



Hemi-arthroplasty for proximal shoulder fractures. Indications and surgical procedure.

Anestis IOSSIFIDIS, MD , FRCS Ed, FRCS Ed (orth.)

Croydon University Hospital,
Shoulder Unit,
London , UK.

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The authors, their immediate families, and any research foundations with which they are affiliated have not received any financial payments or other benefits from any commercial entity related to the subject of this article.

INCIDENCE

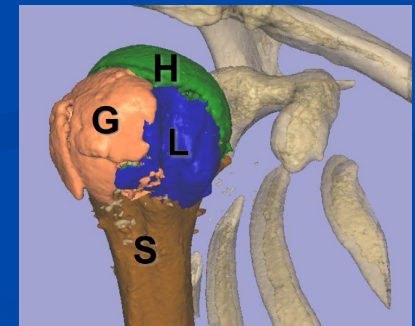
Proximal humeral fractures 10%

Minimal displacement 80%



- Two-part 10
- Three-part 3
- Four-part 4
- Articular surface 3

Displaced Fractures				
	2-part	3-part	4-part	Articular Surface
Anatomical Neck				
Surgical Neck				
Greater Tuberosity				
Lesser Tuberosity				
Fracture-Dislocation	Anterior 			
	Posterior 			
Head-Splitting				



Indications

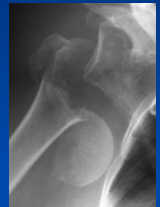
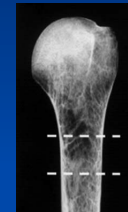
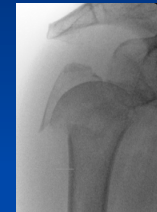
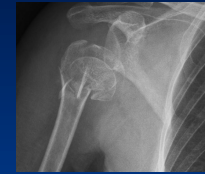
- Osteoporosis
- Four-part proximal humeral fractures and fracture dislocations
- Selected three-part in older patients with osteoporotic bone
- Humeral head splitting fractures
- Chronic shoulder dislocations with impaction fractures involving $> 40\%$ of the humeral head's articular surface
- failed ORIF, AVN, nonunion, malunion

Contraindications:

Infection

Paralysis

Mental or physical disability.



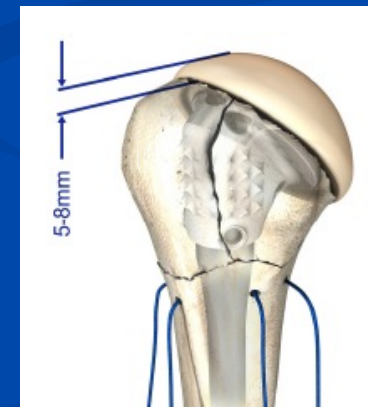
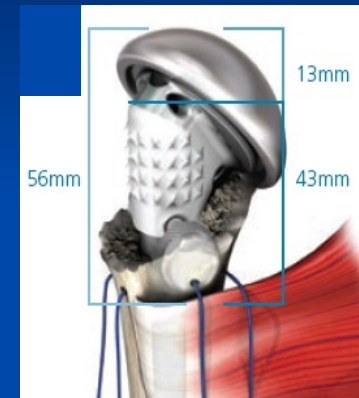
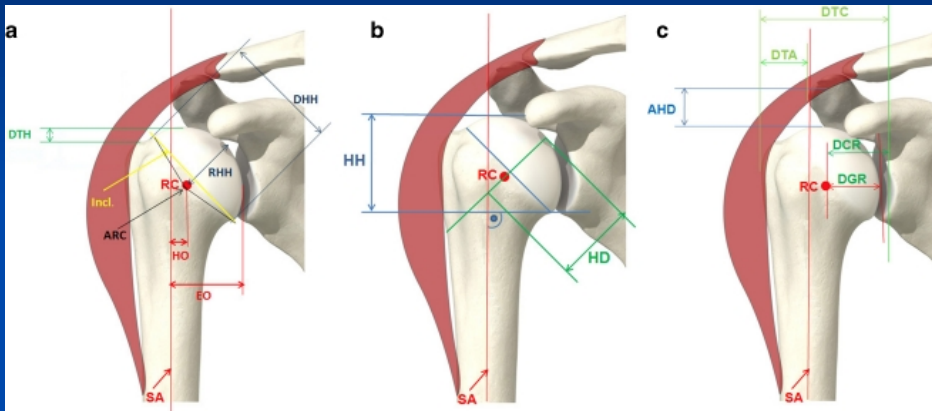
PATIENT POSITION- SURGICAL INSTRUMENTS

- Beach chair position with shoulder draped completely free.
- G.A / interscalene block.
- Specific instruments for prosthesis
- Small drill bits for greater tuberosity reattachment
- Non absorbable sutures.

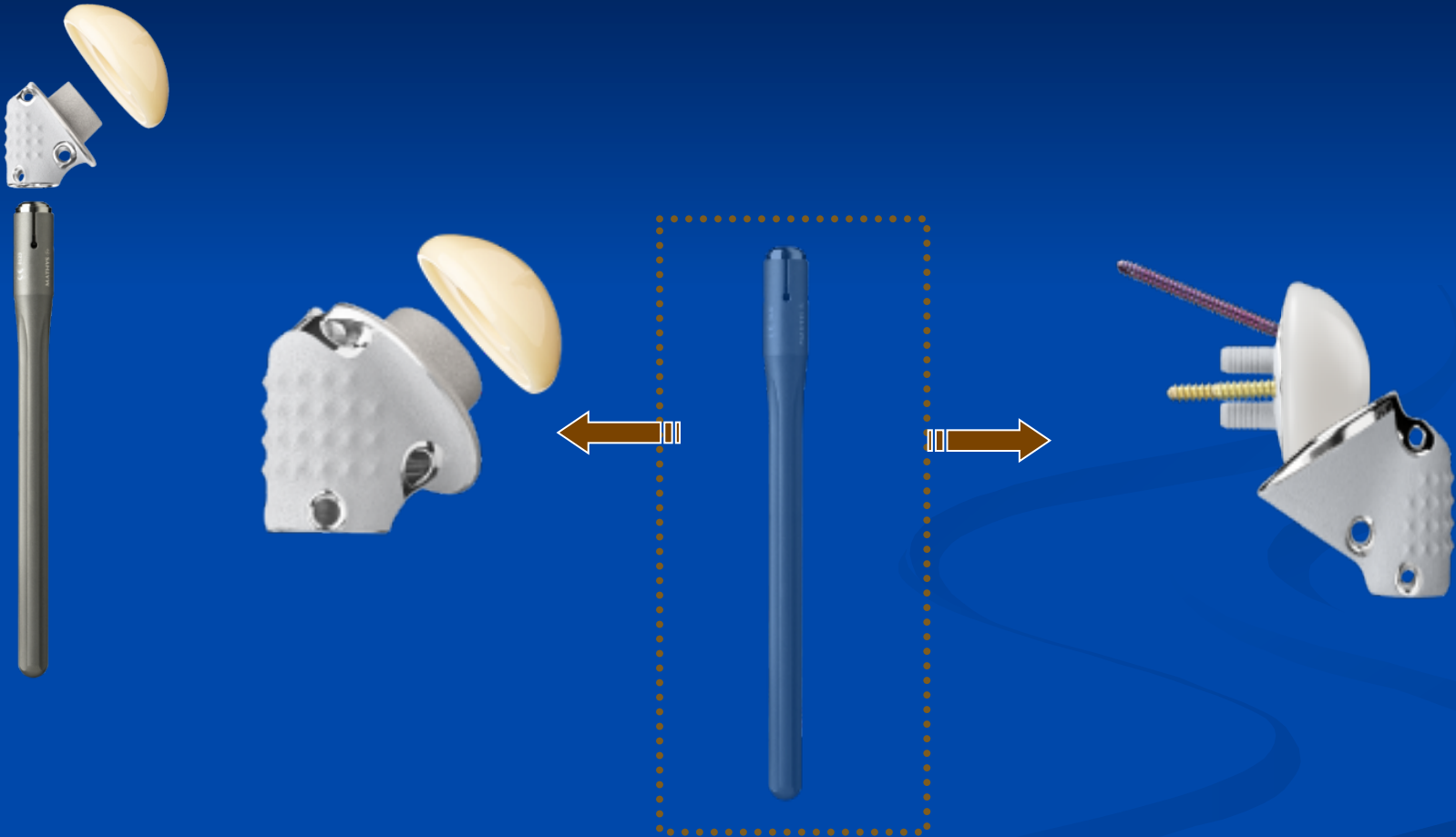


The Need for Modularity

Reestablishing normal glenohumeral anatomic relationships is important to ensure optimal results.

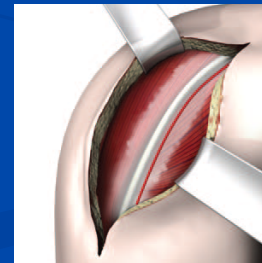
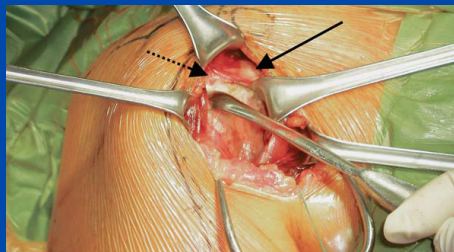
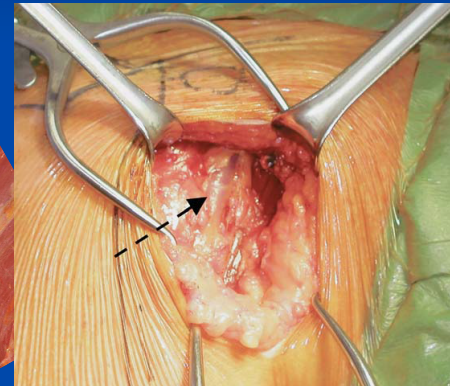
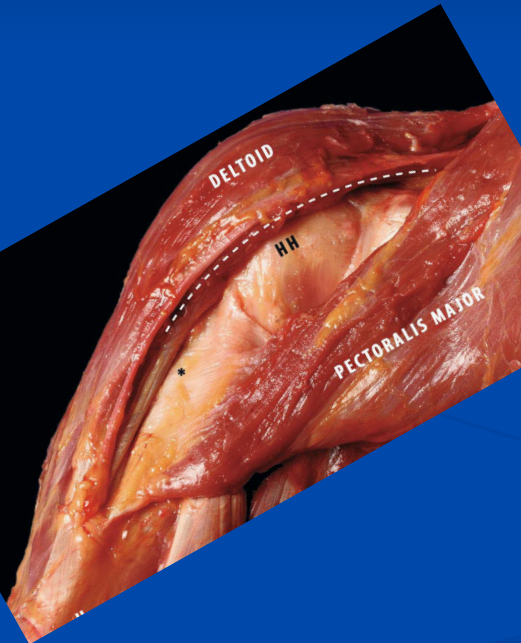
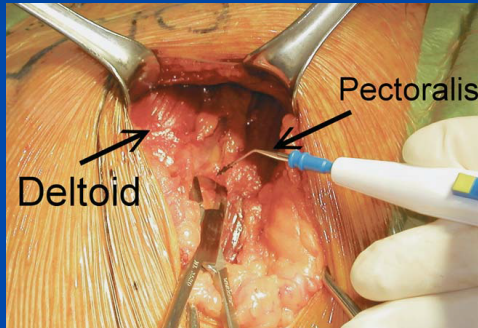


Modularity



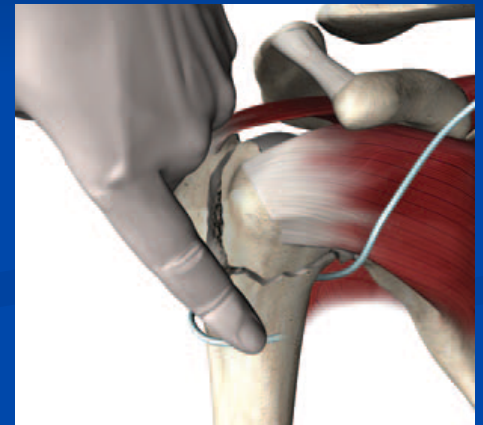
APPROACH

■ Deltopectoral approach.

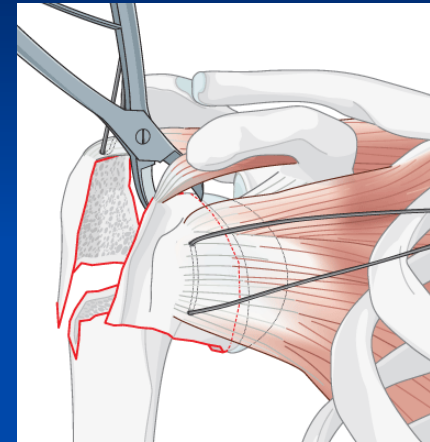
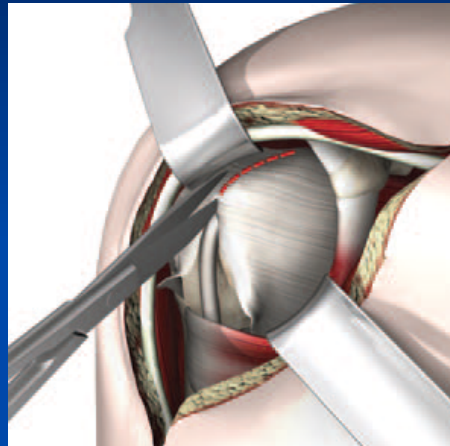
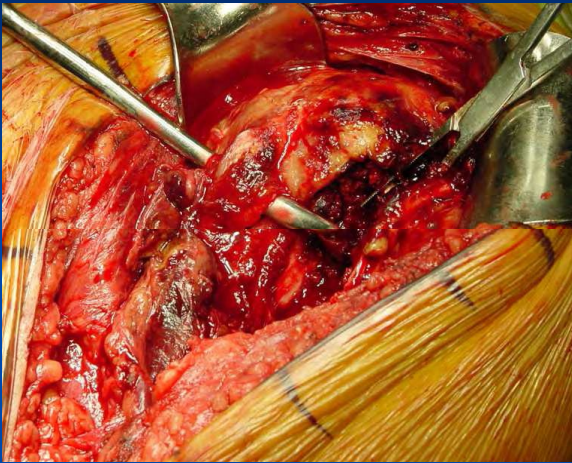


DEEP DISSECTION

- Identify the axillary nerve
- identify the Lesser and Greater Tuberosity
- Humeral Head Retrieval
- Tuberosity Mobilization
- Humeral Stem Preparation and Insertion
- Tuberosity Reattachment



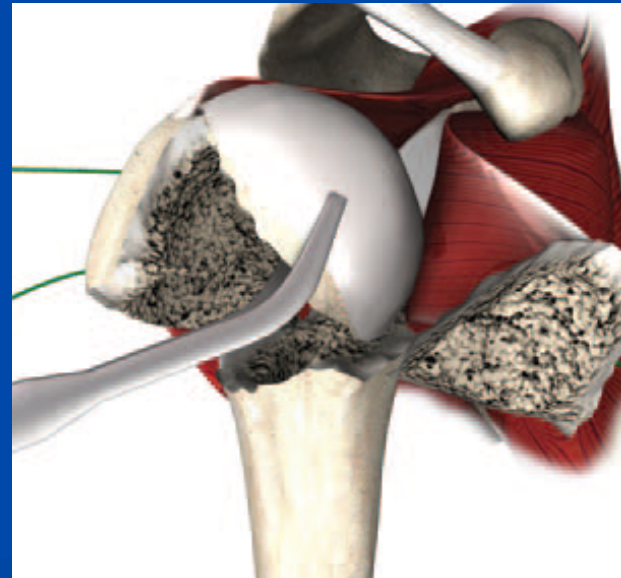
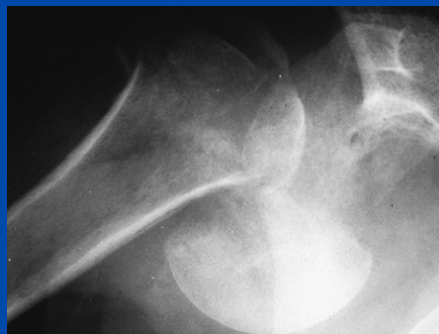
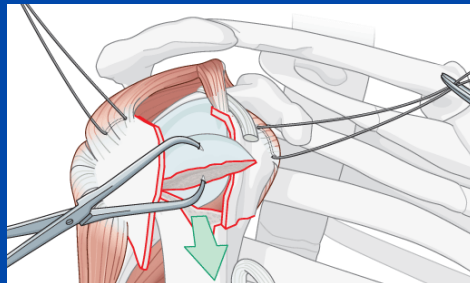
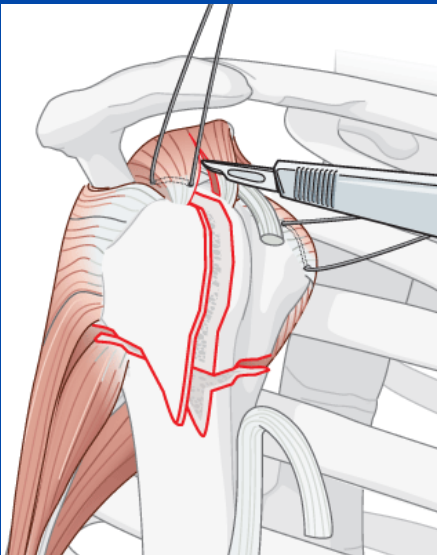
IDENTIFY THE LESSER AND GREATER TUBEROSITY



- The biceps tendon is the key surgical landmark.
- Once the tendon is identified, follow it proximally and release the rotator interval-between the subscapularis and the supraspinatus.
- A nonpenetrating clamp can be used to capture the tuberosities and mobilize them medially and laterally

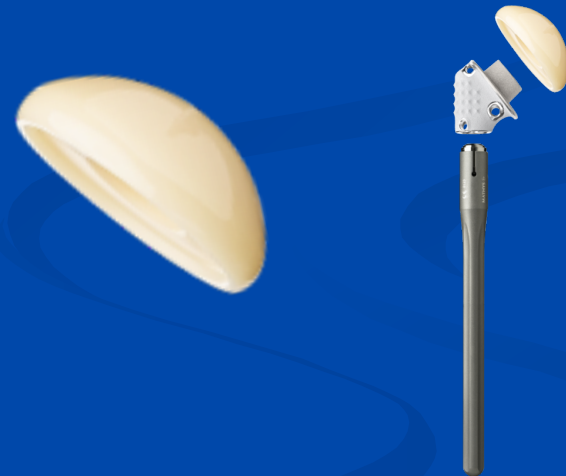
HUMERAL HEAD RETRIEVAL

- divide the soft tissues over the fracture, and extend this incision along cuff interval
- The head is typically found posteroinferiorly.



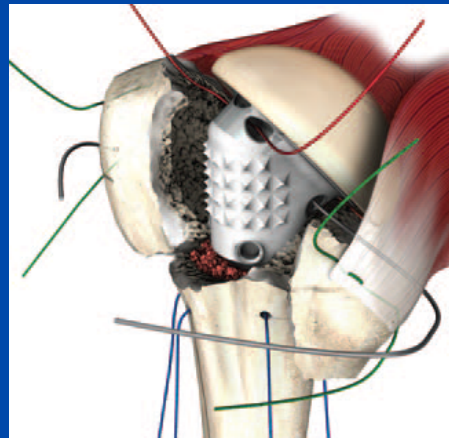
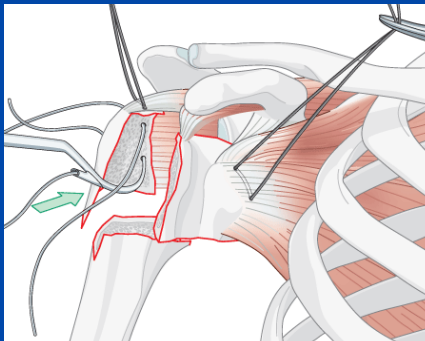
HUMERAL HEAD RETRIEVAL

- Head size = Compare the removed humeral head to the prosthetic heads to determine head size. If between sizes, use the smaller size.



TUBEROSITY MOBILIZATION

- place three #5 nonabsorbable sutures-superiorly, middle, and inferiorly from outside-in at the bone-tendon junction of the greater tuberosity.
- Similarly, a #5 nonabsorbable suture should be placed at the bone-tendon junction of the lesser tuberosity.



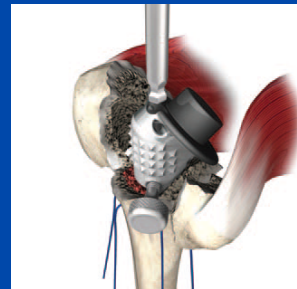
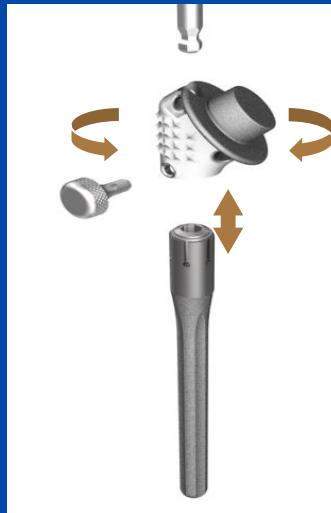
HUMERAL STEM PREPARATION AND INSERTION

- drill 2 holes in the humeral shaft, medial and lateral to the bicipital groove, approximately 1.5-2 cm distal to the proximal aspect of the humeral shaft.
- Pass one #5 nonabsorbable suture from medial to lateral to be used as a figure-of-eight tension band.

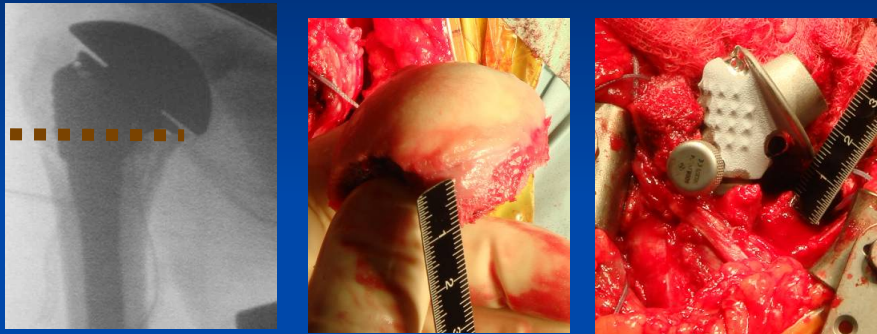


Height – Retroversion

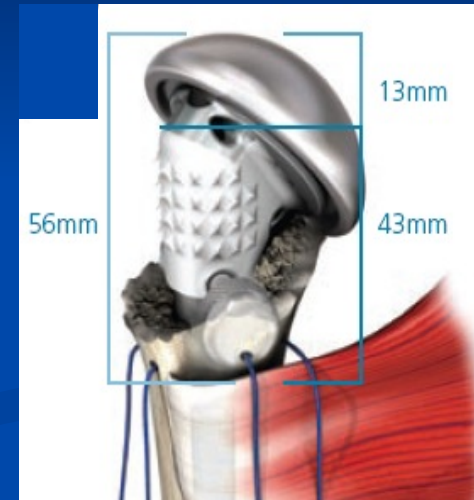
- Proper placement of the humeral component at the correct height and retroversion is critical to the ultimate stability of the greater tuberosity repair and outcome of the procedure.



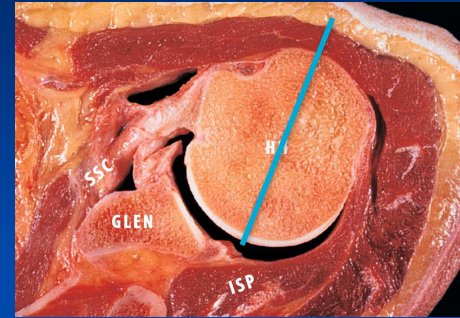
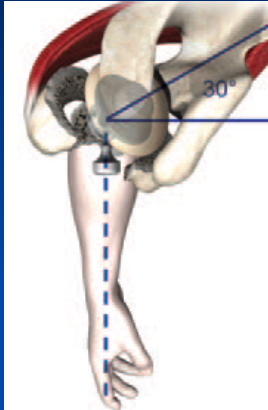
CORRECT HEIGHT



The posteromedial metaphyseal extension determines the implantation height of the prosthesis. It can be measured easily with a ruler.

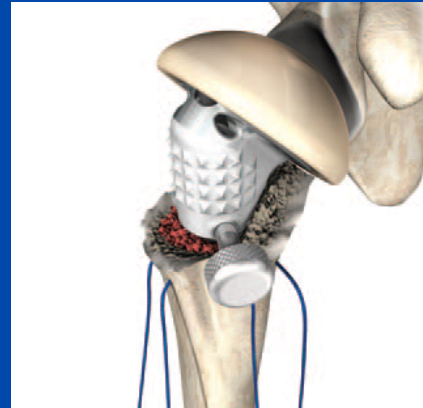
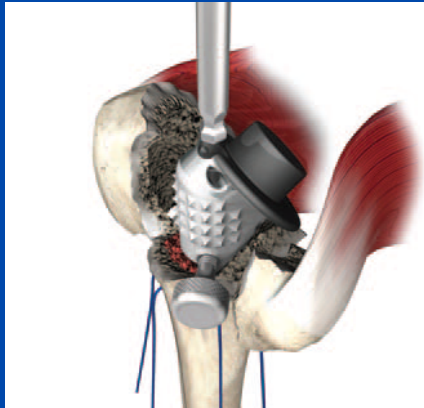


Humeral Head: 20°- 30° retroversion



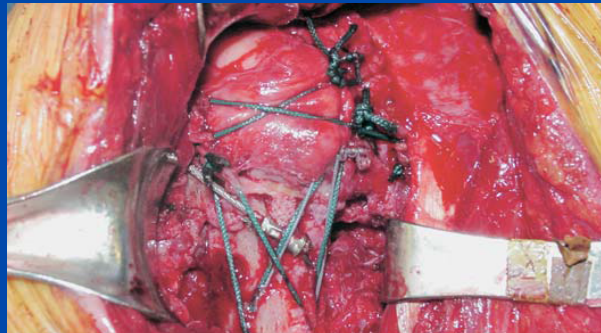
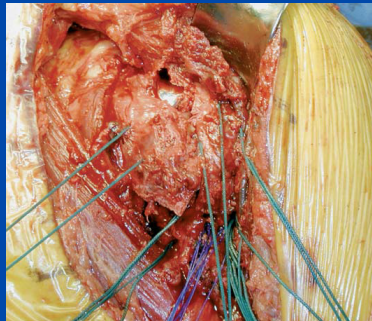
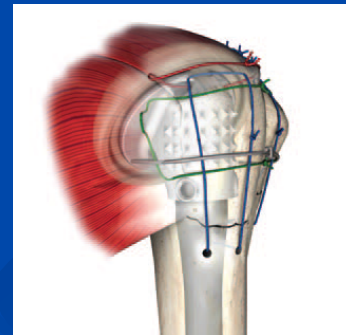
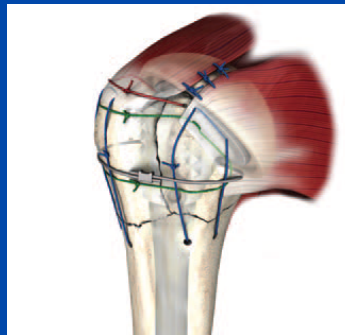
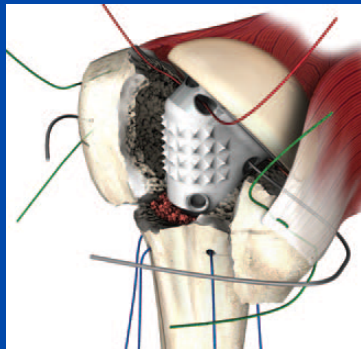
- About 20° degrees of retroversion decreases the tension on the tuberosity repair. This can be achieved by external rotation of the arm to 30° and cementing the component in neutral position.
- A helpful landmark is that in this degree of retroversion, the lateral fin of the prosthesis should lie about 7 to 10 mm behind the distal bicipital groove.

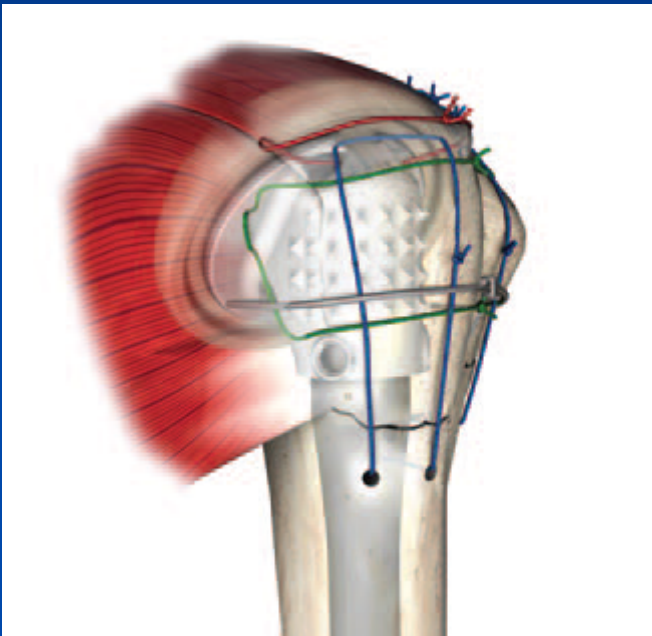
- Mount trial head
- Avoid overstuffing! In case of doubt the smaller head should be used
- Fifty percent translation anteriorly, inferiorly, and posteriorly is desirable.
- Introduce cement and implant the pre – mounted prosthesis



TUBEROSITY REATTACHMENT

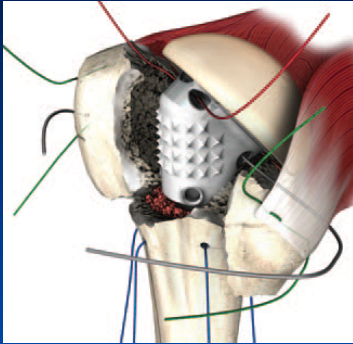
- Tuberosity reconstruction is the most important part of this procedure.
- The goal is to securely reattach the lesser and greater tuberosity to the shaft as well as to each other with transverse and longitudinal sutures.



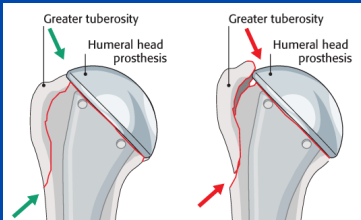
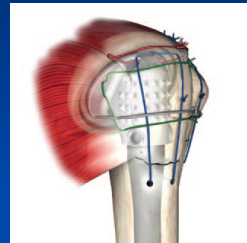


Compression sutures:

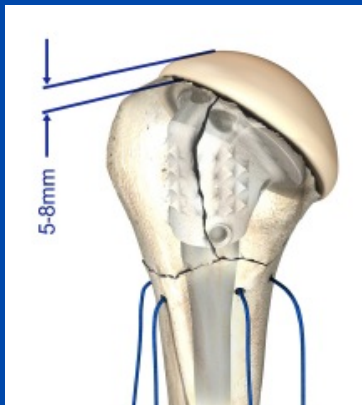
- Tuberosities to shaft (blue)
- Circular compression on prosthesis (grey)



The Greater tuberosity is attached first with transverse and longitudinal sutures

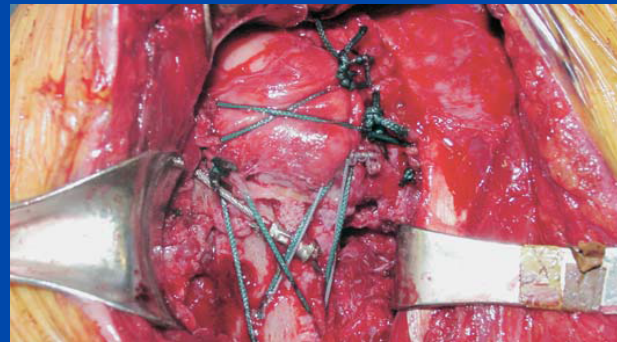
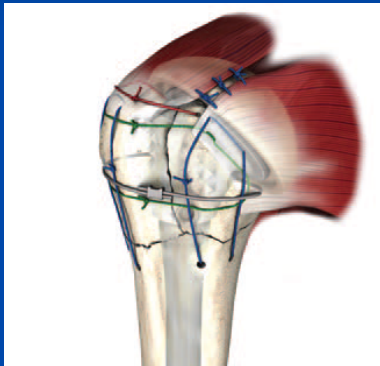


The inferior spike of the greater tuberosity should fit into the fracture gap.



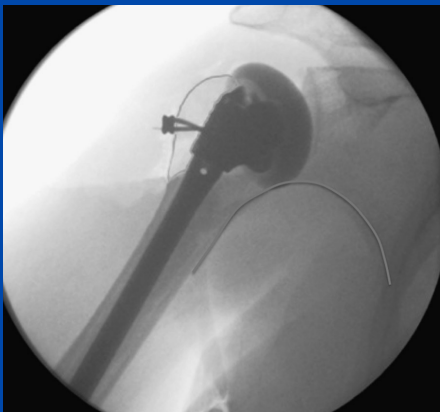
Greater tuberosity 5 to 8 mm below the humeral head

Next, the lesser tuberosity is fixed to the shaft and the greater tuberosity with sutures through the fin, and finally reinforced with a figure-of-eight tension band suture.



Final steps:

- Check for tuberosity impingement at the extremes of motion.
- Close the supraspinatus split
- Tenodesis of the long head of the bicipital



POSTOPERATIVE CARE

- The major risk of early post operative mobilisation is loss of tuberosity fixation.

Rehabilitation depends on

- the patient's needs
- Intraoperative security and tensioning of the tuberosity repair.

