

Case Report



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Late Presentation and Reconstruction of Fingertip Crush Injury in a Child: A Unique Case Report

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Abstract

Introduction: The fingertip is the most commonly injured part of the hand; therefore, fingertip injuries are among the most frequent injuries that surgeons are required to treat. Crush injuries of the fingertip are typically due to compression by a closing door. We report a late presentation of fingertip crush injury and its management on the dominant little finger in a child.

Case presentation: A 2-year-old male presented with infected and early necrosis of dominant hand little fingertip, caused due to door crush injury. The patient presented at 35 days with an exposed distal phalanx, marginal necrosis and partially healed, ulnarly-placed pulp of the fingertip. The parents of the child were counselled for one attempt of thorough debridement and consideration of pulp adipo-fascial flap repositioning to cover the distal phalanx. Local debridement and trimming of the pulp skin edges were carried out. The ulnarly displaced pulp was repositioned on the tip to cover the distal phalanx and sutured to the radial aspect of the nail fold with absorbable sutures. At 2 years follow up, the injured little finger was normal in cosmesis, function and nail growth.

Conclusion: Healing potential in children is good. Thorough debridement, nailbed and pulp reconstruction to cover the tip of distal phalanx and immobilisation for two weeks help to provide better cosmesis in the form of normal contour of the fingertip and movements, even in late presenting cases.

Keywords: Childhood crush injury, Fingertip, Late presentation, Debridement.

Introduction

Crush injuries of the fingertip are common in childhood typically due to door crush injury of fingertip [1]. In severe injuries, the proximal part of the nail (germinal matrix) is sometimes avulsed from its origin. Injury to the sterile matrix of the nail bed with tuft or shaft fracture of the distal phalanx is more common. Studies show that hand injuries accounted for 1.8–2% of attendances in the children's emergency department [2, 3] and out of these, 21–46% were fingertip injuries [2-4].

Fingertip injuries may require surgery and are worrisome for families in terms of cosmesis, function and nail growth in children. Possible short-term complications from fingertip injuries include infection, fracture non-union and amputation [5, 6]. Long-term complications include fingertip deformity, nail dystrophy, and pain.

Case report

We report a case of infected and early necrosis of the little fingertip in the

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Figure 1: Necrosis and soft tissue deformity at the little fingertip.

dominant hand, caused due to door crush injury, in a 2-year-old child. The patient presented at 35 days with exposed distal phalanx, marginal necrosis and partially healed, ulnarly-placed pulp of the fingertip. There was a foul-smelling discharge with doubtful viability of exposed distal phalanx. The pulp cap had marginal skin necrosis.

On examination, the right little finger was swollen with necrosis and soft tissue deformity at fingertip (Fig. 1). Capillary filling in ulnarly mal-placed pulp was delayed. Sensation could not be tested. Active and passive flexion and extension of the proximal interphalangeal and metacarpophalangeal joints were normal. Active range of motion of the distal interphalangeal joint was 15 degrees to 60 degrees. X-ray showed lytic lesion in the tuft of distal phalanx probably because of fracture or osteomyelitis (Fig. 2).

The parents were counselled for an attempt of thorough debridement and pulp flap repositioning to cover the distal phalanx. The possibility of pulp necrosis and requirement for local flap were explained. Under regional block, the pulp skin edges were trimmed and necrotic tissue debrided (Fig. 3). The exposed distal phalanx tuft was debrided to clear infected granulation tissue. After debridement, the injury was analysed and graded as type S3 as there was sterile matrix injury with distal phalanx tuft fracture as per Van Beek's nailbed injury classification [7]. The ulnarly displaced pulp was repositioned on the tip to cover the distal phalanx and sutured to the radial aspect of the nail fold with absorbable suture material (Fig. 4). The sterile matrix of nailbed was re-sutured with the proximal nail bed portion with absorbable sutures. The fingertip was



Figure 3: Local debridement at pulp of distal phalanx and trimming of pulp edges was performed and necrotic tissue was removed.



Figure 2: X-ray showing lytic lesion in the tuft of the distal phalanx probably due to fracture or osteomyelitis.

covered with non-adhesive dressing. A below-elbow slab protecting up to the fingertips was applied.

The reconstructed little fingertip healed by primary intention in two weeks. Microscopy and bacterial cultures revealed no organism. The child regained normal function at six weeks postoperatively. The cosmetic contour of the pulp, distal interphalangeal (DIP) joint movement and nail growth were assessed every three months. At two years follow up (Fig. 5), the injured little finger was normal in cosmesis, function and nail growth.



Figure 4: Tuft of distal phalanx and radial pulp was sutured without grafting.



Figure 5: Follow up at 2 years.

Discussion

Despite extensive literature available on the subject, a crush injury of the fingertip in children is misunderstood. The severity of these injuries is more likely to be underestimated in children as they are less cooperative during examination. There is a belief that such injuries in children heal without any cosmetic disfigurement of fingertip. Fingertip injuries with partial pulp loss with no fracture or without nail plate avulsion are probably amenable to conservative treatment as these have good cosmetic and functional outcomes. However, displaced distal phalanx fractures with nail plate avulsion and injuries extending from sterile to germinal matrix or injuries presenting more than a week need to be considered for operative intervention as these injuries may lead to compromised function of distal interphalangeal joint and nail deformity in future.

Paediatric fingertip injuries are commonly treated in the Emergency Department (ED), where they are often treated conservatively [8]. Some studies highlight that these injuries are often undertreated [9] by ED physicians. If fingertip injuries are not treated appropriately, complications such as long-term tenderness, pain, stiffness in DIP joint, sensory problems, deformity in the nail, soft tissue irregularities, and decreased grip strength can occur [10]. The severity of fingertip injuries can range from simple pulp lacerations to complete distal amputations that are not amenable to replantation.

The eventual result depends on the quality of surgical care and it is estimated that about 10% of all paediatric fingertip injury patients require surgery with general anaesthesia [11]. Yorlets et al described that the children with fingertip injury most commonly presented with a fracture, and 25% of all patients required surgical intervention and 10% received immediate

surgery [12].

Giddins and Hill [13] reported that delayed definitive treatment can provide better cosmetic appearance and function in digit even if the treatment is deferred for two weeks. In our case, we operated approximately 35 days post-injury.

Karakas and Yuce [14] reported in their study that the injury was common in five-year-old children. Many of these injuries required surgical intervention. Composite grafts were performed in 52.3%, full-thickness skin graft in 11%, and V-Y advancement flap was used in 3.1%. In their series, 33.6% children were left to secondary healing by parent's choice.

Learning points from the presented case:

- 1) In a child presenting with a crush injury of the fingertip, avulsed nailbed or tear in the nail matrix are indications for surgical treatment.
- 2) Delayed definitive surgical treatment can provide good cosmesis and functional outcome.
- 3) Possible complications such as nail deformity, infection, poor cosmetic appearance and stiff DIP joint should be explained to parents.

Conclusion

As healing potential in children is good, even delayed presentation of neglected fingertip crush injury with infection and exposed bone can be treated successfully. A thorough debridement, nailbed and pulp reconstruction to cover the tip of distal phalanx and immobilisation for two weeks can provide a normal contour of the fingertip and normal DIP joint movement.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the Journal. The patient understands that his name and initials will not be published, and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil; **Source of support:** None

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