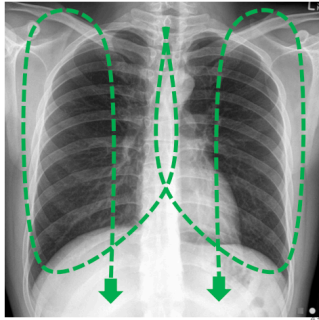


CXR Checklist [PA = good, AP = crAP!]



First pass	Review areas
Trachea	
Mediastinum	
Cardiac borders	Pneumomediastinum
Costophrenic angles	Retrocardiac
Soft tissues	Apices
Bones	Below diaphragm
Below diaphragms	

1. Intro (Pt Name, DOB, date, projection, quality → RIPE)

- Rotation** – medial border of clavicle heads equidistant to spinous process
- Inspiration** – see 6 anterior ribs, MCL
- Position** – supine, erect, lateral, decubitus
- Over-exposure (black)**, under exposure (white) – VERTEBRAE JUST VISIBLE BEHIND HEART

2. AIRWAY- tracheal/mediastinal deviation (? patient rotation) OR obvious masses

3. BREATHING – lung fields, pleura, hilar region

- Air** (?pneumothorax, emphysema)
- Fluid /meniscus sign**(? **Effusion**)
- Consolidation** (?infection)
- Lobar collapse**
- Lesions** (e.g. **malignancy**, **abscess**)

Pleura

- Pleural plaques (?asbestosis)
- Calcification

Hilum

- Bilateral enlargement (?sarcoid)

4. BONES/BREAST SHADOW

- Obvious fractures- clavicles, flail ribs
- Scoliosis, lytic lesions
- METS
- Pectus excavatum

5. CIRCULATION

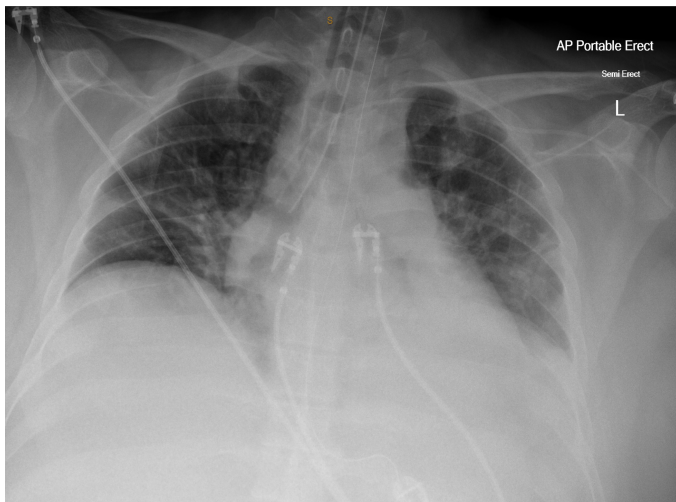
- Cardiomegaly 2° to HF** (> 50% cardiothoracic ratio – adults, > 65% infants)
- Heart border (R = RA, L = LV)
- Aortic knuckle should be visible
- Mediastinal width (>8cm = **aortic dissection**)

6. DIAPHRAGM

- high riding** – phrenic nerve palsy, DMD, MND, MG
- Flattening** – obstructive lung disease (emphysema, asthma)
- Air under diaphragm – pneumoperitoneum (abdo perforation)
- Blunting costophrenic angles – pleural effusion

7. EXTRA DEVICES

- CENTRAL LINE** = internal jugular vein → CVS and cavo-atrial junction
- NGT** =below diaphragm at tip of stomach
- PICC line** = peripheral → cavo-atrial junction
- Portocath** = Subclavian vein → cavo-atrial junction
- ETT** = mouth →3-5cm above carina (level of aortic knuckle)
- Chest drain** = in pleural space
- ECG electrodes**
- Sternal wires** (previous open heart surgery)



Key knowledge:

- [BLACK]**: air > fat > soft tissue > bone **[WHITE]**
- Describing abnormality:**
 - Density** (relative to what?, uniform vs patchy?)
 - Left vs Right** (Which zone?)
 - Anatomical position** (pleura vs parenchyma)
 - Size + borders**

- MOBILE CXR** → **LARGE HEART + SEVERE ROTATION**

Summarise

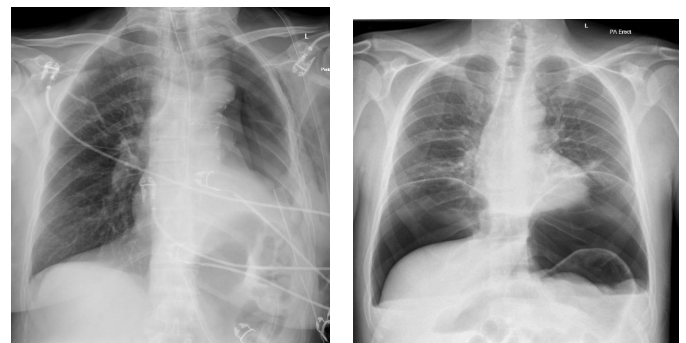
- This is an erect PA CXR of ____ showing ____ To complete my analysis, I would examine previous films and ascertain the clinical hx
- My ddx ____
- Investigations I would order ____

Common presentations/DDx

Opacification (NOT just infection)	Diffuse alveolar shadowing				
- Non-uniform opacification indicating substance in alveoli air-bronchograms (visible bronchioles penetrating consolidated area)	Alveolar oedema caused by fluid filling the alveoli and small airways may typically see "bat wing's distribution"				
DDx: for opacification	<table> <tr> <th>Basic</th><th>Extended</th></tr> <tr> <td> - Pneumonia (viral – COVID atypical, pHp) - APO - Pulm. Fibrosis </td><td> - Pulm. Haem - Extrinsic allergic alveolitis - Vasculitis - Lymphangitis - Miliary pattern (TB, old chicken pox) </td></tr> </table>	Basic	Extended	- Pneumonia (viral – COVID atypical, pHp) - APO - Pulm. Fibrosis	- Pulm. Haem - Extrinsic allergic alveolitis - Vasculitis - Lymphangitis - Miliary pattern (TB, old chicken pox)
Basic	Extended				
- Pneumonia (viral – COVID atypical, pHp) - APO - Pulm. Fibrosis	- Pulm. Haem - Extrinsic allergic alveolitis - Vasculitis - Lymphangitis - Miliary pattern (TB, old chicken pox)				
Fluid (pus, serous, blood) Infection / Pneumonia Atelectasis / collapse Mass/ Cancer Trauma / contusion Infarction Emboli					

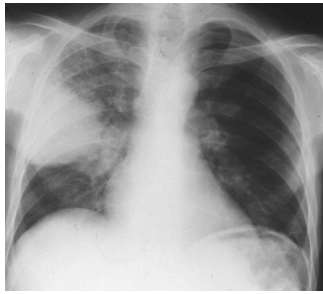
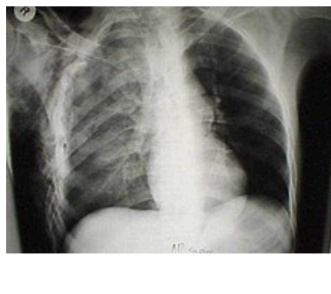
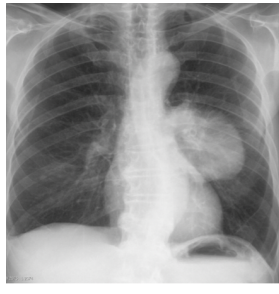
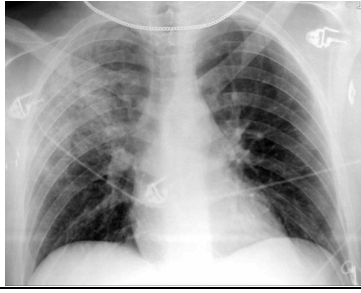
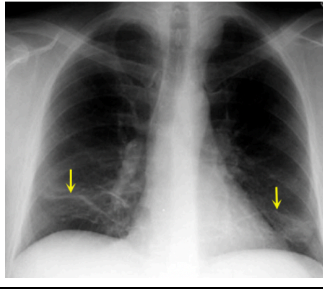
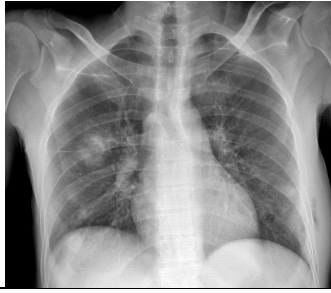
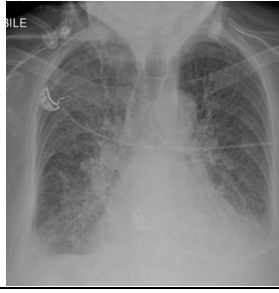
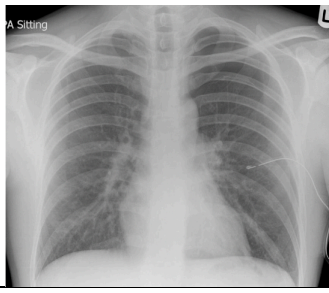
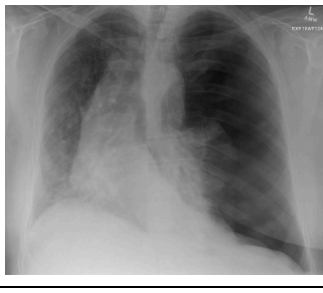
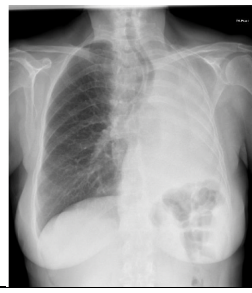
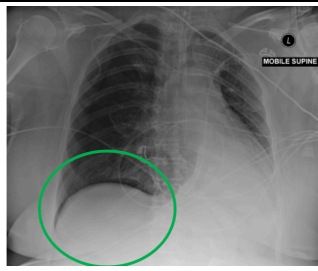
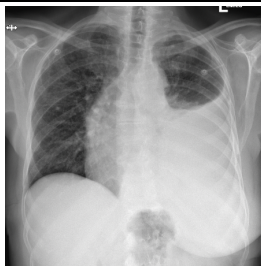
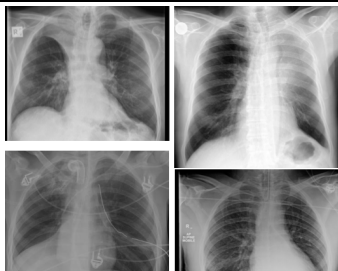
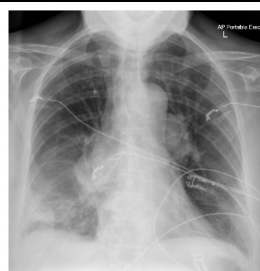
Opacity	Pathology	Opacity (L)	Pathology
R paratracheal stripe	RUL Ant. Mediastinum	Aortic knuckle	LUL
R heart border	RML	L heart border	Lingula
R hemidiaphragm	RLL	Left hemidiaphragm	LLL

*Nb: Can have mixed pathology (both lobes affected)



Pneumonectomy	- No lung markings - Mediastinal and tracheal shift		
Pneumoperitoneum	- Perforated viscous - Post-op laparotomy		
WHITE-OUT	<table> <tr> <td> White out of mediastinum: <u>Towards</u> = collapse <u>Away</u> = effusion <u>Middle</u> = both </td><td> Other causes = ARDS - Sepsis, - trauma, - DIC, - burn, - O2 toxicity, - fat embolism </td></tr> </table>	White out of mediastinum: <u>Towards</u> = collapse <u>Away</u> = effusion <u>Middle</u> = both	Other causes = ARDS - Sepsis, - trauma, - DIC, - burn, - O2 toxicity, - fat embolism
White out of mediastinum: <u>Towards</u> = collapse <u>Away</u> = effusion <u>Middle</u> = both	Other causes = ARDS - Sepsis, - trauma, - DIC, - burn, - O2 toxicity, - fat embolism		

COMMON PRESENTATIONS

			
Pneumonia	Infarction	Trauma	Cancer
			
Haemorrhage	Atelectasis - Affected lobe is smaller - Raised diaphragm ipsilateral - Structures moved <u>towards</u> collapse <i>Cause: obstructive, pneumothorax</i>	Emboli	APO Alveolar shadowing (bat wing) - Kerley B lines (i.e. <i>lymphatic congestion in lateral lower edge</i>) - Kerley A – apical - Kerley C – central Cardiomegaly - Upper lobe venous Diversion Effusion Rx: 1) GTN 2) NIV ventilation 3) Diuresis w/ furosemide (if BP stable)
			
Pneumothorax ➤ Best on expiration film ➤ Absent lung markings ➤ Mediastinal shift ➤ Surgical emphysema?	Tension pneumothorax ➤ Cannula 2nd IC MCL ➤ Finger thoracostomy ➤ Chest drain	➤ Surgical emphysema	Effusion vs mass ➤
			
Supine pneumothorax ➤ Deep sulcus sign ➤ Lung edge ➤ Mach effect	L) pleural effusion - Dense opacification + Blunting CP angles + Meniscus sign Transudate (nephrotic, liver, CCF e.g. dilated CM, thyroid, ovarian - Meig's, enteropathy) Exudate (PE, infection, infarction, inflammation, neoplasm, TB) General Rx ➤ Pleural tap – send for cytology, LDH, pH, protein, glucose ➤ Chest drain	Lobar Collapse ➤ Endoluminal (sputum, blood) ➤ Luminal (cancer, infection e.g. acute bronchitis) ➤ Extraluminal (LN, cancer) General Rx ➤ Early Abx (e.g. augmentin) ➤ Chest PT ➤ CT to exclude malignancy	Focal infiltrate in HTN and smoker ➤ Pneumonia AND ➤ Cancer General Rx ➤ Early ABx for CAP (7-10 day benPen 1g tds PO) ➤ Repeat CXR to confirm resolution

AXR Checklist → AIM TO EXCLUDE BOWEL OBSTRUCTION

1. Intro (Pt Name, DOB, date, projection, quality → RIPE)

- Rotation – medial border of clavicles equidistant to spinous process**
- Position – supine, erect, lateral, decubitus
- Over-exposure (black), under exposure (white)

SYSTEMATIC REVIEW [BOB]

2. BOWEL

Small bowel	Central, valvular conniventes, < 3cm
Large bowel	Peripheral, haustra, faecal material, 6cm
Faeces	Mottle appearance
Gas	Normal in stomach fundus & large bowel/rectum ONLY
Fluid	Infection or perforation
Thumbprinting	= mucosal oedema, haemorrhage → IBD, ischaemic colitis, tumour?

3. OTHER ORGANS

Soft tissue	- Liver, spleen, kidneys, gallbladder - Psoas line (psoas muscle) → runs along course of ureter
Calcification	calcification = chronic pancreatitis or uterine fibroid Stones = gallstones, kidney stones (staghorn), bladder stones → “fat, female > 40s, fertile,” Abdominal aorta = atherosclerosis

4. BONES

Paget's disease	Increased density → Cotton wool lytic/sclerotic pattern
OP	Decreased density
Mets	Lytic lesions (MM vs 2° mets – lung, prostate, breast)
OA	LOSS = loss of joint space, osteophyte, subchondral sclerosis, subchondral cysts
Vertebral fracture	Loss of vertebral height

5. EXTRA DEVICES

- FB → gastric banding
- Stents → ureter
- NGT = tip of stomach
- Drains
- IDC

6. Fluoroscopy /functional imaging → visualise lumen and mucosa

- Barium swallow – oesophageal
- Barium meal – stomach
- Barium follow through (gastrograffin) – small bowel
- Barium enema – large bowel

Indications for fluoroscopy	CI for fluoroscopy
- Hiatus hernia + GORD - Masses - Post-surgical patients - IBD - Zenker's oesophagitis - Chronic abdo pain	- Pregnancy - Bowel obstruction - Bowel perforation

When to do CT?

- Peritonism signs (e.g. guarding, rebound tenderness)
- Sick old non-pregnant patients with no diagnosis
- Abnormal clinical signs and bloods
- Trauma – spleen and liver (active vs inactive bleed)
- CI: pregnancy, haem unstable, CKD (if contrast)

3-6-9 rule (upper limits)

- 3cm** = small bowel
- 6cm** = large bowel
- 9cm** = caecum and sigmoid

Contraindications

- Pregnancy
- Immobile

Summarise

- This is an supine AXR of ____ showing _____. To complete my analysis, I would examine previous films and ascertain the clinical history
- My ddx _____,
- Investigations I would order _____ e.g. erect CXR to see air under diaphragm

Common presentations

SBO (> 3cm)	- Adhesions > hernias > tumours Luminal (gallstones, foreign bodies) Mucosal/bowel (IBD, tumour, necrotising enterocolitis) Extrinsic (adhesions, hernias, intussusception, volvulus) Rx: UA → NG tube → monitor fluid balance
LBO (> 6cm)	- Tumours > hernias > volvulus > diverticulitis > ISS Adenocarcinoma (most common) - UWL + PR bleed Rx: UA → NG tube → monitor fluid balance
Constipation (faecal loading)	- Drugs (e.g. opiates, TCAs) - Immobile or Dehydrated or low fibre diet - Undiagnosed Hirschsprung Untreated: rectal prolapse, faecal incontinence, perforation, haemorrhoids Rx: lactulose, senna, glycerol suppositories, docusate sodium
Volvulus	- Sigmoid “coffee-bean” > caecum “foetal” appearance - Surgical decompression (Dx + Rx)
Bowel Ischaemia	Pneumatosis intestinalis [mottled colon] - Dilated multiple bowel loops - Filling defect in SMA + Reduced mucosal enhancement on contrast-enhanced CT “Good collateral supply of bowel means you need marked stenosis of coeliac, SMA, IMA to generate post-prandial abd pain”
Gallstone Ileus	Rigler's triad $\triangle$ SBO → pneumo-mobilia → impacted gallstone
Surgical ED	Pneumoperitoneum (gas in bowel + Rigler's sign – double wall sign due to air outside bowel) - recent laparotomy? - Diverticulitis, perforated duo ulcer? - takes bloods, hydrate, NBM Necrotising enterocolitis – “football's sign” CRC – “apple-core” sign Toxic megacolon (assoc. UC) – dilated colon without obstruction

MRI for IBD:

- Crohn's** = strictures, fistulas, abscesses (transmural inflammation)
- UC** = toxic megacolon, adenocarcinomas, PSC, cholangiocarcinoma
- Rx:** IVF, IV CS, nutritional support, VTE prophylaxis

What to do if there is bloody diarrhoea?

1. **Hx & examination**
2. **Blood** (FBC, U&E, CRP & Cultures + lactate to detect ischemic colitis since infarcted tissue has raised lactate)
3. **Stool cultures** (identify infection)

Abdominal Pathology on AXR

	Small bowel obstruction	Large bowel obstruction	Pneumoperitoneum	Pneumatosis Intestinalis
Cause	• Functional ileus = Dilated small bowel loop, infection, trauma, metabolic disturbance (e.g. hypoNa, Hypok, DKA) • Mechanical = foreign body, volvulus, inflammatory strictures	• Mechanical = adenocarcinoma, sigmoid volvulus • Cause of strictures = IBD, necrotising enterocolitis, diverticular disease, bowel ischaemia	• Perforated duodenal ulcer • Diverticulitis • Recent laparotomy • Intra-abdominal infection of gas-forming organism	• Idiopathic • COPD/Asthma • Trauma • Intestinal Ischemia
S+S	Absent bowel sound	UWL + PR bleeding		If chronic bowel ischemia: • UWL, malabsorption, post-prandial abd pain • CV risk factors
Ix	• AXR • Water soluble contrast (functional ileus vs mechanical?) • Barium Meal (for neonate with bilious vomiting)	• AXR • Barium Enema • Colonoscopy / Sigmoidoscopy [for cancer]	• AXR (erect OR lying on side) • Urgent CT scan	• Mottled appearance of colon If bowel ischemia suspected • CT abdomen + Pelvis (with and/or without arterial or venous contrast)
Rx	NG tube → monitor fluid electrolytes → CT scan	• Laparotomy & Hartmann's procedure • Laparoscopic colonic resection (esp. if bowel is ischaemia) • Stent placement	• Urgent laparotomy • IV broad spectrum antibiotics • Anaesthetic review	•

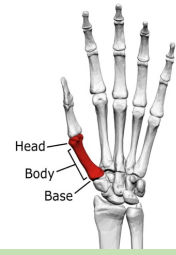
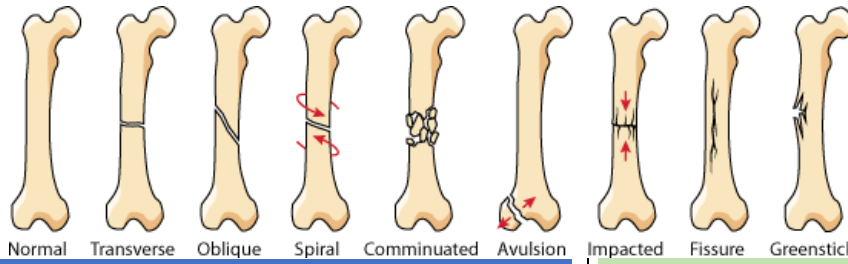
	Constipation	Gallstones	Renal Calculi	Chronic Pancreatitis
Cause	• Reduced dietary fibre • Opioids + TCAs • Hypercalcemia • Anal fissure	• Fat, female, fertile, > 40s, autoimmune (IBD, hemolytic anaemia)	• Hypercalcemia, IBD, recurrent UTI • Type 1 Renal tubular acidosis [due to alkaline urine & hypercalcuria]	• Idiopathic • Gallstones • Ethanol/Alcohol [MAIN] • Trauma • Steroids • Mumps • Autoimmune/inherited • Scorpion tings • Hypercalcemia • ERCP/Surgery • Drugs (e.g. thiazides, azathioprine)
S+S	Tenesmus [RED FLAG] – urge to defecate even after doing it • May lead to: hemorrhoids, rectal prolapse, fecal incontinence	May Present as: • Incidental finding • Biliary colic or cholecystitis • Obstructive jaundice	• Renal colic pain • N + V • Dysuria • Haematuria	• Epigastric pain radiating to back • UWL • Diabetes mellitus • Malabsorption/ steatorrhoea • BEWARE OF Pancreatic abscess → fluid/pus around pancreas needs surgical or endoscopic drainage
Ix	• Transit study • Gastrograffin follow through study • Barium swallow (to confirm constipation) • Fluoroscopic studies to identify defecation mechanism	• US (1st line) • MRCP (best for CBD stone) • “magnetic resonance colangio-pancreatography” – examines biliary tree	• AXR (hard to see uric acid crystals) • Non-contrast CT KUB	• US (1st line) • Elevated Amylase level (in early acute pancreatitis)
Rx	• Lactulose • Senna • Docusate Na • Glycerol suppositories	• Analgesia • IV fluids • Antibiotics • Cholecystectomy (if acute)	• Conservative (analgesia + anti-emetic with regular X-ray KUBs)	• Analgesia • IV fluids (treat shock) • Urinary catheterization (measure urine output) • NG tube (if patient vomiting) • Last resort = laparotomy

Abdominal Pathology on AXR

	Calcified Uterine Fibroid	Splenic Artery Aneurysms	AAA	Bone Metastases
Cause	- Usually intramural (i.e. <u>within myometrium</u>) - Submucosal fibroids (<i>more likely to cause symptoms</i>) DDX: Always check for ectopic pregnancy	- Rare cause of calcification in LUQ - HTN, portal HTN, pregnancy, Liver transplant <u>Must exclude:</u> - Renal calculi - Calcified LN - Sickle cell anaemia	- Atherosclerosis - Old age - Male - HTN - Smoking	- Breast cancer (common cause of sclerosis) - Lung cancer (common cause of lytic) - Renal CC (cause of lytic) - Transitional CC (cause of sclerosis)
S+S	Asymptomatic [MOST] - Menorrhagia - Urinary frequency - Dysmenorrhoea	Asymptomatic (until ruptures)	> 30 mm diameter (AP) - Lower limb ischemia - Hydronephrosis - Syncope/shock - Retroperitoneal fibrosis	- Bone pain - Fractures - SC compression - constipation
Ix	- AXR = popcorn calcification in lower quadrants - MRI pelvis [BEST]	AXR → incidental finding	US (if Asymptomatic and AAA < 5.5cm) Urgent CT (if ruptured AAA)] CTA (if pre-operative plan)	MRI whole spine (esp. if SC compression suspected)
Rx	- NSAIDS (pain relief) Levonorgestrel IUD [deliver progesterone] Tranexamic acid [anti-fibrinolytic to prevent breakdown of clots] GnRH analogues [shrink fibroid by reducing estrogen levels] Last resort = SURGICAL resection	- Rx for: - symptomatic patients - asymptomatic pregnant and child-bearing age females - Splenectomy?	- Urgent laparotomy - IV broad spectrum antibiotics - Anaesthetic review	If SC compression suspected: - Analgesia - Dexamethasone - Urgent radiotherapy to shrink suspect malignant lesion

	Ankylosing Spondylitis	Foreign body	Duodenal atresia	Necrotising Enterocolitis
Cause	Mechanical - Usually at hip - Assoc: - IBD - Pulmonary fibrosis - Aortitis	Children (6 mths – 5 years)	Down's syndrome, malrotation, annular pancreas Exclude: - Duodenal stenosis - Annular pancreas - Predudodenal portal vein	Most common medical emergency in neonates <u>Risk factors</u> - Premature baby - Low birth weight Prolonged antibiotic exposure
S+S	Young male - Back pain - Stiff - HLA-B27	Oropharynx (level of cricopharyngeus) Can lead to: - Perforation (bowel or oesophagus) - Fistula - appendicitis	Condition of Infants (1st days) - Antenatal polyhydramnios - Abd distension - Absent bowel motion	- Abd distension - Melaena (bloody stools) <u>Complications include:</u> - Bowel perforation - DIC - Enterocolic fistula - Short bowel syndrome - Abscess formation
Ix	AXR: - bamboo spine - squared anterior vertebral margins - Non-bulky syndesmophytes	Vital signs - Inspect mouth + oropharynx - Chest exam - Abd exam	AXR -double bubble sign <u>[dilated gas-filled viscous stomach in LUQ extending to central abdomen]</u> Abd US Air injection via orogastric tube under fluoroscopy (<u>confirm double-bubble sign</u>)	FBC [assess response to Rx] Blood cultures [since sepsis mimics necrotising enterocolitis] Abdominal X-ray → dilated small bowel US → detect portal venous gas, bowel wall oedema, bowel wall gas, free fluid in abdomen
Rx	- Analgesia - Physiotherapy - Hip replacement - Infliximab (TNF-alpha antagonists)	Urgent endoscopy (if button battery stuck in mid-oesophagus)	- NG tube Gut rest [<u>until 2-3 days after treatment</u>] - IV fluids Surgical duodenoduodenostomy (remove obstruction via open laparotomy approach)	Gut rest IV fluid IV broad-spectrum antibiotics Cardiac & ventilatory support (<u>if hemodynamically unstable</u>) Surgery (if severe)

X-RAY Checklist → Needs at least 2 views (PA + LATERAL)



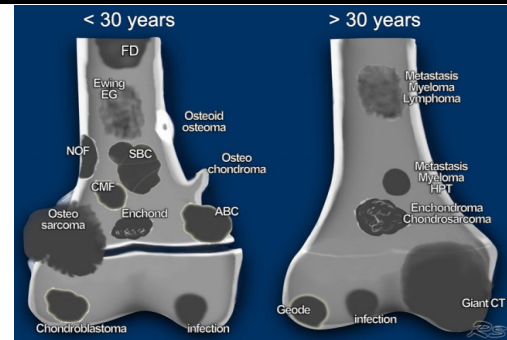
TO DO	ACTION
1. Request	- order additional views (PA, lateral, weight-bearing views) - mechanism of injury
2. Check Details	Pt Name, DOB, date, projection, quality → RIPE
3. Location	Head-body-base diaphysis – metapahysis – epiphysis (distal/proximal)
4. Fracture type	See above
5. Displacement	- Shortened/displaced - Angulated (medial/lateral/varus/valgus)
6. Assoc. findings	- Soft tissue swelling, lytic lesions, , calcifications, - fat pad sign = where fluid pushes fat (lucent) out of normal position - Joint space – narrowing, erosions

Summarise
This is an extra-articular complete transverse fracture of the distal third of the right tibia. Fracture is closed and is non-displaced.

Common presentations	
OA	LOSS
RA	- Loss of joint space - Peri-articular osteopenia - Juxta-articular (marginal) erosions - Soft tissue swelling
Psoriatic	Central erosion “pencil in cup”
GOUT	Punched out lesions (periarticular tophi)
Pseudogout	chondrocalcinosis
Compartment Syndrome	- Beware of unremitting pain 6 P’s



	NWB child #	FOOSH – colles #
Location	Left, Tibial Diaphysis/Shaft	Right radius – metaphysis / distal
# type	Spiral #	Transverse #
Alignment	Undisplaced	Dorsal angulation
Assoc findings	Soft tissue swelling	Soft tissue swelling

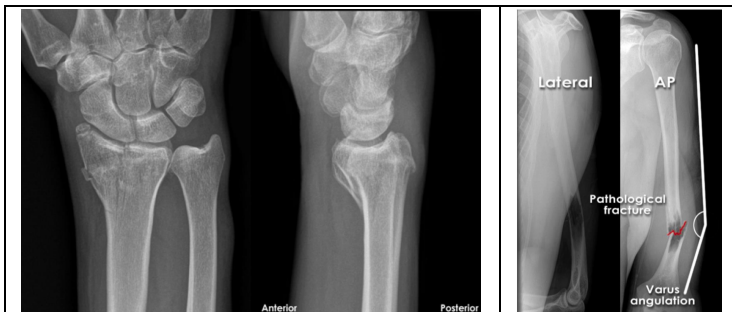


Diagnosing Bone Cancers:

Ewing's sarcoma [5-15 y.o.]	metaphysis/epiphysis of long bones (esp. distal femur and proximal tibia)
Enchondroma [10-30 y.o.]	phalanges
Multiple myeloma [>40 y.o.]	
Osteochondroma [10-30 y.o.]	2 nd most common primary bone tumours
Osteomyelitis [any age]	Can still walk (If not = septic arthritis) → usu. S. aureus [subperiosteal collection to confirm]

Signs of Bone Cancers:

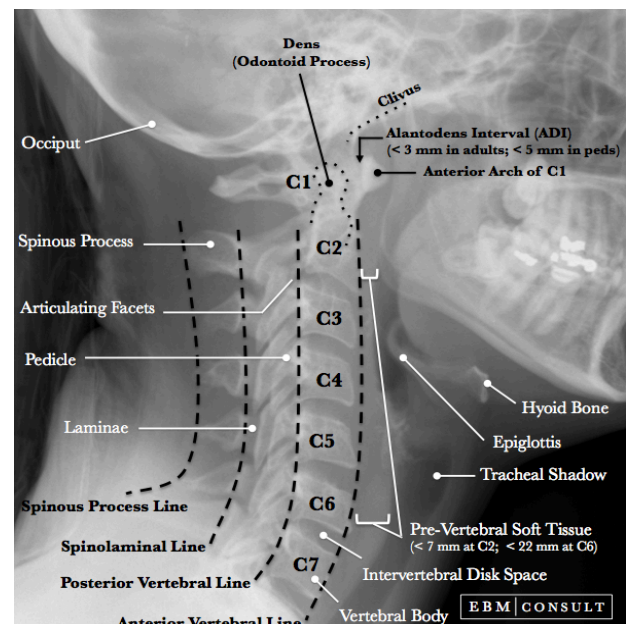
- Moth-eaten or spiculated pattern of bone destruction
- Confirm = biopsy → MRI + PET-CT (check for METs)



	Intra-articular #	Minor trauma
Location	Right radius – metaphysis/distal	Left humerus
# type	Comminuted #	Transverse #
Alignment	ALSO undisplaced ulna styloid	Medial angulation
Assoc findings	Intra-articular	Pathological – lytic lesions (MM)

VERTEBRAL EXAMINATION

Cervical spine	Thoracolumbar spine
- OP - Vertebral fractures - Disc herniation - C1/2 articulation (>3mm = Jefferson's → SCI!!) - C2 – Base of peg's fracture or hangman's fracture (fracture of both pedicles of C2 due to hyperextension injury) - Odontoid fracture	- OP compression fracture - Wedge compression fractures (flexion injury) - Transverse process fracture (rotation or lateral bending) - Disc herniation - Thoracic kyphosis - Lumbar lordosis

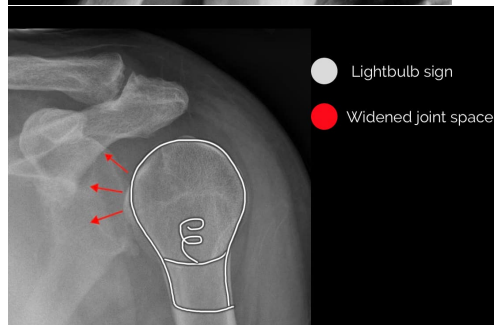
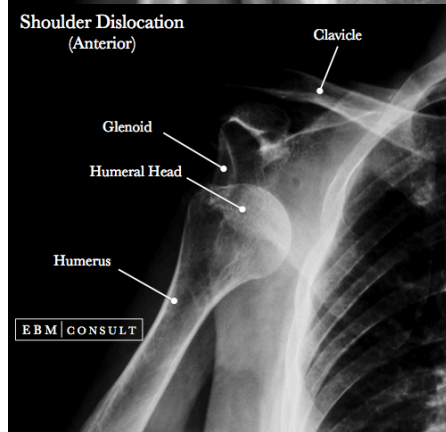
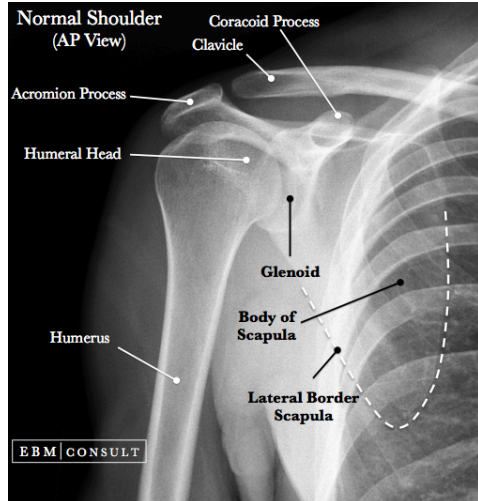


Shoulder (glenohumeral)

	Anterior dislocation of shoulder jt	Posterior dislocation of shoulder jt
AP View	humeral head lies below coracoid process	humeral head looks like light bulb
Axial View	humeral head anterior to glenoid	humeral head posterior to glenoid
Apical Oblique View	humeral head anterior-inferior to glenoid	humeral head posterior to glenoid
Y View	humeral head towards rib and coracoid	humeral head towards acromion

Other common pathologies:

- **Proximal humerus fracture** (anatomical vs surgical neck)
- **Clavicle fracture** (FOOSH, fall onto shoulder)
- **Acromioclavicular jt** – dislocation or subluxation



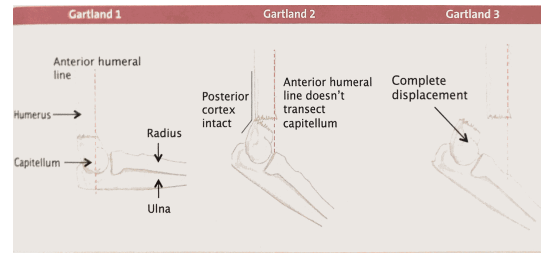
Elbow

[Lateral]: Tendon → artery → median [medial]

- **Posterior fat pad** or sail/triangular sign = **elbow effusion**
- **Anterior fat pad** = normal
- **supracondylar fracture** = (<1/3 capitellum anterior to anterior humeral line)
- **Monteggia fracture** = **fracture of ulna + dislocated radial head**
- **Galaezzie fractured radius (GFR)** + dislocated distal ulna

GARTLAND – supracondylar fracture grading

- Usual children
- High risk of vascular damage
- Avulsion of epicondyles



- Gartland 3 “no contact” = most serious
- All supracondylar fractures **need** REDUCTION to prevent deformity!

Ossification centres in children

- Accumulate in sequence below (CRITOL) – check they are normal and appear by dates below
- **C**apitellum 2y (part of humerus that articulates with radius)
 - **R**adial head 4y
 - **I**nternal (medial) epicondyle 6y
 - **T**rochlea 8y (part of humerus that articulates with ulna)
 - **O**lecranon 10y
 - **L**ateral epicondyle 12y



Radiocapitellar line significance:

- Line along centre of long axis of radius should transect capitellum circle – if not = dislocated radial head

Anterior humeral line significance:

- Should transect capitellum w/ at least 1/3rd of circle anterior to line (if not = supracondylar fracture)

Wrist

Distal radius fracture [shortened distal radius]

- **Colles** = distal radius fracture w/ dorsal angulation
- **Smith's** = distal radius fracture w/ volar angulation
- **Barton's** = intra-articular distal radius fracture

Scaphoid fracture

- Anatomical snuffbox tenderness
- Scaphoid tubercle tenderness
- Thumb telescoping tenderness
- Fracture NOT visible until 10 days after injury

Rx as fracture and repeat X-ray in 10 days → avoid avascular necrosis due to retrograde blood supply

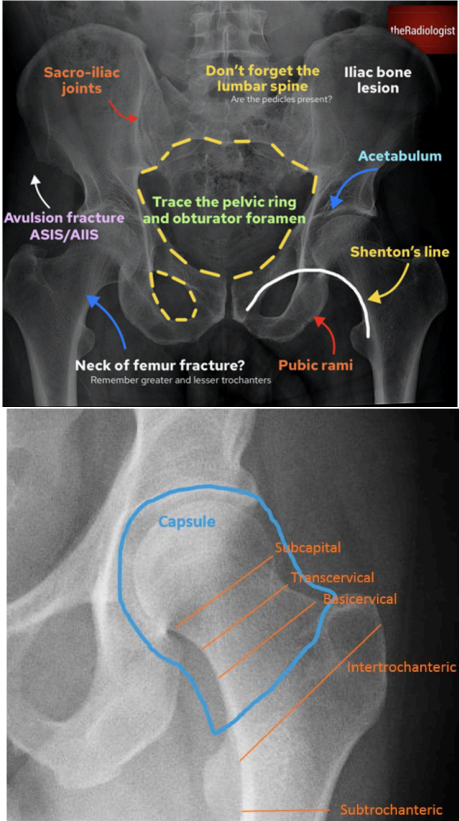
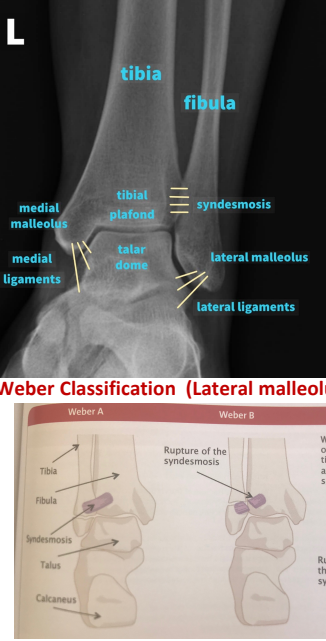
Other fracture

- **Triquetral avulsion fracture** = bone fragment on dorsal/posterior surface of hand
- **Lunate dislocation** = anterior dislocation



Cup = lunate, apple = capitate

- **Lunate dislocation** – lunate (cup) dislocated anteriorly
- **Perilunate** – lunate in line but capitate (apple) and other carpal bones posteriorly located

Pelvis & Hip	Knee	Ankle
Neck of femur fracture (elderly fall) - White line (impacted) - Black line (displaced) - Intracapsular (avascular necrosis) Pubic ramus fracture (elderly fall) Femoral head dislocation (after THR or major trauma) Perthes (5-10yo) = increased density + decreased size of epiphysis SUFE (10-15yo) = best on lateral view Femoral/iliac apophyseal avulsions = sudden muscle contraction (ASIS/AIIS/ischial tuber)	AP View & lateral views Fracture = Lucent/sclerotic lines in medulla Fibular neck fracture → check common peroneal nerve (superficial + deep → DF + eversion) Knee effusion = almond-shaped soft tissue shadow in suprapatellar pouch Lipohaemarthrosis = fat fluid in suprapatellar pouch → intra-articular fracture communicating with joint (<i>esp. tibial plateau fractures</i>)	AP View & lateral views - Lucent/sclerotic lines in medulla = fracture Uniform ankle joint space around talus (> 4mm = talar shift) Proximal/Distal rows of carpal bones = smooth arcs Calcaneal fractures Posterior tibial surface "posterior malleolus" & base of 5th metatarsal
		 Weber Classification (Lateral malleolus fractures) - Weber A: below ankle ht (syndes intact) - Weber B: @ ankle jt (syndes intact or partial torn) - Weber C: above ankle jt (syndesmosis disrupted)
Management of femur neck fractures Intracapsular (subcapital, transcervical, basicervical) - Displaced > 60 yo = THR, hemiarthroplasty - Undisplaced/displaced < 60yo = fixation w. cannulated or dynamic hip screw Extracapsular - Intertrochanteric → dynamic hip screw or intramedullary nail w/ screws into femoral head - Subtrochanteric → intramedullary nail	- Patella tendon rupture = high patella - Patella dislocation = lateral patella - ACL/PCL avulsion fractures = bony fragments from tibial intercondylar eminence Common foot pathologies: - Fractures- phalanx, metatarsal - Base of 5th metatarsal fracture = XS inversion pulls fibularis brevis abducting 5th metatarsal - Lisfranc jt (5th tarsometatarsal joints) = low impact strain or high impact causing subluxation	

Growth Plate Disorders: [Salter-Harris Classification for fractures around physis = growth plate]

Type 1. Slipped/straight across physis [6%]

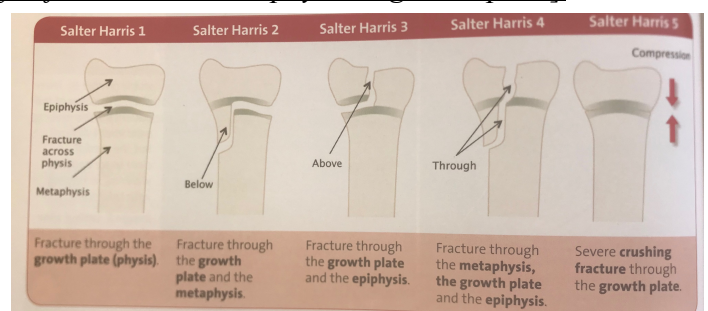
Type 2. Above physis in metaphysis [75%] = good prognosis

The following will cause **growth disturbance**:

Type 3. Lower fracture (below physis) [8%]

Type 4. Through metaphysis, physis and epiphysis [10%]

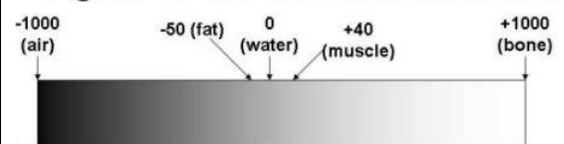
Type 5. Rammed/ruined physis (compression of physis) [1%]



CT Scans Checklist

- 1) Explain RT dosage (highest in abdo-pelvis)
- 2) Do CT benefits > risks?
- 3) Comp? (e.g. child w/ RT-treated leukaemia will have breast cancer in 20-30 years)
- 4) Correct modality – non-contrast vs contrast
 - a. **Oral** – for obstructed bowel
 - i. Barium swallow – oesophageal
 - ii. Barium meal – stomach
 - iii. Barium follow through (gastrograffin) – small bowel
 - iv. Barium enema – large bowel
 - b. **IV contrast** – identify cancers (check washout), LN mets
 - c. Always check eGFR and CRP

Figure 1. The CT Hounsfield scale



Practice Points

- Solid organs = come and go
- Blood vessels (Aorta, IVC, iliac) can be tracked – may be bigger than you think

				
Phase	Non-Contrast	Arterial	Portal Venous	Delayed phase
Timing	Immediate	1 st phase	2 nd phase	Last phase
Ind	• Fractures (skull, MVA) • Bleeds (Acute) e.g. SAH, SDH, EDH	• Tumours	• Abdo pelvis	• Renal collecting system
CI	• Children • Pregnancy	• CKD – need dialysis, • Children, Pregnancy, • allergy, • hyperthyroidism <u>Beware of triple phase CT scans:</u> ➤ Arterial, portal venous, delayed phase ➤ Beware of contra-indications (as high RT dosage)		

Beware of **fat stranding (dirty fat) around organ** – pancreatitis, diverticulitis, appendicitis

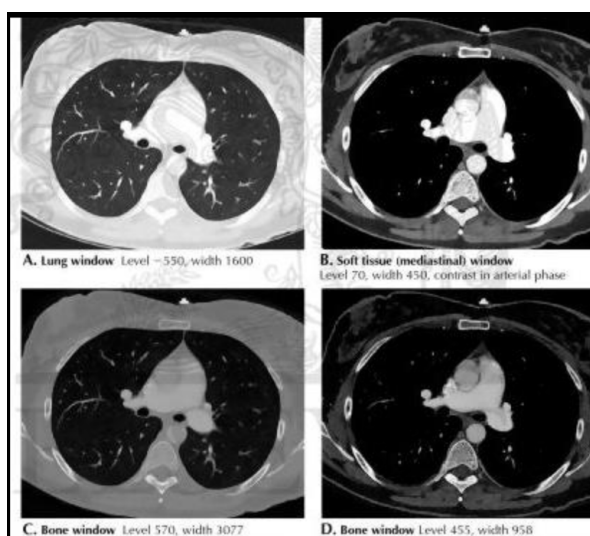
- Abdo pain + bilateral limb swelling → thrombus in IVC
- Check for calcification within the vessel – AAA (very enlarged)
 - Vessels can be tracked.
- Note usu. solid organs = come and go

When to lie prone? (**Flat on tummy** (check top of scan – may be rotated around))

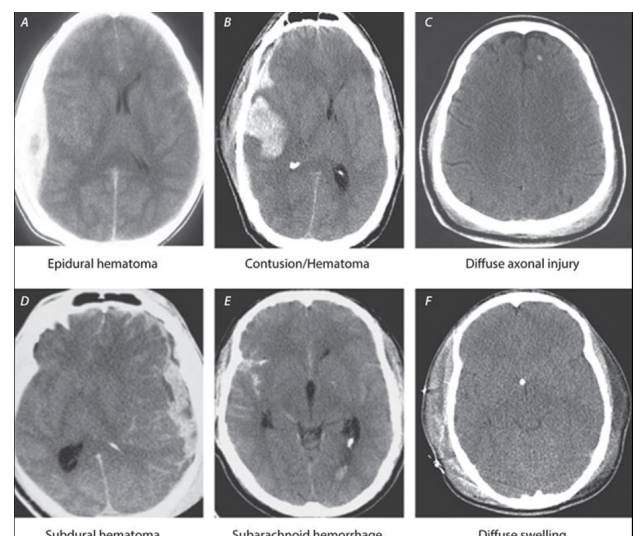
- HRCT → can be done prone (when lying on tummy)
- CT KUB → 3x stricture junction – renal pelvis, entry to bladder,

THINGS TO CHECK for MRI

- Avoid gadolinium contrast for CKD
- Check eGFR and CRP



Different Windows For CT Highlight Different Tissue Types



- Diffuse Axonal Injury = Loss of Grey-White Differentiation
- SAH – Effacement of Sulci
- SDH = acute → subacute → chronic (more hypodense)

