

# Proximal Humerus Fractures

***„my way“***

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# Proximal Humerus Fractures

## *„MAXIMAL“ INTERNAL FIXATION MODALITIES*

- *unstable displaced subcapital fractures with or without intra-articular component*
- *extensive metaphyseal comminution*
- *fractures extending to proximal shaft*
- *proximal humeral non-union*

# **CONVENTIONAL 4.5 T PLATE** *(with combined locking and conventional screws)*



*rotator cuff comminuted bony avulsion*

*6 months*



*1.5 years*

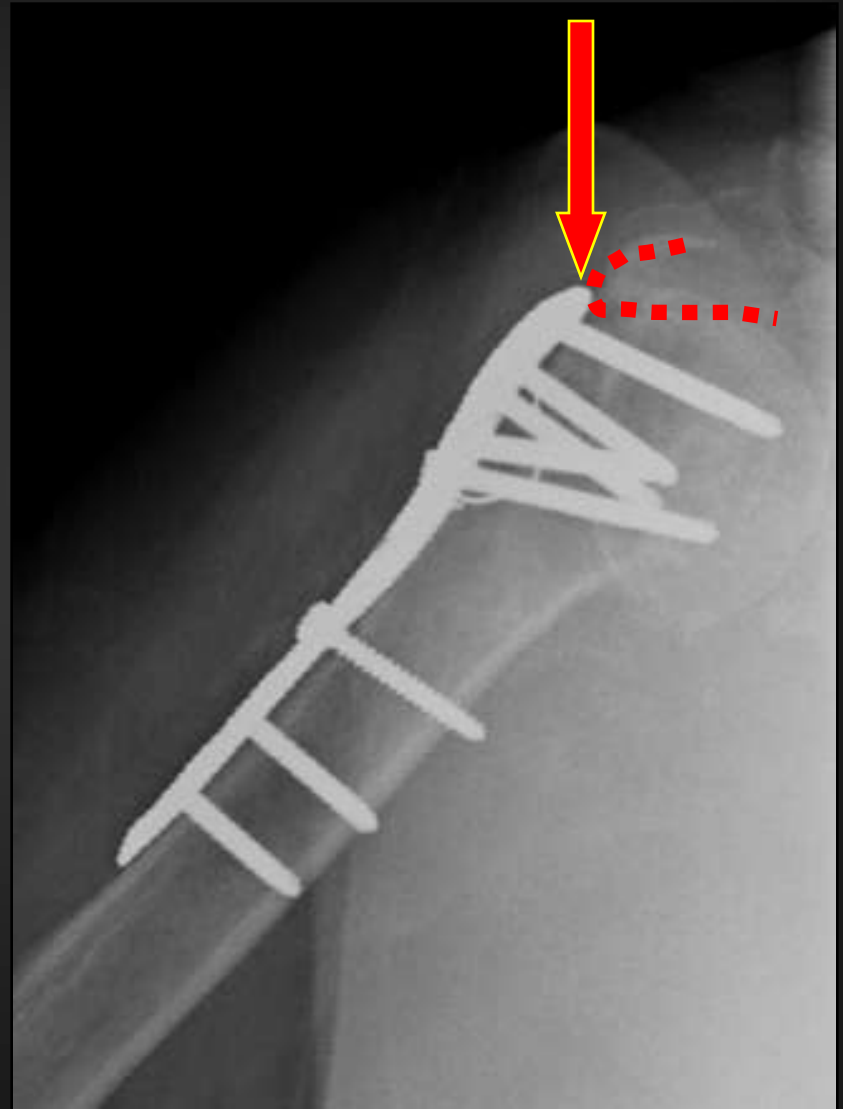


*1.5 years*



## **COMPLICATIONS:**

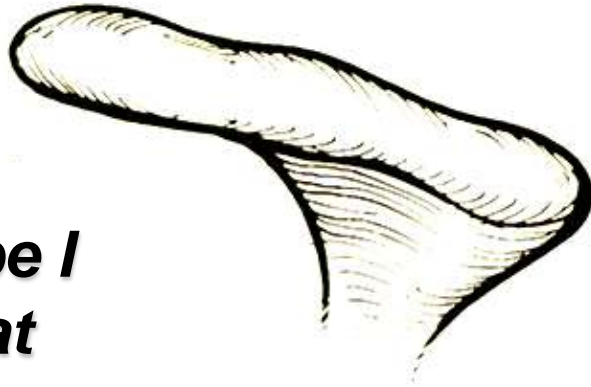
***acromial impingement***





# ***ACROMION MORPHOLOGY***

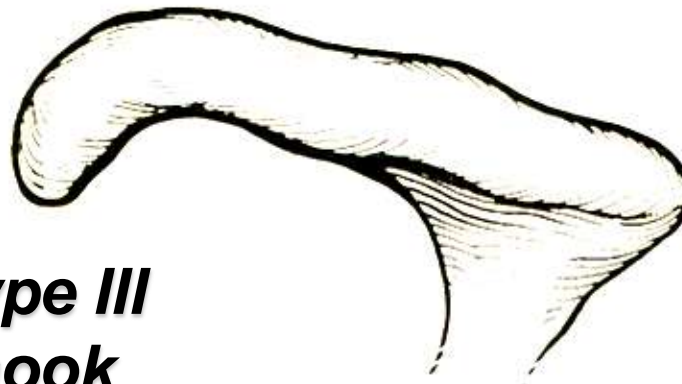
***Type I  
flat***



***Type II  
curved***



***Type III  
hook***



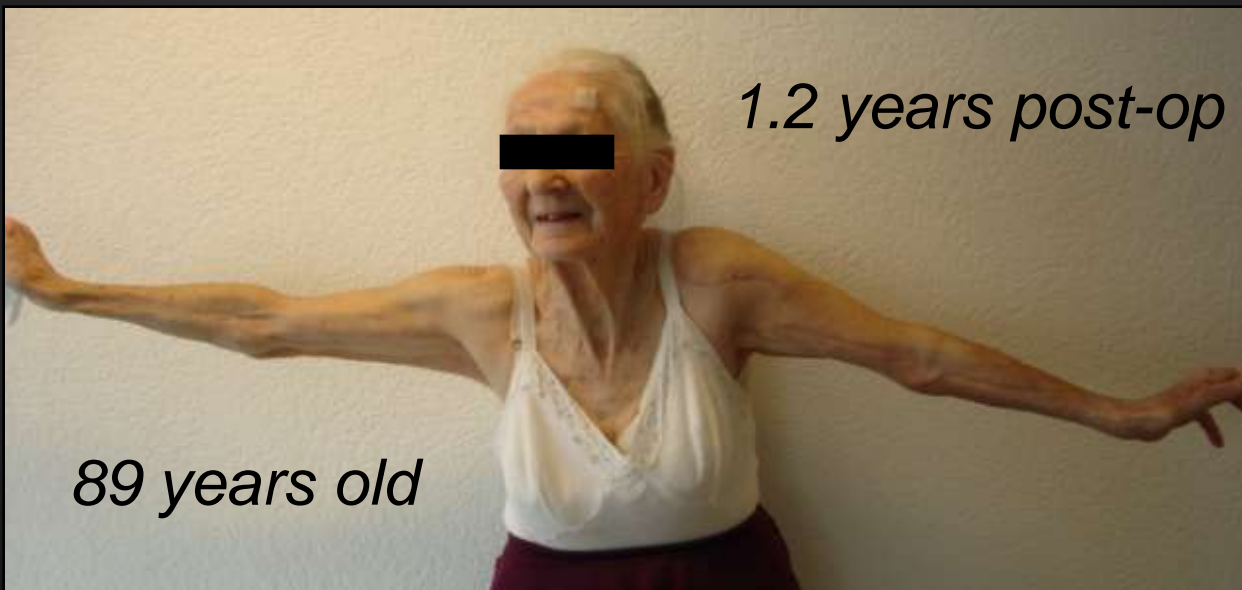
# COMPLICATIONS

## *Loss of fixation*









# ***PROXIMAL HUMERUS PLATING***

## ***ideal requirements***

- **stable fixation**
- **avoid impingement**
- **allow repair of the tuberosities**
- **ease of application**

# *De Puy Johnson and Johnson S<sup>3</sup>*

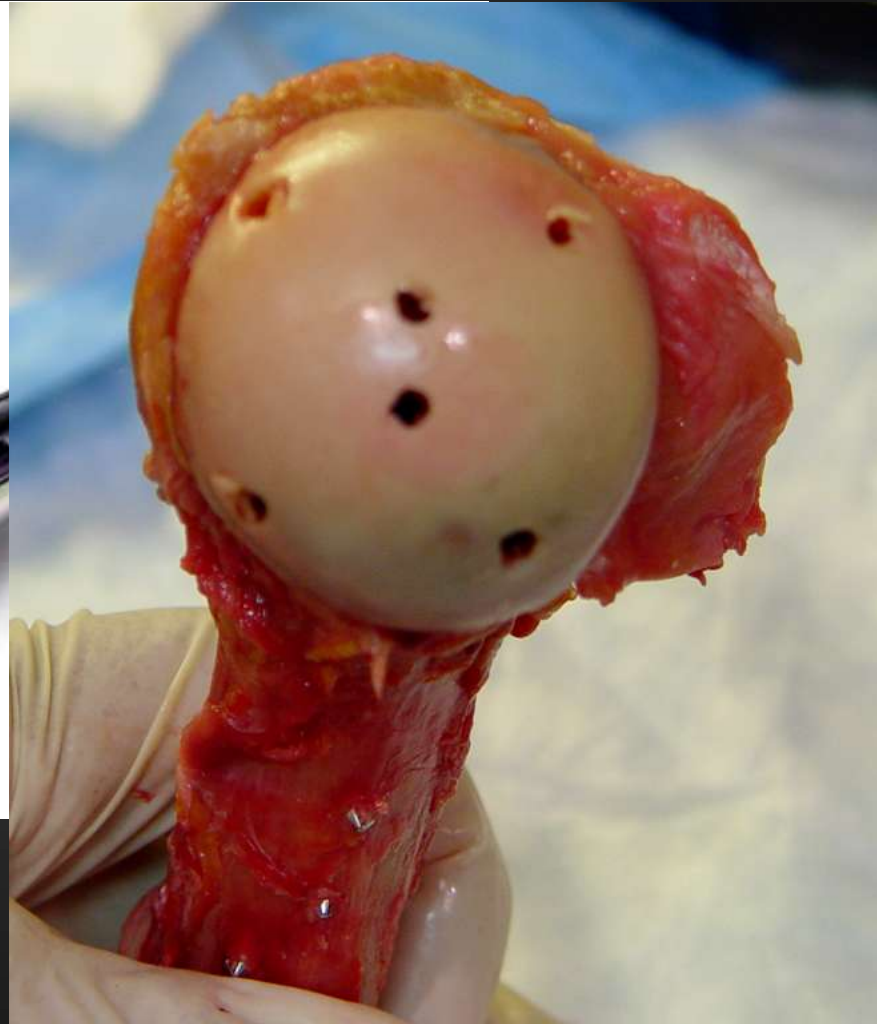
- Spatial subchondral support
- A new approach to angle stable plating of proximal humeral fractures
- Utilises many of the same technologies and principles that contributed to the success of the DVR-A and DNP-A devices



# *Design Requirements*

- **Stable support for the humeral dome**
  - **Allow early motion and function**
- **Anatomic design**
  - **Avoid Impingement**
- **Facilitate repair of the tuberosities**
- **Simplified Technique**

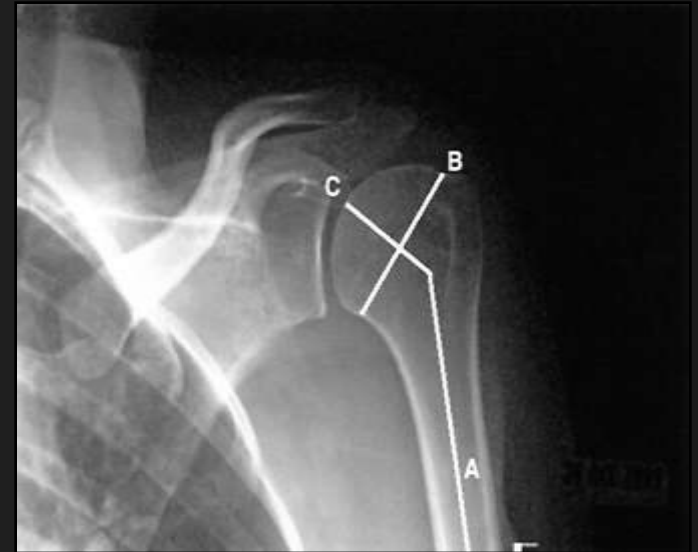
# ***Convergent-Divergent Blunt Pegs***





# *Anatomic Design*

- **Central K-wire = Neck-shaft angle**
- **Pins surround humeral articular center line and parallel to neck shaft angle**
- **Retroversion built into the plate**



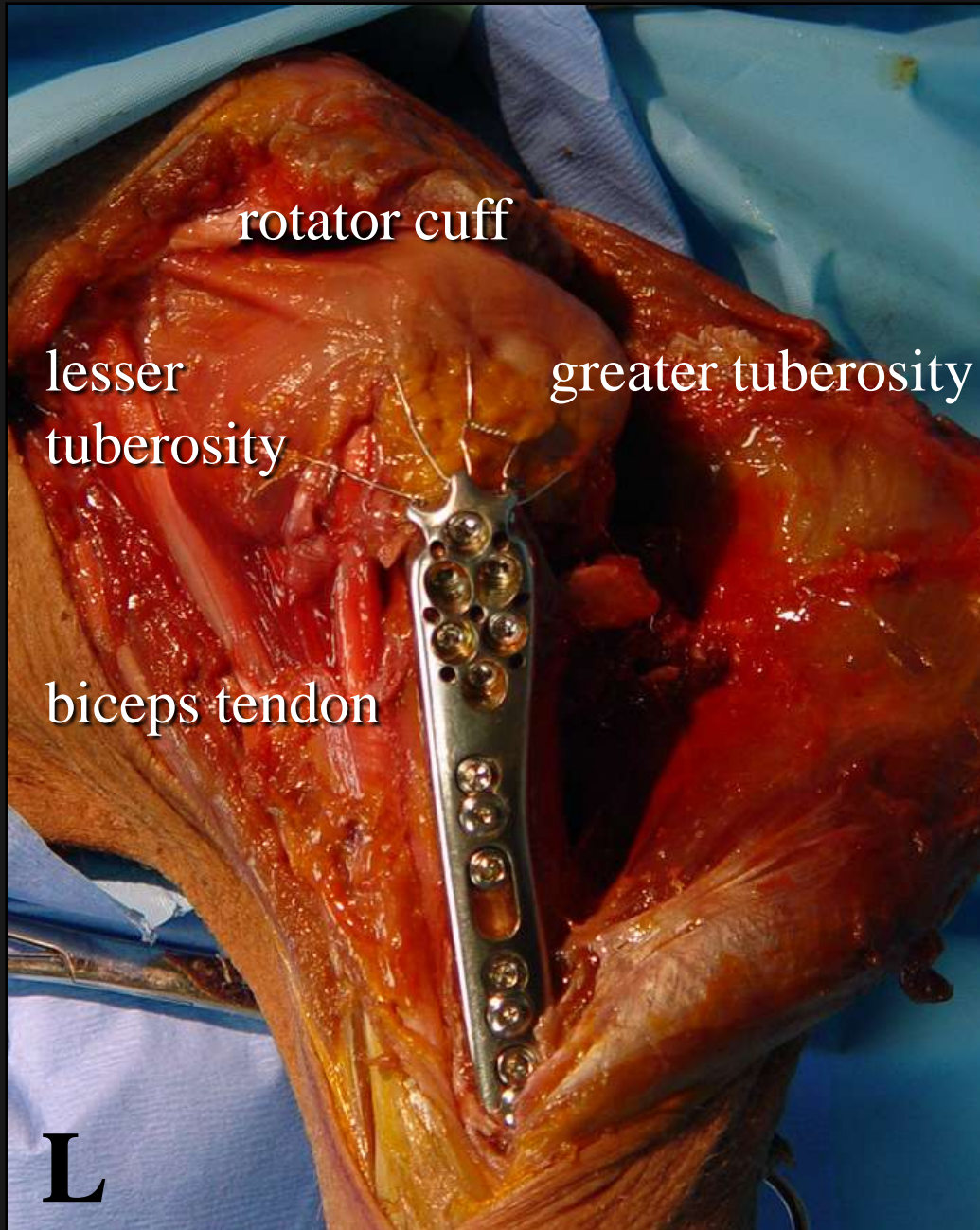




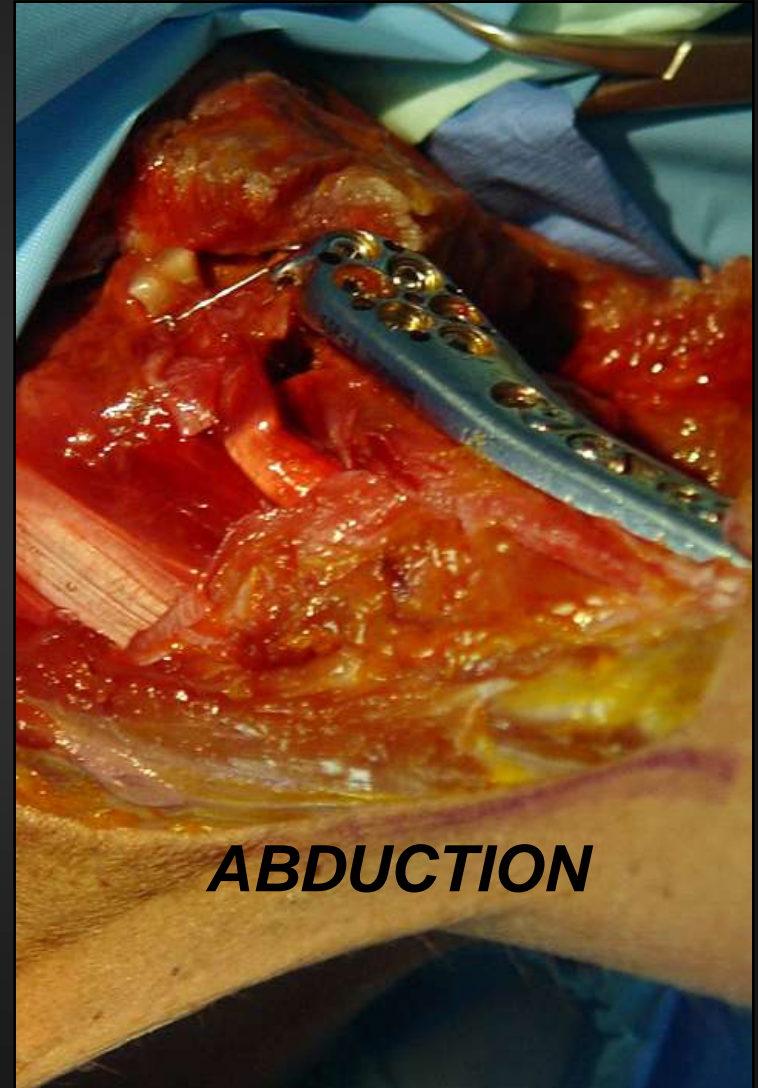


***no acromial impingement***

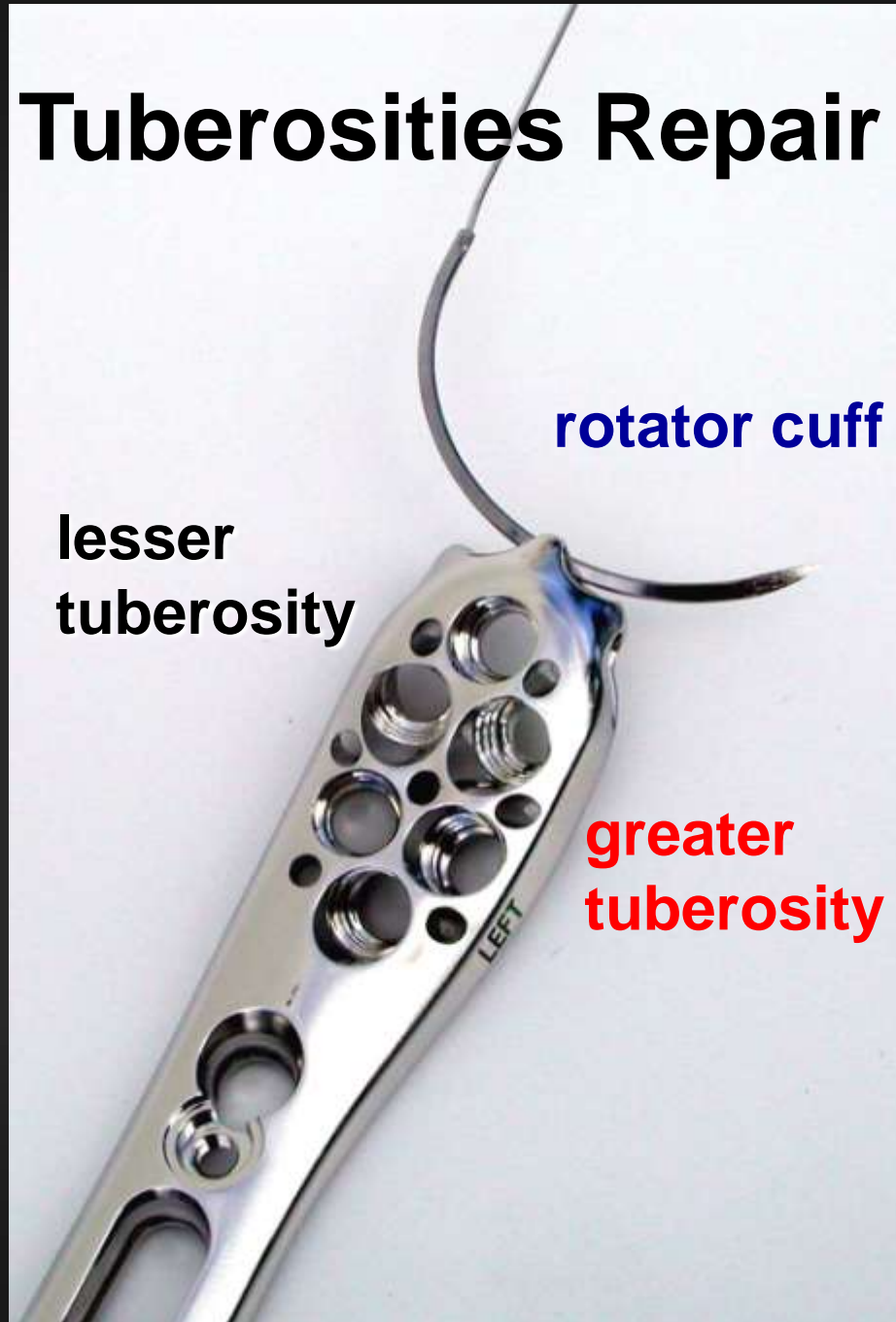




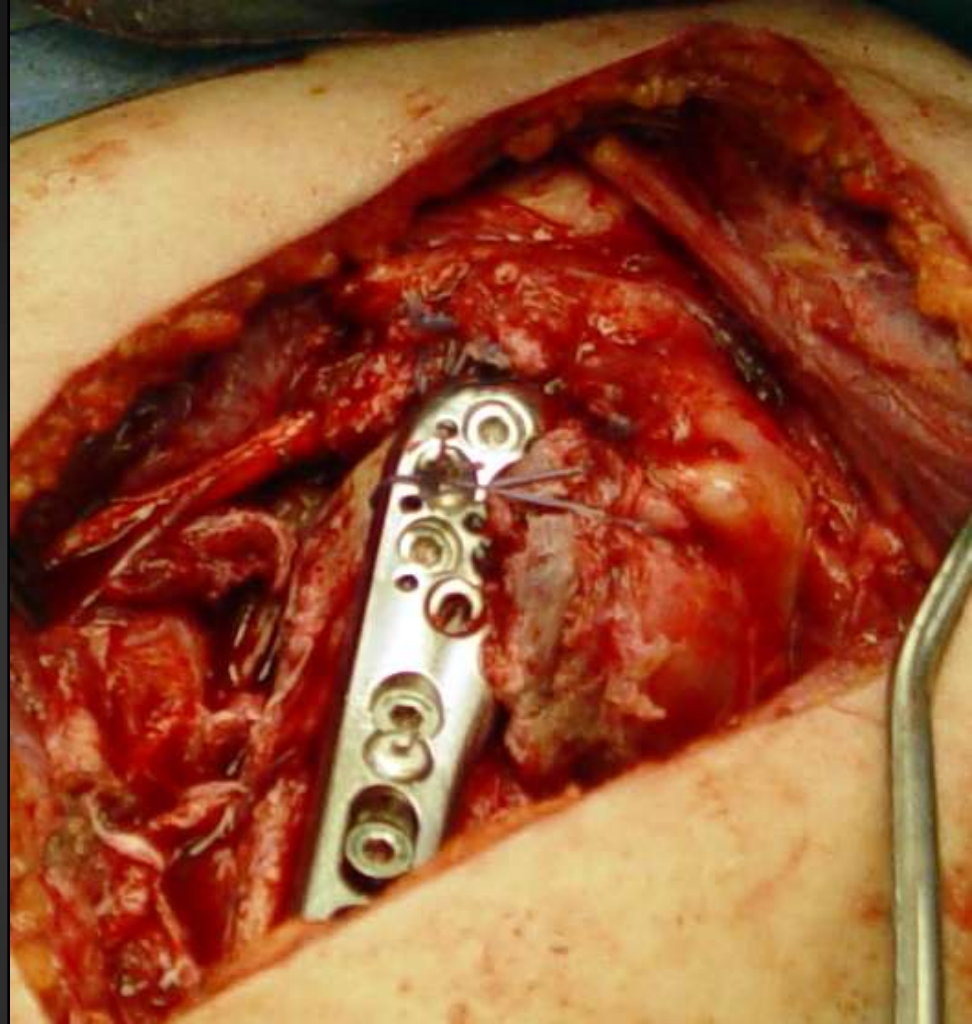
**no impingement**



# Tuberosities Repair







# *Simplified Technique*

**Multiple shaft screw options:**

- variable angle
- locked



# Summary

- An evolution of proven designs
- Principle of *subchondral support* may improve outcomes in challenging fractures
- Solves many of the challenges of proximal humeral angle stable plating
- May be ideally suited for osteoporotic patients



# ***Surgical Technique***



81 years old



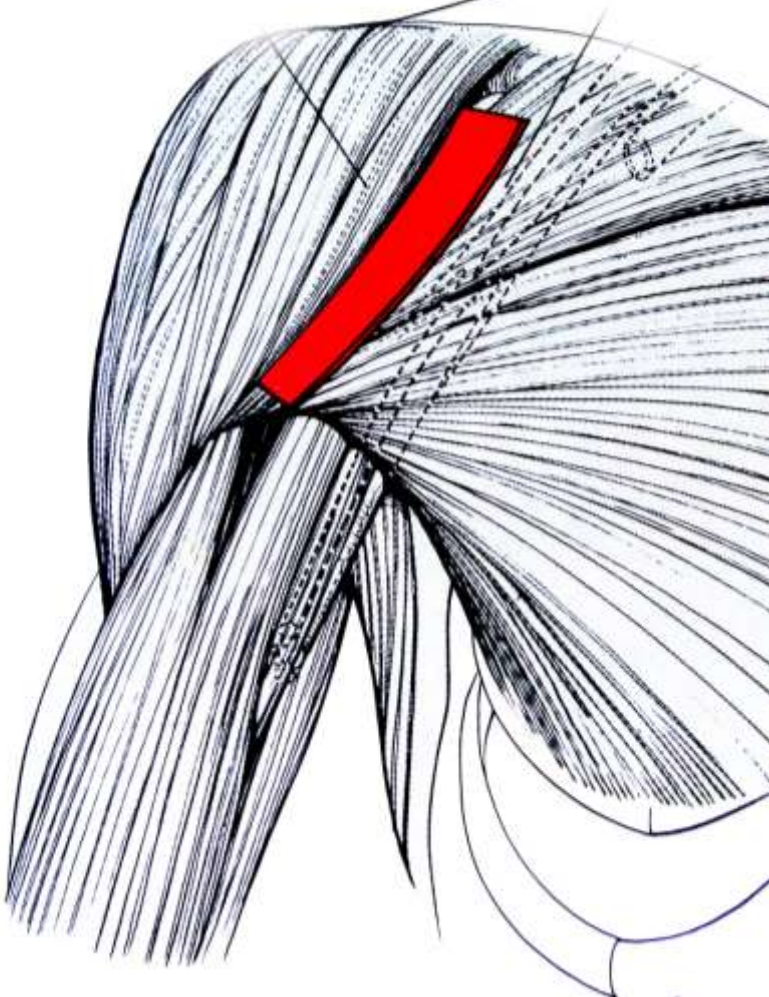
# ***Surgical Technique***



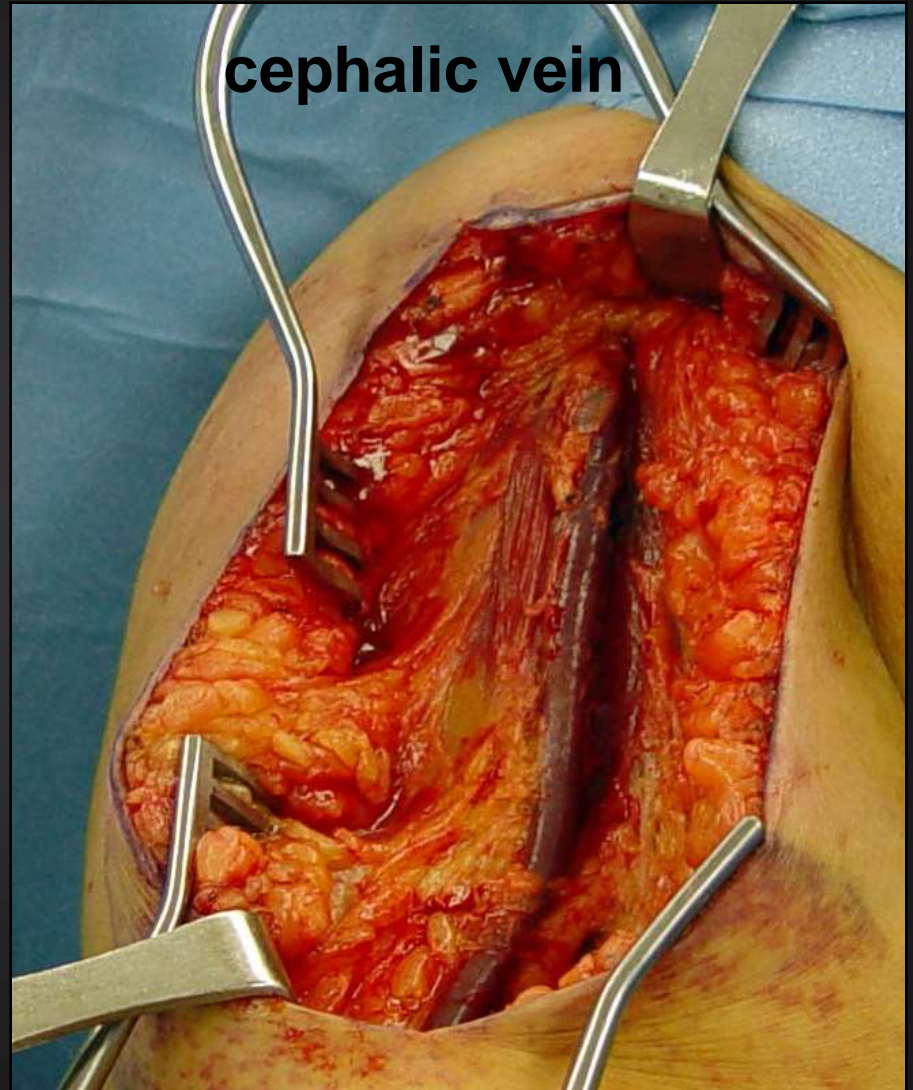


# ***Surgical Technique***

**delto pectoral groove**

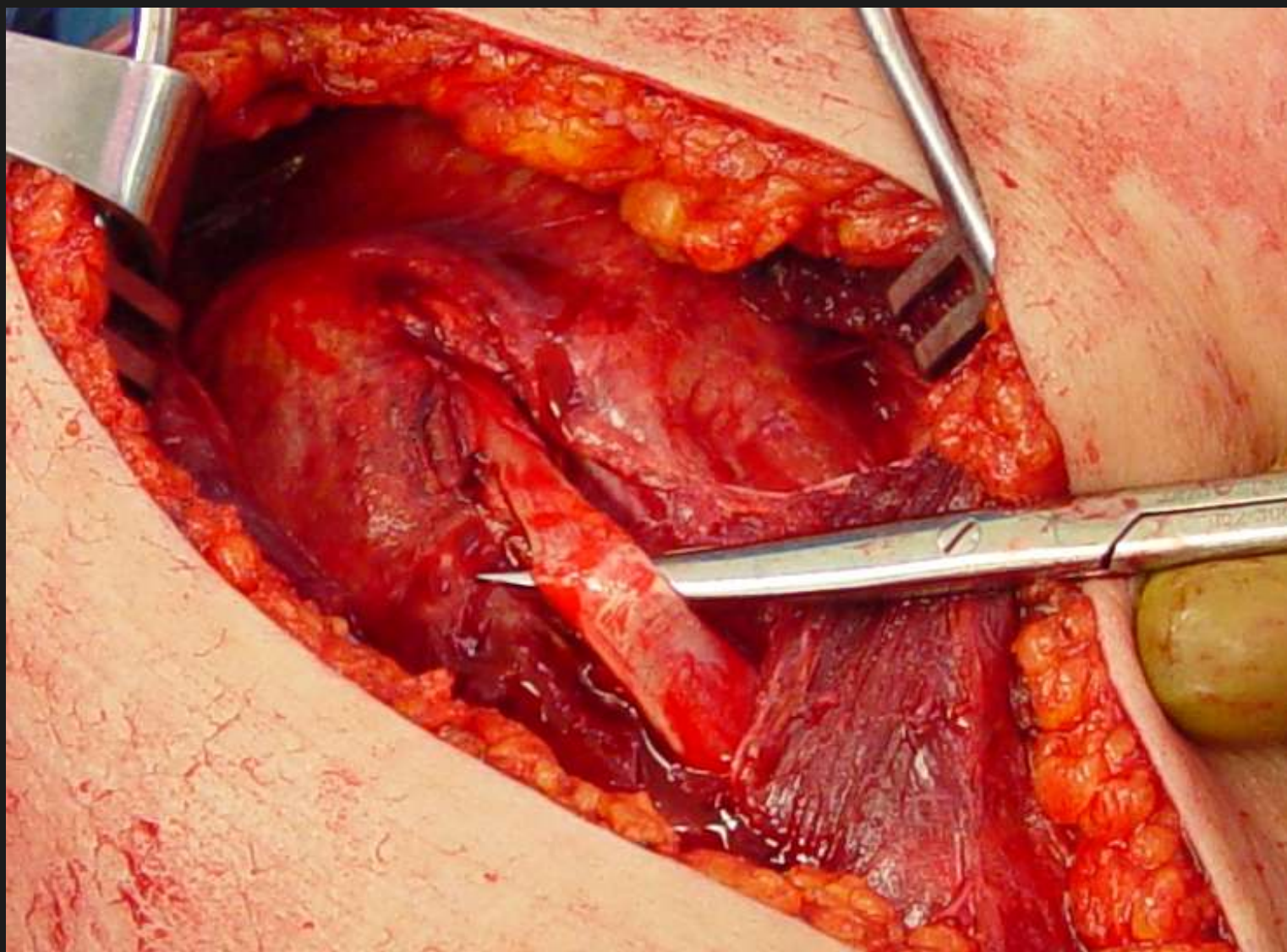


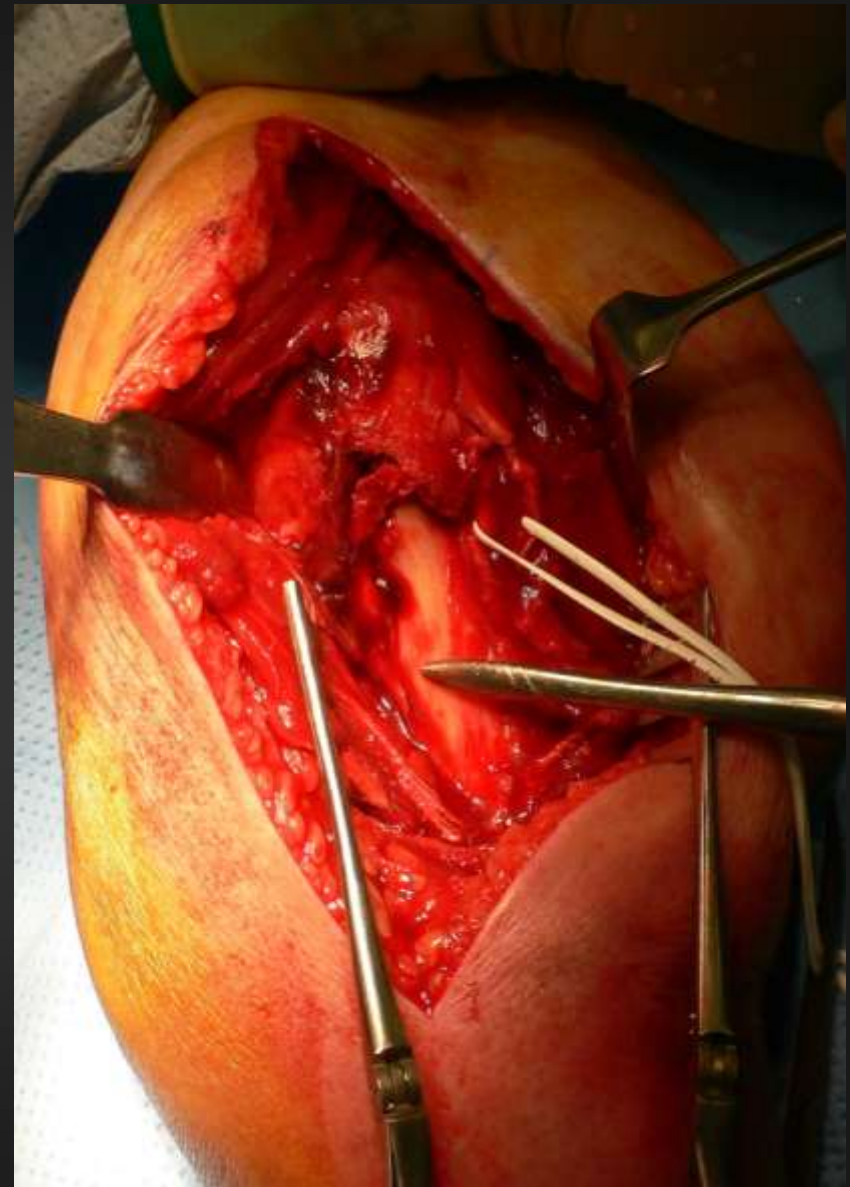
**cephalic vein**



***DELTO-PECTORAL APPROACH***

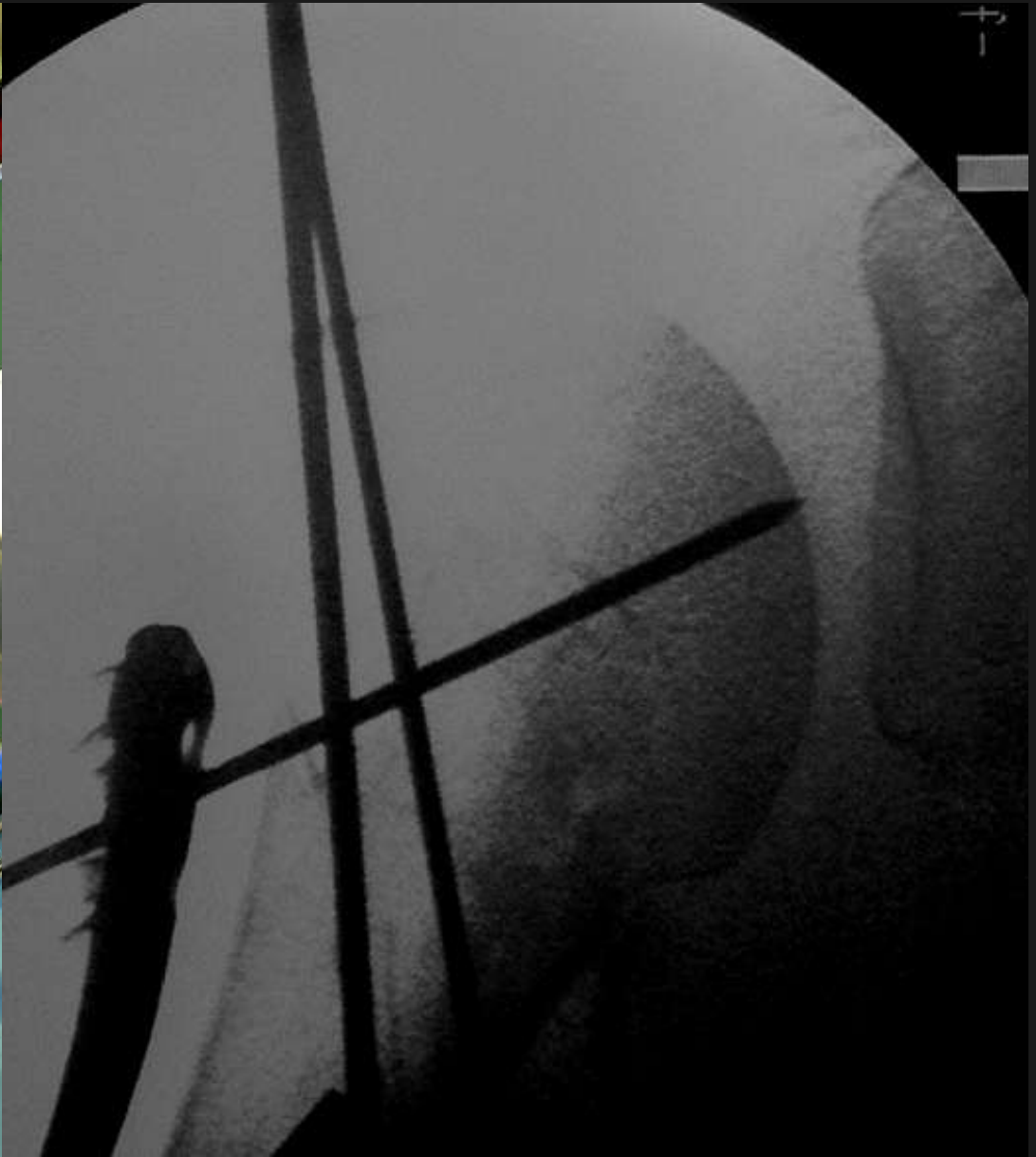




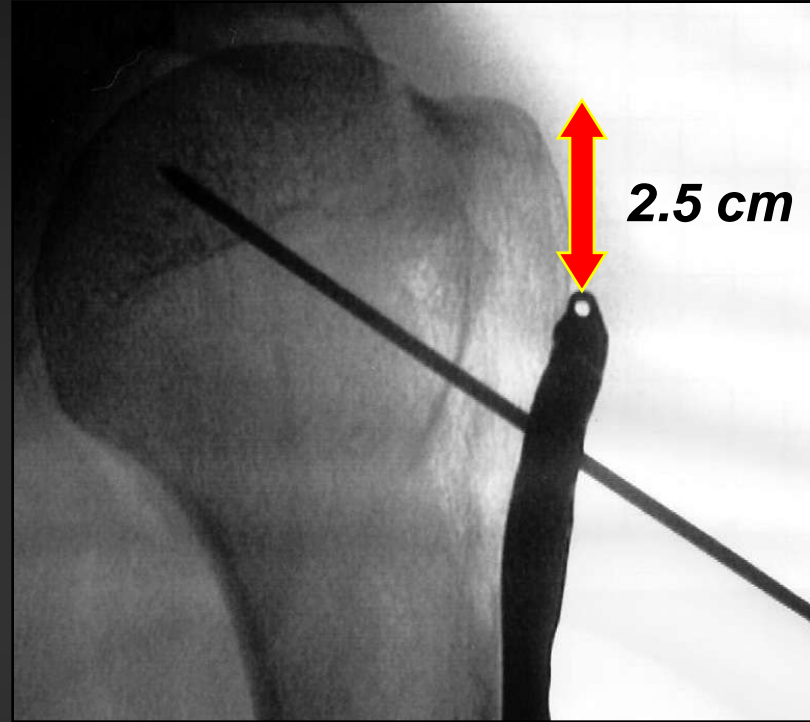


*preliminary fracture reduction*





## **Central Guide K-Wire**



***centralizing the guide wire in the humeral head  
indicates proper plate position***

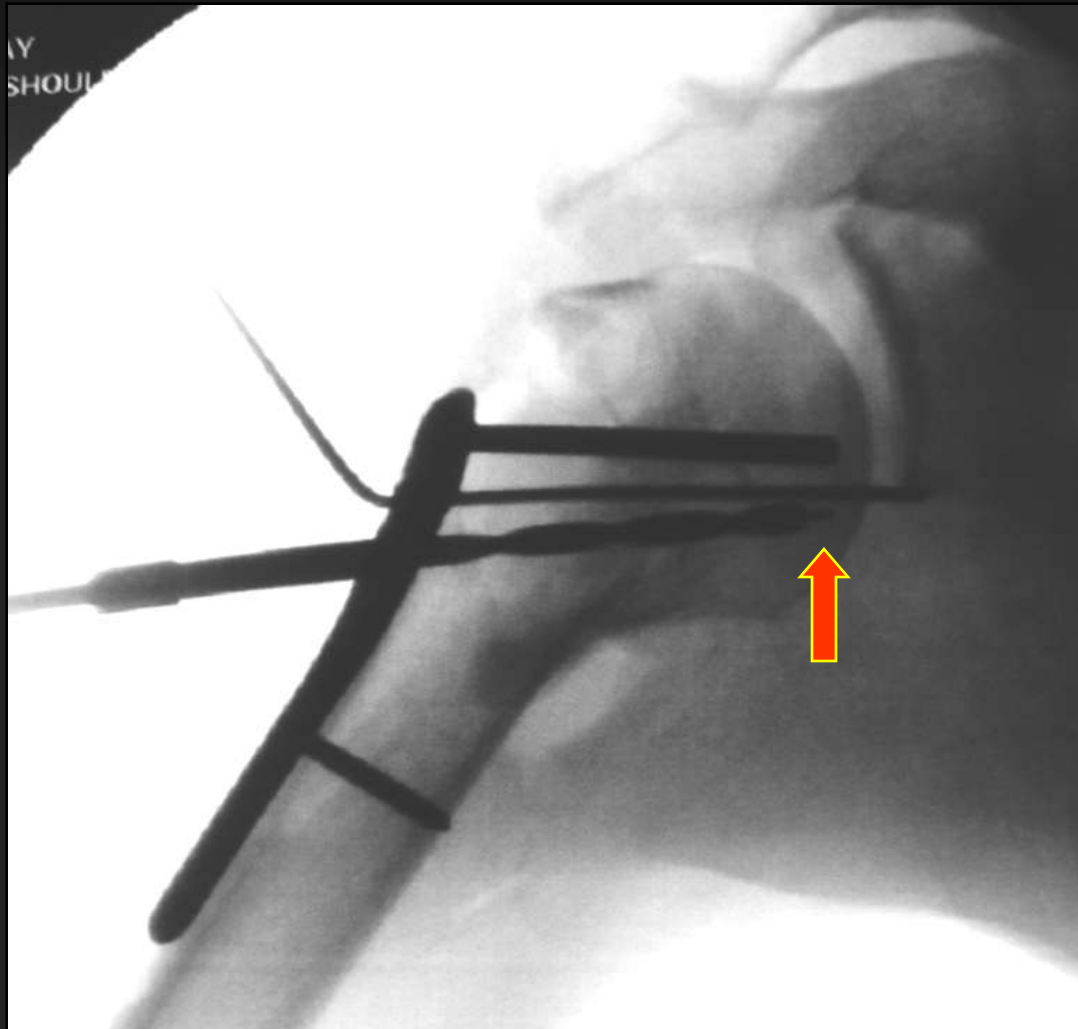
***notice plate distance from tip of greater tuberosity***

*the short drill guide is  
used to perforate the  
near cortex....*



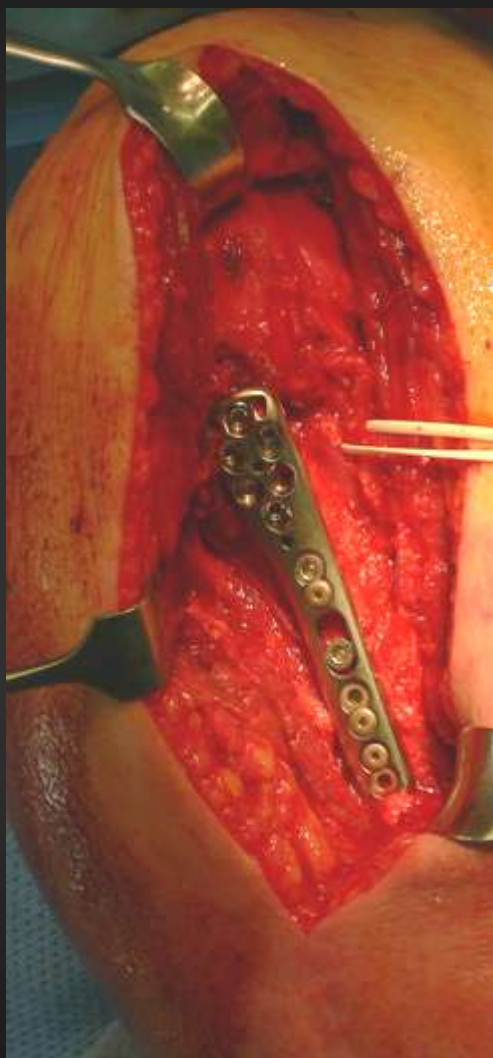
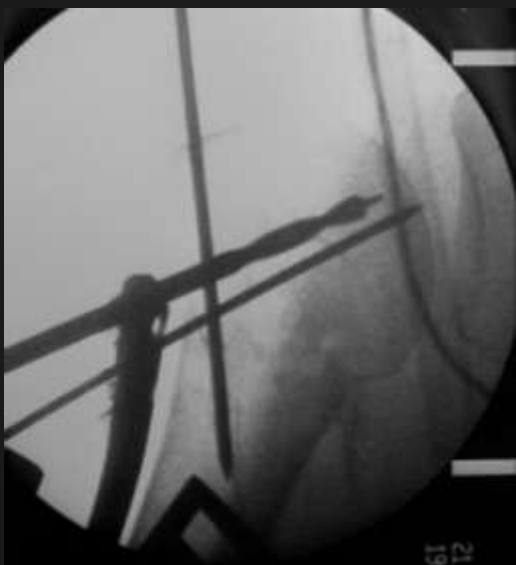
*hand drill to  
subchondral bone....*



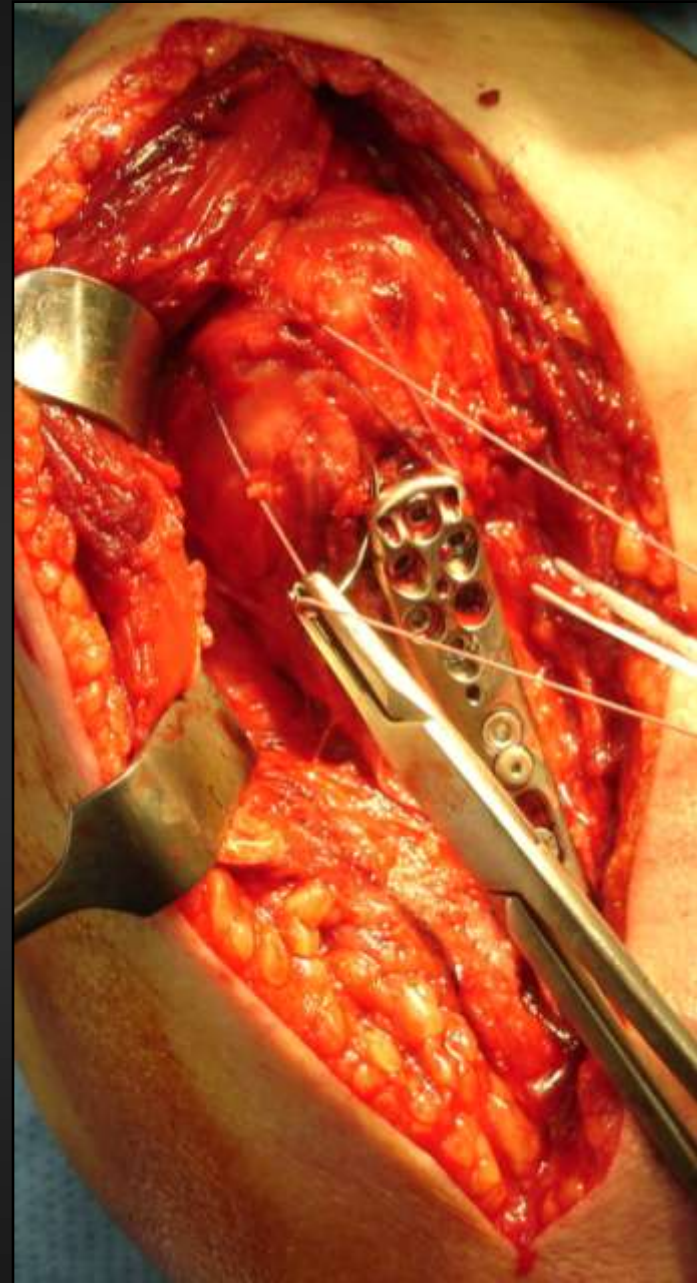
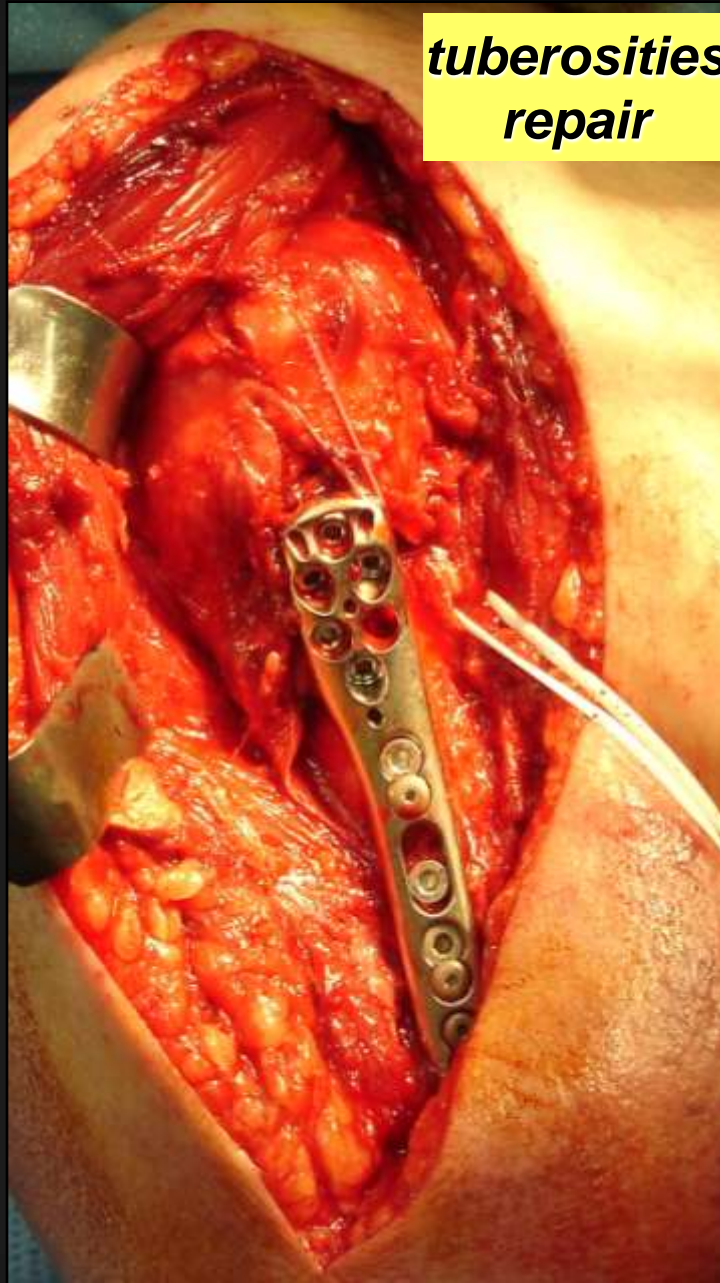


*drill will hit resistance when in contact with subchondral bone*  
*verify drill depth with the use of a fluoroscope*  
*this is the optimal length for the support pegs*

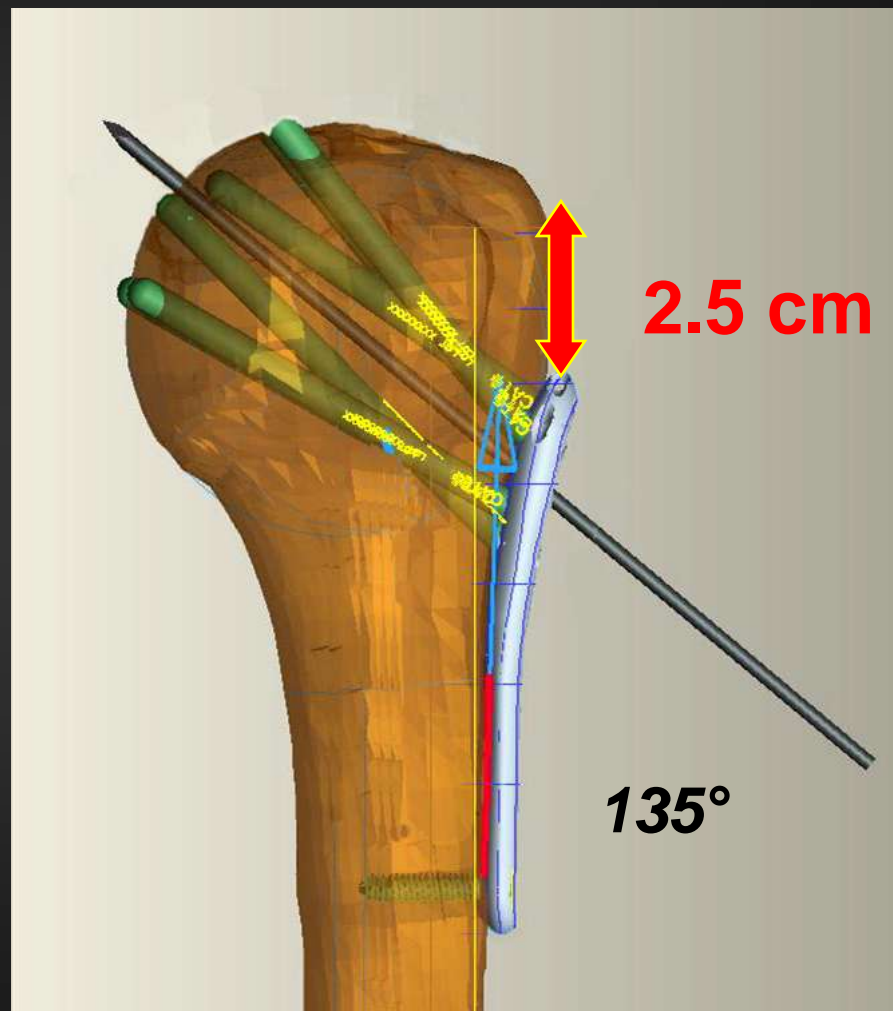
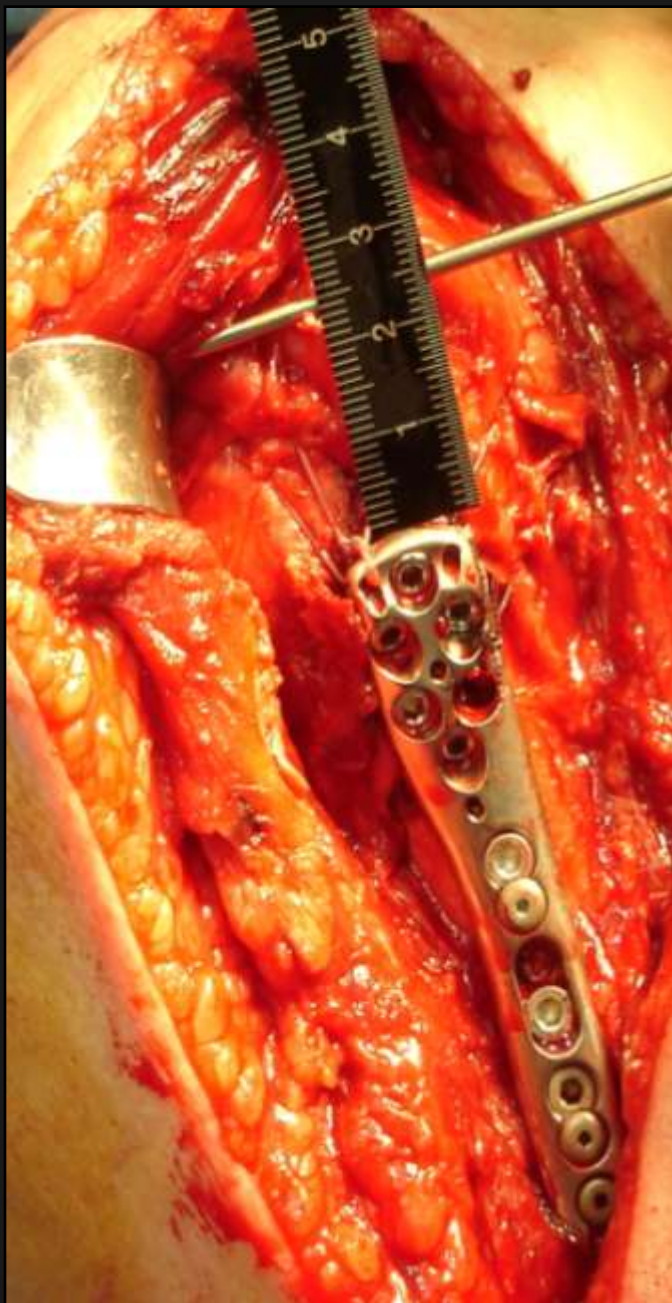




**tuberosities  
repair**









**4 days  
post-op**







6 weeks  
post-op







# ***Clinical Examples***



*52 year old female*







*63 year old female,  
3-part fracture*

R



This is an anteroposterior (AP) radiograph of the right shoulder. The image shows the humeral head, tuberosity, and proximal shaft. A clear fracture line is visible through the greater tuberosity, extending into the articular surface of the humeral head. The fracture is comminuted, with multiple fragments visible. The rest of the humerus and the surrounding soft tissue appear relatively normal.

R



This is a lateral radiograph of the right shoulder. It provides a different view of the same fracture, showing the humeral head and tuberosity from the side. The fracture line is clearly visible, showing the extent of the comminution and the displacement of the fragments. The acromioclavicular joint and the ribs are also visible in the background.





*9 months post-op*



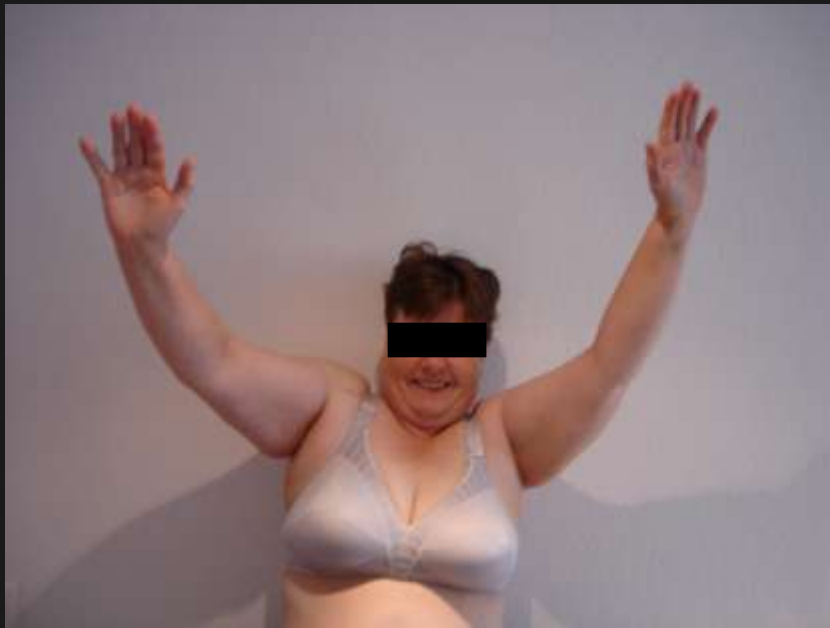
















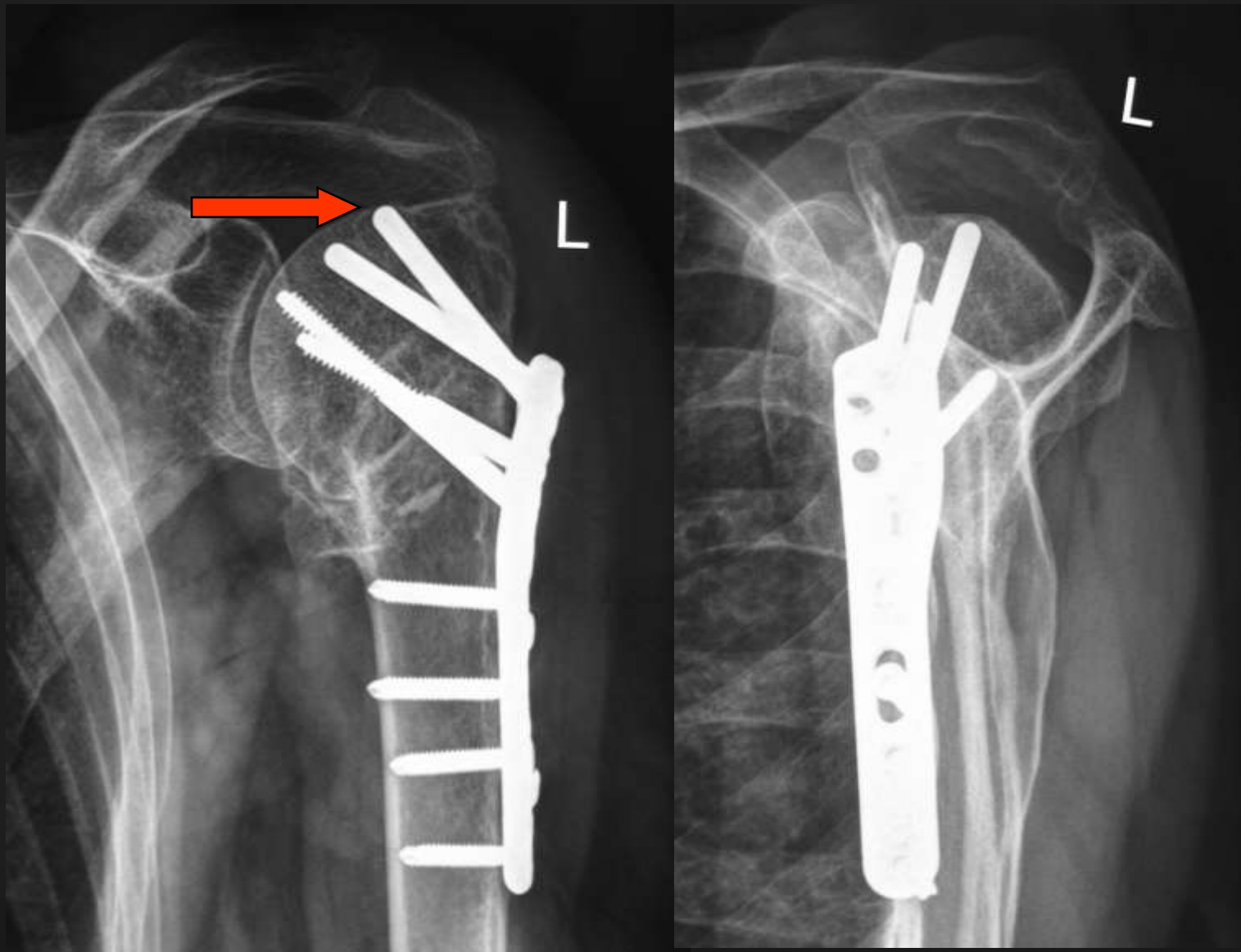








*varus collapse....risk of implant penetration!*





*1 year post-op*



*partial brachial plexus paralysis*



*Ski accident*

R





*post-op  
x-rays*







*2 years  
post-op*



*2 years  
post-op*

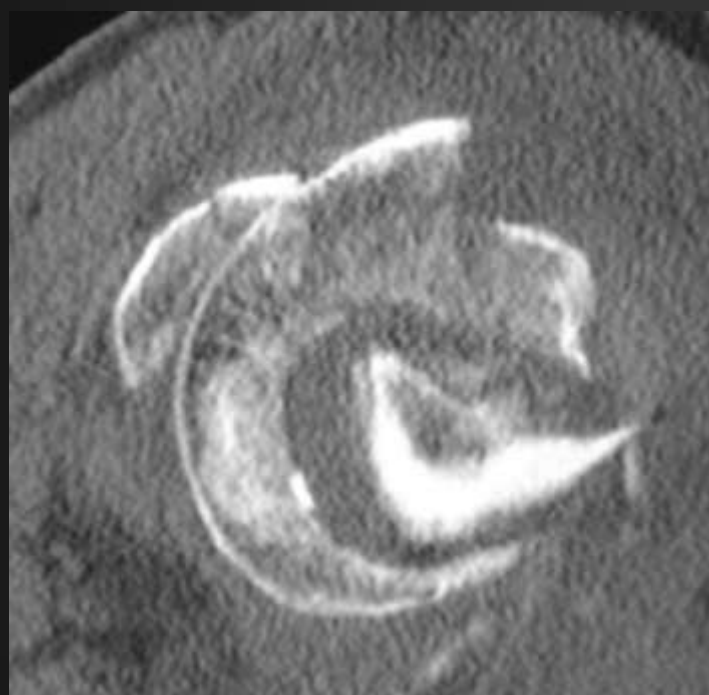
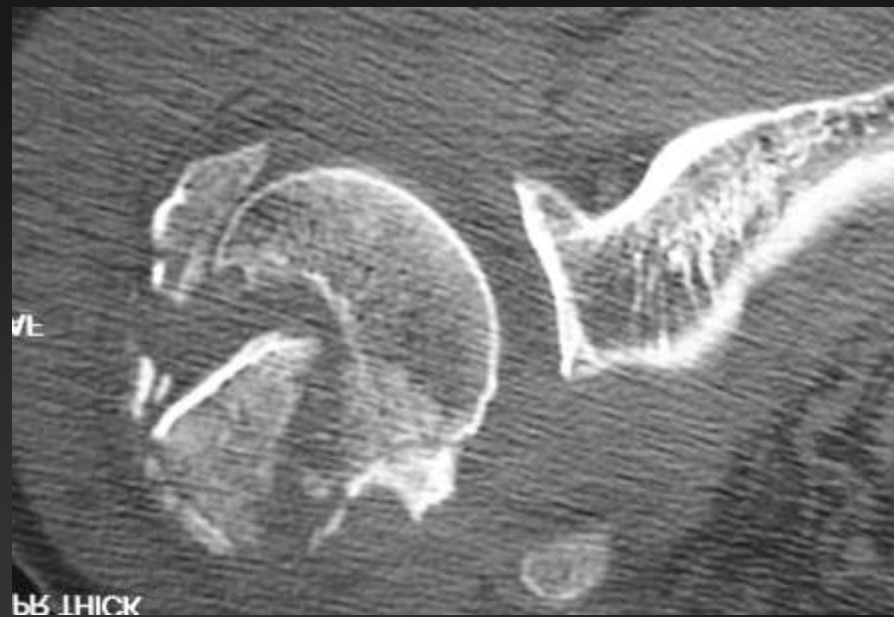


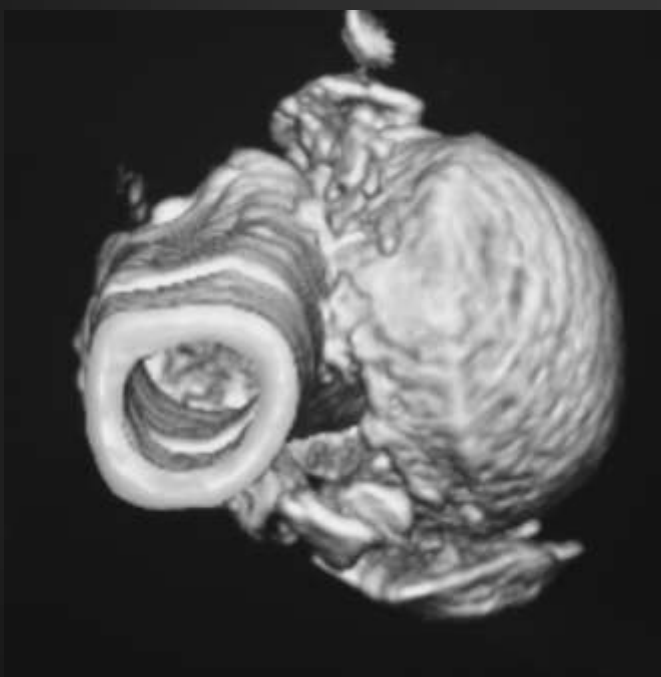
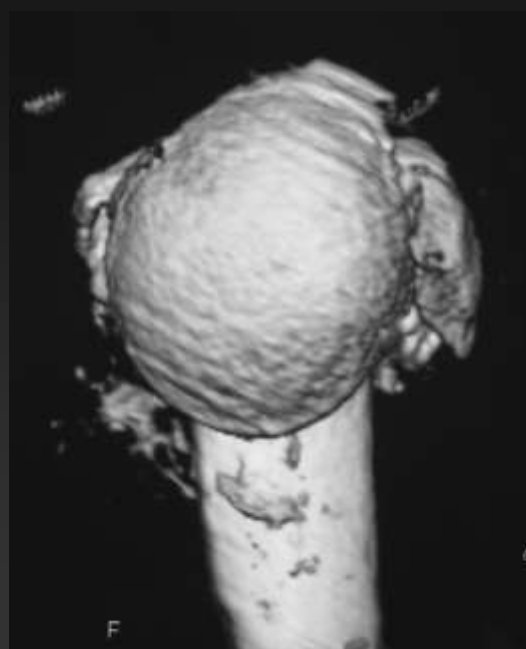
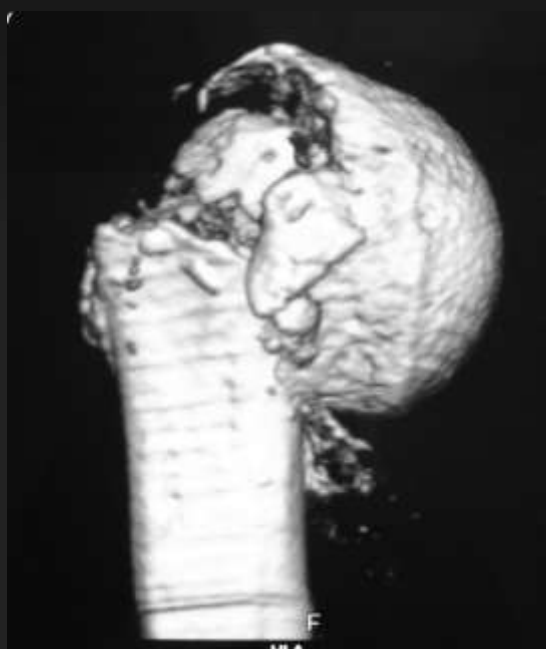


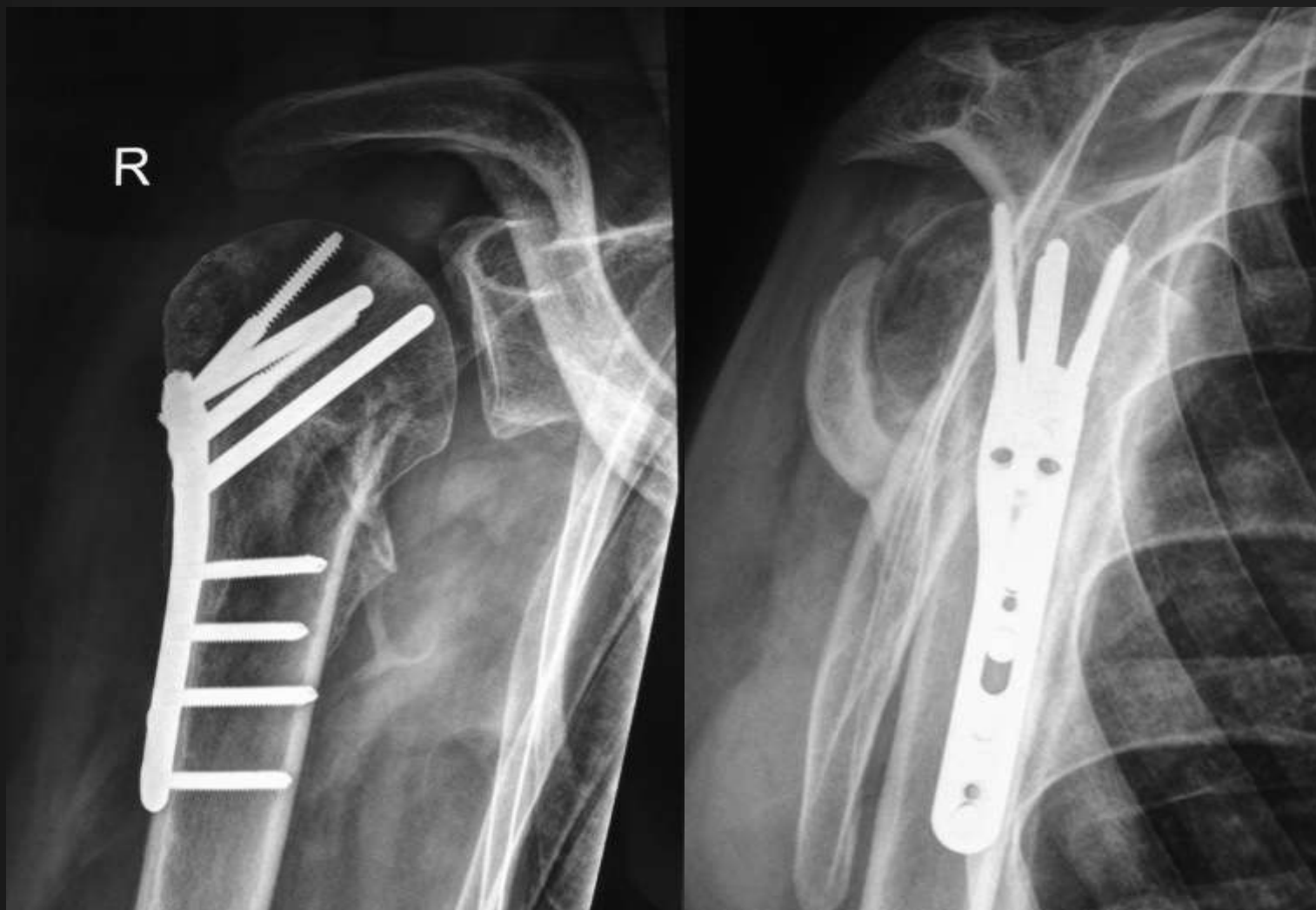
*75 year  
old priest*











*1.2 years post-op*











1.2 years post-op



*87 year old housewife, massive osteoporosis*









# Ideal Fixation

- *Provide rigid fixation*
- *Avoid impingement – plate low on the humerus*
- *Provide subchondral support of the head segment*
- *Anatomic fixation with built in retroversion*
- *Locking fixation in the head and shaft segment*
- *Provide provisional fixation*
- *Suture attachment points for tuberosity/cuff repair*
- *Easy to use*
- *Reproducible results*
- *Multiples sizing options*

# CONCLUSIONS

*rigid fixed-angle plate fixation has a place in the management of proximal humerus fractures*

- 1. Unstable,displaced 2, 3 and 4 part fractures*
- 2. Extensive metaphyseal comminution*
- 3. Metaphyso-diaphyseal extension*
- 4. Osteoporotic fractures*

*our initial clinical experience with the S3 system has produced so far highly satisfactory functional results*



Thank you !

