International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Different Modalities to Treat Salter Harris Type 2 Fracture of Proximal Phalanx in Various Digits of Hand

Neeraj R Shetty[1], Nithin K M[2], Gaurav Patel[3]

Department of Orthopaedics, Kurla Babha Hospital, Mumbai, Maharashtra, India
Corresponding Author Email: *neerajshetty10[at]gmail.com*

Abstract: ***Phalangeal fractures are the most common type of hand fracture that occurs in the pediatric population. The incidence of phalangeal fractures is the highest in children aged 10 to 14 years, which coincides with the time that most children begin playing contact sports. Younger children are more likely to sustain a phalangeal fracture in the home setting as a result of crush and laceration injuries. Salter-Harris type II fractures of the proximal phalanx are the most common type of finger fracture. An unmineralized physis is biomechanically weaker compared with the surrounding ligamentous structures and mature bone, which makes fractures about the physis likely. A thorough physical examination is necessary to assess the digital cascade for signs o f rotational deformity and/or coronal malalignment. Plain radiographs of the hand and digits are sufficient to confirm a diagnosis of a phalangeal fracture. The management of phalangeal fractures is based on the initial severity of the injury and depends on the success of closed reduction techniques. Nondisplaced phalanx fractures are managed with splint immobilization. Stable, reduced phalanx fractures are immobilized but require close monitoring to ensure maintenance of fracture reduction. Unstable, rotationally displaced phalanx fractures require surgical management, preferably via closed reduction and percutaneous pinning.***

1. Introduction

Physeal injuries are unique injuries limited to the pediatric age group. As the cartil aginous physeal region is less strong and often less resistant to the shear and tension forces than the adjacent bony and fibrous tissues, any traumatic force to that region dissipates through the physis. They constitute nearly one-fifth of all pediatric age orthopedic injuries.

Such injuries, if not managed properly, can have long - term sequelae in the form of growth arrest and deformity. The factors that can affect the outcome after these injuries include the age of the patient, the pattern of injury, its location, whether it was an open fracture or closed injury, status of the surrounding soft tissues, and epiphyseal blood supply.

Salter and Harris proposed a prognostic classification of physeal injuries in 1963 consisting of five types of injuries. The majority of Salter-Harris type 1 and 2 injuries heal well with conservative management, whereas type 3 may require operative intervention, and type 4 injuries almost always need surgery.

2. Case Series

We present a series of 15 patients with type2 salter harris fracture involving different digits being managed in different ways. In our study we have divided patients into 3 groups. The 1 st group involves patients with fracture of thumb. 2 nd group involves patients with fracture of either index or middle finger and 3rd group involves patients with fracture involving the ring or little finger.

The 1st group included 3 patients who were managed with Suzuki frame application.

2nd group included 5 patients who were managed with k wire fixation and 3rd group included 7 patients who were managed conservatively.

Here is an example of one patient in 1st group with type 2 salter harris fracture treated with Suzuki frame application. A 12 yr old boy came to outpatient department with complaints of pain and swelling in the left thumb due to trauma since 1 day. On examination there was swelling and tenderness in proximal phalanx base of thumb. Radiograph revealed type 2 salter harris fracture involving proximal phalanx base.

He was then planned for Suzuki frame application following day in operation theatre.

Wrist block was given and after the pain subsided 2 k wires were inserted one in 1 st metacarpal head and other in proximal phalanx head. Both the wires were bent and then rubber band was applied to the bent wires for maintenance of traction. Post op the fracture was well reduced.

Figure 1: Pre- OP X- ray of thumb proximal phalanx fracture

Figure 2: Post OP X- ray with suzuki frame

Post operatively the patients with thumb proximal phalanx salter harris type 2 fracture fixed with suzuki frame had good functional outcome.

Now here is an example of patient with index finger proximal phalanx type 2 salter harris fracture. She was a 11 yr old child with history of trauma following which she had pain and swelling in her right index finger. Local examination revealed tenderness in proximal phalanx base with swelling. Next day she was posted for closed reduction sos k wire fixation. After sedation an attempt was made for closed reduction but the fragment was displacing hence 1 k wire was inserted across the fracture.

Figure 3: Pre op x ray with index finger proximal phalanx type 2 salter harris fracture

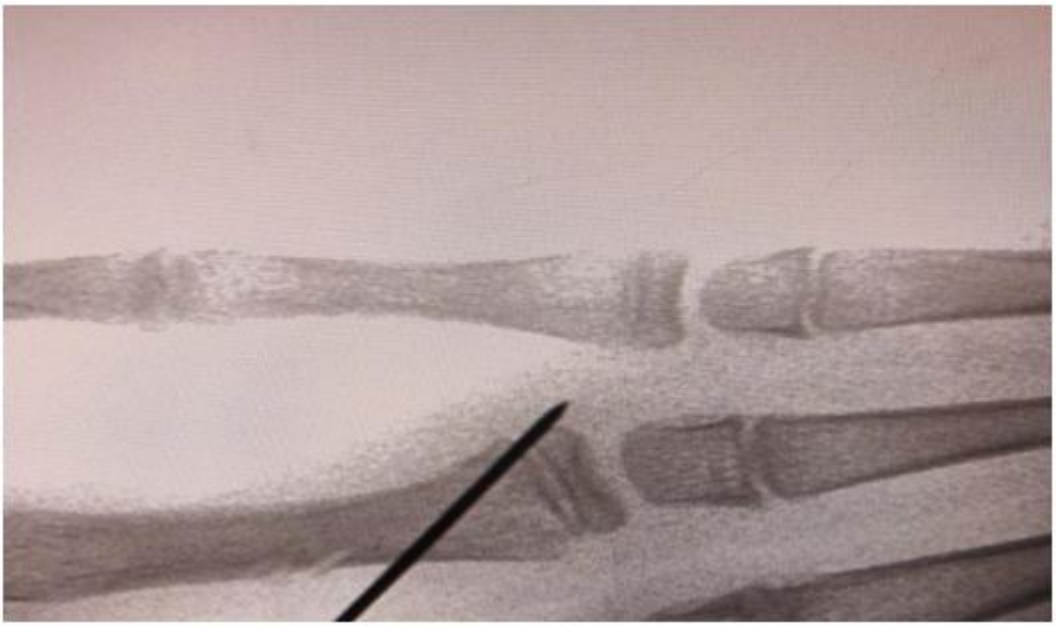

Figure 4: Post op ap view

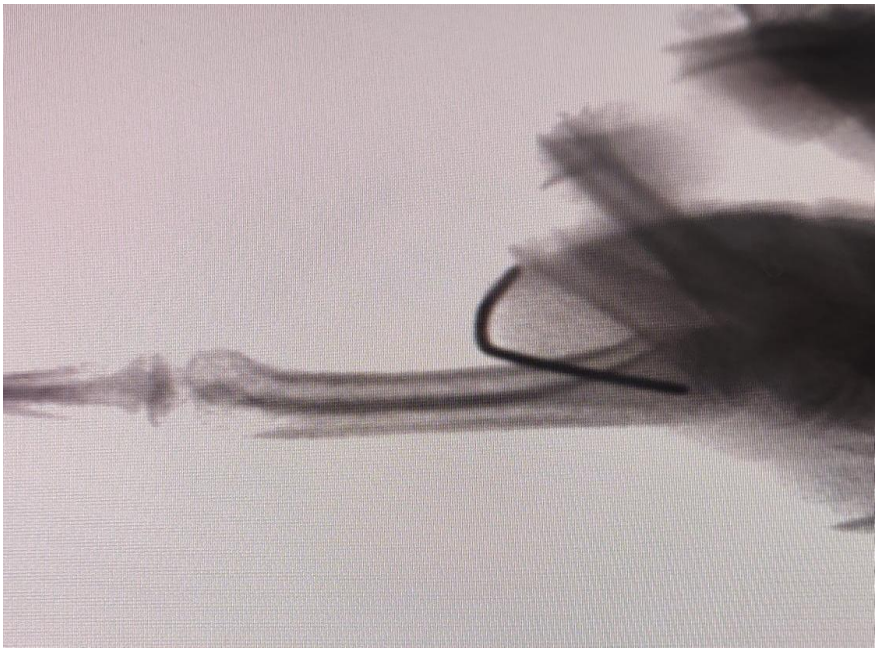

Figure 5: Post op lateral view

Figure 6: 4 weeks later k wire was removed

4 weeks later this patient had good functional outcome when the strapping was removed. Similarly other 5 pts were treated who also had good functional outcome.

Now we give an example of patients with type 2 salter harris fracture involving ring or little finger who were managed conservatively with buddy strapping for 3 weeks. In total 7 patients were treated similarly and all had good functional outcome.

Figure 7: preop x ray with little finger salter harris type 2 fracture of proximal phalanx.

These patients were managed conservatively with buddy strapping. All 7 patients had good functionaloutcome.

3. Discussion

In our study we have shown how to manage type 2 salter harris fractures in various digits of hand. Boyer et al concluded closed reduction and percutaneous pinning (CRPP) of displaced, unstable proximal phalanx fractures in children is safe but commonly experience early stiffness. General trends have shown excellent return of grip strength and good function despite some ongoing pain and stiffness.

Previously reported causes of irreducible fractures that are secondary to soft tissue entrapment include flexor tendons, fibrous tissue, and extensor hood and periosteum. It is important to manage every fracture differently as per its displacement and keeping in mind the final functional outcome.

In our study we found that fractures involving thumb had good functional outcome with Suzuki frame and had no stiffness. Fractures involving index and middle finger with displacement were managed better with k wire fixation. Lastly fractures involving ring and little fingers had good outcome with just closed reduction and buddy strapping. Translation and angulation are still acceptable but not rotation. So rotational correction of fracture is important to give good functional outcome to the patient.

4. Conclusion

Salter-Harris type II fractures are the most common phalangeal fracture seen in the paediatric population. Not all fractures can be managed conservatively. Fractures involving thumb and index finger especially have good outcomes when managed with surgical intervention when there is significant displacement and rotational deformity.

References

[1] Joshua M Abzug et al. J Am Acad Orthop Surg. 2016 Nov.
[2] Vadivelu R, Dias JJ, Burke FD, Stanton J: Hand injuries in children. J Pediatr Orthop2006;26(1):29-35.
[3] Devan O. Higginbotham, Andrew G. Tsai IntJResOrthop 2020 SEP.