

# Upper Extremity Trauma The Hand

Upper Extremity Trauma Hand & Fingers

## The Hand is "Handy"

**Hand is very accessible**

- One place on the body it is socially acceptable to touch

Shaking hands... Holding hands...

Begin-Carter-Sadat Bush-Abdullah

**History**  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

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Upper Extremity Trauma Hand & Fingers

## Hand Imaging: Since Day 1

**1st radiograph:**

- Röntgen's wife's hand
- ✓ December 22, 1895
- Röntgen: "X-rays"
- Exposure time: 15 minutes
- Exposure time today's hand radiographs: 5 milliseconds (5/1,000<sup>th</sup> of a second)

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Upper Extremity Trauma Hand & Fingers

## Hand Imaging: Since Day 1

**1st Demonstration**

- Würzburg Physical Medical Society
- ✓ January 23, 1896
- von Kolliker proposed these new rays be called "Roentgen Rays"

ARRS American Roentgen Ray Society Albert von Kolliker

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Upper Extremity Trauma Hand & Fingers

## 1st Clinical Use of X-rays

**Feb 3<sup>rd</sup>, 1896** Hanover, NH

Prof. Gilman Frost Dartmouth Medical School  
Prof. Edwin Frost Physics & Astronomy Dartmouth College

Eddie McCaughy, 14 years old, fell ice skating

Nurse Frost

Photograph by Howard Langill

- Read about Roentgen in newspaper
- Called Dartmouth Physics Dept.
- Supplied the photographic plates

Ulna fracture

20 minute exposure

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## 1898: What the "in" crowd did

Tsar Nicholas & Alexandra  
Winter Palace  
St. Petersburg  
Invited Dr. H.H. Horne to make these "photographs" of their hands

**X-ray apparatus overloaded the palace's electrical system**

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Upper Extremity Trauma Hand & Fingers

## Edison brings X-rays to Public

Edison's Assistant Clarence Dally ✓ Thomas Edison

1896 National Electrical Exposition, NY

Fluoroscope

Edison looking at bones of Dally's hand

X-ray tube in box

**G. M. DALLY DIES A MARTYR TO SCIENCE**

Was Burned While Experimenting with X-rays.

WORKED WITH T. A. EDISON

For Seven Years He Constantly Underwent Operations, Finally Losing His Arm.

Shielded by Tin Snuff Tins.

1896 Edison's Lab [image.easminhouse.org](http://image.easminhouse.org)  
© 2013 Ken L. Schreibman, PhD/MD [NYT 1904](http://NYT 1904)

**History**  
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# Upper Extremity Trauma

## The Hand

Upper Extremity Trauma Hand & Fingers

### Indications: Hand Imaging

- History
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#### Trauma

- Falls (wrist)
- Bites...
  - ✓ Infection
  - ✓ Humans
  - ✓ Animals
    - ❖ Cats (Tooth chip)



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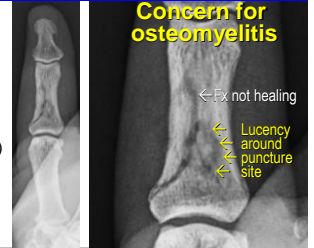
Upper Extremity Trauma Hand & Fingers

### Indications: Hand Imaging

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#### Trauma

- Falls (wrist)
- Bites...
  - ✓ Infection
  - ✓ Humans
  - ✓ Animals
    - ❖ Cats (Tooth chip)
    - ❖ Dogs



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S,C 60yoF, dog bite to thumb 3 weeks ago

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Upper Extremity Trauma Hand & Fingers

### Indications: Hand Imaging

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#### Trauma

- Falls (wrist)
- Bites...
  - ✓ Infection
  - ✓ Humans
  - ✓ Animals
- Foreign bodies
- Lacerations



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Upper Extremity Trauma Hand & Fingers

### Indications: Hand Imaging

- History
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- Terminology
- Hand/Wrist
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#### Trauma

- Falls (wrist)
- Bites...
  - ✓ Infection
  - ✓ Humans
  - ✓ Animals
- Foreign bodies
- Lacerations
- Amputations



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www.SawStop.com

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Upper Extremity Trauma Hand & Fingers

### Indications: Hand Imaging

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#### Trauma

- Falls (wrist)
- Bites...
  - ✓ Infection
  - ✓ Humans
  - ✓ Animals
- Foreign bodies
- Lacerations
- Amputations
- Snow blowers



US Consumer Product Safety Commission,  
**each year** snow throwers cause:  
➢ 6,000 ER visits  
➢ 600 finger amps

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www.cpsc.gov

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Upper Extremity Trauma Hand & Fingers

### Indications: Hand Imaging

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#### Arthritis

- Certainly image whichever joint is painful...
- ... but also image the hands
- The most common characteristics:
  - ✓ Distribution
  - ✓ Erosions
  - ✓ Osteophytes
- for the most common arthropathies:
  - ✓ OA
  - ✓ RA
  - ✓ EOA
  - ✓ Gout
  - ✓ CPPD
  - ✓ PA
- are well reflected in the hands

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# Upper Extremity Trauma The Hand

Upper Extremity Trauma Hand & Fingers

### Arthritis in Hands

**History**

- Indications@
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**Osteoarthritis**

- Joint narrowing
  - ✓ DIPs & PIPs
  - ✓ Thumb Base
  - ✓ CMC & STT
  - ✓ Sparing MCPs & rest of wrist
- Bone production
  - ✓ Sub-cortical sclerosis
  - ✓ **OSTEOPHYTES!**

S,H 73yoF

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Upper Extremity Trauma Hand & Fingers

### Arthritis in Hands

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**Erosive OA**

- Narrowing
  - ✓ IP Joints
  - ✓ Just like OA
- Sparing
  - ✓ Carpus
  - ✓ Just like OA
- Gullwing deformity
- ✓ DIPs
- ✓ Symmetric
- ✓ Older ♀

S,J 59yoF

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Upper Extremity Trauma Hand & Fingers

### Arthritis in Hands

**History**

- Indications@
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**Rheumatoid Arthritis**

- Narrowing
  - ✓ MCPs
  - ✓ Inter-carpals
  - ✓ Unlike OA
- Sparing
  - ✓ IP Joints
  - ✓ Unlike OA
- Subluxation
  - ✓ MCPs ulnar deviation
- Symmetry

I,I 60yoF

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Upper Extremity Trauma Hand & Fingers

### Arthritis in Hands

**History**

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**Gout**

(Less common in hands than toes)

- Distribution
  - ✓ Random
  - ✓ Not all IPs
  - ✓ Not all MCPs
- Erosion
  - ✓ Sharp margins
  - ✓ Overhanging edges

A,J 66yoM

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Upper Extremity Trauma Hand & Fingers

### Arthritis in Hands

**History**

- Indications@
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**CPPD** Calcium Pyro Phosphate Dihydrate deposition disease

- Narrowed MCPs
  - ✓ Unlike OA, more like RA
- Chondrocalcinosis
  - ✓ TFC
  - ✓ Lunate-Triquetral Joint

M,Y 76yoF

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Upper Extremity Trauma Hand & Fingers

### Arthritis in Hands

**History**

- Indications@
- Terminology
- Hand/Wrist
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**Psoriatic Arthritis**

- Distribution
  - ✓ Random
- Erosions
  - ✓ Pencil-in-cup

H,J 73yoM

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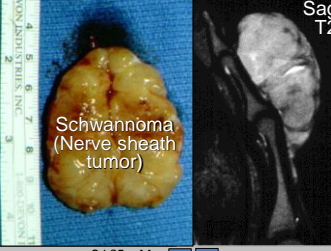
# Upper Extremity Trauma The Hand

Upper Extremity Trauma Hand & Fingers

## Indications: Hand Imaging

**History**  
**Indications** @ @  
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 Hand/Wrist  
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 Fractures  
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**Mass**  
 > Usually evaluated with MRI ...or US  
 > But should start with radiographs  
 ✓ Mass size  
 ✓ Helps to plan scan



Schwannoma (Nerve sheath tumor)

C,J 35yoM

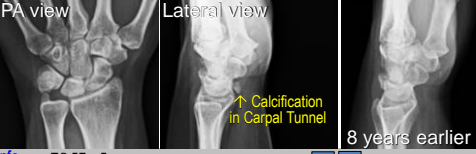
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Upper Extremity Trauma Hand & Fingers

## Indications: Hand Imaging

**History**  
**Indications** @ @  
**Terminology**  
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**Pain?**  
 > Carpal tunnel syndrome  
 ✓ We expect radiographs to be negative  
 ✓ Looking for unexpected surprises



PA view Lateral view

↑ Calcification in Carpal Tunnel

8 years earlier

T,P 57yoF


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Upper Extremity Trauma Hand & Fingers

## Indications: Hand Imaging

**History**  
**Indications** @ @  
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 Hand/Wrist  
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**Bone Age**  
 > At birth many bones unossified  
 ✓ Carpal bones  
 ✓ Epiphyses (ends of bones)  
 ✦ Radius/Ulna, MCs, Phalanges  
 > With aging, these bones ossify  
 ✓ At **specific ages**  
 > Hand radiographs to compare patient's skeletal (bone) age to their chronological age.  
 ✓ Left hand



Images courtesy of Bradley Maxfield, MD

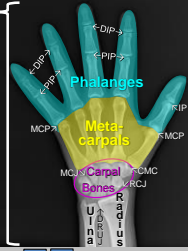
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Upper Extremity Trauma Hand & Fingers

## "Hand" vs "Wrist"

**History**  
**Indications** @ @  
**Terminology**  
 Hand/Wrist  
 Radial/Ulnar  
 Fingers  
**Radiographs**  
 Fractures  
 Mallet (S) (B)  
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**Hand images include:**  
 > Distal Radius & Ulna  
 > All 8 carpal bones  
 > All 5 metacarpals  
 > All 14 phalanges  
 > Joints  
 ✓ Distal Radio-Ulna Joint (DRUJ)  
 ✓ Radio-Carpal Joint  
 ✓ Mid-Carpal Joint  
 ✓ Carpal-Metacarpal Joints  
 ✓ Metacarpal-Phalangeal Joints  
 ✓ Inter-Phalangeal (IP, PIPs, DIPs)



Phalanges  
 Meta-carpals  
 Carpal Bones

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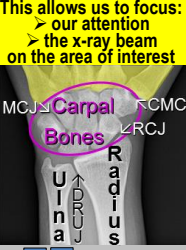
Upper Extremity Trauma Hand & Fingers

## "Hand" vs "Wrist"

**History**  
**Indications** @ @  
**Terminology**  
 Hand/Wrist  
 Radial/Ulnar  
 Fingers  
**Radiographs**  
 Fractures  
 Mallet (S) (B)  
 Boxer's  
 Gamekeeper  
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**Wrist images include:**  
 > Distal Radius & Ulna  
 > All 8 carpal bones  
 > Just metacarpal bases  
 > Joints  
 ✓ Distal Radio-Ulna Joint (DRUJ)  
 ✓ Radio-Carpal Joint  
 ✓ Mid-Carpal Joint  
 ✓ Carpal-Metacarpal Joints

This allows us to focus: our attention > the x-ray beam on the area of interest



MCJ Carpal Bones RCJ CMC

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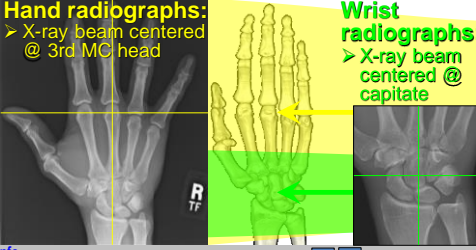
Upper Extremity Trauma Hand & Fingers

## Hand vs Wrist: X-ray Beam

**History**  
**Indications** @ @  
**Terminology**  
 Hand/Wrist  
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**Hand radiographs:**  
 > X-ray beam centered @ 3rd MC head

**Wrist radiographs:**  
 > X-ray beam centered @ capitate



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# Upper Extremity Trauma

## The Hand

Upper Extremity Trauma Hand & Fingers

### Hand vs Wrist: X-ray Beam

History Indications@ Terminology Hand/Wrist Radial/Ulnar Fractures Mallet (S) (B) Boxer's Gamekeeper Bennett WOW (F)

PA Hand ER

Lateral Hand

Can't see this fracture on the Lateral Hand, because it's not centered over the wrist

Lat Wrist

PA Wrist

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Upper Extremity Trauma Hand & Fingers

### Medial vs Lateral?

History Indications@ Terminology Hand/Wrist Radial/Ulnar Fractures Mallet (S) (B) Boxer's Gamekeeper Bennett WOW (F)

For most body parts, we use the terms "medial" and "lateral"

- > Medial: Towards the middle
- > Lateral: Towards the side

But for the hands/wrists, these terms are ambiguous

AP

LATERAL Tibia MEDIAL

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Upper Extremity Trauma Hand & Fingers

### Is the thumb medial or lateral?

History Indications@ Terminology Hand/Wrist Radial/Ulnar Fractures Mallet (S) (B) Boxer's Gamekeeper Bennett WOW (F)

Tomb of Horemheb (1319-1292 BC)

Pharaoh after Tutankhamen before Ramesses

← Thumb Medial

Thumb → Lateral

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Upper Extremity Trauma Hand & Fingers

### Is the thumb medial or lateral?

History Indications@ Terminology Hand/Wrist Radial/Ulnar Fractures Mallet (S) (B) Boxer's Gamekeeper Bennett WOW (F)

Ramesses III (1186-1155 BC)

It depends on how you hold your hands

- ✓ Supinated (palm up)
- ✓ Pronated (palm down)

Thumb Lateral

Thumb Medial

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Upper Extremity Trauma Hand & Fingers

### Is the thumb medial or lateral?

History Indications@ Terminology Hand/Wrist Radial/Ulnar Fractures Mallet (S) (B) Boxer's Gamekeeper Bennett WOW (F)

**Muffler Men**

Created in 1960s by International Fiberglass Co., Venice CA

23 feet tall

Esccondido, CA San Jose, CA Rocky Mount, NC

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Upper Extremity Trauma Hand & Fingers

### Is the thumb medial or lateral?

History Indications@ Terminology Hand/Wrist Radial/Ulnar Fractures Mallet (S) (B) Boxer's Gamekeeper Bennett WOW (F)

When hand is palm up "supinated" (holding soup) thumb is lateral

When hand is palm down "pronated" thumb is medial

Hayward, CA

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# Upper Extremity Trauma The Hand

Upper Extremity Trauma Hand & Fingers

**Not medial/lateral... radial/ulnar instead**

History  
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Bennett  
WOW (F)

*Essentials of HAND SURGERY*  
John Gray Selinger III  
AMERICAN SOCIETY FOR SURGERY OF THE HAND

Radial side Ulnar side

ASSH  
American Society for Surgery of the Hand  
Excellence in hand and upper extremity care since 1946

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Upper Extremity Trauma Hand & Fingers

**Which Finger Hurts?**

History  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
Boxer's  
Gamekeeper  
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Nice when tech. puts an arrow on site of pain.  
Nice when we're given a history of which finger hurts... but should indicate that finger not by number, but by NAME.

Too many arrows is not helpful

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Upper Extremity Trauma Hand & Fingers

**Which is the 1<sup>st</sup> Finger?**

History  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
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Gamekeeper  
Bennett  
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Index Finger? Thumb? Long Finger?

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Upper Extremity Trauma Hand & Fingers

**Finger Numbering = Confusion**

History  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
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Gamekeeper  
Bennett  
WOW (F)

Confusing for  
➢ People ordering radiographs...  
➢ People taking radiographs...  
Example:  
➢ 2 fingers...  
➢ Same patient  
➢ Same day  
➢ Same tech!

Thumb Index finger

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Upper Extremity Trauma Hand & Fingers

**Finger Numbering = Confusion**

History  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
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Fingers have names (not numbers)  
"Thumb"  
"Index"  
"Long" ("Middle")  
"Ring"  
"Small"

Radial side Ulnar side

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Upper Extremity Trauma Hand & Fingers

**Radiographs: Need 3 Views**

History  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
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Bennett  
WOW (F)

PA view Obl view Lat view

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# Upper Extremity Trauma The Hand

## Upper Extremity Trauma Hand & Fingers

**PA ≠ AP**

History  
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Gamekeeper  
Bennett  
WOW (F)

Chest: PA is standard

Posterior → Anterior = "PA"

X-ray tube

Anterior → Posterior = "AP"

Portable Chest = AP

Marty age 13

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## Upper Extremity Trauma Hand & Fingers

**Hand: PA = Standard View**

History  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

✓ Elbow @ shoulder height  
✓ Elbow @ 90°

Raise cassette

Shield → X-rays

Low chair

X-ray beam Posterior → Anterior = "PA"

X-ray beam centered on 3<sup>rd</sup> MC head

Marty age 15

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## Upper Extremity Trauma Hand & Fingers

**Hand: Fan Finger Lateral**

History  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

coneinstruments.com

UW radiograph  
Fingers well fanned

Outside radiograph  
Fingers not fanned

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## Upper Extremity Trauma Hand & Fingers

**Hand: Fan Finger Lateral**

History  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

Good 2<sup>nd</sup> view of:  
✓ Phalanges  
✓ DIPs/PIPs

Metacarpals overlap... not a good 2<sup>nd</sup> view of the MCs (S)

Tech's arrow → Swelling

Lat view

PA view

E,B 21yoM

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## Upper Extremity Trauma Hand & Fingers

**Hand: Oblique View**

History  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

Lat view

Obl view

PA view

E,B 21yoM

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## Upper Extremity Trauma Hand & Fingers

**Step Wedge for Oblique View**

History  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

Product Name Price  
Oblique - Adult Each \$10.25  
Oblique - Pediatric Each \$7.25

www.schreibman.info  
coneinstruments.com

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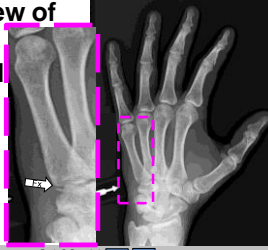
# Upper Extremity Trauma The Hand

Upper Extremity Trauma Hand & Fingers

### Hand: Oblique View

**Important 2<sup>nd</sup> view of the metacarpals**  
**Yields additional views of:**

- Phalanges
- Carpals bones



Q,J 26yoM

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Upper Extremity Trauma Hand & Fingers

### Why not get all 3 views?

**Do < 3 hand views save radiation?**

- Not really
  - Chest PA & Lateral radiographs ≈ 0.06 mSv ≈ 1 week of background radiation
  - 3-view Hand radiographs < 0.01 mSv < 1 day of background radiation

**Do < 3 hand views save money?**

- Not much
  - 1-view hand = 2-view hand = \$113\*
  - There is NO reason to order 1-view rather than 2-views!
  - 3-view hand = \$142 (only \$29 more than 2-views)

UWMF Technical + Professional charges

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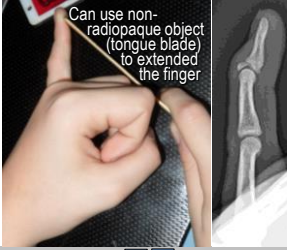
Upper Extremity Trauma Hand & Fingers

### Radiographs: Finger

If interested in only one finger, should order radiographs of just that finger.

- Costs less than hand
- 1-view finger =
- 2-view finger =
- 3-view finger = \$106\* (\$36 less than 3-v hand)
- Bend other fingers out of the way
- Center x-ray beam over that finger

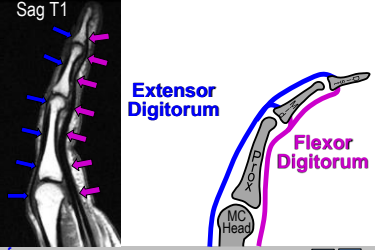
Can use non-radiopaque object (tongue blade) to extend the finger



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Upper Extremity Trauma Hand & Fingers

### Finger Model (Lateral View)



Extensor Digitorum

Flexor Digitorum

Sag T1

MC Head

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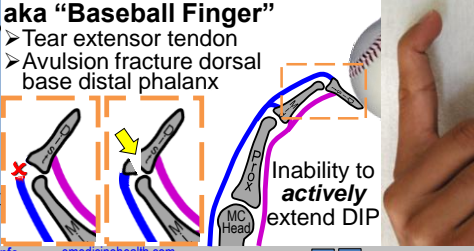
Upper Extremity Trauma Hand & Fingers

### Mallet Finger

aka "Baseball Finger"

- Tear extensor tendon
- Avulsion fracture dorsal base distal phalanx

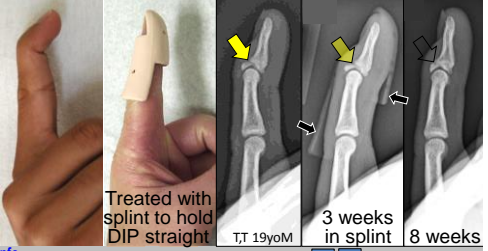
Inability to actively extend DIP



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Upper Extremity Trauma Hand & Fingers

### Mallet Finger



Treated with splint to hold DIP straight

3 weeks in splint

8 weeks

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# Upper Extremity Trauma The Hand

Upper Extremity Trauma Hand & Fingers

## "Mallet Finger"

History  
Indications@@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
● Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

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**Mallet?**  
➤ Google "Mallet"...

Pry bar

"Pry bar finger"?

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Upper Extremity Trauma Hand & Fingers

## Finger Model (Lateral View)

History  
Indications@@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
● Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

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**Extensor Digitorum**

**Flexor Digitorum Profundus (deep) → DIP**

**Flexor Digitorum Superficialis ("surface") → PIP**

Ext. Dig. disruption DIP → DIP flexion (Mallet) → PIP hyper-extension

FDP slips around PIP → PIP hyper-extension

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Upper Extremity Trauma Hand & Fingers

## Swan Neck Deformity

History  
Indications@@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
● Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

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DIP flexion + PIP hyper-extension

Due to RA (most common)

Due to Trauma B, M 16yoM

Flexed distally

Extended proximally

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Upper Extremity Trauma Hand & Fingers

## Boutonnière Deformity

History  
Indications@@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
● Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

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DIP flexion + PIP hyper-extension = Swan Neck

DIP flexion + PIP hyper-extension = Boutonnière

Boutonnière [Fr]: "buttonhole"

Swan neck ring finger

Boutonnière small finger

Due to Trauma P, C 21yoM

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Upper Extremity Trauma Hand & Fingers

## Boutonnière Deformity

### Importance of Multiple Views!

History  
Indications@@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
● Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

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Lateral views:  
Bilateral Boutonnières

S, P 24yoF

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Upper Extremity Trauma Hand & Fingers

## Boutonnière Deformity

History  
Indications@@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
● Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

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*The Three Graces* (1638)  
Paul Rubens (1577-1640)  
Model: Hélène Fourment, wife, 23yo

➤ RA?\*

- ✓ In Hélène?
- ✓ In Rubens himself?

PIP flexion  
DIP hyper-extension

[www.schreibman.info](http://www.schreibman.info)  
[public-domain-photos.org](http://public-domain-photos.org)  
© 2013 Ken L. Schreibman, PhD/MD [Rheumatology.2005;44:881](http://Rheumatology.2005;44:881)

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# Upper Extremity Trauma The Hand

Upper Extremity Trauma Hand & Fingers

## "Boxer's Fracture"

**History**  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

**Combination of:**  
College Student + Alcohol + a wall...  
➤ Fracture 5<sup>th</sup> MC neck

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Upper Extremity Trauma Hand & Fingers

## "Boxer's Fracture"

**History**  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

Best view to measure angulation  
Best view to see MC fractures

Old 4<sup>th</sup> MC Fx  
2<sup>nd</sup> Boxer Fx

"Trauma is not evenly distributed in this population"

PA view hand  
Lat view hand  
Obl view hand

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Upper Extremity Trauma Hand & Fingers

## "Boxer's Fracture"

**History**  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

Best view to measure angulation  
Casting small & ring MCP jts. 90° flexion

PA view hand  
Lat view hand  
Lat view casted

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Upper Extremity Trauma Hand & Fingers

## GAMEKEEPER'S THUMB

C.S. Campbell, Bridge of Earn, Scotland  
The Journal of Bone and Joint Surgery, vol. 37 B, no.1, February 1955

Examined 24 gamekeepers  
➤ 20 (83%) laxity of the thumb  
✓ Metacarpo-phalangeal joint  
✓ Ulnar side

www.schreibman.info JBUS 1955;37:45(1):148-9  
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Upper Extremity Trauma Hand & Fingers

## Thumb Model (PA View)

**History**  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

Ulnar Collat Lig  
Radial Collat Lig  
Torn UCL

➤ Fell a year earlier  
➤ Decreased pinch strength

STRESS

F,D 61yoM

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Upper Extremity Trauma Hand & Fingers

## Injure Thumb MCP UCL

**History**  
Indications@  
Terminology  
Hand/Wrist  
Radial/Ulnar  
Fingers  
Radiographs  
Fractures  
Mallet (S) (B)  
Boxer's  
Gamekeeper  
Bennett  
WOW (F)

➤ Acute trauma/fall  
✓ "Skier's Thumb"  
❖ Falling while holding the ski pole  
✓ Tear UCL  
✓ Avulsion fracture ulnar side of the base of the thumb proximal phalanx

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# Upper Extremity Trauma

## The Hand

Upper Extremity Trauma Hand & Fingers

### Gamekeeper's (Skier's) Fracture

History Indications@ Terminology Hand/Wrist Radial/Ulnar Fingers Radiographs Fractures Mallet (S) (B) Boxer's Gamekeeper Bennett WOW (F)

PA view hand  
PA view thumb  
Lat view hand

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Upper Extremity Trauma Hand & Fingers

### Injure Thumb MCP UCL

History Indications@ Terminology Hand/Wrist Radial/Ulnar Fingers Radiographs Fractures Mallet (S) (B) Boxer's Gamekeeper Bennett WOW (F)

Repetitive stress on the UCL  
 ✓ Scottish Gamekeeper  
 ❖ Get rid of pests...  
 ... rabbits...  
 humanely/quickly  
 ❖ "Chinning"

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Upper Extremity Trauma Hand & Fingers

### Thumb Model (Oblique View)

History Indications@ Terminology Hand/Wrist Radial/Ulnar Fingers Radiographs Fractures Mallet (S) (B) Boxer's Gamekeeper Bennett WOW (F)

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Upper Extremity Trauma Hand & Fingers

### Bennett Fracture

History Indications@ Terminology Hand/Wrist Radial/Ulnar Fingers Radiographs Fractures Mallet (S) (B) Boxer's Gamekeeper Bennett WOW (F)

Edward Hallaren Bennett (1837-1907)  
 Described in 1881\*  
 ✓ Based upon skeletons  
 ✓ 14 years before x-rays  
 ❖ 3 years before George Eastman created photographic film

"So trivial an injury does this appear to be... so little deformity I might fairly be asked what importance attached to the correct diagnosis. Seeing the value of the movements of the thumb, no injury of it is to be lightly regarded and this fracture, though it unites readily with almost inappreciable deformity, renders the thumb lame and useless. The hand fails to grasp or lift with certainty any body requiring a wide gape of the thumb - for instance, to lift a tumbler full of water from the table..."

Woodcut from Bennett's article

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Upper Extremity Trauma Hand & Fingers

### Bennett Fracture

History Indications@ Terminology Hand/Wrist Radial/Ulnar Fingers Radiographs Fractures Mallet (S) (B) Boxer's Gamekeeper Bennett WOW (F)

**Abductor Pollicis Longus Tendon**  
 Pollex: [L] Thumb  
 Abduct: To draw away... from midline of the body

APL: Abducts Thumb

**Bennett Fx:**  
 ✓ Intra-articular  
 ✓ Thumb MC  
 ✓ Ulnar base  
 APL is unopposed  
 ✓ Subluxation of Thumb C-MC

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Upper Extremity Trauma Hand & Fingers

### Bennett Fracture

History Indications@ Terminology Hand/Wrist Radial/Ulnar Fingers Radiographs Fractures Mallet (S) (B) Boxer's Gamekeeper Bennett WOW (F)

Ulnar deviation view  
 Coronal Reformat  
 3m later  
 Healed anatomic alignment

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# Upper Extremity Trauma The Hand

Upper Extremity Trauma Hand & Fingers

**What to Order When (WOW)**

**Always start with radiographs!**

**Hand 3-views (PA, Lateral, Oblique)**

- When need to see all of the bones and joints
  - ✓ Arthritis
  - For metacarpal fractures
  - ✓ Boxer Fracture

**Finger**

- When interested in just one finger
  - ✓ Mallet, Swan Neck, Boutonniere
  - ✓ Gamekeeper's fracture

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Upper Extremity Trauma Hand & Fingers

**What to Order When (WOW)**

**Foreign bodies (FB)?**

➤ Radiographs: radiopaque FB

- ✓ Metal
- ✓ Glass
  - ❖ All glass is radiopaque

Tip of ballpoint pen in hand

Glass in hand

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Upper Extremity Trauma Hand & Fingers

**What to Order When (WOW)**

**Non-Radiopaque foreign bodies?**

- ✓ Wood splinters
- ✓ Sea urchin spines
- Can't be seen with radiographs or CT
- May be able to see with MR
- ALL can be seen with Ultrasound!

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Upper Extremity Trauma Hand & Fingers

**Non-Radiopaque Foreign Body**

PA view hand: Negative

T1fs +IV Contrast Coronal: Focal area of enhancement

T1fs +IV Sag: Marker

US Sag: Wood Splinter

www.schreibman.info M,E 11yoF  
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Upper Extremity Trauma Hand & Fingers

**What to Order When (WOW)**

**Masses, Infections, Synovitis**

- ALWAYS START WITH RADIOGRAPHS!
- MR is the next imaging study of choice
  - ✓ Usually with IV contrast
  - ✓ Contrast is particularly helpful for synovitis (RA)
    - ❖ Normal synovium does not enhance
    - ❖ Vascularized pannus greatly enhances
  - ✓ These MR studies should be ordered by the specialist who will be treating the condition
    - ❖ Rheumatologist
    - ❖ Hand Surgeon

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Upper Extremity Trauma Hand & Fingers

**Questions?**

**Raise your hand...**

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