Fracture complexe ESH
Que choisir ?
Hémi ou Inversée

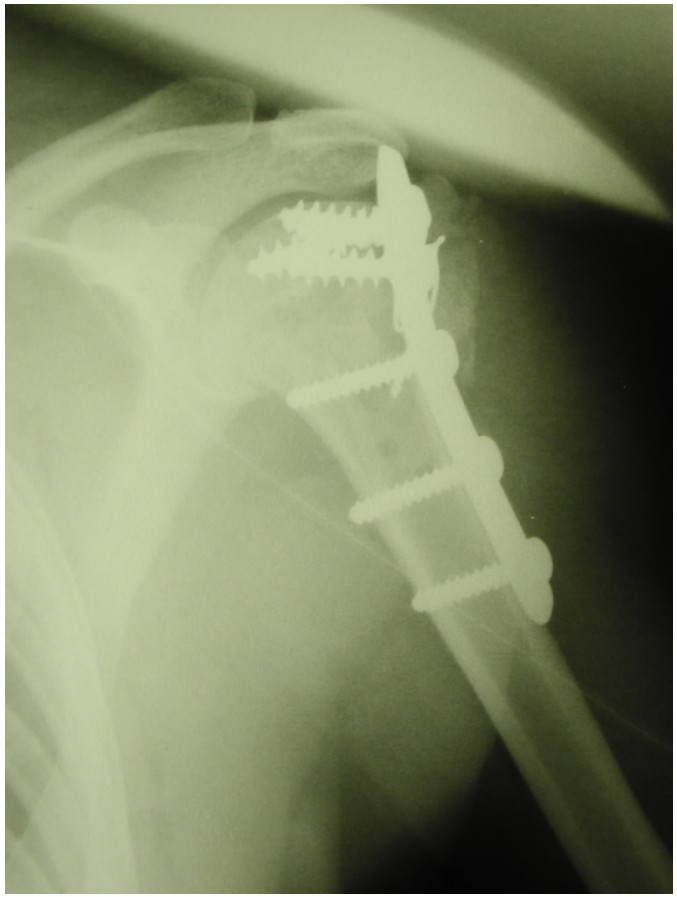
Ph Valenti
Paris

Proximal Complex fracture of the humerus Surgeon is not always happy !!!!

Reduction is not anatomical !!!!

Great tuberosity is not reduced !!!

Material may be is not adapted



Sometimes the patient is young
And you try an osteosynthesis

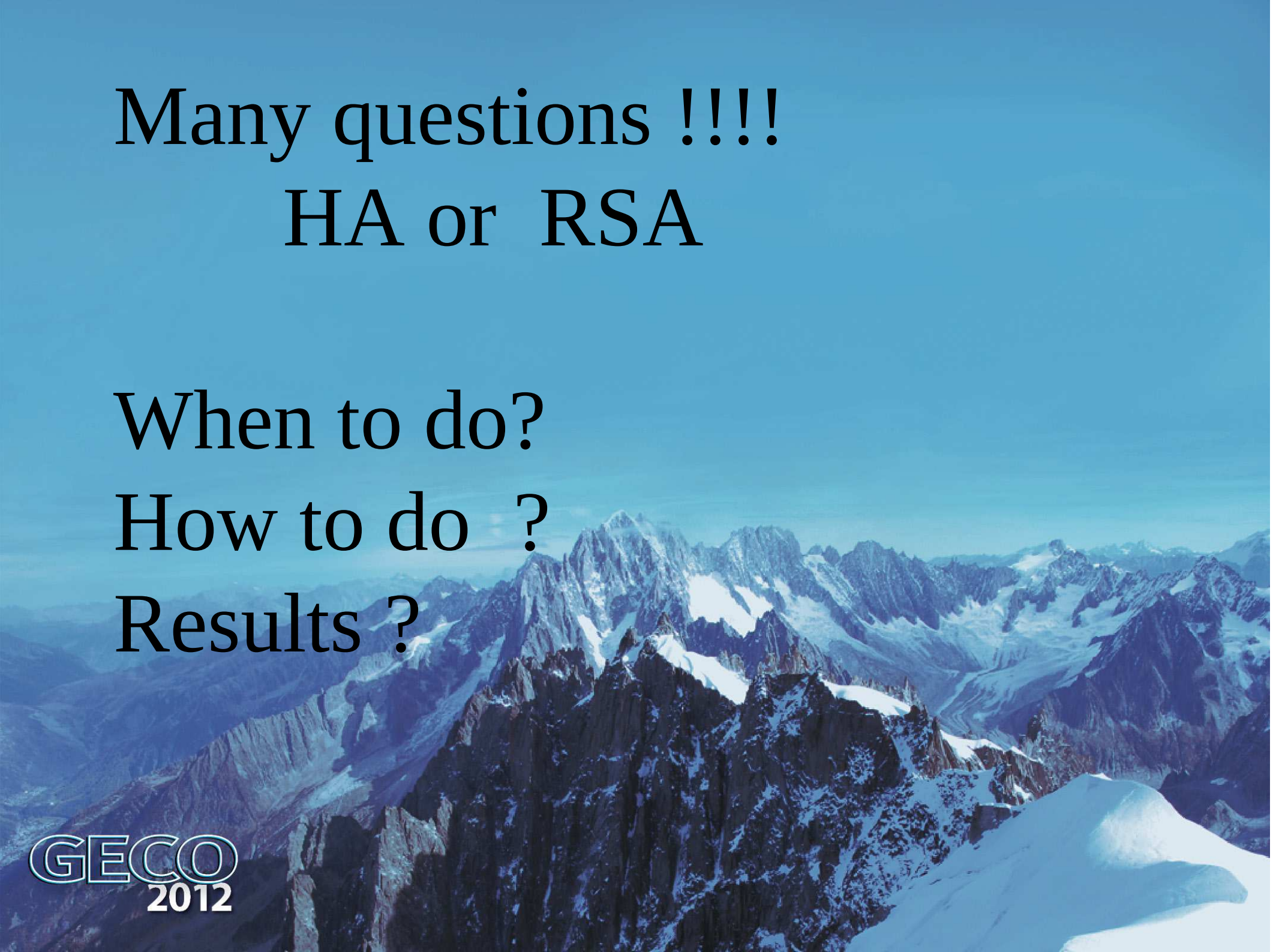
Secondary necrosis
Malunion of Tuberosities

LIMIT OF OSTEOSYNTHESIS !!!

PROSTHESIS
Should be

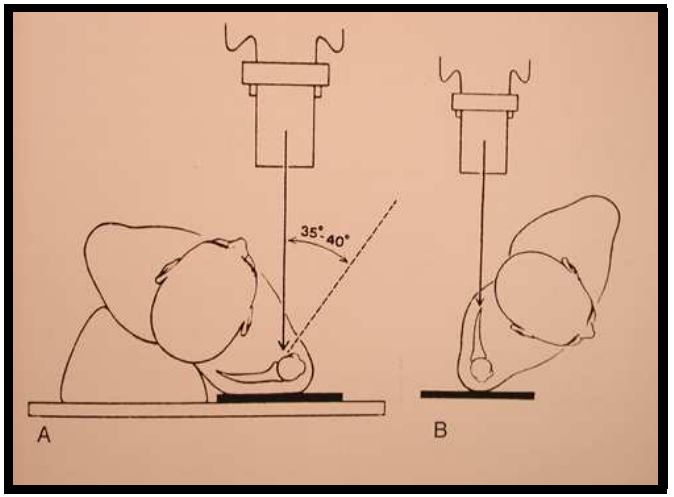
ON THE TABLE

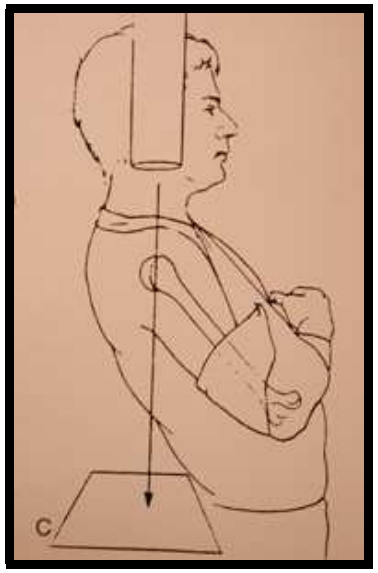
NO !!


Many questions !!!!
HA or RSA
When to do?
How to do ?
Results ?
GECO
2012

Precise evaluation of the fracture

- AP view
- Lateral scapula view
- Garth View





- Misdiagnosed

Posterior dislocation head

Fracture line

Glenoid fracture

Primary pathologic proximal humerus fracture

Underestimated tuberosity fracture (Codman 1934)

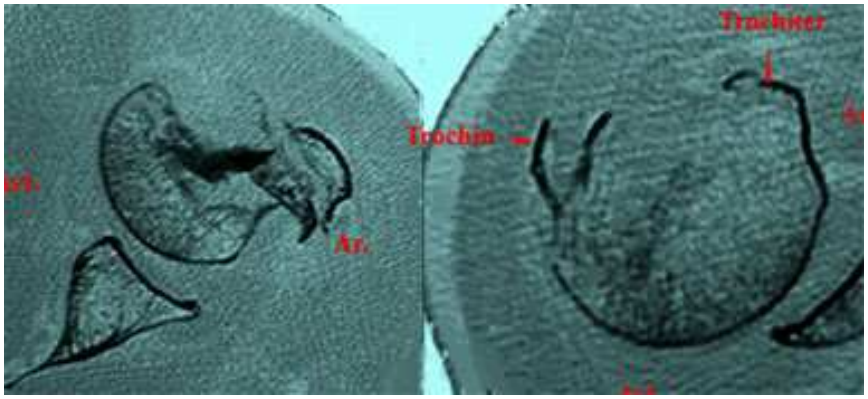
TWO orthogonal view

CT scan systematically

GT =ROTATOR CUFF

- Articular fracture
- Displacement lesser tuberosity
- Degree osteoporosis
- Thickness cortical bone
- Degree of comminution tuberosities
- Trophicity cuff function ?

(DG / Muscle)



General considerations

- physiological age
- Comorbidities +++

  smokers, diabetis, arteriopathy..
- Motivation of the patient

When we choose hemiarthroplasty ?

Functionnal cuff
Reparable cuff
= good synthesis of tuberosities
High potential of healing
No osteoporotic bone
Patient motivated for rehabilitation

Xrays + CT Scan

INDICATIONS HEMIARTHROPLASTY

- 4 PART DISPLACED FRACTURE
- FRACTURE - DISLOCATION

- 3 PART FRACTURE IN OLDER PATIENT
  osteoporotic , comminuted

- HEADSPLITING FRACTURE
  IMPRESSION FRACTURE
  (1/2 ARTICULAR SURFACE)

REPARABLE CUFF

Hemiarthroplasty/ Fract
Variable results

Constant score	**58**	**(11 – 98)**
Anterior Elevation	**92,4°**	**(15 – 170)**
External Rotation	**30,4°**	**(0 – 90)**

Boileau P et col JSES 2002
Robinson CM et al JBJS am 2003
Antuna SA et col JSES 2008
Kontakis G et col JBJS br 2008

Hemiarthroplasty/ Fract

32 cas retrospective review

Ph Valenti D Katz

Constant score	**53 (27 – 80)**
Anterior elevation	**105° (54 – 160)**
External rotation	**21° (-20 – +60)**

15% still painfull

80% good subjective results

60% bad or acceptable objective results

Antuna SA et Col
JSES 2008

57 protheses/ Fract FU > 5 years

8 /10 NO PAIN

50% patients Ant elevation > 100°

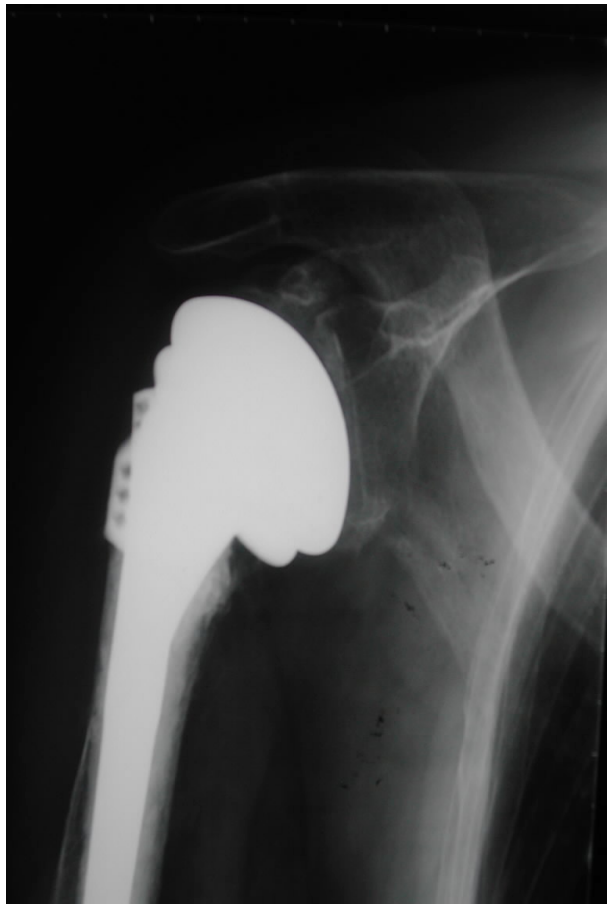
Pain relief is more predictable than ROM

FACTORS ASSOCIATED WITH POOR OUTCOME

- **AGE > 60 years**
- **OPERATIVE DELAY > 15 days**
- **COMMINUTED FRACTURE (osteoporosis)**
- **MIGRATION OF THE TUBEROSITIES**
- **MALPOSITION OF THE PROSTHESIS**
- **NO REHABILITATION PROGRAM**

High % of complications !!!

> 50%

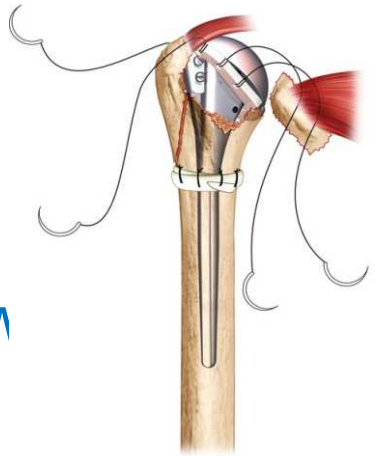


NO AAE, ER difficult revised !!

What we should do?
To improve hemiarthroplasty

- Reproduce the bony anatomy JIG
  humeral head:
  Good size / thickness / heigth / retroversion

- Restore functionnal cuff
  anatomical reduction tuberosities / stable / good healing

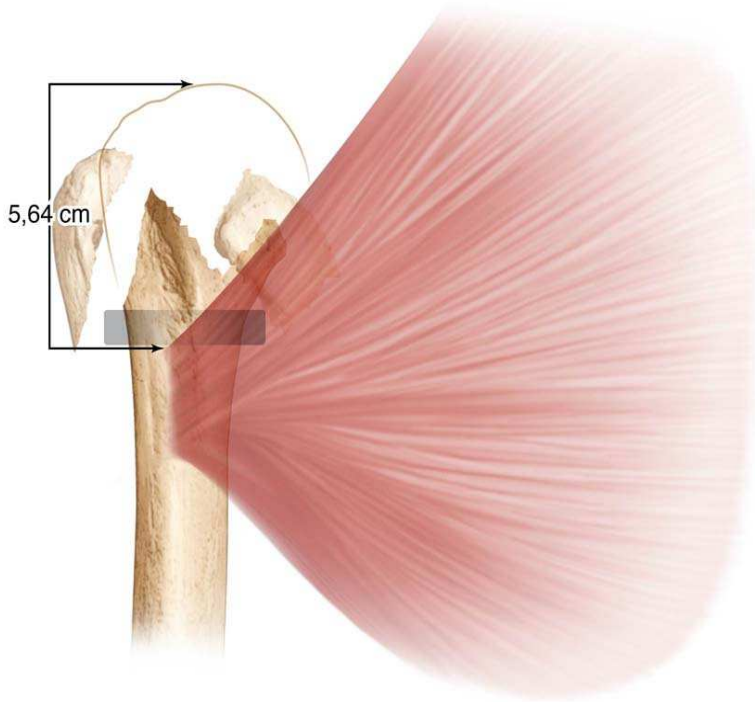


- Post op management

abduction splint 4-6 we / Passive ROM / Active>6w

How to reproduce the good heigth and retroversion

JIG Reduce tuberosity
Top of GT

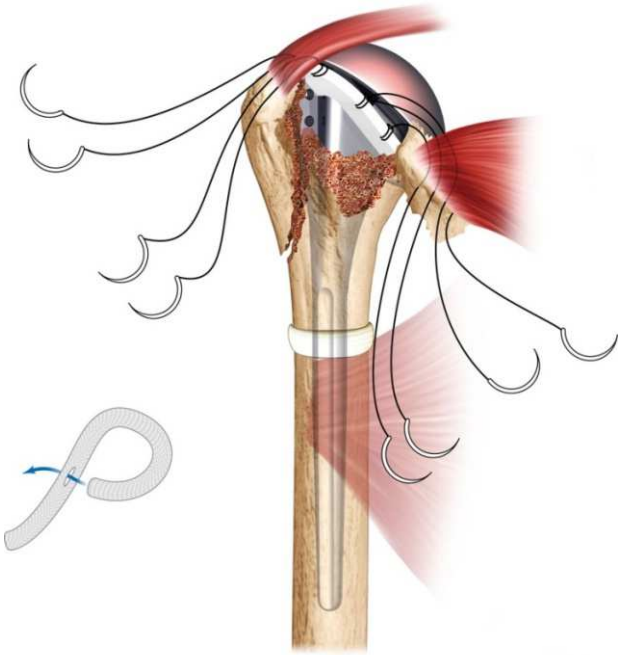


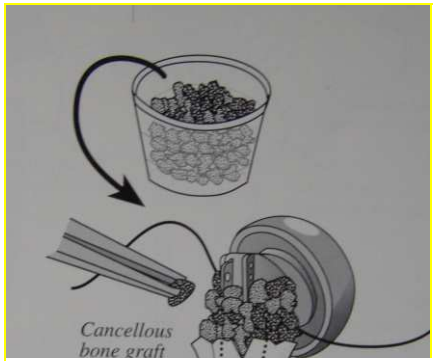
Murachowsky JSES 2006
Comminuted tuberosities

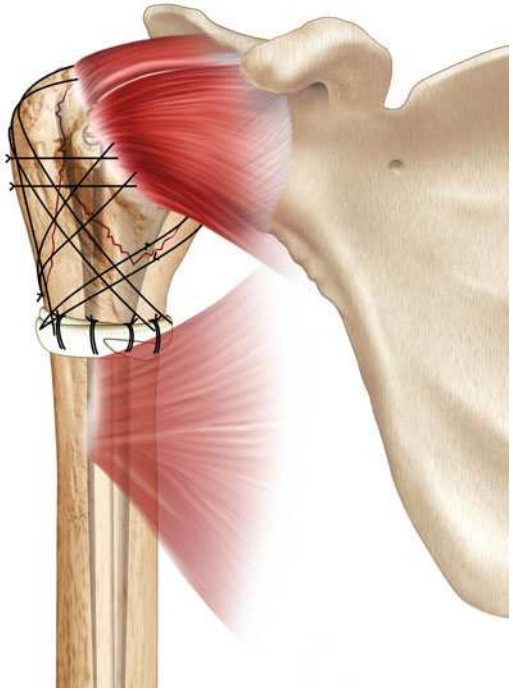
How to choose the good Humeral head ?

- controlateral X Rays
- Template
- Measure
- Cover metaphysis
- Excentric head
  (offset post + medial)
- Control with scopy +++

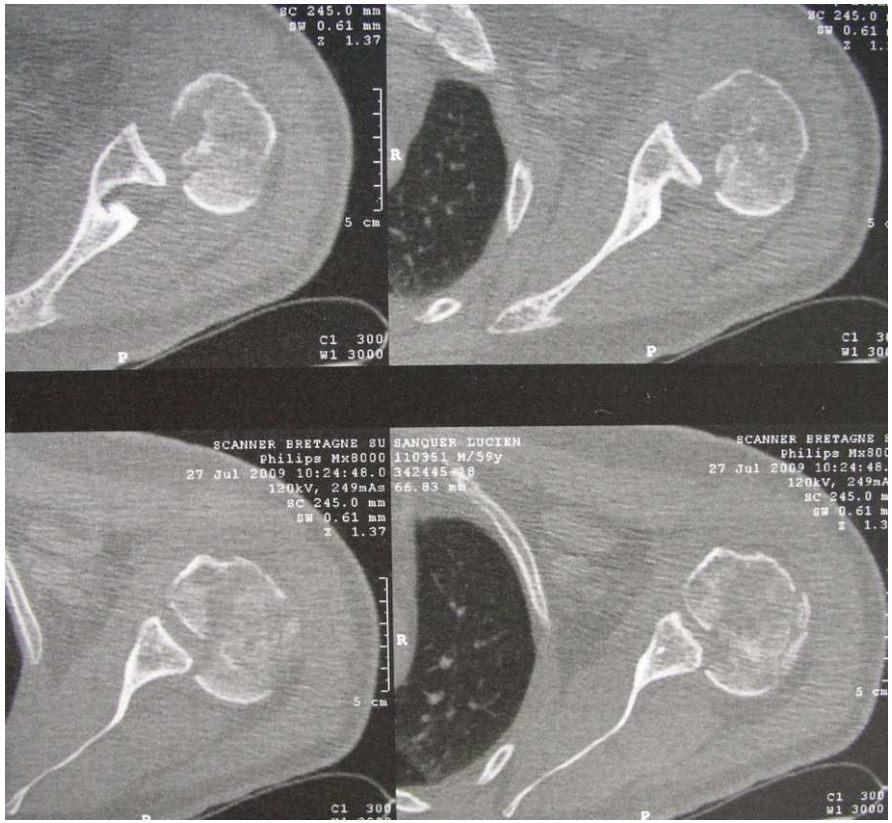
How to reduce tuberosities repair the cuff







Homme 59 ans
Moto
Fr 6/07/09
Diiagnostic luxation post a 3 semaines




SANQUER
08/09

If we have to remember some messages !!!

Just care about tuberosities

Any possibilitie to catch Great tuberosity later

Beware to smokers

Humeral head necrosis not rare

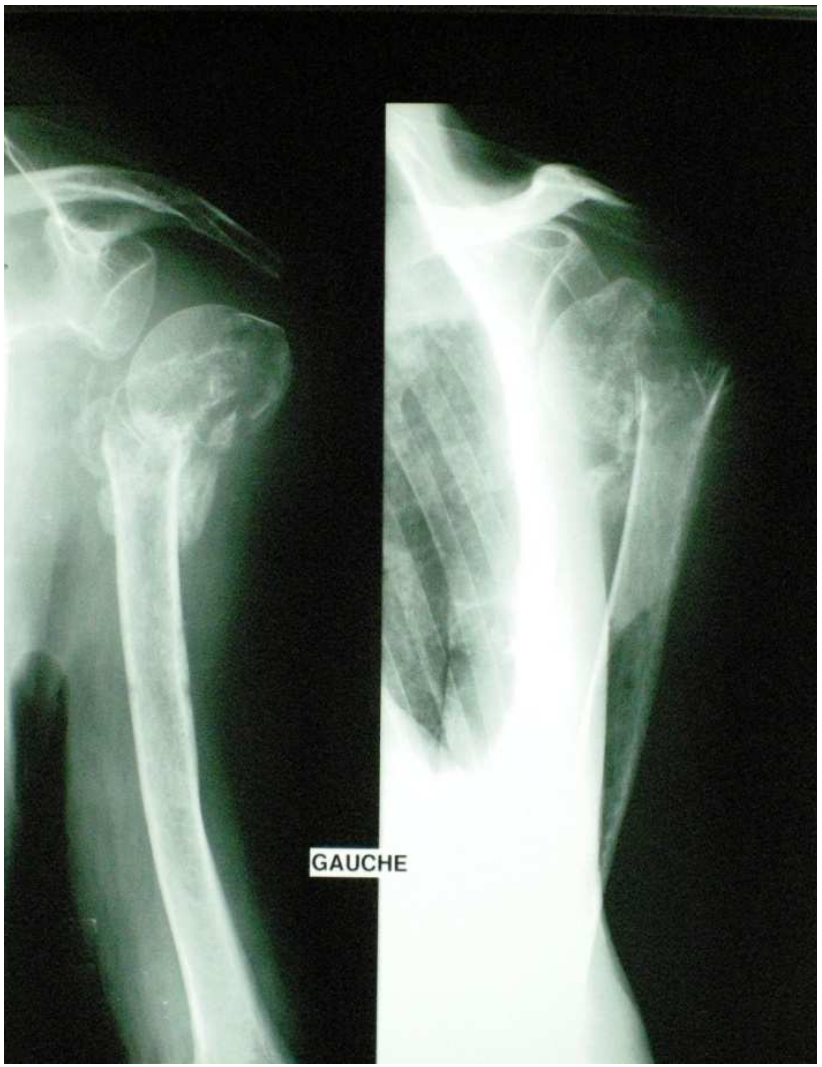
but not important

Great tuberositie in anatomic position

more important

Indications RSA

Elderly patients > 75 Y Old
Osteoporotic bone
Comminuted tuberosities
Fatty infilt cuff
No cooperated patient
Medical comorbidities
Arthritis



ContraIndications RSA

- Young and active patient
- Insufficient glenoid bone stock
  for secure fixation of the Base plate
- Axillary nerve lesion
- Active infection
- Good quality of tuberosities
  With a high potential of healing
  to obtain a good cuff

RSA for complex fracture

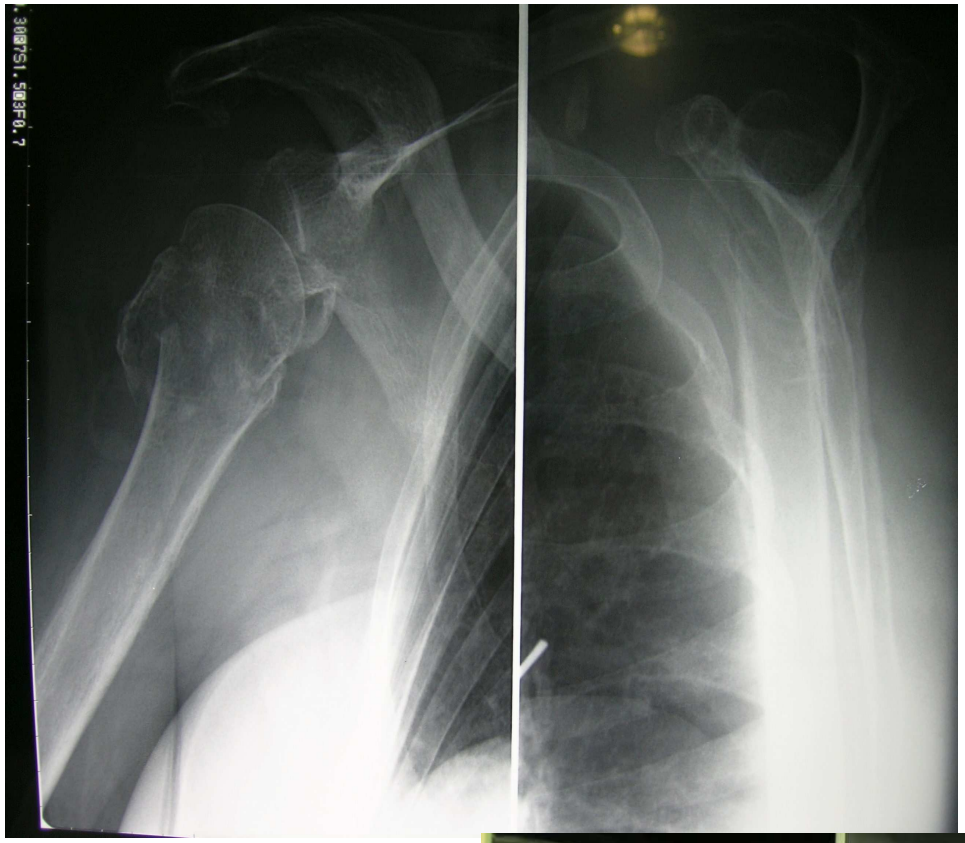
Restore forward elevation
Doesn't restore external rotation
with only the deltoid

You should repair
GT infraspinatus + teres minor
LT subscapularis

You can do a resection of supraspinatus

RSA n=31

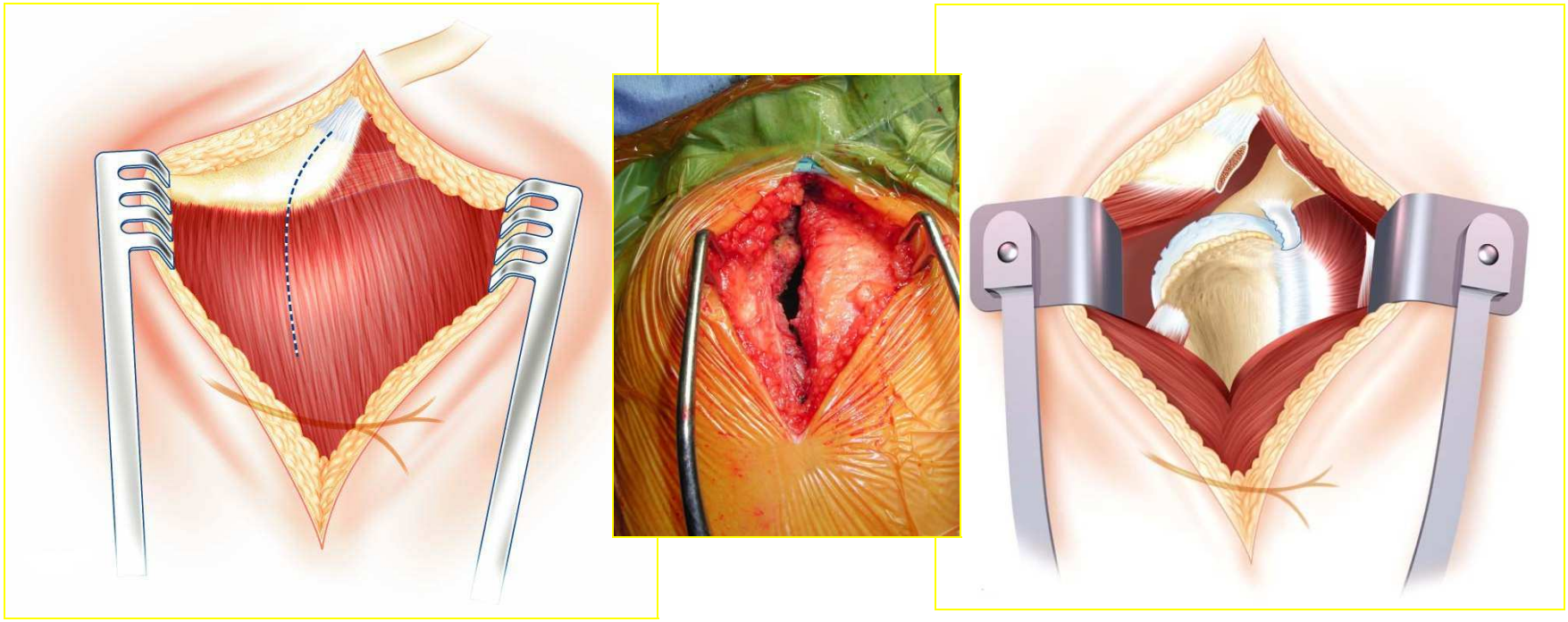
- Retrospective review
- April 2004 - April 2008
- FU 22.5 months (12 – 41)
- 29 Women 2 Male
- Mean Age : **76,6 (38 - 86)**
- Surgery delay : 10 **Days**
- Hospitalisation **: 6 Days**




DROIT
02.09.2005 19:03


GAUCHE
1:55PM
(Female25-11-1921 85A

Supero lateral approach +++

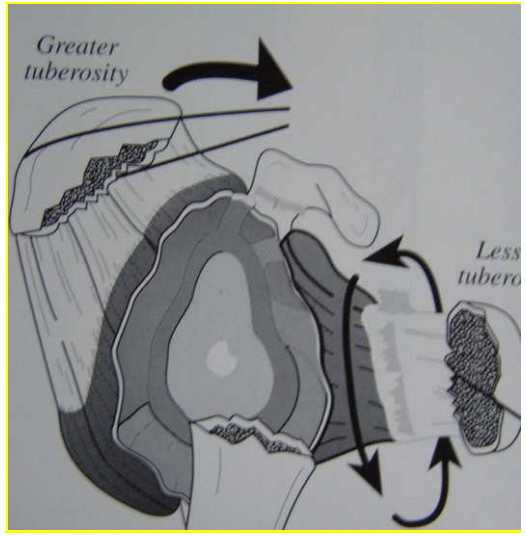


Split deltoid (resection CA Lig)

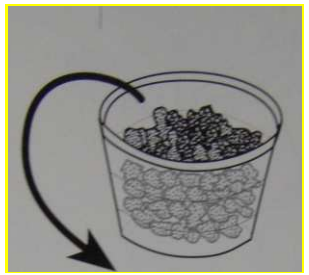
Take care of axillary nerve

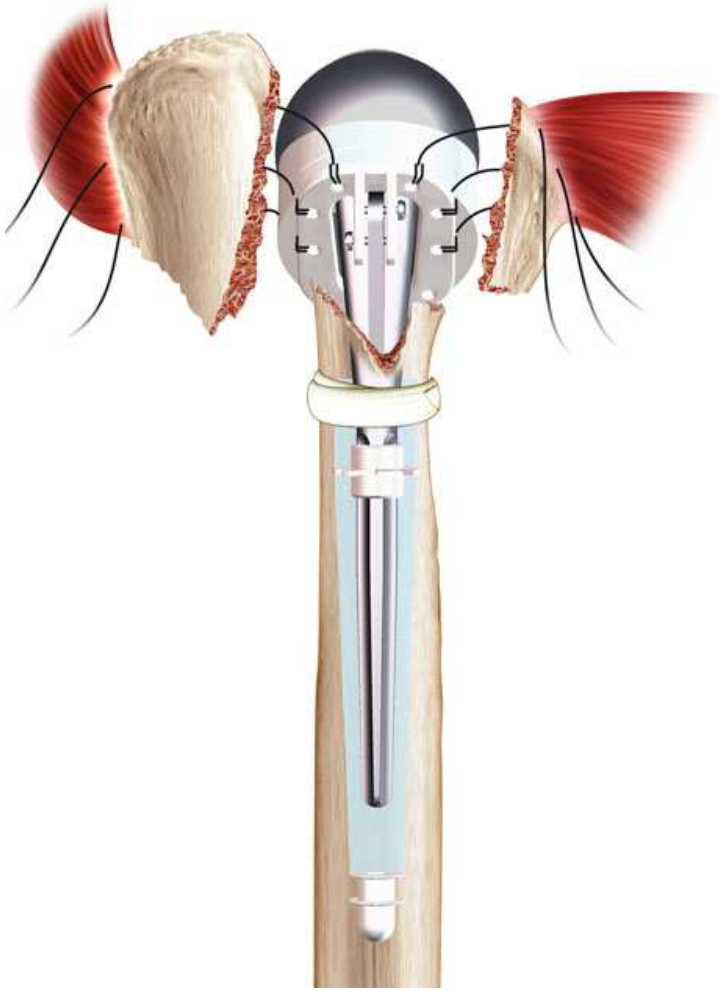
To catch easier tuberosities

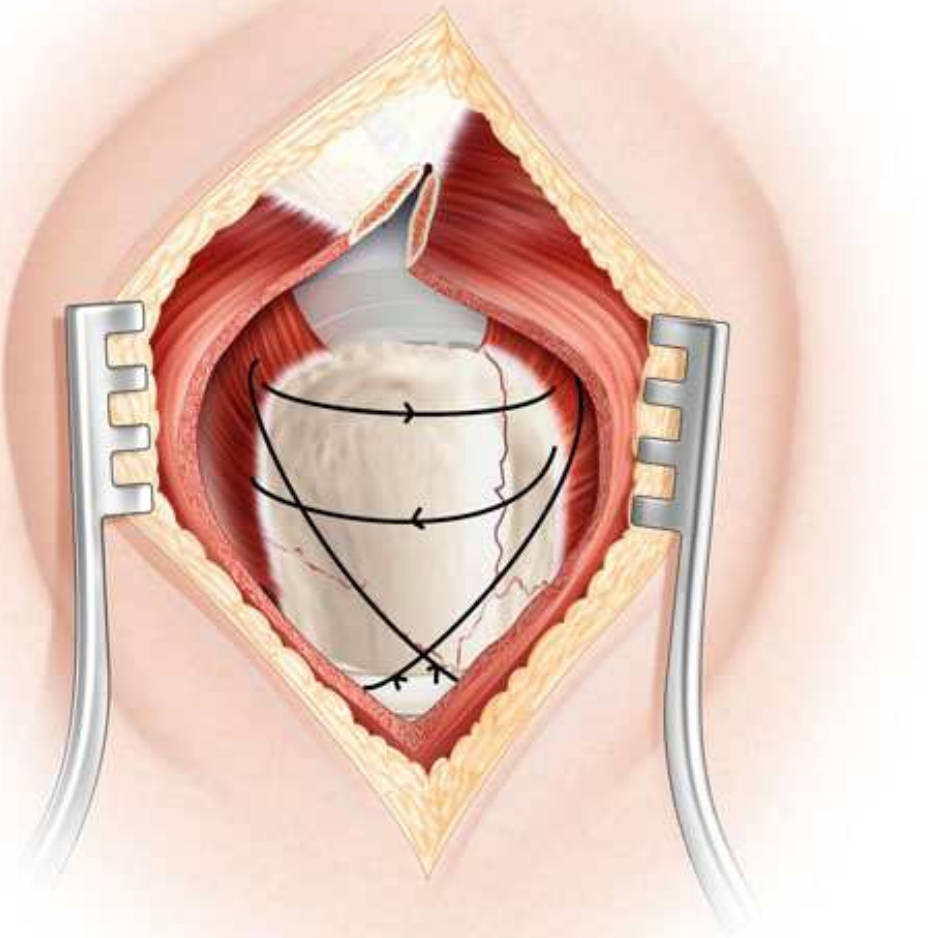
Except if the fract extend to diaphysis DP



Repair the Tuberosities



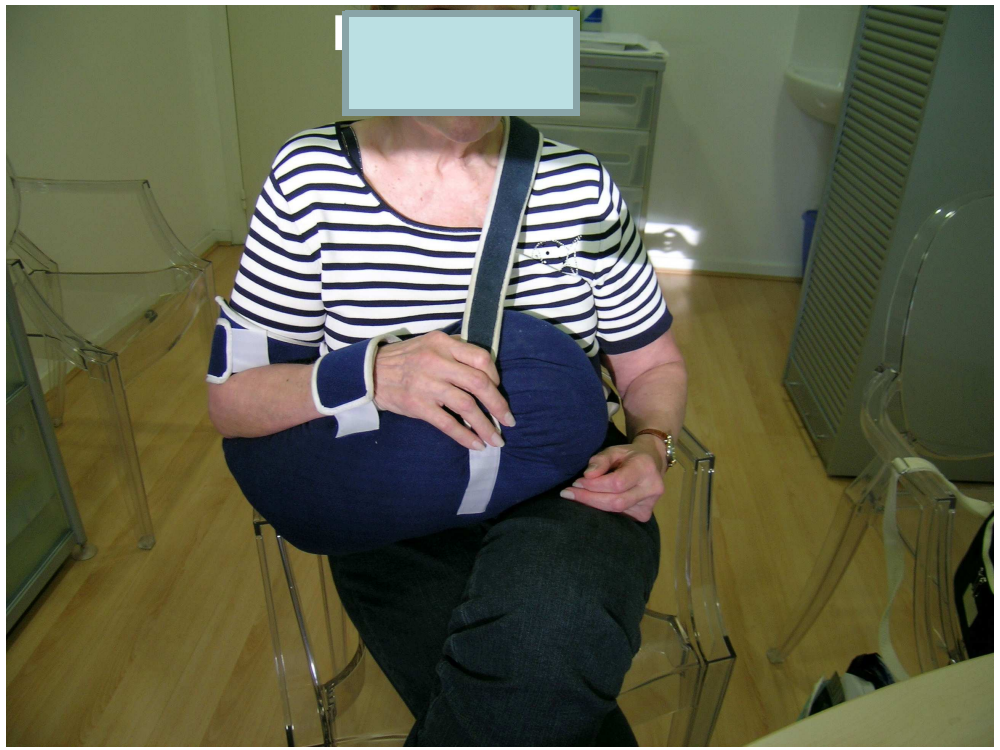




Repair subscapularis / IS /Tm
Bone graft around metaphysis
Resection SS
Biceps tenodesis / Tenotomy
Humeral stem cemented

RESULTS n= 31

- CONSTANT Score 53.4 (21 - 73)
- Almost no pain (13 in Constant pain scoring)
- Subjective satisfaction:
  - Very satified 17
  - Satisfied 11
  - Moderately satified 3
- NO Stiffness



RESULTS ROM n=31

- Abduction

  94°(30°- 160°)

- Active anterior elevation

  124°(100°- 170°)

- E Rotation 1 : 12° (0°- 40°)
- E Rotation 2 : 53° (10°-95°)
- I Rotation SACRUM

COMPLICATIONS n=6 18%

- Per op. N=3 10%
  - 1 pillar fracture
  - 2 ant. wall fragilisation
- Post op. N=3 10%
  - 1 dislocation
  - 1 deltoid paresis + tuberosity migration (falling)
  - 1 complex regional pain syndrome (associated dist. radius fracture)

RESULTS XRays n=31

NO Notch (lateralized RSA)

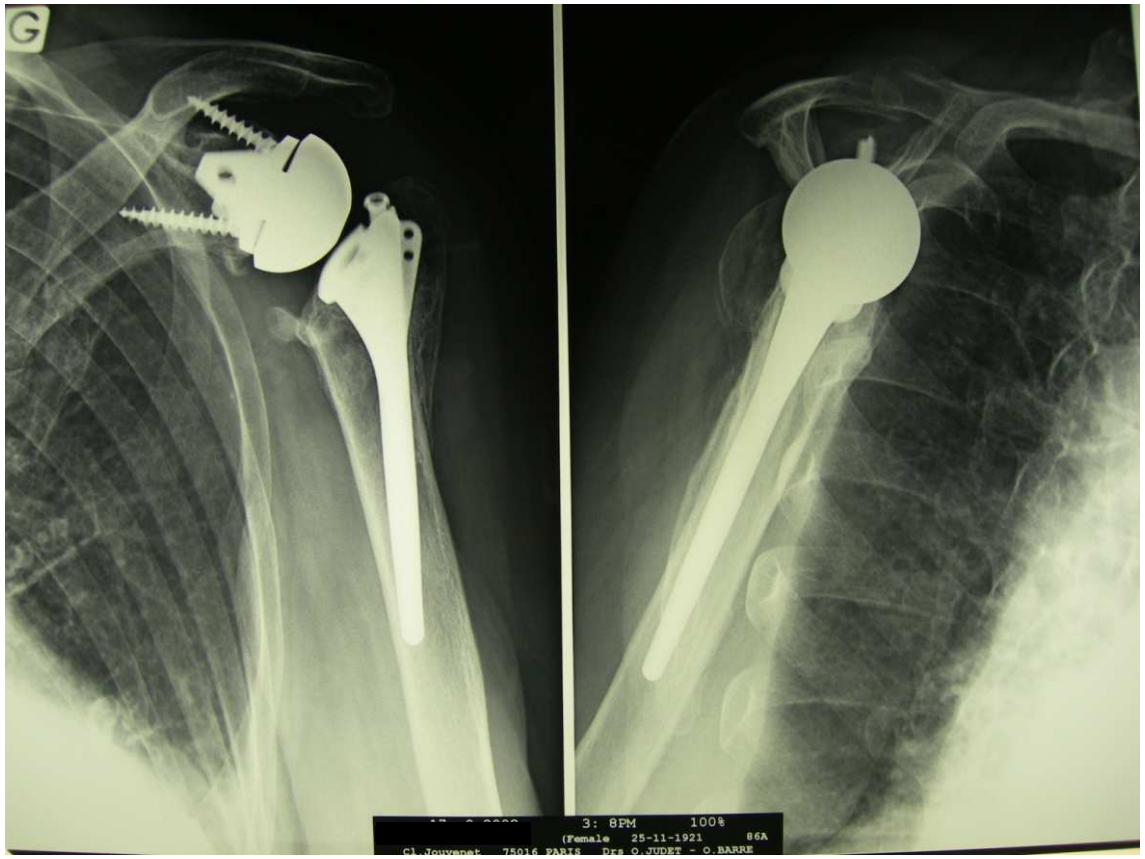
No glenoid loosening

3 mechanical dissociation

2 tuberosities resorption

14 ectopic ossifications !!!

Correlation between
quality of tuberosities healing
And External rotation



NO NOTCH

NO PAIN
AAE 100°
ER 20°
IR SACRUM
CONSTANT 55

Very satisfied
FU 4 years

Literrature RSA for fracture

Authors	cases	FU m	Const	AAE°	E R1°	complic
Cazeneuve 2006	30	86	60	120	20	40%
Bufquin 2007	40	22	44	97	30	28%
Gallinet 2009	16	12	53	96	9	20%
Sirveaux 2008	20	19	55	122	18	
Klein 2008	20	33	63	122	25	
Boileau 2010	32	10	61	126	22	NO
Our serie	***31***	***23***	***54***	***112***	***13***	***18%***

If we compare RSA versus HA for fracture

Results

More constant

More predictable than HA

NO bad result

Less complication

Early mobilization

More simple rehabilitation

Return at home early for older patient

If we have to remember HA some messages !!!

1) Good analysis of the fracture:

Standard Xrays(orthogonal view)

CT Scan

Numbers fragments / degree of displacement

degree osteoporosis /degree of comminution GT
(GT =ROTATOR CUFF)

physiological age / delay Fract <4w versus >4w

If we have to remember some messages !!!

2) Surgical technique

Supero lateral A+ or Delto pectoral A +++

Anatomical reduction GT = Cuff (IS +Tm) ERot

Good heigth / retroversion head prosthesis

Healing tuberosities = functionnal cuff

Post op rehabilitation

No immobilisation / no agressive R / no brace in medial rotation

One shot surgery (Neer 1970)

If we have to remember RSA some messages!!!

1) Indications should be limited to

>75 years old or younger with comorbidities
No functionnal cuff osteoporotic bone

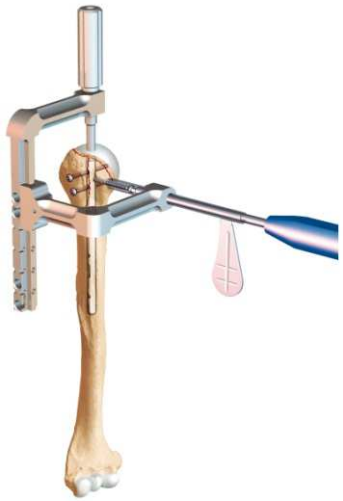
2) Reconstruction and good healing of the tuberosities (IS)

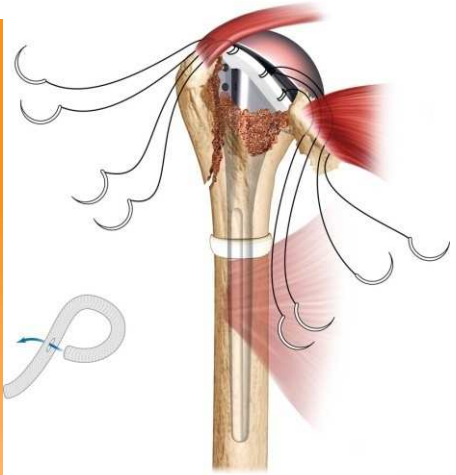
can restore better external rotation

3) Result more constant and more predictable than HA

Even if you are an expert

You can change your indication during the operation





3 solutions… that’ s all.

A single instrumentation for complex fracture

Conclusions

- Currents results of HA are inconstant !!!!

Possibilities of improvement:

Design of prosthesis to reproduce anatomy

JIG for good heigth and good retroversion

Repair cuff = materiel to fix and to heal tuberosities

- Keep indications for RSA

Osteoporotic and comminuted tuberosities

Arthritis or no functionnal cuff

➢75 y old