Upper Limb Tumours

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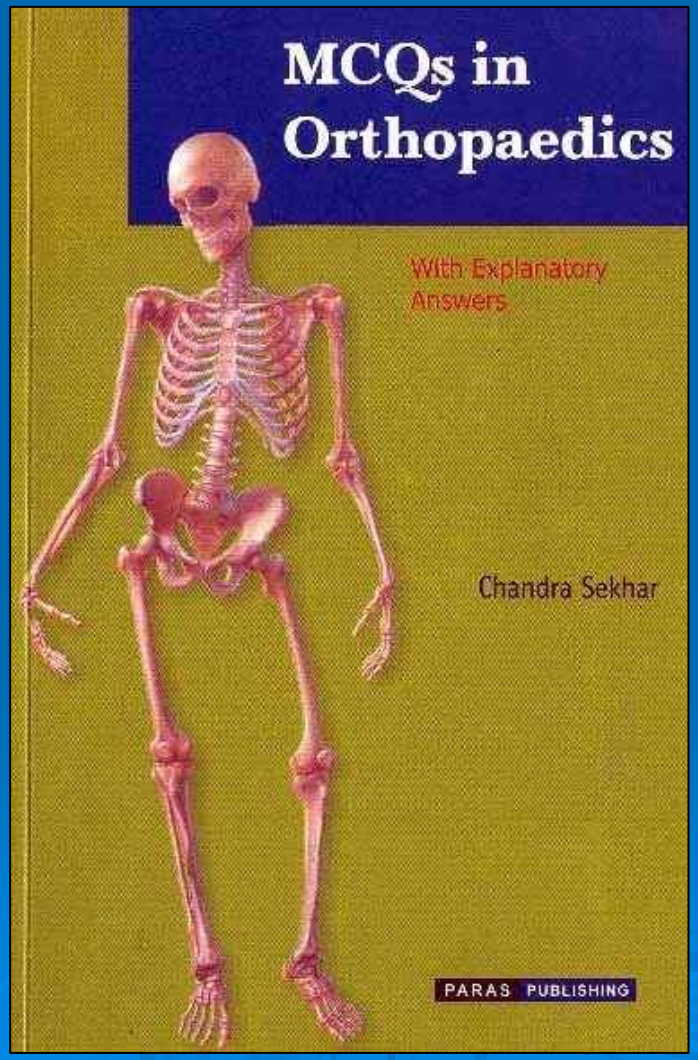
Overview

- MCQs
- Tumour Basics
- Common tumours
  - Bone
  - Soft tissue
- Considerations specific to Upper Limb tumours
- Proximal humeral resection/reconstruction
- Cases
- MCQ answers

MCQs


MCQs in Orthopaedics
With Explanatory Answers
Chandra Sekhar
PARAS PUBLISHING

- 1: The most common primary tumour that occurs in the bones of the hand is which of the following?

A. Intraosseous ganglion
B. Giant cell tumour
C. Chondrosarcoma
D. Enchondroma
E. Epithelioid sarcoma

- 2: Which is the most common primary tumour that results in metastatic lesions in the hand?

A. Lung
B. Breast
C. Prostate
D. Multiple myeloma
E. Thyroid

- 3: What is the most common malignant tumour of the hand?

A. Epithelioid sarcoma
B. Chondrosacrcoma
C. Osteosarcoma
D. Basal cell carcinoma
E. Squamous cell carcinoma

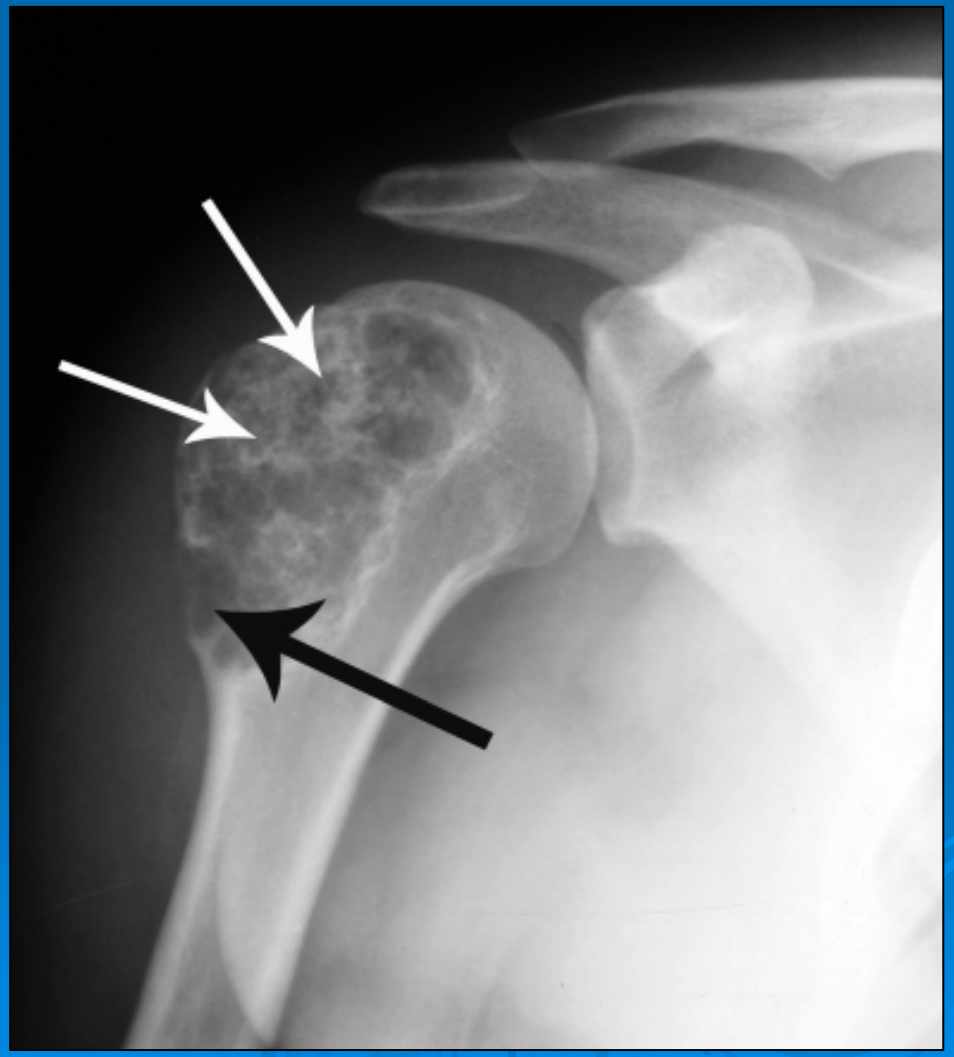
- 4: What is the most common soft tissue sarcoma of the hand?

A. Alveolar rhabdomyosarcoma
B. Synovial sarcoma
C. Epithelioid sarcoma
D. Malignant fibrous histiocytoma
E. Soft tissue osteosarcoma

- 5: Which flaps are most useful for reconstruction of full-thickness shoulder defects following tumour resection from the shoulder area?

A. Latissimus dorsi and pectoralis major
B. Trapezius and pectoralis major
C. Latissimus dorsi and pectoralis minor
D. Trapezius and lattissimus dorsi
E. Free gracilis

- 6: What type of matrix is being formed by this tumour?
- 7: What is the term for this radiological appearance?



- 8: An 8-year old boy presents with a high grade osteosarcoma of the humerus. There is a large extraosseous soft tissue mass associated with the tumour. According to the Enneking system, how should this tumour be classified?

A. IA
B. IB
C. IIA
D. IIB
E. III

- 9: Which chromosomal translocation would you expect to see in the previous case of Ewings sarcoma?

A. 9:18
B. 11:22
C. 1:20
D. 3:9
E. 21:23

- 10: A 59-year old woman with metastatic breast carcinoma presents with acute, symptomatic hypercalcaemia. Which of the following is not a potential symptom or sign of hypercalcaemia?

A. Coma
B. Chvostek sign
C. Shortened QT interval
D. Hyporeflexia
E. Polydipsia

- 11: The radiographic appearances listed below are all consistent with a diagnosis of giant cell tumour except?

A. It has an eccentric location
B. It has a permeative border
C. It abuts the subchondral bone of the articular surface
D. It has a bone forming matrix
E. It occurs in the epiphyseal region

- 12: When performing an incisional biopsy of a suspected malignant musculoskeletal neoplasm of the proximal humerus, the surgeon should adhere to all of the following except?

A. Biopsy should be performed through muscle rather than through intermuscular planes
B. Neurovascular bundles should not be exposed during the procedure
C. The incision should be transverse
D. The biopsy should be performed at the institution where the definitive operation will be performed rather than at the referring centre
E. The approach should not violate a compartment that is not already occupied by the lesion

- 13: What radiological appearance is demonstrated below?

Tumour Basics

Definition:

- Mass of tissue formed as a result of abnormal excessive and inappropriate proliferation of cells, growth of which occurs indefinitely regardless of the mechanisms that control normal cellular proliferation

Tumour Basics

History/Examination

- Pain
  - Persistent, night, analgesia
- Swelling/mass
- Rate of progression
- Age
  - Young – Benign Vs Ewings / osteosarcoma
  - 40-60 – Chondrosarcoma / haemopoetic tumours
  - 70s – Metastasis / osteosarcoma / myeloma / lymphoma
- Neurologic symptoms
- Previous malignancy / radiotherapy / +ve FH

Tumour Basics

Imaging: Image whole bone affected

- What is the effect of the lesion on the bone?
  - Matrix formation
  - Zone of transition / margin
    - Slow growing – narrow / sclerotic
    - Rapid growing – permeative / ill defined
- What is the effect of the bone on the lesion?
  - Bones response – Sclerosis / Codmans triangle / sunray spiculation
- Is the lesion solitary or multiple?
- Where in the bone is the lesion

Tumour Basics

Codman's Triangle

Sunray Spiculation

Tumour Basics

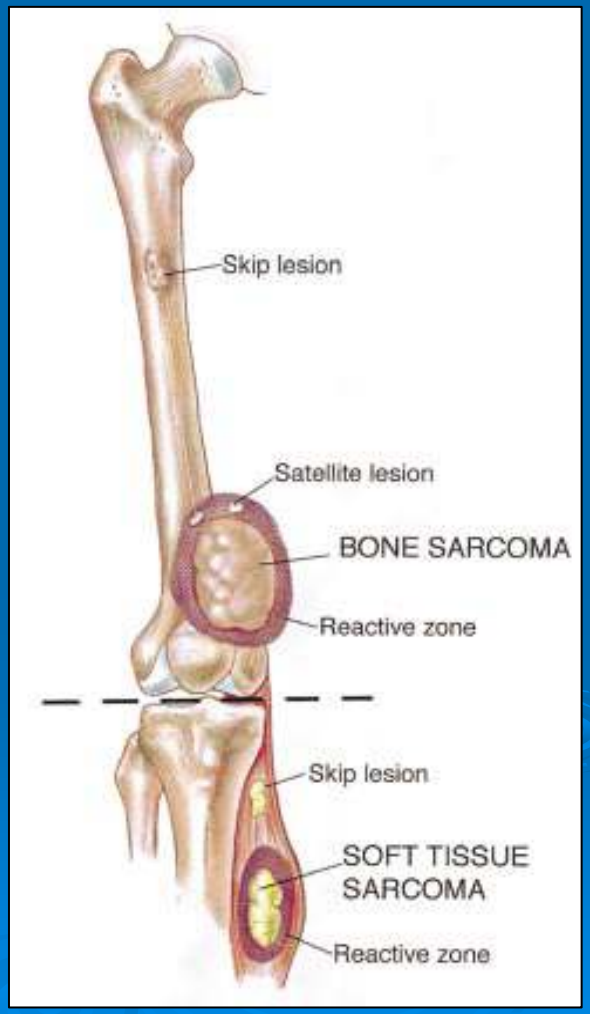
Imaging: Other studies

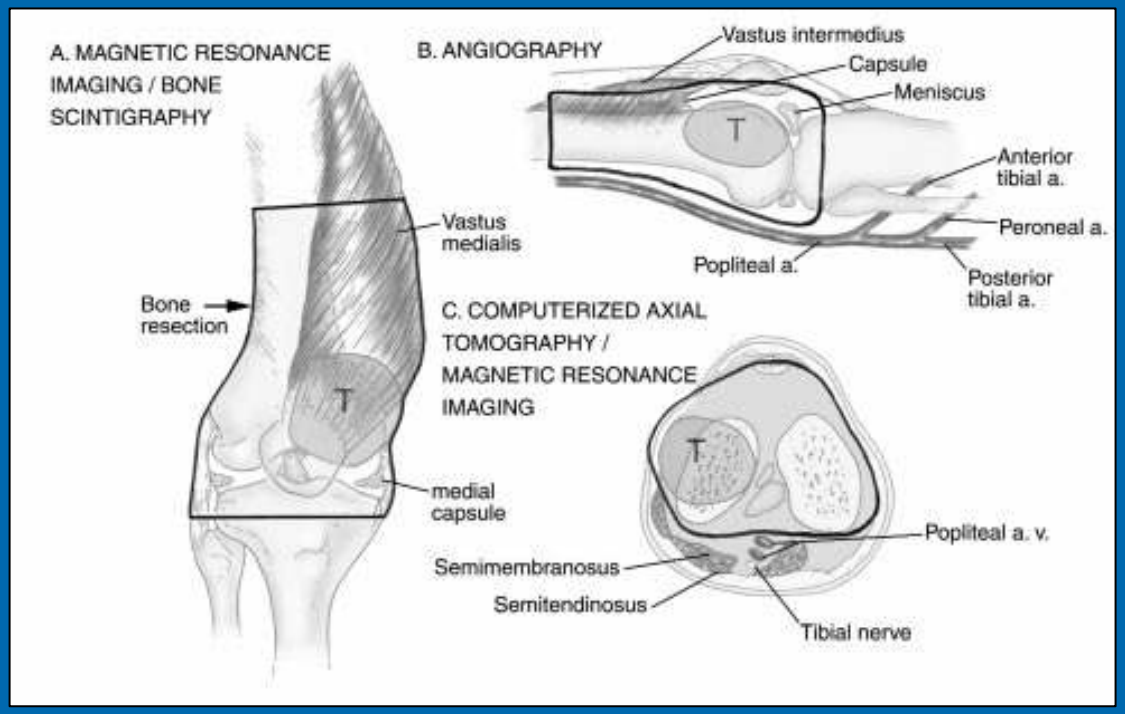
Characterising and Staging tumour

- CXR
- USS
- Bone Scan
- CT/MRI
- Others eg PET Scan

Bloods

- Ca^{2+}, ALP
- PSA, Electophoresis, Urine Bence-Jones





Relationship of the various imaging modalities to the different components of a bone sarcoma

Plain radiographs: Assess bony involvement and cortical breakdown.

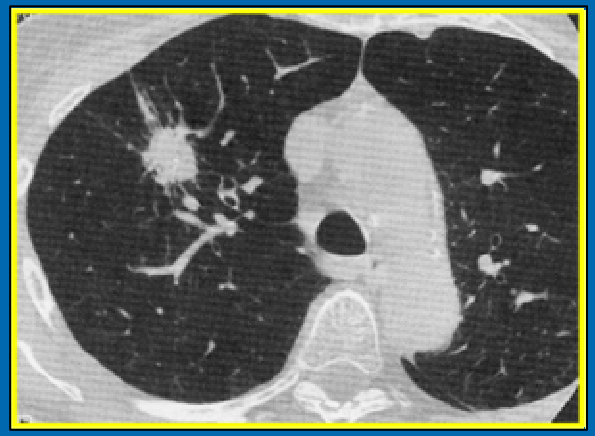
CT: Determines the exact extent of bone destruction, role in staging

MRI: Determines the medullary & extraosseous components of the tumour

Bone scan: Evaluates cortical and intraosseous extents of the tumor, presence of metastatic bone disease

Angiography: Relation of the tumour to the major blood vessels

Tumour Basics



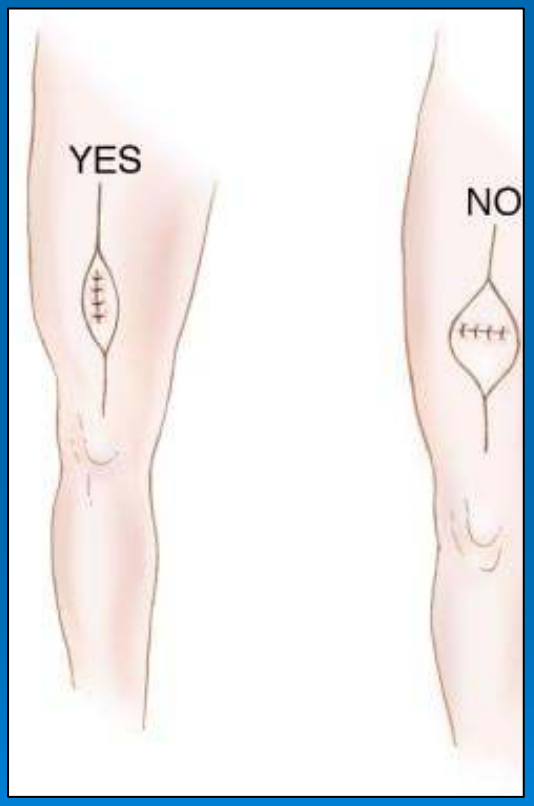
Tumour Basics

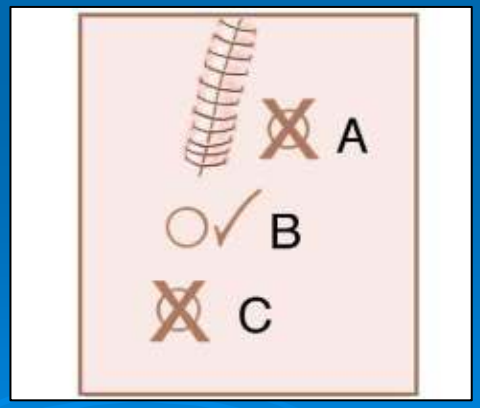
Biopsy

- Ideally surgeon who will perform resection
- Performed through muscle
- Stay within compartment
- Longitudinal not transverse incision
- Don't expose Neurovascular bundles
- Don't lift skin/tissue flaps
- Send sample for culture
- Meticulous haemostasis
- Fresh Vs Fixed

Needle (Jamshedi/Trucut/Islam) Vs Open Vs Excisional

Tumour Basics





Drain placement

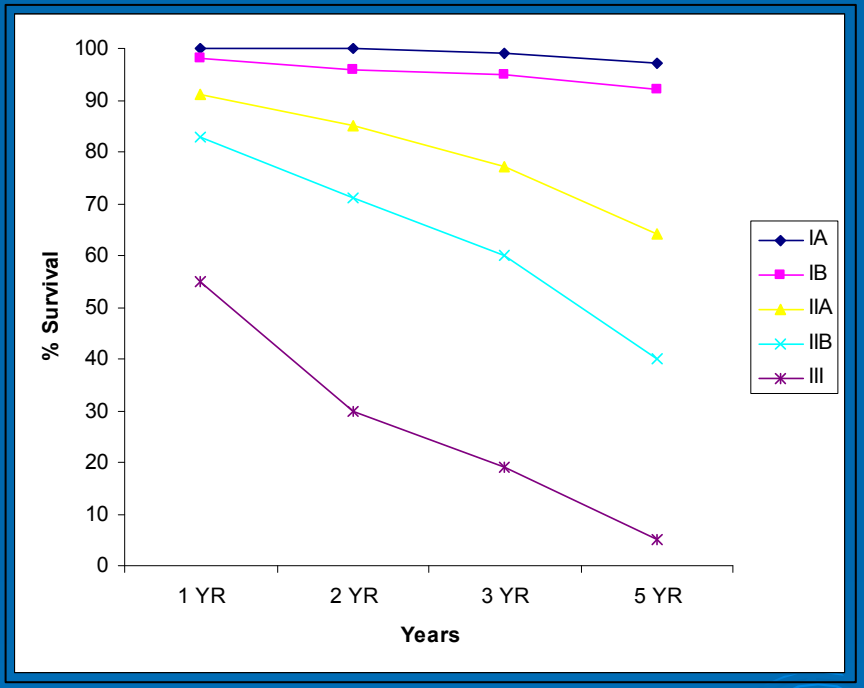
Tumour Basics

Staging

- Why?
  - Prognostic / Guide treatment & adjuvant therapies
- Enneking
  - Grade (From Biopsy):
    Low (G1) Vs High (G2) grade
  - Site (From local imaging):
    Intracompartmental (T1) Vs Extracompartmental (T2)
  - Metastasis (From staging CT/Bone scan):
    No Mets (M0) Vs Mets (M1)

Tumour Basics

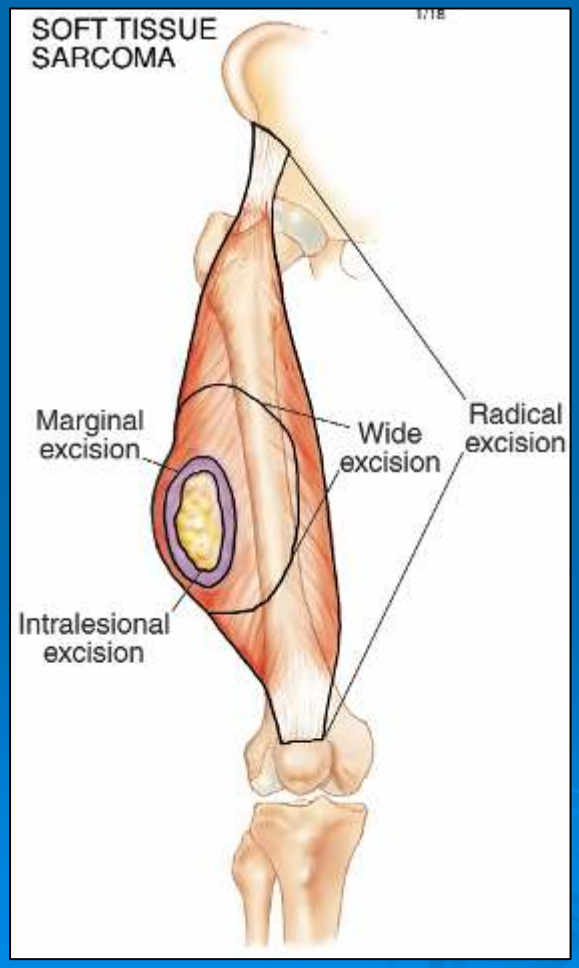
Stage	Grade	Site	Metastasis
IA	G1	T1	M0
IB	G1	T2	M0
IIA	G2	T1	M0
IIB	G2	T2	M0
III	Any	Any	M1

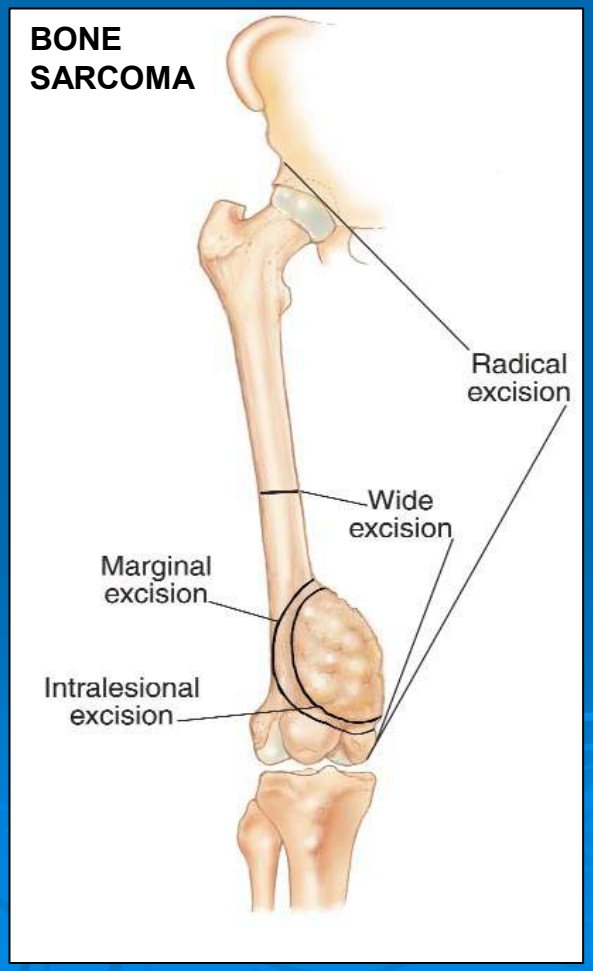


Survival by Enneking's surgical stage of 219 patients with primary bone sarcoma.

Tumour Basics

Tumour Excision





Common Bone Tumours

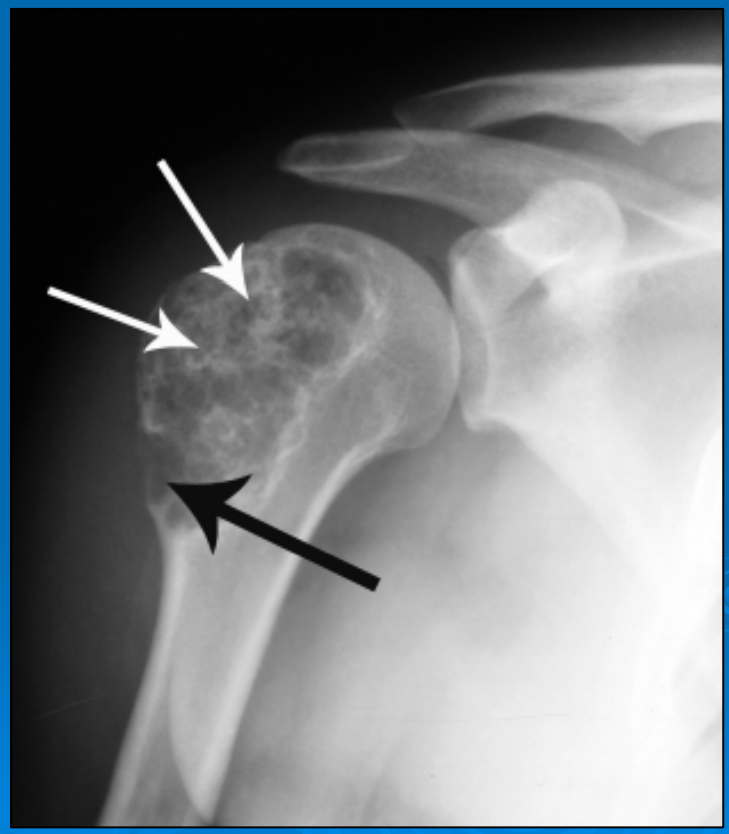
Osteosarcoma – Malignant spindle cell tumour

- Bimodal age distribution
- Distal femur (50%) & Prox Humerus (25%)
- X-ray – lytic/sclerotic, permeative margins, Codmans triangle, sunray spiculation
- ≈10% have lung mets at presentation
- Survival ↑ with adjuvant/neo adjuvant chemotherapy
- Poor prognosis if develops in Pagetic bone

Common Bone Tumours

Chondrosarcoma – Malignant cartilage tumour

- 4th/5th Decade
- M>F
- X-ray – patchy calcification: Popcorn appearance, endosteal scalloping
- Often slow growing with late metastasis
- Not chemo/radiosensitive



Common Bone Tumours

Ewings – Malignant small round blue cell tumour

- Assoc with (11:22) chromosome translocation
- Occurs in kids (median age 13)
- Mainly femoral / tibial diaphysis
- Often have soft tissue invasion leading to Onion skin appearance on x-ray
- Assoc systemic upset – ↑ESR, ↑Temp, pain
- Neoadjuvant Chemo highly effective in ↓tumour bulk

Common Bone Tumours

Giant cell tumour – Benign but aggressive tumour

- 80% occur in the mature skeleton
- Varied behaviour
  - Latent vs active vs aggressive
- Pathology: Multinucleated giant cells & stomal cells
- Epiphyseal abutting subchondral bone
- Treatment: excision preserving joint / reconstruction

Common Bone Tumours

Enchondroma – Benign Cartilage tumour

- Islands of persisent cartilage in metaphysis due to defective endochonral ossification
- Lesions in hand/feet – benign
- Lesions in pelvis/long bones more concerning
- Single Vs Multiple (Olliers) Vs + Haemangiomas (Maffuccis)

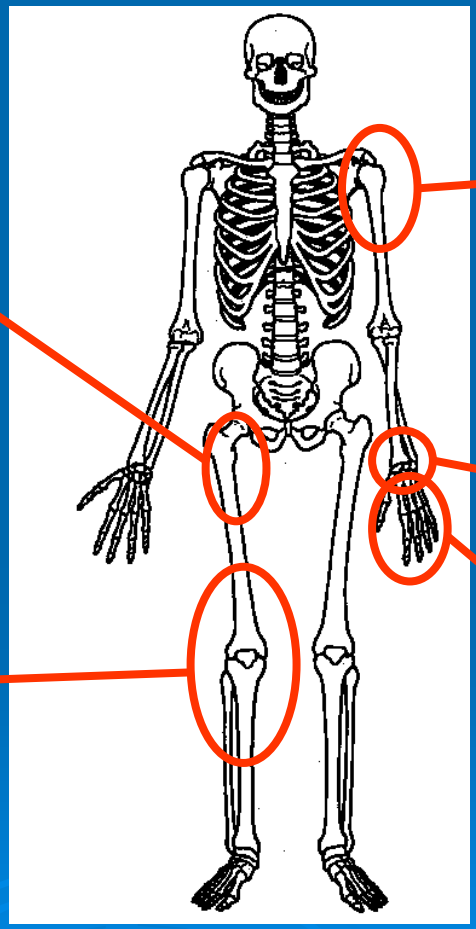
Common Bone Tumours

Osteochondroma (Exostosis) – Benign bone surface tumour

- Commonest benign bone tumour
- Solitary Vs Multiple (Diaphyseal acalasis)
- Bone stalk with cartilage cap
- Should stop growing when parent bone stops growing
- Low risk of malignant change
- Concern if ↑size or cap >1cm

Common Bone Tumours

Osteosarcoma
Chondrosarcoma
Ewings
Enchondroma
Osteochondroma



Osteosarcoma
Chondrosarcoma
Ewings
Enchondroma
Osteochondroma
GCT

GCT

Osteosarcoma
Chondrosarcoma
Ewings
Enchondroma
Osteochondroma
GCT

Enchondroma

Common Bone Tumours

Metastasis

- Lung, Breast, Prostate, Kidney, Thyroid

Principles:

- Control pain
- Control mass of deposits
- Treat fractures
- Treat ↑$Ca^{2+\#}$
- Prophylactic stabilisation

Haematopoietic tumours: Lymphoma, Myeloma

Soft Tissue Tumours

- Soft Tissue Sarcomas in upper limb

	UL (%)	LL (%)
Malignant fibrous histiocytoma	40	31
Liposarcoma	15	25
Synovial Sarcoma	10	5
Malignant PNST	7	7
Lieomyosarcoma	7	8
Fibrosarcoma	7	3
Epithelioid sarcoma	3	1
Other	11	20

Gerrand et al: The influence of Anatomic location in patients with STS of the extremity. CANCER 2003 97(2): 485

Soft Tissue Tumours

- Benign “lumps and bumps”
  - Synovium : Ganglia, GCT tendon sheath, PVNS
  - Fat : Lipoma
  - Vascular : AV malformations, Haemangiomas, Glomus tumour
  - Fibrous tissue : Fibroma, Fibromatosis
  - Neural : Schwanoma, Neurofibroma
  - Others : Post traumatic conditions, epidermal cysts, CMC Boss

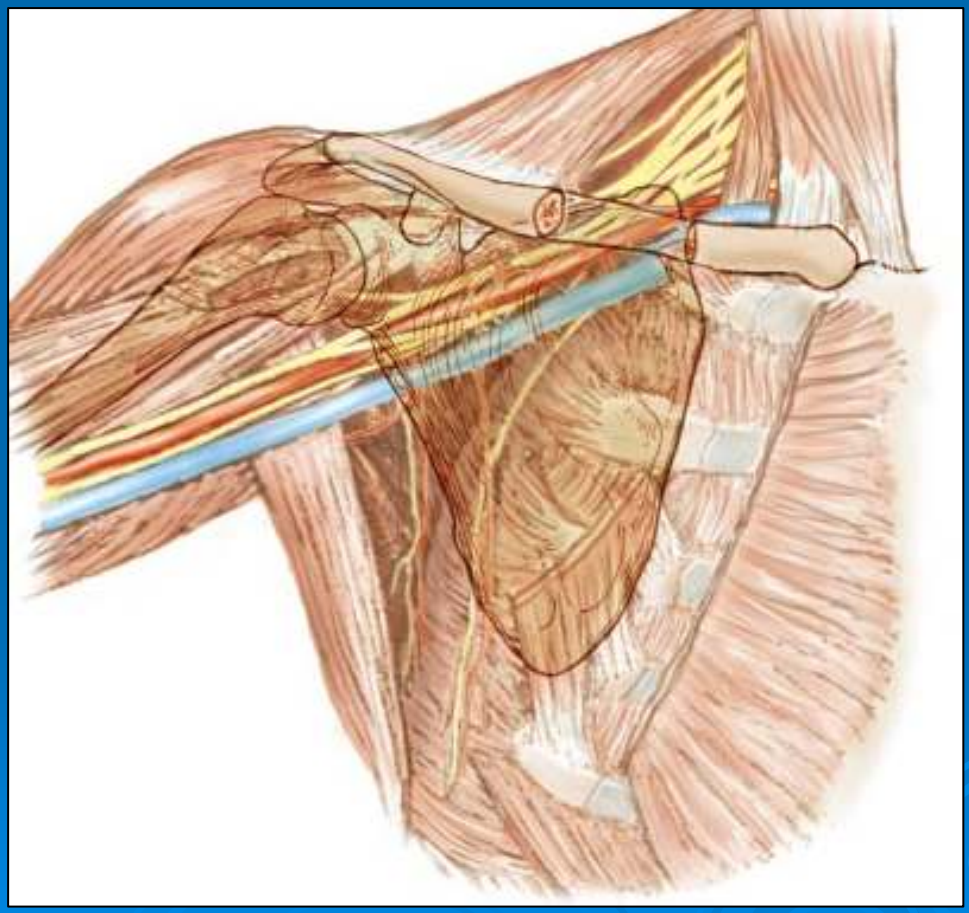
Considerations specific to UL STS

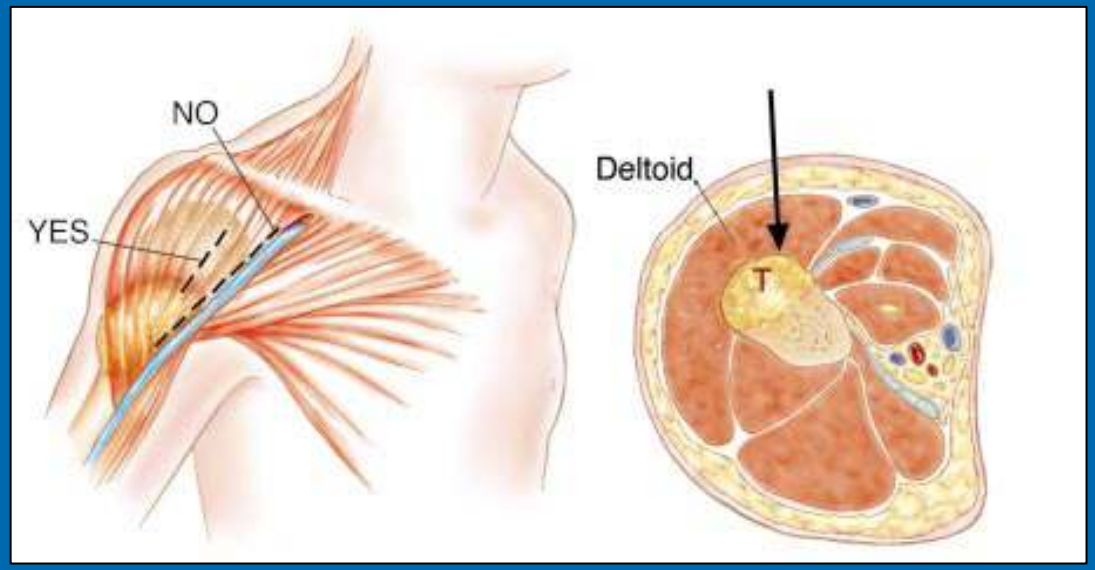
- UL Vs LL
  - Smaller lesions at presentation
  - Less likely to be deep to or involving the investing fascia
  - Higher rate of unplanned excision before referral
  - Tumours of different histological types
  - Higher rate of local recurrence
    - ?Related to:
    - Histological type
    - Unplanned excisions
    - Anatomy
    - Use of adjuvant modalities

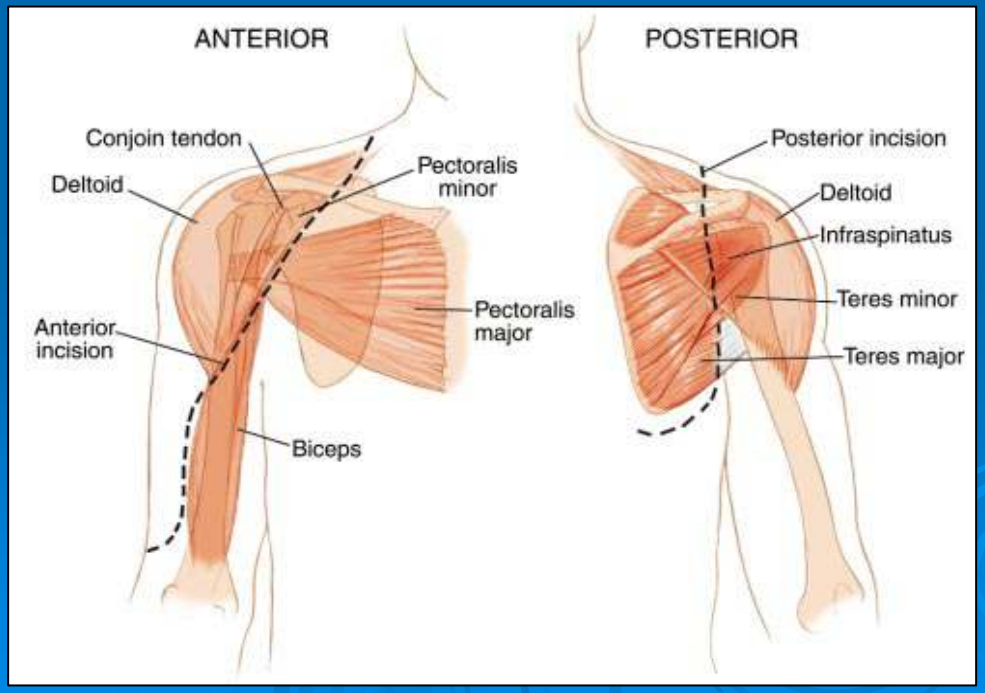
Considerations specific to UL STS

- Preservation of function is key consideration
  - Less likely to amputate
  - Preference for WLE and reconstruction
- Treatment of 2ndry boney metastasis
  - UL not weight bearing
  - Can therefore consider use of conservative measures eg protection in sling, immobilisation for fractures etc

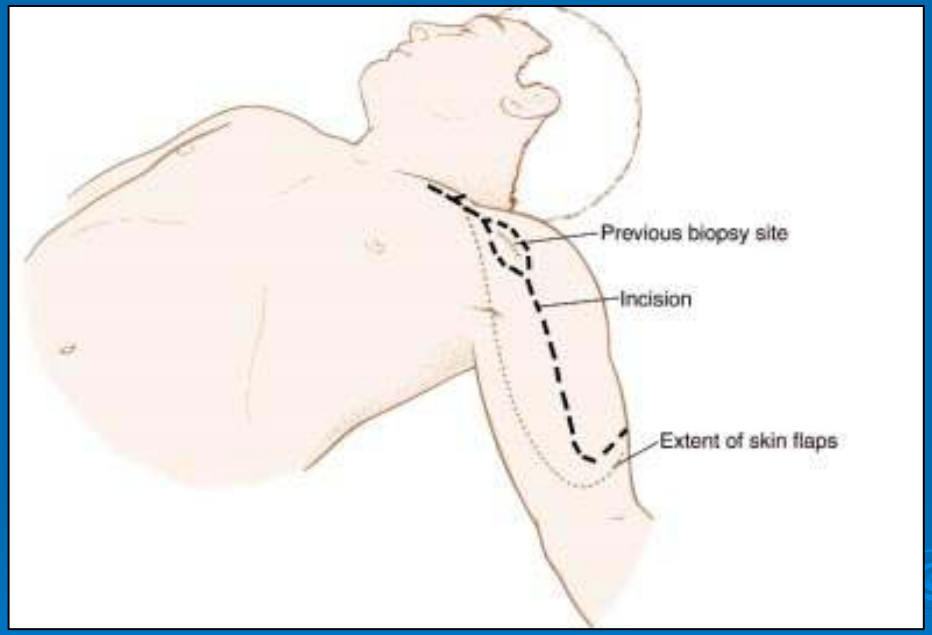
Proximal humeral reconstruction

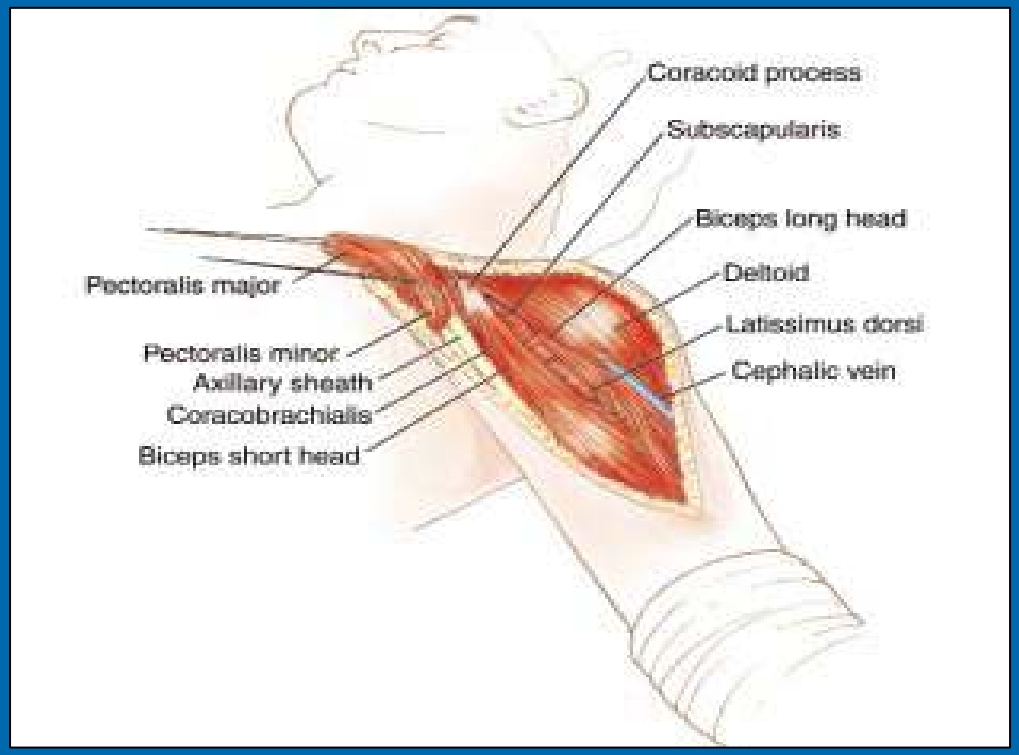


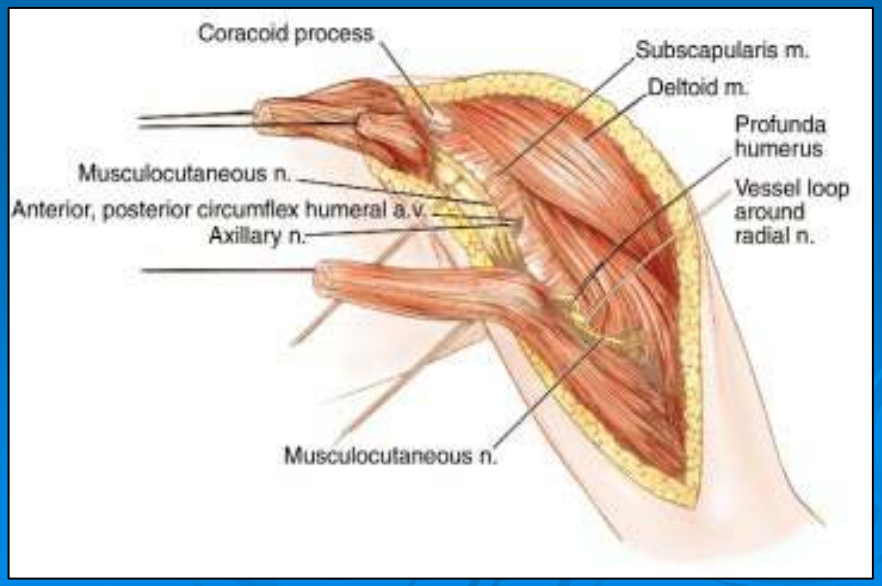

NO
YES
Deltoid
T

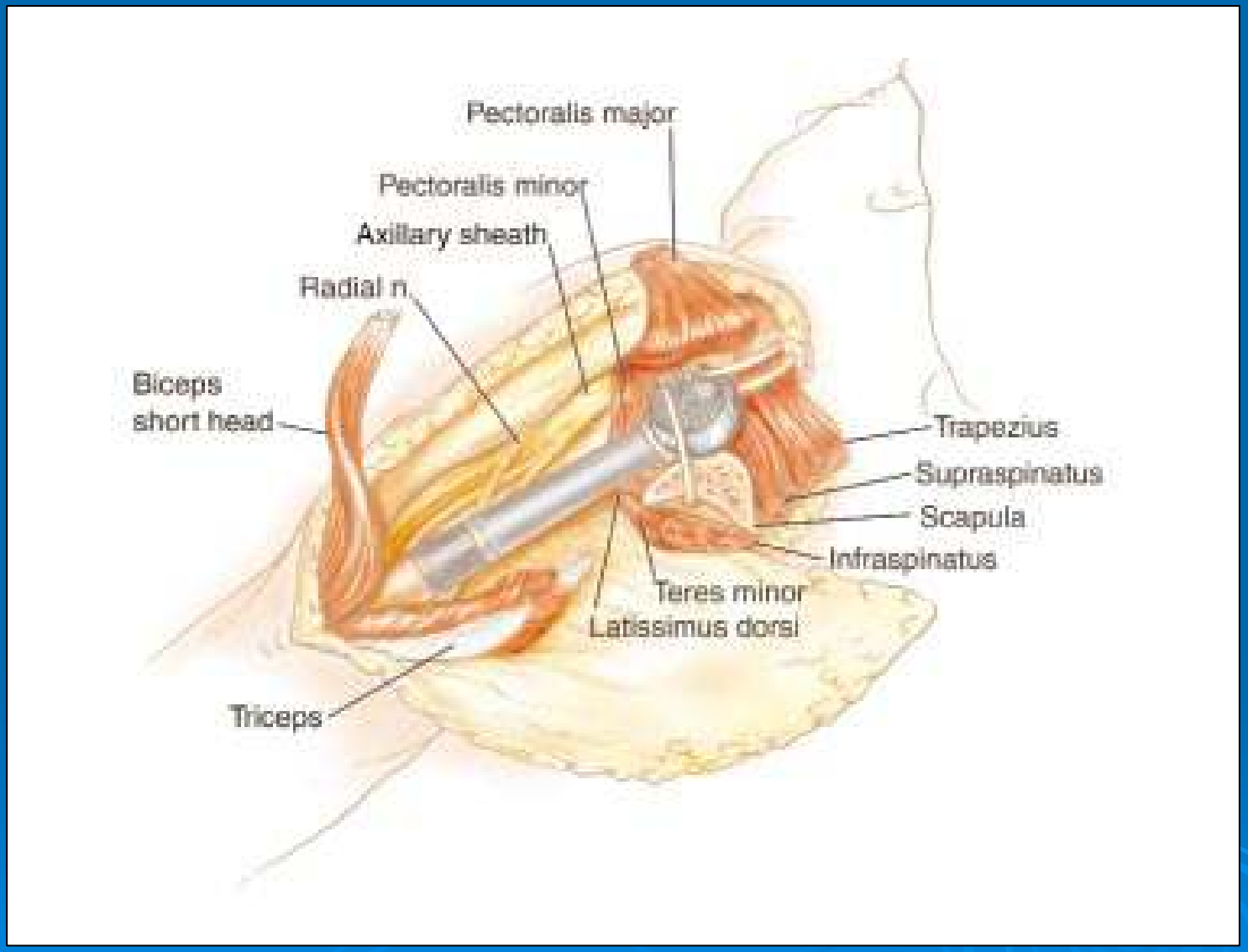

ANTERIOR
POSTERIOR
Conjoin tendon
Deltoid
Pectoralis minor
Anterior incision
Pectoralis major
Biceps
Posterior incision
Deltoid
Infraspinatus
Teres minor
Teres major

Biopsy




Coracoid process
Subscapularis
Biceps long head
Deltoid
Pectoralis major
Latissimus dorsi
Pectoralis minor
Cephalic vein
Axillary sheath
Coracobrachialis
Biceps short head


Coracoid process
Subscapularis m.
Deltoid m.
Profunda humerus
Musculocutaneous n.
Vessel loop around radial n.
Anterior, posterior circumflex humeral a.v.
Axillary n.
Musculocutaneous n.


Pectoralis major
Pectoralis minor
Axillary sheath
Radial n.
Biceps
short head
Trapezius
Supraspinatus
Scapula
Infraspinatus
Teres minor
Latissimus dorsi
Triceps

Proximal humeral reconstruction

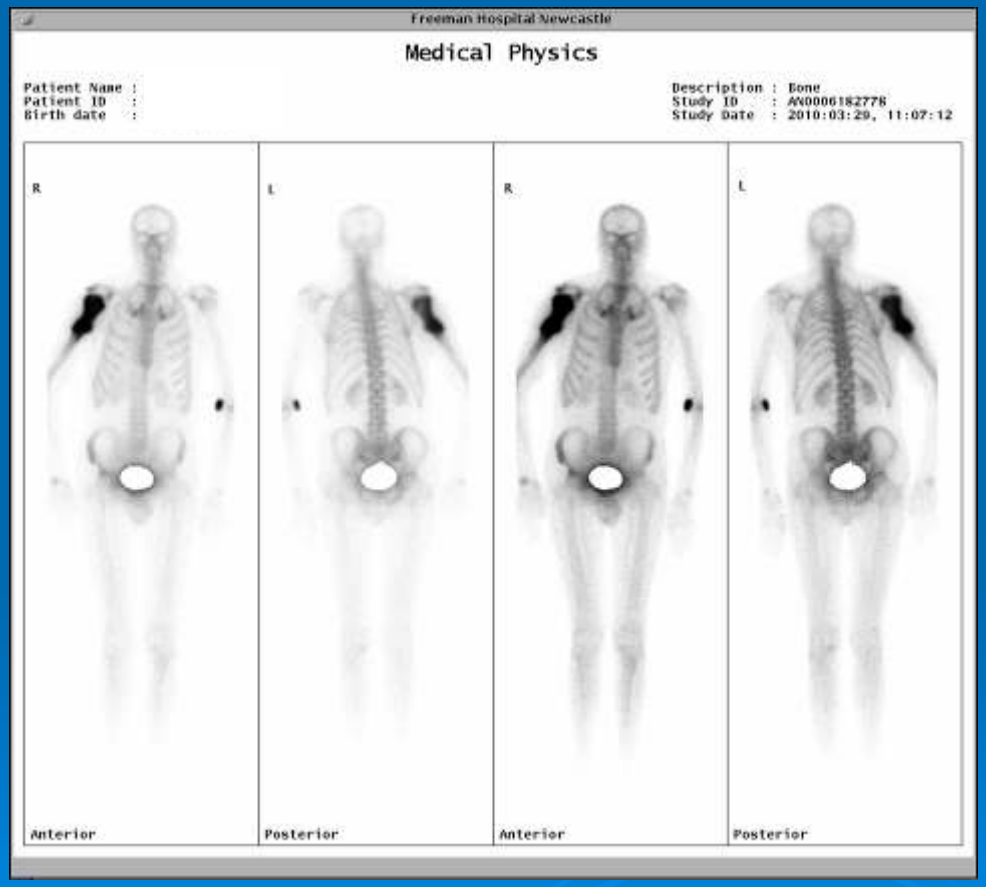
84 yo male

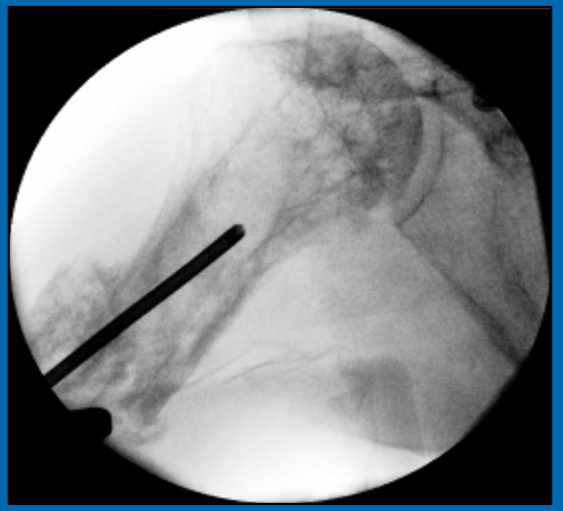
Pathological fracture

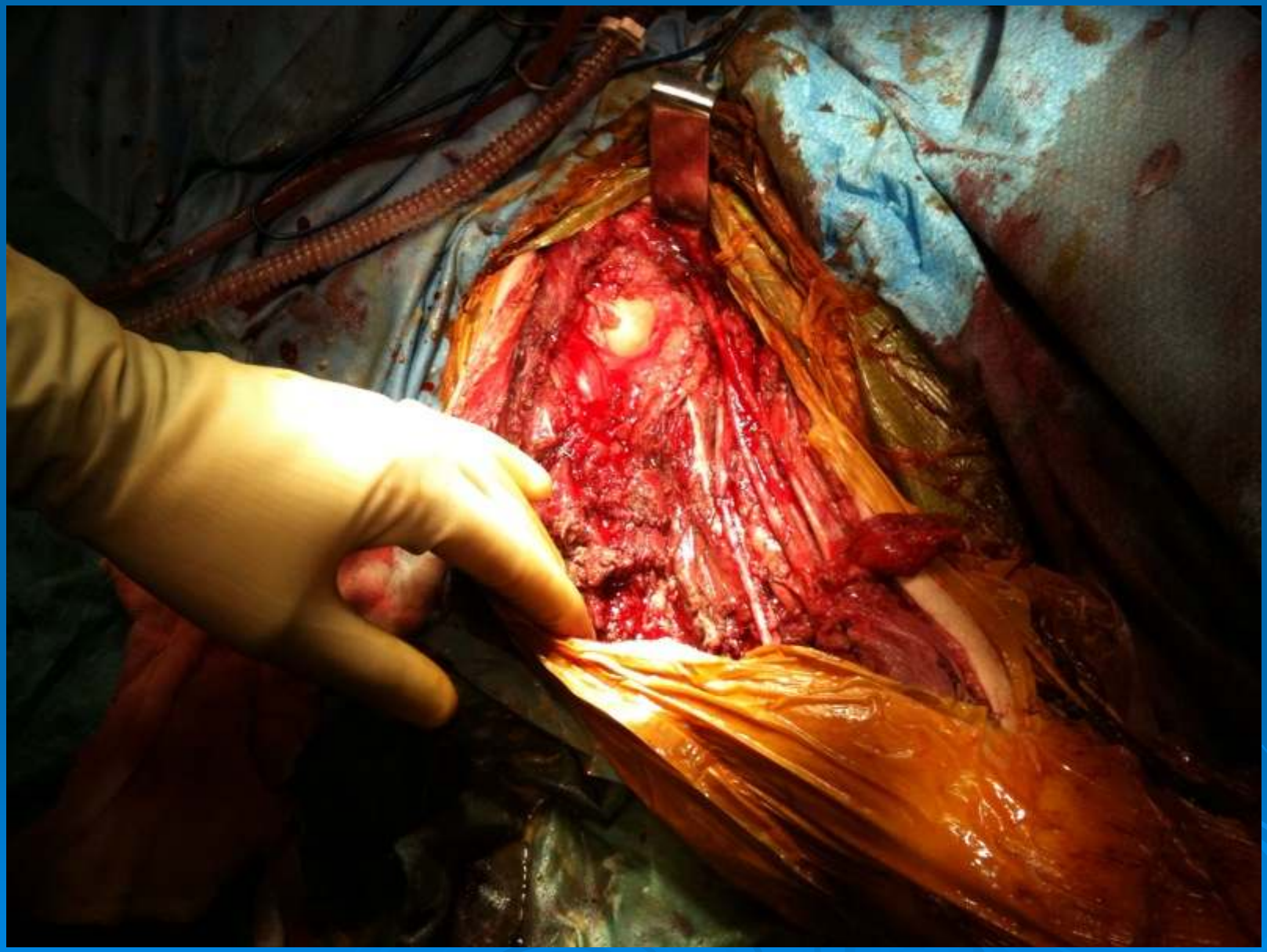
1. Most likely diagnosis?

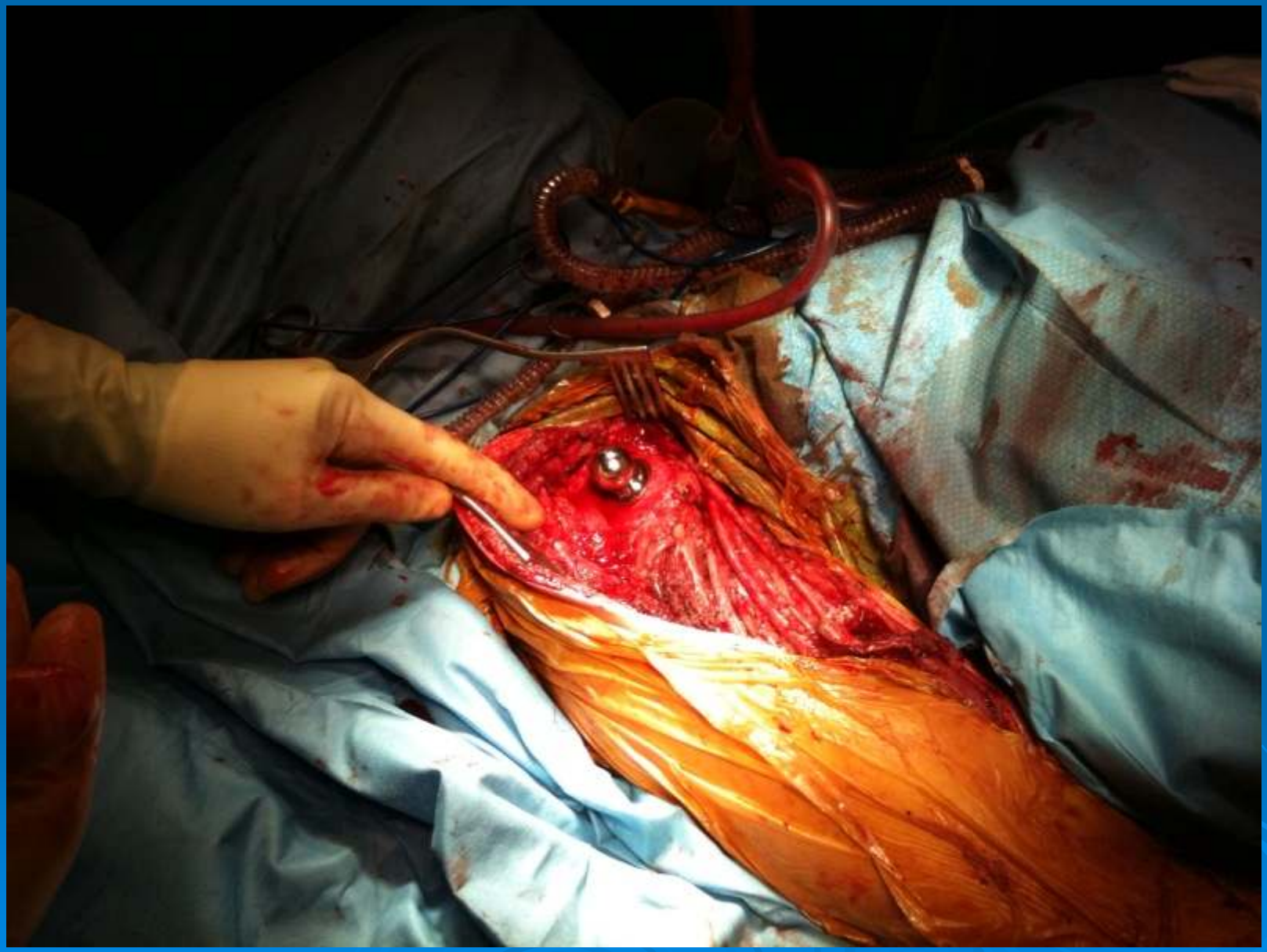
2. What next?

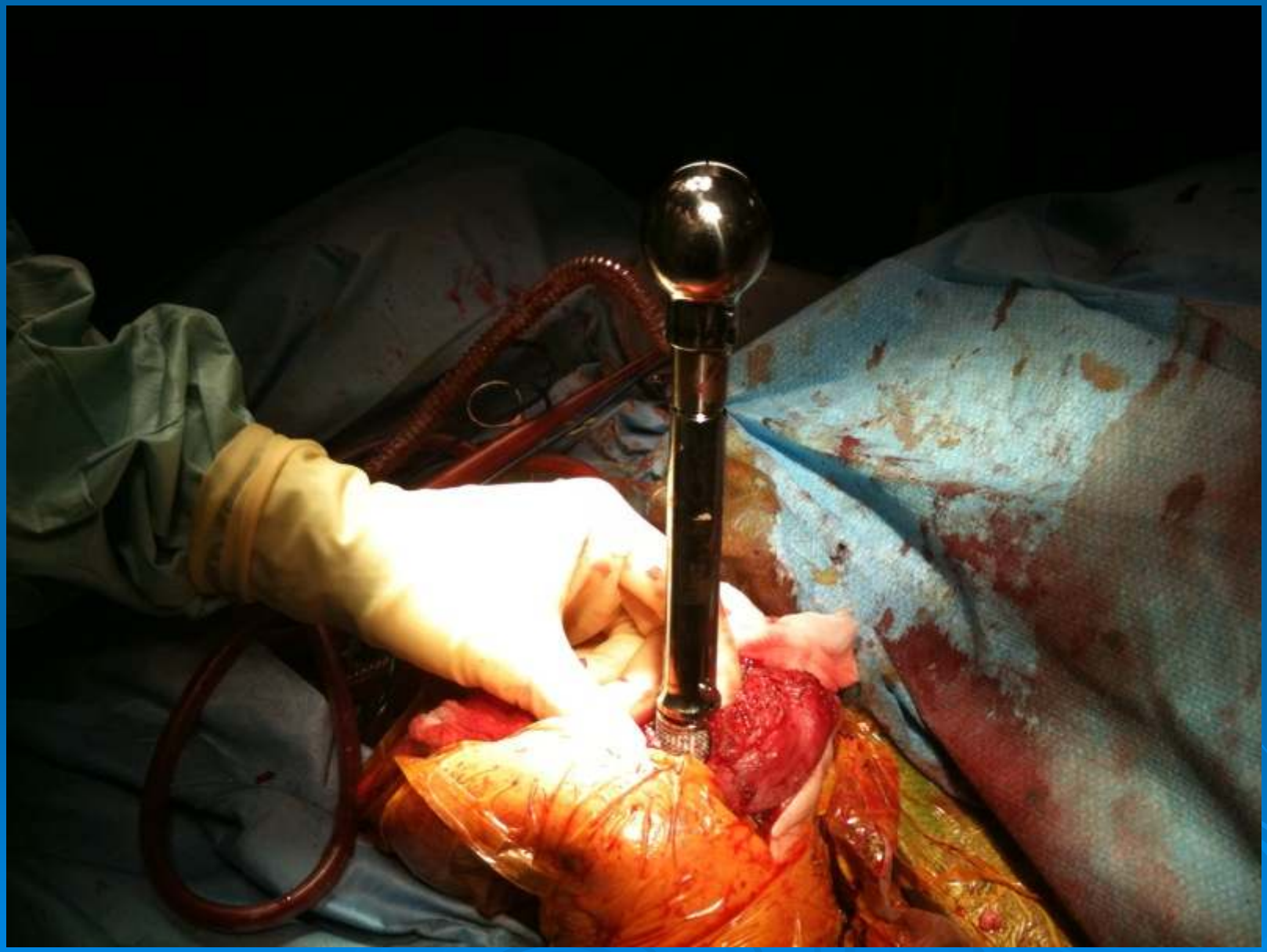
Proximal humeral reconstruction

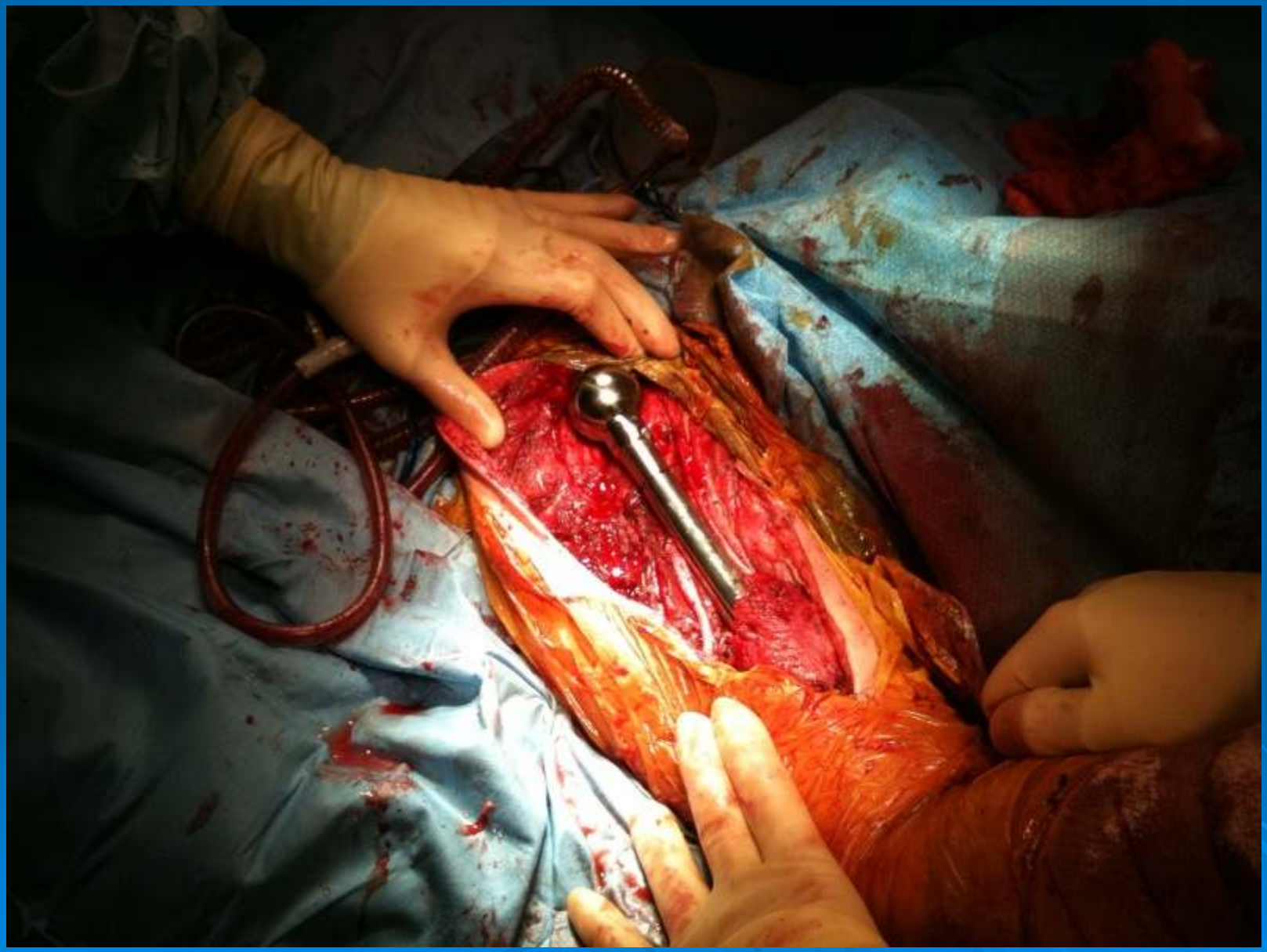




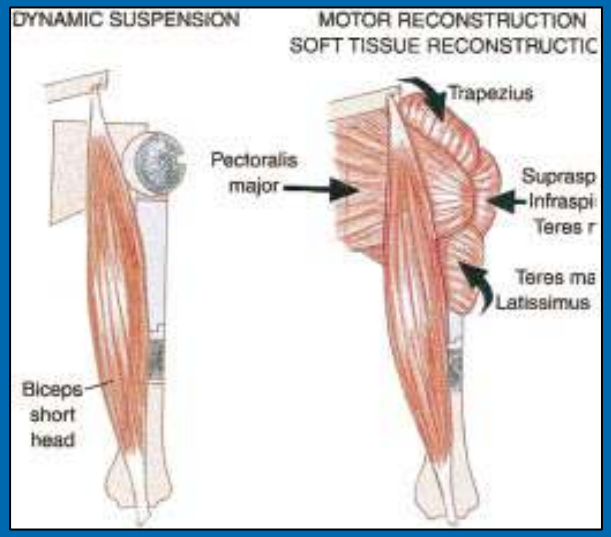


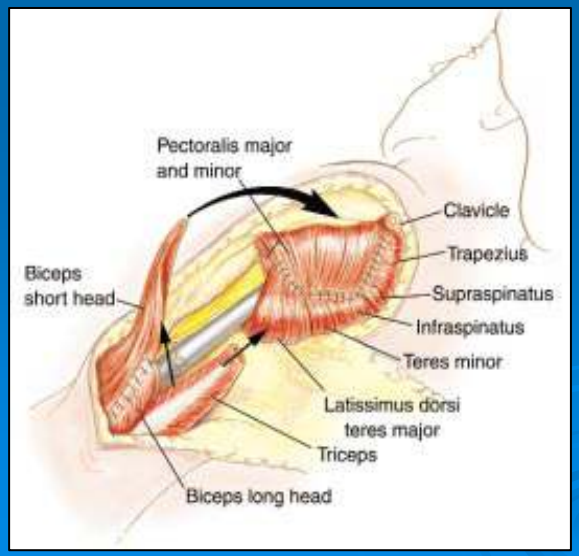


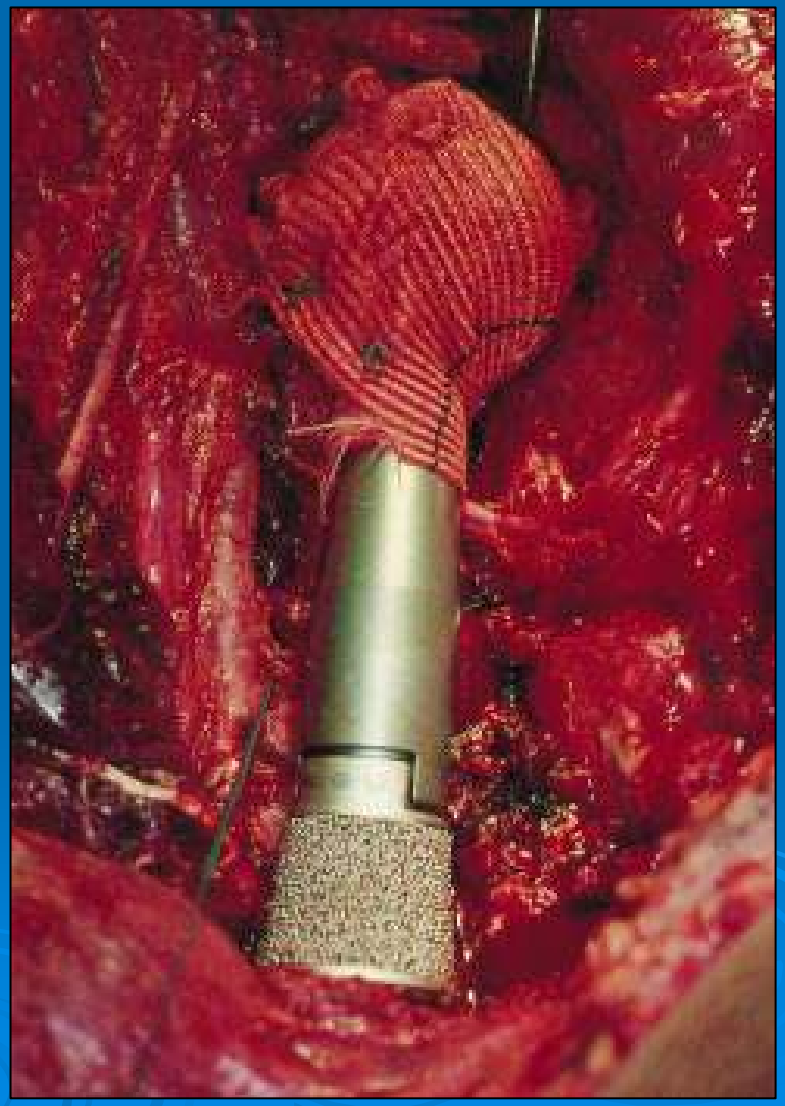




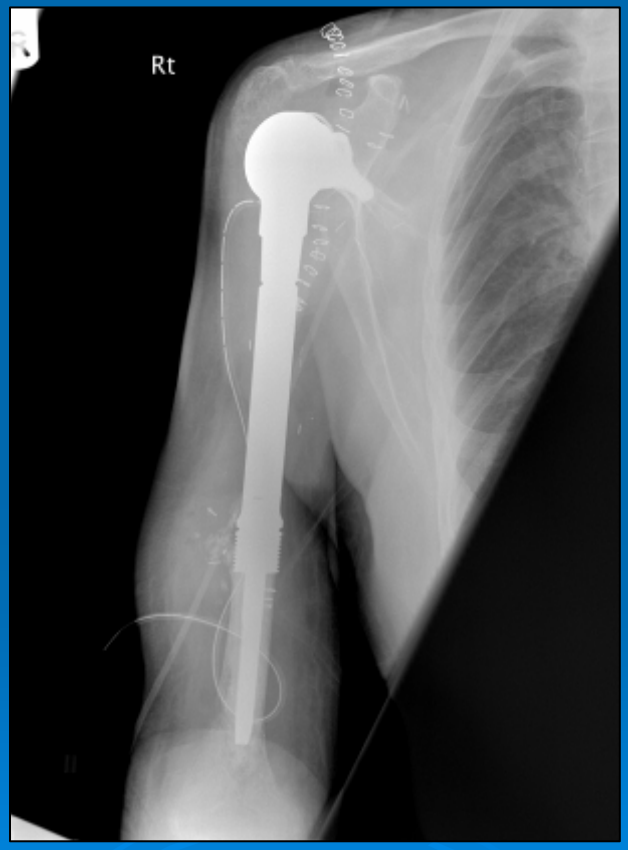
Covering the reconstruction



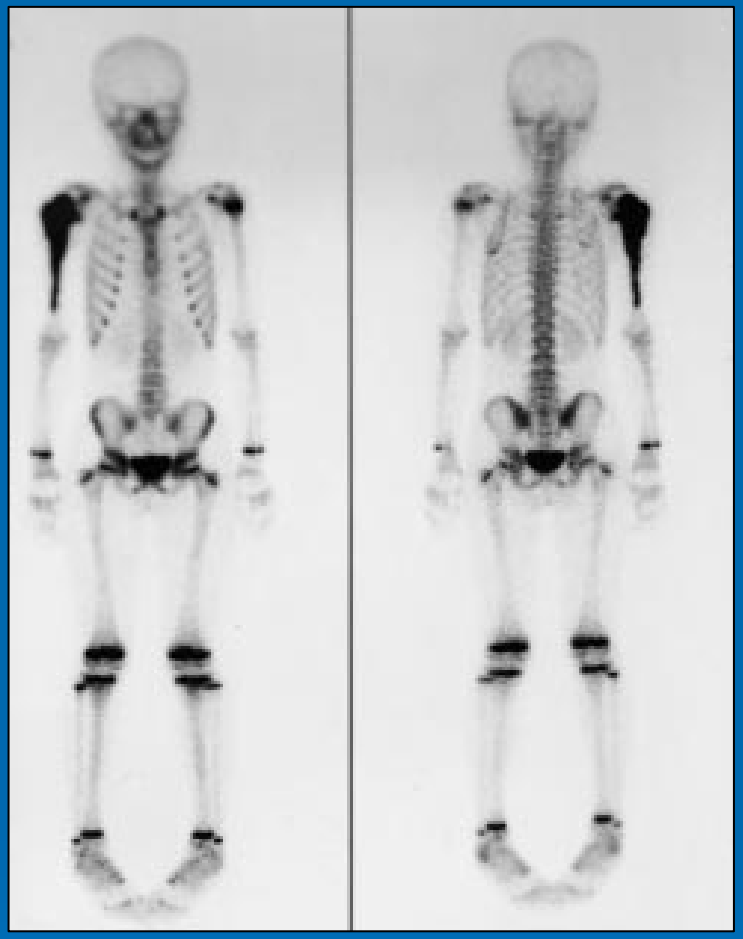




Reconstruction



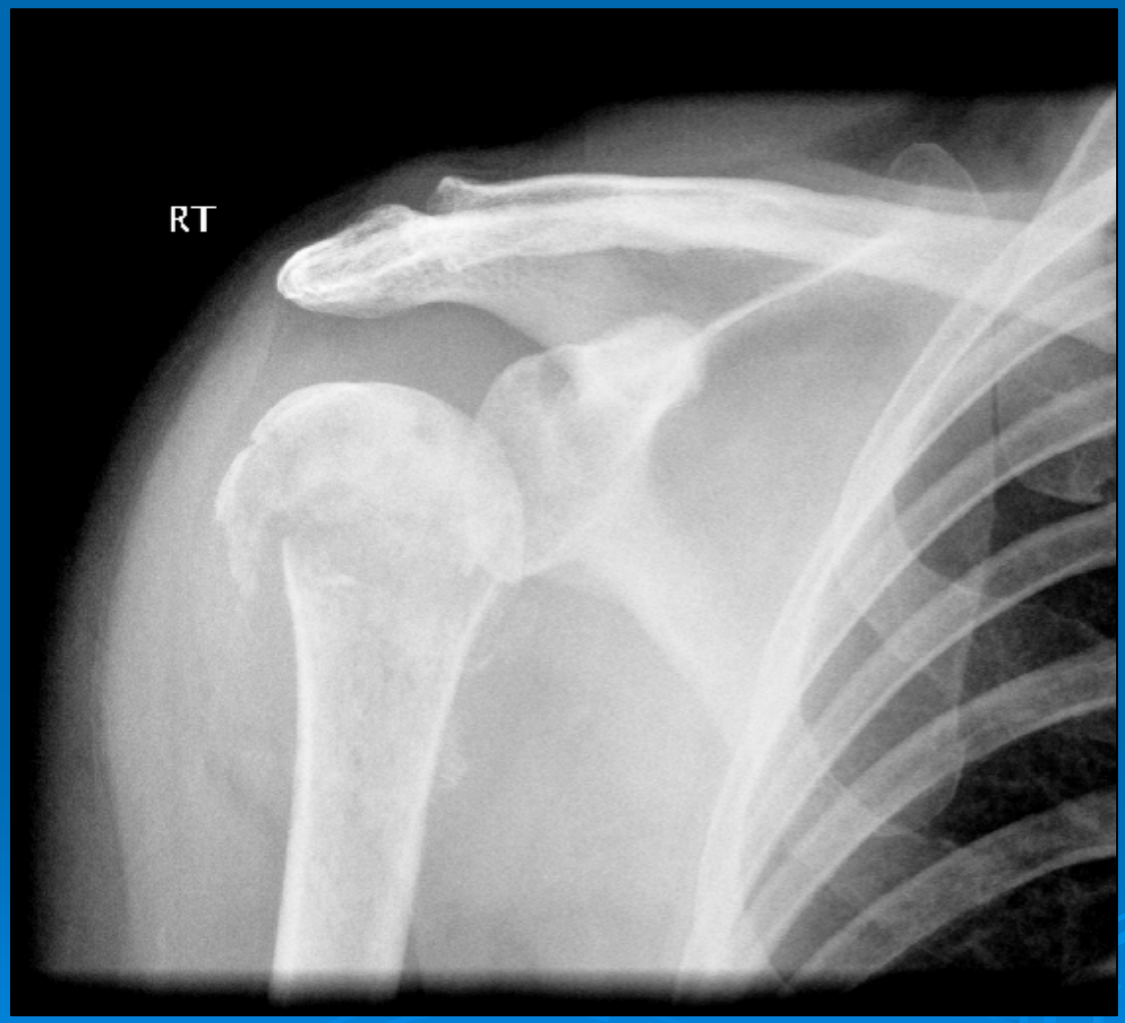
Cases



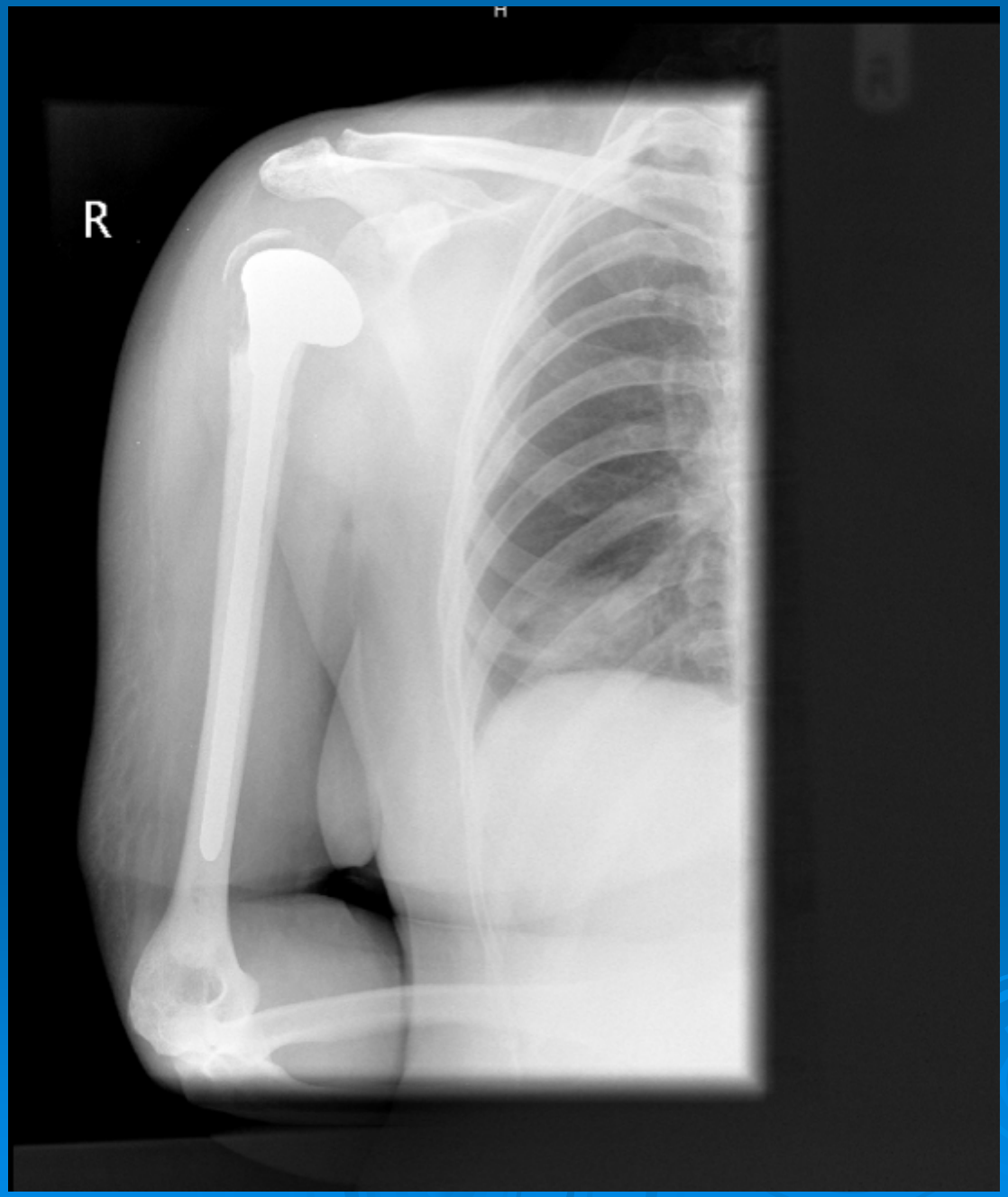
1. Describe the x-ray appearance
2. Diagnosis?

1. Diagnosis?

54 yo female with pathological # due to metastatic breast Ca



1. Options for treatment?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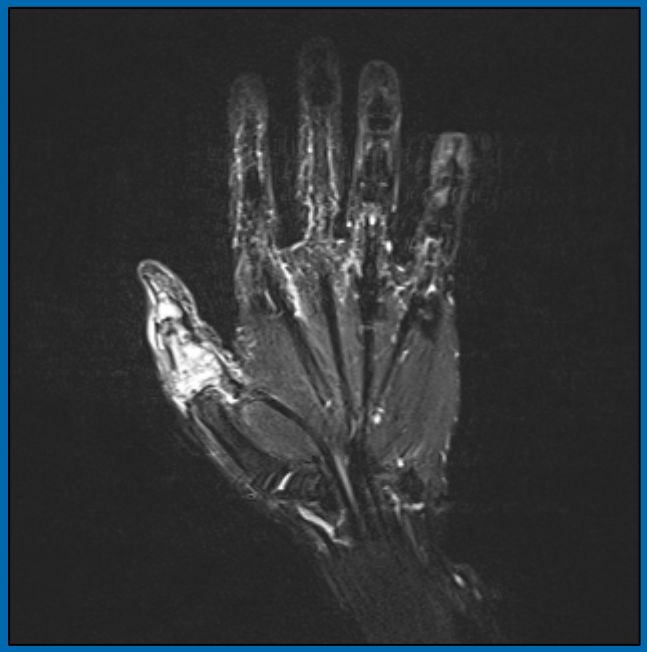
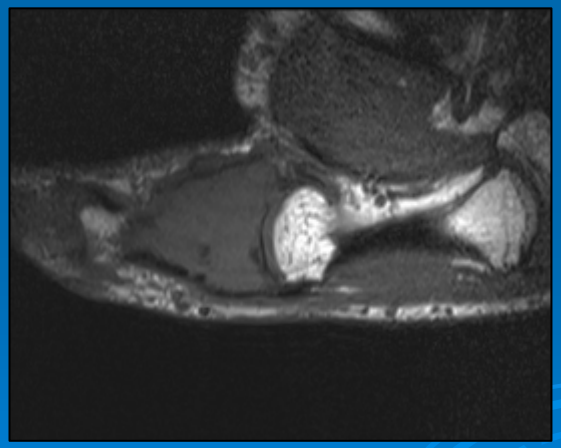
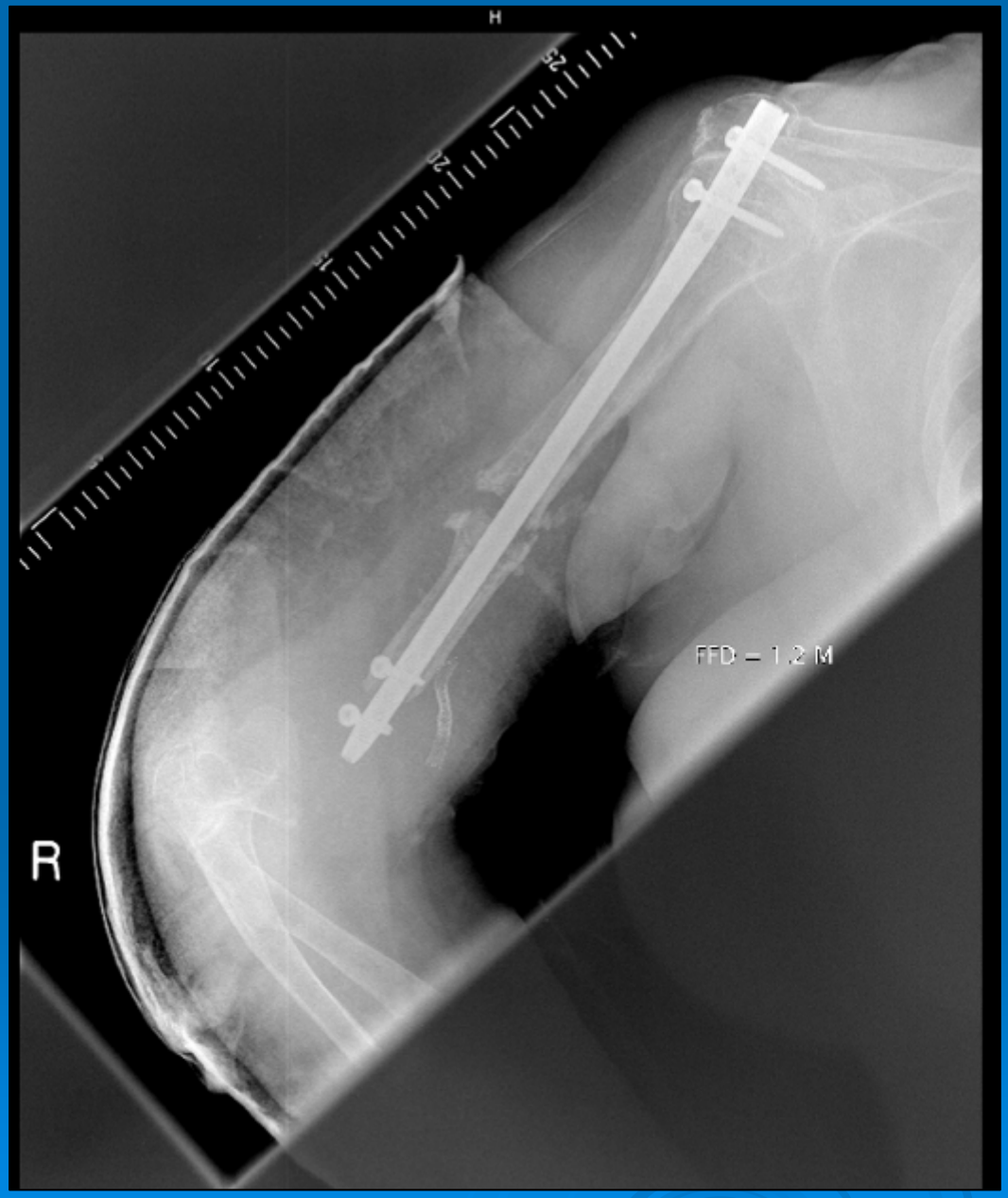




1. Arising from bone or soft tissue?

Low grade Haemangio-endothelioma



72 yo female

Nailing of metastatic thyroid Ca

Pseudoaneursym of brachial artery

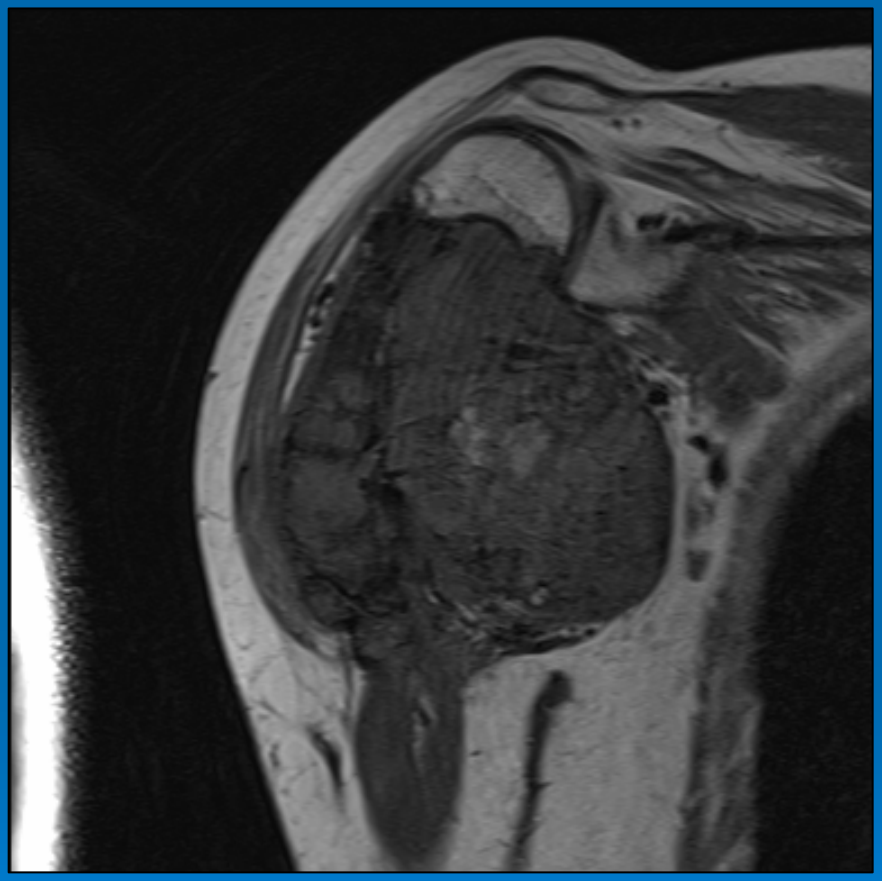
Pain++, instability, non functional, episodes hand going white

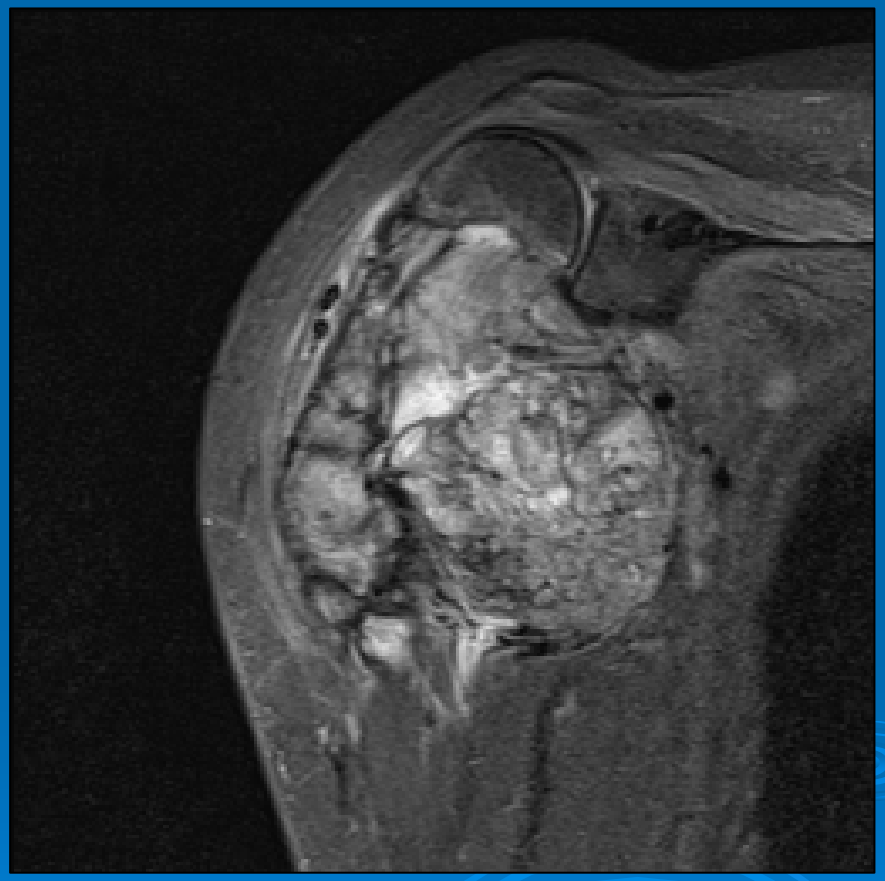
1. Options for management?

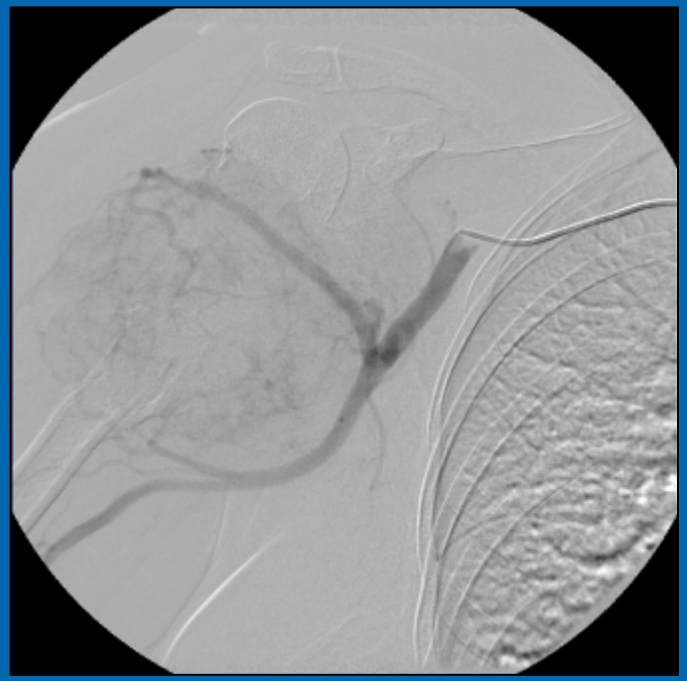

PA ERECT
RT

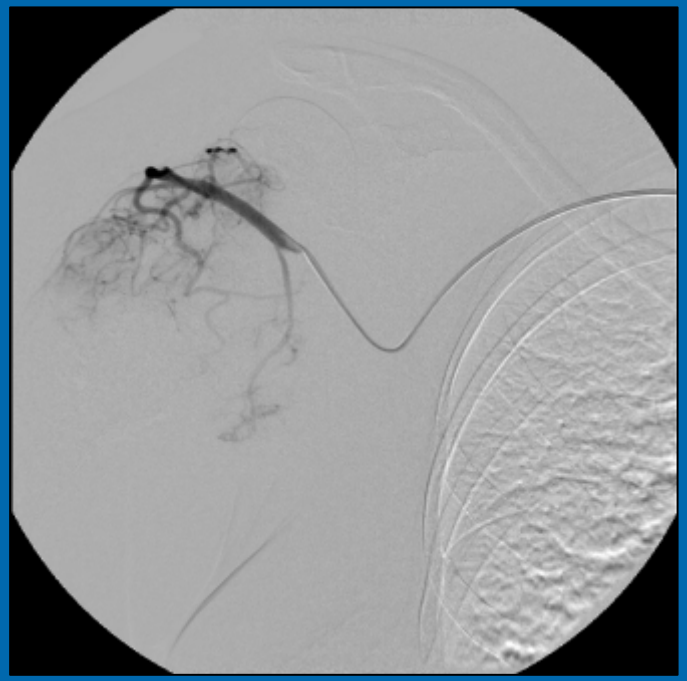
62 yo female : Metastatic renal cell Ca

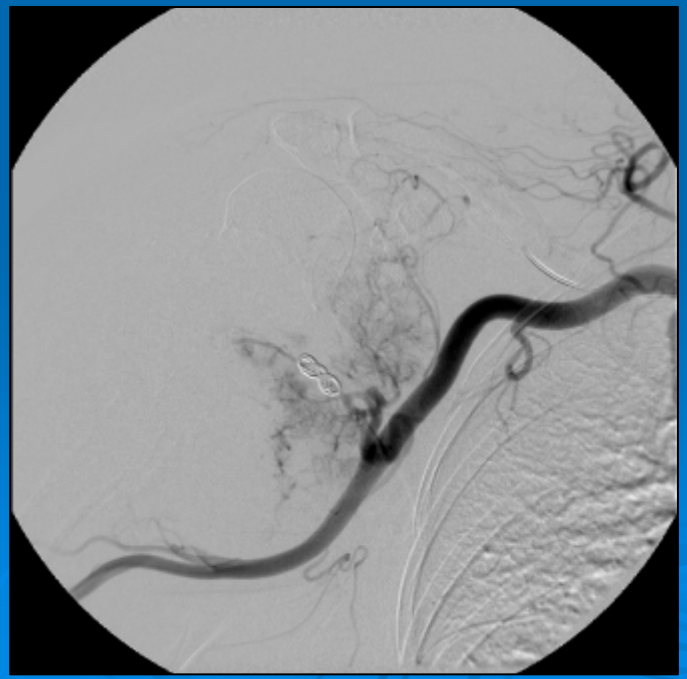
1. Preoperative considerations?
2. Surgical management?

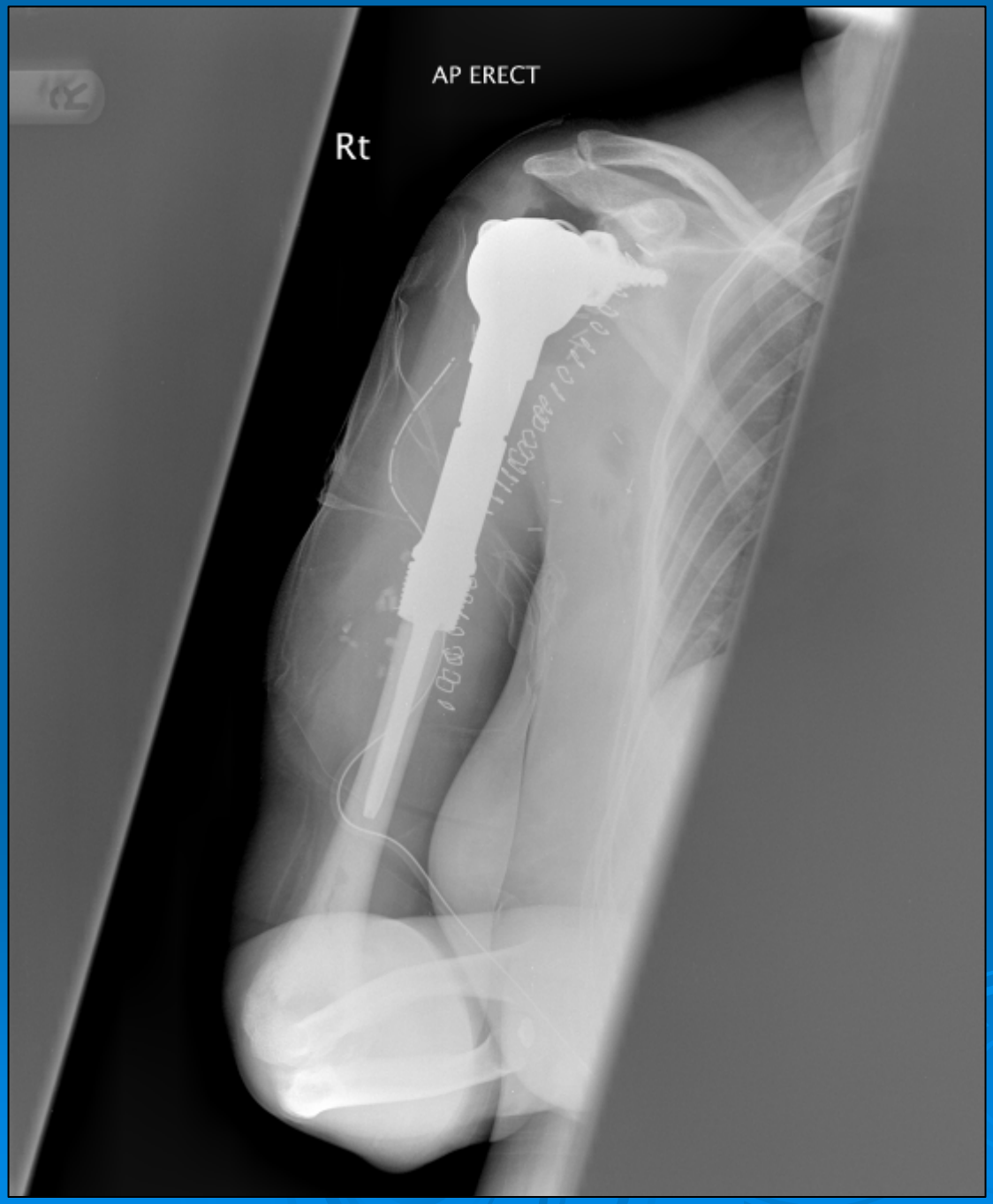




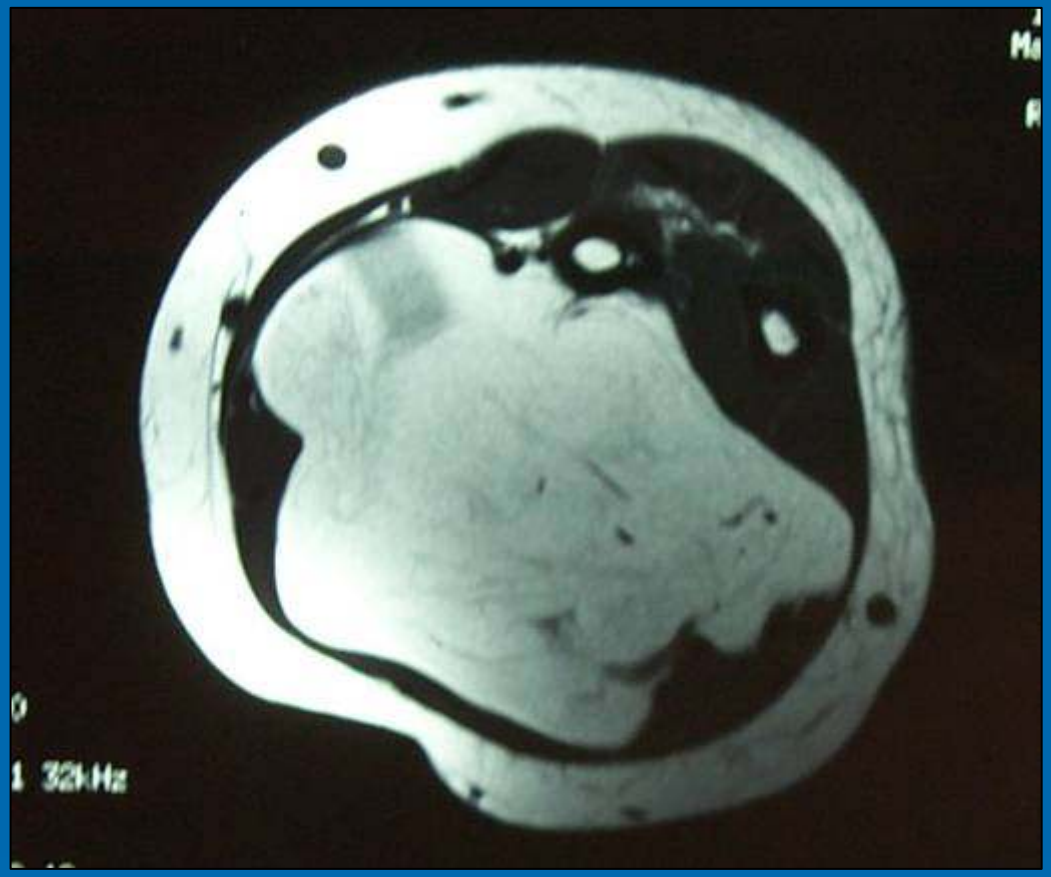




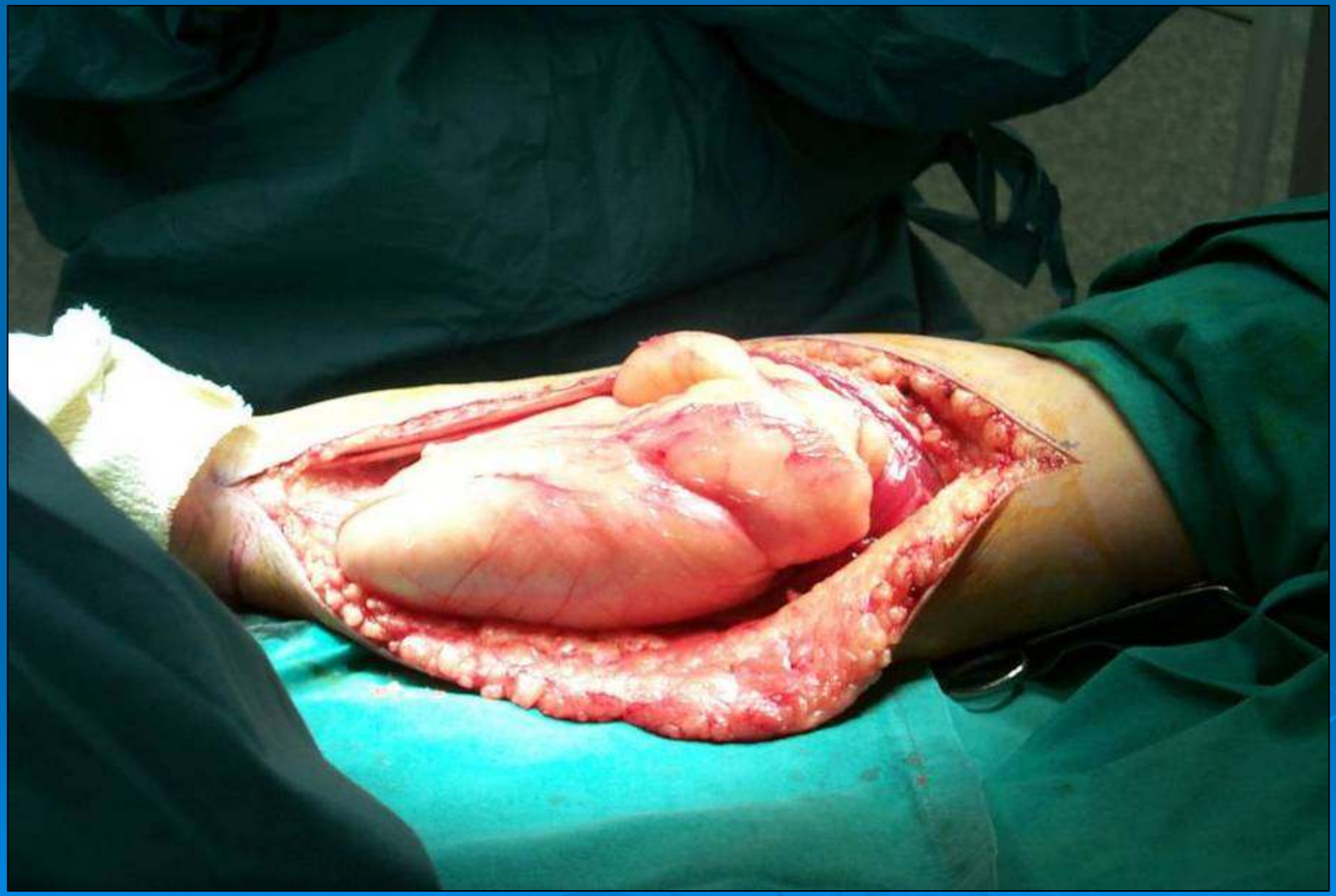


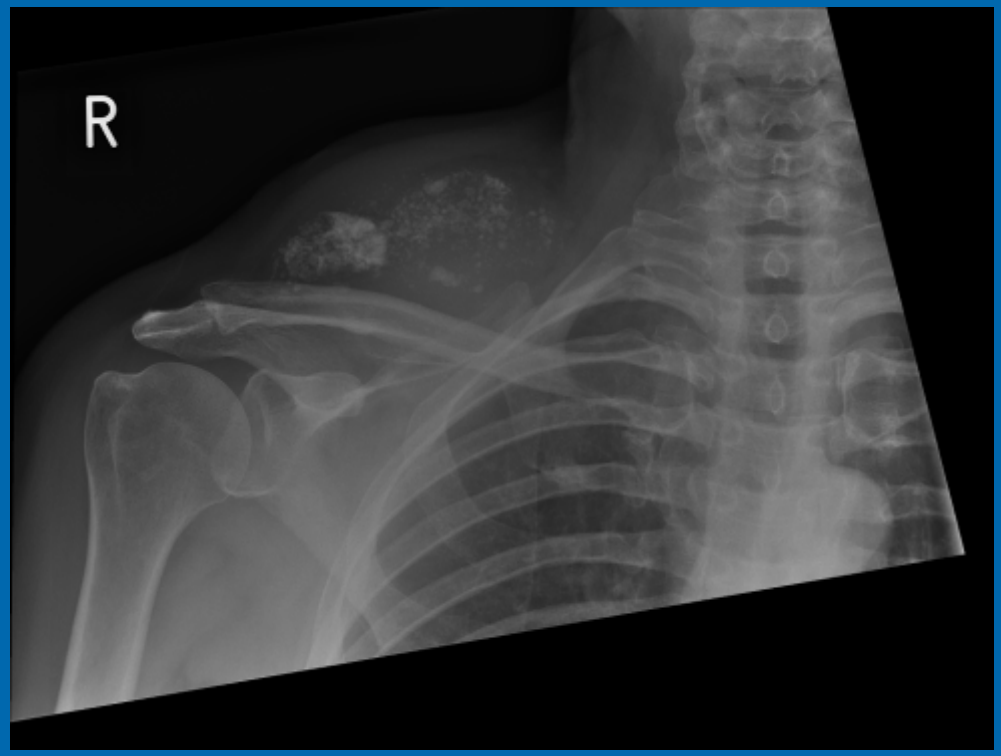

AP ERECT
Rt

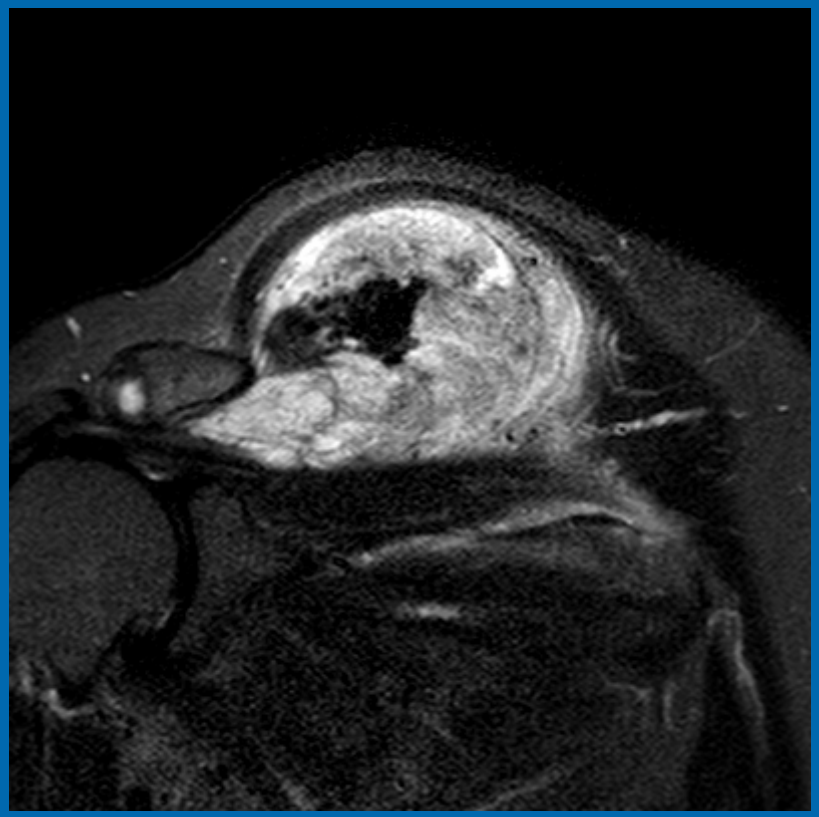
1. How would you investigate?



1. Diagnosis?





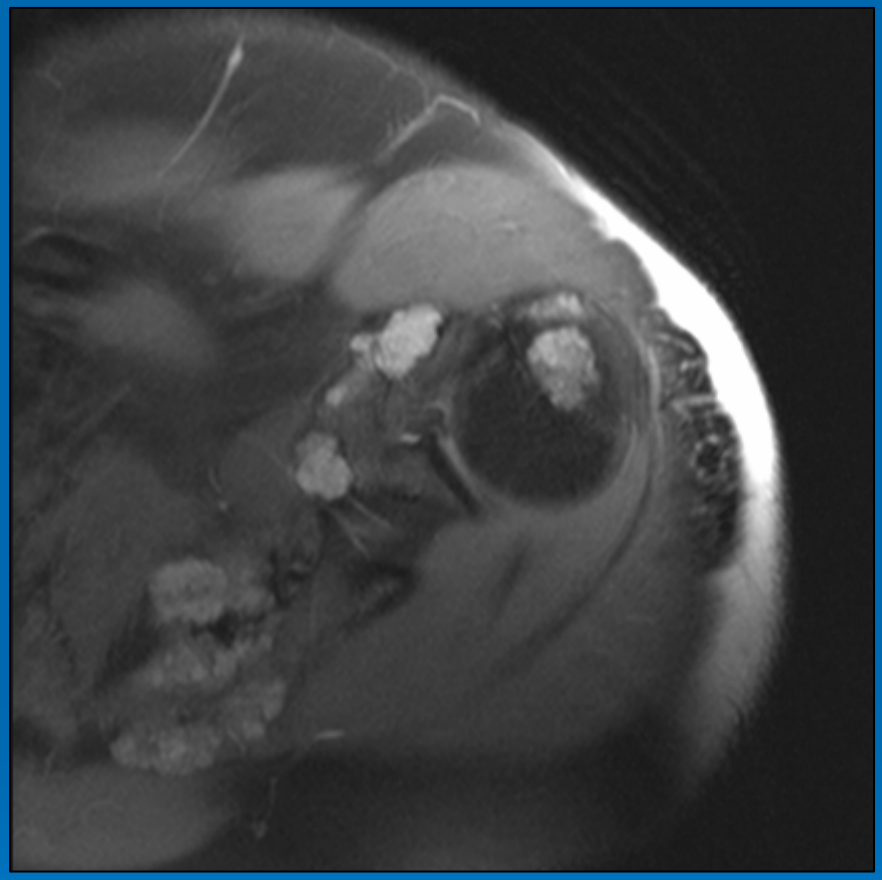


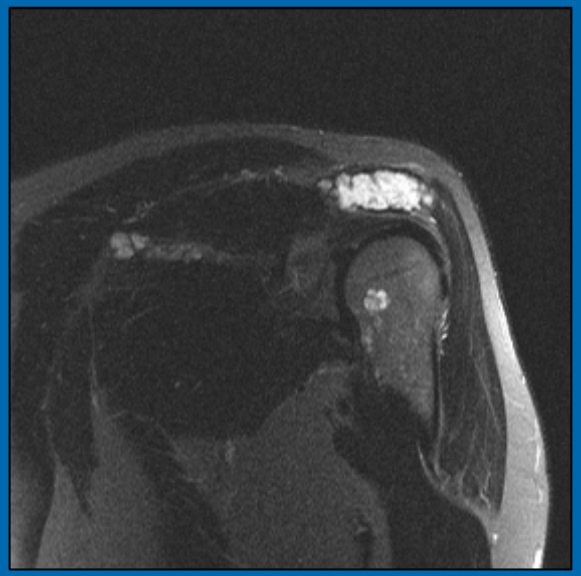
1. Benign or malignant?
2. How would you proceed surgically?

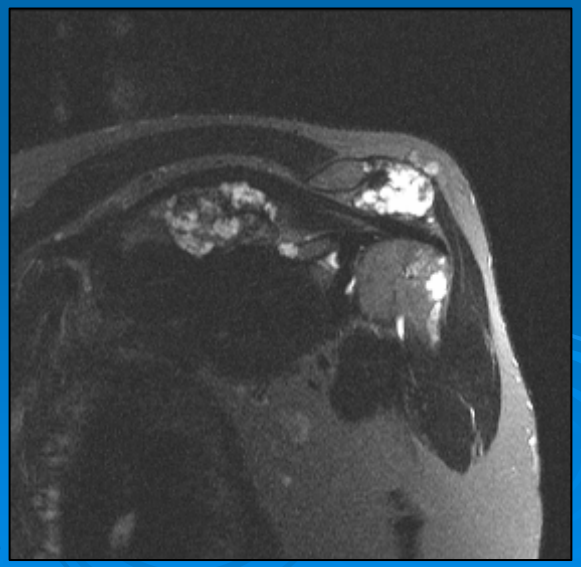
Male with multiple calcified lumps and haemangiomas

1. Diagnosis?

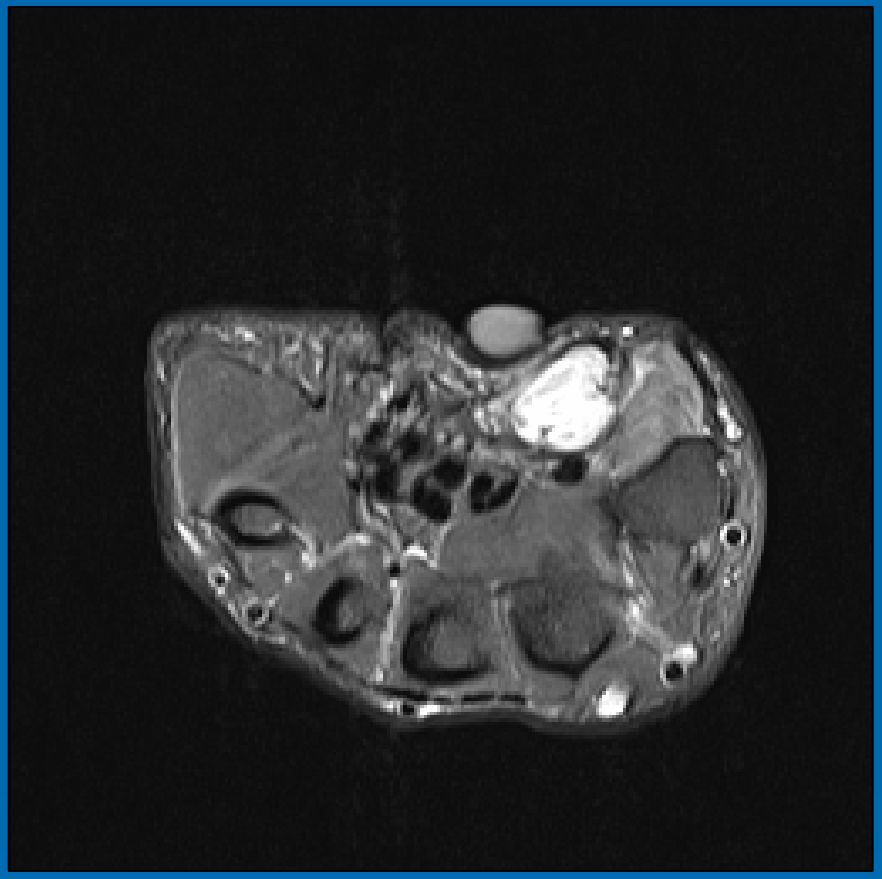
Same patient with Maffuci's syndrome

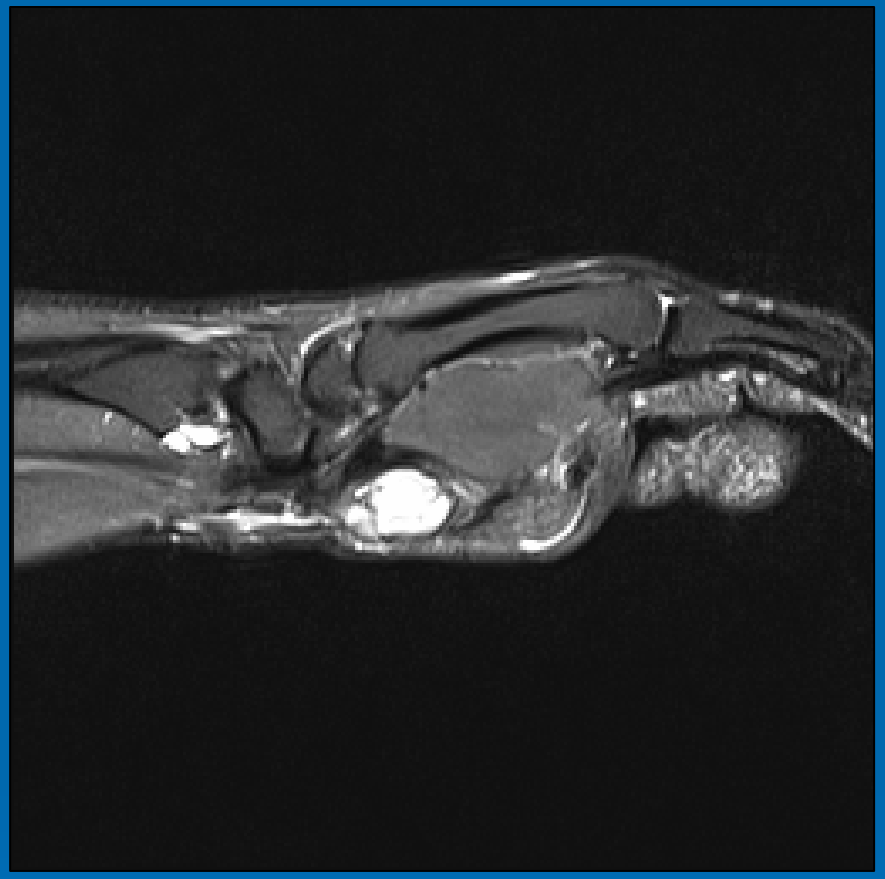




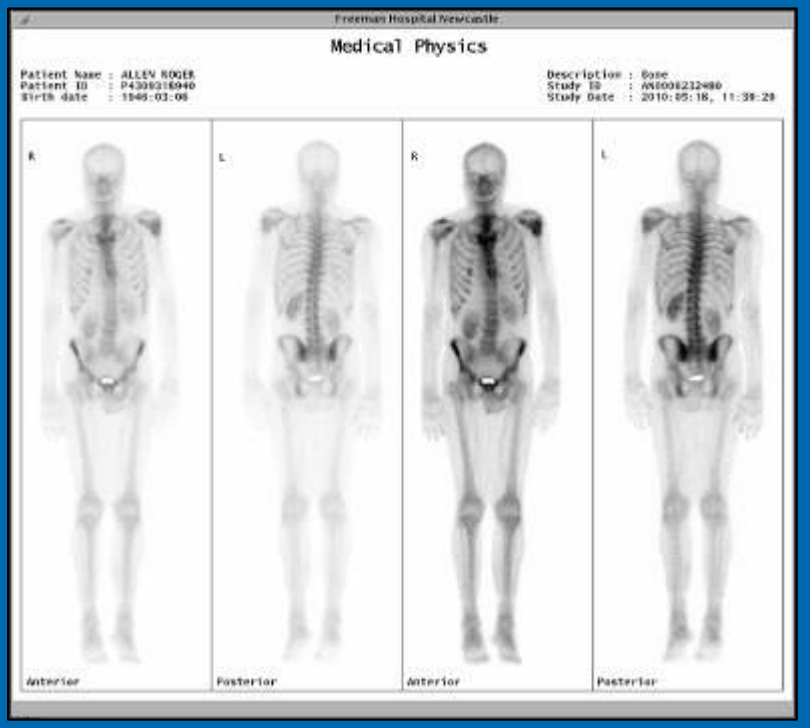


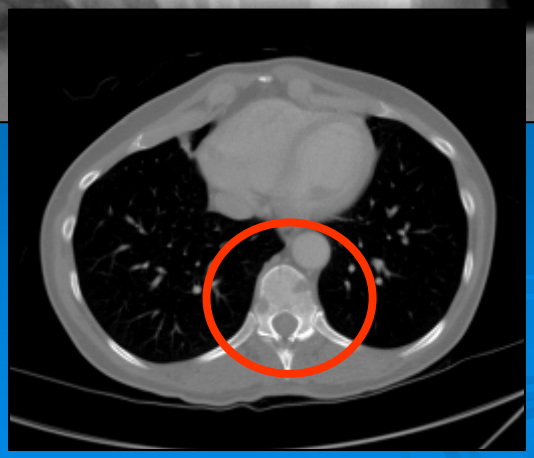
1. Diagnosis?





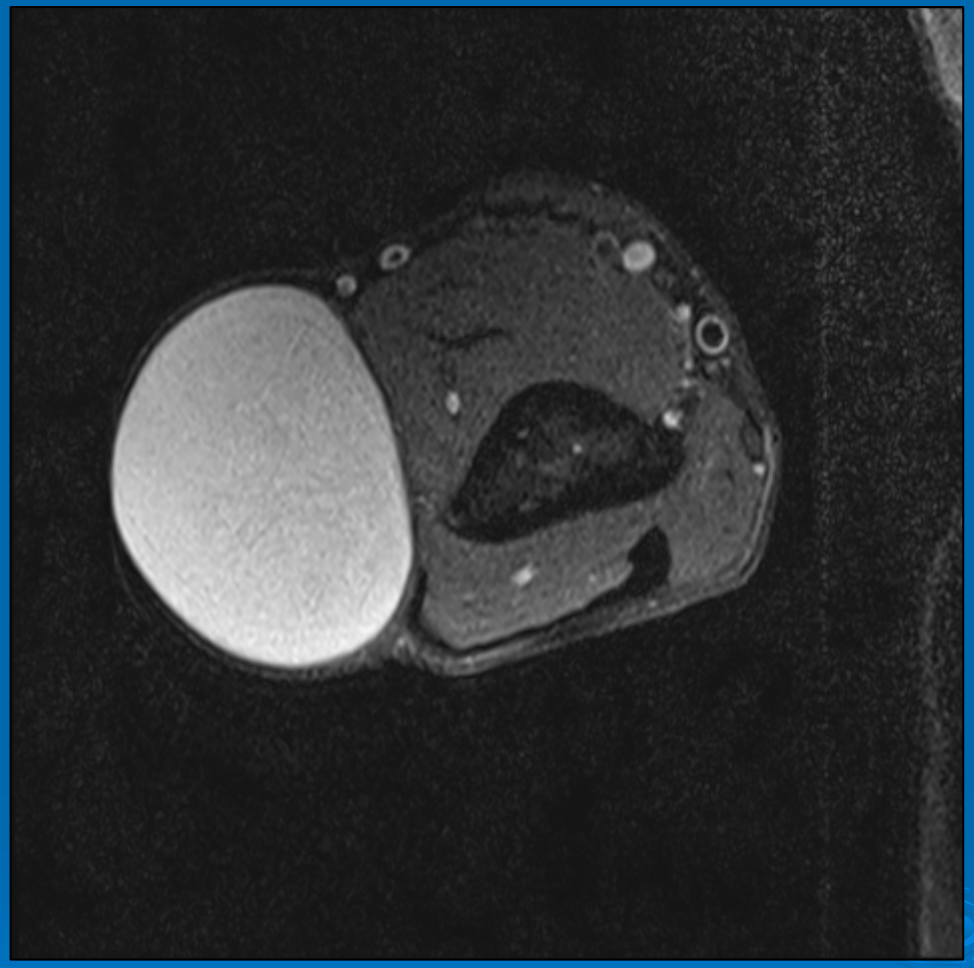
1. Tissue of origin?



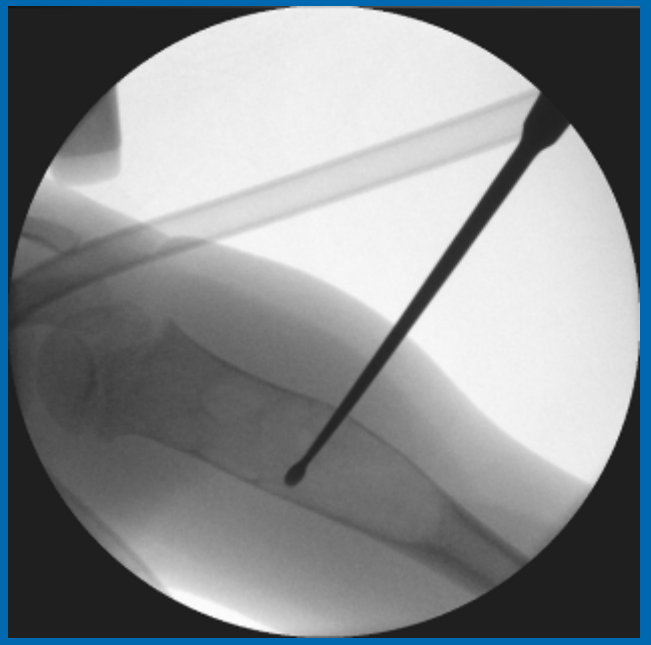


65 year old

1. Diagnosis?
2. Treatment?



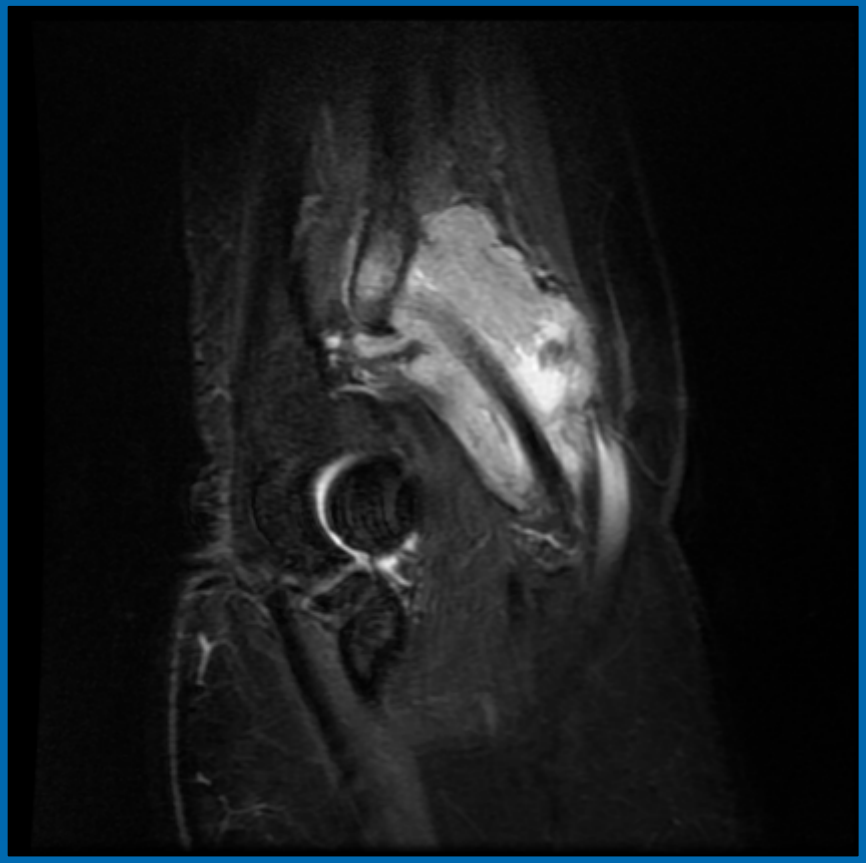
1. Benign or Malignant?

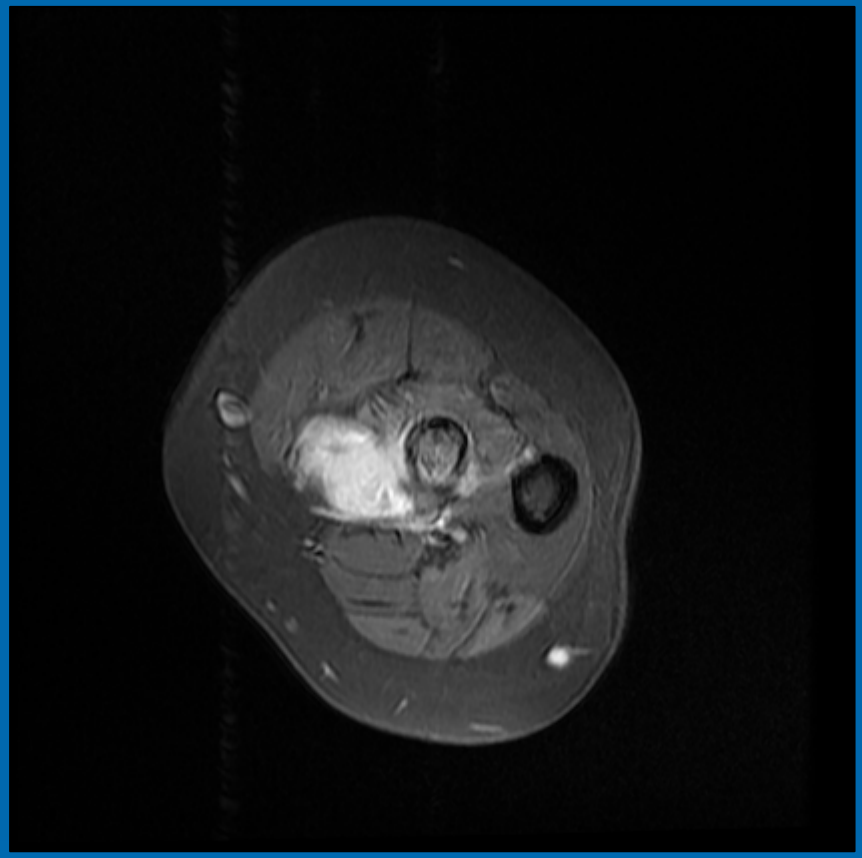


1. Diagnosis

32 yo female, acute painful swelling distal forearm

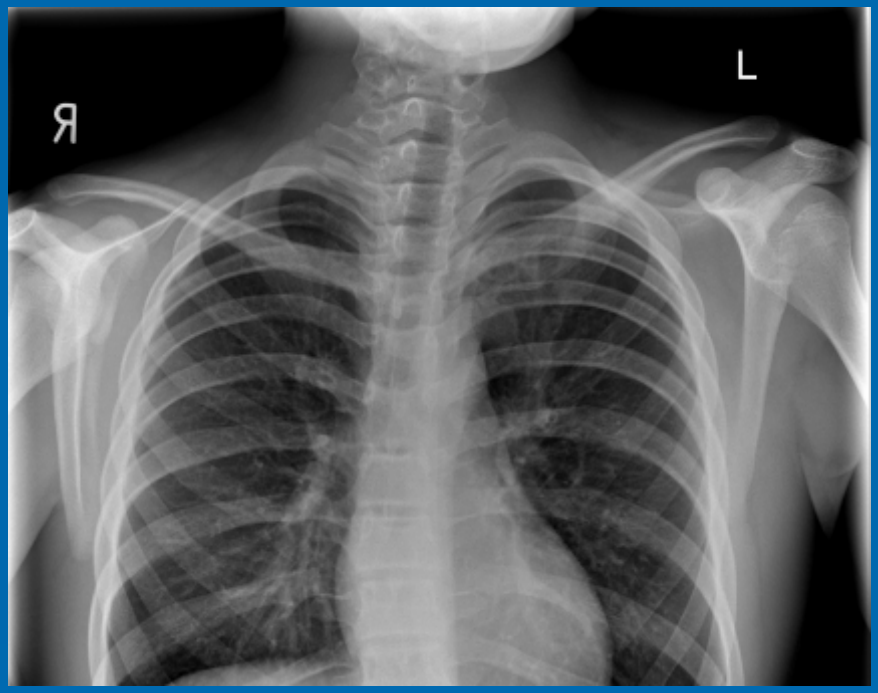
1. Diagnosis?

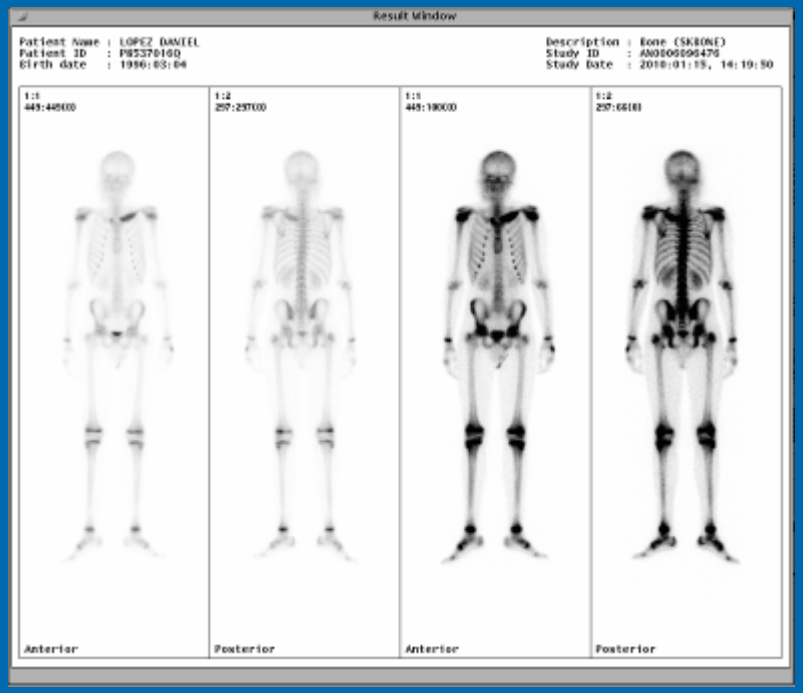




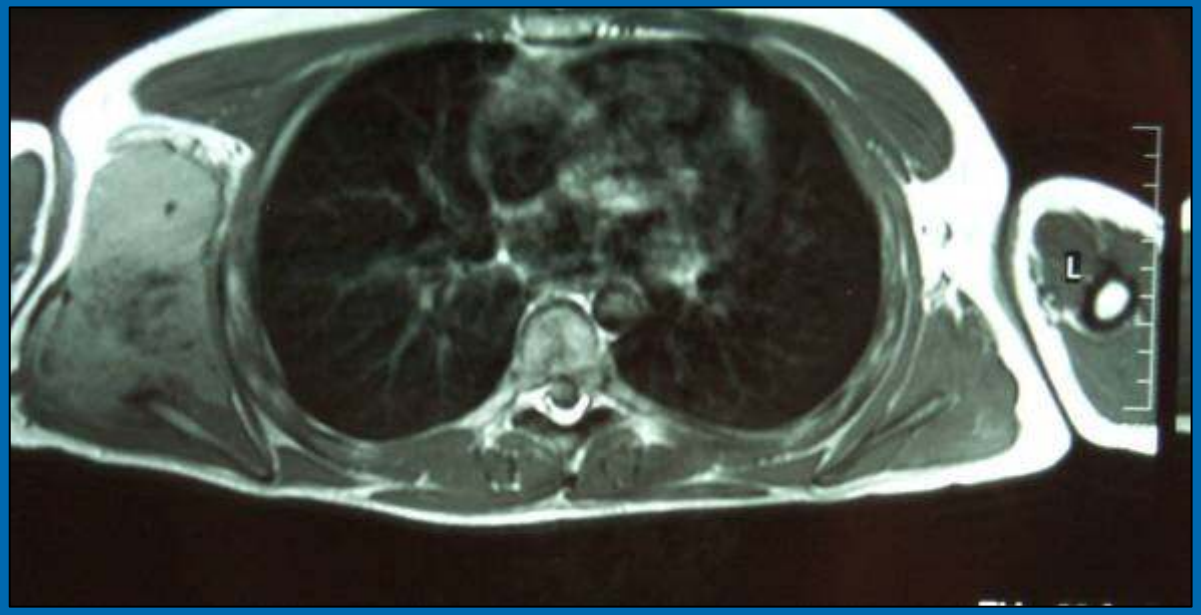
1. What are we looking at?
2. Diagnosis?

15 yo male with medial clavicular swelling and acne





1. Diagnosis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SL 8
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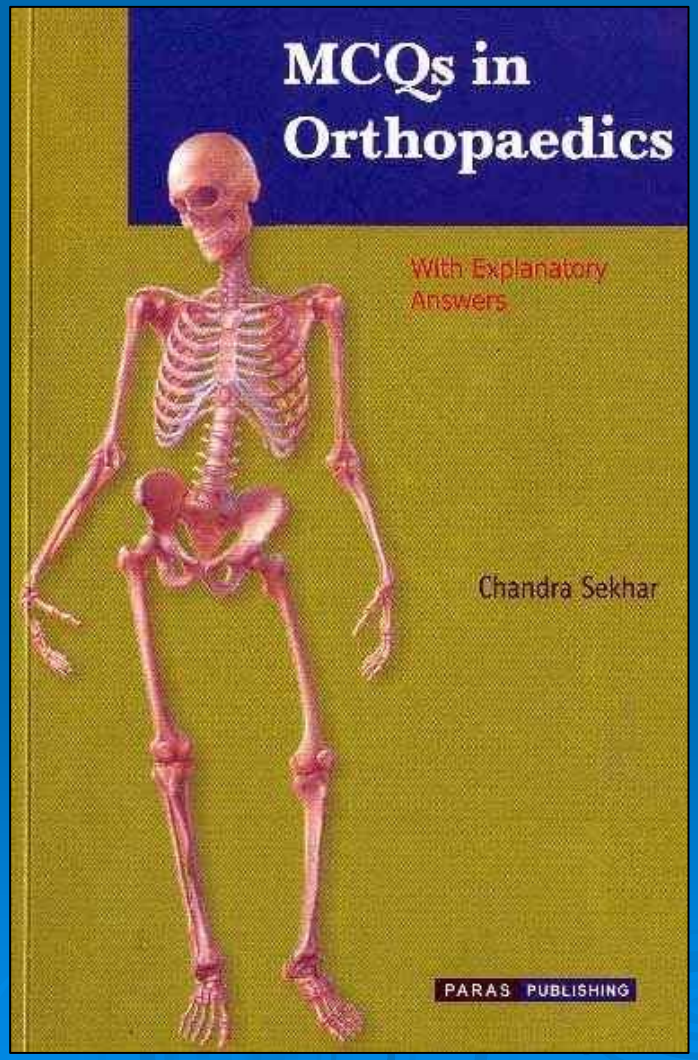
10 cm
AP –11 ant

Fibromatosis

MCQ Answers


MCQs in Orthopaedics
With Explanatory Answers
Chandra Sekhar
PARAS PUBLISHING

- 1: The most common primary tumour that occurs in the bones of the hand is which of the following?

A. Intraosseous ganglion
B. Giant cell tumour
C. Chondrosarcoma
D. Enchondroma
E. Epithelioid sarcoma

- 2: Which is the most common primary tumour that results in metastatic lesions in the hand?

A. Lung
B. Breast
C. Prostate
D. Multiple myeloma
E. Thyroid

- 3: What is the most common malignant tumour of the hand?

A. Epithelioid sarcoma
B. Chondrosacrcoma
C. Osteosarcoma
D. Basal cell carcinoma
E. Squamous cell carcinoma

- 4: What is the most common soft tissue sarcoma of the hand?

A. Alveolar rhabdomyosarcoma
B. Synovial sarcoma
C. Epithelioid sarcoma
D. Malignant fibrous histiocytoma
E. Soft tissue osteosarcoma

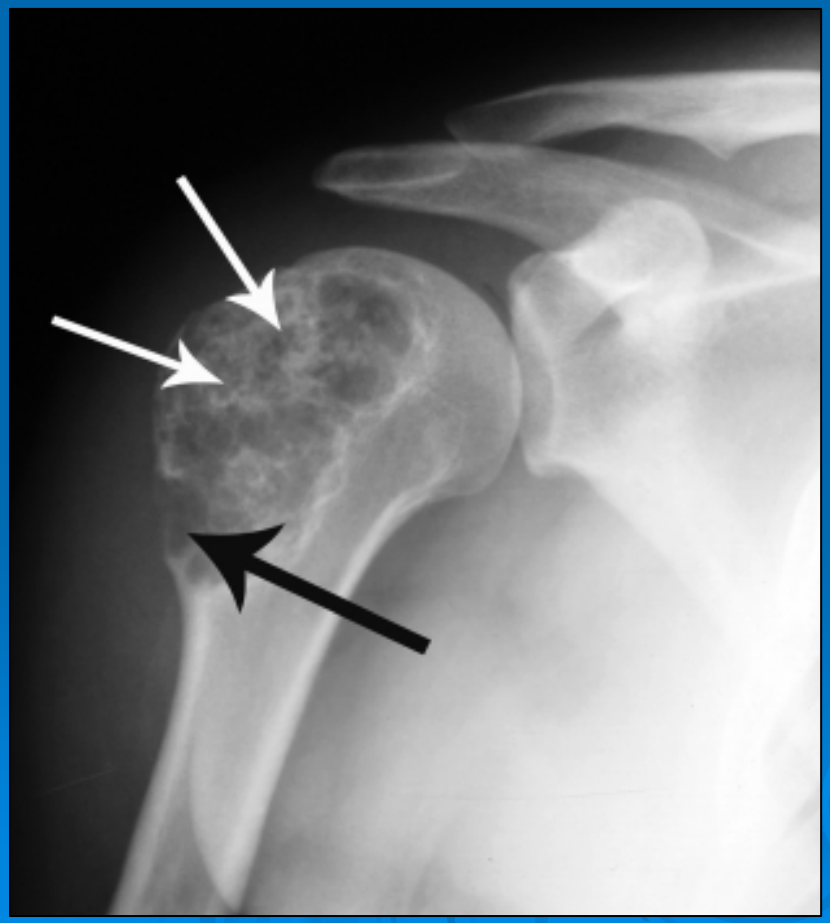
- 5: Which flaps are most useful for reconstruction of full-thickness shoulder defects following tumour resection from the shoulder area?

A. Latissimus dorsi and pectoralis major
B. Trapezius and pectoralis major
C. Latissimus dorsi and pectoralis minor
D. Trapezius and lattissimus dorsi
E. Free gracilis

- 6: What type of matrix is being formed by this tumour?

  Chondroid
- 7: What is the term for this radiological appearance?

  Popcorn calcification



- 8: An 8-year old boy presents with a high grade osteosarcoma of the humerus. There is a large extraosseous soft tissue mass associated with the tumour. According to the Enneking system, how should this tumour be classified?

A. IA
B. IB
C. IIA
D. IIB
E. III

- 9: Which chromosomal translocation would you expect to see in the previous case of Ewings sarcoma?

A. 9:18
B. 11:22
C. 1:20
D. 3:9
E. 21:23

- 10: A 59-year old woman with metastatic breast carcinoma presents with acute, symptomatic hypercalcaemia. Which of the following is not a potential symptom or sign of hypercalcaemia?

A. Coma
B. Chvostek sign
C. Shortened QT interval
D. Hyporeflexia
E. Polydipsia

- 11: The radiographic appearances listed below are all consistent with a diagnosis of giant cell tumour except?

A. It has an eccentric location
B. It has a permeative border
C. It abuts the subchondral bone of the articular surface
D. It has a bone forming matrix
E. It occurs in the epiphyseal region

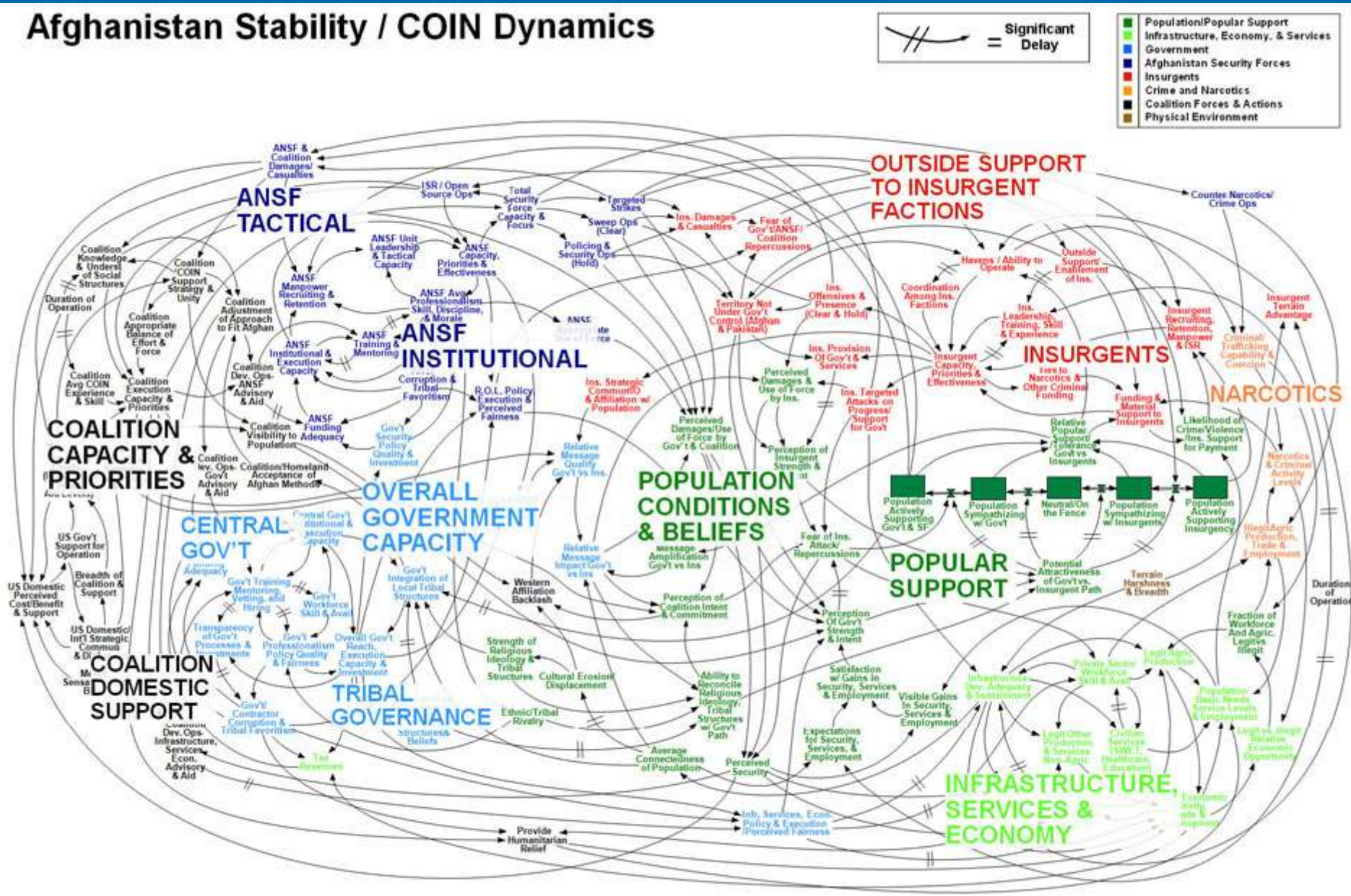
- 12: When performing an incisional biopsy of a suspected malignant musculoskeletal neoplasm of the proximal humerus, the surgeon should adhere to all of the following except?

A. Biopsy should be performed through muscle rather than through intermuscular planes
B. Neurovascular bundles should not be exposed during the procedure
C. The incision should be transverse
D. The biopsy should be performed at the institution where the definitive operation will be performed rather than at the referring centre
E. The approach should not violate a compartment that is not already occupied by the lesion

- 13: What radiological appearance is demonstrated below?

  Codman's triangle

Afghanistan Stability / COIN Dynamics



WORKING DRAFT – V3