



The Royal College of Surgeons of England



British  
Orthopaedic  
Association

# Proximal Humeral Fractures – current evidence

Amar Rangan

Clinical Professor, Trauma & Orthopaedic Surgery

The James Cook University Hospital



Durham  
University

School of Medicine and Health

South Tees Hospitals



NHS Foundation Trust

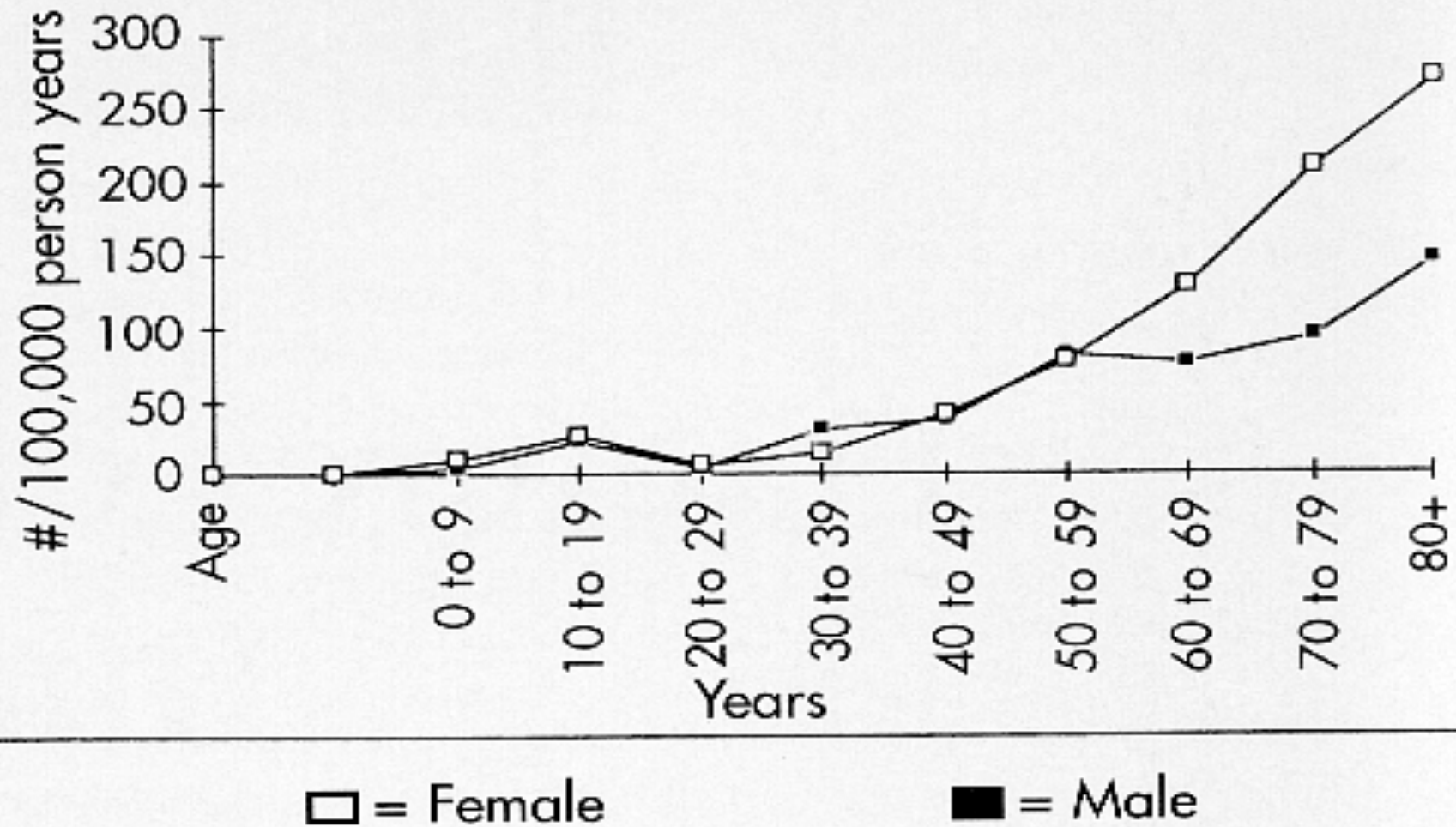
# Epidemiology

- 5% of all fractures
- 3<sup>rd</sup> most common # >65yrs
- Increasing public health problem
- Incidence ↑ threefold 1970 – 1998
- ? ↑ threefold by 2030

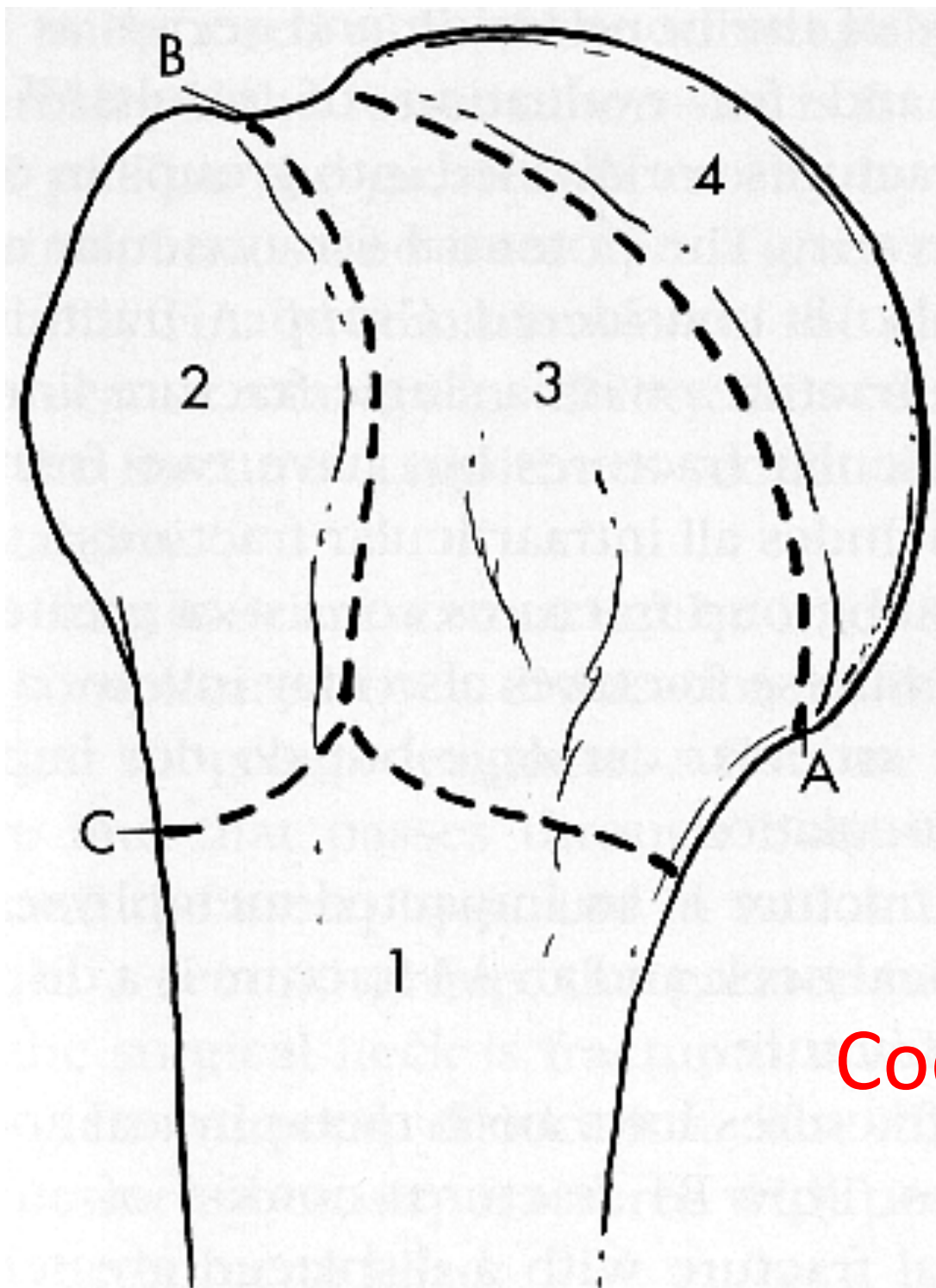


*Kannus P, Palvanen M, Niemi S et al, (Finland). Acta, Oct 2000*

## Incidence of Proximal Humerus Fractures

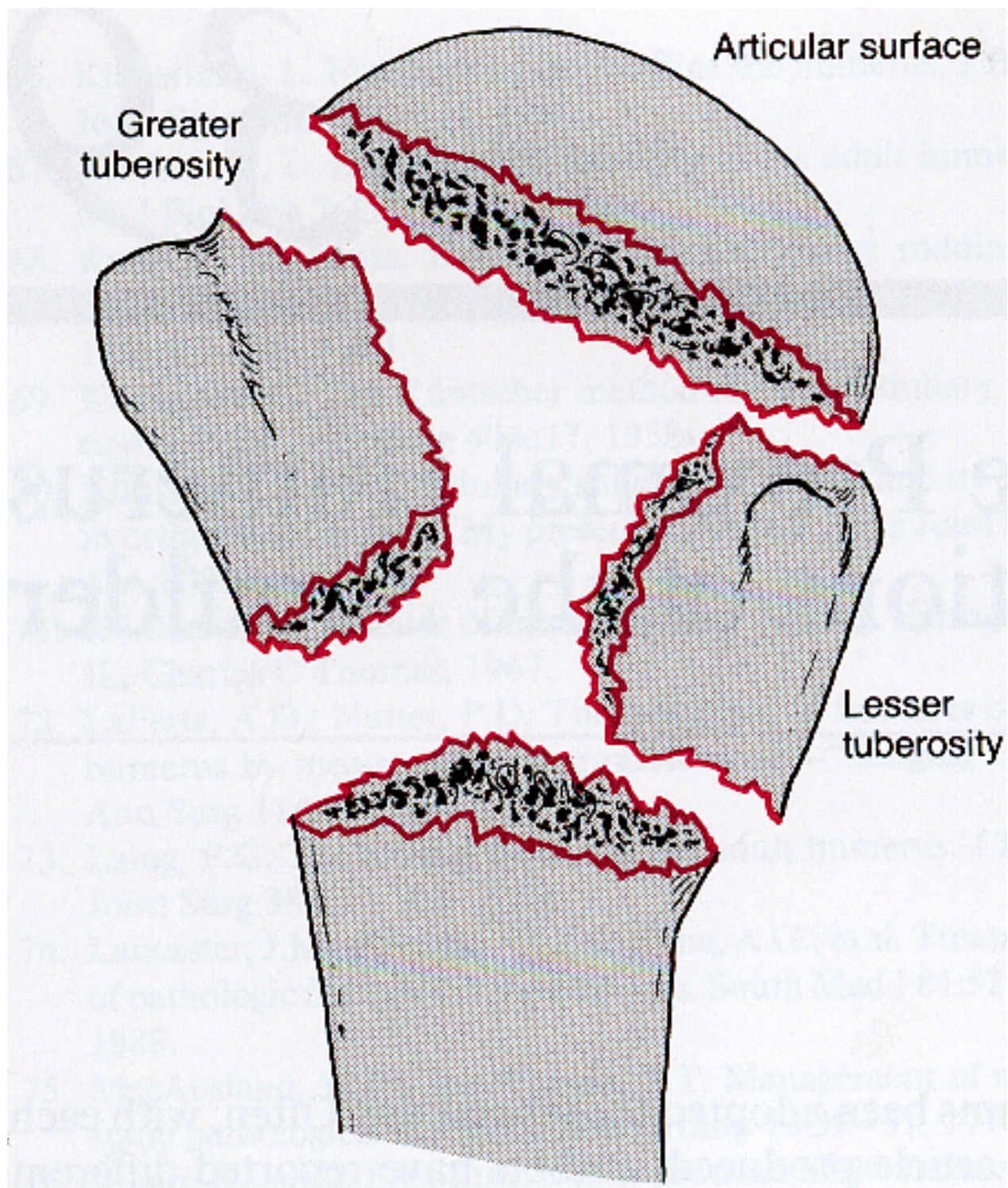


Lind T, Kroner K, Jensen J: Acta Orthop Trauma Surg, 1989



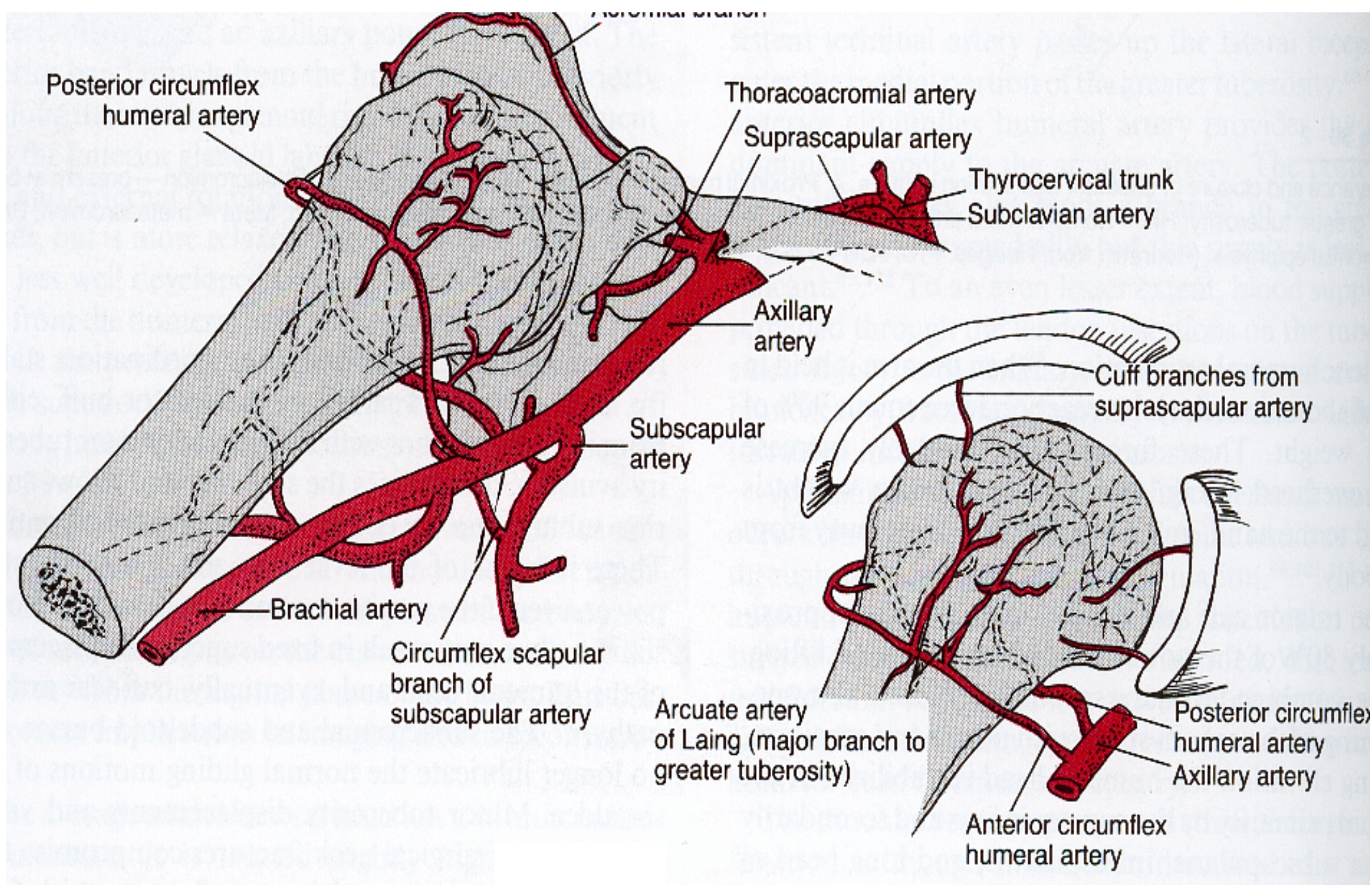
Codman's segments





Neer's "Parts"





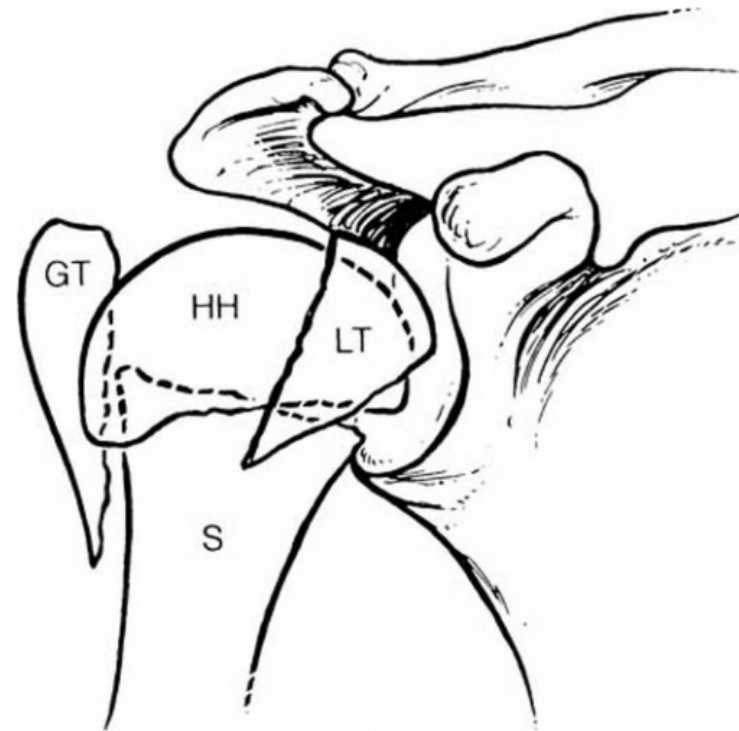
Laing PG: Arterial supply to the adult Humerus; JBJS 1956



# Classification – valgus impacted

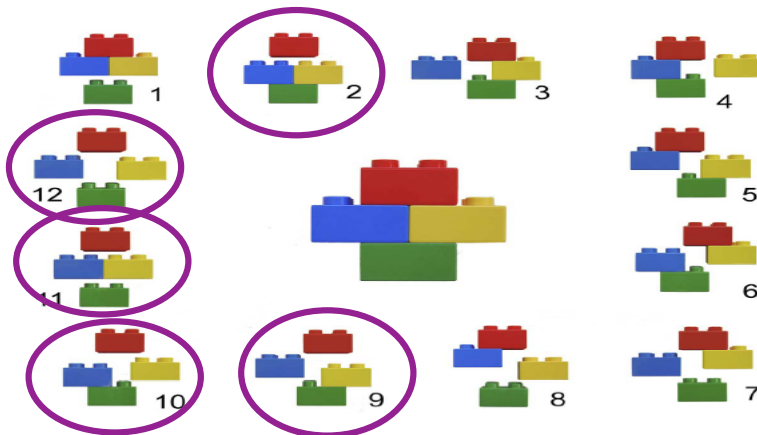
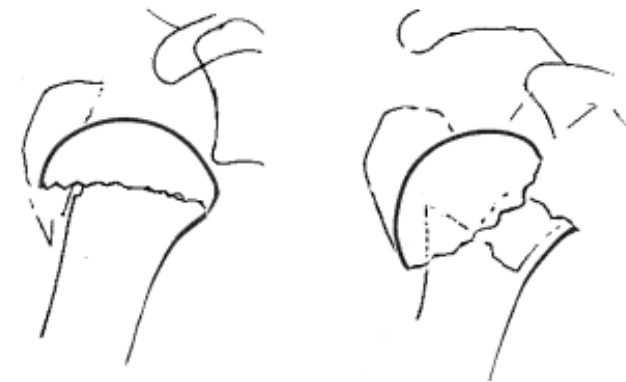
- Lower rate AVN, better outcome than other 4 part #

– Jakob et al JBJS Br 91  
73 295-8



# Anatomy – vascular predictors of avascular necrosis

- Predictors of ischaemia
  - Calcar length < 8mm (0.8)
  - Medial hinge disrupted (>2mm) (0.79)
  - Fracture pattern (0.7)



Hertel et al JSES 2004 13 427–33

Which fractures / patients do better  
with surgery?

“Data from published literature is inadequate for  
evidence based decision making with regard to  
treatment of complex proximal humeral  
fractures”

Misra A, Kapur R, Maffulli N: Injury Jun 2001

- 3 randomised
  - 4 prospective
  - 26 retrospective
- Small study populations
- Differences in:
- patient selection
  - Classification
  - Outcome measurement

**“Scientific evidence for treatment recommendations of displaced proximal humeral fractures is still limited”**

Tingart M, Bathis H, Bouillon B et al, Chirurg Nov 2001



<b>Author</b>	<b>No. of patients</b>	<b>Treatment method</b>
Bertoft, 1984	20	Physiotherapy vs home exercises
Lundberg, 1979	42	- Do -
Kristiansen, 1989	85	Sling 1 wk vs 3 wks
Rommens, 1993	28	Gilchrist vs Desault bandage
Revay, 1992	48	Hydrotherapy vs no hydrotherapy
Livesley, 1992	48	Electromagnetic field vs dummy
Kristiansen, 1988	30	Ex-fixation vs sling
Zyto, 1997	40	Wiring vs sling
Hoellen, 1997	30	TBW vs Hemiarthroplasty

Gibson JNA, Handoll HHG, Madhok R: Cochrane review

# Proximal humeral fractures: A systematic review of treatment modalities

- 66 publications – 2653 patients
- Inability to draw conclusions from current literature
- Paucity of quality literature
- Need for higher quality evidence to determine optimal treatment interventions

*Lanting B, MacDermid J et al. JSES Feb 2008;17(1):42-54*

# Non-operative treatment

## Minimally displaced

- 1 week vs 3 week immobilisation less short term pain
  - Kristiansen Angermann Larsen Arch Orth Tr Surg 1989 108 339-41
  - Lefevre-Colau et al JBJS Am 2007 89:2582-90
- 2 part #s – physio at 1 week vs 3 week less painful for same result
  - Hodgson Mawson Stanley D JBJS Br 2003 85 419-22.
- Sling more comfortable than body bandage
  - Rommens Heyvaert Unchir 1993 19 114-8

# Interventions

- MUA + sling / bandage
- Percutaneous K-wires
- External fixation
- Rush pins
- Rush pins with tension band wiring
- Tension band wiring
- Circlage wiring
- Sutures with k-wiring
- Parachute technique
- Resch fixator
- Suture anchors
- Capstan screw technique
- Compression screws
- Compression screw with tension band
- Plant tan humeral fixator
- Polarus nail
- Zimmer locking nail
- AO nail
- Russell Taylor humeral nail
- Condylar cephalic nail
- Flexible humeral nails
- Halder humeral nail
- Seidel nail
- AO clover plate
- AO T-plate
- Blade plate
- Philos plate
- Hemiarthroplasty (several designs)
- Total shoulder arthroplasty (-do-)
- Reverse polarity shoulder replacement

# Interventions

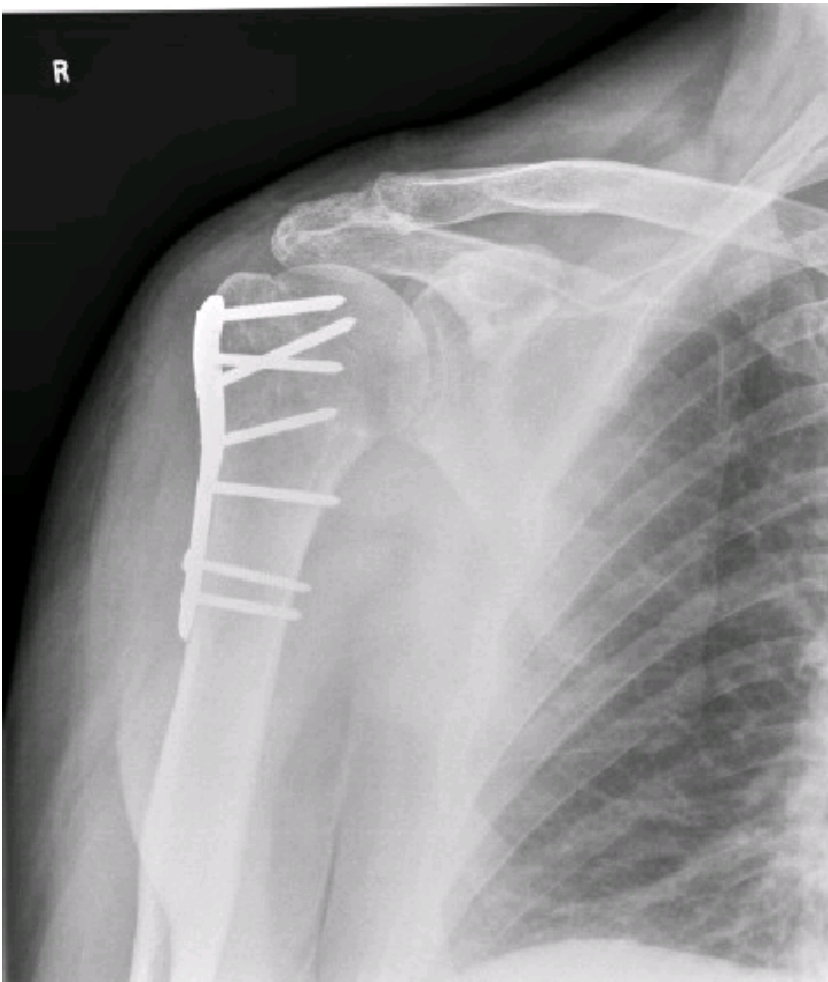
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graph TD; A[Interventions] --> B[Humeral head preservation]; A --> C[Humeral head replacement]; B --> D["•Transosseous sutures<br/>•Percutaneous wiring<br/>•ORIF – Plating<br/>•Intramedullary nailing"]; C --> E["•Hemiarthroplasty<br/>•(Reversed polarity replacement)"]
```

Humeral head preservation

- Transosseous sutures
- Percutaneous wiring
- ORIF – Plating
- Intramedullary nailing

Humeral head replacement

- Hemiarthroplasty
- (Reversed polarity replacement)



Anatomical reduction

Stable fixation

Early mobilisation

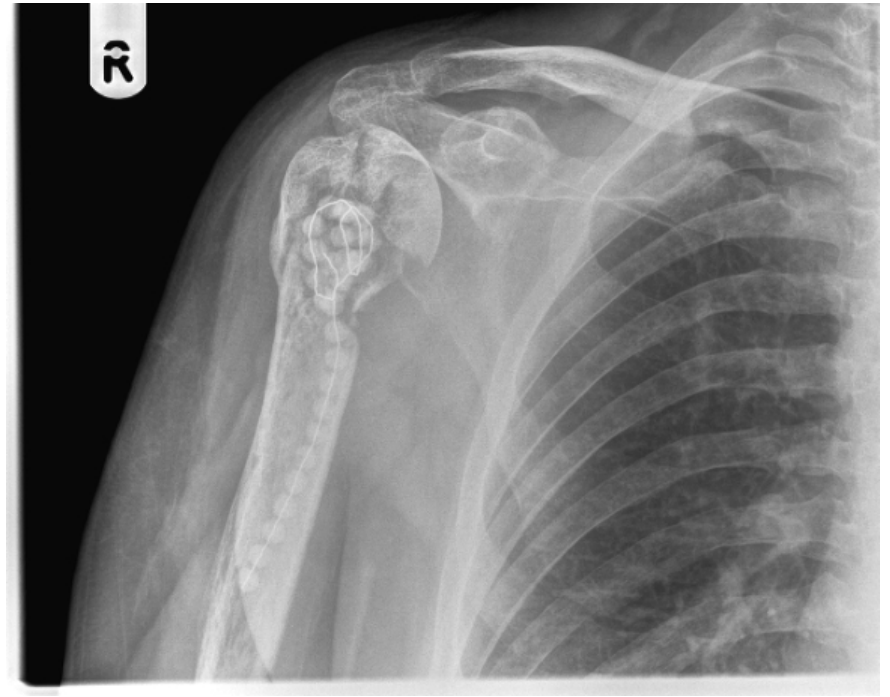
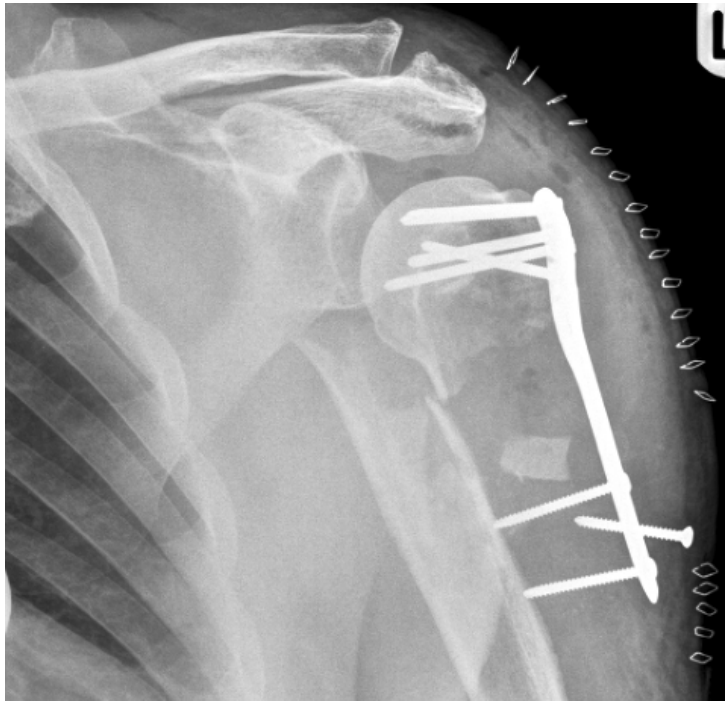
Uneventful # healing

Poor function





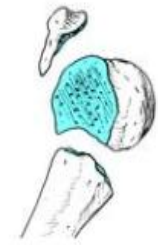






Does surgery improve outcomes in displaced proximal humeral fractures?



P  
R  
O  
F  
H  
E  
R

## Proximal Fracture of the Humerus: Evaluation by Randomisation (ProFHER) trial

### Trial Management Group includes:

Amar Rangan: Chief Investigator (Teesside University & South Tees NHS Trust)

Stephen Brealey: Trial Manager (University of York)

Laura Dennis: Trial Co-ordinator (Teesside University)

Helen Handoll: Senior Lecturer (Teesside University)

Catherine Hewitt: Trial Statistician (University of York)

David Torgerson: Director of York Trials Unit (University of York)

**Sponsor:** University of Teesside

# Role of surgery

- Some patients are likely to benefit from surgery
- We don't yet know how to identify the phenotypes that benefit from surgery
- Surgery brings with it complications & its consequences
- Lack of good quality evidence to inform practice



**Does it need surgery?**

Fix or replace?

What implant or prosthesis?

Should I do it?

Do I have the resources for  
post op rehab?

Should I send it to someone  
else?

**“Results of bad surgery  
are worse than the results  
of a bad fracture”**



"From inability to leave well alone;  
From too much zeal for the new and contempt for what is old;  
From putting knowledge before wisdom, science before art,  
and cleverness before common sense,  
From treating patients as cases, and  
From making the cure of the disease more grievous than the  
endurance of the same,  
Good Lord, deliver us."

Sir Robert Hutchinson  
(1871-1960) London physician