MI 133: Clinical Seminar II

Finger & Thumb
Pathology & Image Analysis

1

Pathology

2

Tuft or burst fracture

- A fracture of the fine cancellous bone at the distal tip of the phalanx

Causes: direct blow or a crush injury, lacerations, hyperextension, hyperflexion, rotation

Complications: Rare, but can have joint stiffness, numbness and hypersensitivity, and nail deformities

https://www.uptodate.com/contents/distal-phalanx-fractures

3

Radiographic appearance: comminuted fractures of the distal phalanx

Technique: No manual exposure factor change

Prognosis/Treatment: Ice and splinted

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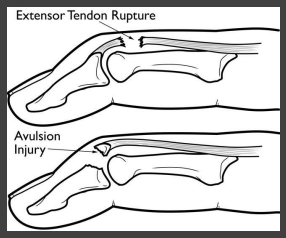
Baseball (Mallet) fracture

https://orthoinfo.aaos.org/en/diseases--conditions/mallet-finger-baseball-finger/

- Injury to the thin tendon that straightens the end joint of a finger or thumb

Causes: unyielding object (like a ball) strikes the tip of a finger or thumb and forces it to bend further than it is intended to go.

Complications: Infection



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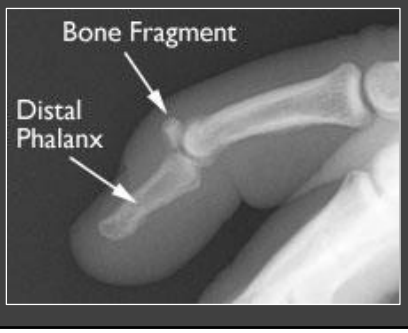
Radiographic appearance: a piece of the distal phalanx bone breaks away with the tendon.

Technique: No manual exposure factor change

Prognosis/Treatment: Splint or Surgical repair for larger fracture



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Bennett's fracture

- Fracture of the base of the thumb

Causes: forced abduction of the first metacarpal

Complication: osteoarthritis

Radiographic appearance: two piece fracture of the base of the thumb metacarpal

Technique: No manual exposure factor change

Prognosis/Treatment: Spica cast or Surgery

https://radiopaedia.org/articles/bennett-fracture

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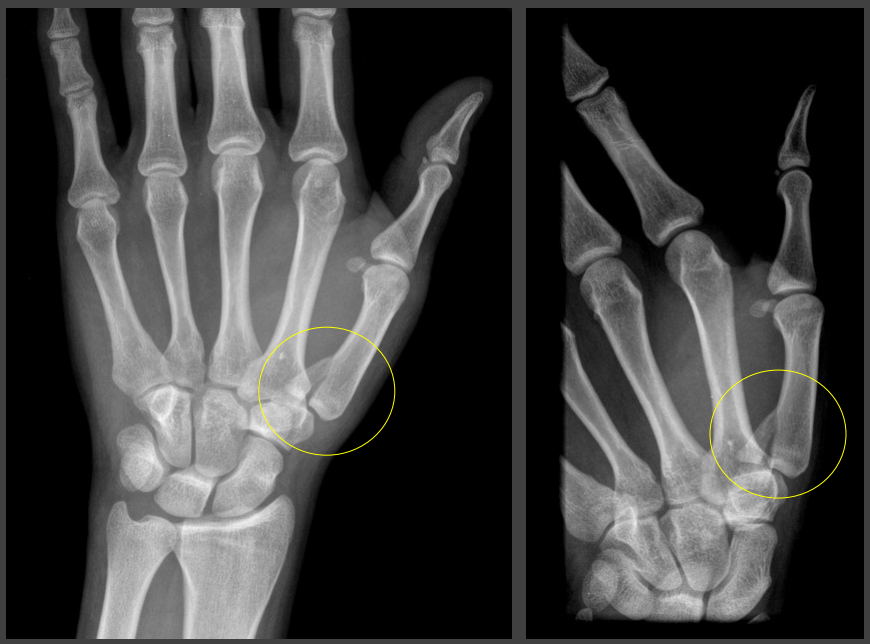

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Image Analysis - Fingers

EI Values
Acceptable 100-300
Direct

9

Fingers – PA

- Evidence of proper collimation and presence of side marker placed clear of anatomy of interest
- Entire digit from fingertip to distal portion of the adjoining metacarpal
- No soft tissue overlap from adjacent digits
- No rotation:
  - Equal concavity of both sides of the phalangeal bodies
  - Equal amount of soft tissue on both sides of the phalanges
- Fingernail, if seen, centered over the distal phalanx
- Open interphalangeal (IP) and MCP joint spaces
- Bony trabecular detail and surrounding soft tissues

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A. PA

EI: 220

11

B. PA

EI: 60

12

C. PA

EI: 240

13

Fingers – Oblique

- Evidence of proper collimation and presence of side marker placed clear of anatomy of interest
- Entire digit, including the distal portion of the adjoining metacarpal
- Digit rotated at a 45-degrees, demonstrated by the concavity of the elevated side of the phalangeal bodies
- No superimposition of the proximal phalanx or MCP joint by adjacent digits
- Open interphalangeal (IP) an MCP joint spaces
- Bony trabecular detail and surrounding soft tissues

14

D. Oblique

EI: 100

15

E. Oblique

EI: 300

16

F. Oblique

EI: 260

17

Fingers – Lateral

- Evidence of proper collimation and presence of side marker placed clear of anatomy of interest
- Entire digit from fingertip to distal portion of the adjoining metacarpal
- No rotation:
  - Fingernail in profile, if visualized and normal
  - Concave, anterior surfaces of the phalanges
- No superimposition of the proximal phalanx or MCP joint by adjacent digits
- Open interphalangeal (IP) joint spaces
- Bony trabecular detail and surrounding soft tissues

18

G. Lateral

EI: 200

19

H. Lateral

EI: 280

20

I. Lateral

EI: 175

21

Thumb - Oblique

- Evidence of proper collimation and presence of side marker placed clear of anatomy of interest
- Area from the distal tip of the thumb to the trapezium
- Proper rotation demonstrated by concave surface of elevated side of the proximal phalanx and metacarpal
- Open interphalangeal (IP) and MCP joint spaces
- Bony trabecular detail and surrounding soft tissues

22

J. Oblique

EI: 100

23

K. Oblique

EI: 180

24

L. Oblique

EI: 175

25

Thumb - Lateral

- Evidence of proper collimation and presence of side marker placed clear of anatomy of interest
- Area from the distal tip of the thumb to the trapezium
- No rotation:
  - Concave anterior surface of the proximal phalanx and metacarpal
  - Thumbnail, if visualized and normal, in profile
- Open interphalangeal (IP) and MCP joint spaces
- Bony trabecular detail and surrounding soft tissues

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M. Lateral

EI: 800

27

N. Lateral

EI: 100

28

O. Lateral

EI: 270

29

Thumb - AP

- Evidence of proper collimation and presence of side marker placed clear of anatomy of interest
- Area from the distal tip of the thumb to the trapezium
- No rotation:
  - Concavity of the phalangeal and metacarpal bodies
  - Equal amount of soft tissue on both sides of the phalanges
  - Thumbnail, if visualized, in the center of the distal thumb
- Overlap of soft tissue profile of the palm over the midshaft of the first metacarpal
- Open interphalangeal (IP) and MCP joint spaces without overlap of bones
- Bony trabecular detail and surrounding soft tissues

30

P. AP

EI: 180

31

Q. AP

EI: 100

32

R. AP

EI: 150

33