year-old girl may have been close to skeletal maturity with little chance for the fracture to remodel.

In our series, reconstructive subcondylar surgery was not required and we simply observed the remodelling of the fractures which depends on the patient's age and time. Our patients were four

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Fig. 1a

Fig. 1b

Fig. 1c

Case 1. Radiographs of a four-year-old boy showing a) a displaced fracture of the neck of the proximal phalanx of the index finger with early callus three weeks after injury and (b and c) lateral and AP views with complete remodelling of the PIP joint 14 months after injury.

Fig. 2a

Fig. 2b

Case 1. Clinical photographs of the child's hand showing a) full flexion and b) extension of the fingers.

and three years of age. The patient reported by Mintzer et al⁶ was seven years old. On this basis we suggest that a longer period of observation of up to two years is prudent when treating a fracture of

the neck of the phalanx which presents late in a child with open growth plates of the finger. Spontaneous remodelling of these fractures can occur despite the distance of the fracture from the physis.

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Fig. 3

Case 2. Radiograph of a three-year-old girl at presentation showing displaced fractures of the neck of the middle phalanges of the ring and little fingers.