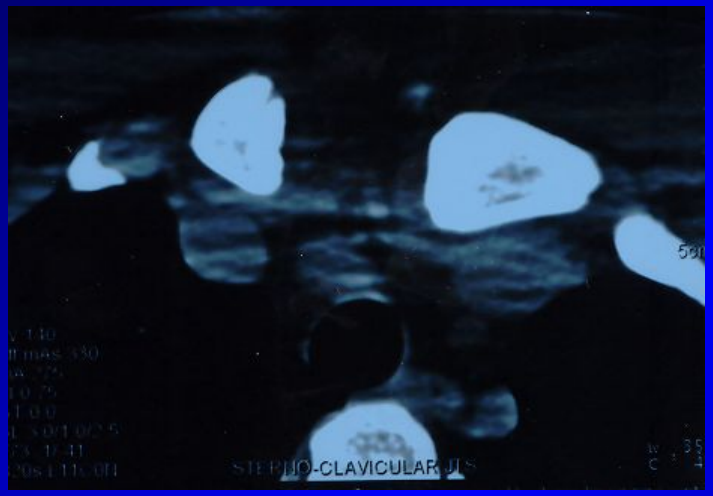
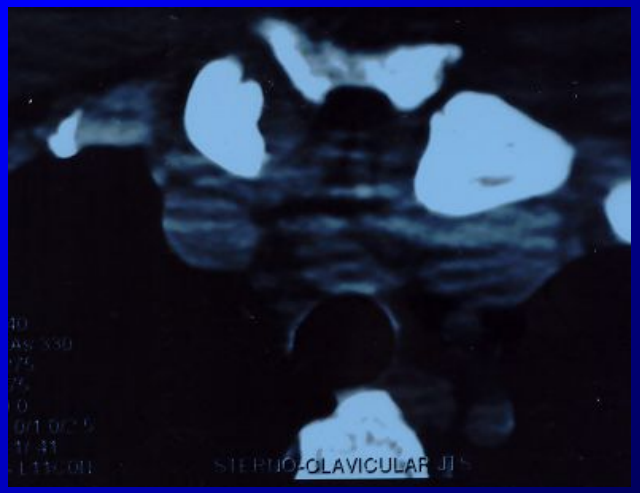
SC Joint, Clavicle and AC Joint

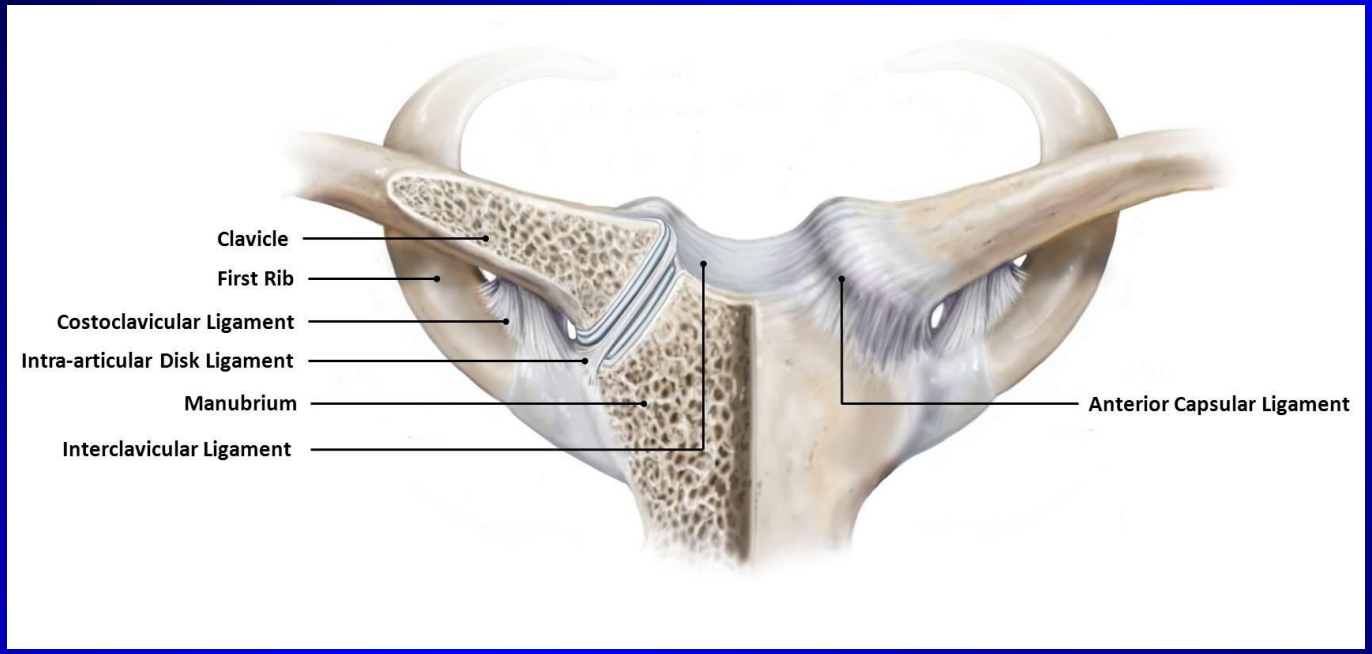
Philip M Jacobs, M.D.

Assistant Professor
Orthopaedics
UT-Health San Antonio

SC JOINT INJURIES






Clavicle
First Rib
Costoclavicular Ligament
Intra-articular Disk Ligament
Manubrium
Interclavicular Ligament
Anterior Capsular Ligament

Issue #1

Sternoclavicular joint injuries are rare

Cave, Fractures and Other Injuries, 1958

1,603 shoulder girdle injuries

- 3% sternoclavicular

- only 1 posterior

Issue #2

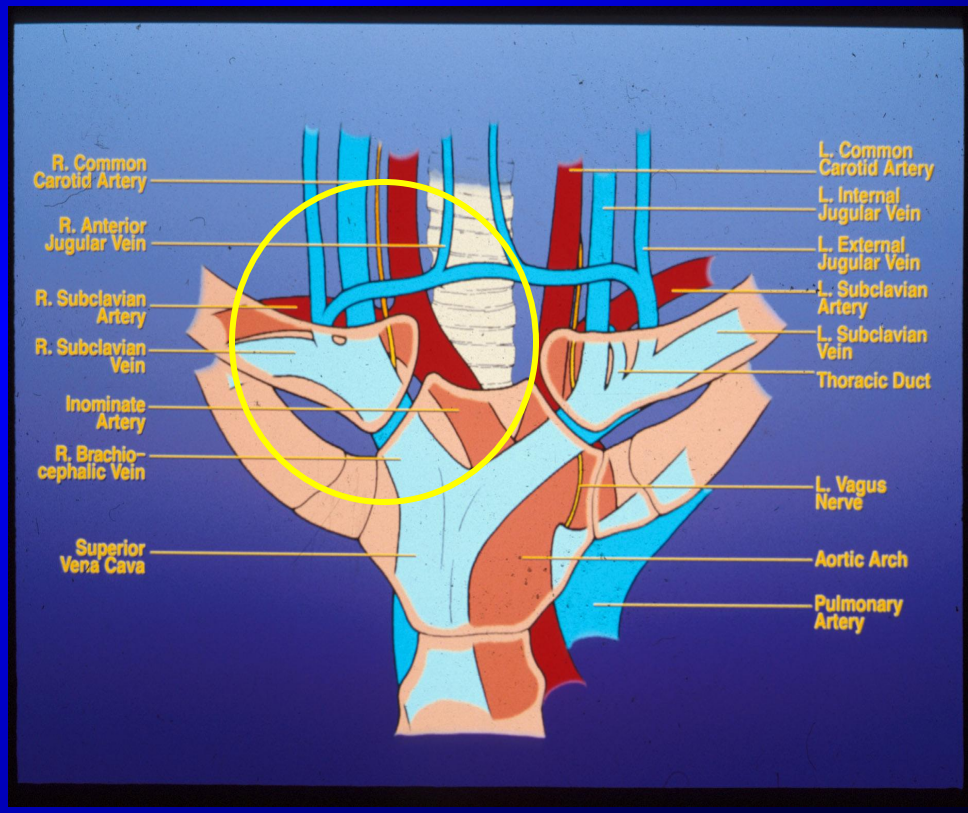
Sternoclavicular joint injuries are potentially life-threatening

Worman and Leagus, J. Trauma, 1967

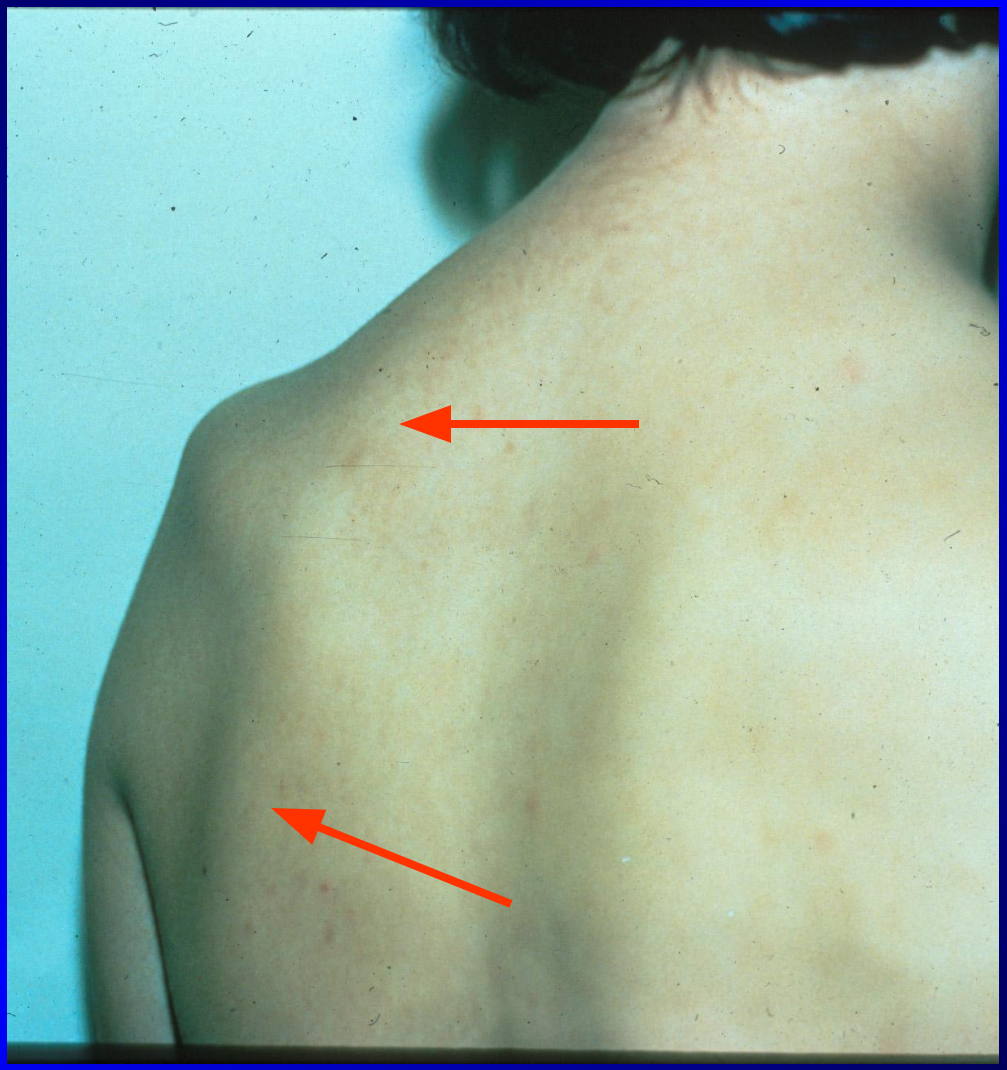
27% of 60 patients suffered injury to the trachea, esophagus, or great vessels

Issue #2

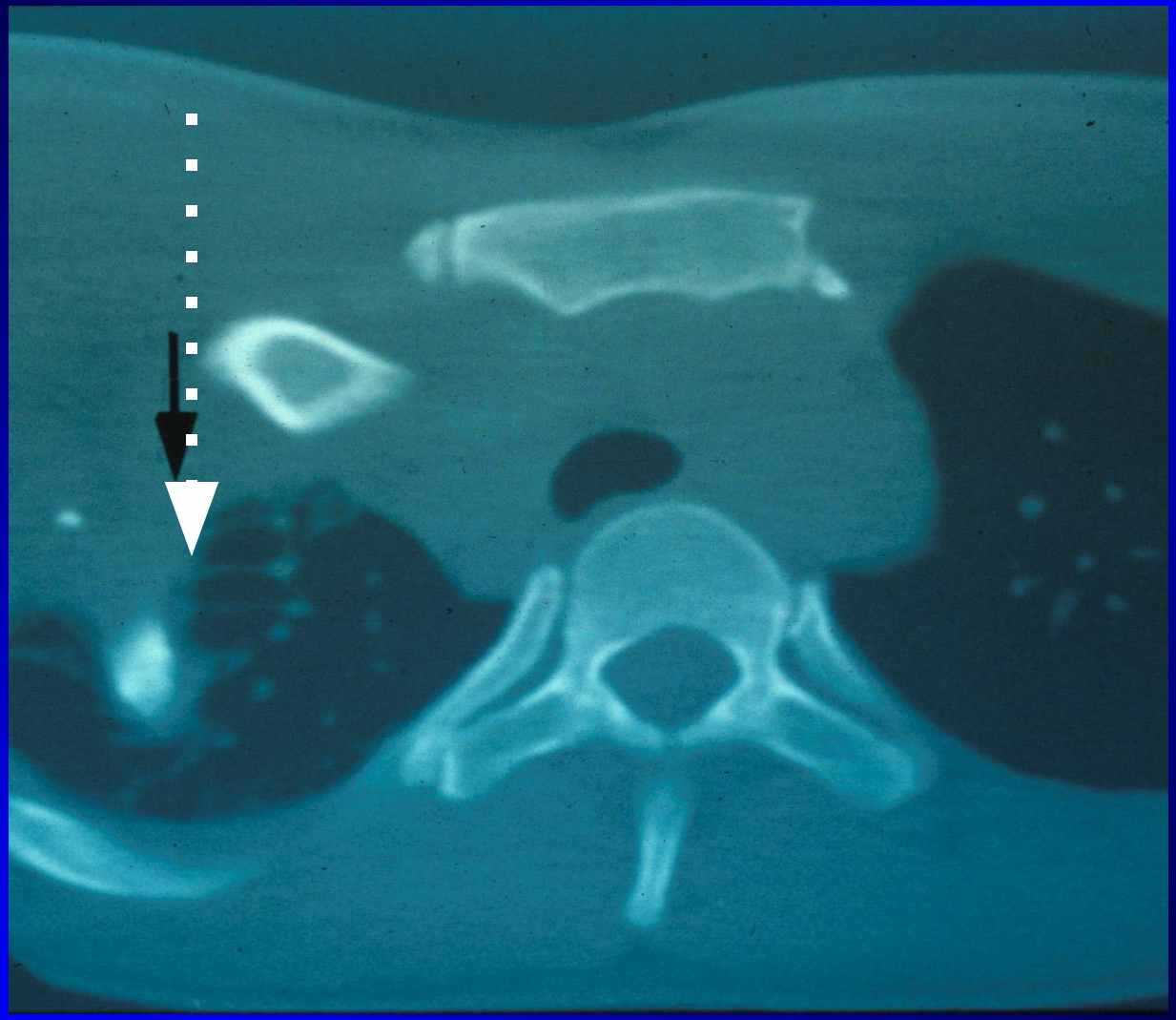
Serious injuries are usually associated with posterior injuries



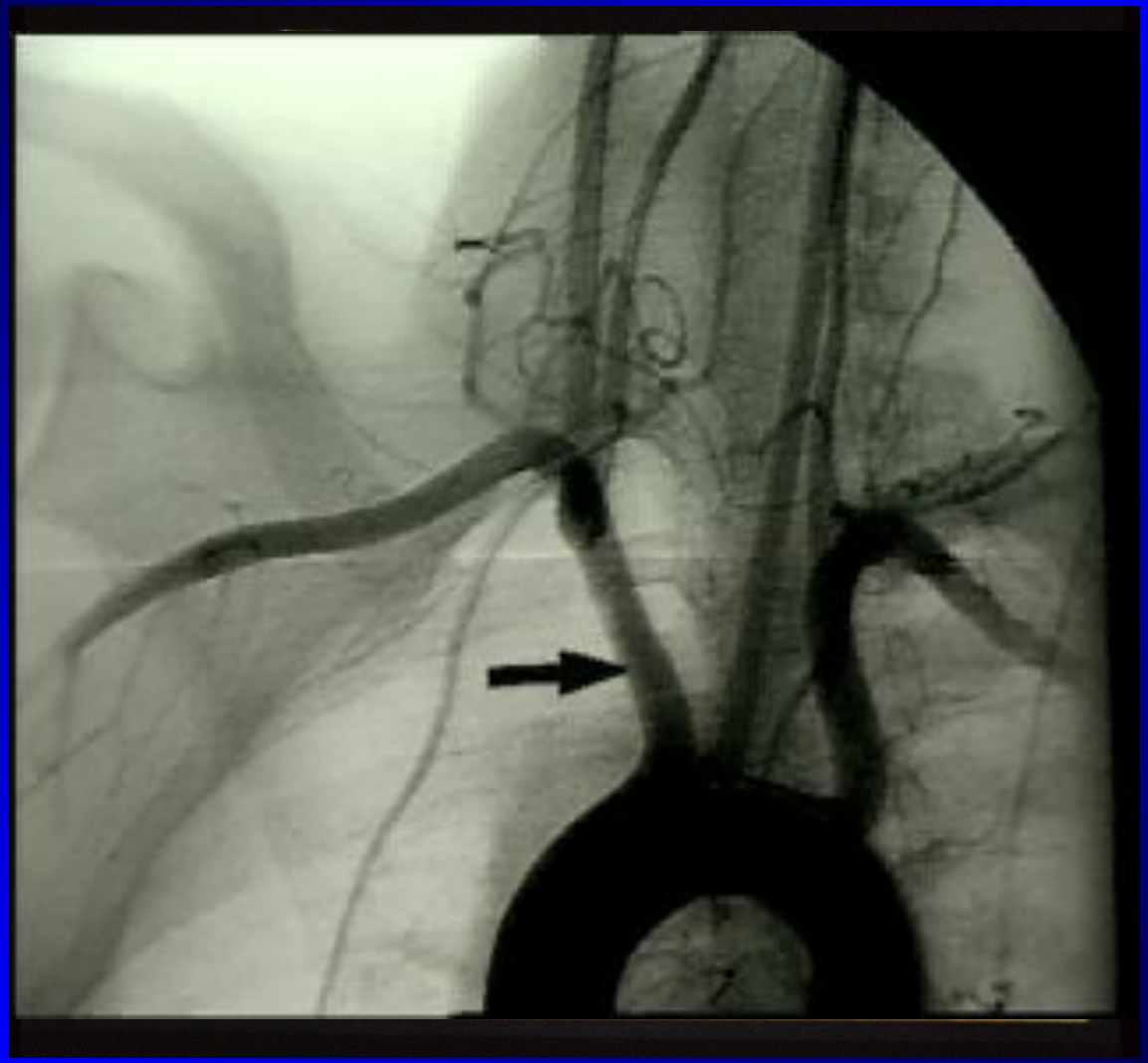
Brachial Plexus



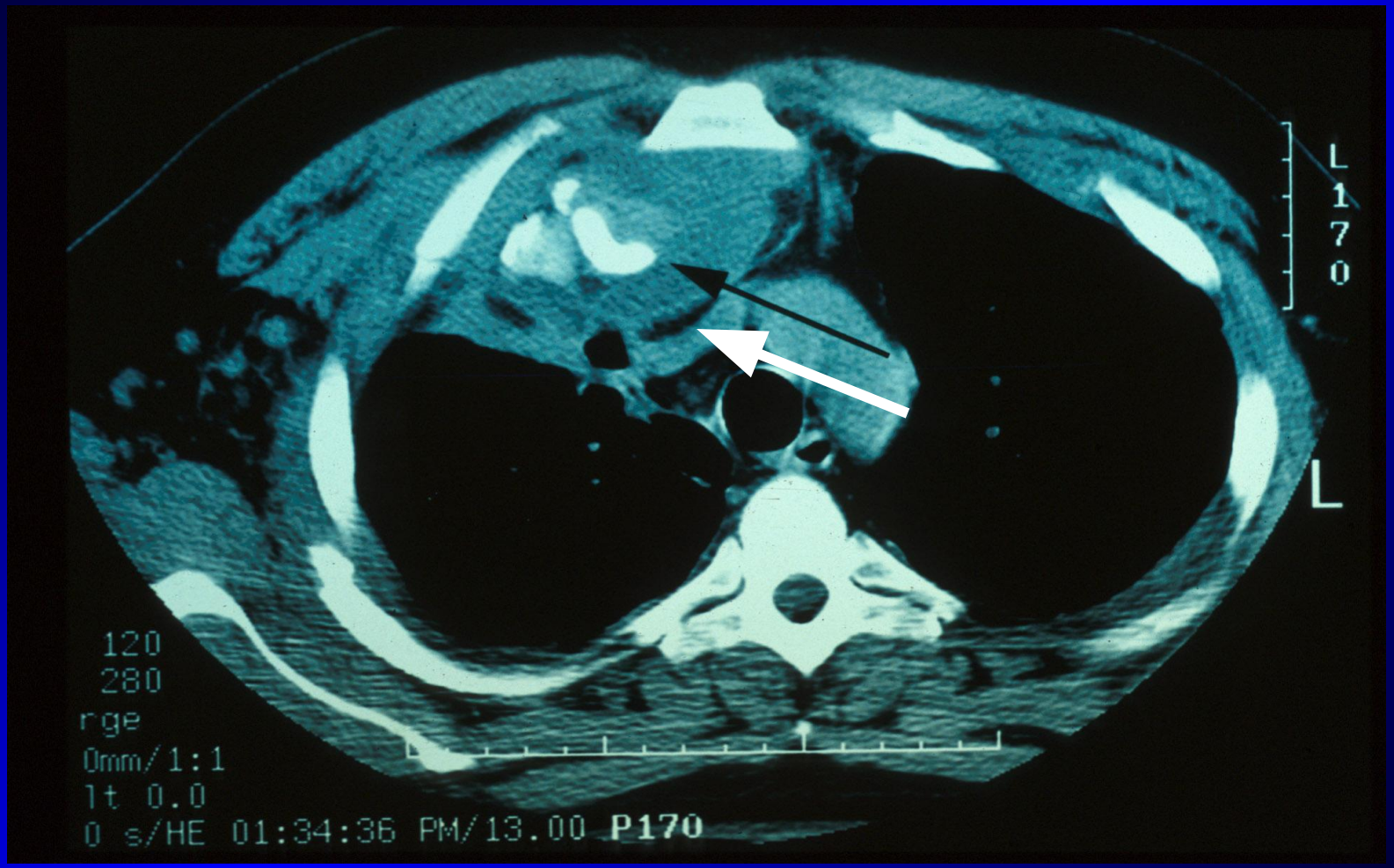
Pneumothorax



Vascular Insult

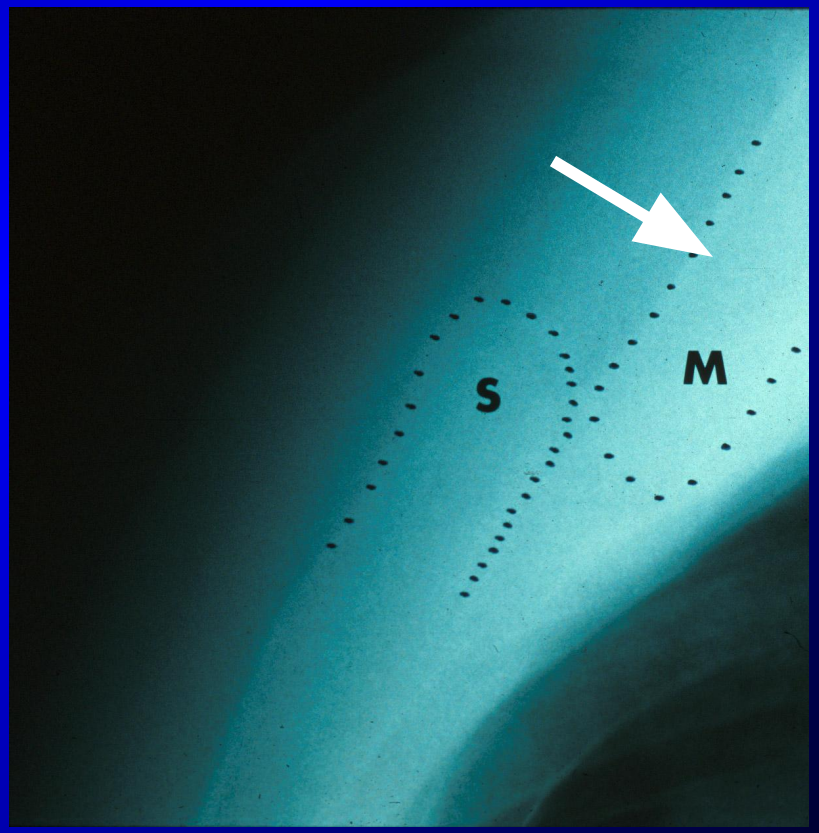


Dysphagia and Hoarseness

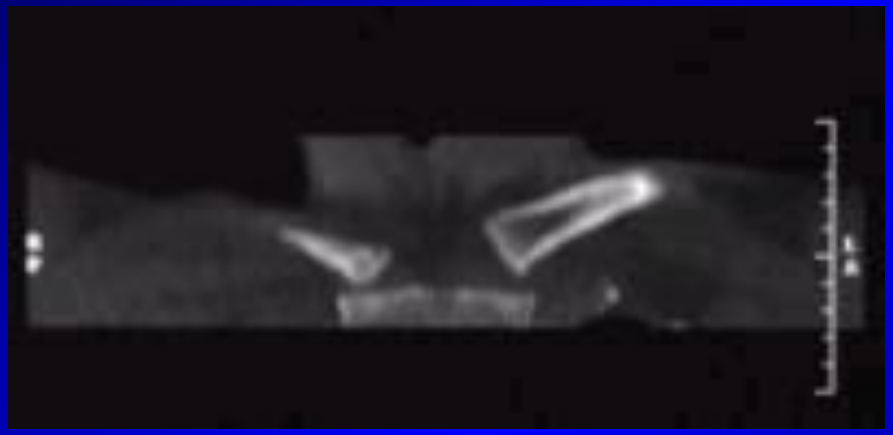


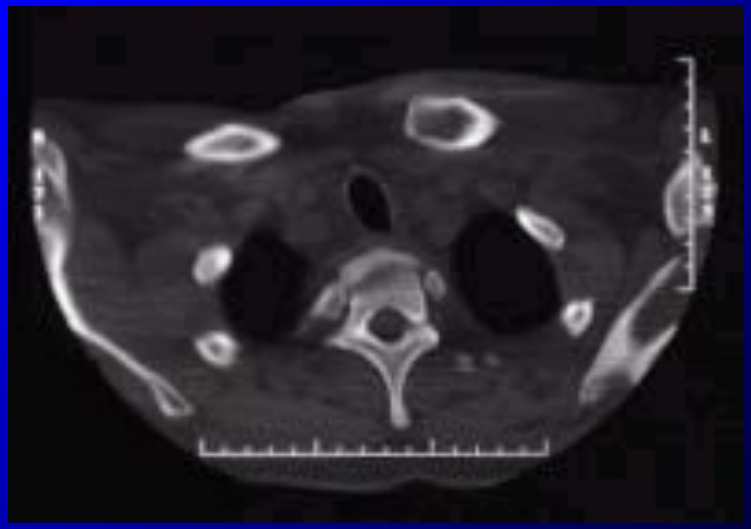
Issue #3

- Sternoclavicular injuries require an accurate diagnosis and treatment plan



SC JOINT INJURY





SC JOINT INJURIES

Classification

- Etiology
  - Atraumatic
  - Traumatic
- Direction
  - Anterior
  - Posterior

*Most injuries are anterior

Atraumatic

- Occurs without significant trauma
- Young female patients
- Anterior displacement during elevation of the arm
- Reduction occurs when the arm is returned to the side

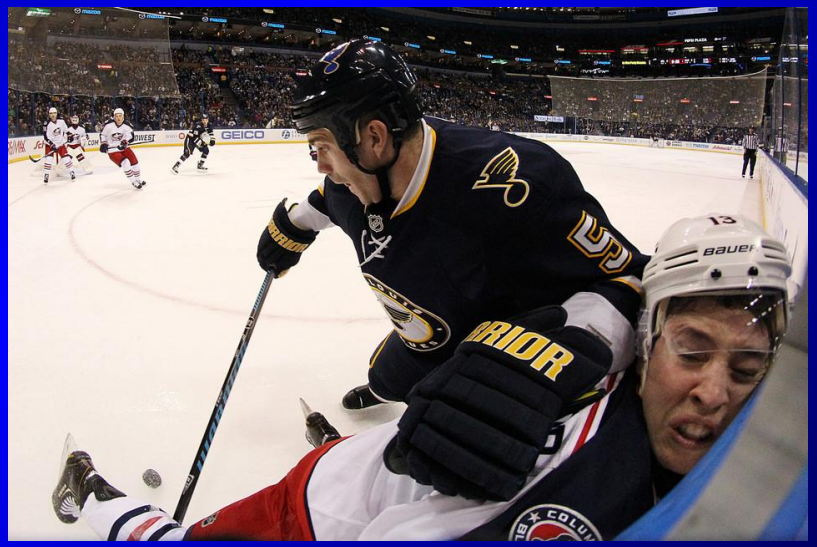
Rockwood and Odor,

J.Bone Surg 1989

Illustrative Case

Traumatic Injuries

80% attributed to motor vehicle accidents and sports



Omer, J.Trauma, 1967

Wirth and Rockwood, Complications in Orthop. Surg. 1994

SC JOINT INJURIES

ANTERIOR

HX: - Direct blow or fall lateral shoulder

- Pain over medial clavicle

- Most Common

SC JOINT INJURIES

ANTERIOR

PE: - Prominent medial clavicle

- Tender over medial clavicle

- Xrays : Serendipity View

- CT Scan

Anterior SC Dislocation

SC JOINT INJURIES

ANTERIOR

TX: - ? Closed Reduction

- Sling

- Ice

- NSAIDs

- ROM as tolerated

- Strength after Pain free ROM

SC JOINT INJURIES

POSTERIOR

HX: - Direct blow lateral shoulder

- Less Common

- Higher Morbidity

(great vessels, esophagus, trachea)

SC JOINT INJURIES

POSTERIOR

PE: - Pain over medial clavicle

- Hoarseness

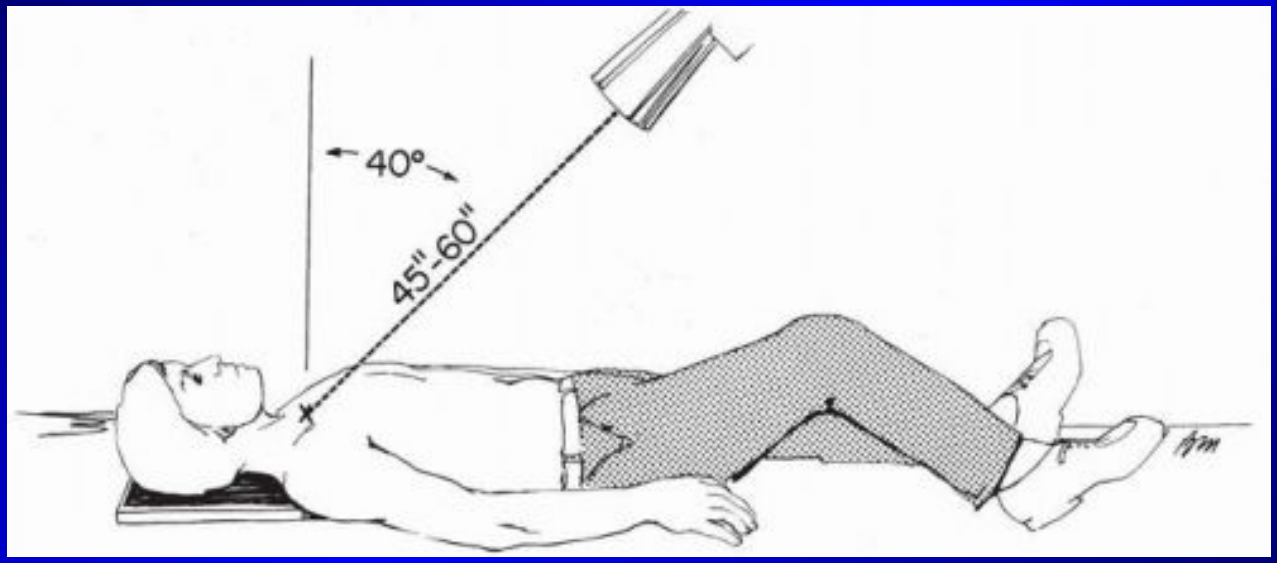
- Difficulty Swallowing

- Respiratory Distress

- XR: Serendipity view

- CT Scan

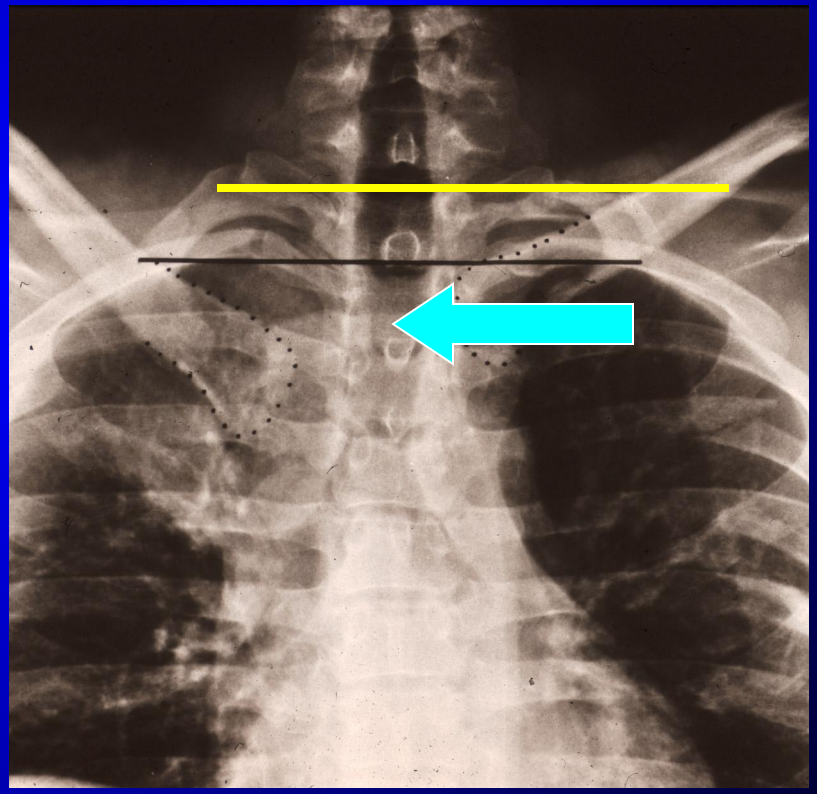
Serendipity View



Radiographic Examination

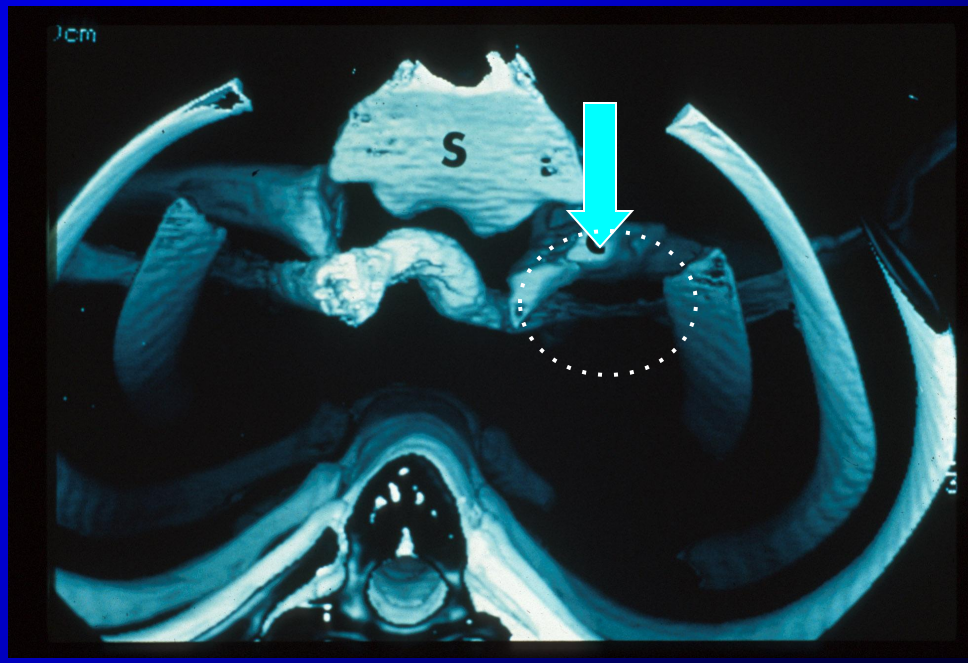
Projected views

Rockwood, Fractures 1975

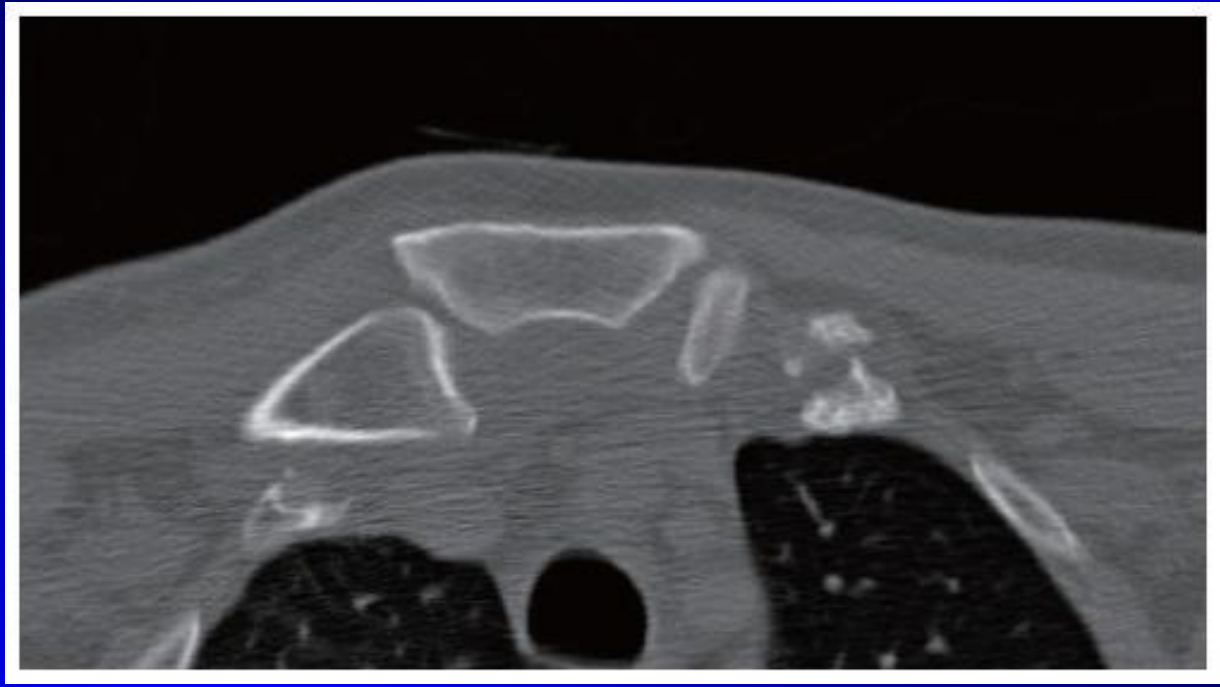


Radiographic Examination

CT imaging is the gold standard



CT Gold Standard



SC JOINT INJURIES

POSTERIOR

TX: - Immediate Closed Reduction

- Betadine / Towel Clip

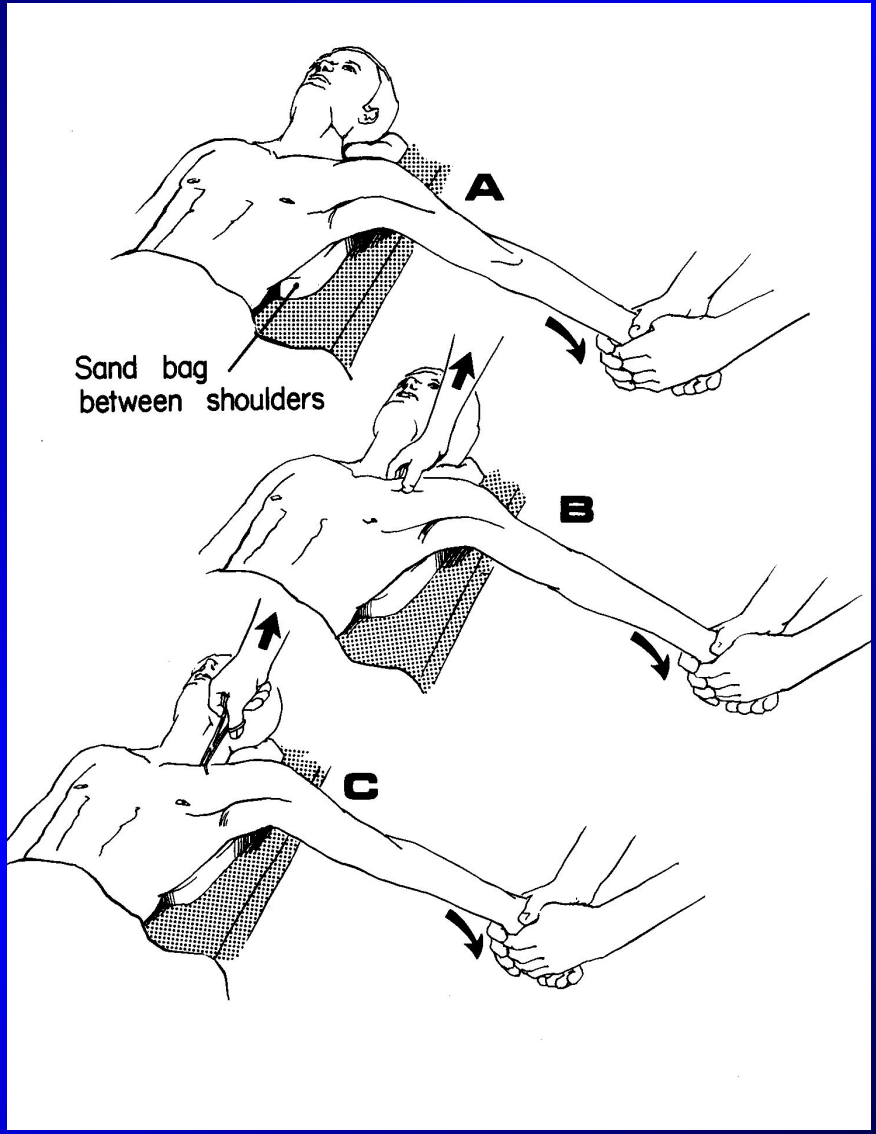
- Sling / F/u CT Scan

- ROM – start at 3 weeks

- Strength – 6-8 weeks

- Return to play up to 12 weeks

POST SC REDUCTION



Treatment (closed reduction)

- *Abduction-traction technique*
  - Sandbag/bolster placed between shoulders
  - Lateral traction followed by extension of arm

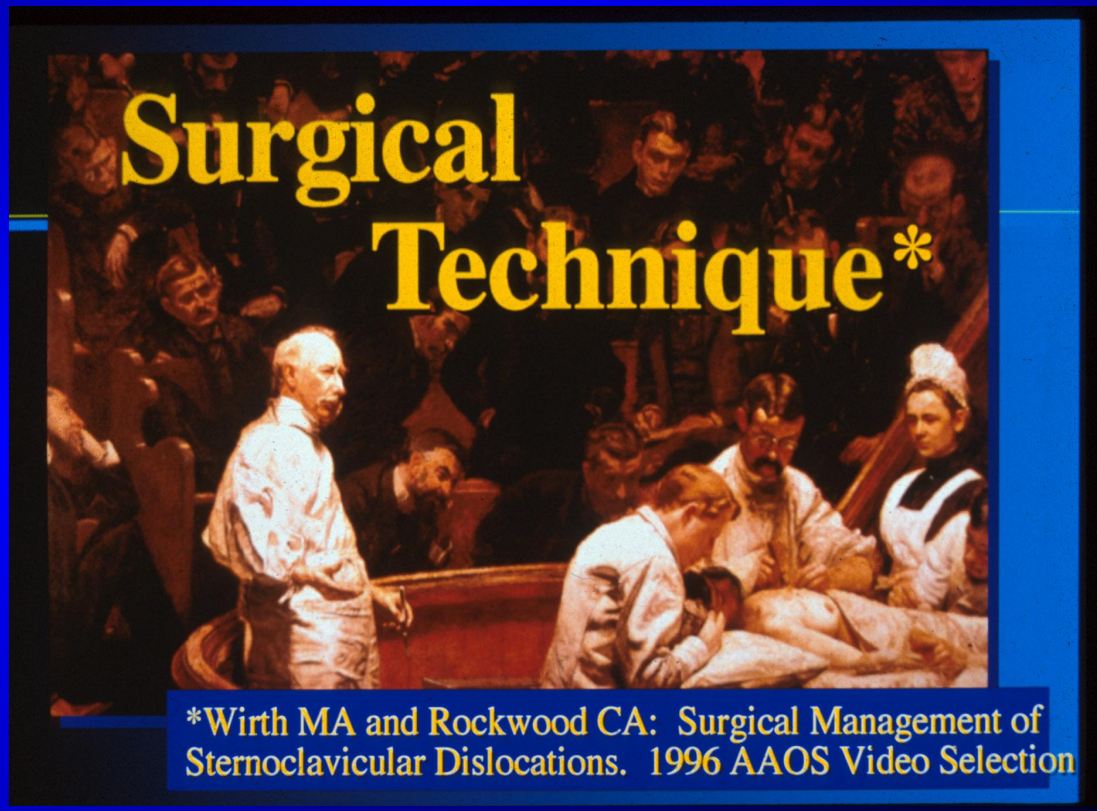
*Usually successful if performed within first 24-48 hours

Treatment (operative)

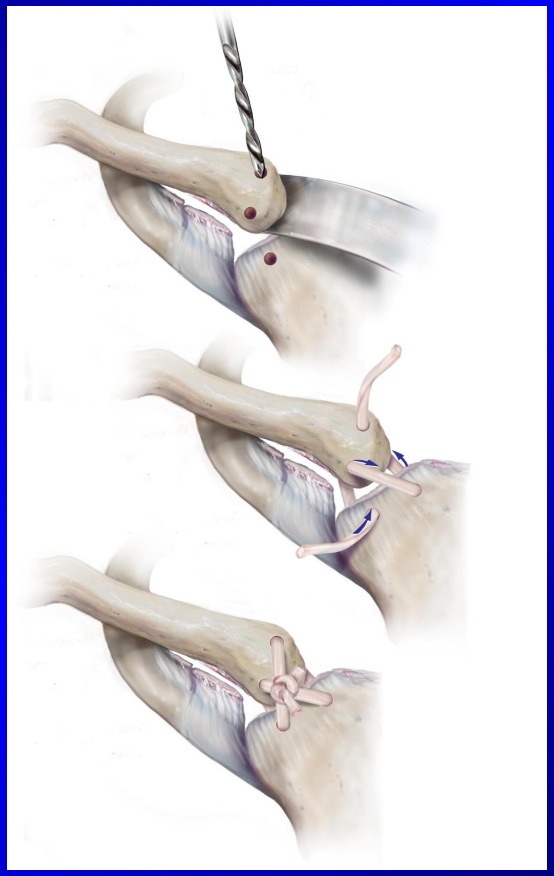
2 Goals

-decompression

-stabilization

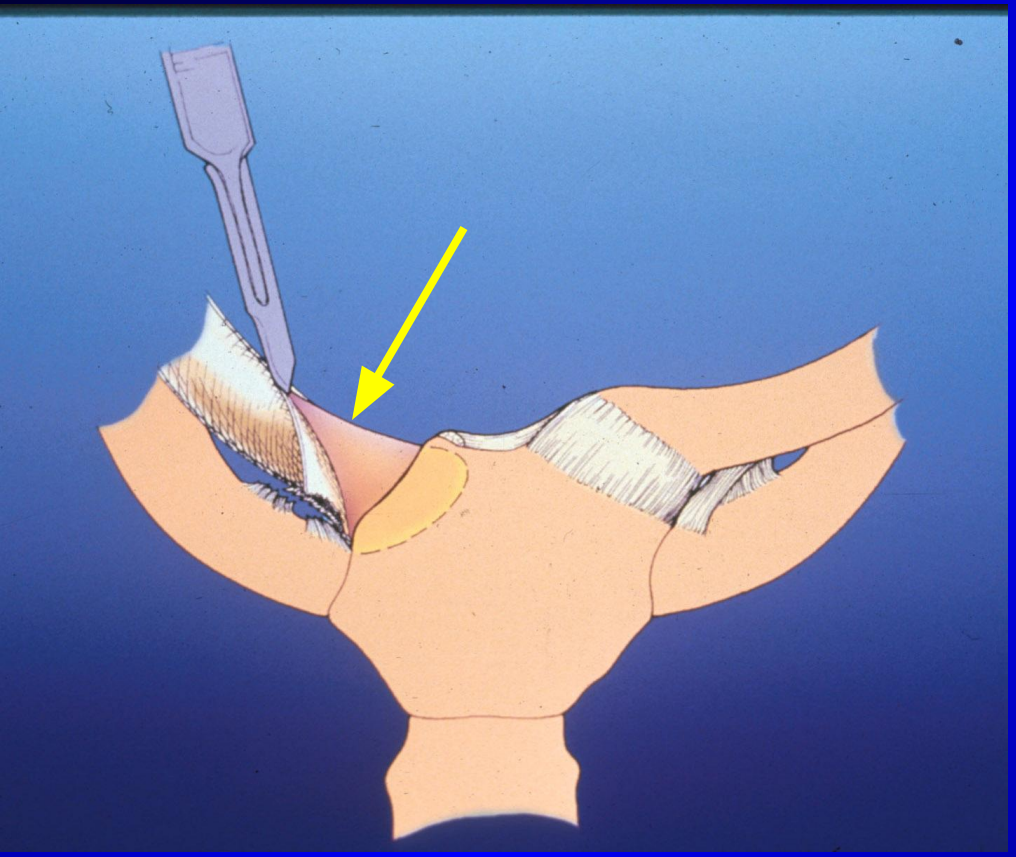


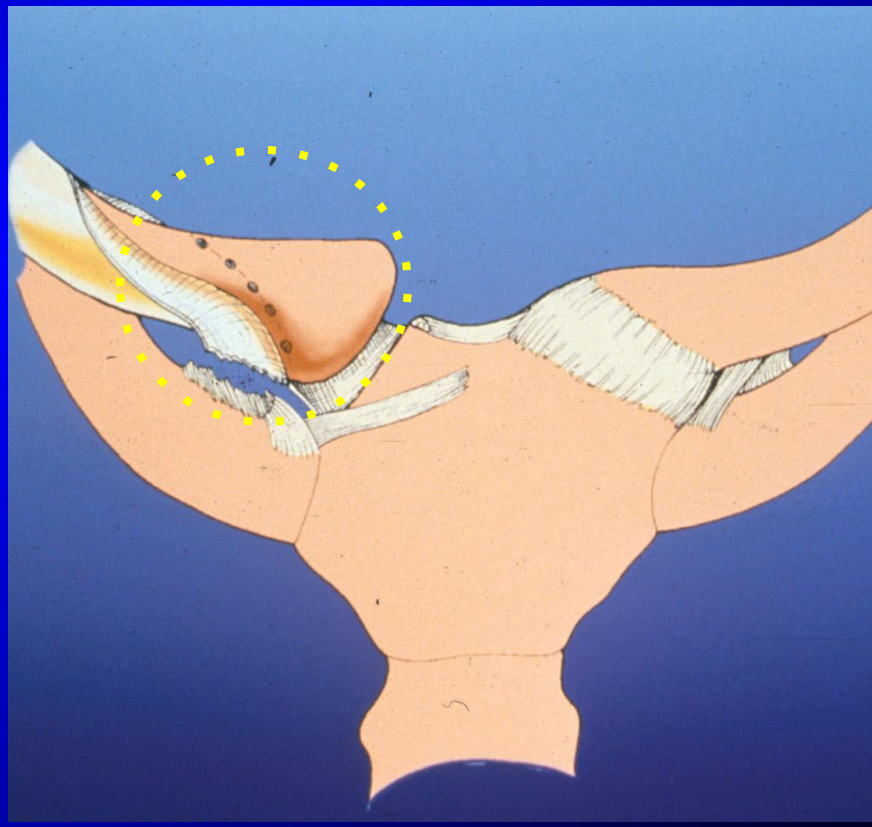
Surgical Technique



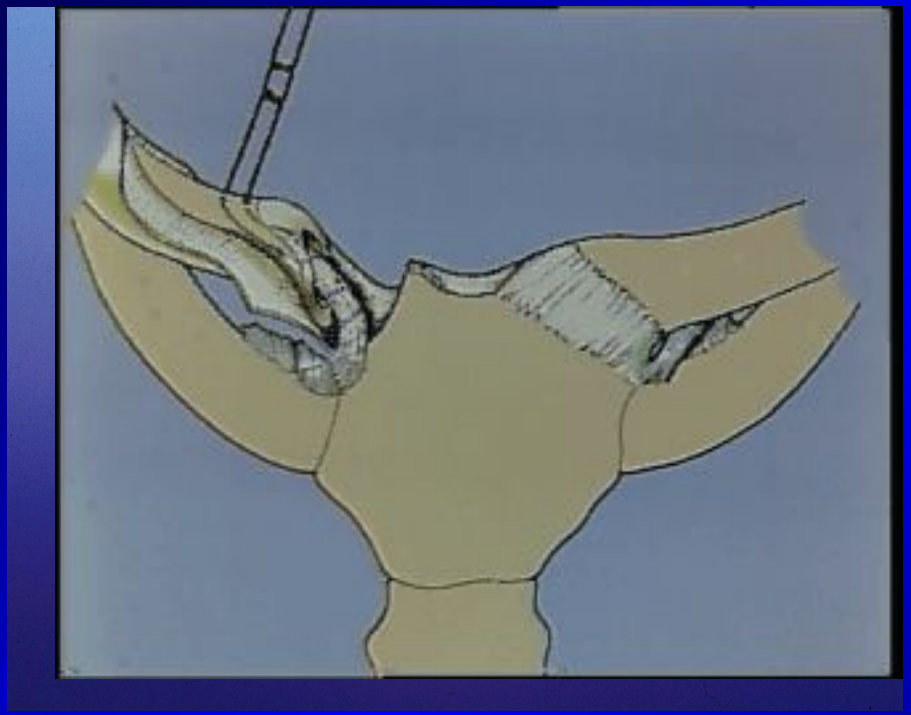
Illustrative case

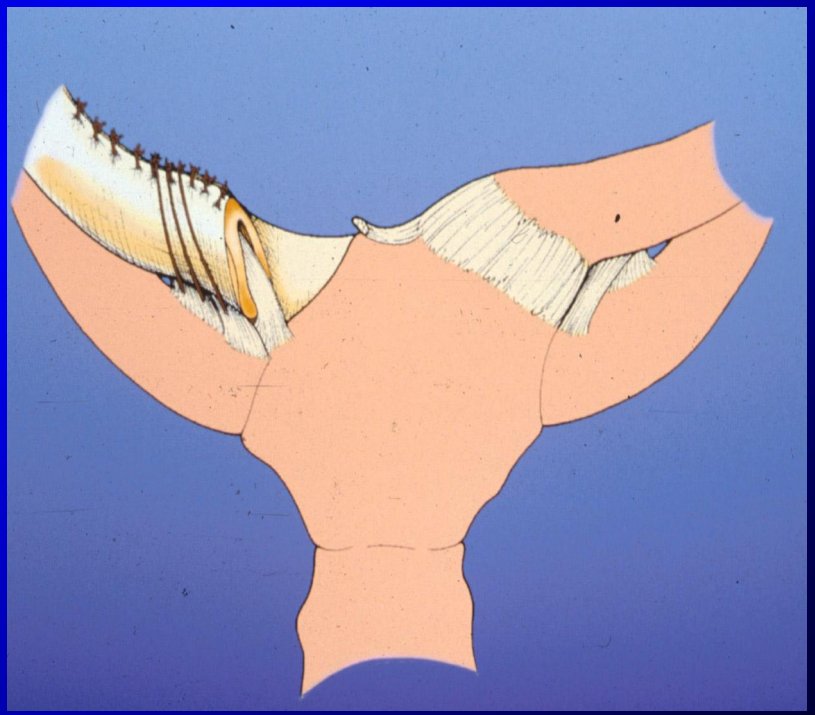
Surgical Technique





Surgical Technique





Complications (operative)

- Through 1992, 7 deaths and 3 near deaths
- All were the result of transfixing the sternoclavicular joint (Kirschner wires or Steinmann pins)

Do not *use transfixing pins- large or small, smooth or threaded, bent or straight!!!*

Summary

- Closed reduction is usually successful in acute injuries if performed early
- Late appearing complications are ***not*** uncommon

Late-appearing complications have been reported

- Vascular compromise
- Exertional dyspnea
- Brachial plexopathy
- Fatal sepsis (tracheoesophageal fistula)

Summary

Posterior sternoclavicular joint injuries are uncommon but potentially *life-threatening*

Poland, 1898
Greenlee, JAMA, 1944
Kennedy, JBJS, 1949
Wasylenko & Busse, Can. J. Surg., 1981

Summary

Careful examination

is

extremely

important!

CLAVICLE FRACTURES

Clavicle Fractures

- Mid-clavicular fractures – 80 %
- Lateral Fractures 15 %
- Medial Fractures 5 %

Clavicle Fractures

History

- Direct blow
- Fall on lateral shoulder

Clavicle Fractures

Physical Exam

- Crepitus over fracture site
- Tender to palpation
- “Skin Tenting”
- Check NV status

CLAVICLE FRACTURE

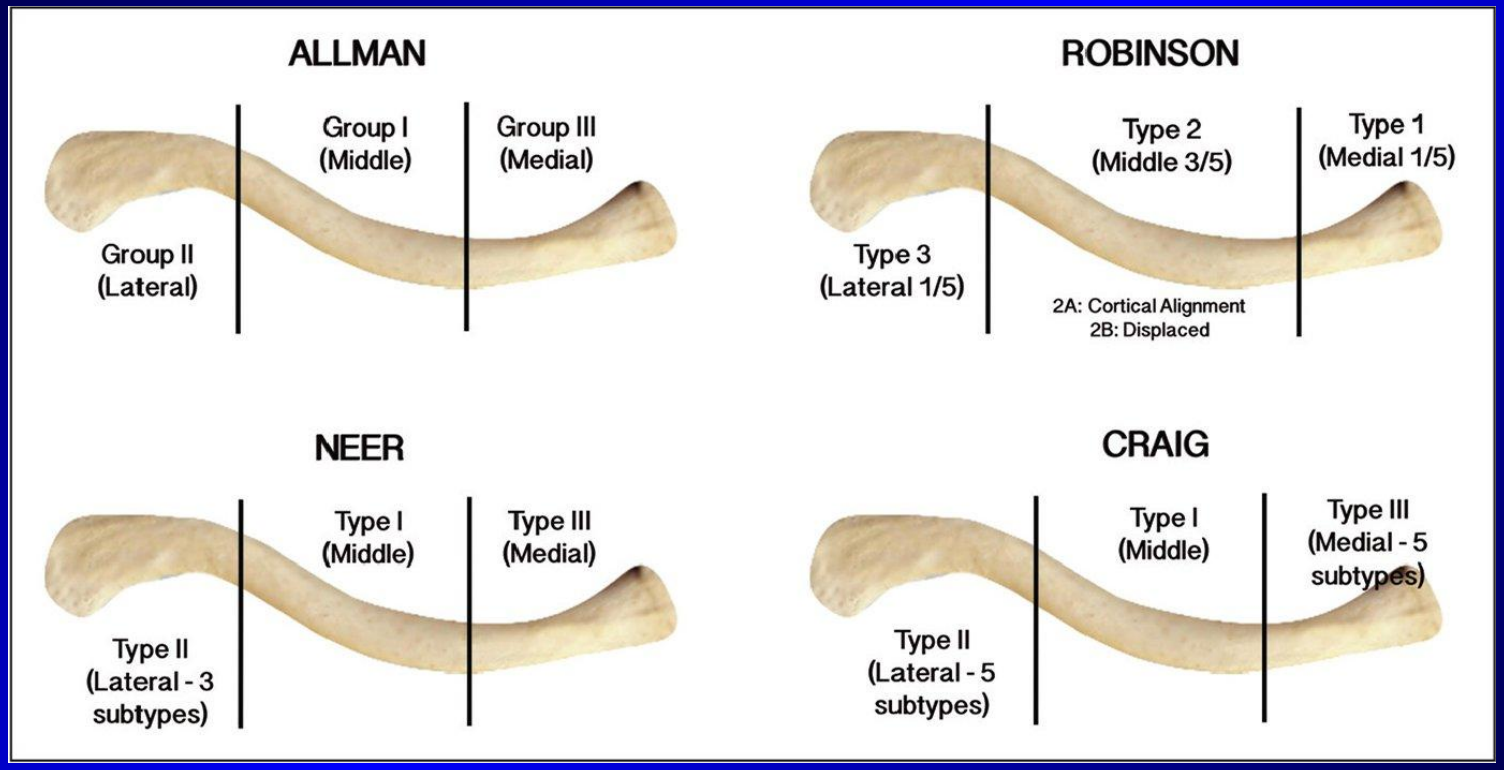

ALLMAN
Group I
(Middle)
Group III
(Medial)
Group II
(Lateral)
ROBINSON
Type 2
(Middle 3/5)
Type 1
(Medial 1/5)
Type 3
(Lateral 1/5)
2A: Cortical Alignment
2B: Displaced
NEER
Type I
(Middle)
Type III
(Medial)
Type II
(Lateral - 3
subtypes)
CRAIG
Type I
(Middle)
Type III
(Medial - 5
subtypes)
Type II
(Lateral - 5
subtypes)

Table 1

Classification of Clavicle Fractures

Group/ Type	Allman Classification	Neer Classification	Robinson Classification	Craig Classification
1	Group I: Middle third fracture	Type I: Middle third clavicle fracture	Type 1: Medial fifth clavicle fractures: Nondisplaced Extra-articular Intra-articular Displaced Extra-articular Intra-articular	Type I: Middle third fractures
2	Group II: Fracture distal to CCL, nonunion common	Type II: Lateral third fracture; split into 3 subtypes: Type I, fracture medial to CCL Type II, fracture occurs at level of CCL-trapezoid remaining intact with distal segment Type III, fracture lateral to CCL entering the ACJ	Type 2: Middle 3/5th clavicle fractures: Type 2A: Cortically aligned fractures Nondisplaced Angulated Type 2B: Displaced fractures Simple wedge type Mutlifragmentary, segmental	Type II: Distal third fractures: Minimally displaced Displaced fractures, fracture medial to the CCL and trapezoid intact Conoid torn, trapezoid intact Articular surface fracture Fractures in children Intact CCL attached to periosteal sleeve, proximal fragment displaced Comminuted fractures
3	Group III: Proximal end clavicle fractures	Type III: Medial third fractures	Type 3: Lateral fifth clavicle fractures: Nondisplaced Extra-articular Intra-articular Displaced Extra-articular Intra-articular	Type III: Proximal third fractures: Minimally displaced Displaced Intra-articular Epiphyseal separation Comminuted

Abbreviations: ACJ, acromioclavicular joint; CCL, coracoclavicular ligament.

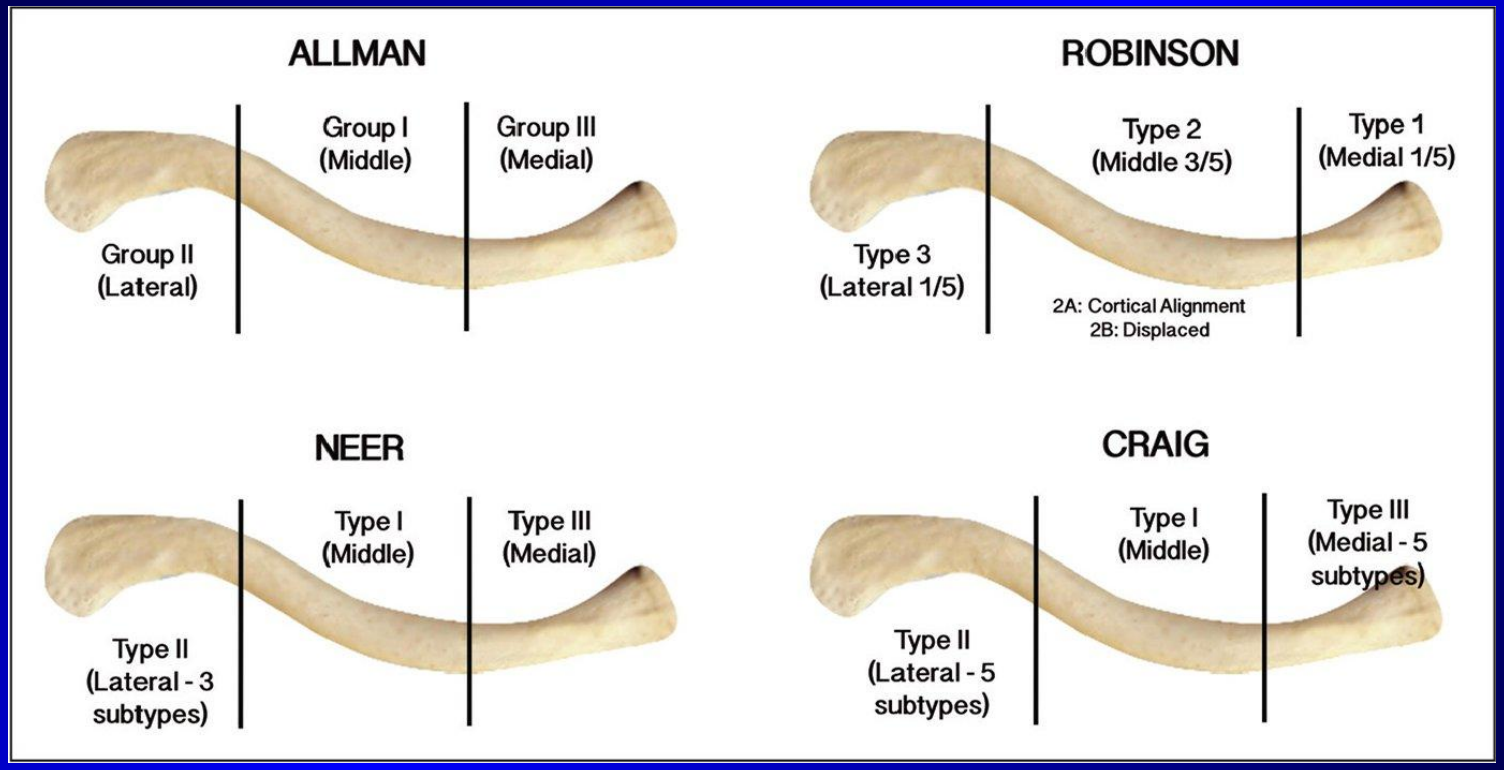

ALLMAN
Group I
(Middle)
Group III
(Medial)
Group II
(Lateral)
ROBINSON
Type 2
(Middle 3/5)
Type 1
(Medial 1/5)
Type 3
(Lateral 1/5)
2A: Cortical Alignment
2B: Displaced
NEER
Type I
(Middle)
Type III
(Medial)
Type II
(Lateral - 3
subtypes)
CRAIG
Type I
(Middle)
Type III
(Medial - 5
subtypes)
Type II
(Lateral - 5
subtypes)

Table 2

Indications for Operative and Nonoperative Management

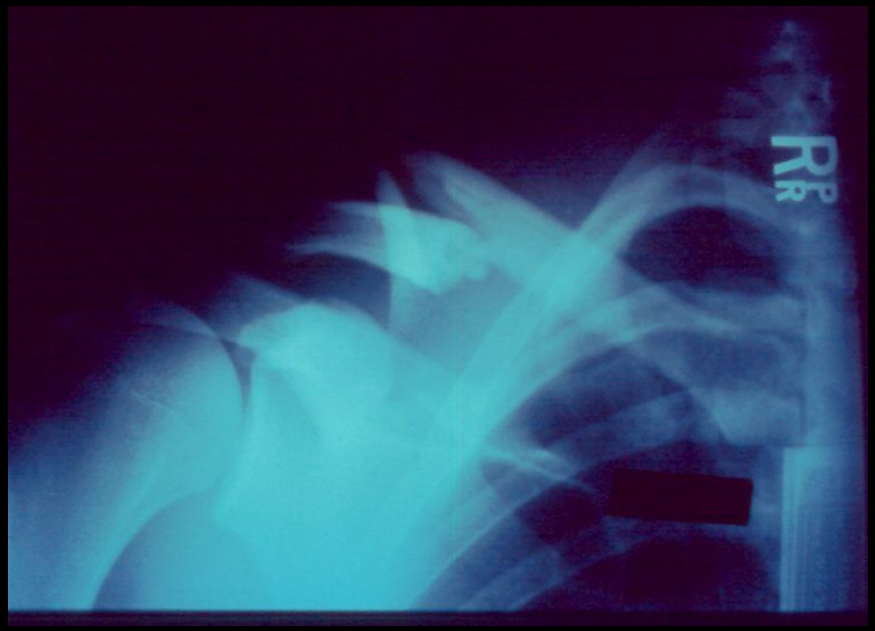
Management	Indication	Relative Contraindication
Nonoperative	Nondisplaced fractures	Open fractures
	Skin intact	Multiple extremities injured
	Medically unfit for surgery	Skin tenting or impending skin necrosis
Operative	Comminuted fractures	Infection
	Fractures with 100% displacement fractures	Severe skin condition (eg, acne)
	Prolonged nonunion	Stroke patient with little extremity usage
	Open fractures	
	Floating shoulder	
	Neurovascular involvement	
	Significant shortening (>2 cm)	
	Vertical fragment	
	Infection	

Clavicle Fractures

Treatment - Nonoperative

- Figure 8 Strap
- Sling
- ROM when nontender
- Strengthening when XR evidence of healing

CLAVICLE FRACTURE



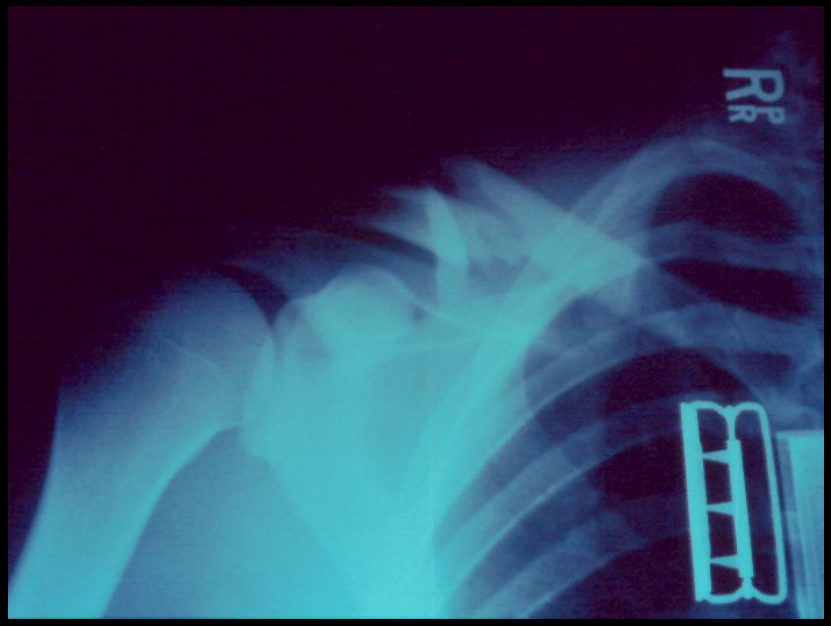
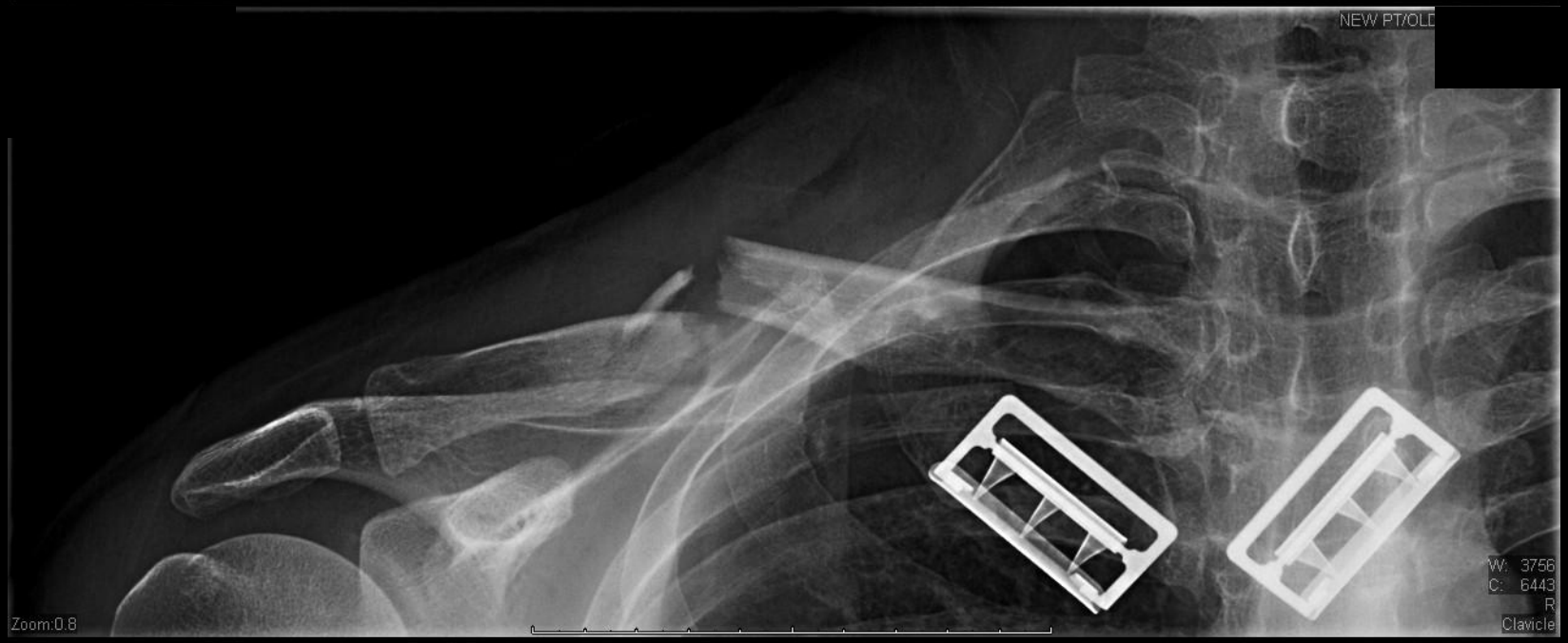


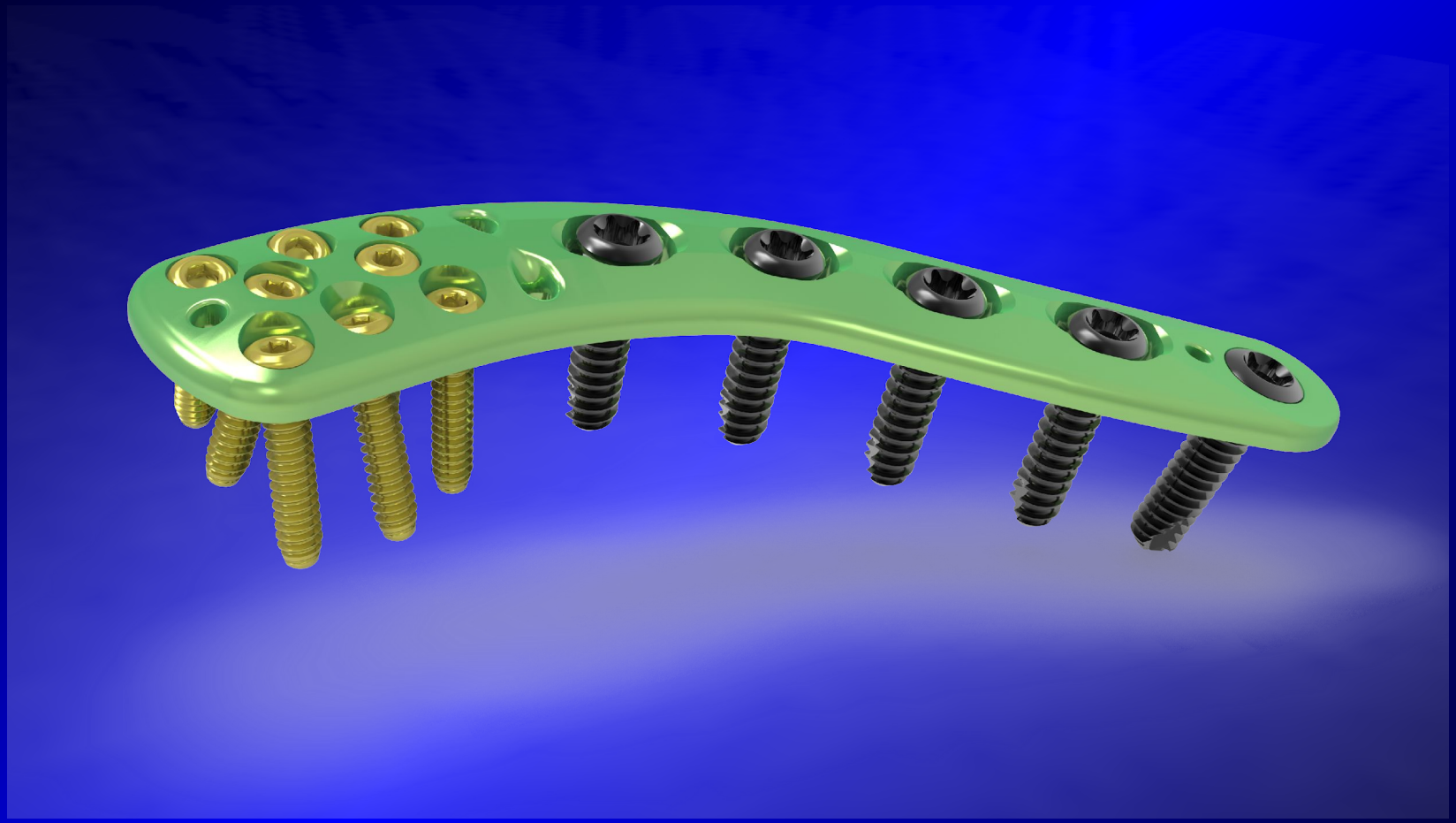
FIGURE 8 STRAP

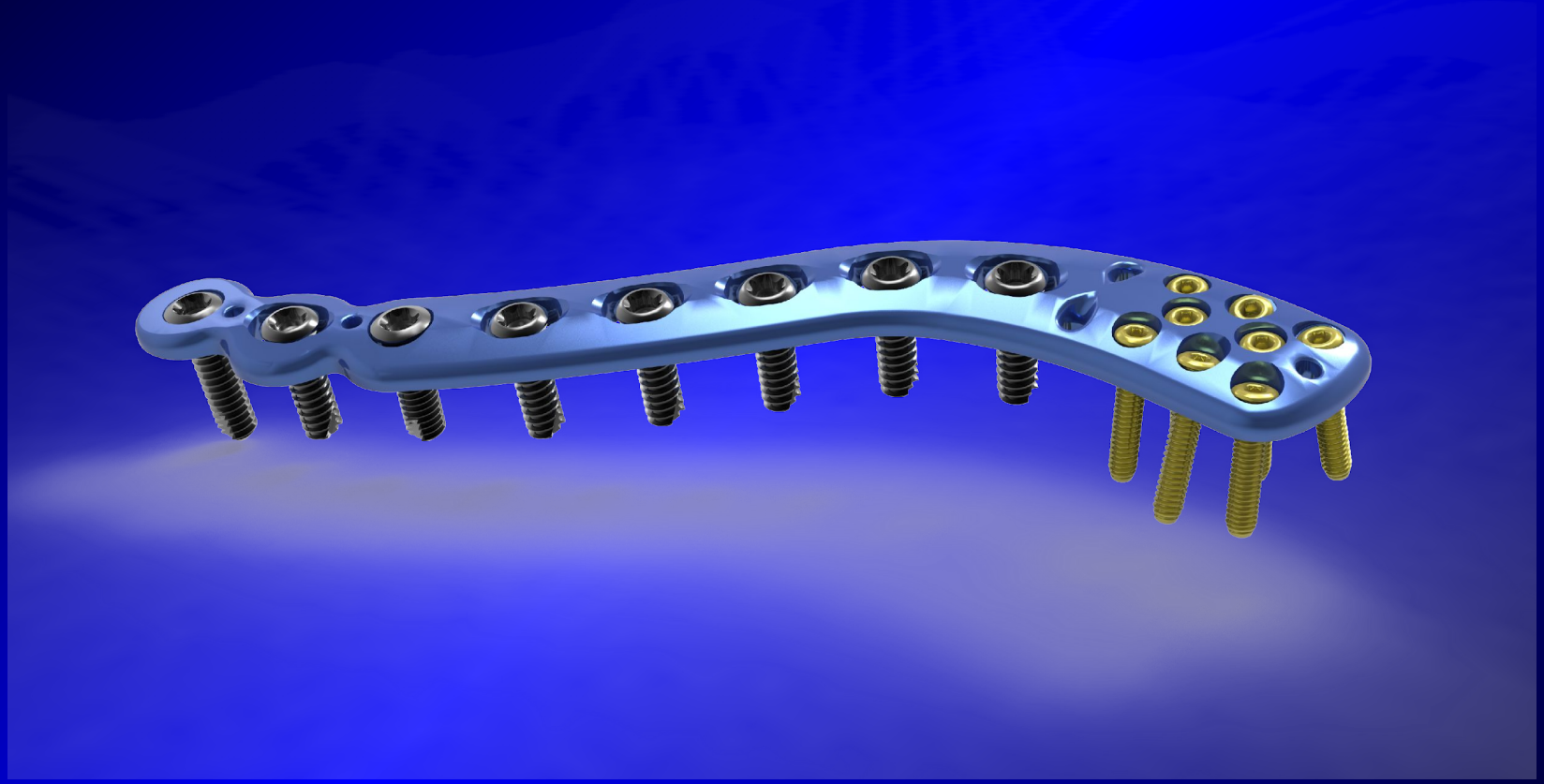

NEW PT/OLD
W: 3756
C: 6443
R
Clavicle
Zoom:0.8

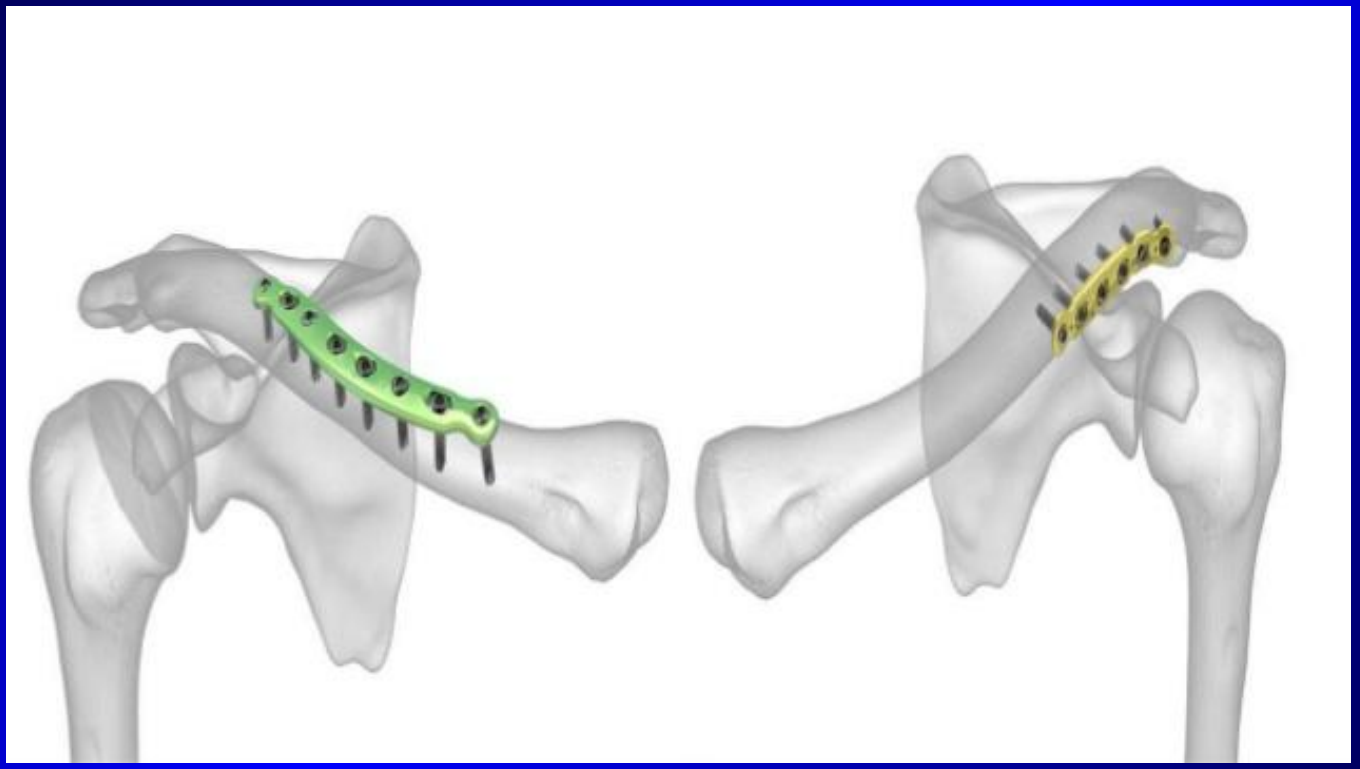
Clavicle Fractures

Treatment – Operative

- Plate vs IM fixation
  - Severe comminution
  - Significant displacement
  - > 2 cm shortening
  - Open Fracture







CASES

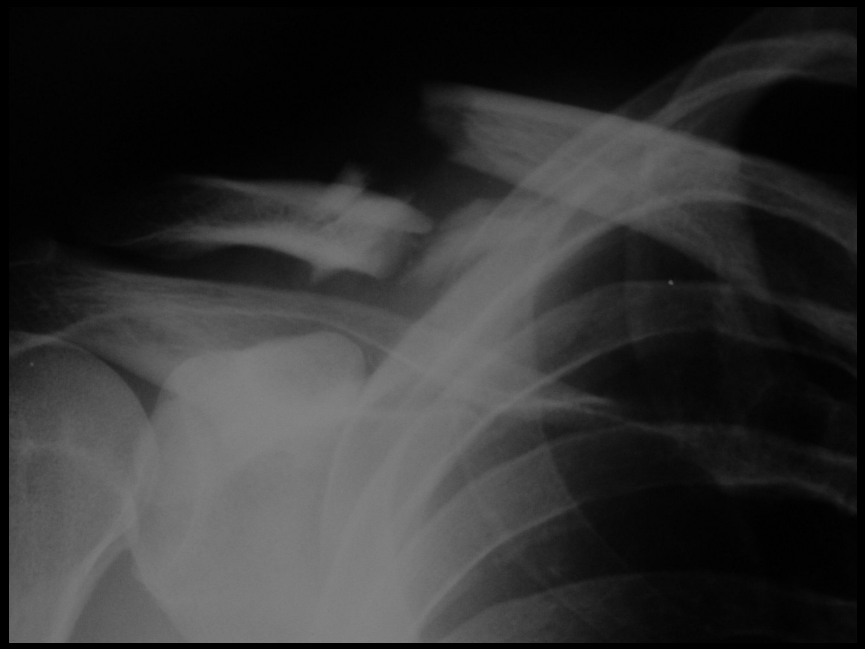

W: 16382
C: 8192
R
Clavicle
Zoom:0.6

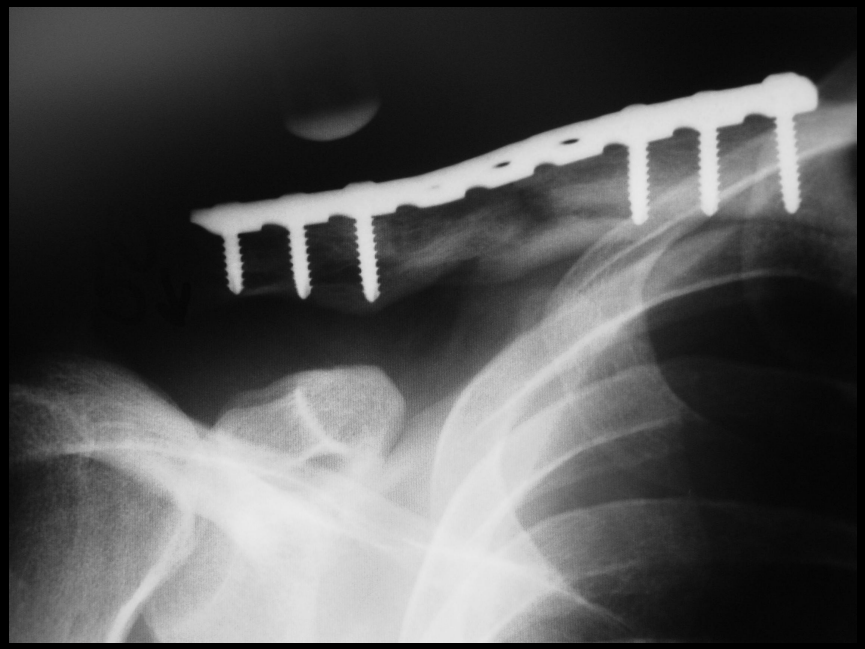

R
W: 3958
C: 5436
R
Clavicle
Zoom:0.6

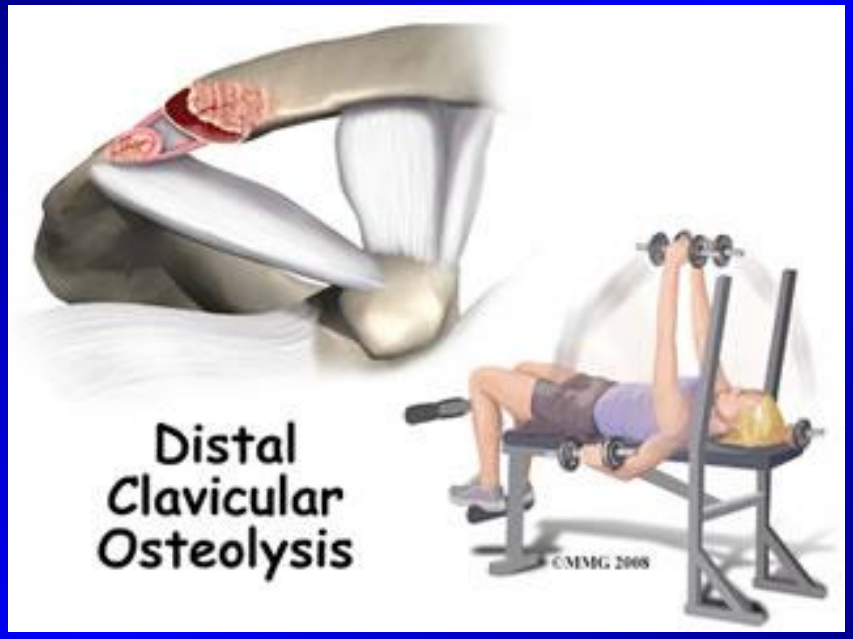

W: 4000
C: 5200
R
Clavicle
Zoom:0.6


R
DF

CLAVICLE FRACTURE





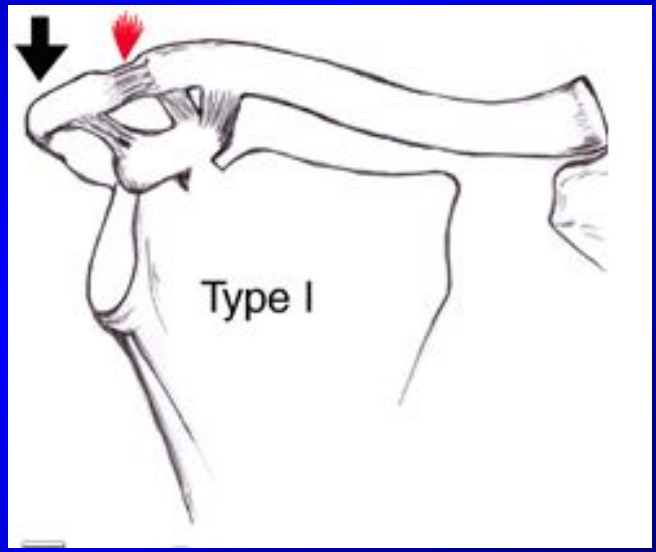

Distal
Clavicular
Osteolysis
©MMG 2008


RPR

AC JOINT INJURIES

Type I AC Separation

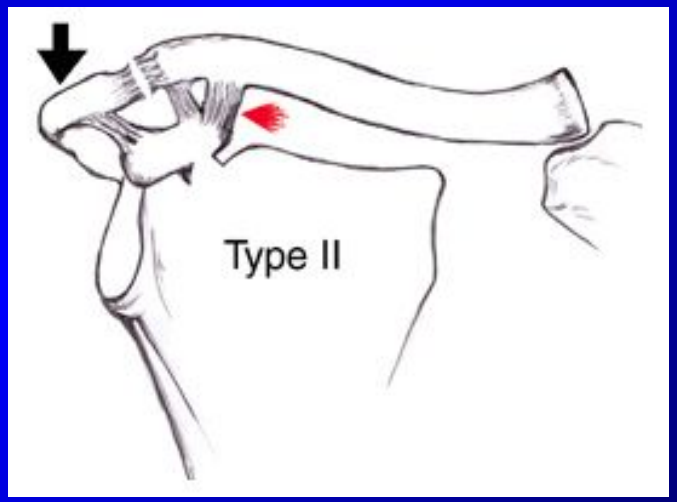
- Partial Tear
  AC Ligament



Type II AC Separation

- Tear AC ligament

- Subluxation of AC joint



AC JOINT INJURIES

TREATMENT

Type I / II : Sling

Ice / NSAIDs

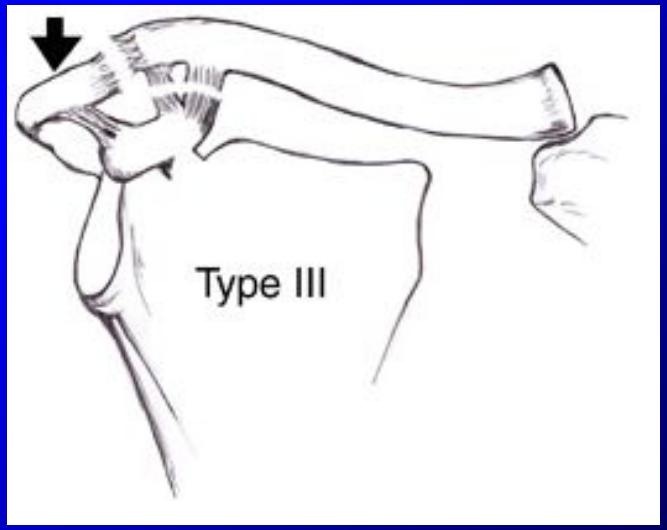
ROM early

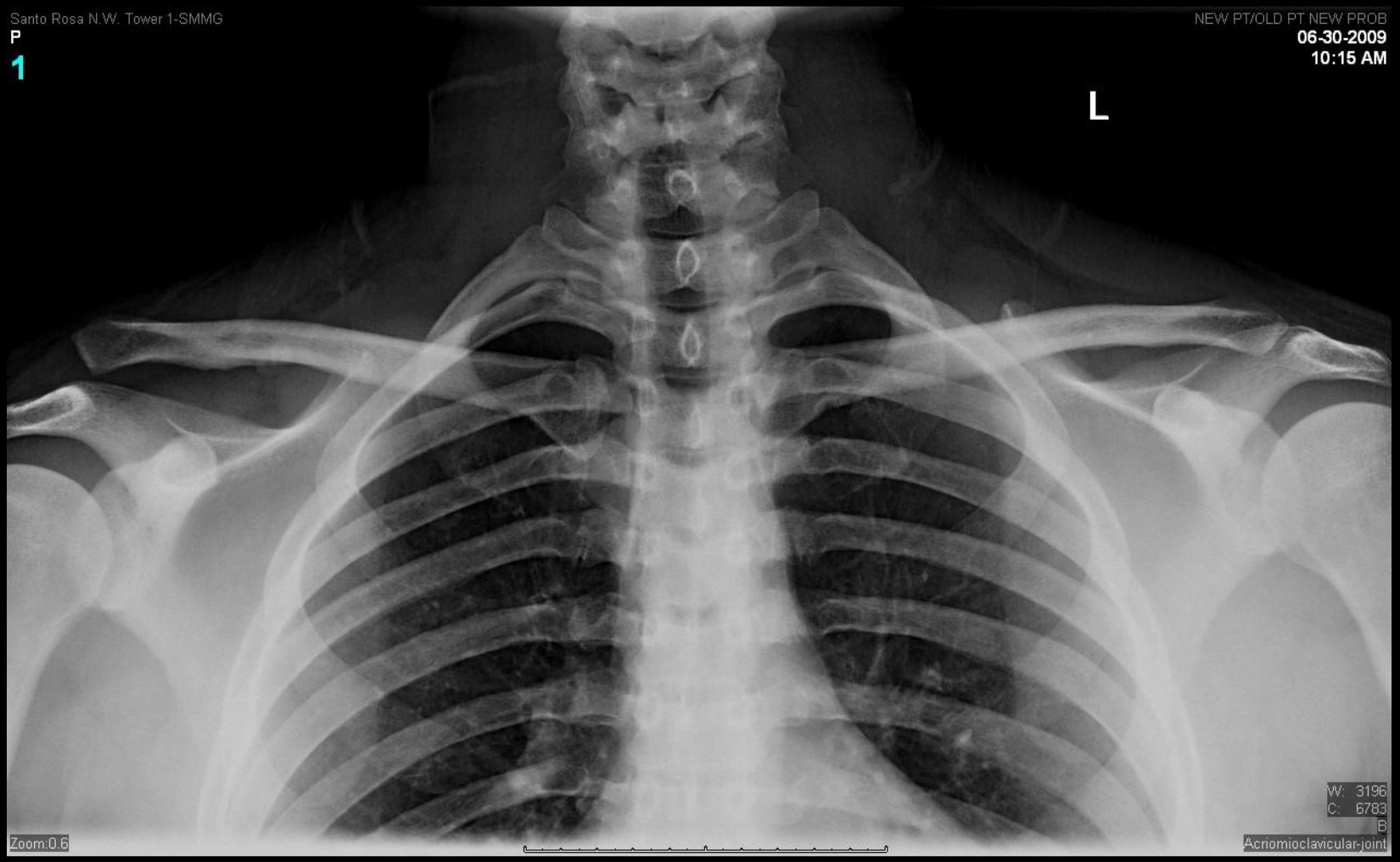
Strength when full ROM

RTP - nontender

Type III AC Separation

- Tear of AC and CC ligament
- Superior Displacement
- XR: Increased CC distance (25 – 100 %)




Santo Rosa N.W. Tower 1-SMMG
P
1
NEW PT/OLD PT NEW PROB
06-30-2009
10:15 AM
L
W: 3196
C: 6783
B
Acriomioclavicular-joint
Zoom:0.6

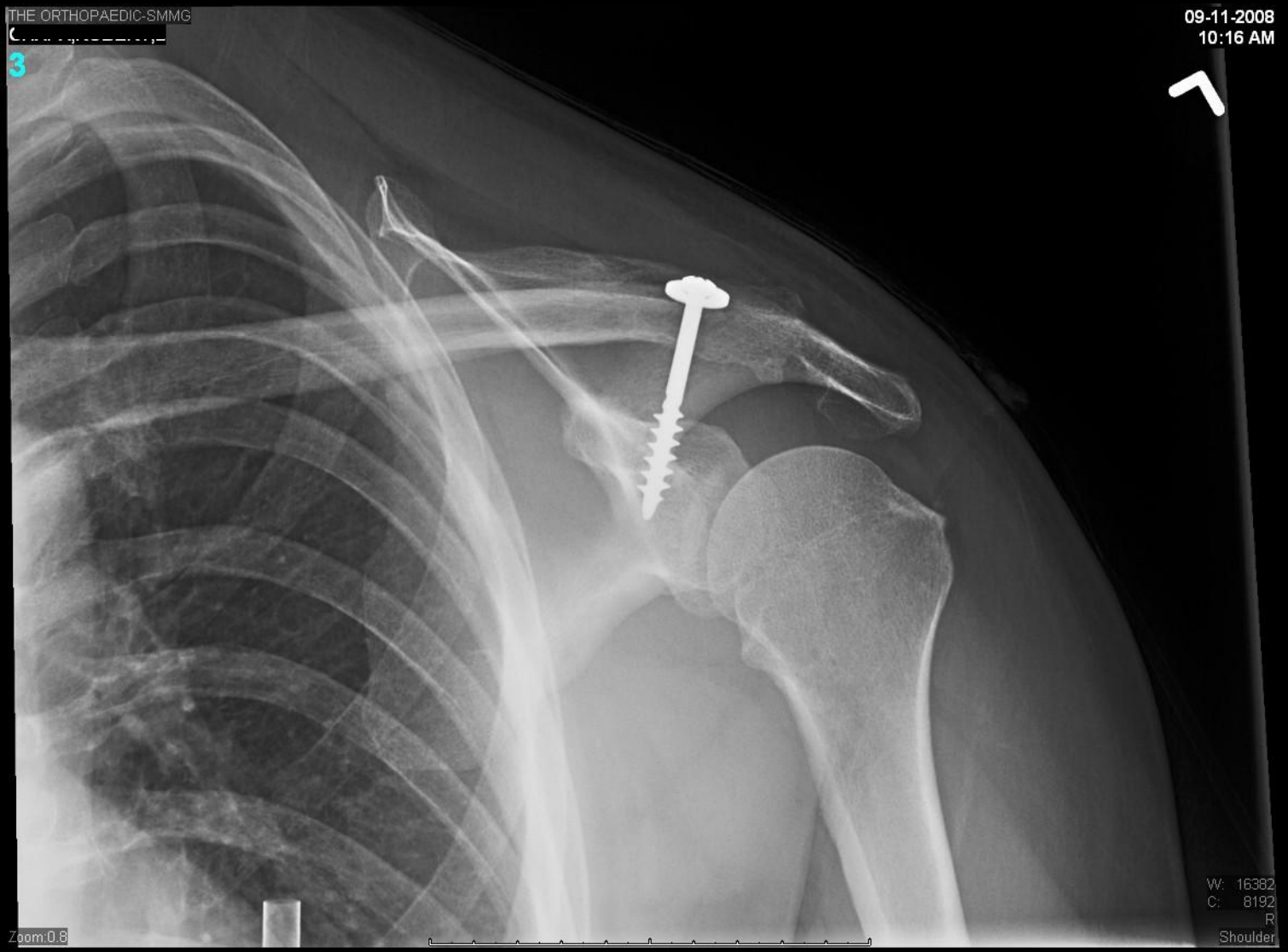
AC JOINT INJURIES

TREATMENT

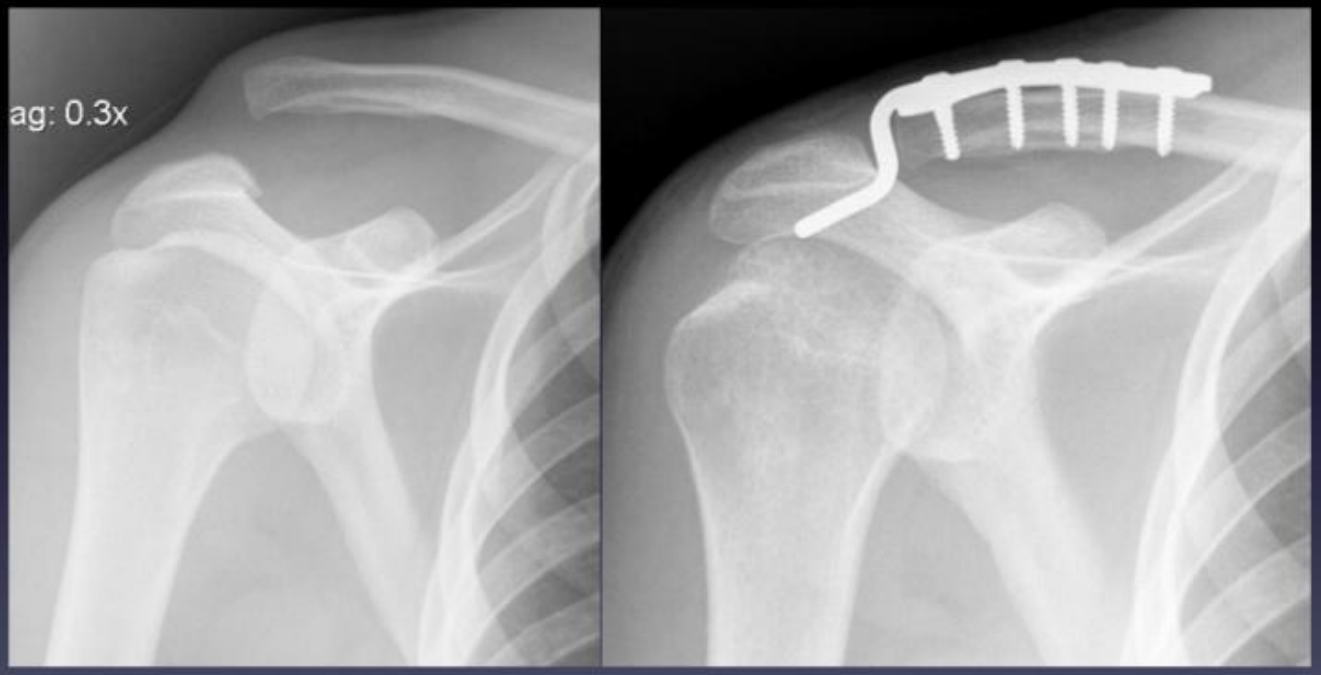
Type III – Conservative vs AC recon

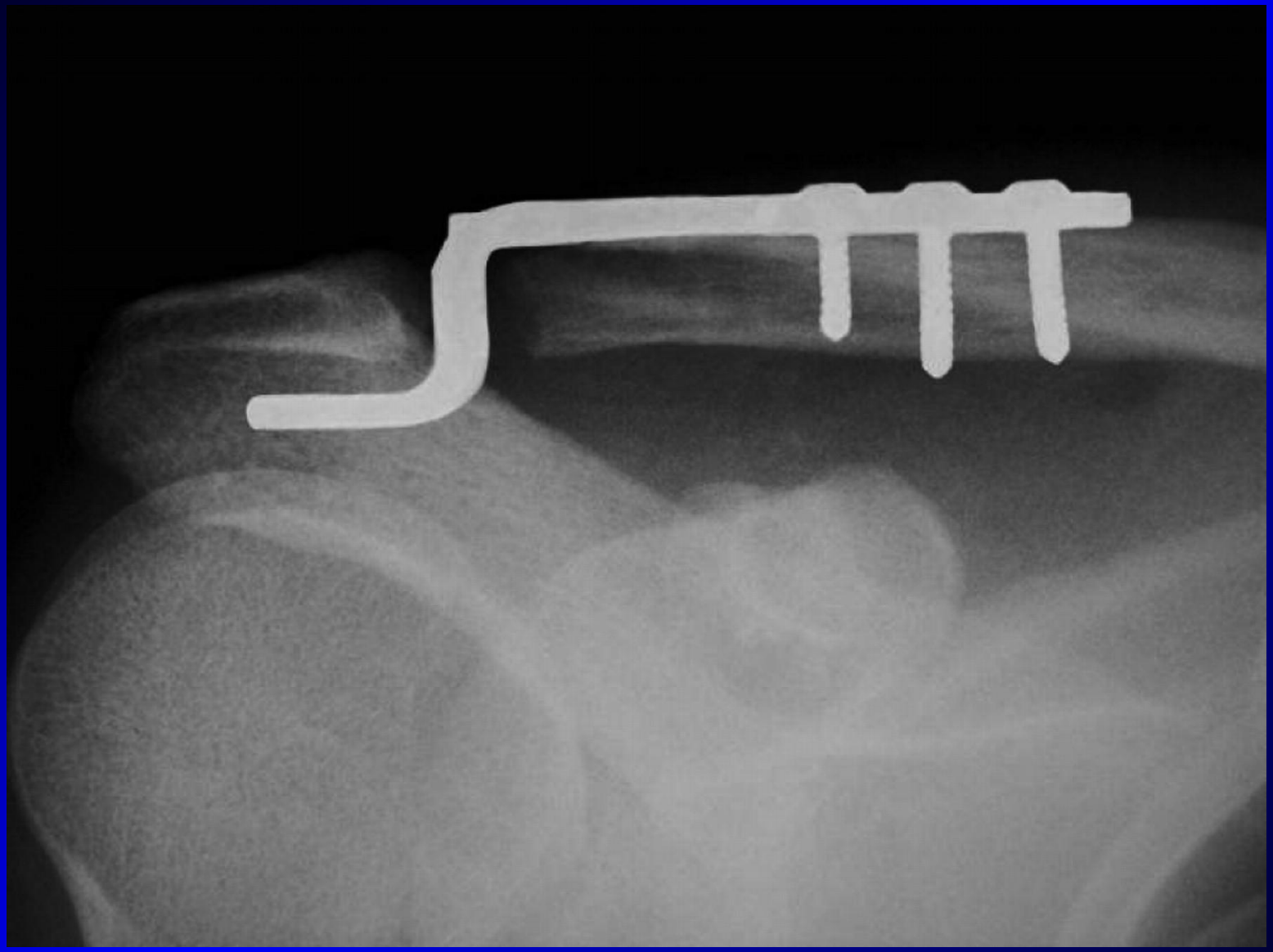
- Cosmetic Deformity


Santa Rosa N.W. Tower 1 - SMMG
08-12-2008
08:42 AM
1
L
KH
W: 5110
C: 6570
R
Shoulder
Zoom:0.6


THE ORTHOPAEDIC-SMMG
3
09-11-2008
10:16 AM
W: 16382
C: 8192
R
Shoulder
Zoom:0.8

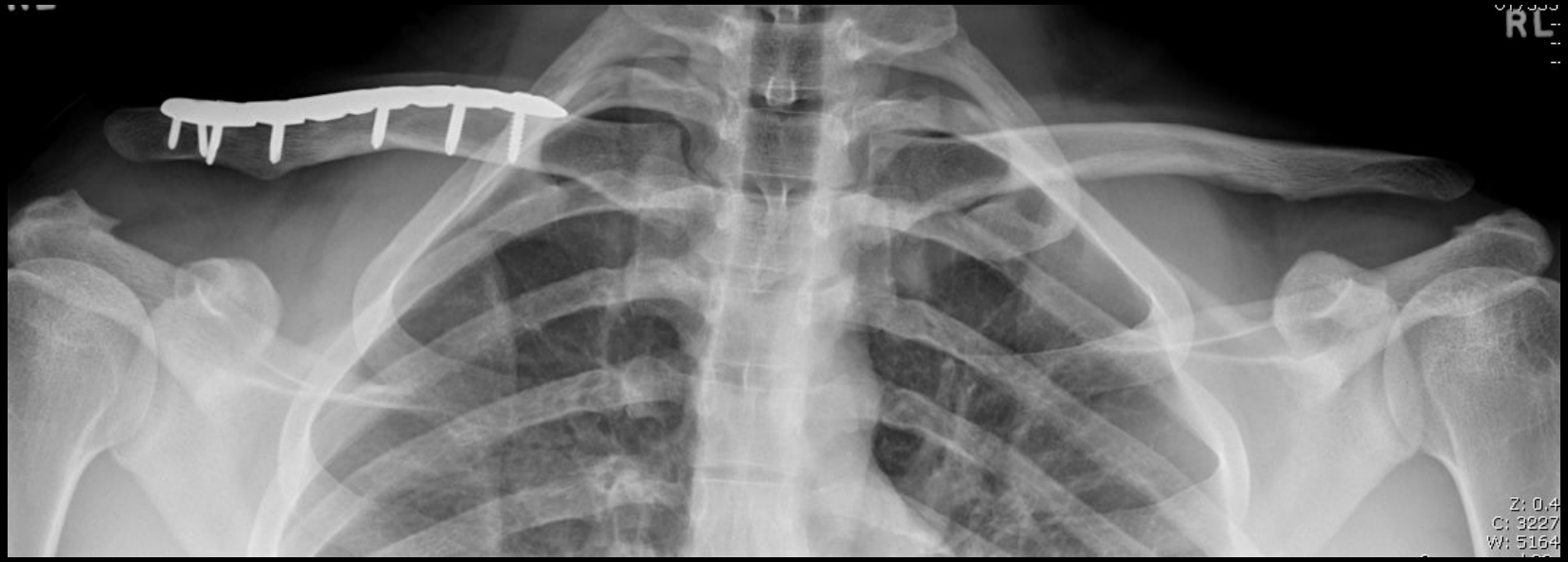
Hook Plate

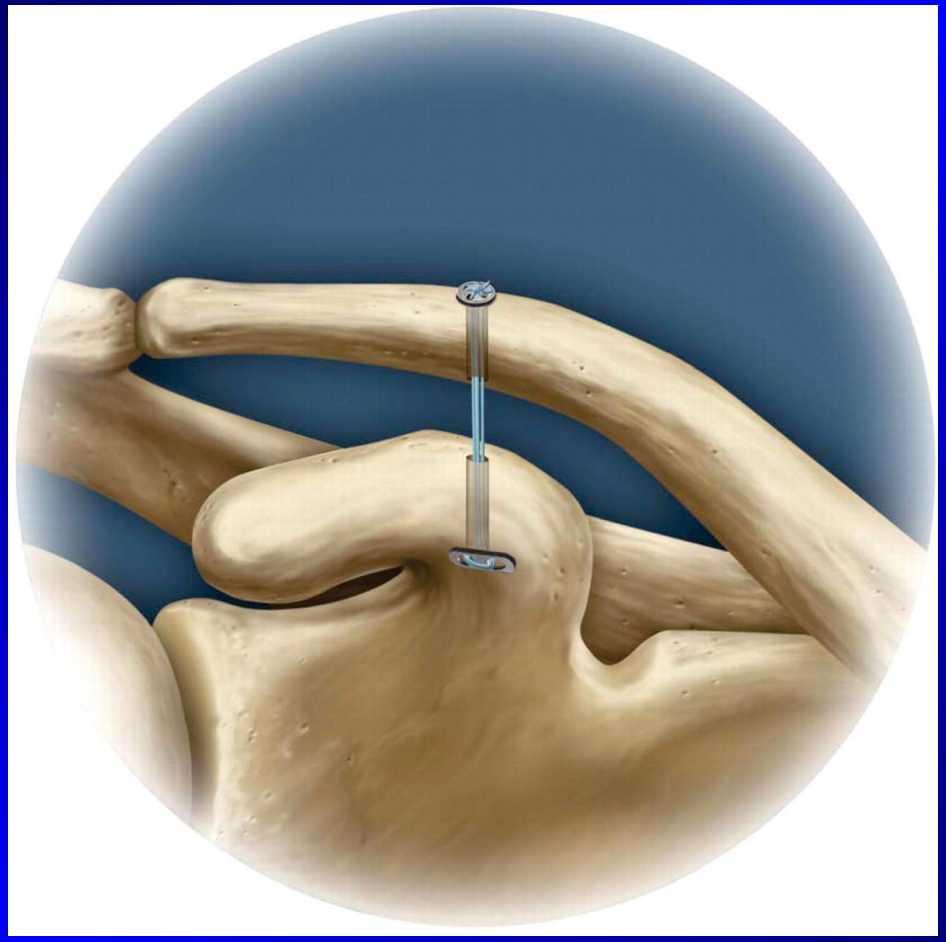




CASES


.6959
/1992
E4R
L
XR AC JOINTS 7
W AC JOINTS WO
12/5/2017 10:28
R
23.5mm
14.67mm

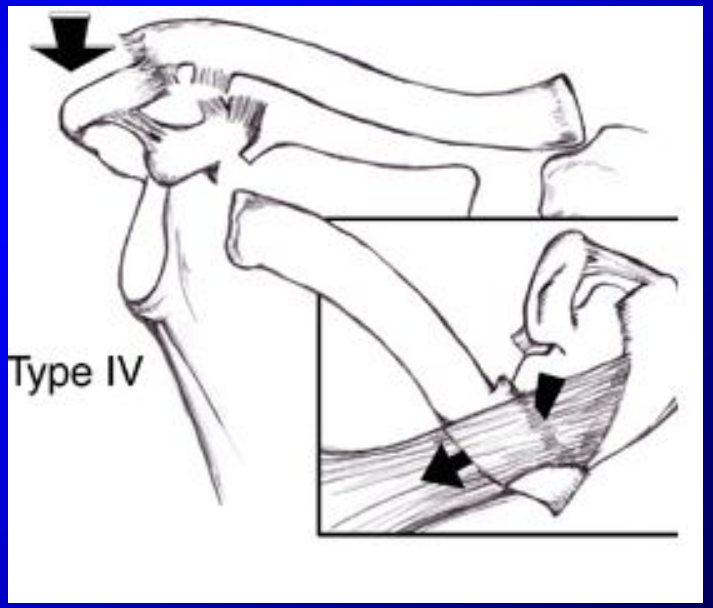

RL
Z: 0.4
C: 3227
W: 5164




R
RL
L
RL

Type IV AC Separation

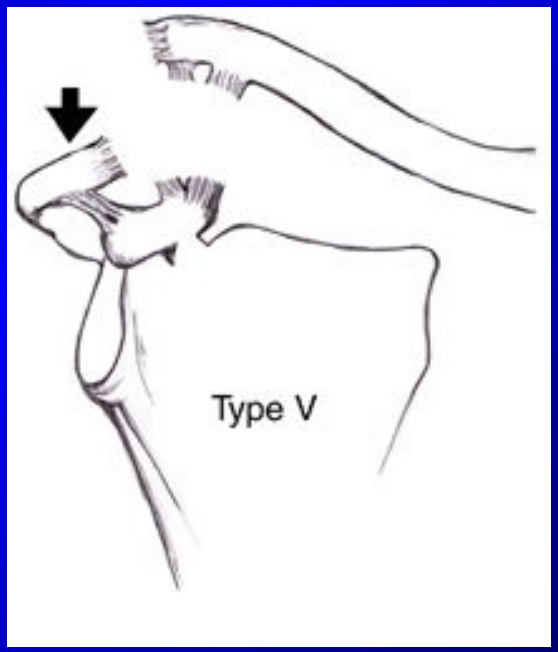
- XR: Increased CC distance
- Posterior displacement to acromion




R
limited mobility

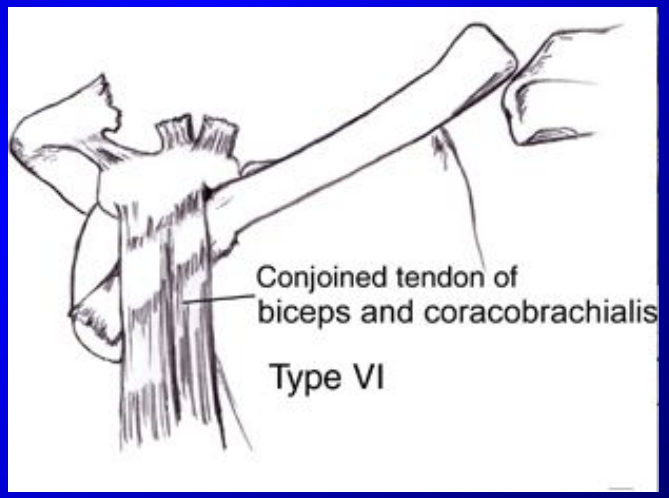
Type V AC Separation

- " Ear Tickler"
- XR: > 100 % CC distance



Type VI AC Separation

- XR: Subcoracoid Dislocation



AC JOINT INJURIES

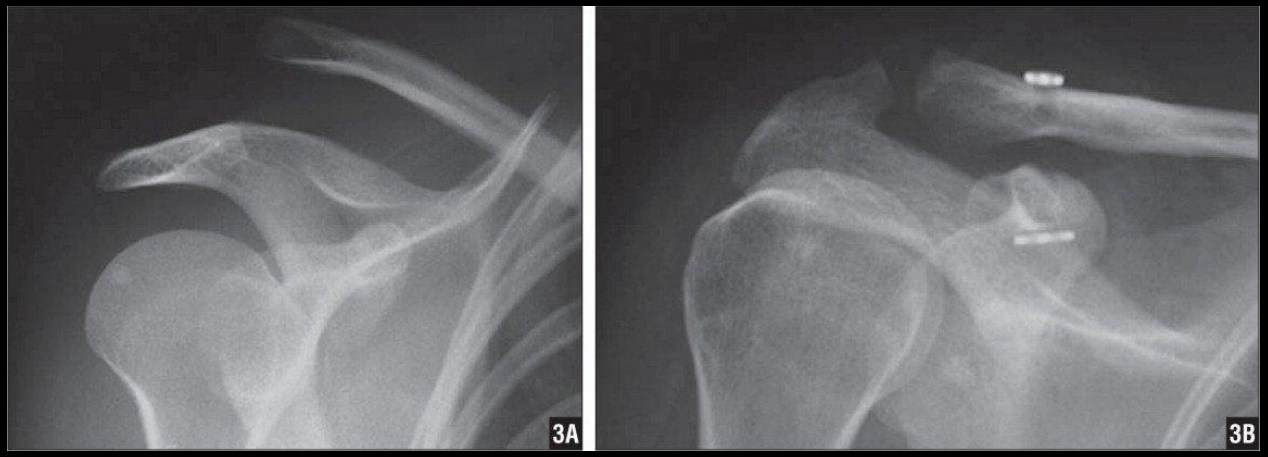
TREATMENT

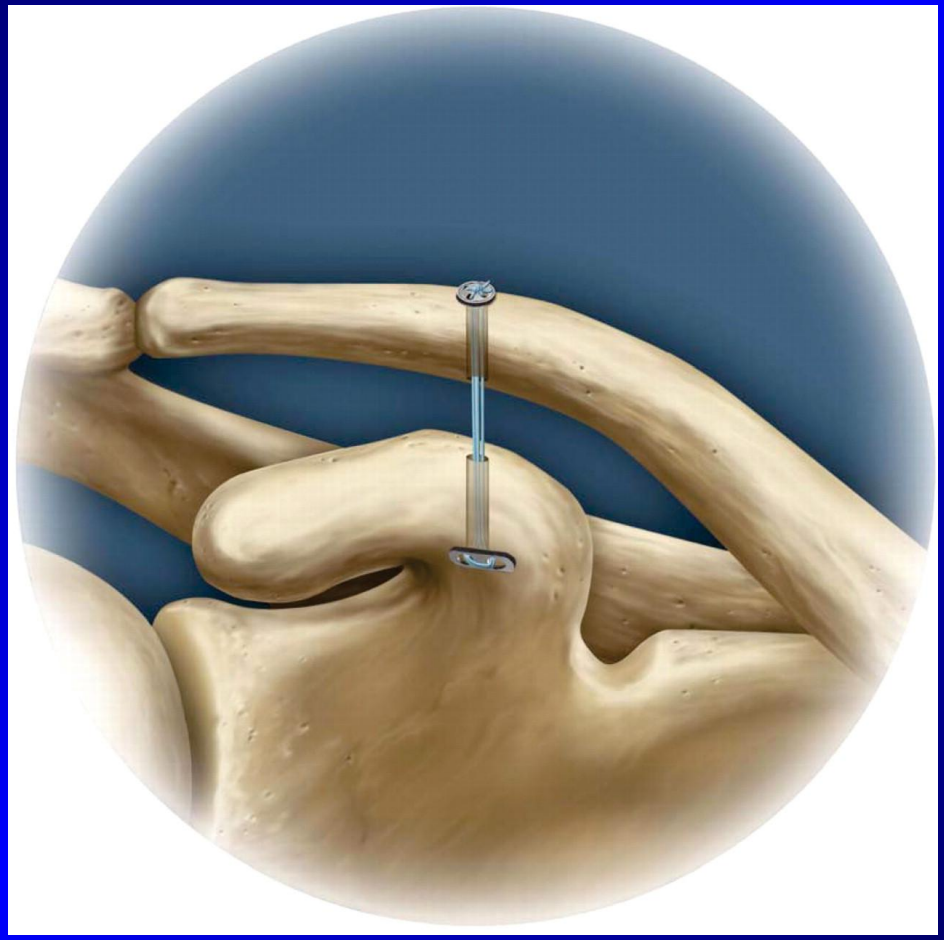
Type IV / V / VI

Surgery – AC Reconstruction

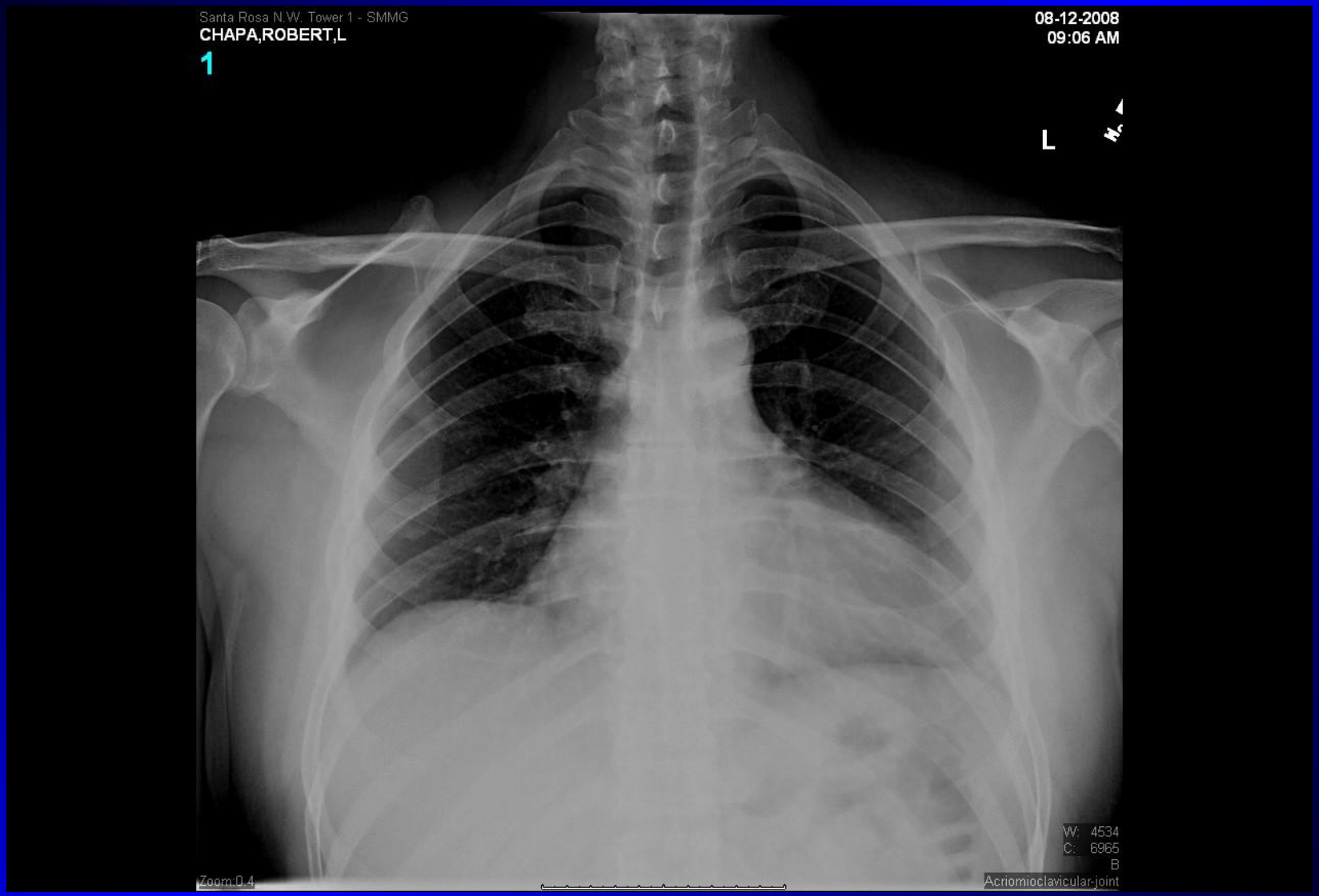
CASES


R
46


3A
3B




RJCM


Santa Rosa N.W. Tower 1 - SMMG
CHAPA,ROBERT,L
1
08-12-2008
09:06 AM
L
W: 4534
C: 6965
B
Zoom:0.4
Acriomioclavicular-joint

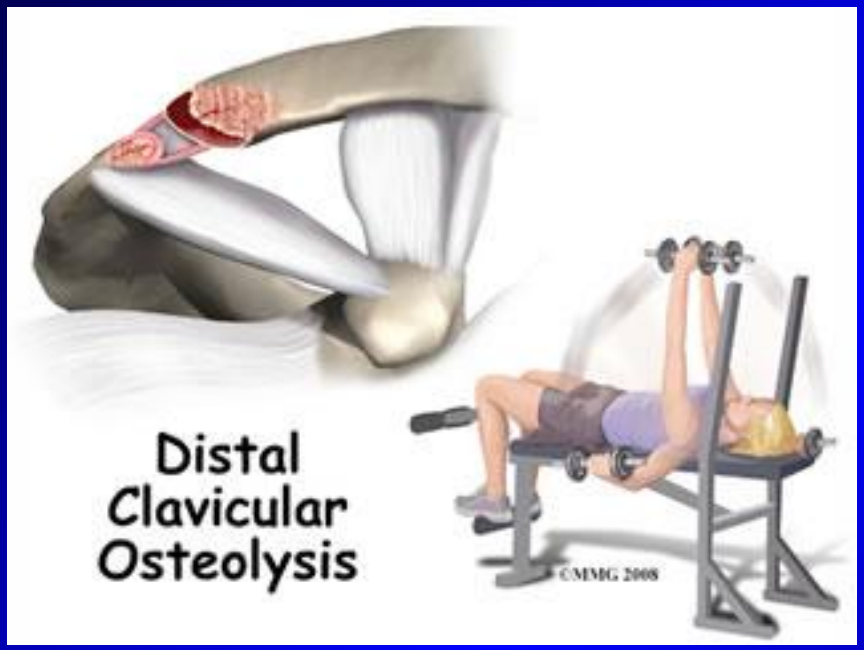

R
KH

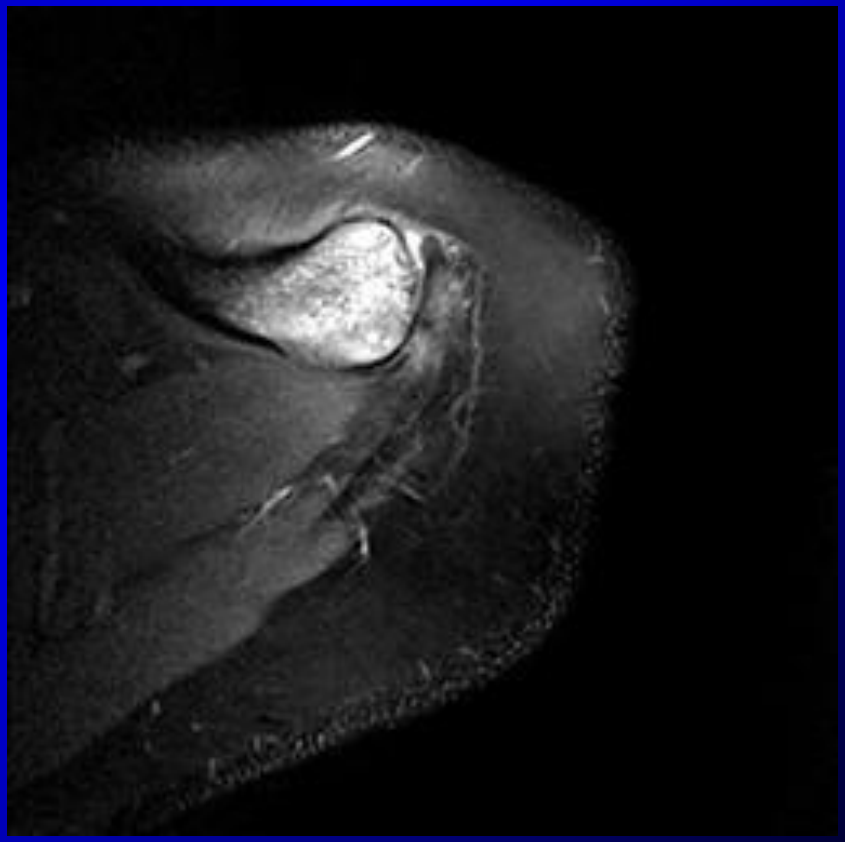

R
KH

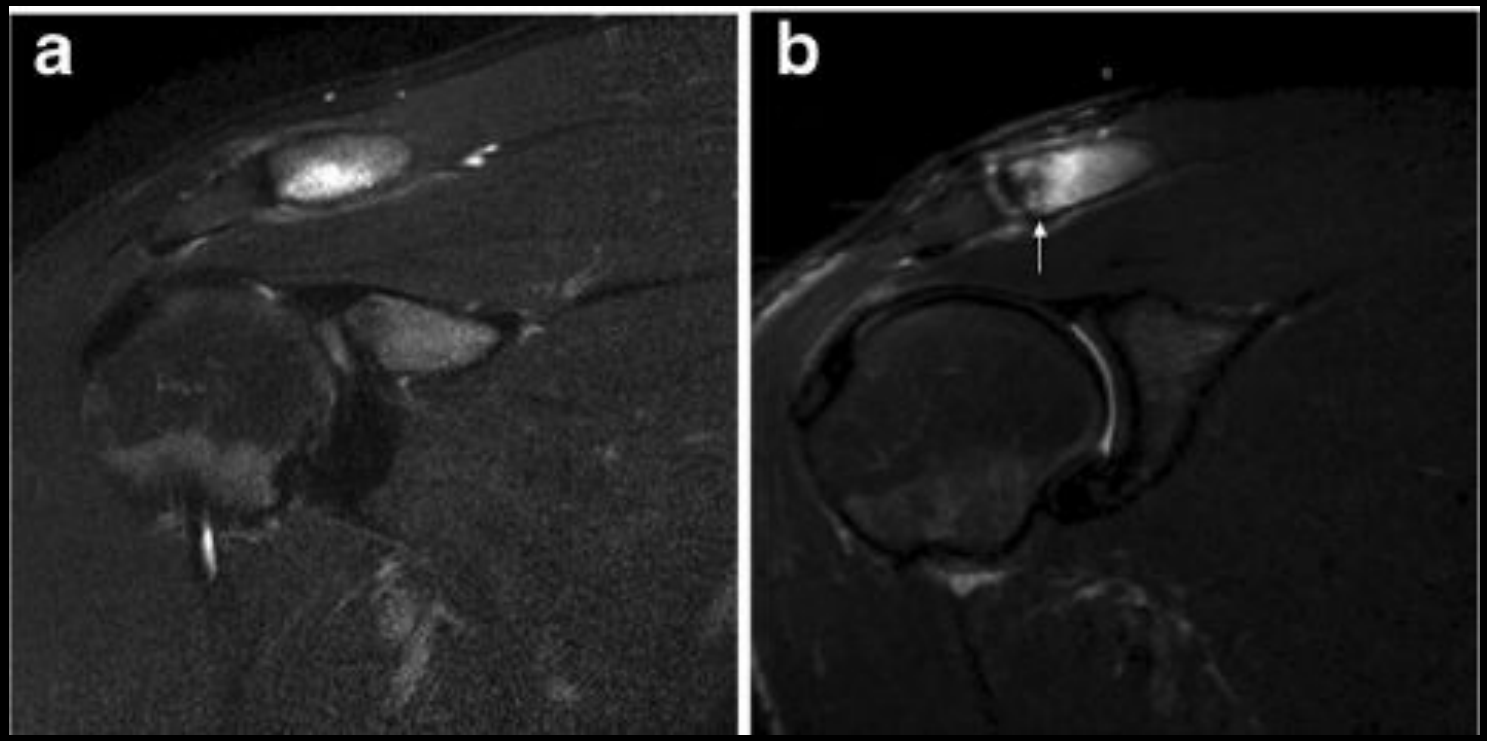
OSTEOLYSIS DISTAL CLAVICLE


R

“ Weightlifter’s Shoulder “





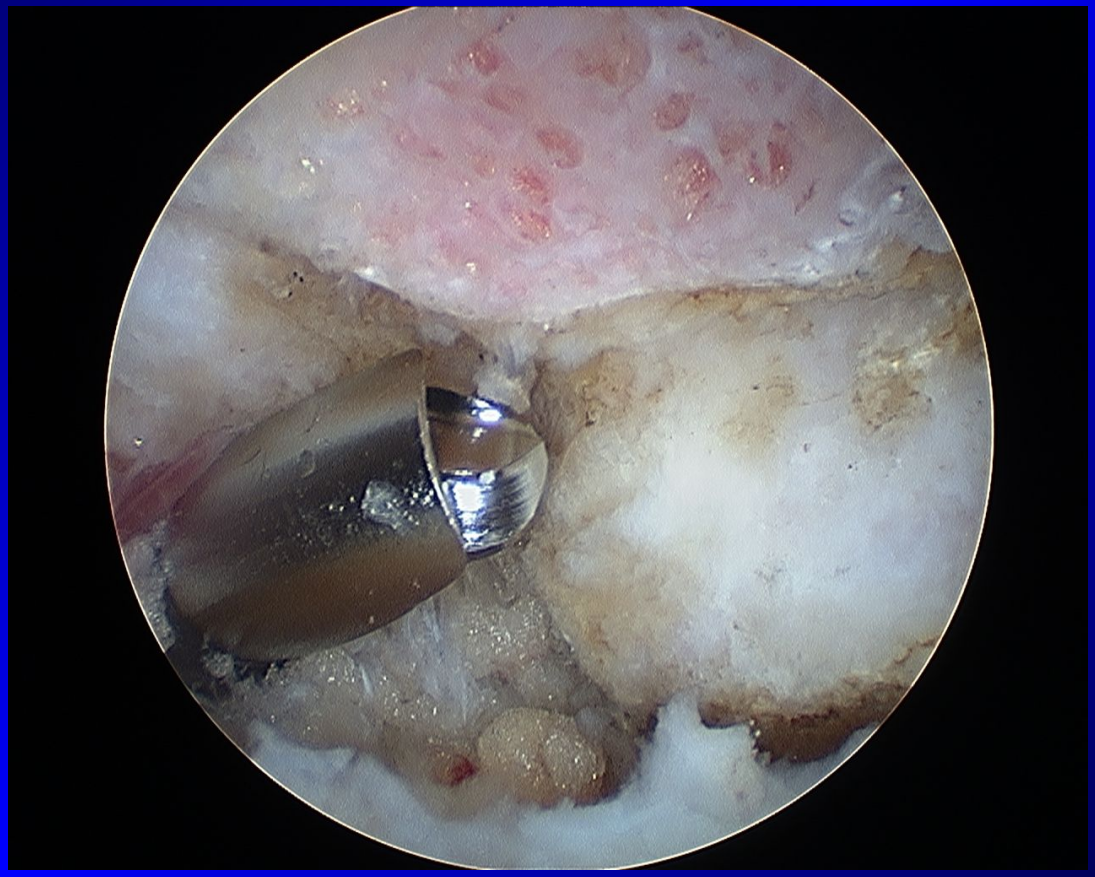

a
b

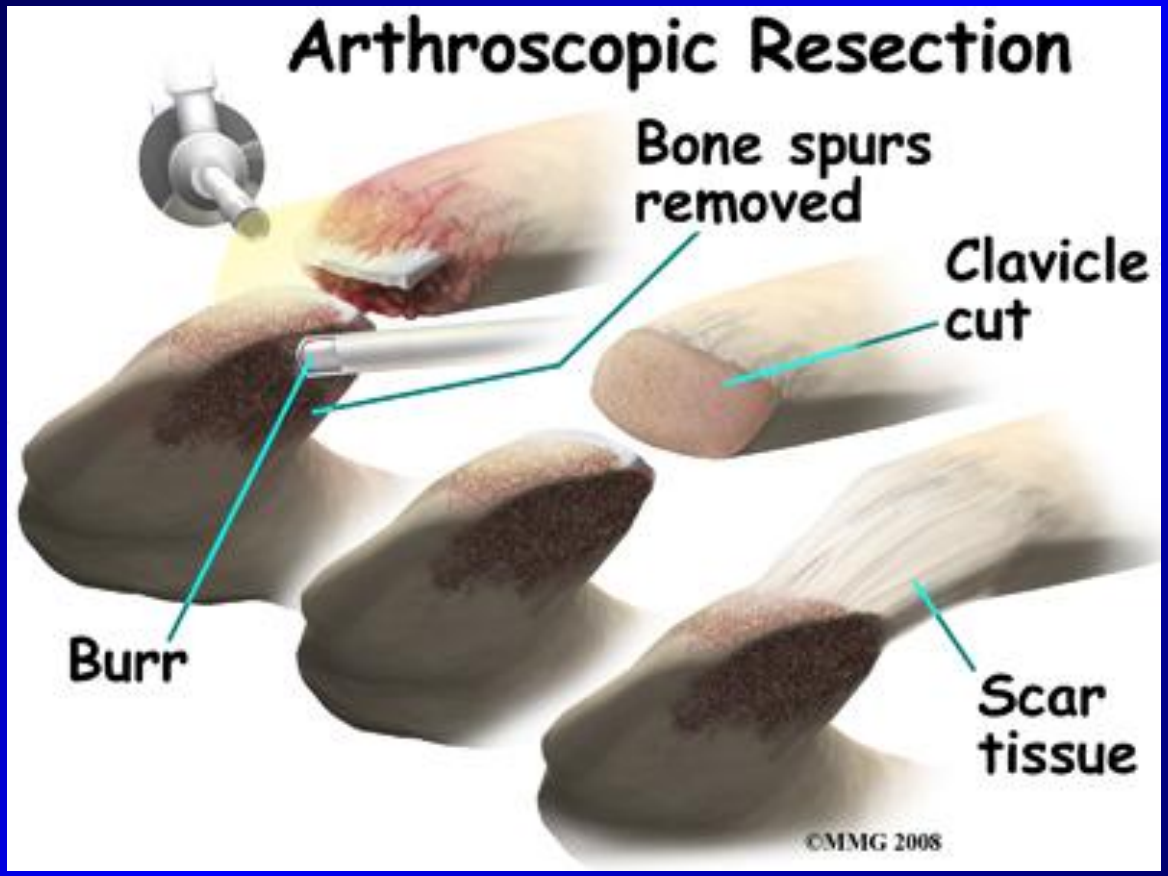
Treatment

- Rest, Ice, NSAIDs, Activity Modification
- AC Joint Injection
- Arthroscopic vs Open Distal Clavicle Resection

AC Joint Injection

Arthroscopic Distal Clavicle Resection




Arthroscopic Resection
Bone spurs removed
Clavicle cut
Burr
Scar tissue
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THANK YOU