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Delayed union in paediatric distal radius fracture- management with multiple cast: A case report

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Abstract

Fractures involving upper limbs are commonly seen in children. Out of the fractures involving upper limbs distal radius fractures are most common and are usually caused by road traffic accidents or fall from height with outstretched hand thereby causing fracture and rotational displacement. Distal radius fractures are more commonly seen in boys as compared to girls usually seen in age group of 10-14 years. Its account for approximately 40% of all pediatric long bone fractures. Metaphyseal fractures are more common as compared to diaphyseal or epiphyseal one. Non-union and Delayed union is rare and usually heals with appropriate management. Distal radius fractures in children have a good prognosis and the vast majority can be treated without surgery. Reporting a case of 15 year old boy with 2 days old Right Distal end of Radius fracture managed conservatively with multiple casts.

Keywords: delayed union, paediatric distal radius fracture-management, multiple cast

Introduction

Distal radius fractures are one of the most common injuries encountered in Emergency department accounting for about 40% of all long bone fractures in children. A peak incidence is seen in girls between 10 and 12 years and in boys between 12 and 14 years.

The key difference between the child's bone and that of an adult is the physis that needs to be taken into account for the treatment of these fractures. Physeal injuries are very common in children, making up 15% of all distal forearm fractures. The distal physis of the radius accounts for 75% of the growth of the radius and 40% of the growth of the entire upper extremity. Extraphyseal and extraarticular fracture are more common than physeal injuries. The Salter-Harris fracture classification system is used to grade physeal injuries based on their imaging appearance. This grading has prognostic significance: higher grades imply an increased likelihood of eventual growth disturbance. Most of these fractures are stable after reduction and do not require fixation, particularly in younger children. The rate of long-term complications in childhood distal radius fractures is low.

In childhood, the periosteal sleeve is thick and protects the cortex. The bone is softer and more pliable than in adults and the growing bone exhibits the unique feature of growth with considerable remodeling potential. This accounts for the range of different fracture types that is uniquely seen in childhood: the buckle (torus), the classical greenstick fracture, the complete fractures (adult type), and the fractures involving the growth plate. In addition, the plasticity of the children's long bones can cause a bowing of the radius.

A malunion occurs when a fractured bone heals in an abnormal position, which can lead to impaired function of the bone or limb and make it look like it is 'bent'. Similarly, a nonunion is the result of a fractured bone failing to heal after an extended period of time – in some cases over a period of 9 to 12 months whereas Delayed union occurs when a bone fails to unite within an average anticipated time. For a given fracture, healing time varies with location and configuration as well as the specific bone and age group

Case Report

A 15 Years old boy came to emergency room with pain and swelling in right wrist associated

with decreased movements after history of fall with outstretched hand at his home 2 days back. On the examination there is a tenderness over right wrist and diffused swelling. No any scar and abrasions over right wrist. Range of motion decreased when compared with left wrist with no distal neurovascular deficit. No any other joint involvement is seen. General condition of patient is fair with no any other systems involvement. On clinical presentation of right wrist is posteriorly angulated just proximal to right wrist and posterolaterally displaced with dinner fork deformity (Fig 1) .



Fig 1: Shows Dinner Fork deformity seen in right wrist

On radiological investigation there is closed extra articular and extraphyseal right distal end of radius fracture with dorsally tilted (Fig 2).



Fig 2: Shows closed Extraarticular and extraphyseal right distal end of radius fracture with distal ulna fracture

Conservative management done with hand shake reduction maneuver by traction-counter traction and direct pressure over the epiphysis, followed by palmarflexion and ulnar deviation ,provided by 2 assistants. The technique makes use of the thumb flap as well as the extended thumb of the operator's hand (right hand for the right wrist fracture and vice versa) to ensure accurate and not excessive flexion (no more than about 40°) along with ulnarization of the fractured distal radius,

because a marked wrist flexion can cause median nerve compression. Hence, the cotton soft roll (3 to 4 layers to obtain a proper padding) as well the plaster of Paris bandage rolls wrapped circumferentially and molded to the patient's forearm and hand. Then the wrist is flexed no more than about 40° onto the thumb flap of the operator's open hand and ulnarized around the extended thumb, always maintaining the traction-countertraction until the plaster is dry. (Fig 3).



Fig 3: Shows casting (cast no 1) in position of palmar flexion and ulnar deviation of right wrist.Arrow shows moulding point

Immediate radiograph revealed acceptable reduction of fracture ends (Fig 4).



Fig 4: Radiograph shows reduction and alignment achieved immediate after cast (Cast no 1)

On followup after 4 weeks, the radiograph of right wrist revealed delayed union of distal end of radius fracture ends . Parent of boy gave history of improper immobilisation at home and not followed proper instructions (Fig 5).



Fig 5: Radiograph after 4 weeks followup shows delayed healing at fracture ends (cast no 2)

Recasting done with similar hand shake maneuver. After 1 month followup ,radiograph showed callus formation at

fracture ends but not achieved to the expectation (Fig 6) so continued cast for 1 month more with fiber glass cast (Fig 7).



Fig 6 and 7: Radiograph shows callus formation after recasting but not achieved to expectation (cast no 3).

After 4 weeks on followup, radiograph right wrist revealed healed fracture ends with good callus formation (Fig 8) and

good range of motion achieved (Fig 9).



Fig 8: Radiograph shows reduction and alignment of both distal radius and ulna with good amount of callus formation (completely healed)

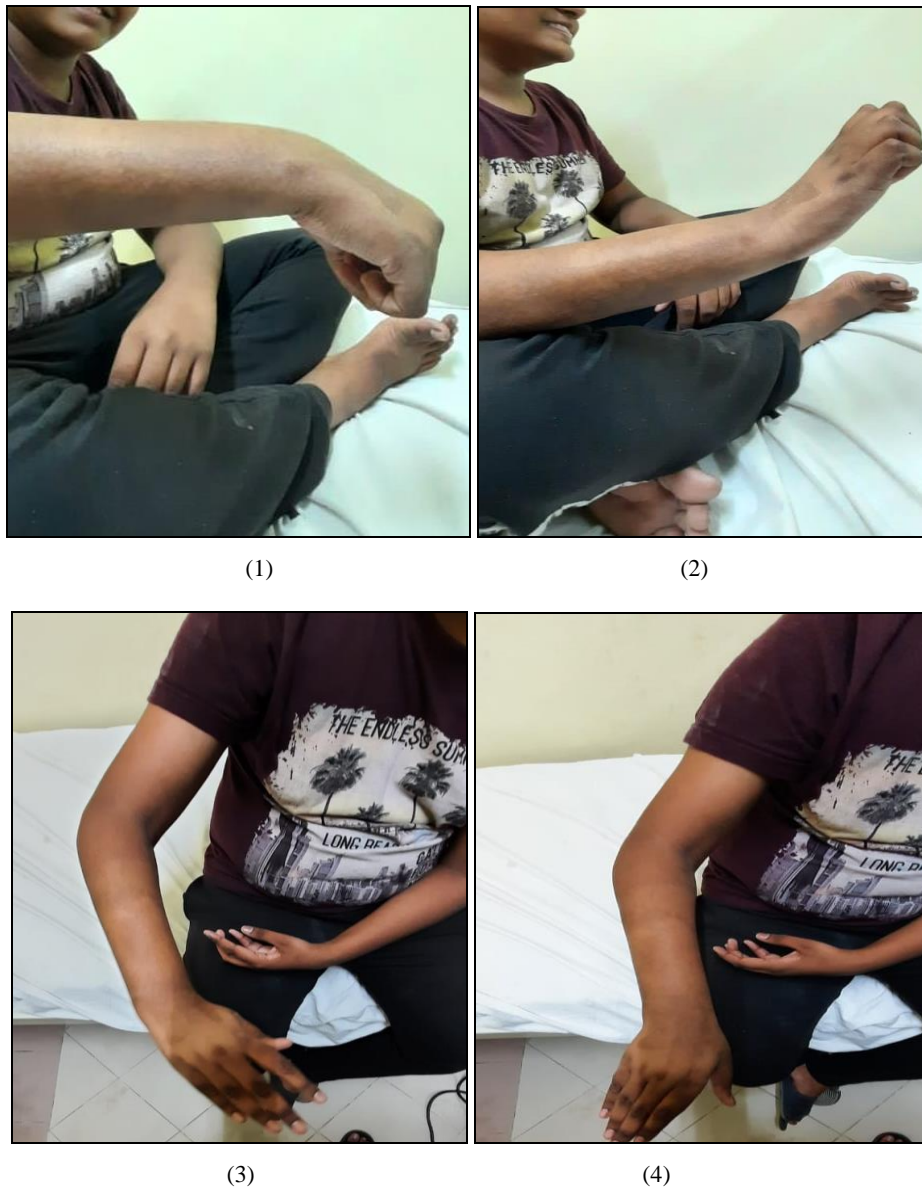


Fig 9: Showing acceptable range of movements of right wrist after complete 3 months followup from the day of fracture

Discussion

The closed reduction methods like Handshake technique allows to obtain a precise, adequate, and non excessive wrist flexion along with proper ulnarization, avoiding or minimizing possible drawbacks with traditional manipulation methods. Undisplaced and partial displaced distal end of radius and ulna can be easily managed with closed reduction techniques. As in our case report we managed with multiple castings even after not showing healing signs after few weeks then later on showed good sign of healing with callus formation with good clinical outcome on follow-up. Hence we concluded that delayed healing can be managed with multiple casts and proper follow-up

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