Successful non-operative management of bilateral non-contemporary proximal radial physeal injuries in a skate-boarding teenager: a case report

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Citation

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Abstract

Bilateral radial head fractures, whether contemporaneous or otherwise, have been very rarely described in paediatric patients. We present the case of a teenage boy who fell while skate-boarding onto his elbows on two occasions seven months apart. He sustained undisplaced proximal radial physeal injuries bilaterally. These fractures were managed non-operatively, with satisfactory healing clinically and radiologically, and return to full range of movement.

CASE

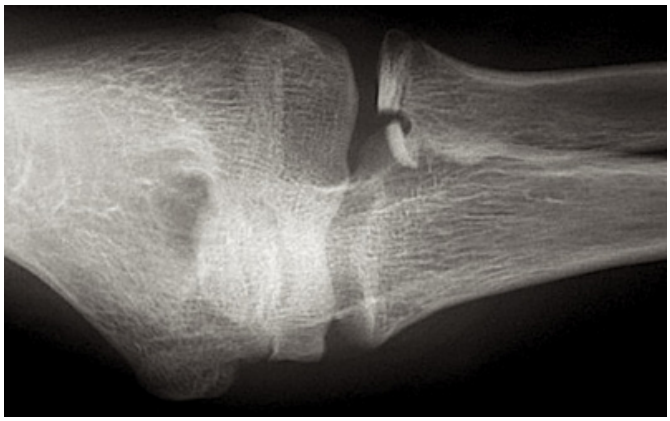
A 13 yr old right-handed boy presented to casualty after falling on to his outstretched left hand while skate-boarding in a public place. His left elbow was tender with a reduced range of movement. Radiographs showed a displaced anterior fat pad, but no fracture (Fig 1). Upon subsequent review in fracture clinic, he did not have any residual pain, but range of movement was from 10-90 degrees of flexion, with limited supination and pronation. A repeat x-ray two months later showed a healed mal-united fracture through the epiphyseal plate (Salter-Harris type IV) with no functional improvement (Fig 2). He was started on a regime of physiotherapy to improve his range of movement.

Figure 1

Figure 1: Initial radiographs Left Elbow

Figure 2

Figure 2: Two months later.



At seven months post-fracture, he had regained flexion to 110 degrees, with near normal pronation. He had a normal carrying angle with no valgus or varus deformity at the elbow. At this visit, his parents casually mentioned that he had suffered another fall a week ago while skate-boarding after school. Radiographs showed an undisplaced Salter-Harris type IV injury of the right radial head (Fig 3). It was decided to continue with non-operative management for both these injuries.

A repeat x-ray two months after the recent fall showed some absorption in the smaller radial head fragment on the right-sided, recently injured elbow (Fig 4). This correlated clinically with a mildly reduced range of movement, such that flexion lagged by 10 degrees while extension was 10 degrees deficient in supination.

Figure 3

Figure 3: Initial radiograps Right Elbow.

Figure 4

Figure 4: Two months later.

As the patient's clinical progress was overall encouraging, he was instructed to continue his exercises. Upon review in clinic another five months later, radiographs confirmed fracture healing in both radial heads (Fig. 5 and 6). Even though the left radial head seemed radiologically dislocated, it was clinically in joint, and stable to valgus and varus stress. He had normal and bilaterally comparable carrying angles, with full flexion/extension and supination/pronation bilaterally He was discharged from follow-up nearly two years after his first injury. He has since not sought any further consultation, and has started working part-time, while continuing with his higher education.

Figure 5

Figure 5: Final radiograph Left Elbow

Figure 6

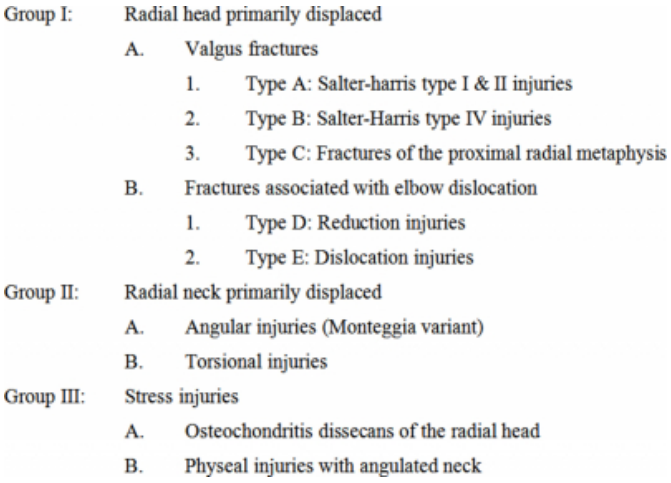
Figure 6: Final radiograph Right Elbow

DISCUSSION

Isolated radial head fractures are infrequent, comprising only 2% of all peri-articular fractures. Mason[1] suggested a classification to facilitate typing and management of adult radial head fractures. This was subsequently modified by Morrey[2] and Hochkiss[3].

Chambers[4] has classified paediatric proximal radial fractures into three groups. This scheme is based on the mechanism of injury and degree of displacement of the radial head.

Figure 7



Group I: Radial head primarily displaced
- A. Valgus fractures
  - 1. Type A: Salter-harris type I & II injuries
  - 2. Type B: Salter-Harris type IV injuries
  - 3. Type C: Fractures of the proximal radial metaphysis
- B. Fractures associated with elbow dislocation
  - 1. Type D: Reduction injuries
  - 2. Type E: Dislocation injuries

Group II: Radial neck primarily displaced
- A. Angular injuries (Monteggia variant)
- B. Torsional injuries

Group III: Stress injuries
- A. Osteochondritis dissecans of the radial head
- B. Physeal injuries with angulated neck

The vast majority of radial head fractures in both paediatric and adult age groups result from a fall on an outstretched hand. This causes the radial head to collide with the capitellum and the force of this collision can be transmitted in a number of ways. Possibilities include loading in axial, valgus, or posterolateral directions, or associated with an ulnar fracture or fracture-dislocation[5].

Management depends on the clinical presentation, type of injury and associated injuries. Swelling is variable in size and tenderness. Forearm supination and pronation can elicit crepitation, or be blocked all together by the fractured fragment. It is worthwhile to examine the distal radioulnar joint, interosseous space, and medial joint line as well, to rule out associated injuries. These can include medial collateral ligament rupture, capitellar farcture, posterior dislocation alone or with coronoid fracture (terrible triad), posterior Monteggia's fracture, and Essex-Lopresti lesion[5].

Synchronously occurring bilateral radial head fractures have been reported as a result of sporting injuries [6][7][8] and even trivial trauma[9] These were all Mason type I injuries, and were managed conservatively without any adverse features.

We have not come across a young patient reproducing this injury pattern with the same sporting mechanism. Zalavras[10] et al studied skeletal injuries resulting from skate-boarding and related sporting activities. They found 191 skate-boarding related fractures, 48.2 % of which involved the forearm. Six percent of these forearm injuries affected the proximal third of the forearm.

CONCLUSIONS

Considering the potential for extremity injuries skate-boarders, we recommend the routine use of elbow, wrist and knee guards. We also concur with earlier authors that non-operative management yields excellent results for undisplaced radial head fractures.

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