

Case report



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Triple longitudinal fracture of distal phalanges; a report of a rare case and review of the literature

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Abstract

Phalanx fractures are frequent. They account for 10% of all fractures. Distal phalanges are the most fractured bones of the hand. They are usually caused by a compressive force, such as in crush injuries. This kind of injuries are common in all age groups. they can damage important structures such as bones, muscles, tendons, blood vessels, nerves, skin and nail bed, which should be repaired in order to retrieve not only good functional outcome, but also a good cosmetic appearance. We report the case of an atypical simultaneous fracture of the distal phalanx of three fingers, and discuss it in the light of the literature.

Introduction

Hand is the most important functional unit of the upper limb. The function of the hand is to grasp and form precise movements, such as writing, eating. Hand injuries commonly pose a challenge, whether it is a minor fingertip injury or a high-energy compression injury involving severe soft tissue damages. Phalanx fractures are often involved in this kind of injuries, and distal phalanges are the most commonly affected. Simultaneous longitudinal fracture of the distal phalanx of several hand fingers is an exceptional fracture which we will discuss in the light of the literature presented below.

Patient and observation

A 21 year-old man, construction worker, right-handed, without medical history, was referred to emergencies department showing a crush injury, caused by a heavy metallic object falling on his left hand during his building activities. The young man experienced severe and sudden pain. Clinical examination showed bruising at the distal end of the index, middle, ring and small fingers, associated with subungual hematomata. There were no skin opening nor external bleeding (Figure 1). There was a tenderness to pressure over distal phalanges of the four injured fingers. Flexor and extensor mechanisms as well as cascade sign were assessed showing no abnormalities. Nerve examination revealed no sensory dysfunction. Standard x-ray imaging of the left hand in anteroposterior, lateral and oblique views showed a longitudinal full length fracture of the distal phalanx of the index, middle and ring fingers classified Kaplan I (Figure 2). Treatment consisted in an immobilization with anterior hand splint for 4 weeks, followed by functional rehabilitation of the hand and fingers. A good radiological and functional result was obtained.

Discussion

Phalangeal and metacarpal fractures are among the most common skeletal trauma. They account for 10% of all fractures according to a series of 10000 fractures [1]. A male preponderance is consistently observed [2]. These fractures usually occur after a crush injury; whether it is a minor fingertip injury or a high-energy compression injury involving severe soft tissue damages. Type of injury also depends on patient's age. Children and teenagers are often injured during sporting activities, young and middle aged patients during work activities. Hand injuries occurring in the elderly population are often the result of falls and accidents [3]. Phalanx fractures are usually associated with other conditions such as nail bed, skin, muscle, tendon, vessel and nerve injuries, depending on the crushing energy. Distal phalanges are by far the most commonly fractured bones in the hand [4], considering how exposed distal ends of fingers are to injuries. These fractures can be extra-articular; occurring at the tuft, shaft or the phalanx metaphysis, or intra-articular involving tendon injuries; as in flexor avulsion, extensor avulsion (mallet finger deformity), collateral avulsion or fracture-dislocation [5]. Kaplan divided shaft fractures into longitudinal (I), comminuted (II) and transverse (III) [6,7] (Figure 3). According to a data reported by Da Cruz *et al.* (1988), among all terminal phalanx fractures, only 6% were closed longitudinal fractures [8]. Despite the fact that most cases are treated with nonoperative methods using closed reduction and splinting, some fractures may need surgical intervention using Kirchner wires by percutaneous pinning or open reduction. This includes bone loss, open fracture, intra-articular fracture with displacement and associated soft tissue injuries [9]. The majority of closed distal phalangeal shaft fractures are slightly displaced and inherently stable, requiring limited splintage. Longitudinal fractures usually requires within three to four weeks to heal, whereas transversal ones may take longer [6]. In Da Cruz series, all six patients with closed longitudinal fracture of distal phalanx had fully recovered within six months [7]. Alas, patients generally consider this

kind of injuries as inconsequential, which may lead to severe hand dysfunction.

Conclusion

Longitudinal fractures of distal phalanx are rare, even rarer when simultaneously occurring at several fingers. They can go unnoticed. Accurate clinical and radiological diagnosis as well as immobilization followed by early functional rehabilitation are the key elements of good functional outcome.

Competing interests

The authors declare no competing interests.

Authors' contributions

All the authors have read and agreed to the final manuscript.

Figures

Figure 1: clinical photography of the left hand showing bruising and subungual hematoma of the index, middle, ring and small fingers

Figure 2: radiographs of the left hand (anteroposterior « A » and oblique « B » views) showing a longitudinal full length fracture of the distal phalanx of the index, middle and ring fingers classified Kaplan I

Figure 3: Kaplan's classification of distal phalanx fractures

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Figure 1: clinical photography of the left hand showing bruising and subungual hematoma of the index, middle, ring and small fingers



Figure 2: radiographs of the left hand (anteroposterior « A » and oblique « B » views) showing a longitudinal full length fracture of the distal phalanx of the index, middle and ring fingers classified Kaplan I

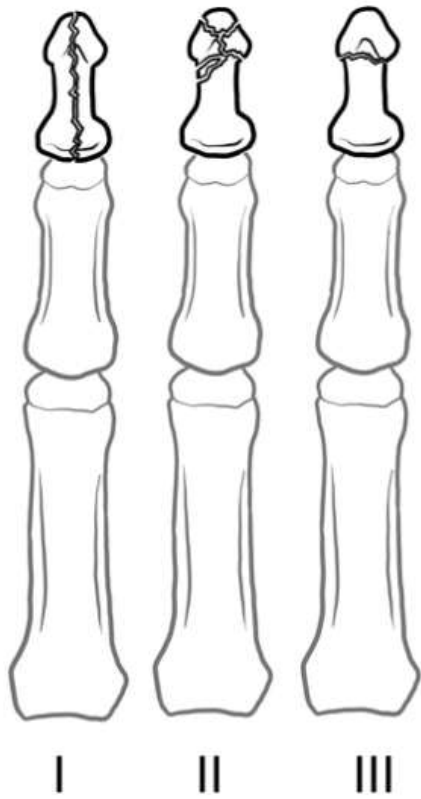


Figure 3: Kaplan's classification of distal phalanx fractures