

Upper Extremity Trauma: Shoulder

Upper Extremity Trauma Shoulder


Goal **Objectives**

Better 3-D Understanding of The Shoulder

- Anatomy
- Imaging

Objectives

- Illustrate Anatomy
 - 3-D Scapula
 - Glenohumeral Joint
- Imaging Techniques
 - Radiographic Views
 - CT Optimization
- Shoulder Trauma
 - How not to miss a posterior dislocation

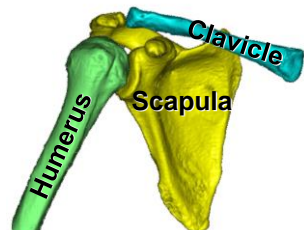


www.schreibman.info Ken Schreibman, PhD/MD Professor of Radiology University of Wisconsin – Madison 1/60

Upper Extremity Trauma Shoulder

Shoulder: 3 Bones

- Bones
- Radiographs
- AP & Obl
- Ax & WP
- Y & ACJ
- AC Injury
- GH Dislocate
- Anterior
- Posterior
- CT



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Upper Extremity Trauma Shoulder

Scapula: Anterior View

- Bones
- Radiographs
- AP & Obl
- Ax & WP
- Y & ACJ
- AC Injury
- GH Dislocate
- Anterior
- Posterior
- CT

“Flat Bone”


- ✓ Scapula
- ✓ Skull
- ✓ Pelvis
- ✓ Sternum
- ✓ Ribs

➢ As opposed to “Long Bones”

- ✓ Humerus
- ✓ Clavicle
- ✓ ...

Scapula has complex 3-D anatomy

- Helps to look at it from multiple views



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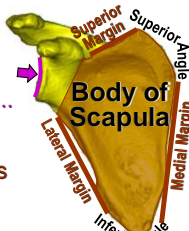
Upper Extremity Trauma Shoulder

Scapula: Anterior Medial View

- Bones
- Radiographs
- AP & Obl
- Ax & WP
- Y & ACJ
- AC Injury
- GH Dislocate
- Anterior
- Posterior
- CT

Parts:

- **Glenoid**
 - ✓ Shallow Socket
 - ❖ Dislocates...
- **Body**
 - ✓ Triangular
 - ❖ 3 Margins
 - ❖ 2 Angles



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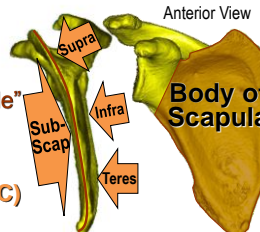
Upper Extremity Trauma Shoulder

Scapula: Medial View

- Bones
- Radiographs
- AP & Obl
- Ax & WP
- Y & ACJ
- AC Injury
- GH Dislocate
- Anterior
- Posterior
- CT

Parts:

- **Body**
 - ✓ Razor Thin
 - ❖ “Shoulder Blade”
 - ✓ No articular surfaces
 - ✓ Origin of all 4 Rotator Cuff (RC) Muscles



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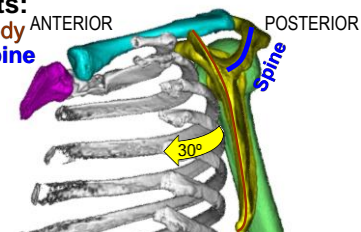
Upper Extremity Trauma Shoulder

Scapula: Medial View

- Bones
- Radiographs
- AP & Obl
- Ax & WP
- Y & ACJ
- AC Injury
- GH Dislocate
- Anterior
- Posterior
- CT

Parts:

- **Body** ANTERIOR
- **Spine** POSTERIOR




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Upper Extremity Trauma: Shoulder

Upper Extremity Trauma Shoulder

Scapula: Posterior Medial View

- Bones ③ ④ ⑧
- Radiographs
 - AP & Obl
 - Ax & WP
 - Y & ACJ
 - AC Injury
 - GH Dislocate
 - Anterior
 - Posterior
 - CT
- Parts:
 - Body
 - Spine
 - Posterior Structure
 - Off back of Body
 - Defines RC muscles
 - Supraspinatus
 - Above the spine
 - Infraspinatus
 - Below the spine

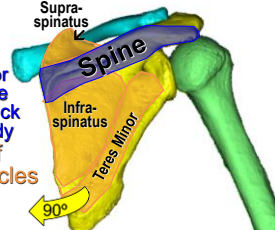


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Upper Extremity Trauma Shoulder

Scapula: Posterior View

- Bones ③ ④ ⑧
- Radiographs
 - AP & Obl
 - Ax & WP
 - Y & ACJ
 - AC Injury
 - GH Dislocate
 - Anterior
 - Posterior
 - CT
- Parts:
 - Body
 - Spine
 - Posterior Structure
 - Off back of Body
 - Origin of RC Muscles
 - Supraspinatus
 - Infraspinatus
 - Teres Minor

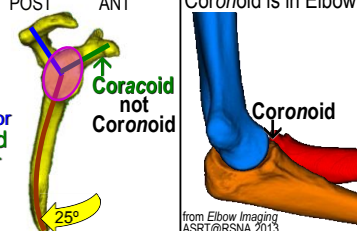


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Upper Extremity Trauma Shoulder

Scapula: Lateral View

- Bones ③ ④ ⑧
- Radiographs
 - AP & Obl
 - Ax & WP
 - Y & ACJ
 - AC Injury
 - GH Dislocate
 - Anterior
 - Posterior
 - CT
- "Y-view"
 - 3 Limbs:
 - Body
 - Inferior
 - Spine
 - Posterior
 - Coracoid
 - Anterior
 - Shallow Socket
 - Glenoid

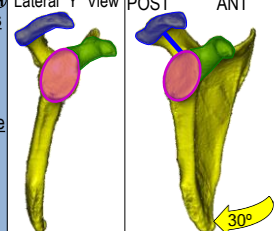


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Upper Extremity Trauma Shoulder

Scapula: Anterior Lateral View

- Bones ③ ④ ⑧
- Radiographs
 - AP & Obl
 - Ax & WP
 - Y & ACJ
 - AC Injury
 - GH Dislocate
 - Anterior
 - Posterior
 - CT
- Lateral "Y" View
 - Coracoid
 - Most anterior part of the scapula
 - Arises from anterior glenoid
 - Acromion
 - Arises from posterior spine
 - Points anterior



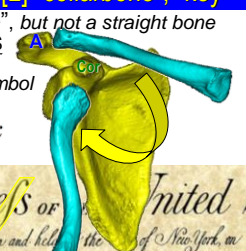
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Upper Extremity Trauma Shoulder

Clavicle: [L] "collarbone", "key"

fastener of the shoulder
elymonline.com

- Bones ③ ④ ⑧
- Radiographs
 - AP & Obl
 - Ax & WP
 - Y & ACJ
 - AC Injury
 - GH Dislocate
 - Anterior
 - Posterior
 - CT
- "Long Bone", but not a straight bone
 - elongated-S
 - elongated-f
 - Integral Symbol



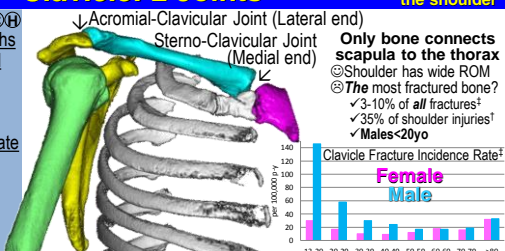
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Upper Extremity Trauma Shoulder

Clavicle: 2 Joints

fastener of the shoulder

- Bones ③ ④ ⑧
- Radiographs
 - AP & Obl
 - Ax & WP
 - Y & ACJ
 - AC Injury
 - GH Dislocate
 - Anterior
 - Posterior
 - CT
- Acromial-Clavicular Joint (Lateral end)
- Sterno-Clavicular Joint (Medial end)
- Only bone connects scapula to the thorax
 - Shoulder has wide ROM
 - The most fractured bone?
 - 3-10% of all fractures
 - 35% of shoulder injuries
 - Males < 20yo



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Upper Extremity Trauma: Shoulder

Upper Extremity Trauma Shoulder

Humerus: 1 Head, 2 Necks

Bones (S, C, H)
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
AC Injury
 GH Dislocate
 Anterior
 Posterior
CT

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Upper Extremity Trauma Shoulder

Neer Classification Proximal Humerus Fractures

Bones (S, C, H) **Count Parts** (displaced > 1cm, angled > 45°) not fragments

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Upper Extremity Trauma Shoulder

Humerus: External vs Internal Rotation

Bones (S, C, H)
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
AC Injury
 GH Dislocate
 Anterior
 Posterior
CT

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Upper Extremity Trauma Shoulder

Shoulder: 3 Bones & 2 Joints

Bones (S, C, H)
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
AC Injury
 GH Dislocate
 Anterior
 Posterior
CT

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Upper Extremity Trauma Shoulder

Radiographs: AP view Humerus Int. Rotated

Bones (S, C, H)
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
AC Injury
 GH Dislocate
 Anterior
 Posterior
CT

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Upper Extremity Trauma Shoulder

Radiographs: Oblique Humerus Ext. Rotated

Bones (S, C, H)
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
AC Injury
 GH Dislocate
 Anterior
 Posterior
CT

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Upper Extremity Trauma: Shoulder

Upper Extremity Trauma Shoulder

Radiographs: Technical Points

Bones ©C®
Radiographs
AP & Obl
Ax & WP
Y & ACJ
AC Injury
GH Dislocate
Anterior
Posterior
CT

Both AP & Oblique:
1) Shot Standing
2) Shield Genitals
3) Boomerang Filter
Allows good exposure of GHJ without overexposure of ACJ

Less stuff to penetrate here
Than here

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Upper Extremity Trauma Shoulder

Boomerang Filter

Bones ©C®
Radiographs
AP & Obl
Ax & WP
Y & ACJ
AC Injury
GH Dislocate
Anterior
Posterior
CT

Sometimes we can see the filter on radiographs

Well exposed ACJ
Well exposed GHJ
Usually we see only the internal radiopaque tracer chain

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Upper Extremity Trauma Shoulder

Boomerang Filter

ACJ way over-exposed
ACJ now well-exposed

Technologist forget to use boomerang filter
Repeated with boomerang filter in place

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Upper Extremity Trauma Shoulder

Radiographs: Need Orthogonal Views +

Bones ©C®
Radiographs
AP & Obl
Ax & WP
Y & ACJ
AC Injury
GH Dislocate
Anterior
Posterior
CT

AP/Obl = Orthogonal views of humerus
> Internal/External rotation of humerus
AP/Obl ≠ Orthogonal views of GH joint
> AP doesn't even profile glenohumeral joint
The 3 Orthogonal views to the GHJ are:

Oblique "Grashey"
Axillary (supine)
West Point (prone)

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Upper Extremity Trauma Shoulder

Radiographs: Axillary view (supine)

Bones ©C®
Radiographs
AP & Obl
Ax & WP
Y & ACJ
AC Injury
GH Dislocate
Anterior
Posterior
CT

Profiles glenohumeral joint
> Width
✓ Arthritis
> Alignment
✓ Dislocations

Coracoid (anterior)
Articular surface humeral head
Articular surface glenoid
ACJ
X-Rays
F,K 16yoF

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Upper Extremity Trauma Shoulder

Radiographs: West Point view (prone)

Bones ©C®
Radiographs
AP & Obl
Ax & WP
Y & ACJ
AC Injury
GH Dislocate
Anterior
Posterior
CT

Profiles glenohumeral joint
> Width
✓ Arthritis
> Alignment
✓ Dislocations

Acromion
ACJ
Articular surface glenoid
Articular surface humeral head
Coracoid (anterior)
X-Rays
F,K 16yoF

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Upper Extremity Trauma: Shoulder

Upper Extremity Trauma Shoulder

Radiographs: West Point vs Axillary

AP view (upright) QA: No filter
3 metal Mitek suture anchors in Anterior Glenoid
Anterior Glenoid
Bankart Reconstruct
West Point view (Prono)
Coracoid (anterior)
Clavicle
Parallels
Both well show GHJ width/alignment
> Ax: Anterior glenoid overlaps clavicle
> WP: Well shows anterior glenoid

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Upper Extremity Trauma

Radiographs: UW 3-view series

Bones © © ©
Radiographs
AP & Obl
Ax & WP
Y & ACJ
AC Injury
GH Dislocate
Anterior
Posterior
CT

Standard (trauma, pain)
1) AP
2) Oblique
3) Axillary
2-views of: ✓ ACJ
✓ Proximal Humerus
2-views of: ✓ Glenohumeral Joint

Instability (3-views Glenohumeral Joint)
1) Oblique
2) Axillary
3) West Point

If need orthogonal views Scapula, ACJ
4) Lateral ("Scapular Y", "Arch"/"Outlet")

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Upper Extremity Trauma Shoulder

Radiographs: Scapular Y view (PA)

Bones © © ©
Radiographs
AP & Obl
Ax & WP
Y & ACJ
AC Injury
GH Dislocate
Anterior
Posterior
CT

Orthog. view:
> Scapula
✓ Body
✓ Coracoid
✓ Spine
✓ Acromion
> AC Joint
For discussion of Y vs Arch views.

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Upper Extremity Trauma Shoulder

Radiographs: AC Joints (Bilateral)

Without weights

Bones © © ©
Radiographs
AP & Obl
Ax & WP
Y & ACJ
AC Injury
GH Dislocate
Anterior
Posterior
CT

Anatomic alignment of Acromia with lateral ends of Clavicles

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Upper Extremity Trauma Shoulder

Radiographs: AC Joints (Bilateral)

Bones © © ©
Radiographs
AP & Obl
Ax & WP
Y & ACJ
AC Injury
GH Dislocate
Anterior
Posterior
CT

We don't use weights at UW

"Weights should be attached to wrists as shown and not held in hands."

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Shoulder: 3 Bones & 2 Joints

2 Ligaments attach clavicle to scapula:
> AC Lig Acromio-Clavicular
> CC Lig Coraco-Clavicular

AC injury types based on:
✓ Which ligaments are torn
✓ Degree/direction of A-C displacement

Acromion
Clavicle
Coracoid
Scapula
Gleno-Humeral Joint
Acromial-Clavicular Joint

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Upper Extremity Trauma: Shoulder

Upper Extremity Trauma Shoulder

Acromioclavicular Injury: Type 1

Bones **AC Lig: Sprain (intact)**
CC Lig: Intact
ACJ: Aligned

Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ

AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

AC injuries most commonly occur in males <30 related to contact sports
 Galen (120-199AD) diagnosed his own AC dislocation received from wrestling.
 Treated himself with tight bandages to hold clavicle down, keeping arm elevated.
 He abandoned the treatment after only a few days as it was so uncomfortable.
 (Low compliance rate of shoulder bracing)

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Acromioclavicular Injury: Type 2

Bones **AC Lig: Torn**
CC Lig: Intact
ACJ: Subluxated

Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ

AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

While clavicle appears displaced up, it's the scapula that's displaced down

Symptomatic **Asymptomatic**

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Acromioclavicular Injury: Type 3

Bones **AC Lig: Torn**
CC Lig: Torn
ACJ: Dislocated

Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ

AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

C→C distance is increased
 less than twice the normal distance

Symptomatic **Asymptomatic**

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Upper Extremity Trauma Shoulder

Acromioclavicular Injury: Type 5

Bones **AC Lig: Torn**
CC Lig: Torn
ACJ: Very Dislocated

Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ

AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

C→C distance is increased
 more than twice the normal distance

Deltoid/Trapezius muscles are torn from clavicle

Symptomatic **Asymptomatic**

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Upper Extremity Trauma Shoulder

Acromioclavicular Injury: Type 4

Bones **AC Lig: Torn**
CC Lig: Torn

Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ

AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

Clavicle Posterior to Acromion
 ✓Hard to see on AP view
 ✓Need to look at Axillary view

This type is very rare

AP view **Axillary view**

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Upper Extremity Trauma Shoulder

Acromioclavicular Injury: Type 6

Bones **AC Lig: Torn**
CC Lig: Torn

Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ

AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

This type is so rare I've never seen one

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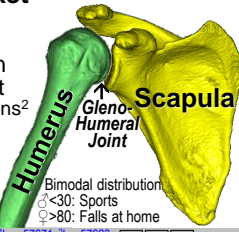
Upper Extremity Trauma Shoulder

Shoulder: 3 Bones & 2 Joints

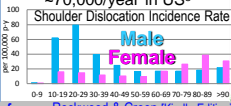
Bones ⓈⓐⓂⓂ
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
 AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

GHJ: Shallow Socket

- Glenoid covers only ~25% humeral head¹
- ⊙ 360° range of motion
- ⊙ **Most** dislocated joint
- ✓ 45% of ALL dislocations²
- ~70,000/year in US³



Bimodal distribution
 ♂ <30: Sports
 ♀ >80: Falls at home





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Upper Extremity Trauma Shoulder

Shoulder Range of Motion

Bones ⓈⓐⓂⓂ
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
 AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

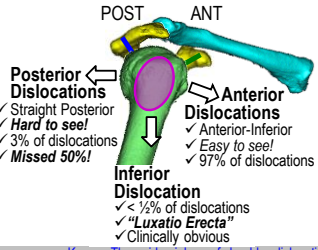



www.schreibman.info Nature_v498_483-6_27June2013
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Upper Extremity Trauma Shoulder

Gleno-Humeral Dislocations

Bones ⓈⓐⓂⓂ
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
 AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT



- **Glenoid**
- ✓ **Shallow Socket**
- 3 Limbs:
 - ✓ Body
 - ❖ Inferior
 - ✓ Coracoid
 - ❖ Anterior
 - ✓ Spine
 - ❖ Posterior

www.schreibman.info Kröner. The epidemiology of shoulder dislocations Arch Orthop Trauma Surg. 1989;108:268-90. 39/60


Upper Extremity Trauma Shoulder

GH Dislocations: Inferior

Bones ⓈⓐⓂⓂ
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
 AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

Luxatio Erecta [L] "Dislocation" "Upright"

- Humerus stuck in abduction
- ✓ "Hands up dislocation"



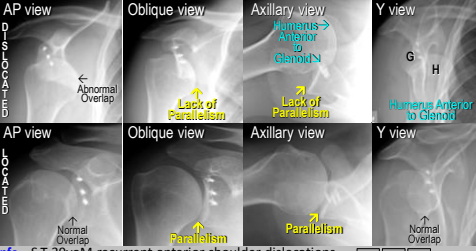
1 hour later after reduction in ED

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Upper Extremity Trauma Shoulder

GH Dislocations: Anterior

Bones ⓈⓐⓂⓂ
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
 AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT



S.T 39yoM recurrent anterior shoulder dislocations

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Upper Extremity Trauma Shoulder

GH Dislocations: Subcoracoid

Bones ⓈⓐⓂⓂ
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
 AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

Humerus Anterior-Inferior to Glenoid

- Easy to see on all radiographic views
- ≈ 3% Anterior Dislocations are subcoracoid



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Upper Extremity Trauma: Shoulder

Upper Extremity Trauma Shoulder

GH Dislocations: Subglenoid

Bones (S, C, H)
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
AC Injury
GH Dislocate
 Anterior
 Posterior
CT

Humerus Anterior-Inferior to Glenoid
 Easy to see on all radiographic views
 1/3 Anterior Dislocations are subglenoid

AP view Oblique view Axillary view

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Upper Extremity Trauma Shoulder

GH Dislocations: Anterior

Bones (S, C, H)
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
AC Injury
GH Dislocate
 Anterior
 Posterior
CT

2 Very rare types (I've never seen either...)
 Subclavicular Intrathoracic

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GH Dislocations: Anterior

Bones (S, C, H)
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
AC Injury
GH Dislocate
 Anterior
 Posterior
CT

Humerus Anterior-Inferior to Glenoid
 Easy to see on all radiographic views
 ✓ AP: Abnormal G-H overlap
 ✓ Obl: Lack of G-H parallelism
 ✓ Ax: Humeral Head Ant. to Glenoid
 ✓ Subcoracoid=2/3, Subglenoid=1/3
 ✓ Subclavicular, Intrathoracic, Luxatio Erecta = all rare

Can have characteristic fractures:
 ✓ Humeral Head (Hill-Sachs)
 ✓ 40-90% single disloc. ~100% recurrent dislocations
 ✓ Anterior Glenoid (Bony Bankart)

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Upper Extremity Trauma Shoulder

GH Dislocations: Hill-Sachs

Bones (S, C, H)
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
AC Injury
GH Dislocate
 Anterior
 Posterior
CT

AP view Oblique view Axillary view Humerus Anterior to Glenoid

AP view Oblique view Axillary view Humerus aligned with Glenoid

Posterior Humeral Head impacted on Anterior Glenoid
 Creating wedged fracture in the postero-superolateral humeral head
Hill-Sachs Defect

www.schreibman.info P,D 24yoF Hill, Sachs: The Grooved Defect of the Humeral Head, Radiology 1940; 35:690-700
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Upper Extremity Trauma Shoulder

Mechanism

Bones (S, C, H)
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
AC Injury
GH Dislocate
 Anterior
 Posterior
CT

Axillary view
 Anterior humerus dislocates, postero-superior head impacts into anterior-inferior glenoid (creating Hill-Sachs fracture)
 ± fracture antero-inferior glenoid
 Bankart fracture
 ✓ "Bony Bankart"
 ✓ The defect Bankart described was not of the bone, but of the cartilaginous labrum

www.schreibman.info Bankart: The Pathology and Treatment of Recurrent Dislocation of the Shoulder. JBJS 1938 v26 p23-9
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Upper Extremity Trauma Shoulder

GH Dislocations: Bankart Fx

Bones (S, C, H)
Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
AC Injury
GH Dislocate
 Anterior
 Posterior
CT

H,D 35yoM P,C 32yoM

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Upper Extremity Trauma: Shoulder

Upper Extremity Trauma Shoulder

Bankart: Often best seen on WP

Bones \odot \odot \oplus \oplus
 Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
 AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

Oblique view
 Axillary view
 Axillary view: Clavicle overlaps anterior glenoid
 West Point view
 No fracture seen
 West Point view: Well shows anterior glenoid

E, H 20yoM

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Upper Extremity Trauma Shoulder

Dislocations: Anterior v Posterior

Bones \odot \odot \oplus \oplus
 Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
 AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

Anterior Dislocations (97%)
 > Goes Anterior & Inferior
 ✓ Easy to see
 > Indirect trauma
 ✓ Rarely from direct blow
 > 48% fall at home. 35% during sports

Posterior Dislocations (3%)
 > Goes Straight Posterior
 ✓ Harder to see
 > 67% Trauma (Falls > MVA > Sports)
 > 31% Seizure
 > 2% Electrocution
 Internal Rotators overwhelm weaker External Rotators

Zacchilli JBJS Am 2010;92(3):542-549
 W.F 19yoM Recurrent
 Robinson JBJS Am 2011;93(17):1605-1613
 S, C 58yoF Bike v Car

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Upper Extremity Trauma Shoulder

Posterior Dislocation Clues: 1

Humerus Stuck in Internal Rotation

Bones \odot \odot \oplus \oplus
 Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
 AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

GT en face
 GT en face
 Humeral Head is in Internal Rotation
 Humeral Head still is in Internal Rotation

58y e v

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Upper Extremity Trauma Shoulder

Posterior Dislocation Clues: 2

Lack of Parallelism on Oblique View

Bones \odot \odot \oplus \oplus
 Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
 AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

Dislocated
 Relocated
 Lack of Parallelism
 Parallelism

S, C 58yoF Bike v Car

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Upper Extremity Trauma Shoulder

Posterior Dislocation Clues: 3!

Look at the Axillary/WP View!

Bones \odot \odot \oplus \oplus
 Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
 AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

Oblique
 AP
 West Point!
 Humeral Head Posterior to Glenoid!
 Lack of Parallelism
 Humeral Head stuck in Internal Rotation

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Upper Extremity Trauma Shoulder

Posterior Dislocation Clues: Bonus

Trough Line Sign (Reverse Hill-Sachs)

Bones \odot \odot \oplus \oplus
 Radiographs
 AP & Obl
 Ax & WP
 Y & ACJ
 AC Injury
 GH Dislocate
 Anterior
 Posterior
 CT

Anterior Dislocation:
 ✓ Anterior Glenoid impacts into
 ✓ Posterior Humerus
 ✓ "Hill-Sachs"

Posterior Dislocation:
 ✓ Posterior Glenoid impacts into
 ✓ Anterior Humerus
 ✓ Trough Line Sign

AP
 West Point
 Trough Line Sign
 Trough Line Sign

AJR 1978; 130: 945-950

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Upper Extremity Trauma: Shoulder page 10 of 10

Upper Extremity Trauma Shoulder

Shoulder: What to Order When

Bones ©CⓂ Radiographs AP & Obl Ax & WP Y & ACJ AC Injury GH Dislocate Anterior Posterior CT	Radiographs (Obl + Ax + AP/WP ± Y) \$207 > Hx: Trauma (Fractures, Dislocations) > Hx: Pain (Arthritis, Calcific Tendonitis, ...) MR > Rotator Cuff tears (without contrast) \$2,946 > Labral tears (with intra-articular contrast) \$4,325 US > Dx: Rotator Cuff tears (sizeable tears) \$665 > Rx: Calcific Tendonitis Lavage* \$1,519 CT: Mostly for surgical planning \$1,473
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www.schreibman.info *Lee & Rosas AJR online 2010 v195 n3 Video Article
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Upper Extremity Trauma Shoulder

One final case...

Triceps Spur
Elbow Laceration

Direct trauma was to elbow

Anterior Dislocation
Subcoracoid
Surgical Neck Fracture
Angulated > 45°
2-Part Fracture (at least)

Indirect trauma was to shoulder

www.schreibman.info R,D 58yoM: Cleaning gutters, fell from 6ft ladder. Fell on elbow, shoulder pain
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Upper Extremity Trauma Shoulder

Multiple Views...

AP: Relocated

Cor (Ant)

AP: Dislocated

Axillary: Dislocated

Axillary: Relocated

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Upper Extremity Trauma Shoulder

CT: 2D Reformats

AP: Relocated 16:05

CT Axial slice through GHJ

Bankart Fx

CT: Coronal Reformat (Perpendicular to GHJ)

Bankart Fx

AP: CT scout 17:39

CT: Sagittal Reformat (Parallel to GHJ)

Bankart Fx

www.schreibman.info R,D 58yoM: Cleaning gutters, fell from 6ft ladder. Fell on elbow, shoulder pain
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Upper Extremity Trauma Shoulder

CT: 3D Reformats

Bones ©CⓂ

Radiographs
AP & Obl
Ax & WP
Y & ACJ
AC Injury
GH Dislocate
Anterior
Posterior
CT

Scapula only

Bankart Fx

Sagittal Reformat (Parallel to GHJ)

Coronal Reformat (Perpendicular to GHJ)

Humerus only

Post ORIF

www.schreibman.info R,D 58yoM: Cleaning gutters, fell from 6ft ladder. Fell on elbow, shoulder pain
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Upper Extremity Trauma Shoulder

Goal: Better 3-D Understanding of Shoulder

Objectives:

- Illustrate Anatomy: 3-D Scapula, Glenohumeral Joint
- Imaging Techniques: Radiographs, CT Optimization
- Shoulder Trauma: *How not to miss posterior dislocation*

Three Easily Missed Dislocations:

- Every **Elbow**, look for **Radial Head** dislocation
- Every **Shoulder**, look for **Posterior** dislocation
- Every **Foot**, look for **Lisfranc** dislocation

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