

Recent advance

Extra-articular fractures of the digital metacarpals and phalanges of the long fingers

Les fractures extra-articulaires des métacarpiens et des phalanges des doigts longs

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Received 11 September 2012; received in revised form 13 August 2013; accepted 15 August 2013

Available online 30 December 2013

Abstract

Metacarpal and phalangeal fractures of the long fingers are the result of trauma occurring under extremely varied circumstances. As a consequence, the clinical presentation varies greatly, with every bone and joint potentially being involved. Each step of their treatment is crucial, although the benign appearance of these injuries can lead to steps being missed: diagnostic phase with clinical examination and radiographs; therapeutic phase where the most suitable treatment is chosen, which combines mobilization of the digital chains as soon as possible and in every patient; follow-up phase with regular monitoring to detect any complications, especially secondary displacement, and verify that good progress is being made during rehabilitation. The goal of any fracture treatment is to preserve or restore the anatomy, with the emphasis here being on the stability and mobility of the digital chains. The potential progression towards serious functional sequelae (pain, instability or stiffness in hand) and the resulting significant socio-economic repercussions must be at the forefront of a surgeon's mind early on during the initial care of any finger or hand trauma.

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Keywords: Fracture; Metacarpal; Phalanx

Résumé

Les fractures des métacarpiens et des phalanges des doigts longs relèvent de traumatismes aux circonstances extrêmement variées et au polymorphisme clinique vaste, car elles peuvent atteindre toutes les structures osseuses et toutes les articulations. Chaque étape de leur prise en charge est primordiale, même si, souvent, leur apparente bénignité fait négliger cette approche : étape diagnostique par l'examen clinique et radiographique ; étape thérapeutique avec le choix du traitement le mieux adapté, associé dans tous les cas et dès que possible à une mobilisation des chaînes digitales ; suivi régulier dans le but de dépister une complication et en particulier un déplacement secondaire, et afin de vérifier la bonne évolution en cours de rééducation. Le traitement de toute fracture n'a-t-il pas en effet pour but de toujours préserver ou restaurer l'anatomie et de privilégier la stabilité et la mobilité des chaînes digitales ? L'évolution possible vers des séquelles fonctionnelles majeures à type de main douloureuse, instable ou raide, avec comme conséquence leur lourd retentissement socioéconomique, doit être une préoccupation constante dès la prise en charge initiale de tout traumatisme de la main et des doigts.

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Mots clés : Fracture ; Métacarpien ; Phalange

1. Introduction

A great deal has been written about finger fractures. However, experience shows that lack of knowledge about these injuries leads to inappropriate treatments being suggested,

which contributes to functional sequelae (finger stiffness, malunion) and significant socio-economic repercussions. Although these hand injuries appear benign in an emergency setting, a well-thought-out treatment plan and regular radiological and clinical follow-up are the only way to ensure bone union without sequelae, which is required for patients to return to their pre-injury condition.

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Since these injuries occur under wildly different circumstances, the clinical presentation varies greatly. Generally, any type of hand deformity is suggestive of a fracture, but many injuries have no clinical signs and may trip up unprepared surgeons. The diagnosis must be based on history and clinical examination; radiological evaluations are also extremely valuable in these cases.

The goal of any fracture treatment is to preserve or restore the anatomy, with the priorities being thumb column stability and long finger mobility.

In terms of prognosis, metacarpal fractures are vastly different from phalanx fractures because they do not affect hand function as much. Similarly, the functional prognosis of proximal phalanx fractures is worse than that of intermediate or distal phalanx fractures. Because of complexity of tendon anatomy, any adhesions between the fracture site and tendon can stiffen the entire finger.

2. Diagnosis [1–4]

2.1. Clinical diagnosis

2.1.1. Deformity

The clinical picture of a metacarpal or phalangeal fracture can take on various appearances. If the fracture is not displaced, it will cause little or no hand deformity. Palpation is used to identify localized pain or crepitus, with systematic radiology evaluations needed to uncover the fracture. Depending on the etiology, the deformity can be localized to one finger or be more diffuse with the patient having a “painfully swollen hand”. Edema accumulates in the free spaces on the back of the hand resulting in a deformity where the wrist is in flexion, the metacarpophalangeal (MCP) joint(s) in extension, the proximal interphalangeal (PIP) joint(s) in flexion and the thumb in adduction. This “claw-hand deformity” could remain as is if not treated quickly. The MCP collateral ligaments retract and immobilize these joints in extension; the volar structures of the PIP also retract, immobilizing these joints in flexion. Over time, this deformity is a source of significant functional sequelae, even if the underlying injury was treated appropriately.

2.1.2. Rotational deformity

Rotational deformity is insidious and can only be detected by asking the patient to make a fist (if possible); if the injured finger overlaps the next finger, a rotation deformity exists (Fig. 1).

2.1.3. Associated complications

These are rare except in the context of severe hand trauma. Any cutaneous opening, abrasion, tendon injury, etc. must be assessed.

2.1.4. Special case - distal phalanx

In cases of distal phalanx fractures (shaft, tuberosity), the nail must be evaluated to look for subungual hematoma, nail avulsion, injury to the nail bed and/or matrix, dislocation of the

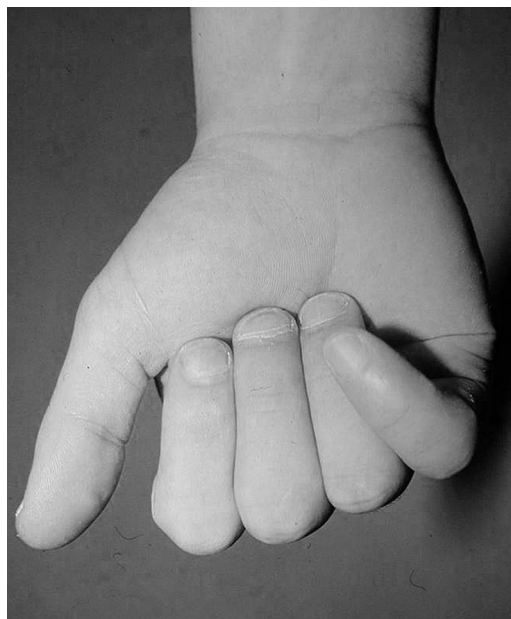


Fig. 1. Rotational deformity of the 5th finger: in flexion, this finger overlaps the next finger.

Trouble de rotation de l'auriculaire : en flexion, ce doigt chevauche le doigt voisin.

nail outside the unguinal fold and tear of the nail bed with associated pulp defect.

2.1.5. Special case - open swollen hand

An “open swollen hand” with multiple wounds defies description. Treatment is complex because of the associated injuries, often significant.

No matter the diagnosis, the initial clinical examination must be systematic and the injured hand compared with the non-involved one.

2.2. Medical imaging

Clear, interpretable images are needed: A-P and pure lateral views over the injured area and oblique views in cases where overlapping bones prevent analysis of lateral views (base of proximal phalanges, metacarpals). Radiographic analysis allows the fracture line(s) and displacement (sagittal and frontal) to be analyzed. Specific views are requested as needed. CT scan is rarely needed in an emergency context. Nevertheless it is useful before operating on carpometacarpal (CM) fractures or when X-rays are hard to read, especially with complex metacarpal fracture(s) extending into the wrist joint. Ultrasonography and magnetic resonance imaging (MRI) have a limited role in current hand trauma practice.

3. Treatment methods

3.1. Conservative (non-surgical) methods

With a non-displaced, stable fracture (transverse, short oblique), the surgeon can resort to non-surgical treatment,

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