



# Proximal Humerus Fx's

## Multifragment 3-&4-part

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**Utku KANDEMIR, MD**

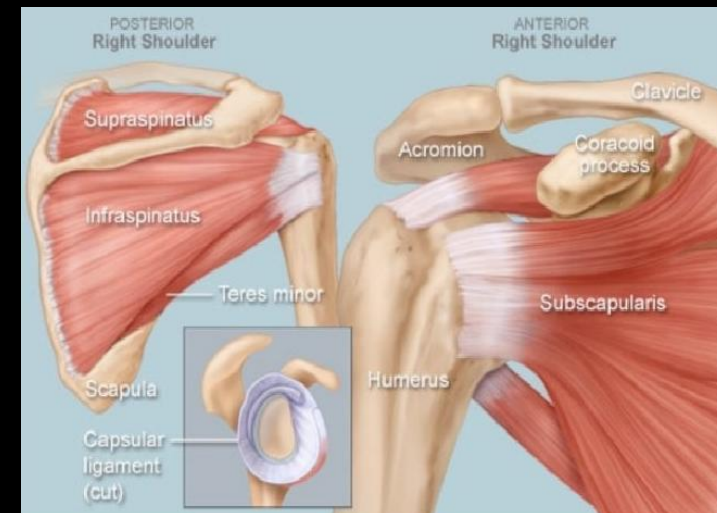
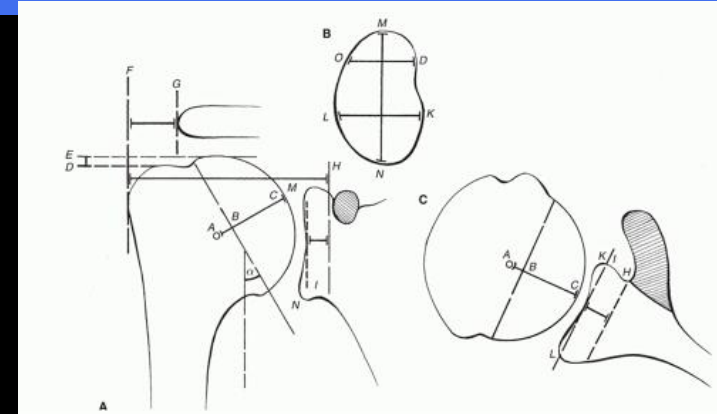
Professor

University of California, San Francisco



# Treatment Goal

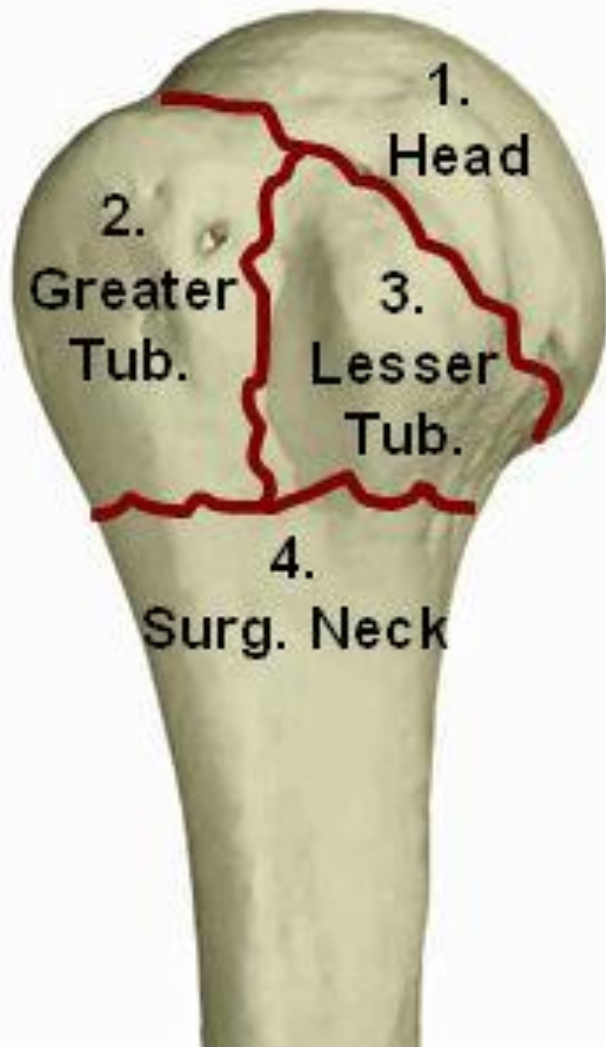
- ❑ Restore FUNCTION !
- ❑ Function follows the Anatomy
- ❑ Obtaining & Maintaining Anatomic REDUCTION (stable fixation)
- ❑ Allow early progressive ROM



# MM, 58 y/o female



# Classification



# Neer's Classification

## The Journal of Bone and Joint Surgery

*American Volume*

VOLUME 52-A, No. 6

SEPTEMBER 1970

### Displaced Proximal Humeral Fractures

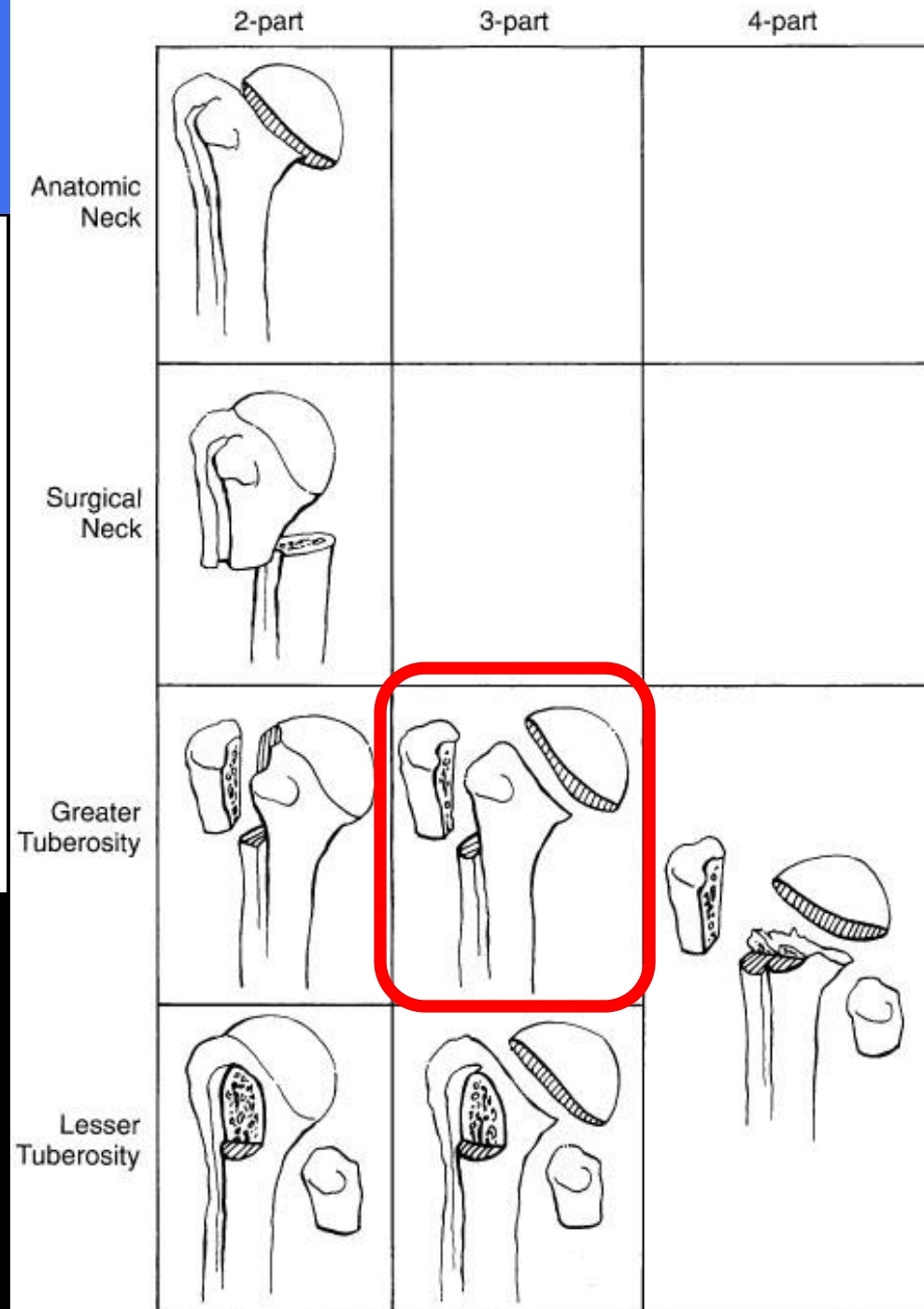
PART I. CLASSIFICATION AND EVALUATION\*

BY CHARLES S. NEER, II, M.D.†, NEW YORK, N. Y.

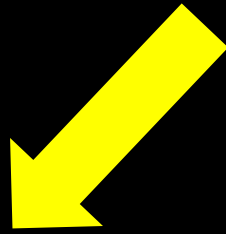
## □ Displacement

— >1cm

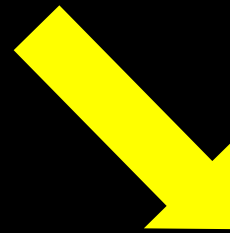
— >45 degrees



# Treatment Options



**NONOPERATIVE**



**OPERATIVE**



# Treatment Options

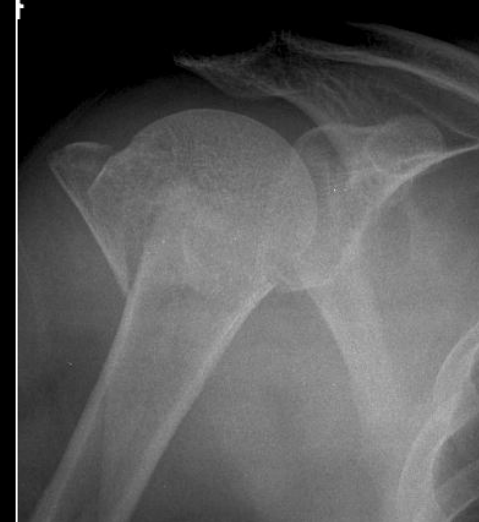


## ▣ *DISPLACEMENT*



# Treatment Options

▣ ***STABILITY***

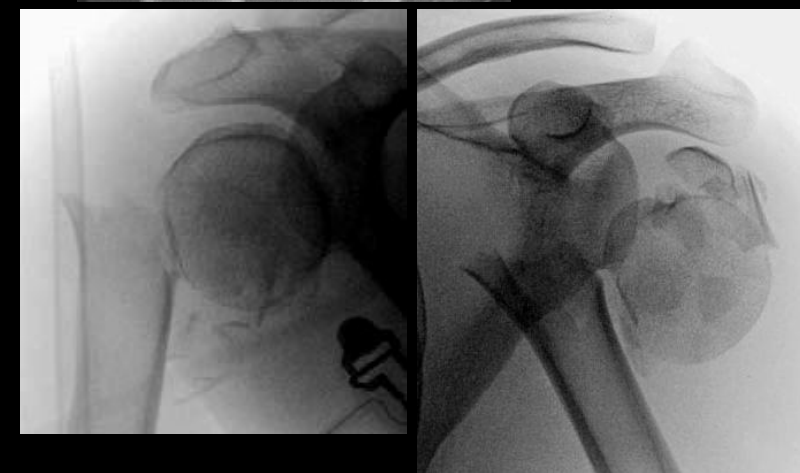


# Treatment: *OPERATIVE*



## □ *UNSTABLE*

- Shear mechanism
- Head shaft dissociation
- Angulation without impaction
- High energy mechanism
- Significant soft tissue Injury



# Treatment: Nonop vs Op

## ❑ *DISPLACEMENT/STABILITY*

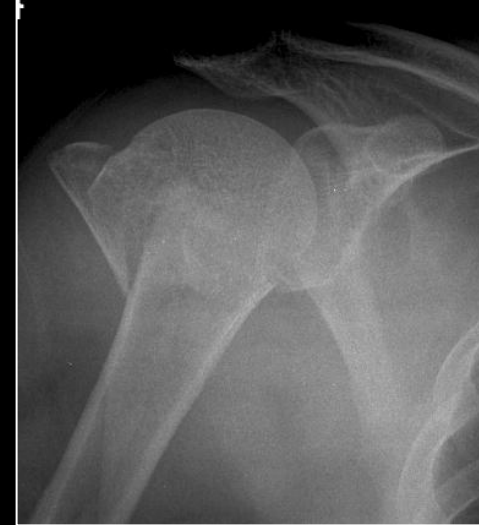
### ❑ NONOPERATIVE

- Mild/no Displacement,
- Cannot self-care

~~Elderly: > 65 y/o ????????~~

### ❑ OPERATIVE

- Displaced Unstable Fx



54 y/o, RHD, s/p fall downstairs, ED



# 54 y/o, RHD, postinjury day #5: Clinic

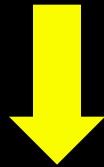


54 y/o, RHD, postinjury 12 months



# Displaced Fx: NONOP vs OPERATIVE

Nonoperative Tx of Unstable  
Displaced Fx



**Malunion (Nonunion)**



Loss of function

Loss of Motion, Pain, Weakness



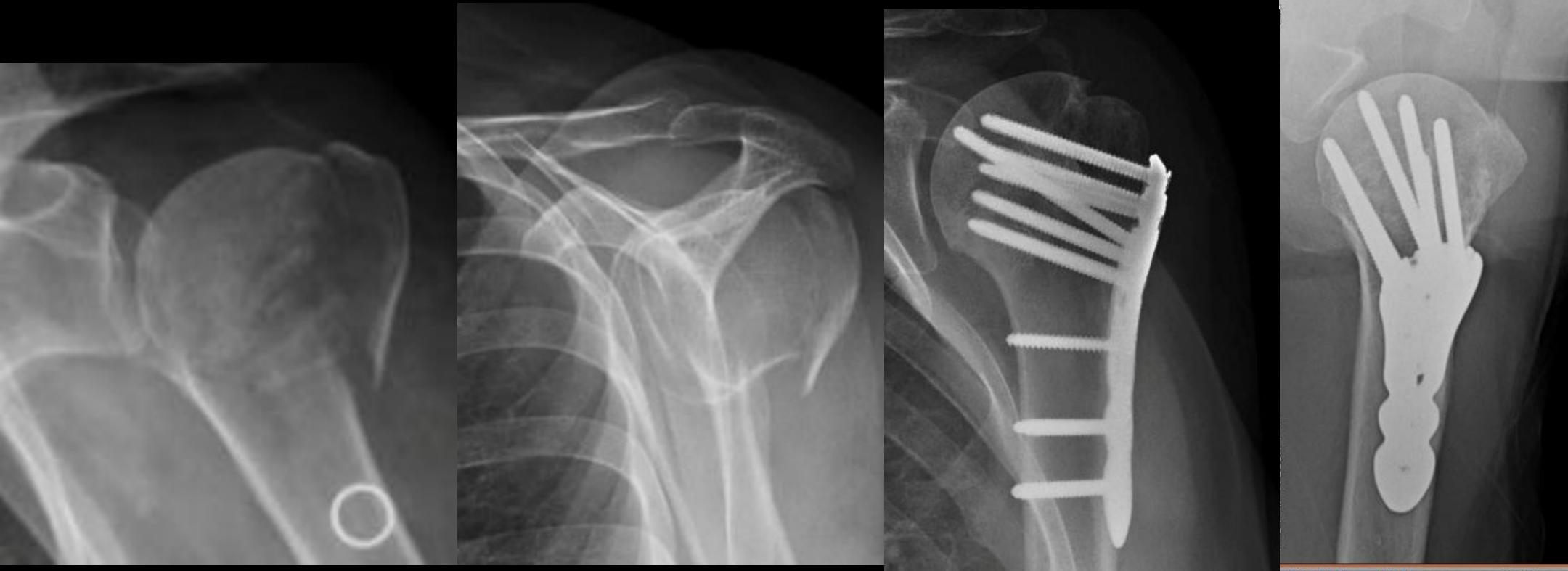
# Word of Wisdom

- While Surgery Offers The Patient The **Best** Chance for a **GOOD** Outcome, the **WORST** Complications result From **Unsuccessful** Surgery



# ORIF

- ▣ Most common type of surgical tx in US
- ▣ Technically demanding & challenging



# Complications

## ORIF (fixed angle device)



□ Up to 44 %

	<u>n=</u>	<u>Complication</u>
Sun JC 2013	68	12 %
Spross C et al. 2012	294	28 %
Sudkamp N et al. 2009	187	34 %
Brunner F et al. 2009	158	44 %
Owsley KC, GorczycaJT 2008	53	36 %
Meier RA et al. 2006	36	33 %
Fankhauser F et al. 2005	29	17 %

# Fracture Pattern

**VARUS**



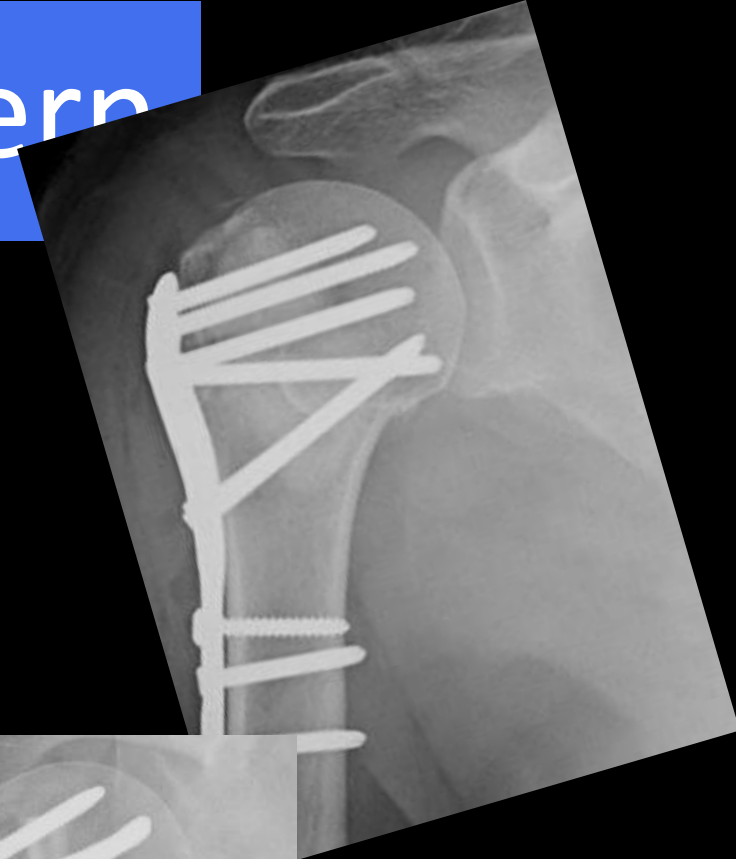
**VALGUS**



**COMPLETE  
DISPLACEMENT**



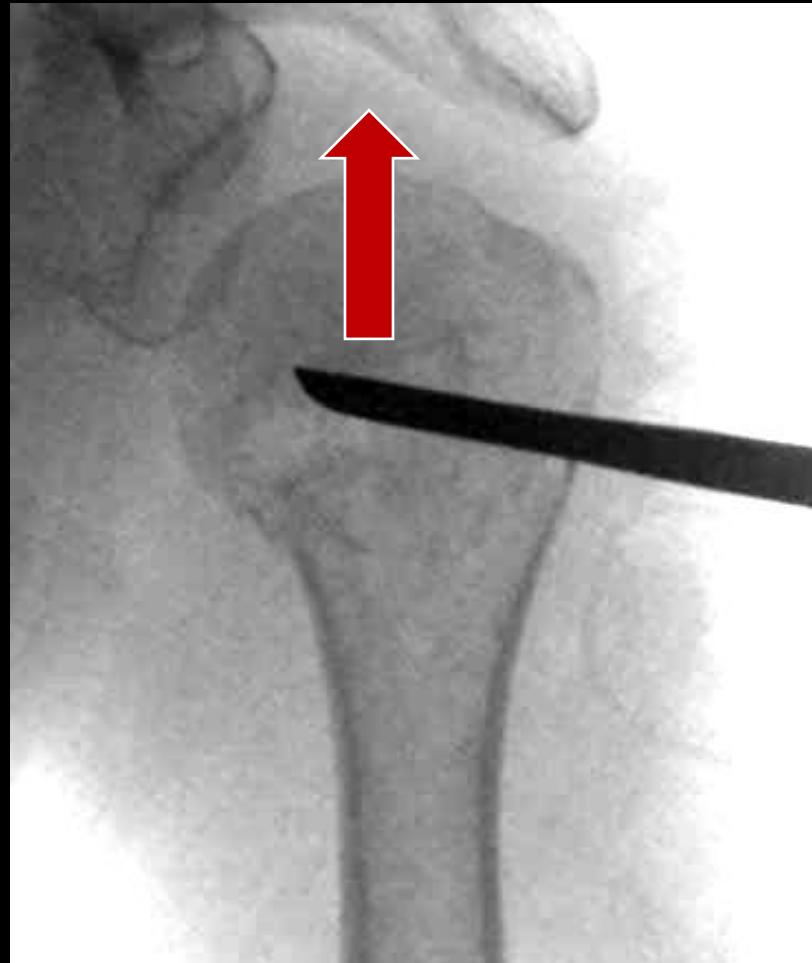
# Reduction- Valgus pattern



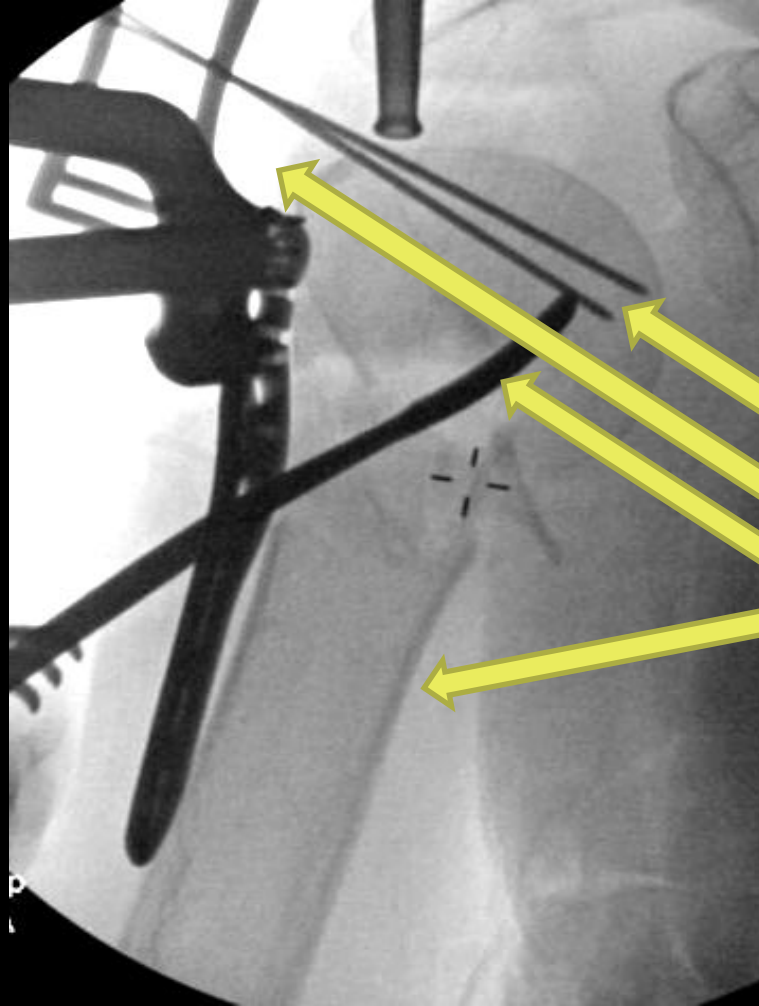
# Reduction - Valgus & Translation pattern



# Reduction – Varus pattern



# Reduction – Varus pattern



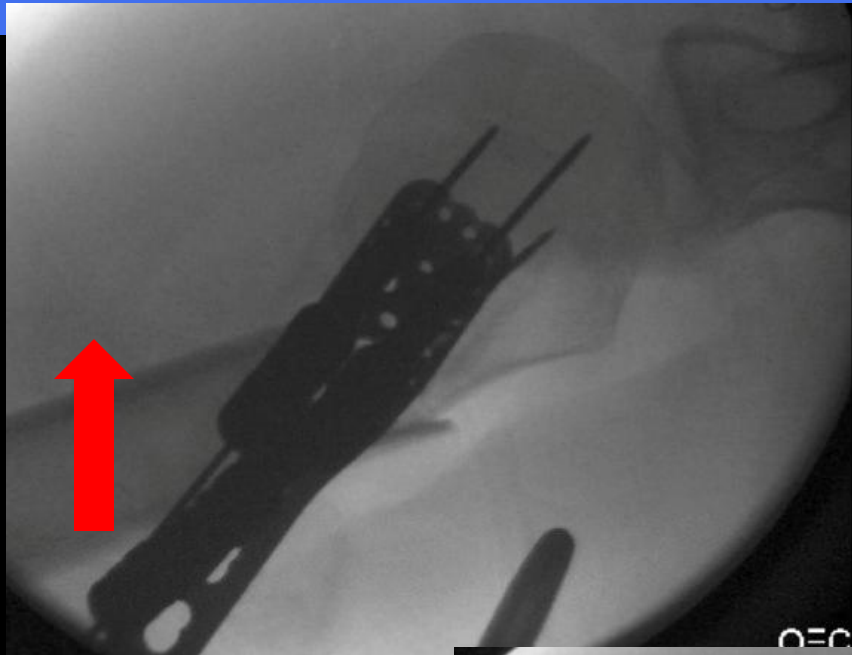
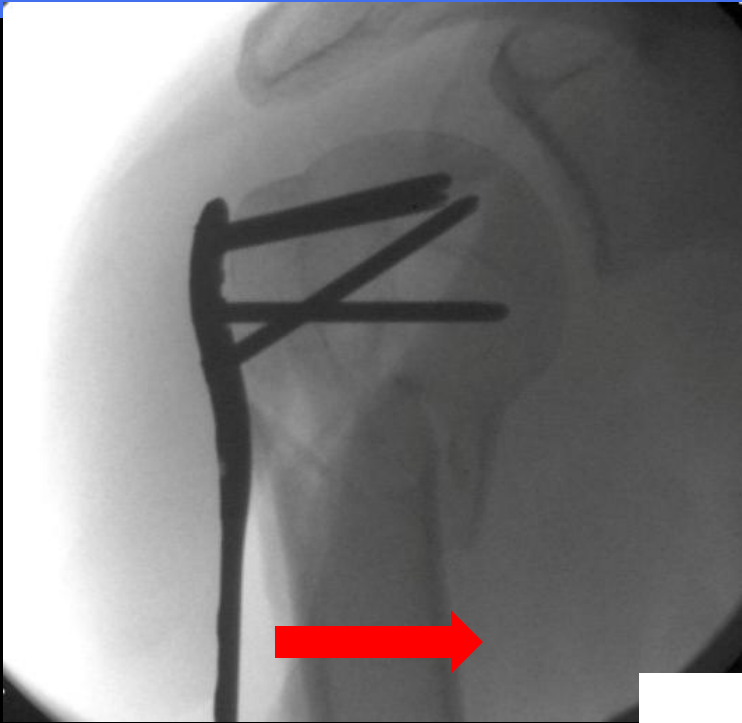
## Devarusize

1. K-wire joysticks
2. Cuff sutures
3. Elevator
4. Arm abduction

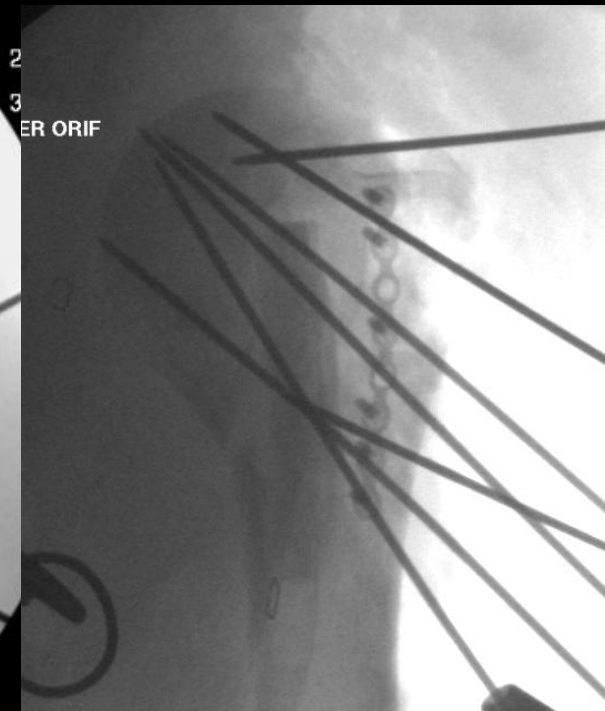
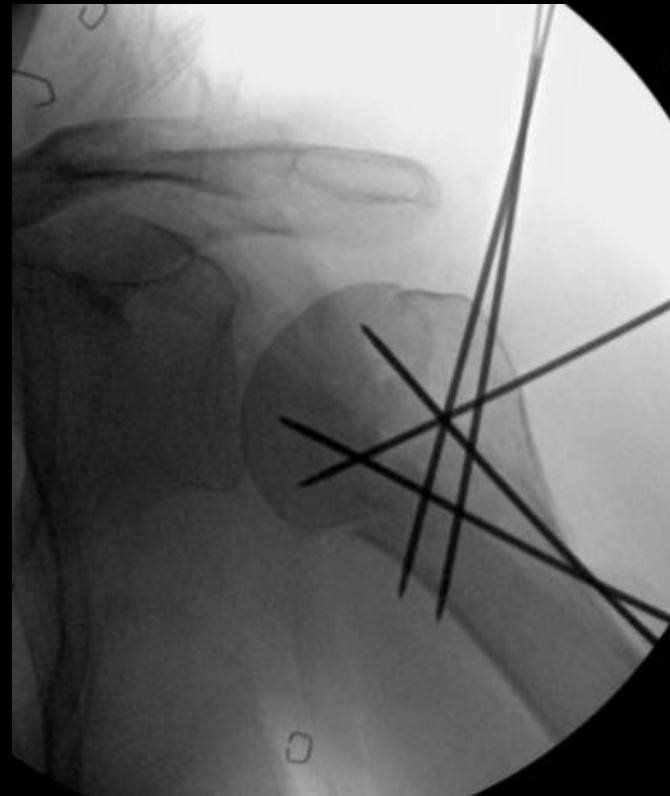
# Reduction – Varus pattern- Young



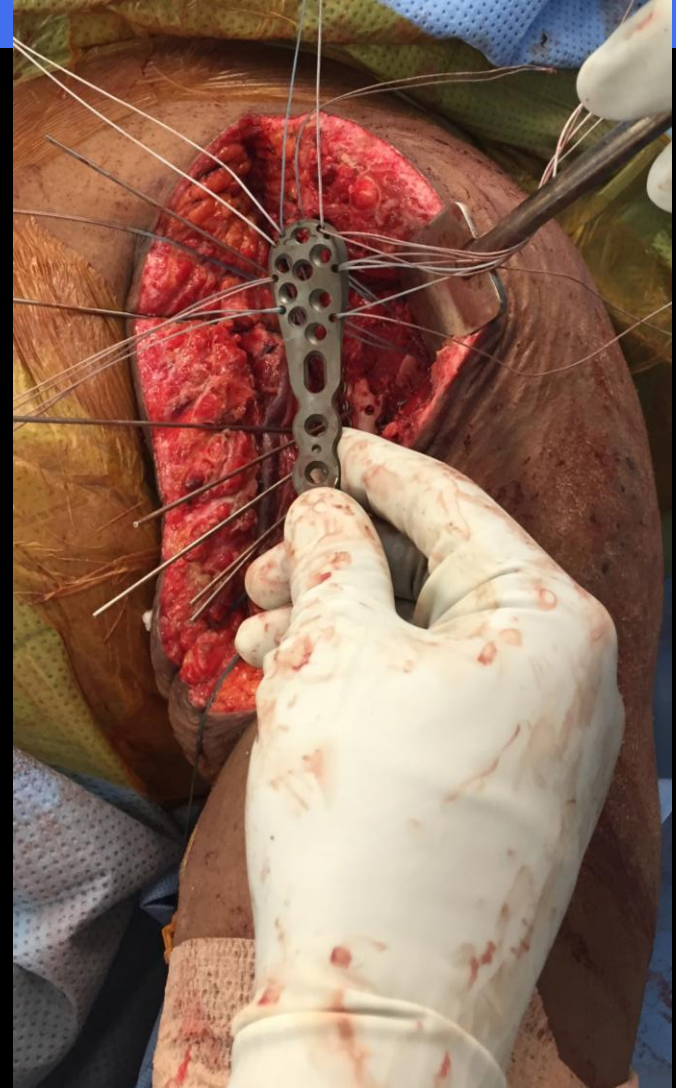
# Reduction – Varus pattern- Young

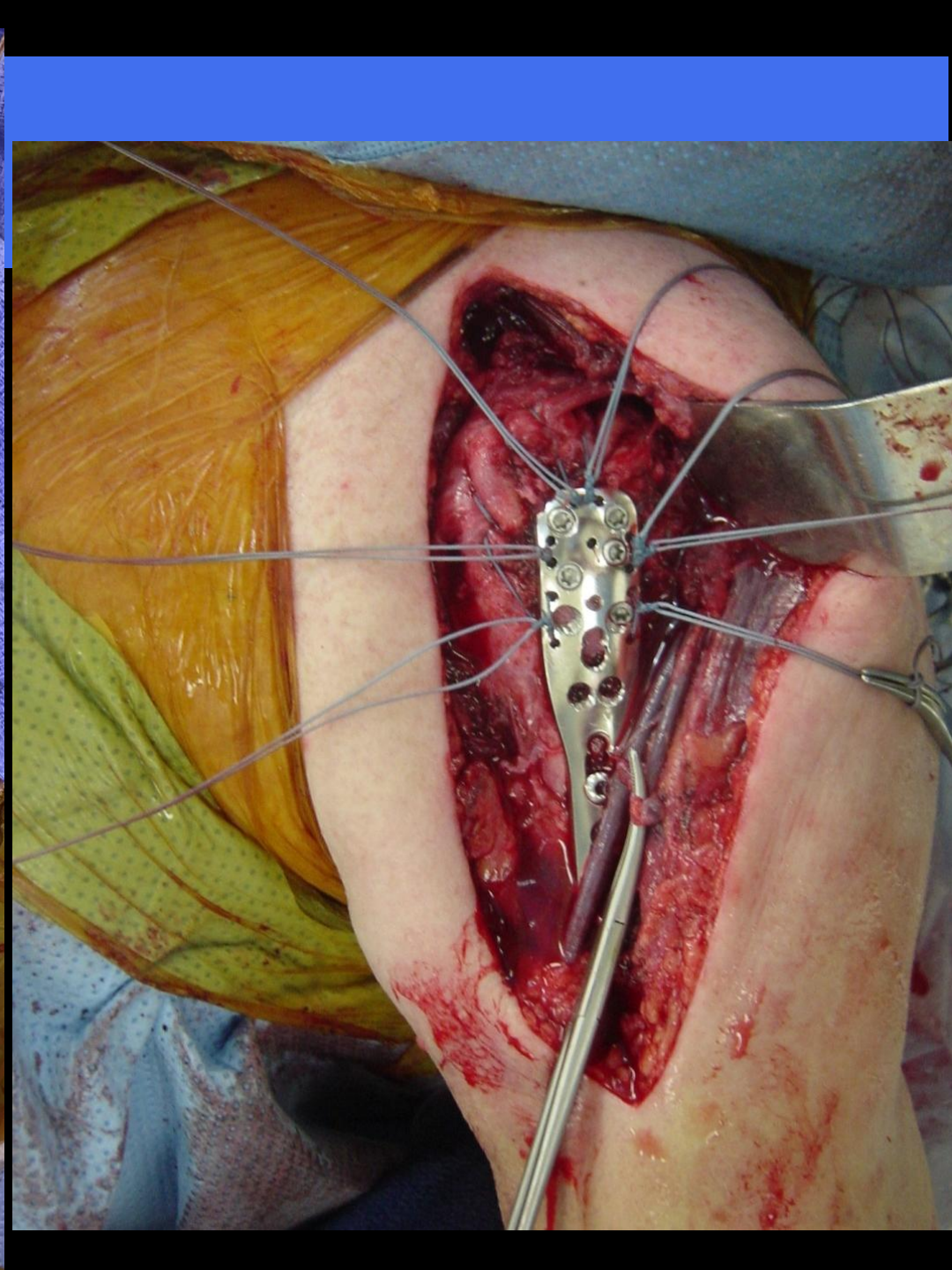
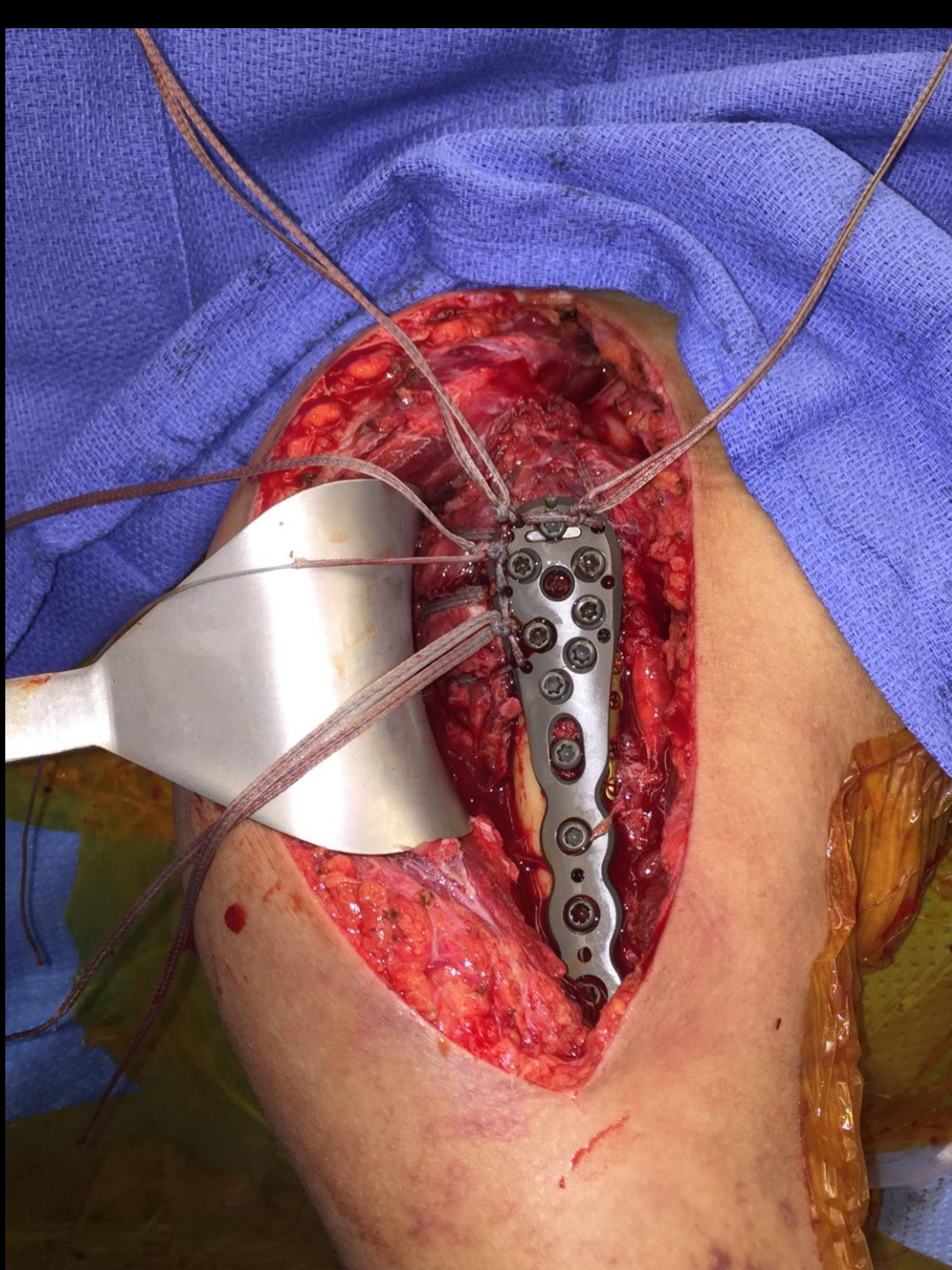


# Provisional Fixation

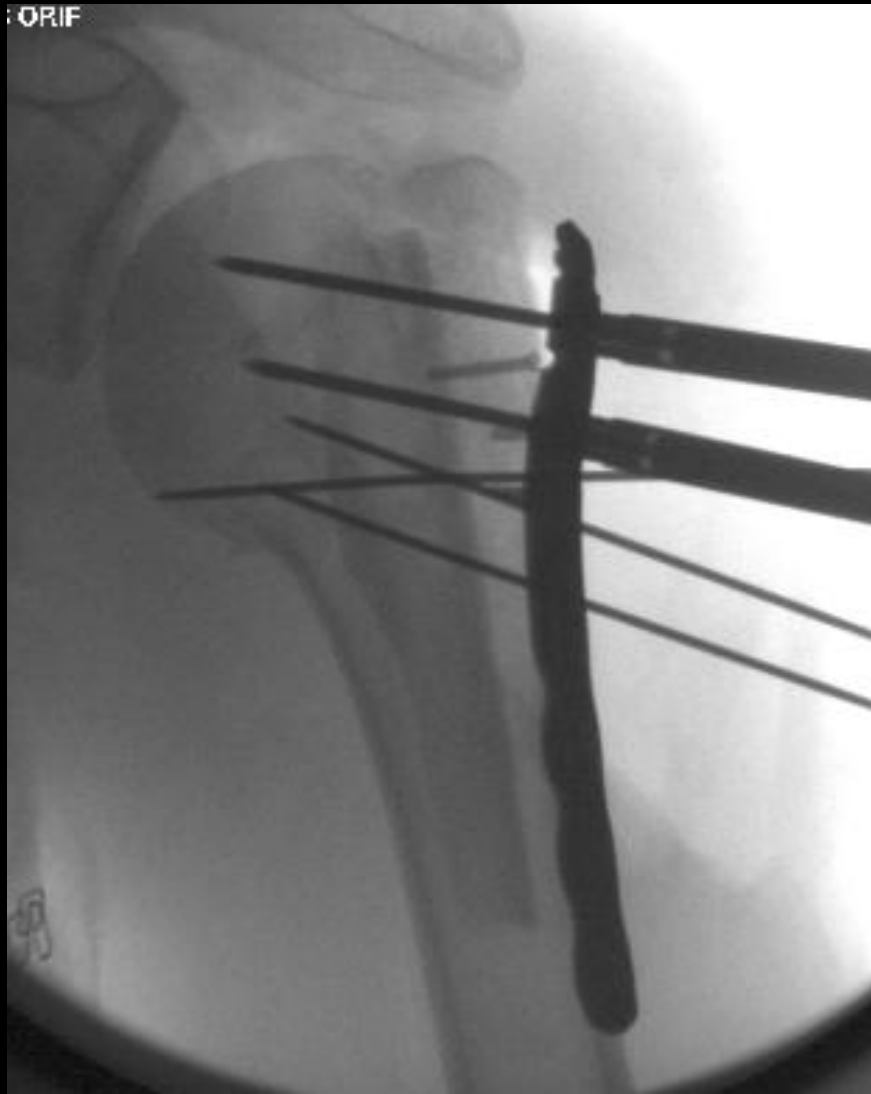


# Sutures through the rotator cuff

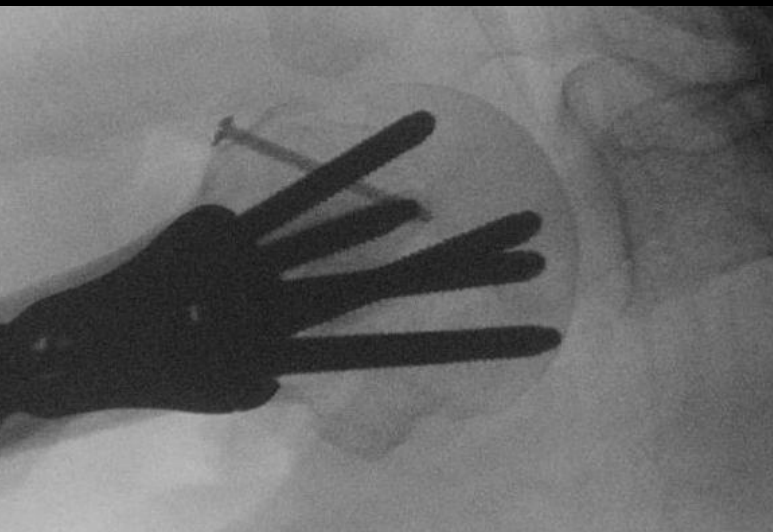
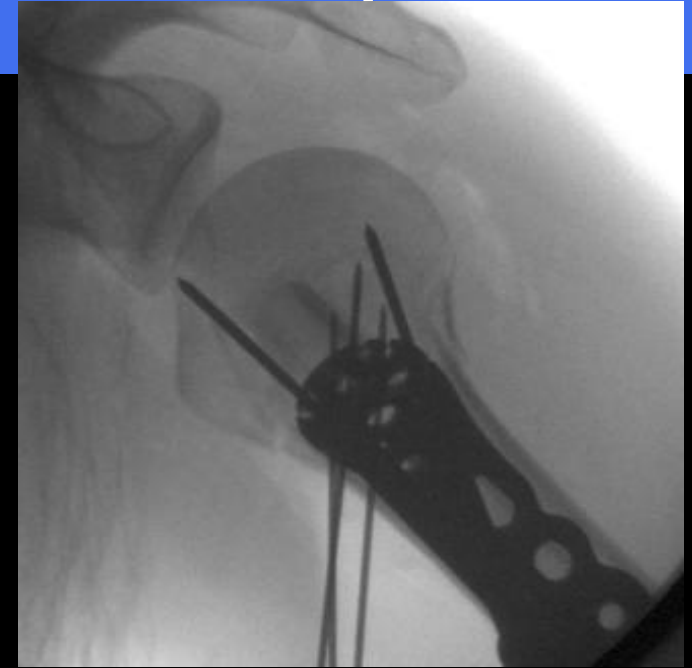
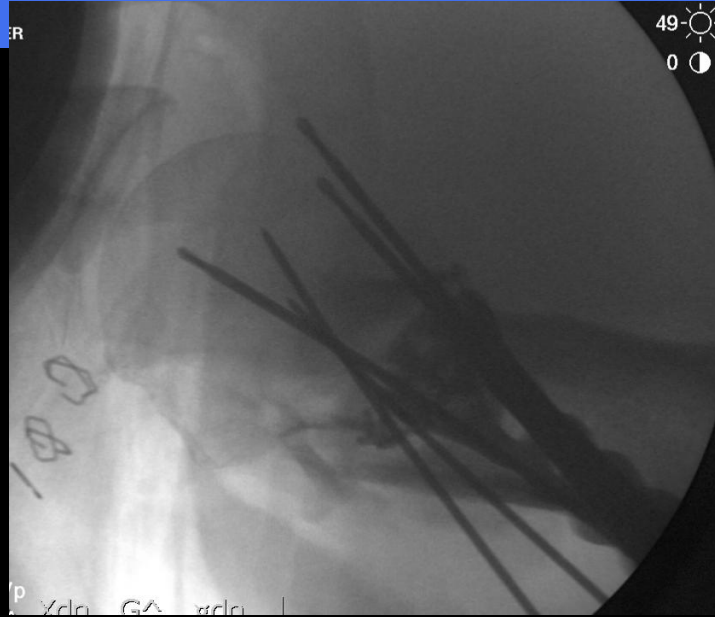
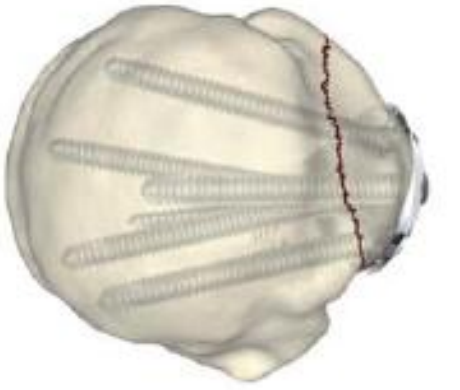




# Positioning of plate - Coronal plane



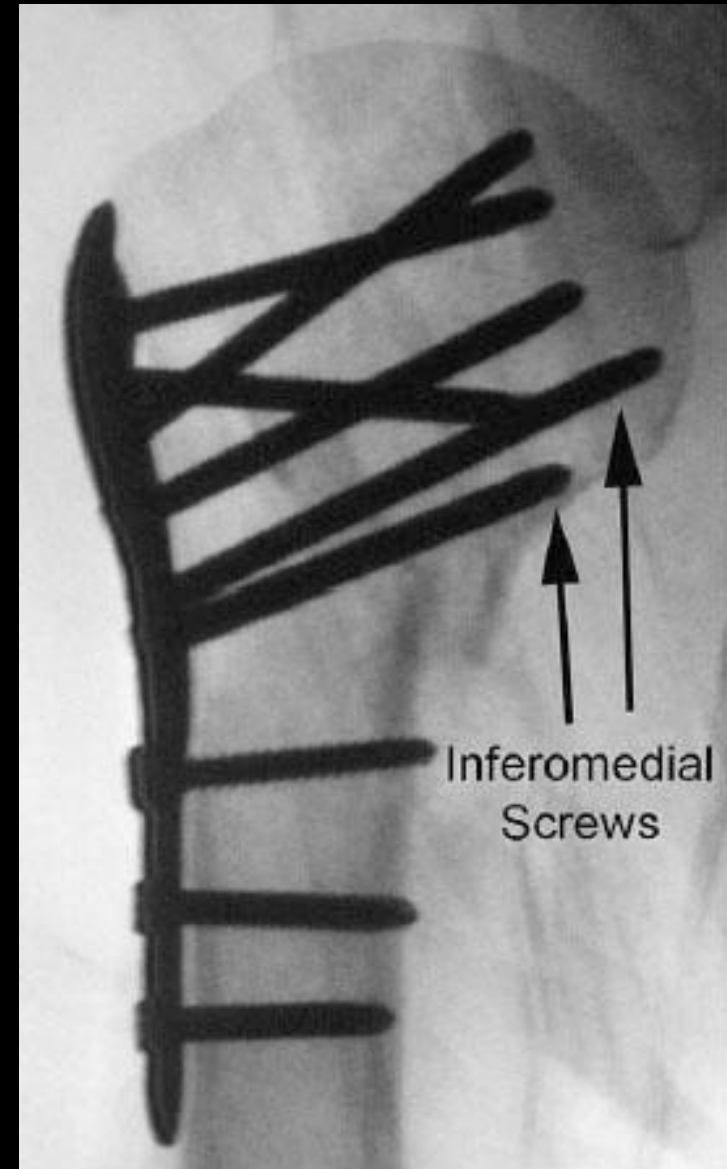
# Positioning of plate- Transverse plane



# Fixation - Varus pattern

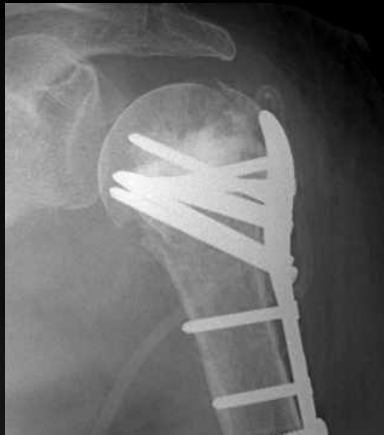
“Medial *Calcar* Support”:

- Anatomical reduction of medial cortex (competent)
- Apposition
- Inferomedial screws



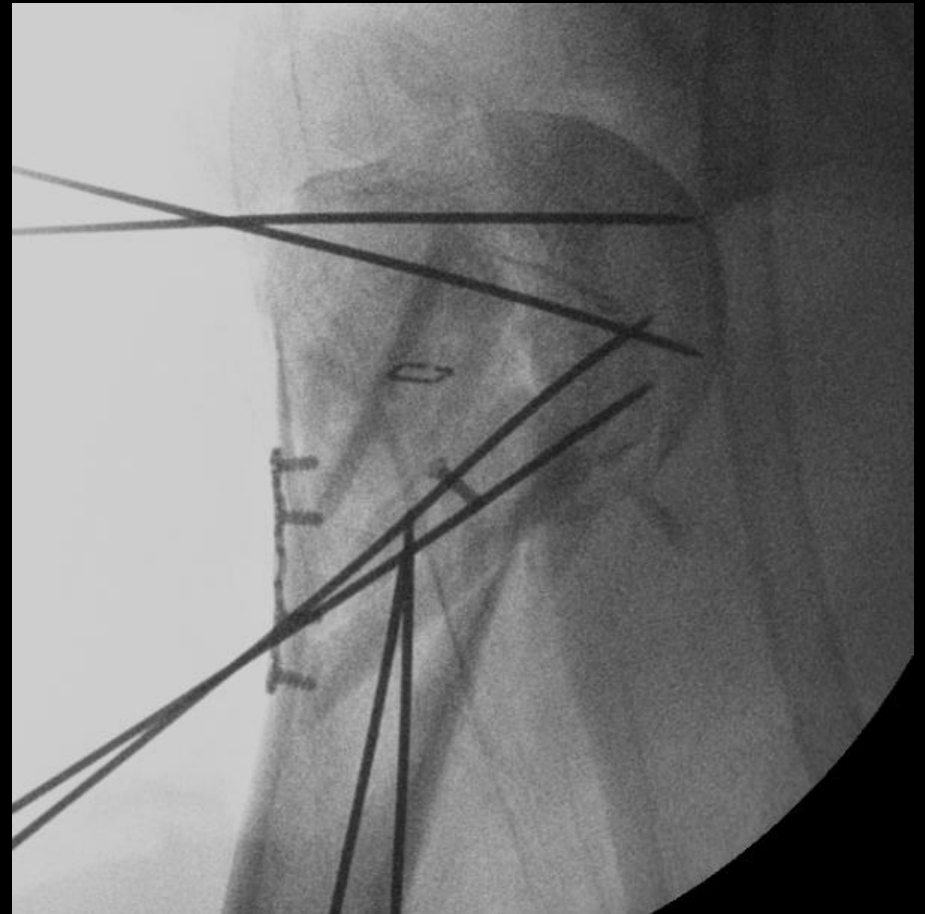
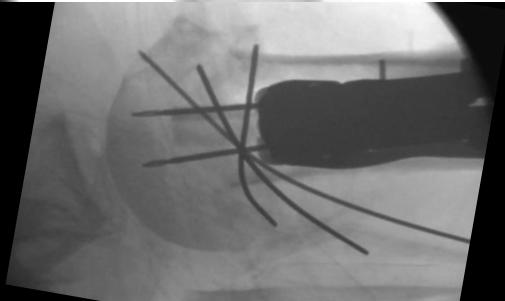
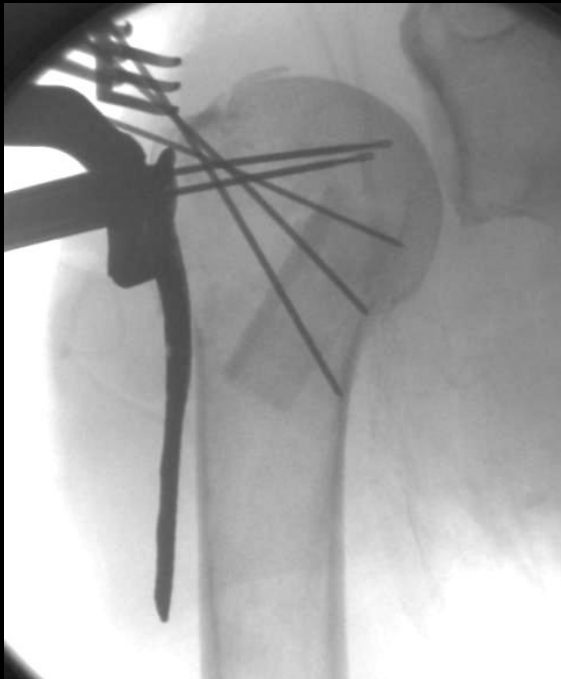
# Fixation - Valgus pattern

## □ CaPO<sub>4</sub> Cement Augmentation



# Fixation – Varus pattern

- ▣ Augmentation with fibular graft

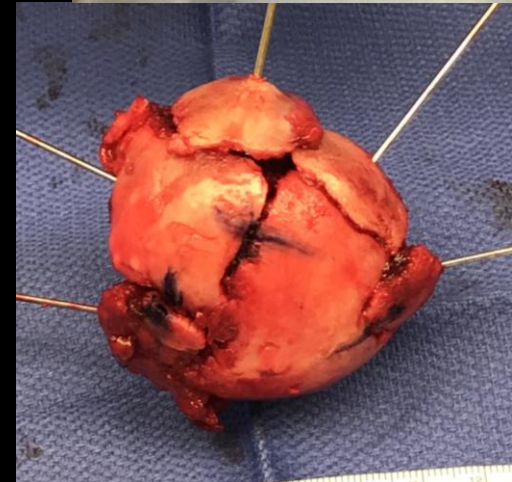


# Fixation - Augmentation



# Arthroplasty

- When fixation – *stable to allow early progressive ROM* – NOT possible
  - Fx pattern, Bone quality
  - >75 y/o, >65 y/o with comorbidity
- Arthroplasty not easy technically and high risk for dx



88 y/o

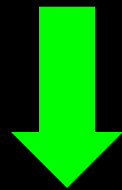




# UNSTABLE DISPLACED 3- & 4-Part Proximal Humerus Fxs

## ▣ My Practice

Unstable Displaced fx in a patient who can self care



**OPERATIVE TREATMENT**



# DISPLACED 3- & 4-Part Proximal Humerus Fxs

- <65 y/o:
  - **ORIF** with augmentation (sutures, bone void filler ± fibular shaft)
  - (**Hemiarthroplasty** if >50 yo, significantly displaced anatomic neck, head split, Fxdx)
- Tuberosities not repairable or >75 yo or >65 yo with comorbidity, Fx Dx >65 yo
  - **rTSA**

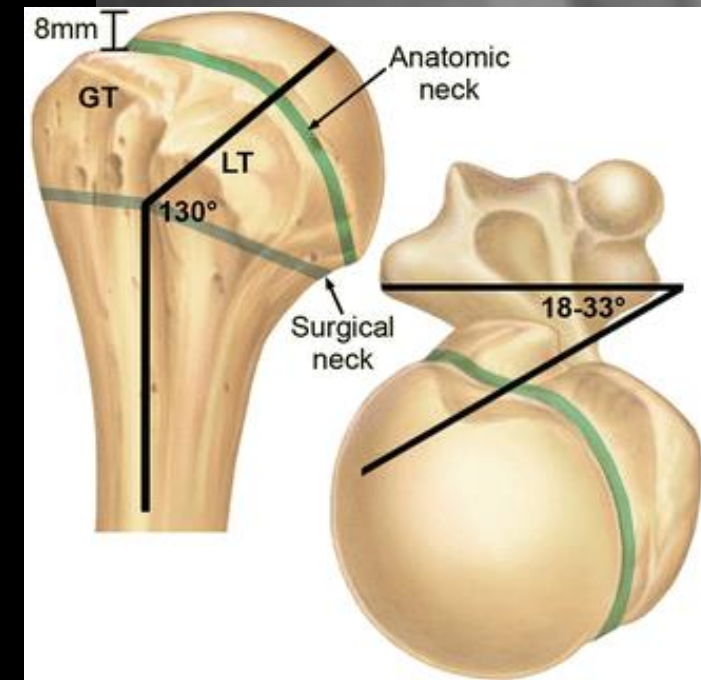
# Take Home Messages

- Analyze Displacement and Stability

- Restoration of Anatomy

↔ Functional Outcome

- Surgery provides **Best Outcome** for Unstable Displaced fxs



# THANK YOU



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