

Chapter

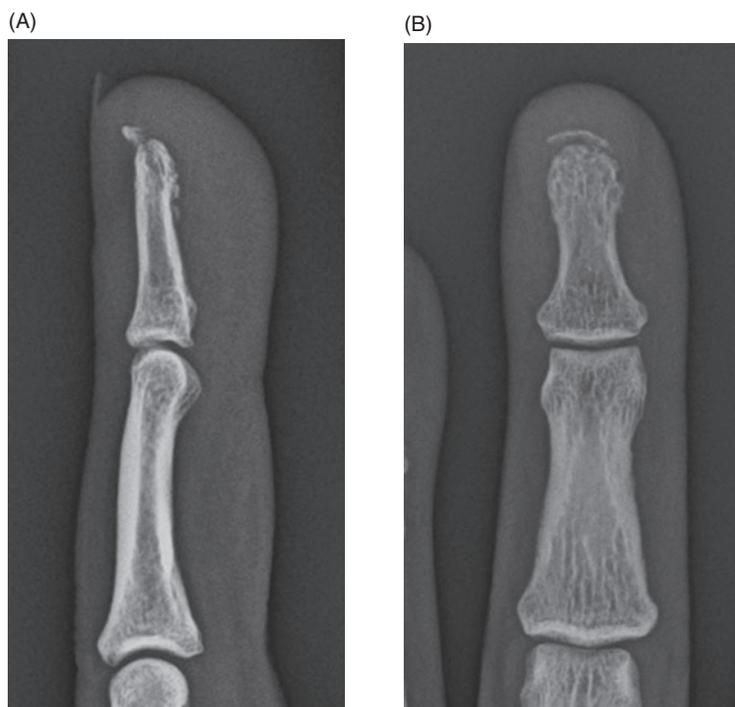
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Fractures and dislocations of the fingers

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Case 1-1

Phalangeal tuft avulsion fracture

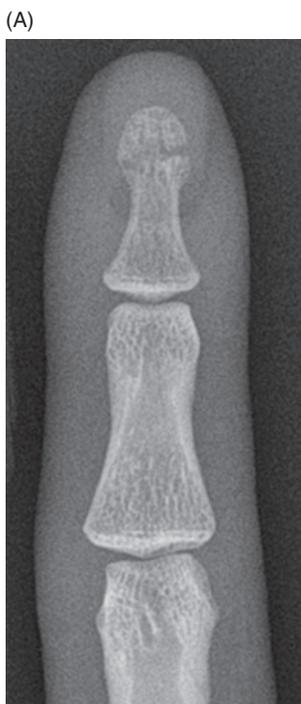


31-year-old woman injured in a ground-level fall. Lateral (A) and PA (B) radiographs of the left middle finger. There is an avulsion fracture of the very tip of the tuft distal phalanx. The fingernail appears to be intact. The connective tissue septae that support the pulp of the fingertip attach to the tuft of the distal phalanx.

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Case 1–2**Phalangeal tuft fracture**

42-year-old man whose thumb was crushed by a tie-down chain while unloading a truck. PA radiograph of the right thumb. There is transverse fracture through the tip of the phalangeal tuft of the thumb with a small amount of comminution. A soft tissue laceration extends from the thumbnail through the fracture site. More than 50% of all phalangeal fractures involve the distal phalanx, most often involving the unguis tuft [1–2]. These may be comminuted or not. The fibrous septae extending from periosteum to the skin resist displacement of fragments.

Case 1–3**Phalangeal tuft fracture**

43-year-old woman who was bitten in the hand by an aggressive dog. PA (A) and lateral (B) radiographs of the right index finger. There is a transverse fracture of the distal phalanx through the phalangeal tuft. There is a soft tissue defect in the nailbed on the lateral view.

Case 1–4 Finger amputation

(A)



(B)



31-year-old man whose hand was trapped in a mechanical laundry press for several seconds. PA radiograph of the right index and middle fingers (A) and of the amputated part of middle finger (B). There has been amputation through the DIP joint of the middle finger with soft tissue degloving injury. The radiograph of the amputated fingertip shows an intact distal

phalanx, with fragments of the middle phalanx, and an extensive portion of soft tissues that were degloved from the dorsal aspect of the middle phalanx. The long soft tissue structure coiled around the amputated fingertip is the flexor digitorum profundus tendon to the middle finger with some attached muscle tissue.

Case 1–5 Mallet finger

17-year-old man who jammed his small finger. Lateral radiograph of the right small finger. There is a fracture at the dorsal aspect of the base of distal phalanx with slight flexion of the DIP joint. This injury is an avulsion fracture of the common extensor tendon insertion at dorsal base of the distal phalanx. A direct blow to the fingertip with forced flexion at the DIP joint, as from a baseball in flight against an outstretched finger, gives rise to this fracture pattern, also known as mallet finger or baseball finger [1–3].

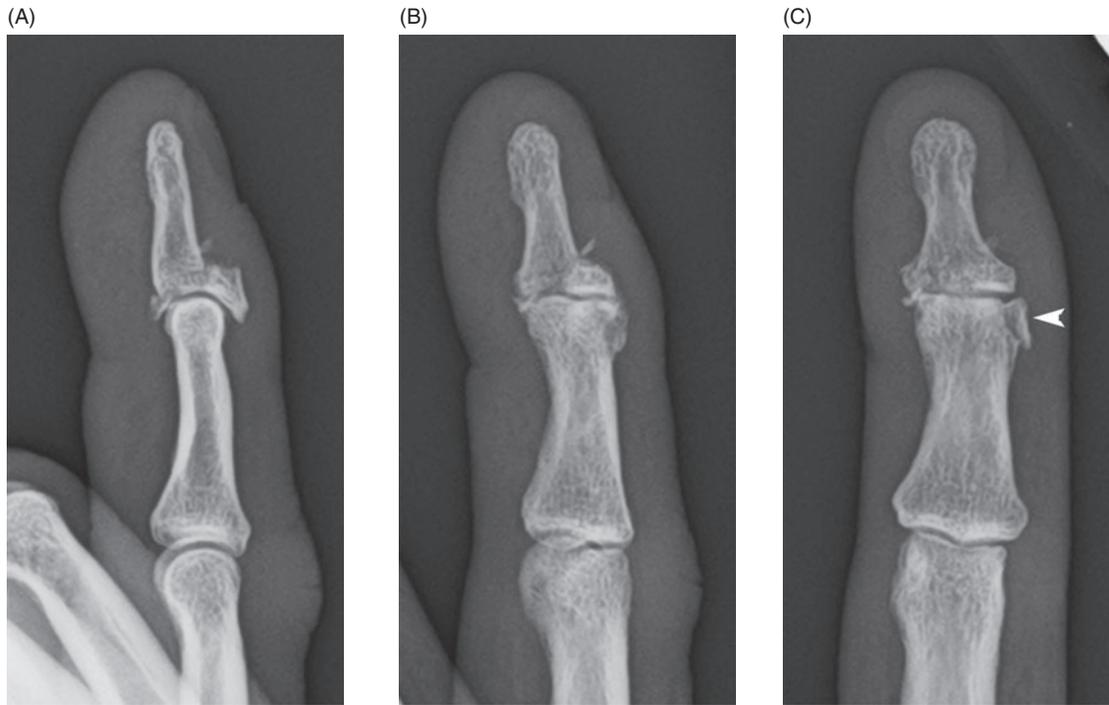
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Case 1–6**Mallet finger**

27-year-old man who injured his small finger several months ago. Lateral radiograph of the right small finger. There is an isolated flexion deformity at the DIP joint, without fracture. This lesion is a soft tissue mallet finger. Rupture of the common extensor tendon results in unopposed flexion at the DIP joint, with the flexed distal phalanx likened to a mallet. Most cases of mallet finger are soft tissue avulsion injuries of the tendon; only 25% of cases of mallet finger will demonstrate an avulsion fracture [1–4].

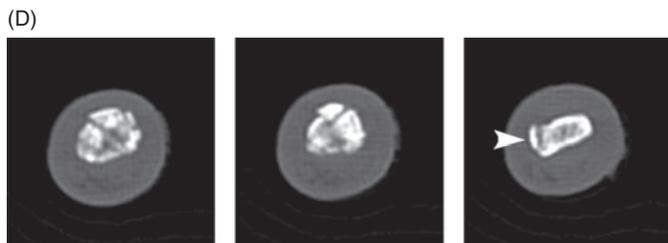
Case 1–7**Mallet finger**

28-year-old woman who injured her small finger in a bicycle crash. Lateral radiograph of the right small finger. There is an intra-articular fracture of the distal phalanx of the small finger. The small dorsal fragment includes the majority of the articular surface and remains located. The large volar fragment has a minority of the articular surface and is subluxated volarly by unopposed tension from the flexor tendon, resulting in displacement of the fragments.

Case 1–8**Complete articular fracture of the distal phalanx**

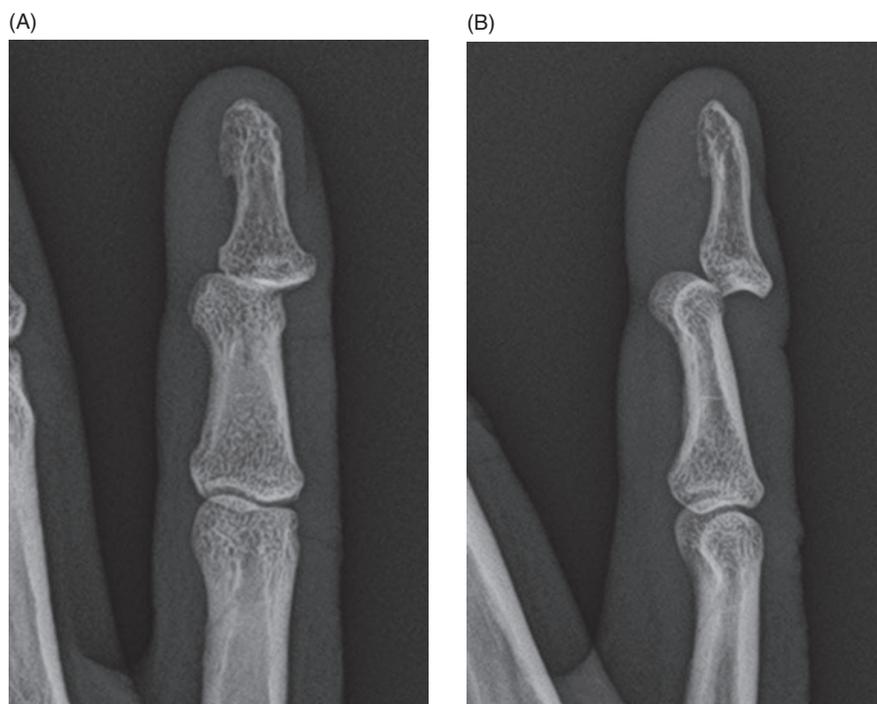
52-year-old man with crush injury to the small finger. Lateral (A), oblique (B), and PA (C) radiographs of the right small finger. There are comminuted intra-articular fractures involving

the entire articular surface of the distal phalanx at the DIP joint. There is also a fracture involving the lateral condyle of the middle phalanx (arrowhead).



Axial CT through the DIP of the right small finger. There are comminuted fractures of the proximal end of the distal phalanx of the small finger. The lateral condylar middle phalanx fracture is also demonstrated (arrowhead).

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Case 1–9**Dorsal DIP dislocation**

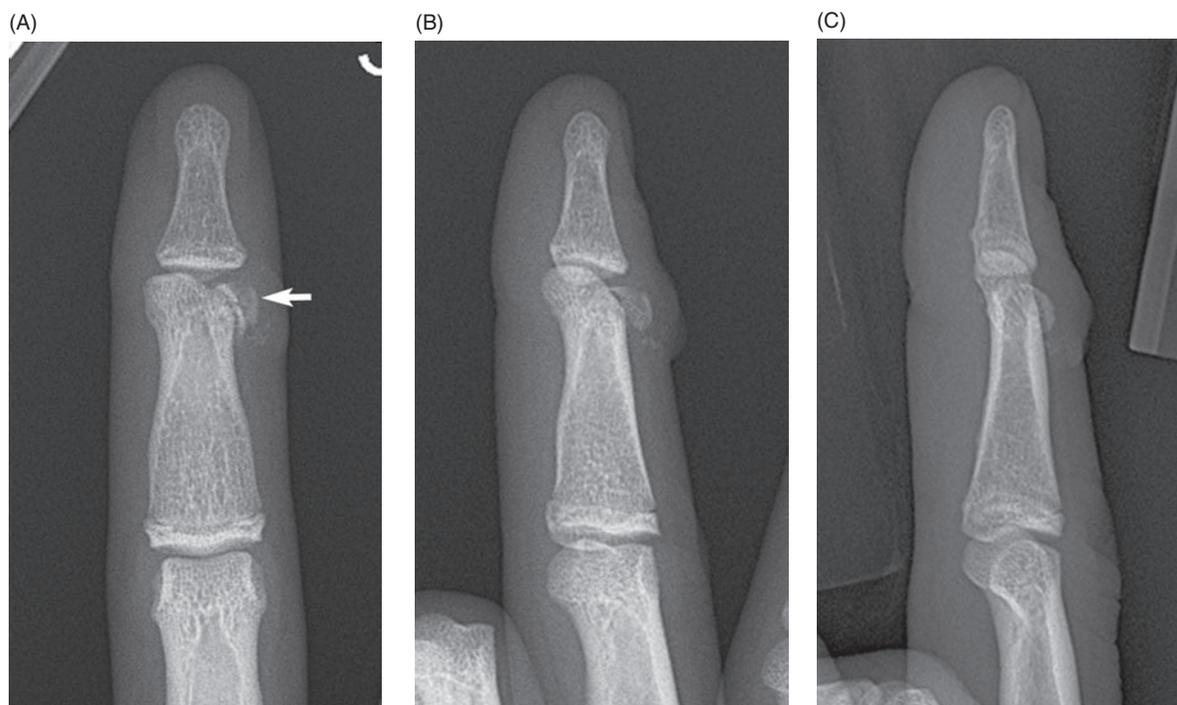
31-year-old woman who jammed her finger trying to catch a basketball pass. PA (A) and lateral (B) radiographs of the right small finger. There is dorsal dislocation of the distal phalanx. Dislocations in the fingers are usually dorsal and easily reducible, often by the patients themselves at the time of injury. The mechanism of injury is typically hyperextension [5–6].

Case 1–10**Volar DIP dislocation**

47-year-old man with a crush injury to the ring finger. PA (A) and lateral (B) radiographs of the right ring finger. There is volar dislocation of the distal phalanx with crush injuries of the soft tissues. Volar dislocations in the fingers are uncommon and often irreducible [5–6].

Case 1–11 Thumb dislocation

46-year-old man who injured his hand in an altercation. Oblique radiograph of the right thumb. There is dislocation of the thumb IP joint with dorsolateral dislocation of the distal phalanx. These are uncommon injuries. Hyperextension and rotation are the mechanism of injury. A ruptured palmar plate or tendon can become interposed into the joint preventing nonsurgical reduction [7].

Case 1–12 Medial condyle fracture of the middle phalanx

15-year-old male who injured his finger fighting with a dog. PA (A), oblique (B), and lateral (C) radiographs of the right middle finger. There is a fracture of the medial condyle of the middle phalanx at the DIP joint. This displaced, intra-articular fracture is best seen on oblique views, and may require open

reduction and internal fixation. Bicondylar T- or Y-shaped fractures may occur. Intra-articular malunion may lead to posttraumatic osteoarthritis. Stable fixation of the small fragment can be technically challenging [1–2].

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Case 1–13**Oblique phalanx fracture**

25-year-old man injured his hand playing football. PA radiograph of the right ring finger. There is an oblique fracture of middle phalanx extending to the joint surface. The mechanism of injury for oblique fractures is axial loading. Incongruity at the articular surface typically needs to be addressed surgically when it exceeds 2–3 mm.

Case 1–14**Crush injury of the thumb**

30-year-old man who sustained a crush injury to his thumb. Lateral (A), oblique (B), and PA (C) radiographs of the right thumb. There is a near amputation with fracture through the proximal phalanx. Circumferential soft tissue deformity and fracture deformity are at the same level; however, complete detachment has not occurred. Unfortunately, the digit was not replantable, and his hand was reconstructed by deepening the first web space.

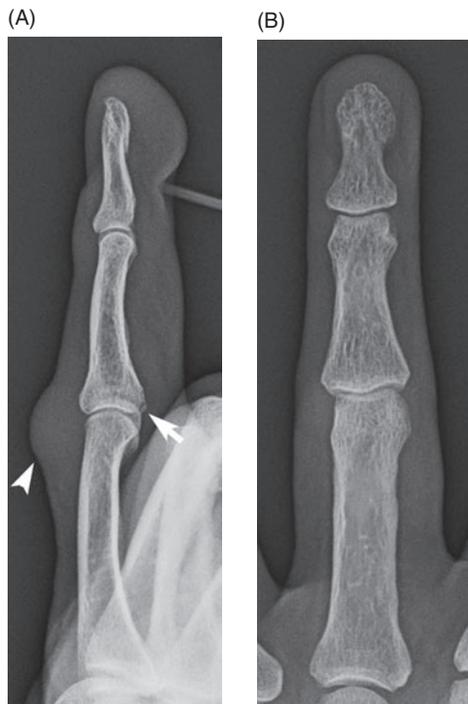
Case 1–15**Dorsal PIP dislocation**

18-year-old man injured finger playing basketball. Lateral radiograph of the left small finger. There is dorsal dislocation of the middle phalanx. A small bone fragment (arrow) is seen at the volar aspect of the distal proximal phalanx, likely a displaced volar plate avulsion fracture from the volar aspect of the dislocated middle phalanx. PIP joint dislocations are the most frequent dislocations in the hand. Mechanism of injury for dorsal PIP dislocation is forced hyperextension with axial compression. Dislocations that may be easily reduced are considered simple; dislocations that are irreducible and require surgical treatment are considered complex [8]. These injuries are virtually always accompanied by volar plate fracture or soft tissue detachment and sometimes by collateral ligament injuries.

Case 1–16**Volar plate fracture**

20-year-old woman who injured her finger in an altercation. Lateral radiograph of the right small finger. There is a mildly displaced volar plate fracture of the middle phalanx at the PIP joint of the small finger. The small triangular-shaped volar fragment comprises only a small fraction of the articular surface and the middle phalanx remains normally located at the PIP joint. When a large fragment is avulsed, the middle phalanx may dislocate dorsally and the injury is unstable [9].

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Case 1–17**Volar plate fracture**

58-year-old man who jammed his ring finger when he fell on the stairs. Lateral (A) and PA (B) radiographs of the left ring finger. There is focal soft tissue swelling at the PIP joint (arrowhead). There is a very small, minimally displaced fracture of the middle phalanx at the volar margin at the PIP joint that corresponds to the attachment of the volar plate (arrow). Volar plate avulsion occurs from hyperextension injury that typically involves a small fragment of bone that is difficult to see. Small volar plate fractures may be easily overlooked if one does not specifically search for them.

Case 1–18**Volar plate fractures**

17-year-old man with finger injury, relocated in the field. Lateral radiograph of the fingers. There are tiny fracture fragments (arrows) at the volar aspect of the base of the middle phalanges of the index and middle fingers, indicative of volar plate injuries. The mechanism of injury is hyperextension injury to the volar plate. Volar plate mechanisms are present at the PIP and MCP joints, and avulsion injuries are typically manifested as fractures at the volar bases of the proximal or middle phalanges.