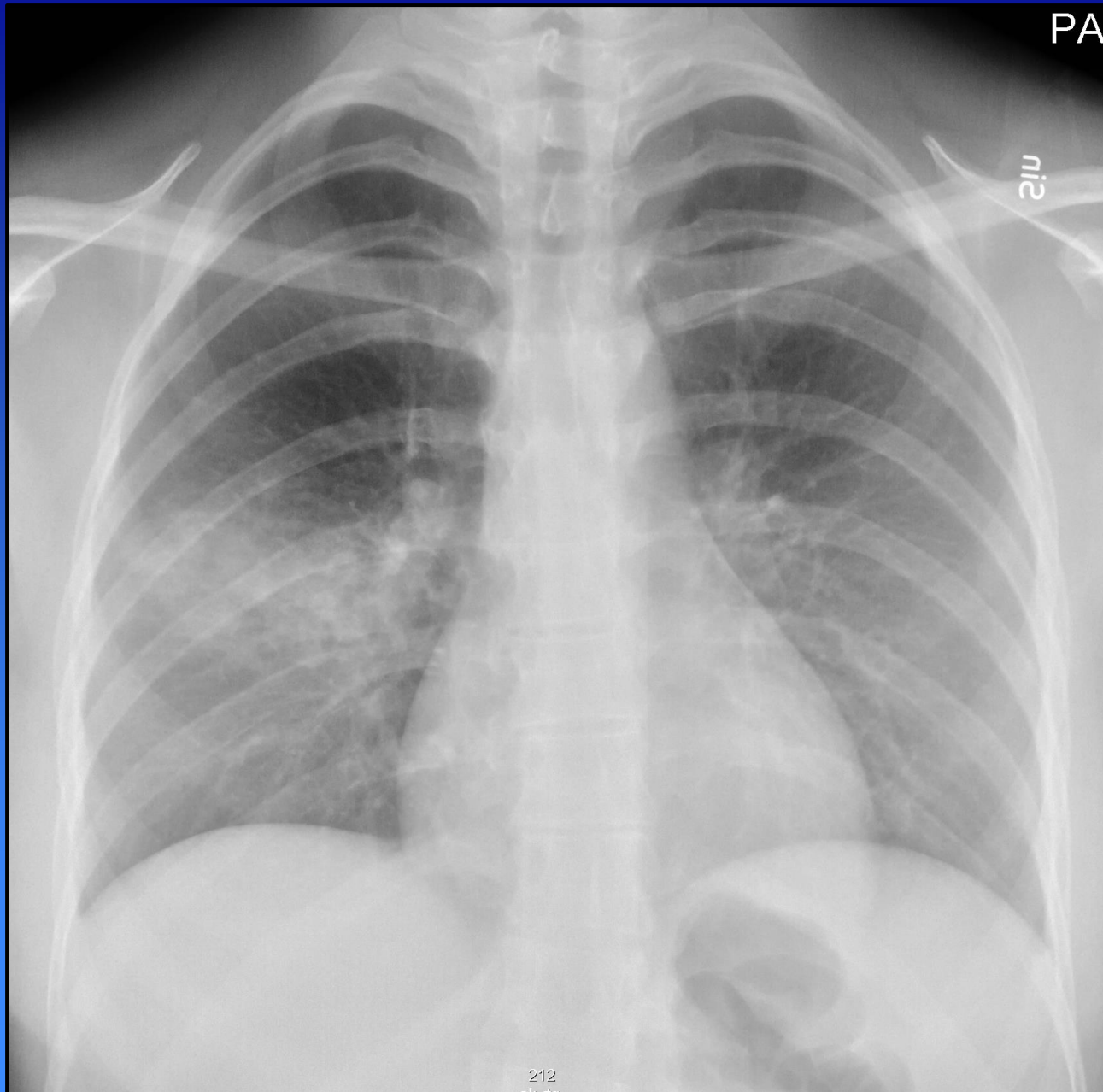


Thorax 1+2

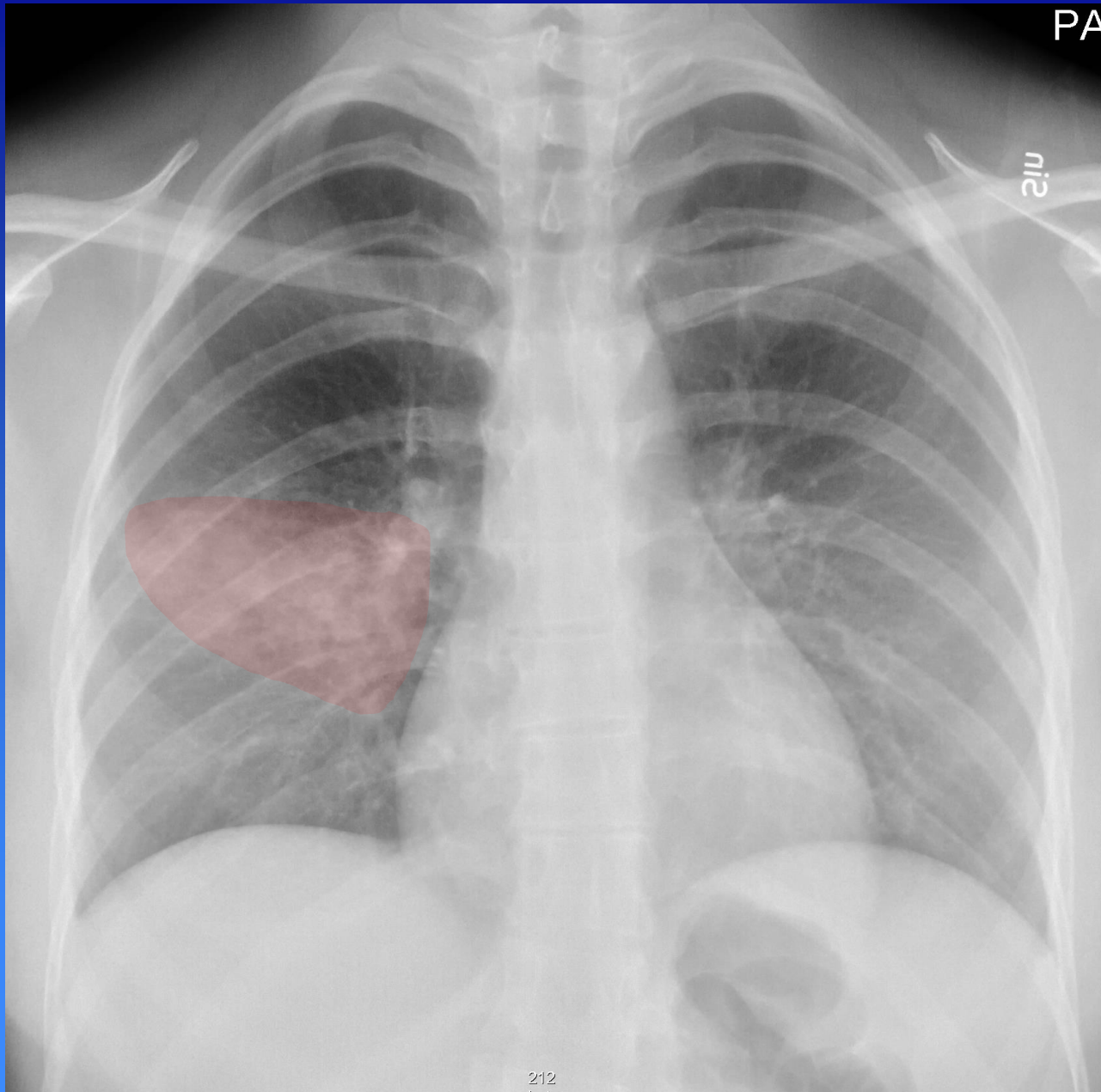
Michel Bach Hellfritzsch

Thorax



Rtg. af thorax PA

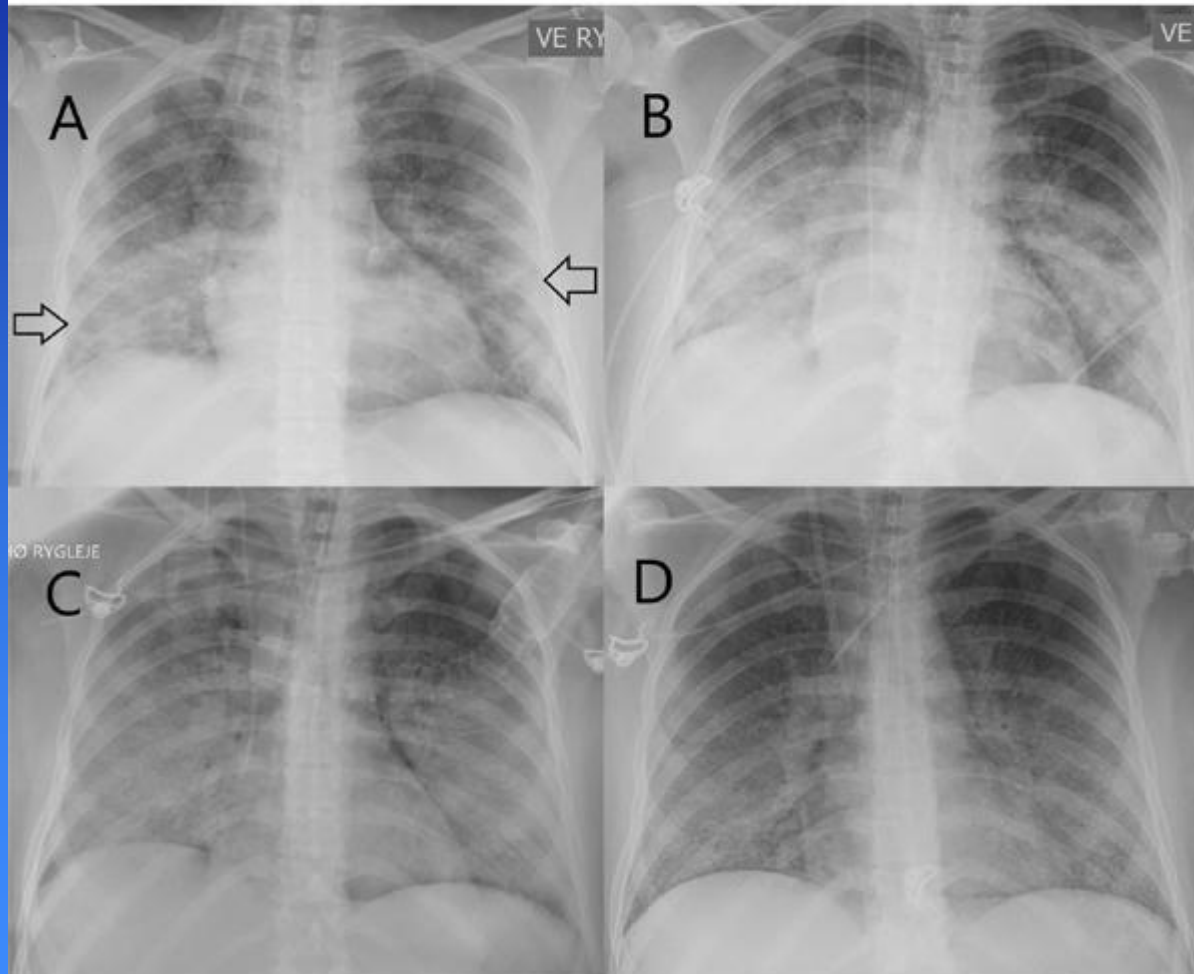
Yngre kvinde med
feber og hoste



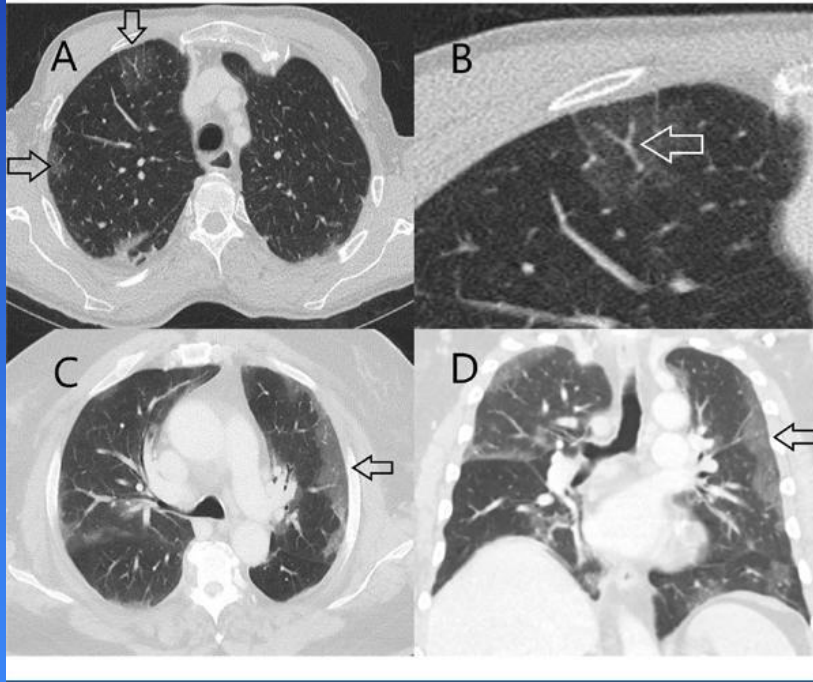
Rtg. af thorax PA

Yngre kvinde med
pneumonisk
infiltrat i højre
lunge
(lungebetændelse)

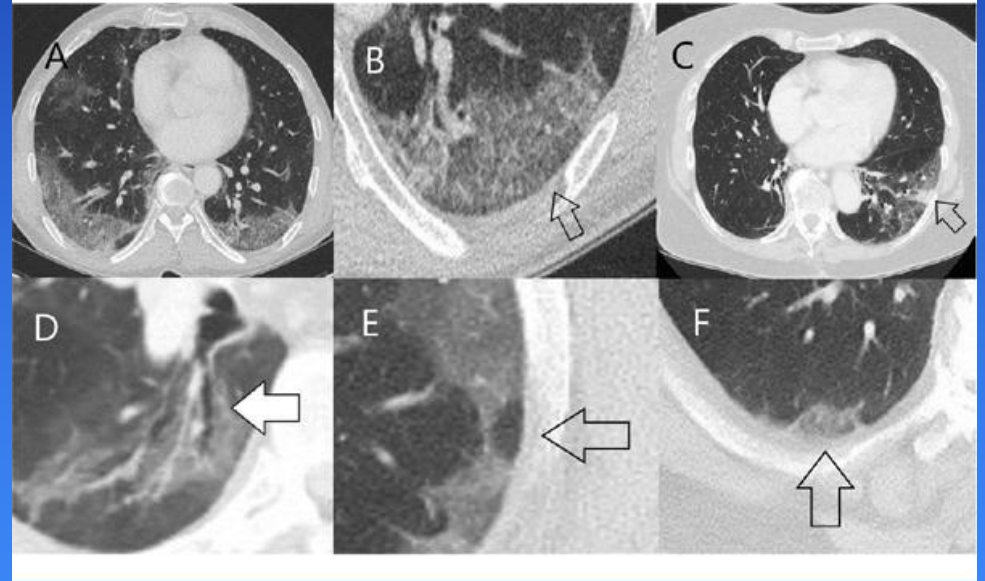
FIGUR 1 / Røntgen af thorax i rygleje i forskellige faser af COVID-19 hos den samme patient. **A.** Bilaterale perifere infiltrater i flere lobi, men fortrinsvist posterobasalt (pile). **B.** Progression af infiltraterne på begge sider. **C.** Yderligere progression, nu med acute respiratory distress syndrome-forandringer («hvide lunger»). **D.** Betydeligt aftagende infiltrater på begge sider mod slutningen af forløbet.



FIGUR 2 / Typiske CT-forandringer ved COVID-19 i sygdommens initiale fase. A. Perifere matglasinfiltrater (pil) udelukkende unilateralt i én lobus (aksialt snit). B. Vaskulære forstørrelser (pil) i matglasinfiltratet formentlig pga. interstitielt ødem/inflammation og/eller hyperæmi. De øvrige perifere lungekar bemærkes at være væsentligt mindre. C og D. Bilaterale perifere matglasforandringer (pile) i flere lobi med afrunding (samme patient, hhv. aksialt og koronalt snit).

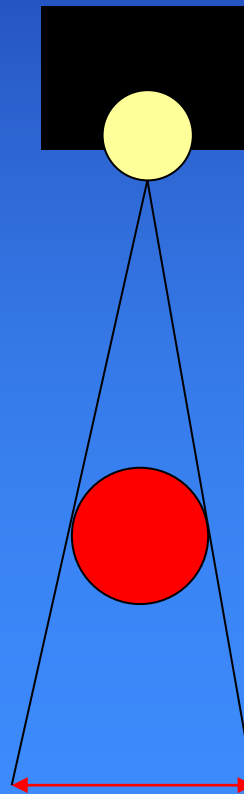
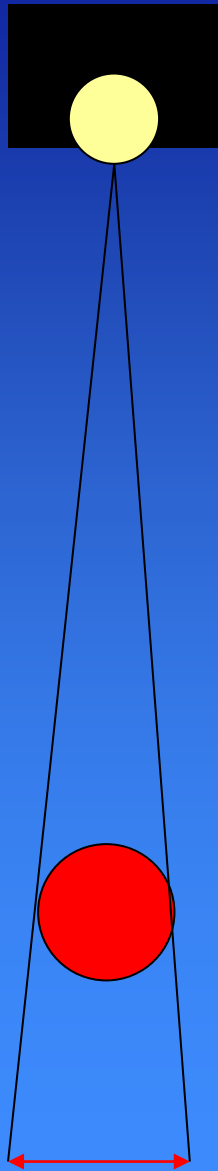


FIGUR 3 / Typiske CT-forandringer på aksiale snit ved COVID-19 når sygdommen progredierer. A. Udbredte perifere multilobære og bilaterale infiltrater inkl. crazy paving. B. Crazy paving. Dette fremkommer ved tilkomst af inter- og intralobulær septumfortykkelse i matglasinfiltraterne. C. Konsolidering i matglasinfiltratet. D. Traktionsbronkiektasier – der »trækkes« i bronkierne formentlig på baggrund af omkringliggende fibrose eller kollaps af omkringliggende alveoler. E. Arcade-like sign som tegn på sekundær organiserende pneumoni. F. Reverse halo sign – fremkommer ved omslutning af det perifere matglasinfiltrat af en »halo« af konsolidering.

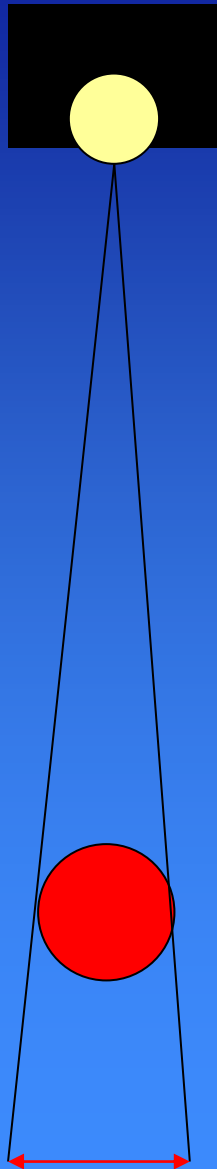


Thorax – principper for optagelsen

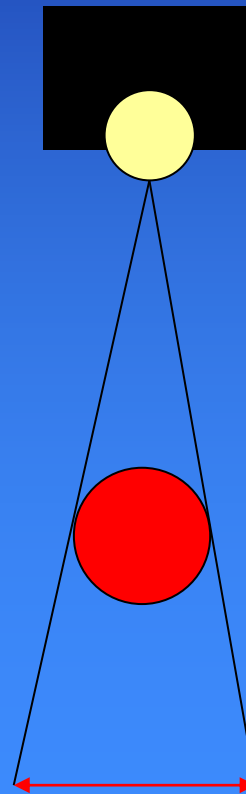
Geometrisk forstørrelse



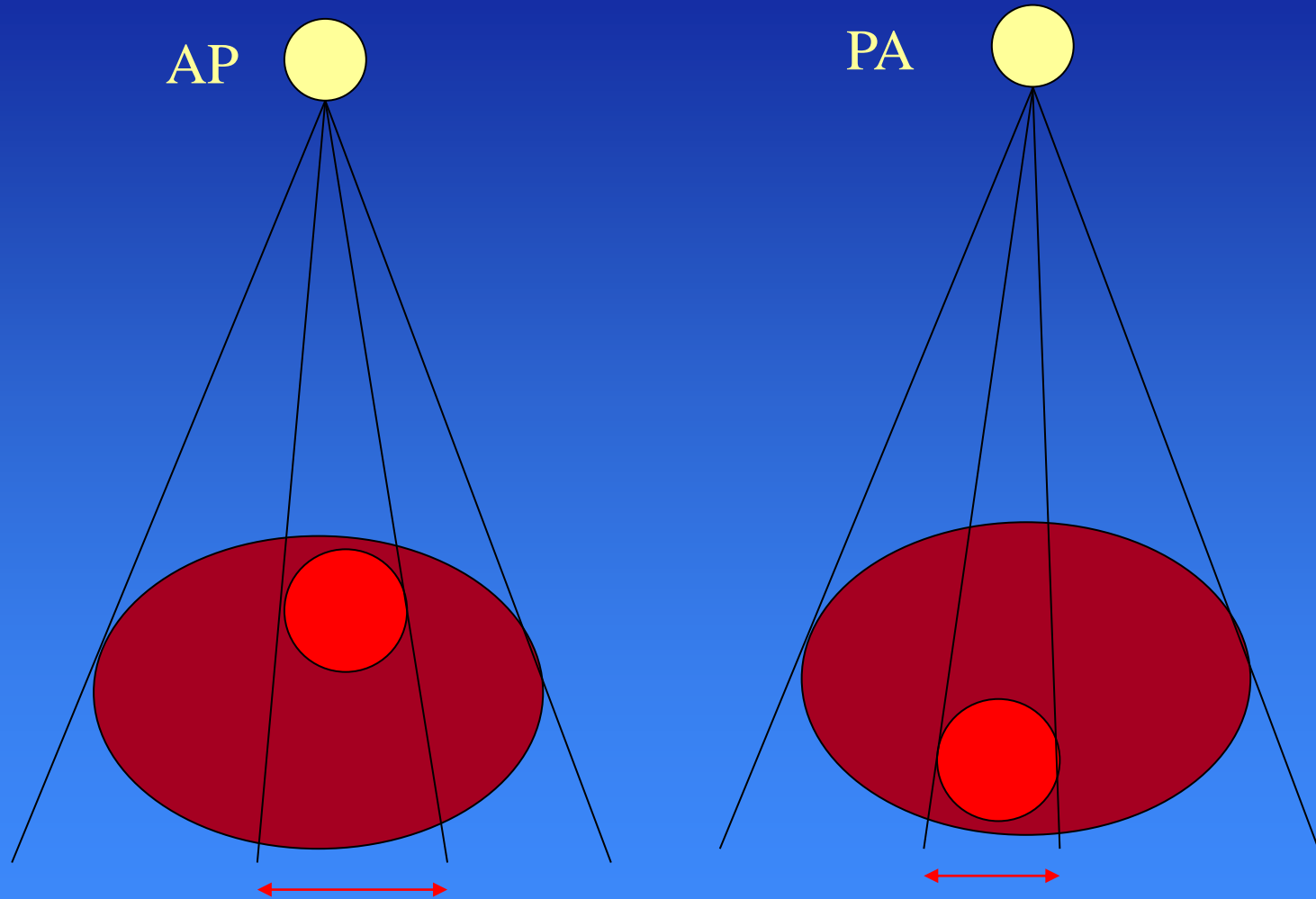
Geometrisk forstørrelse



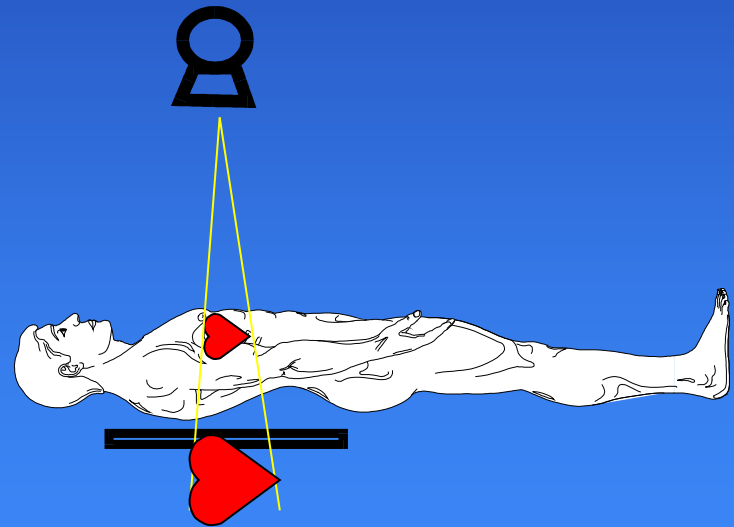
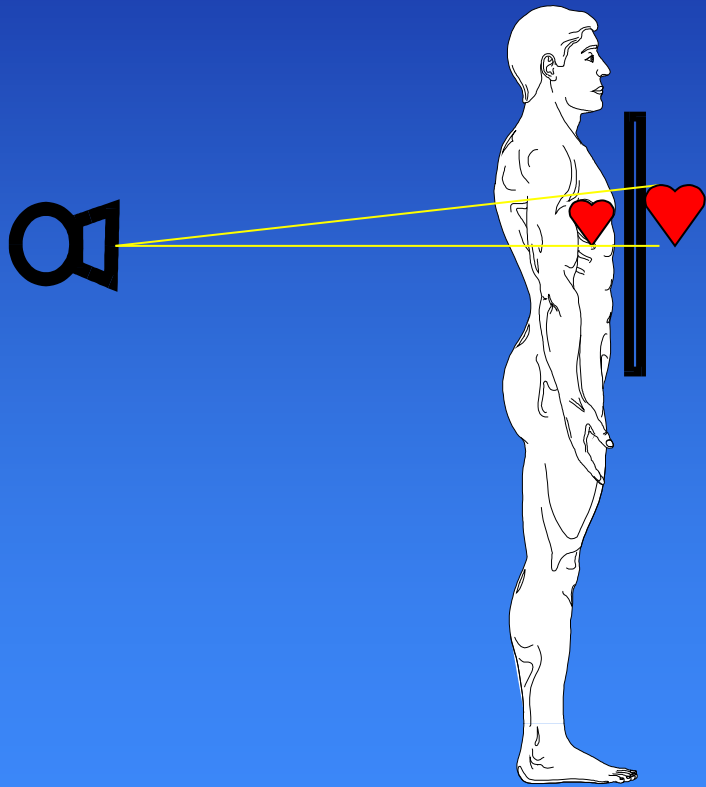
Jo større afstand der er mellem lyskilden (røntgenrøret) og objektet der belyses, jo mindre bliver forstørrelsen af den skygge (røntgenbillede) der dannes.



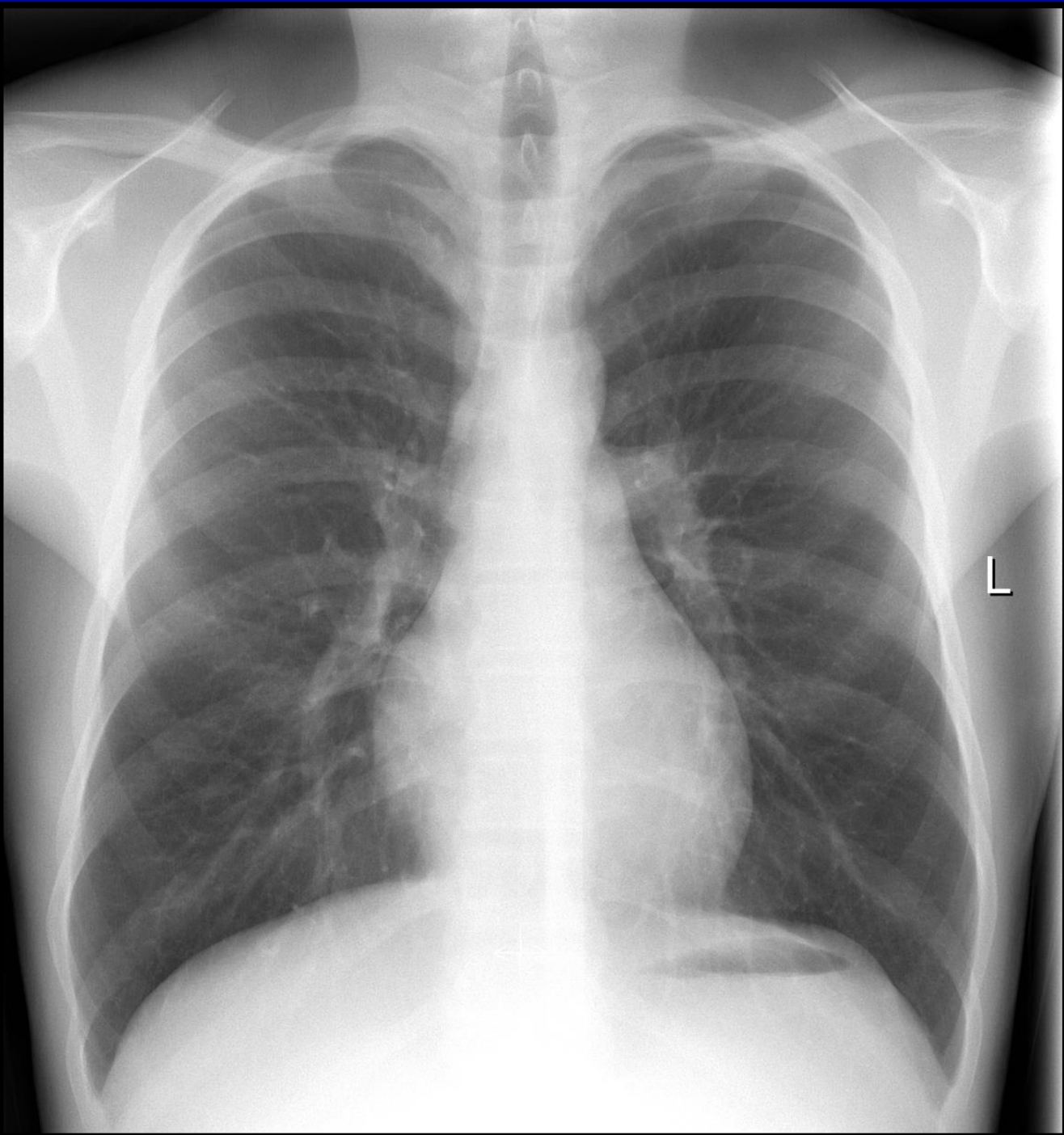
Geometrisk forstørrelse



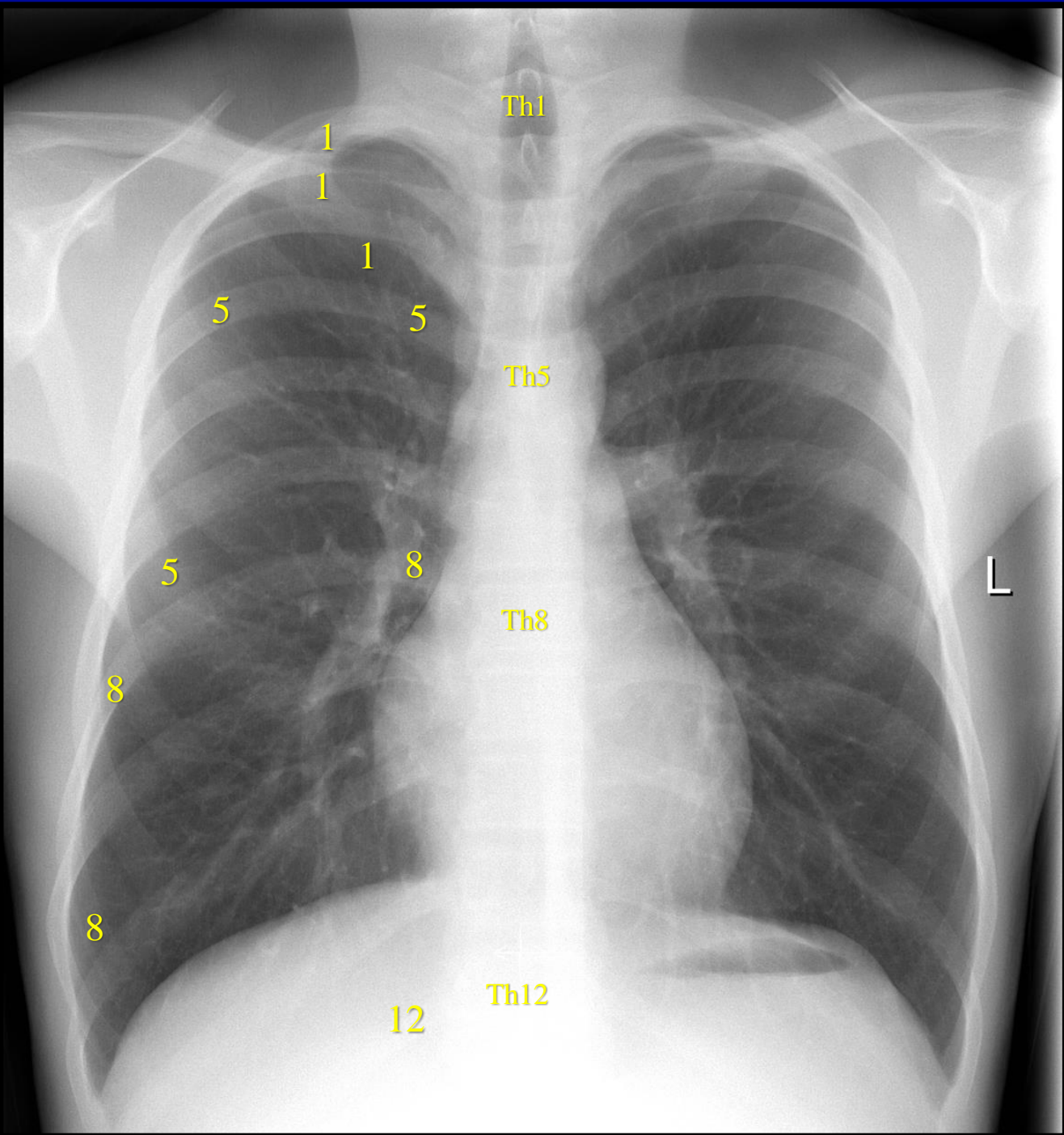
Geometrisk forstørrelse



Thorax skelettet

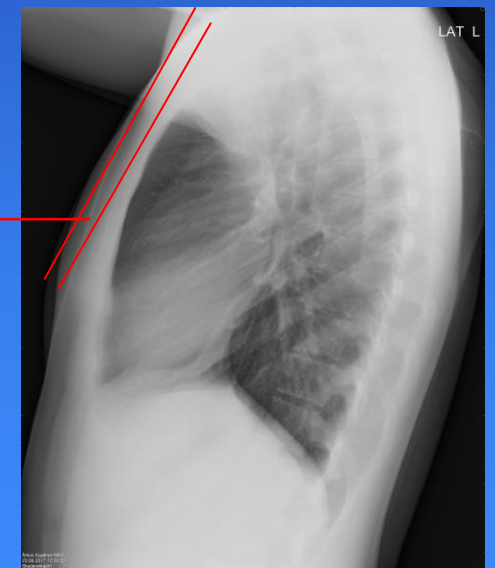
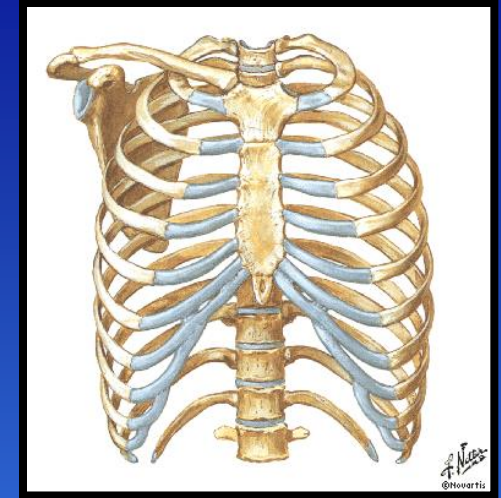
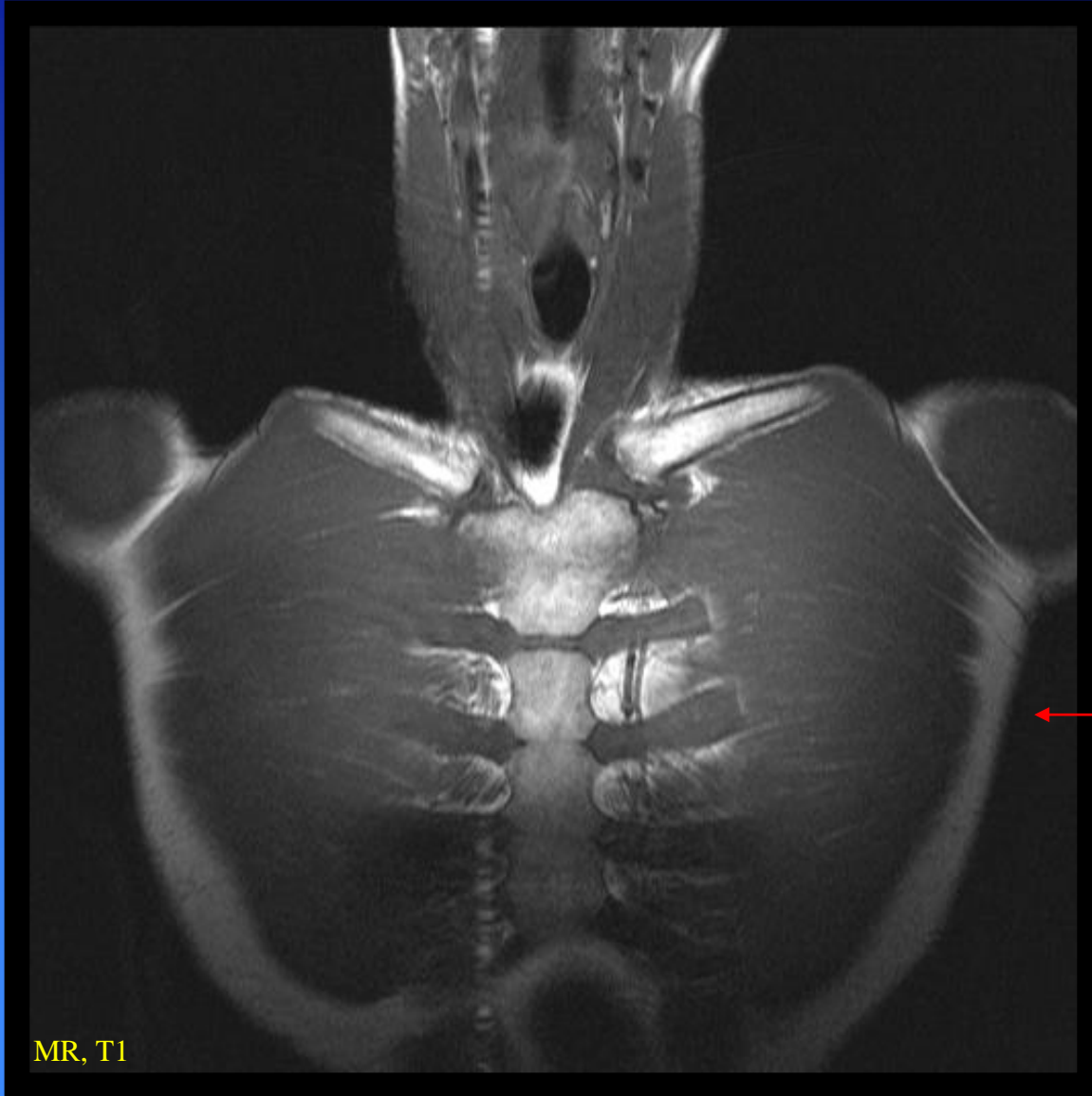


Rtg. af thorax:
PA optagelse

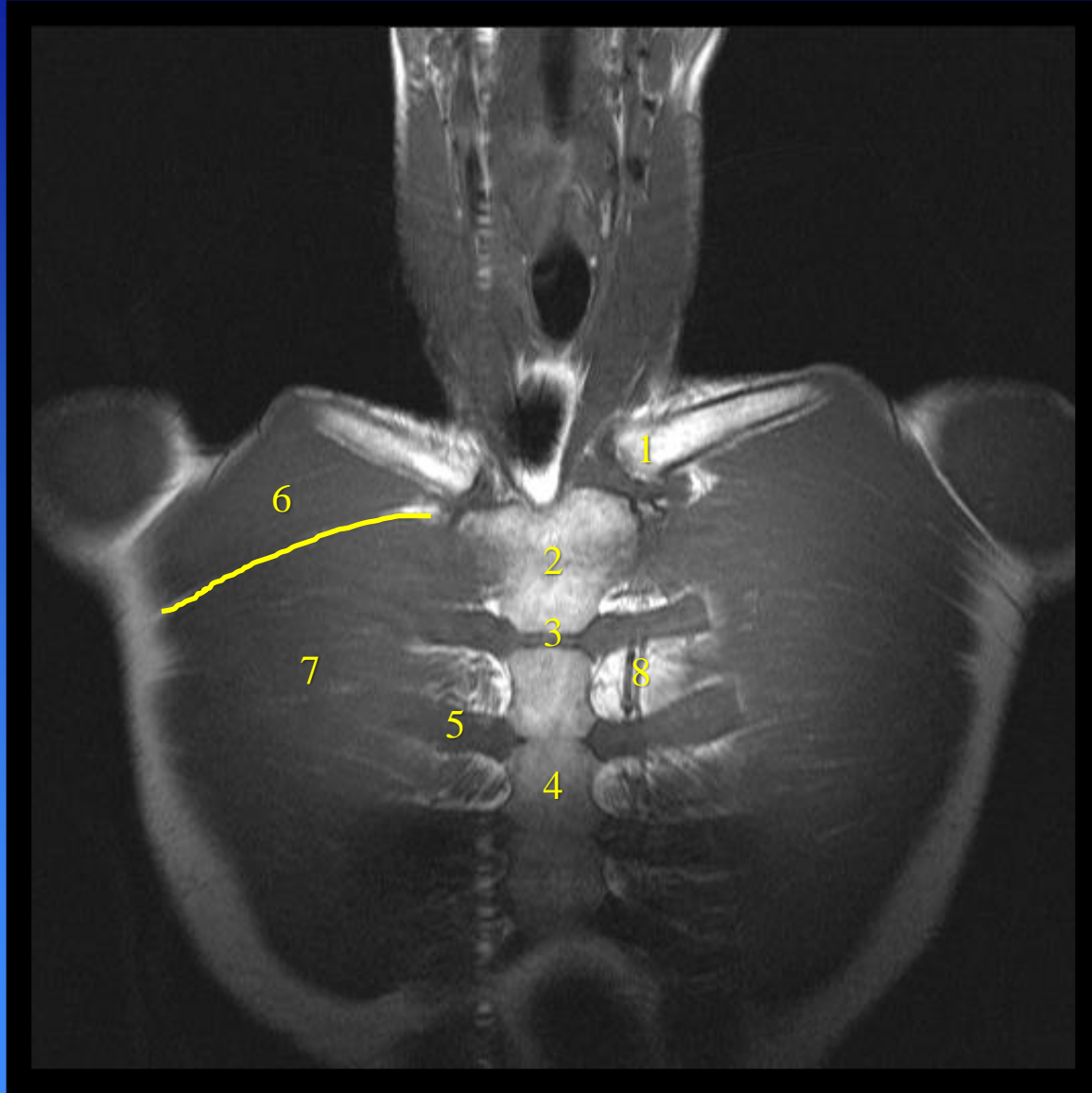


Rtg. af thorax:
PA optagelse med
markering af costa
nummer 1, 5 og 8.
Benyt evt. de
thoracale hvivler
som hjælp til niveau
bestemmelse.

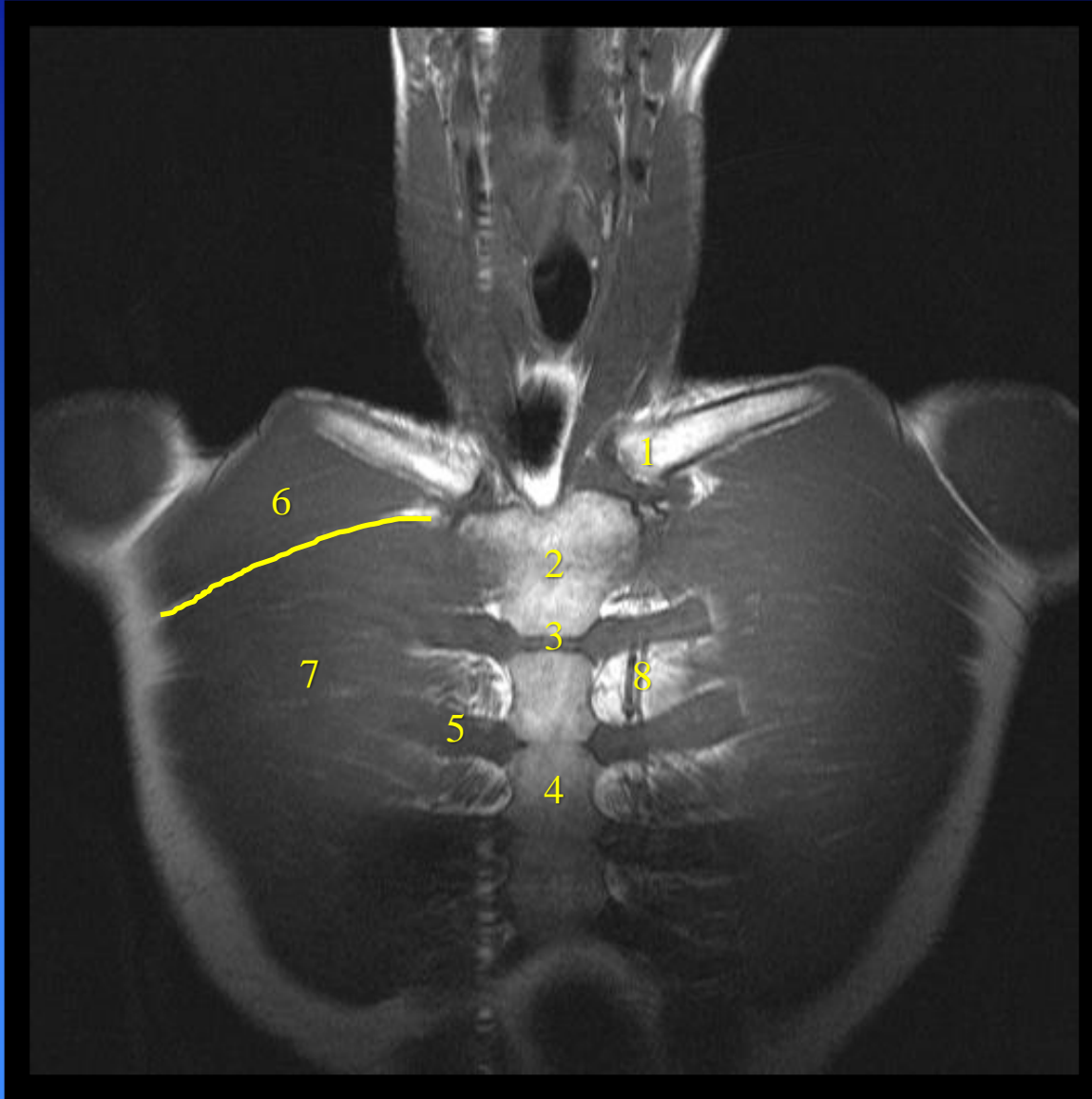
Cartilago costalis.



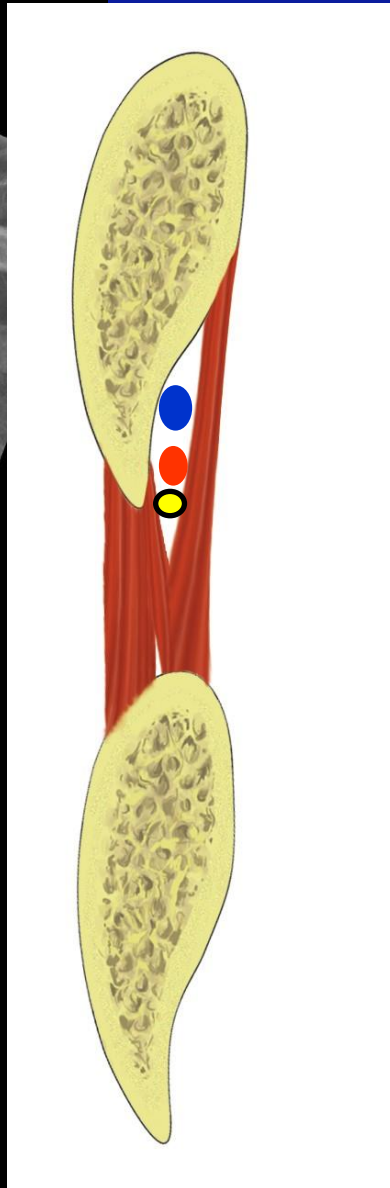
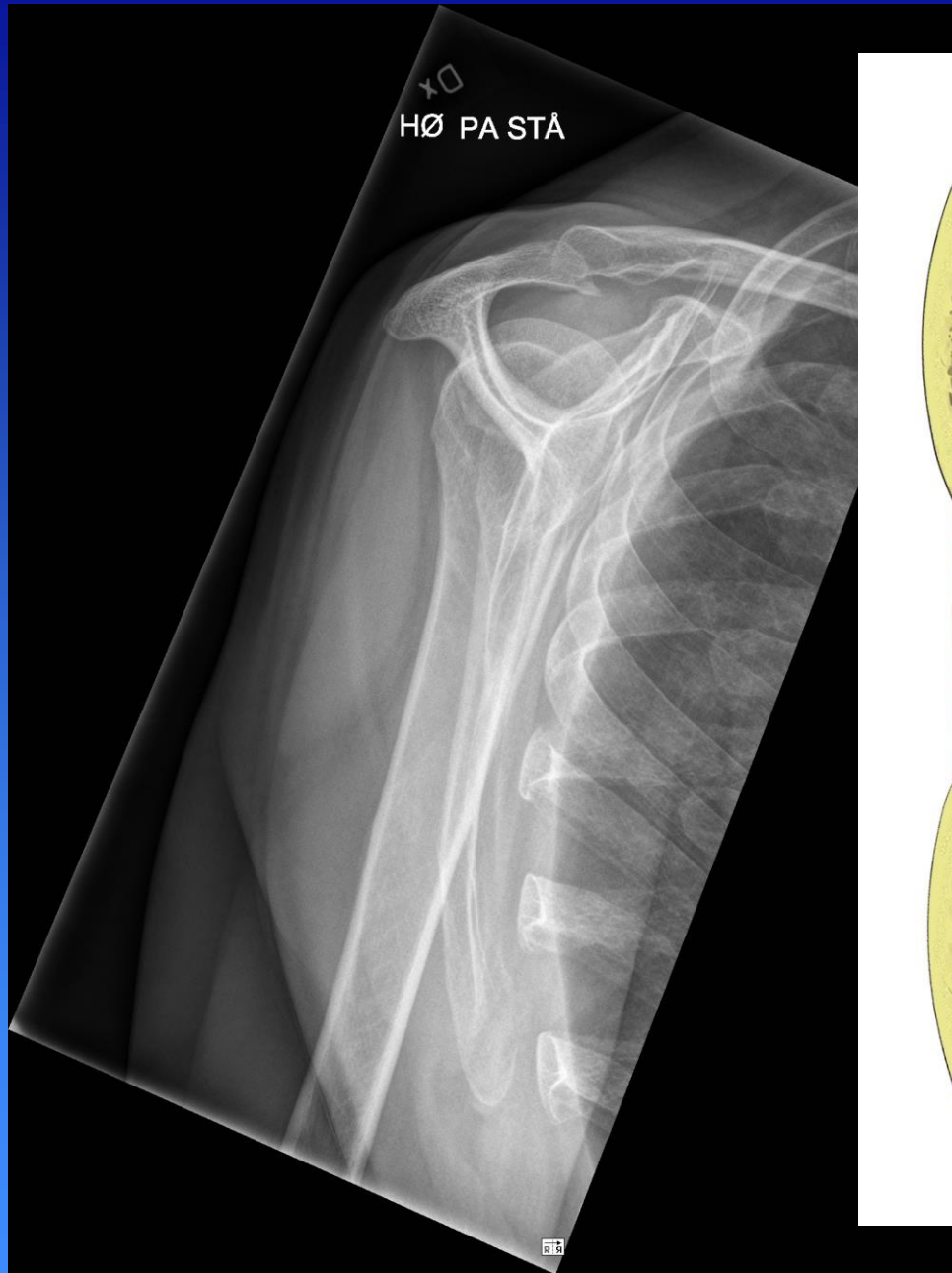
Cartilago costalis.



Cartilago costalis.

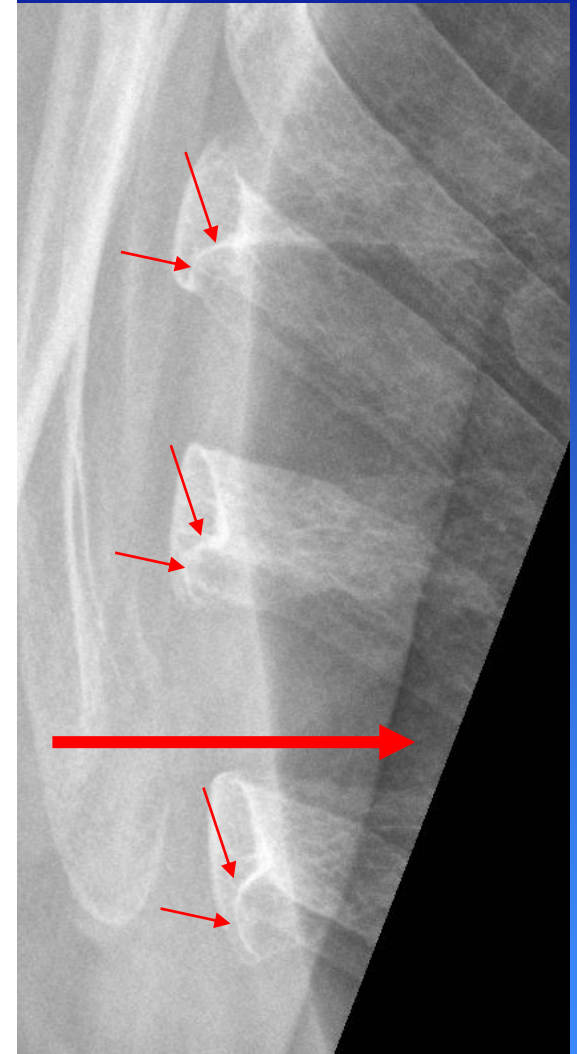
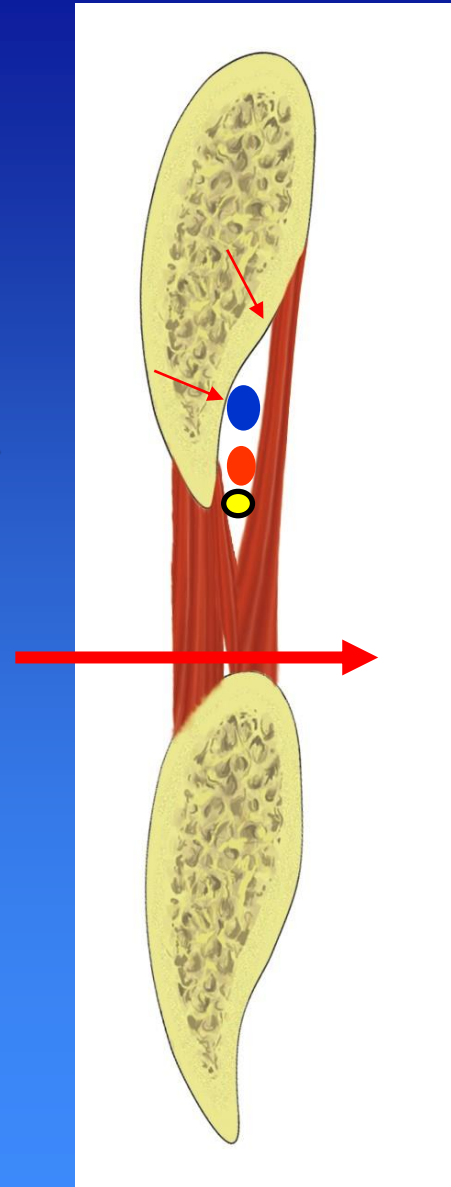


1. Clavicula (extremitas sternalis)
 2. Manubrium sterni
 3. Synchondrosis manubriosternalis
 4. Corpus sterni
 5. Cartilago costalis (3 dx.)
- M. pectoralis major:
6. Pars clavicularis
 7. Pars sternocostalis
 8. Vasa thoracica interna

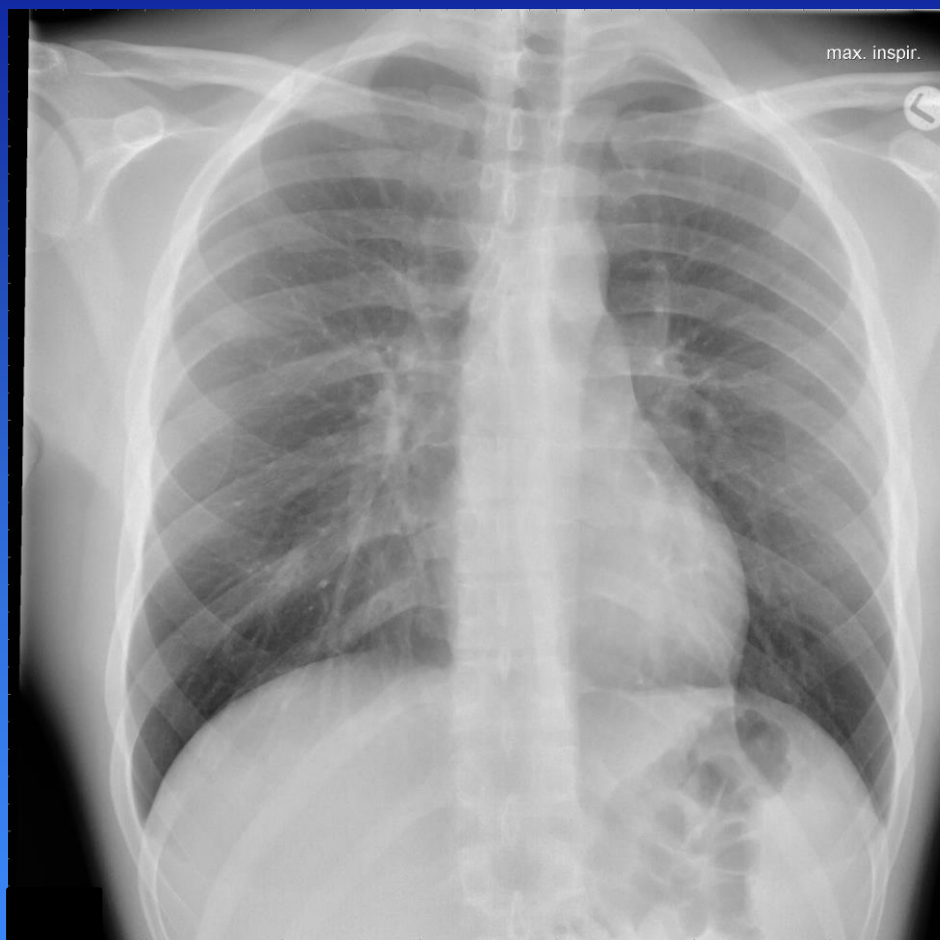


På en Y-optagelse af højre skulder, er stråleretningen lige tangentielt på costae, således at der opnås godt indblik til sulcus costae.

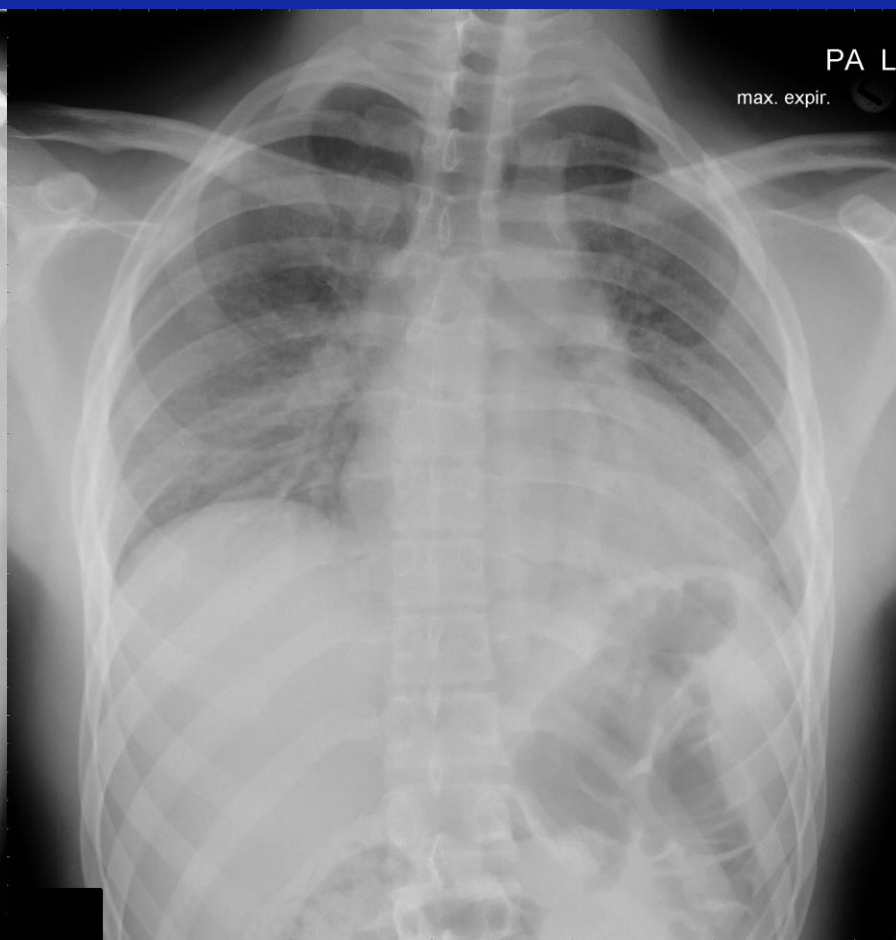
På den skematiske tegning ses endvidere placeringen af intercostal kar og nerver. Det fremgår heraf tydeligt, hvorfor man ved indstik intercostalt, f.eks. i forbindelse med anlæggelse af et pleuradræn, skal stikke langs overkanten af underliggende costa.



Brystkassens bevægelser

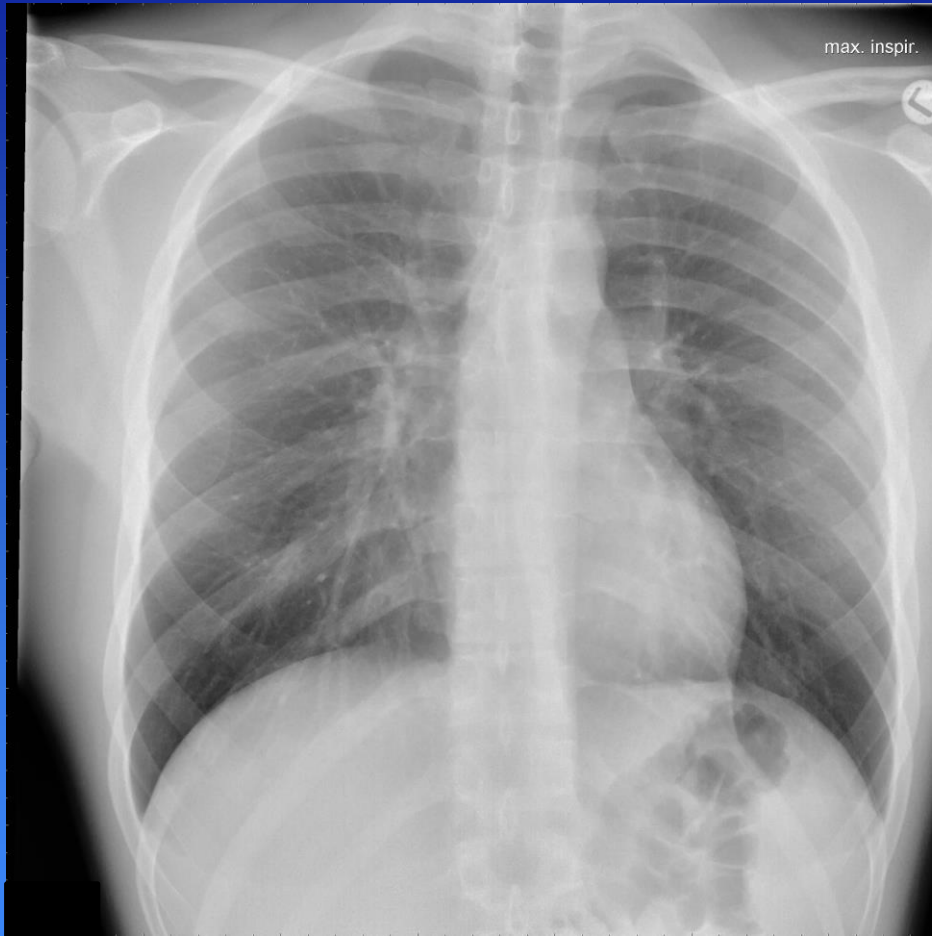


Maksimal inspiration

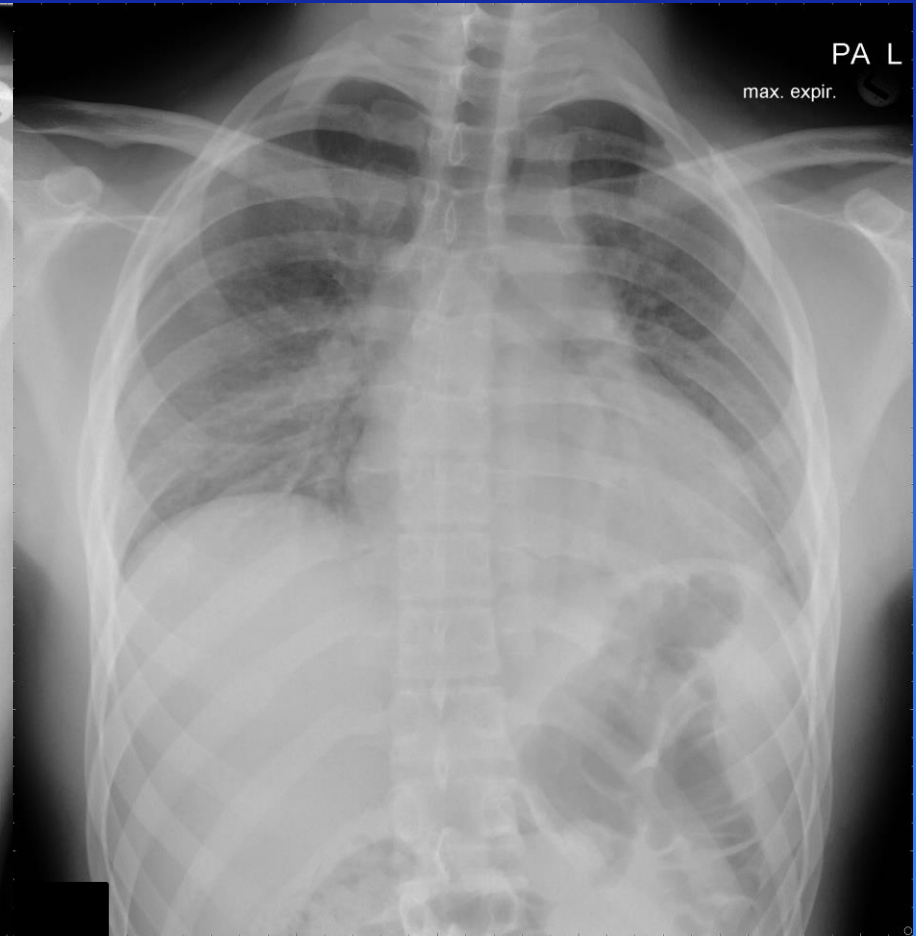


Maksimal ekspirasi

Røntgenoptagelse af thorax PA i henholdsvis maksimal inspiration og expiration. Det fremgår tydeligt af de to undersøgelser, hvorfor det er vigtigt, at man altid benytter samme inspirationsfase, hvis man f.eks. måler hjertets bredde. Dette gøres altid på en stående PA optagelse i maksimal inspiration.



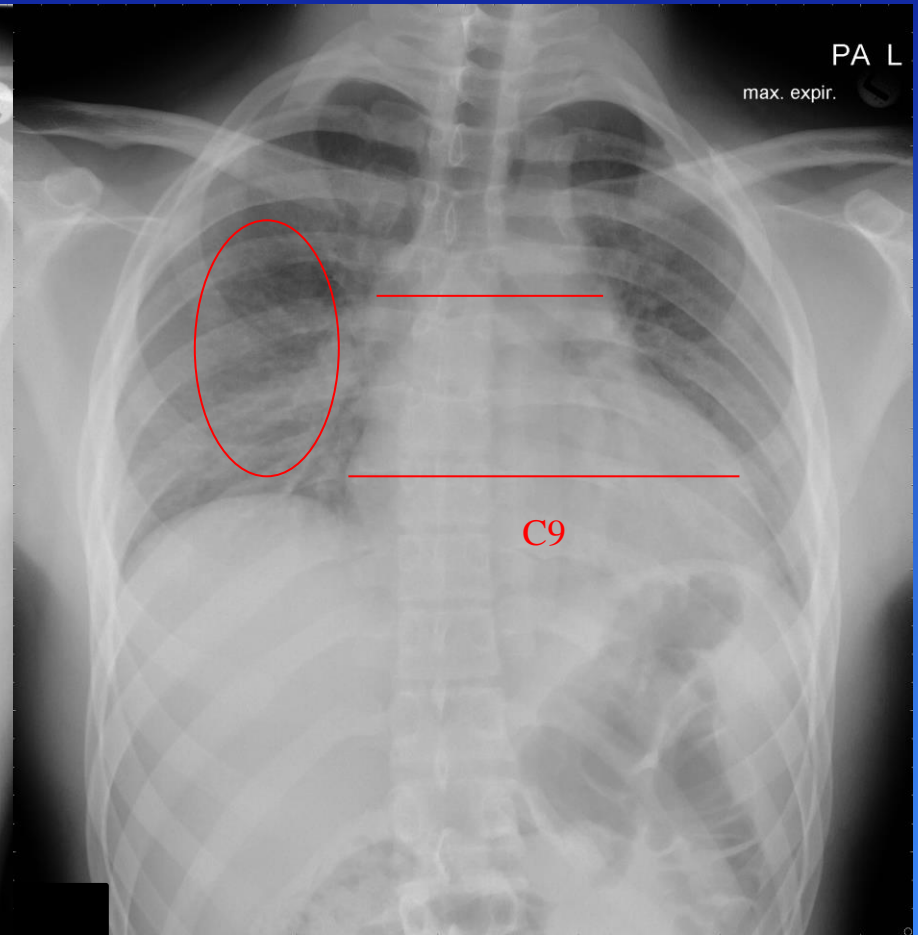
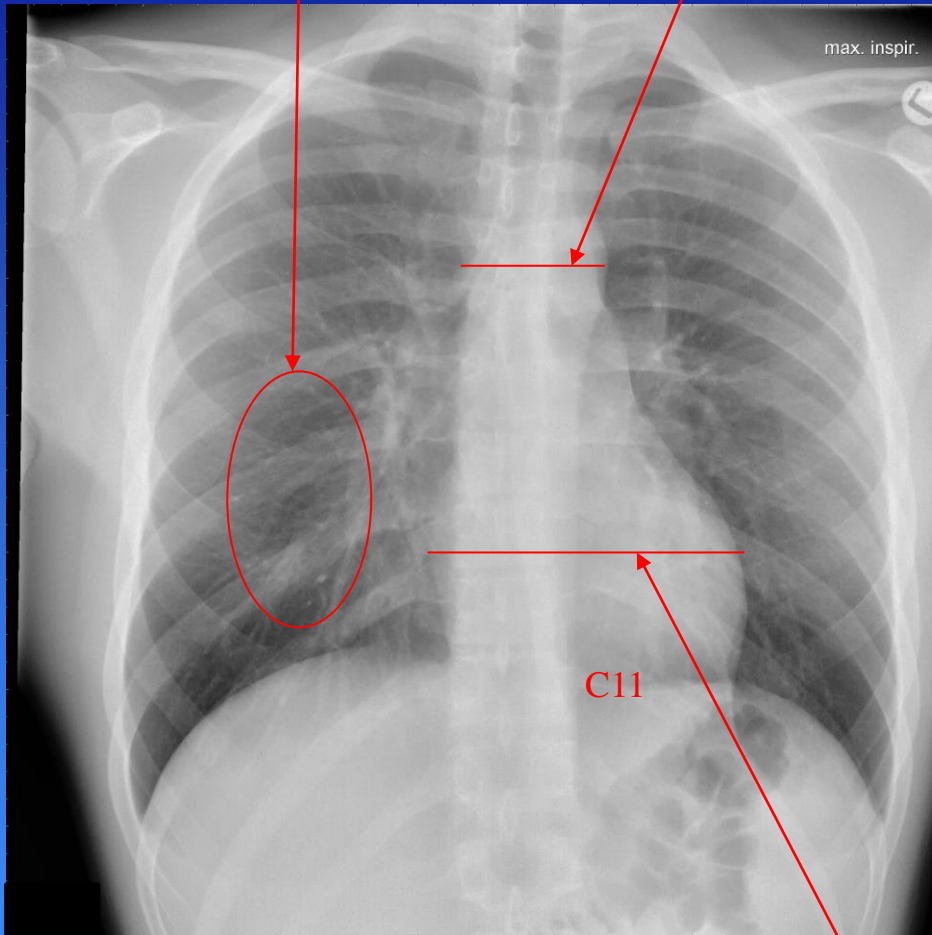
Maksimal inspiration



Maksimal expiration

Vurdering af lungekartegning

Mediastinalbredde

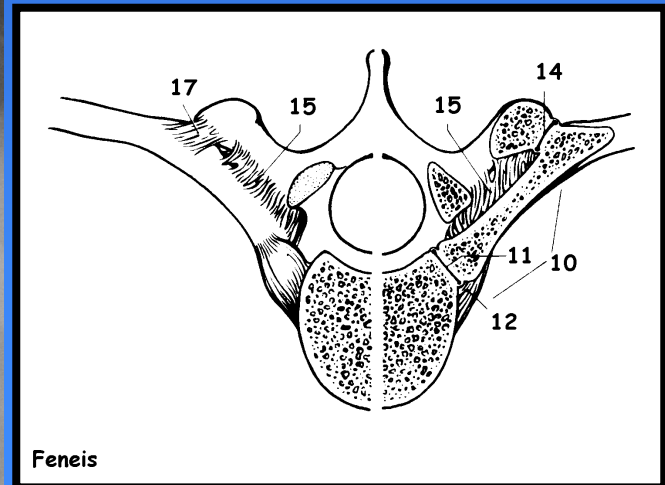
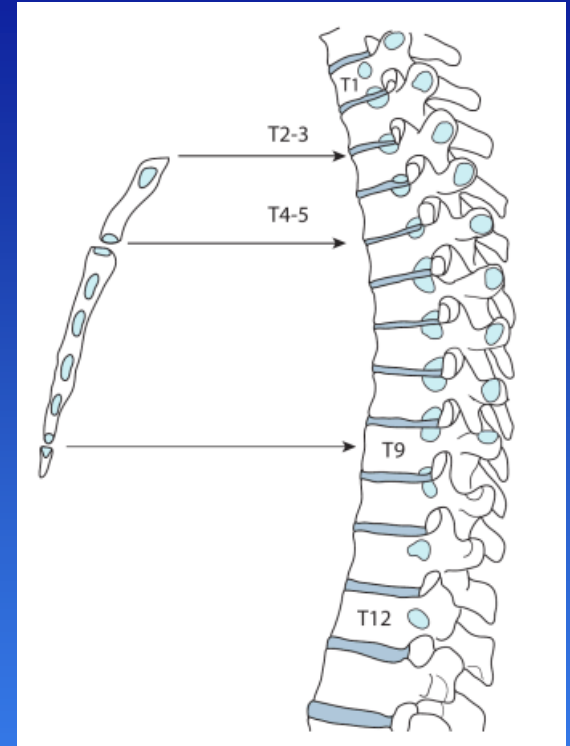
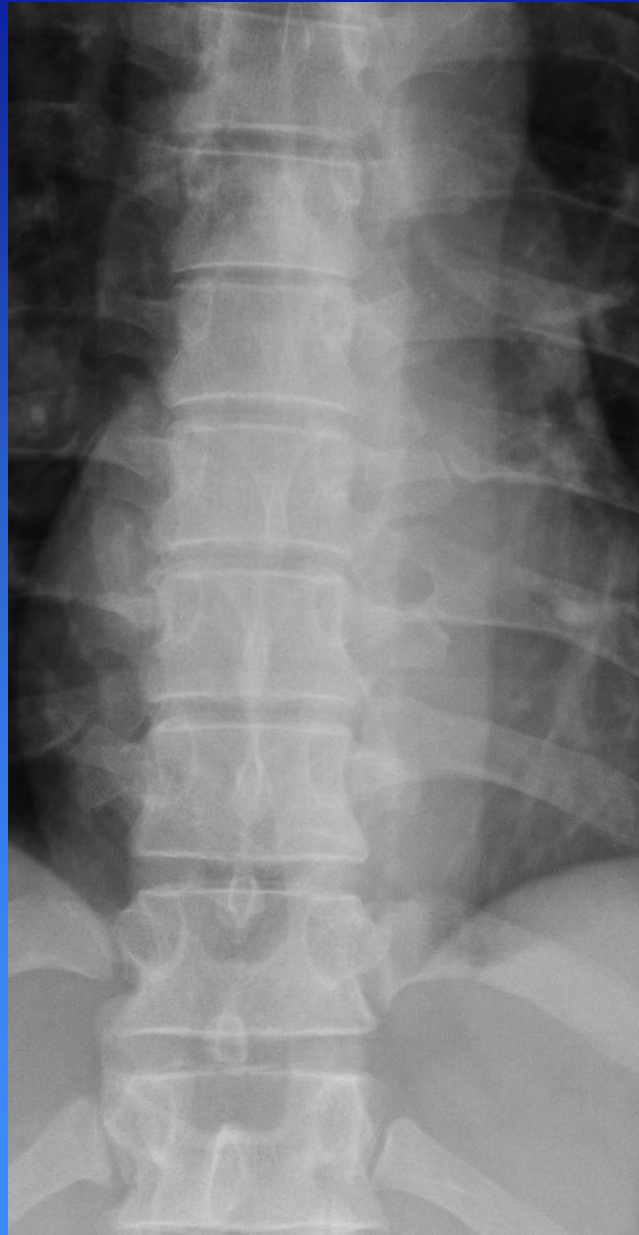


Maksimal inspiration

Maksimal expiration

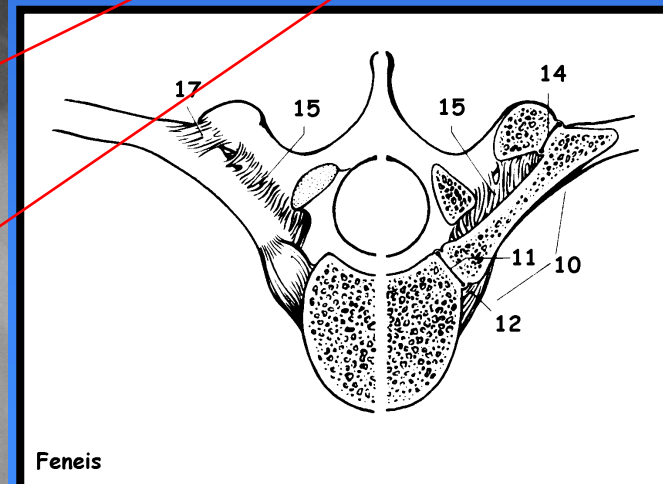
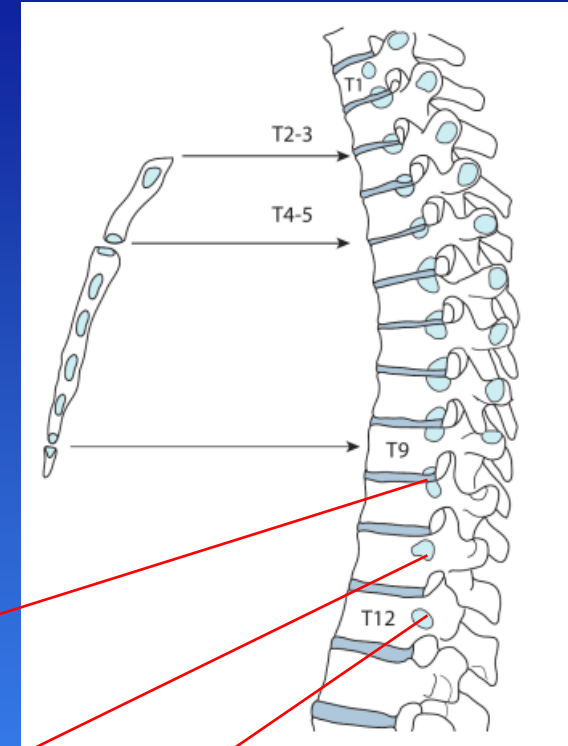
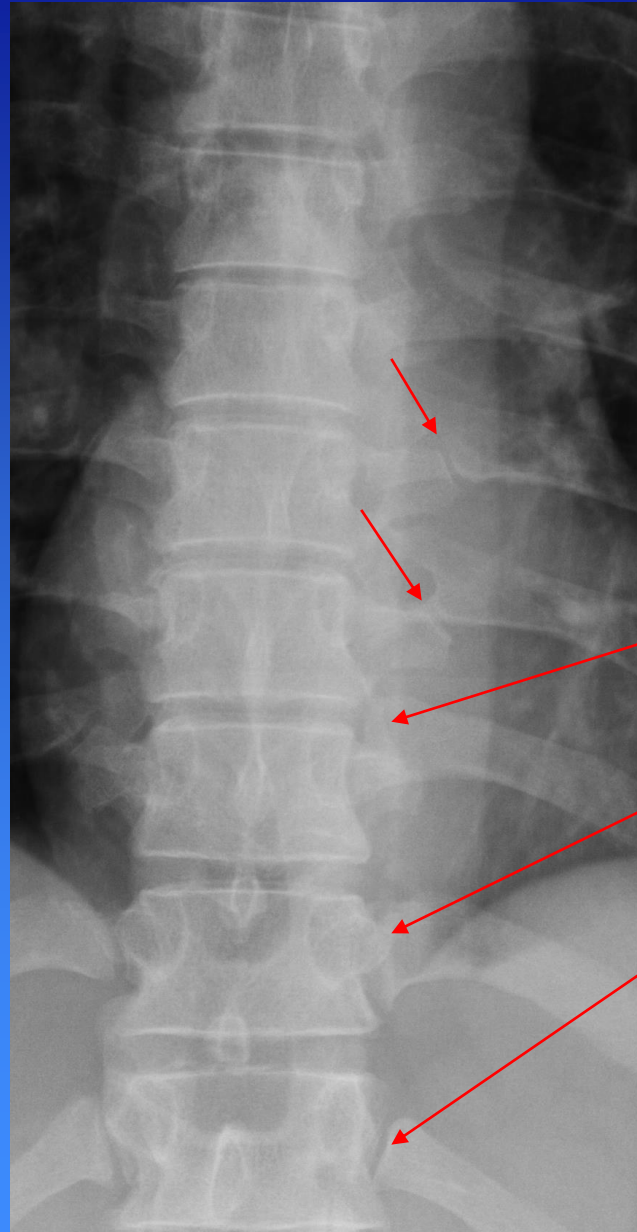
Hjertebredde

Røntgen af columna thoracalis



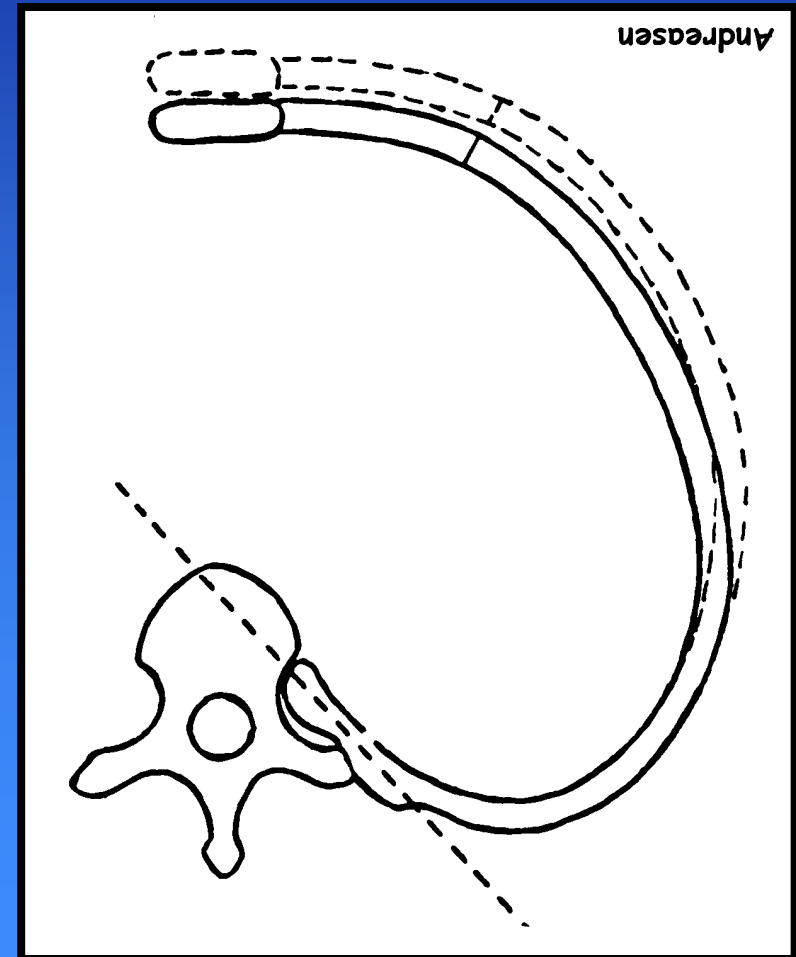
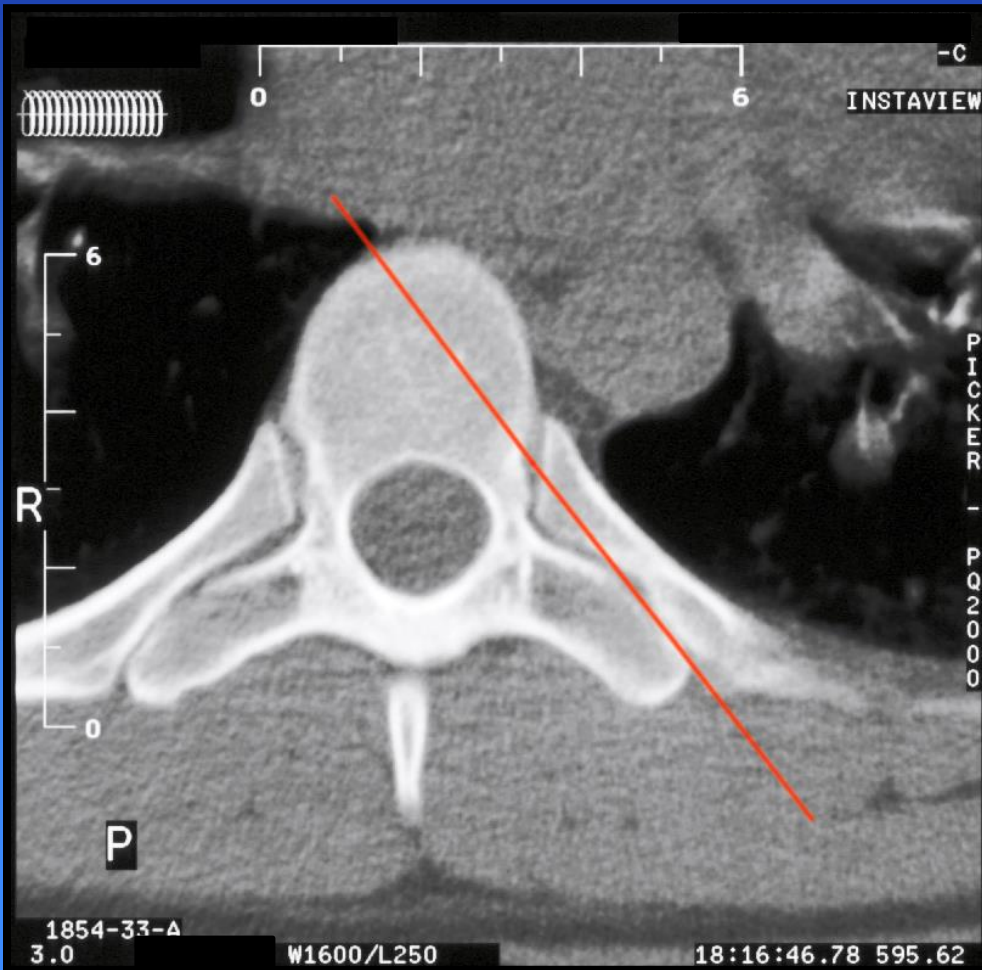
Røntgen af columna thoracalis

Costa 1, 11 og 12 artikulerer medialt midt på corpus lateralt, hvorimod de øvrige costae, artikulerer med discus intervertebralis og de tilstødende costae svarende til articulationes costovertebrales, idet der også er en artikulation mellem costa og processus transversus.

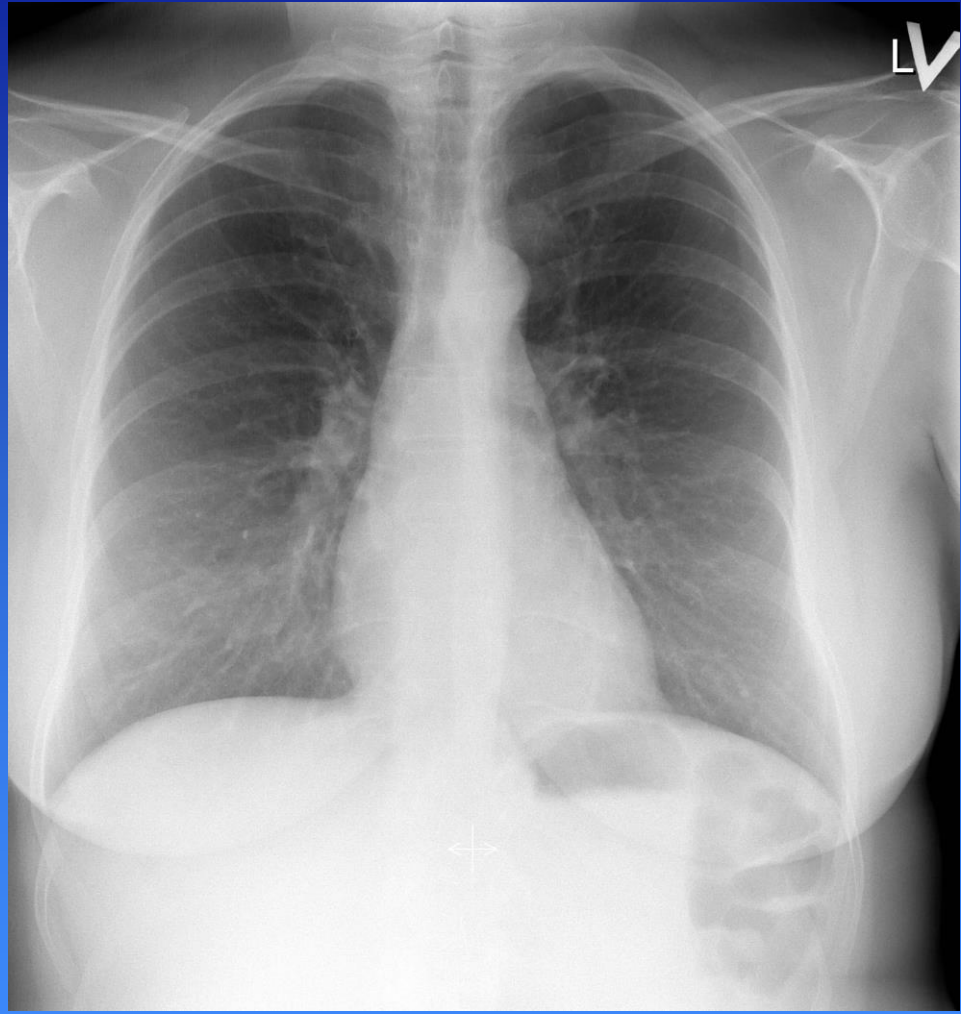
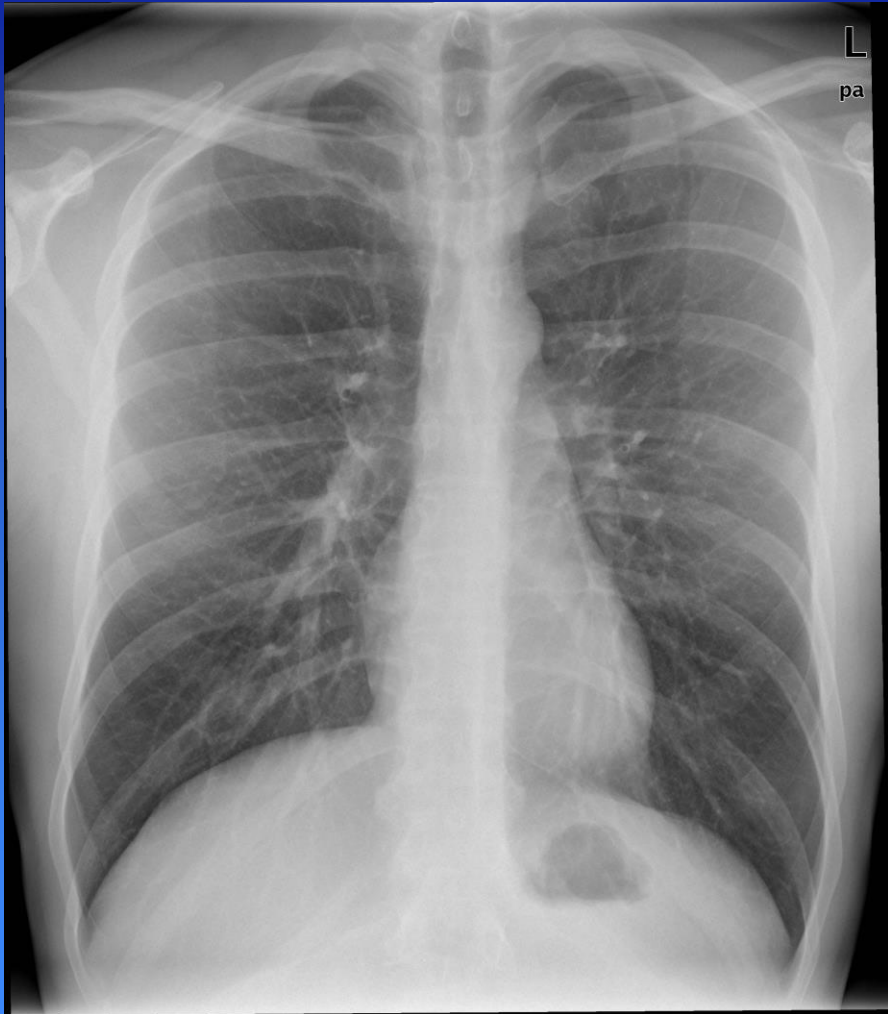


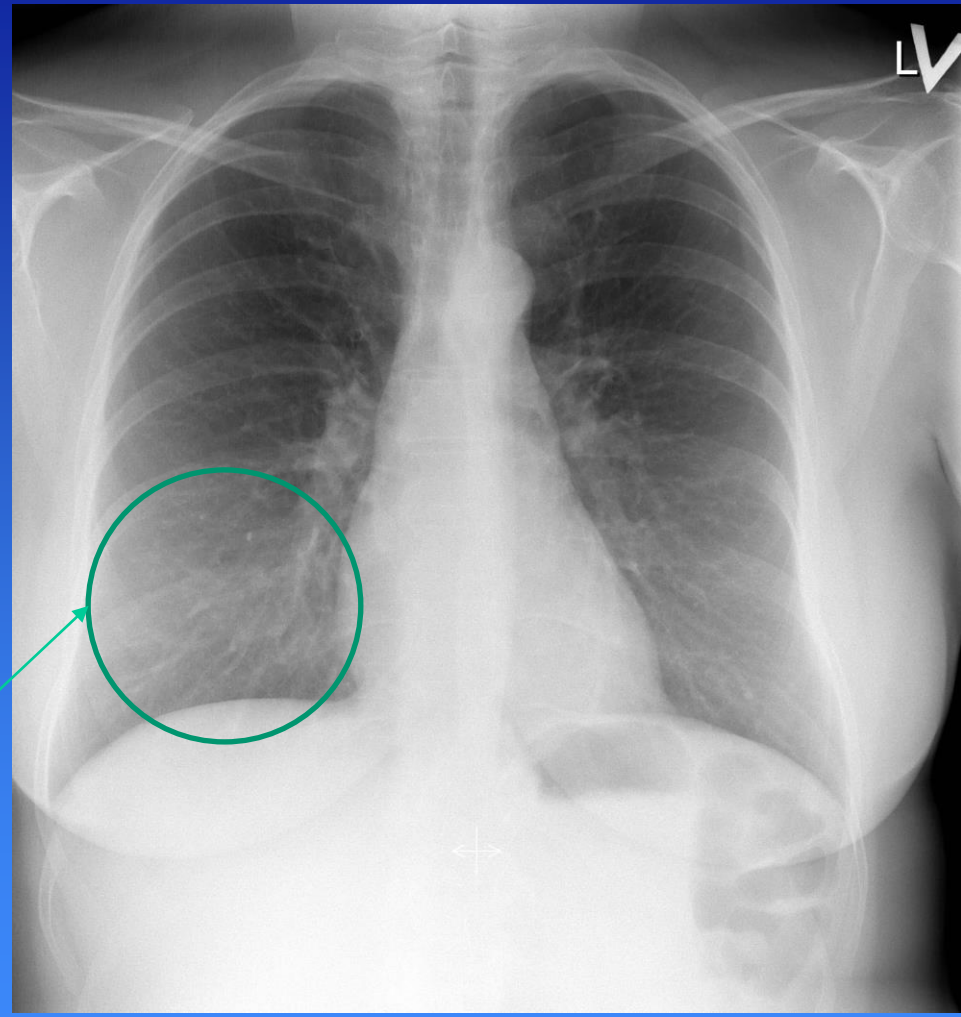
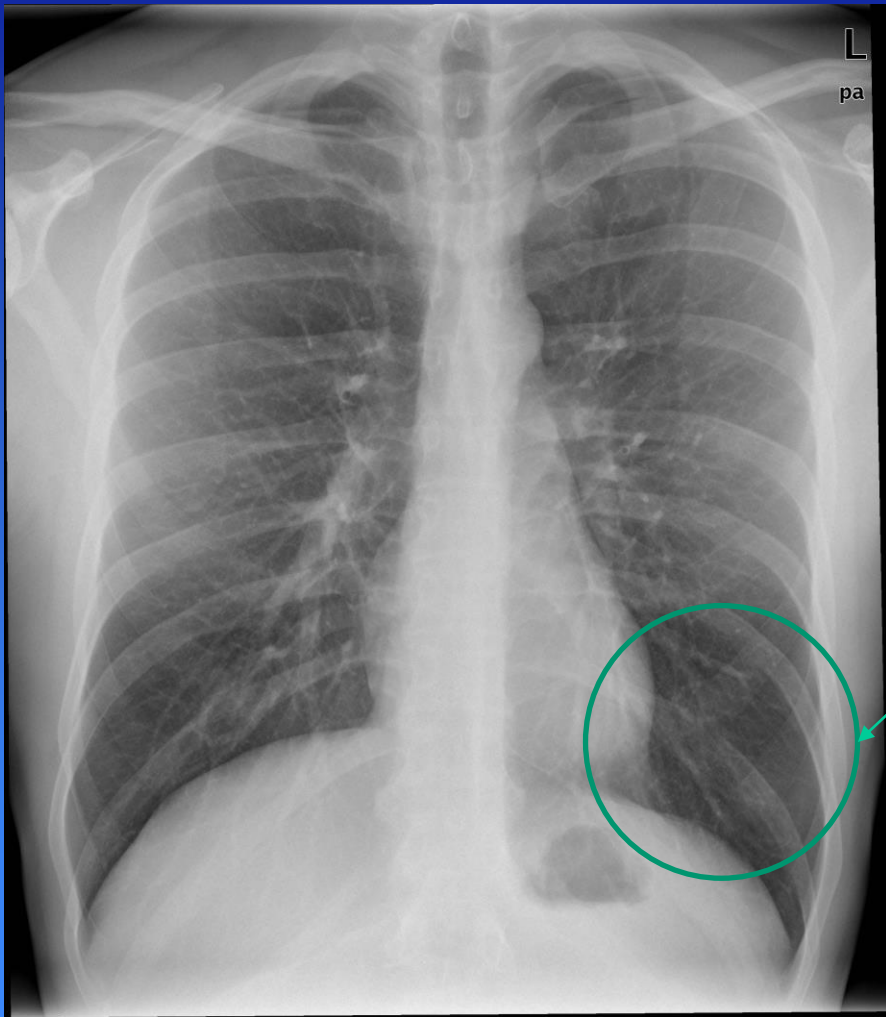
Brystkassens bevægelser

Articulatio costovertebralis: Kombineret led (Articulatio capitis costae et articulatio costotransversaria).



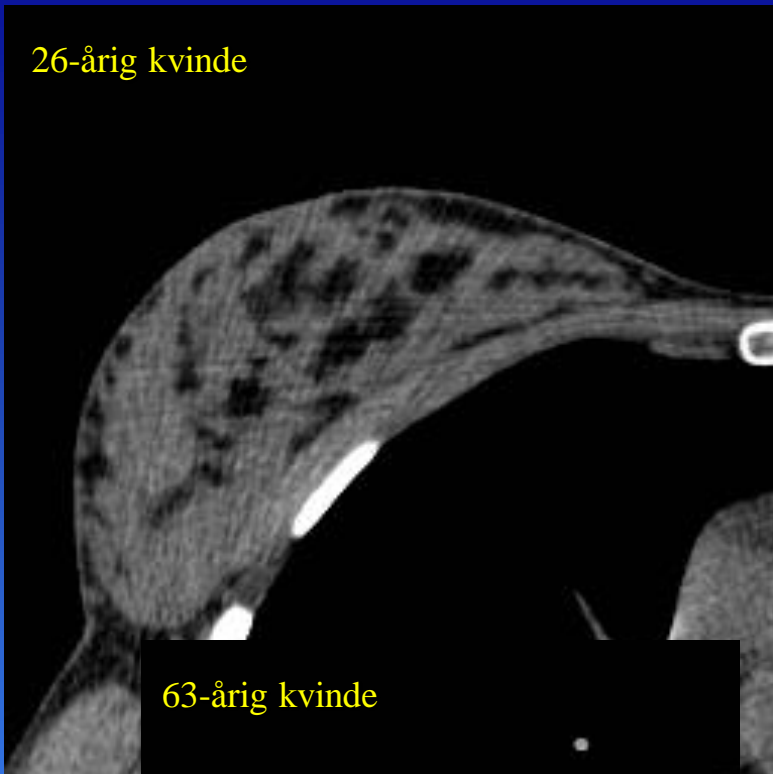
Mammae



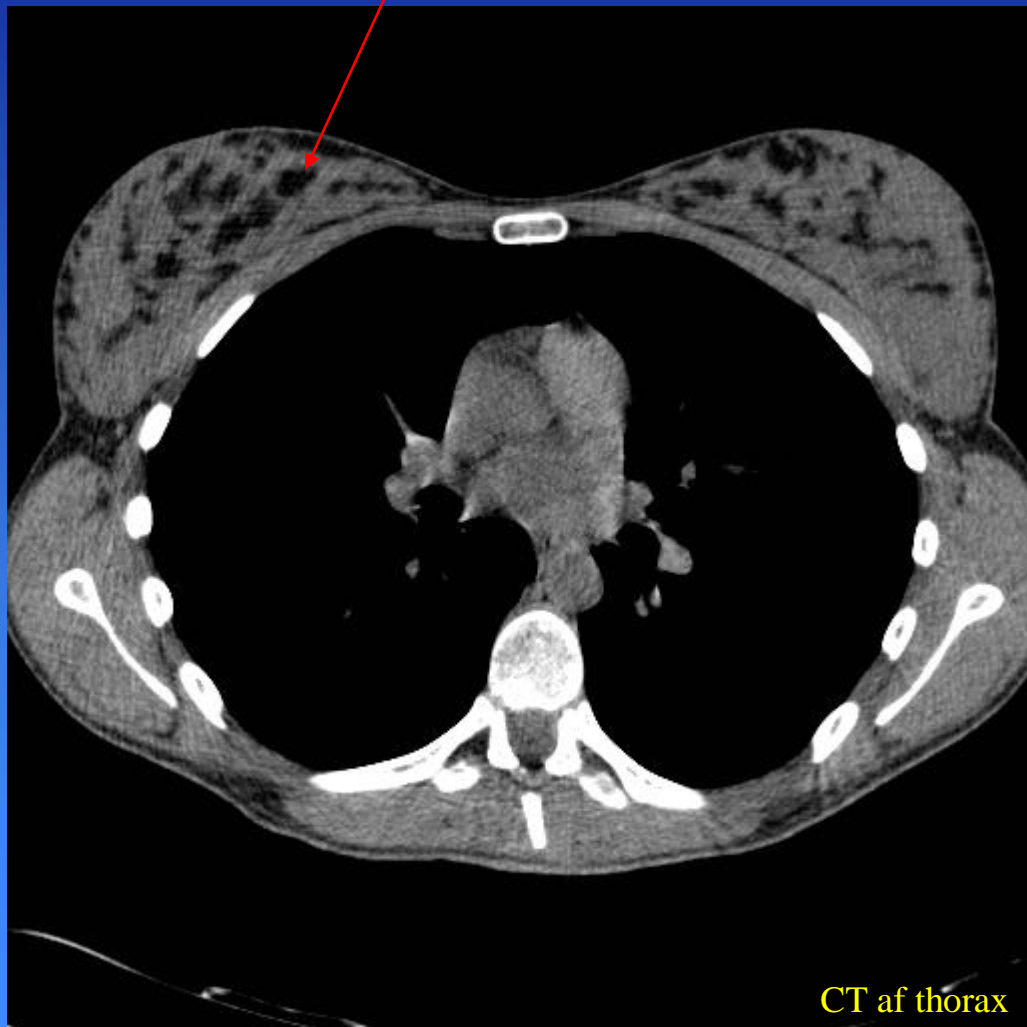
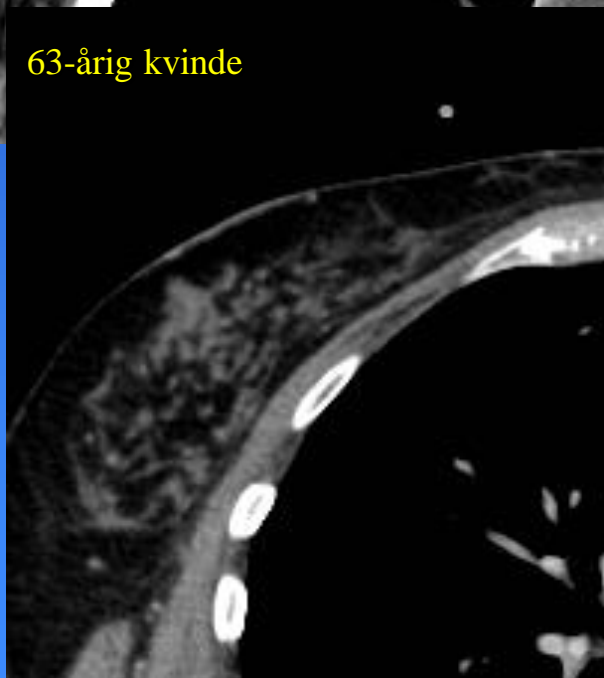


Røntgenoptagelsen til venstre er af en mand og til højre af en kvinde. Der ses sløring af lungfeltet kaudalt pga. mammae.

26-årig kvinde



63-årig kvinde



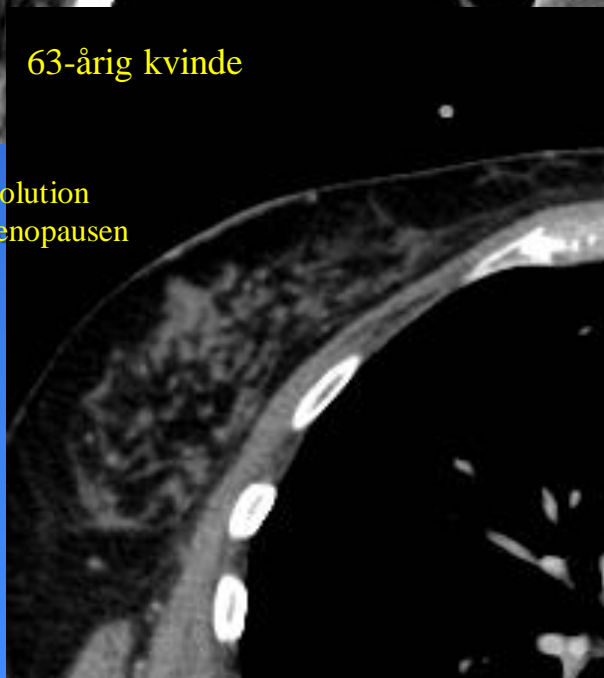
CT af thorax

26-årig kvinde



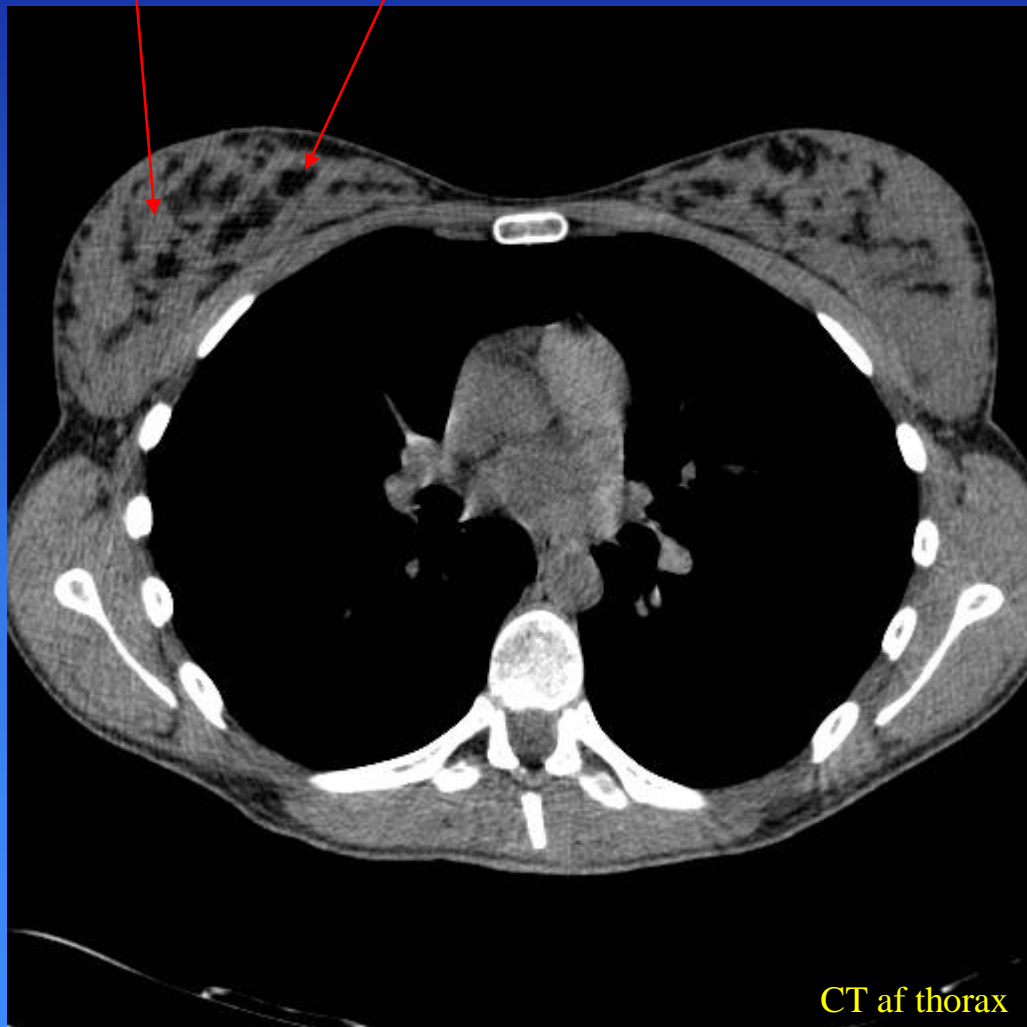
63-årig kvinde

Fedtinvolution
efter menopausen



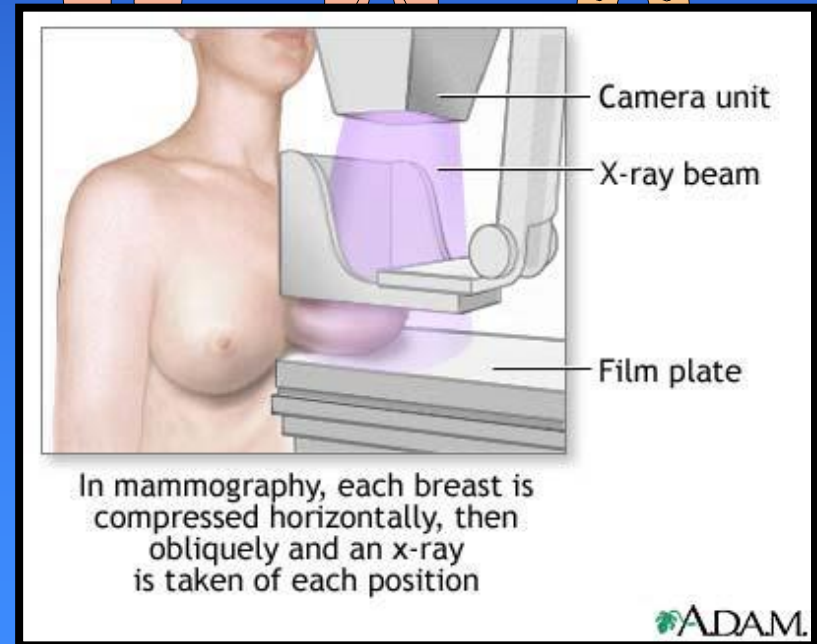
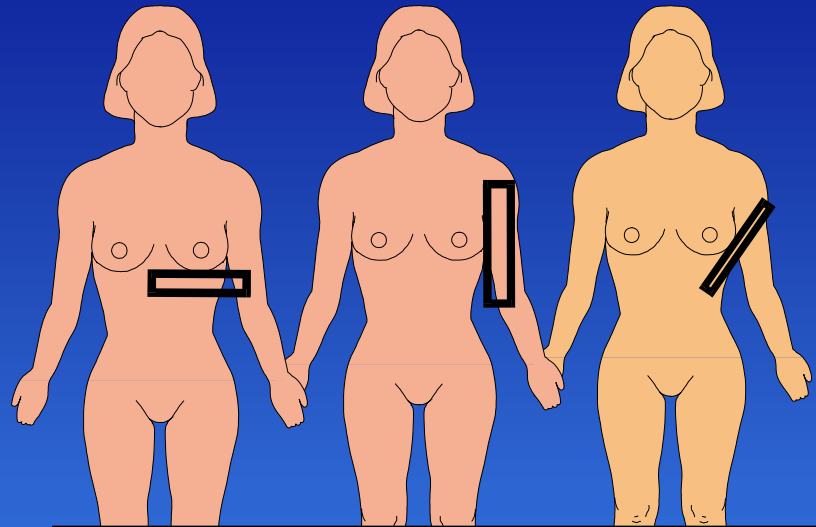
Kirtelvæv

Fedtvæv

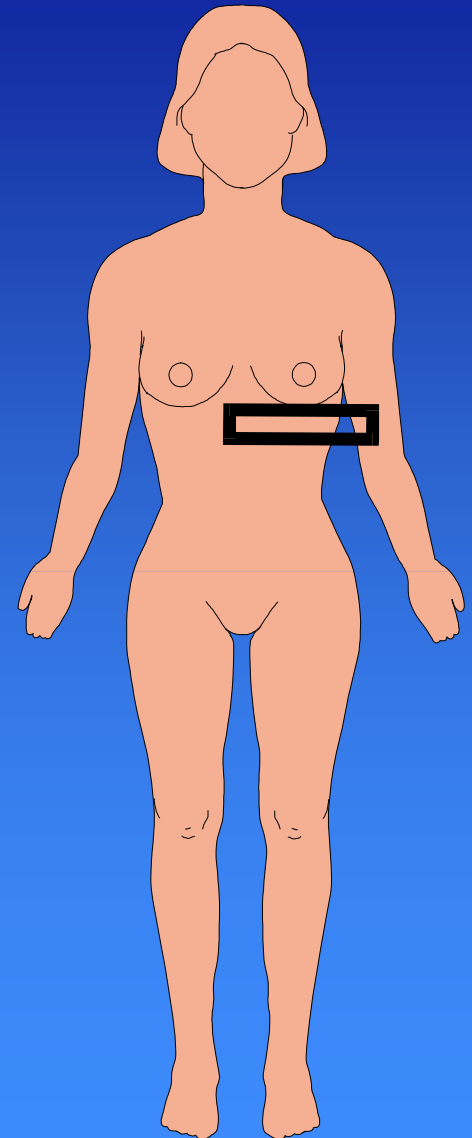
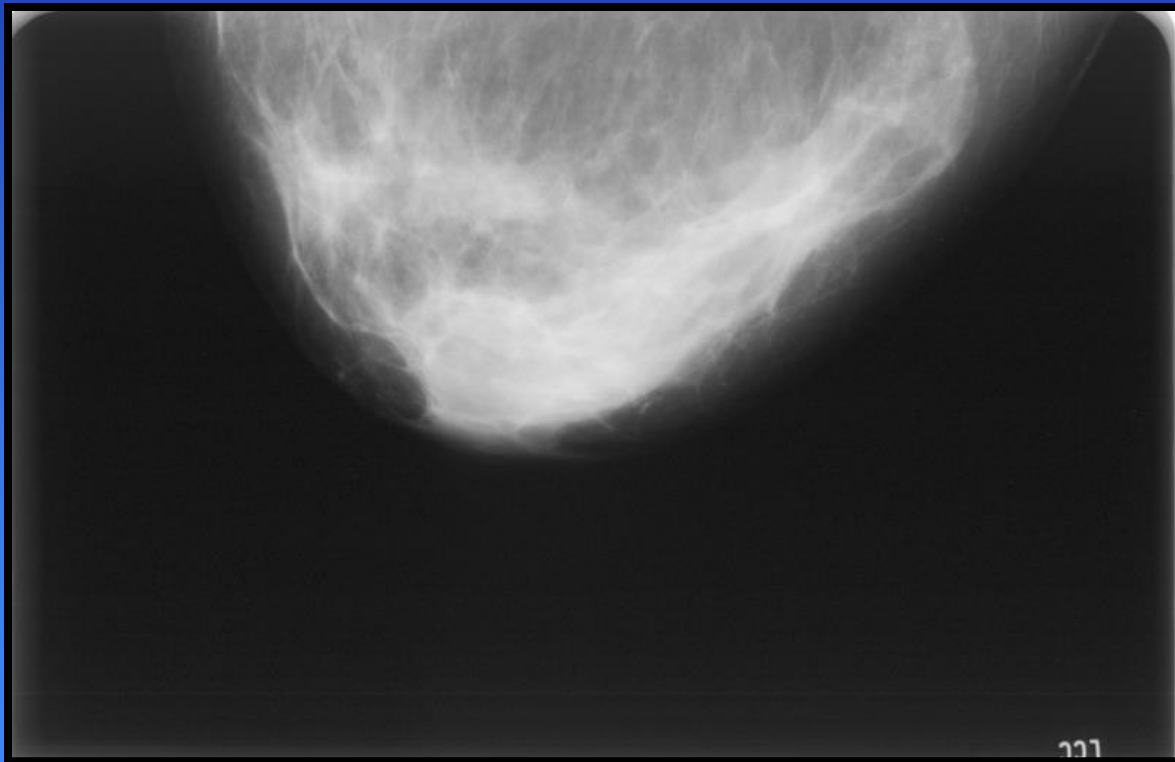


CT af thorax

Mammografi: Røntgenundersøgelse af brystet



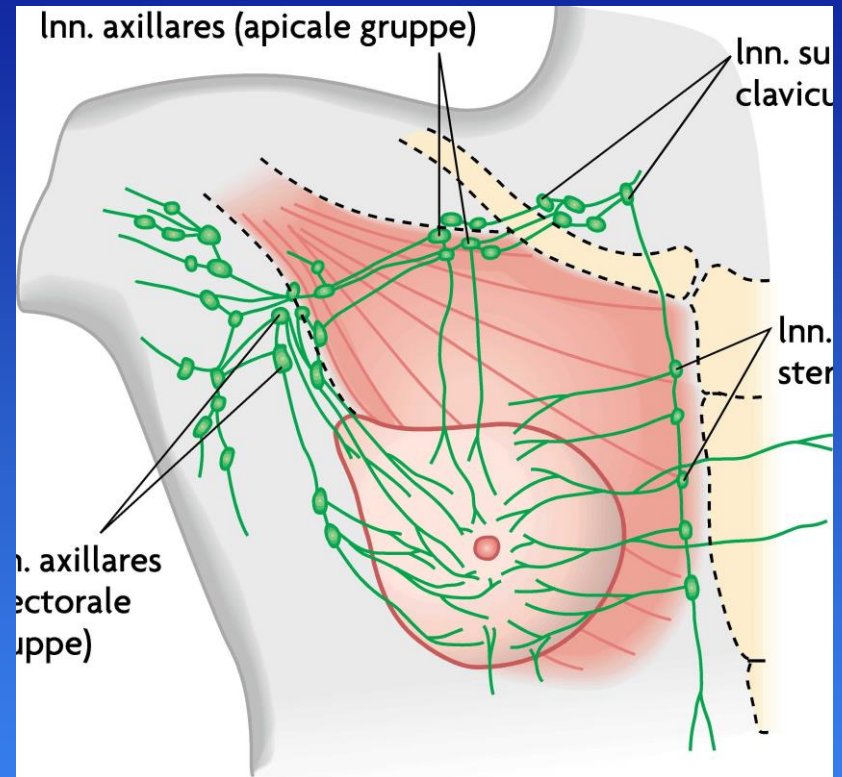
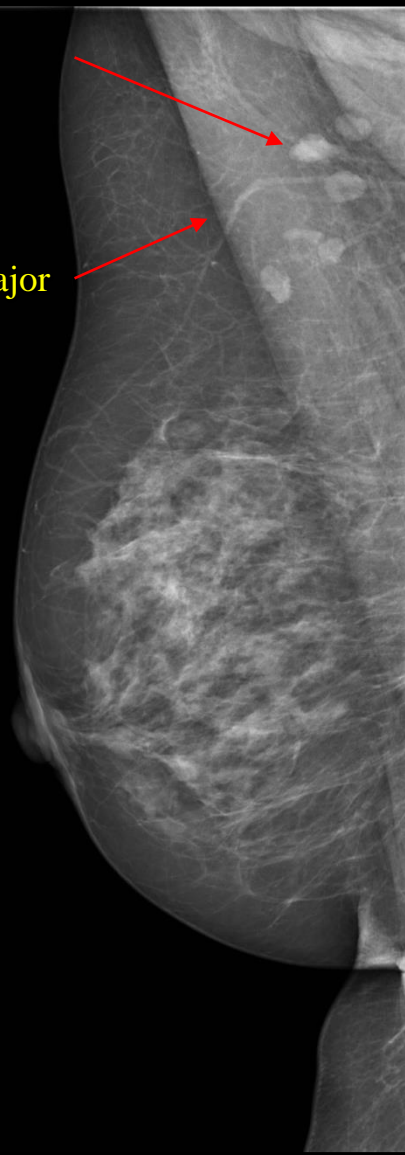
Mammografi, kvinde 40 år kraniokaudal projektion.



Mammografi, kvinde 65 år skråprojektion.

R-MLO

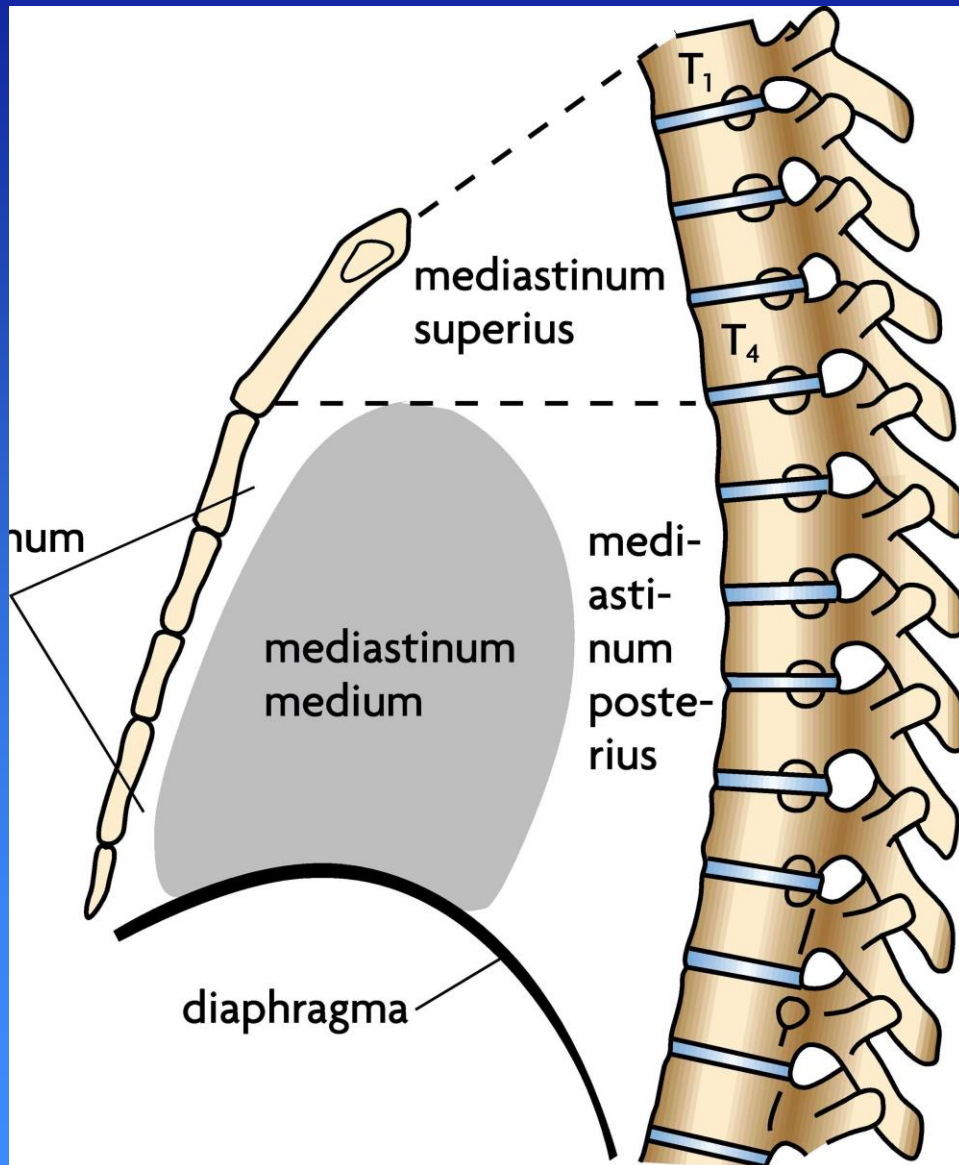
M. pectoralis major



Lnn. axillares (pectorale gruppe -> centrale, laterale, subscapulære og apikale gruppe) 75 % af drænagen
Lnn. parasternalis
Lnn. infraclaviculares
Drænage kaudalt og videre til peritoneum parietale

Mediastinum

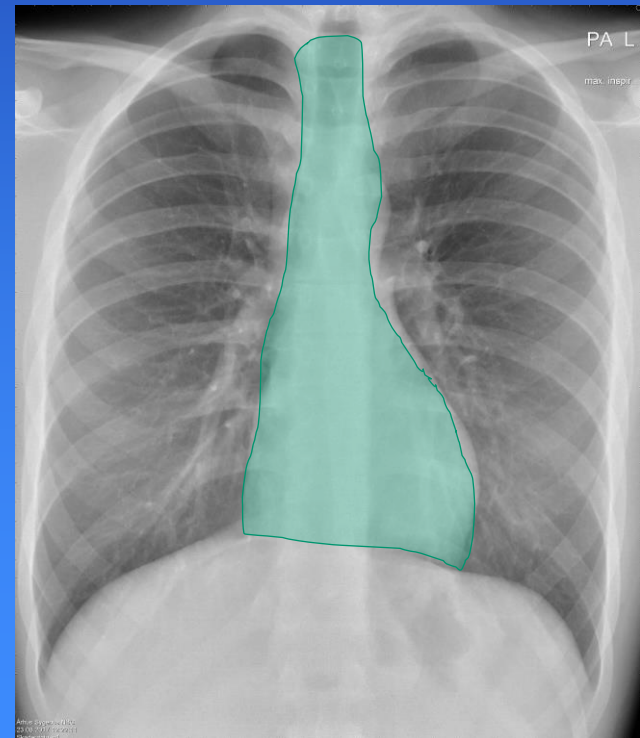
Mediastinum: Brystskillevæggen.



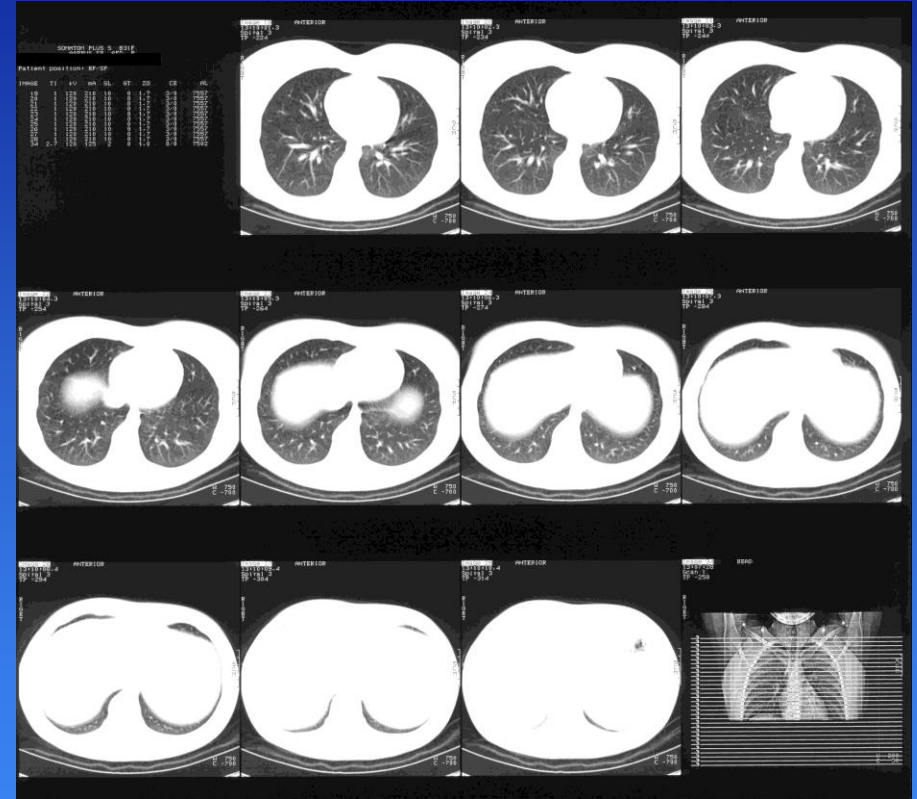
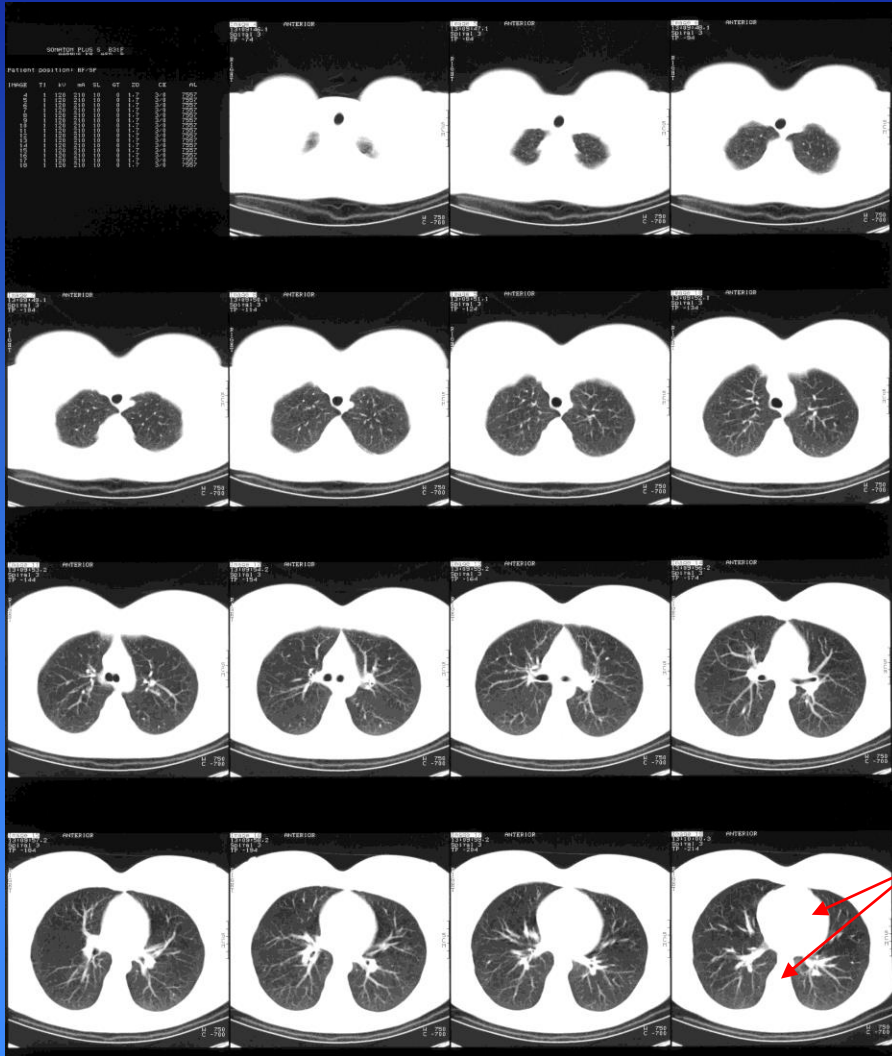
Mediastinum superius

Mediastinum inferius

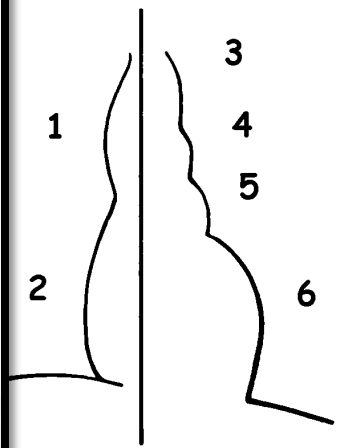
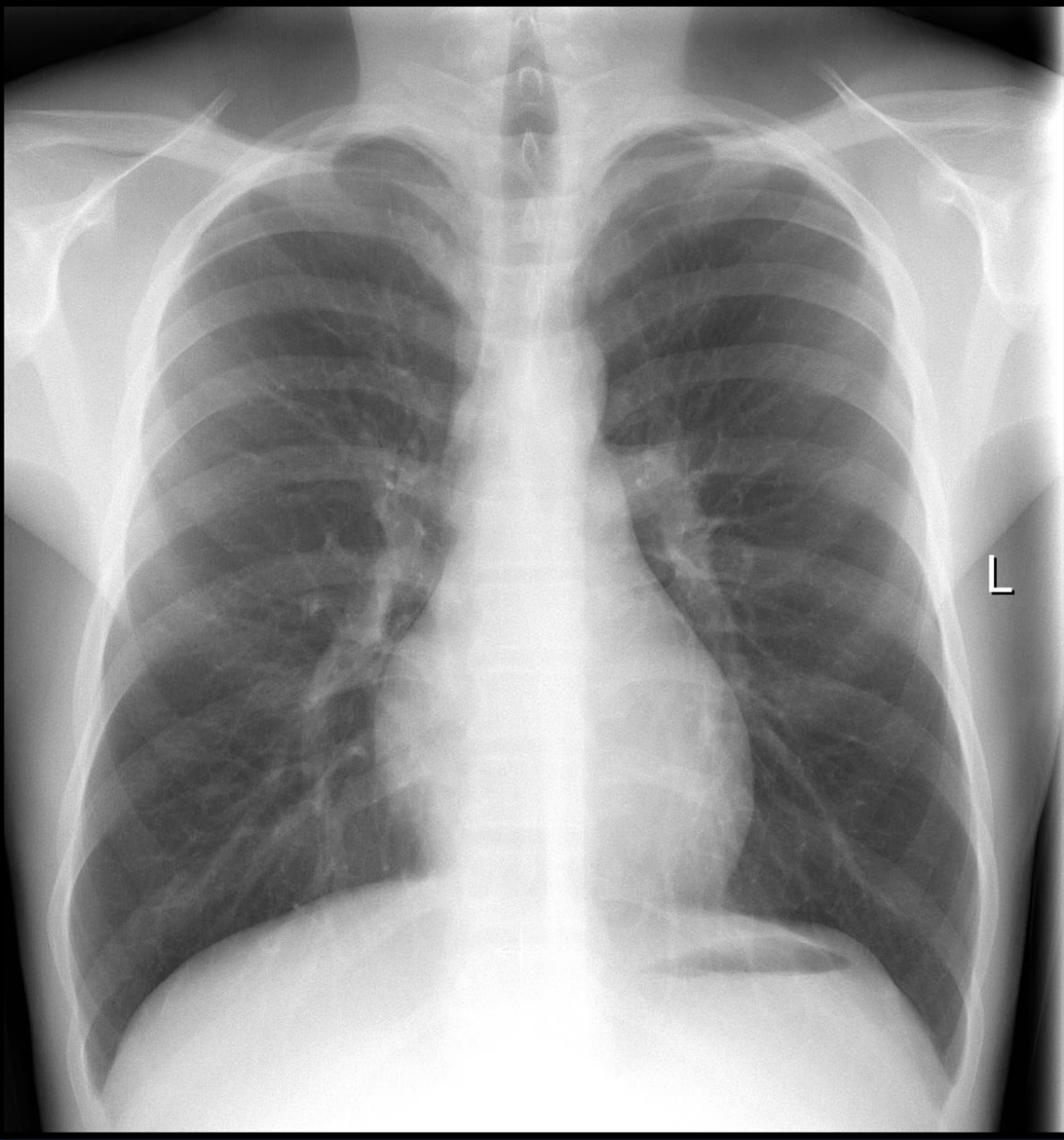
- Mediastinum anterius
- Mediastinum medium
- Mediastinum posterius



Mediastinum: CT thorax (lungevindue), yngre kvinde.

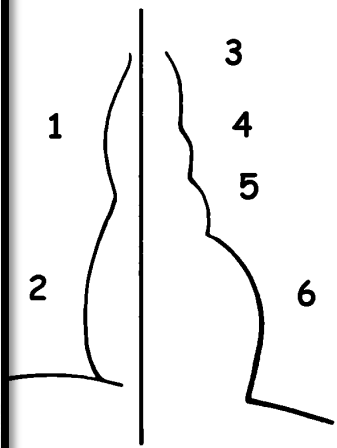
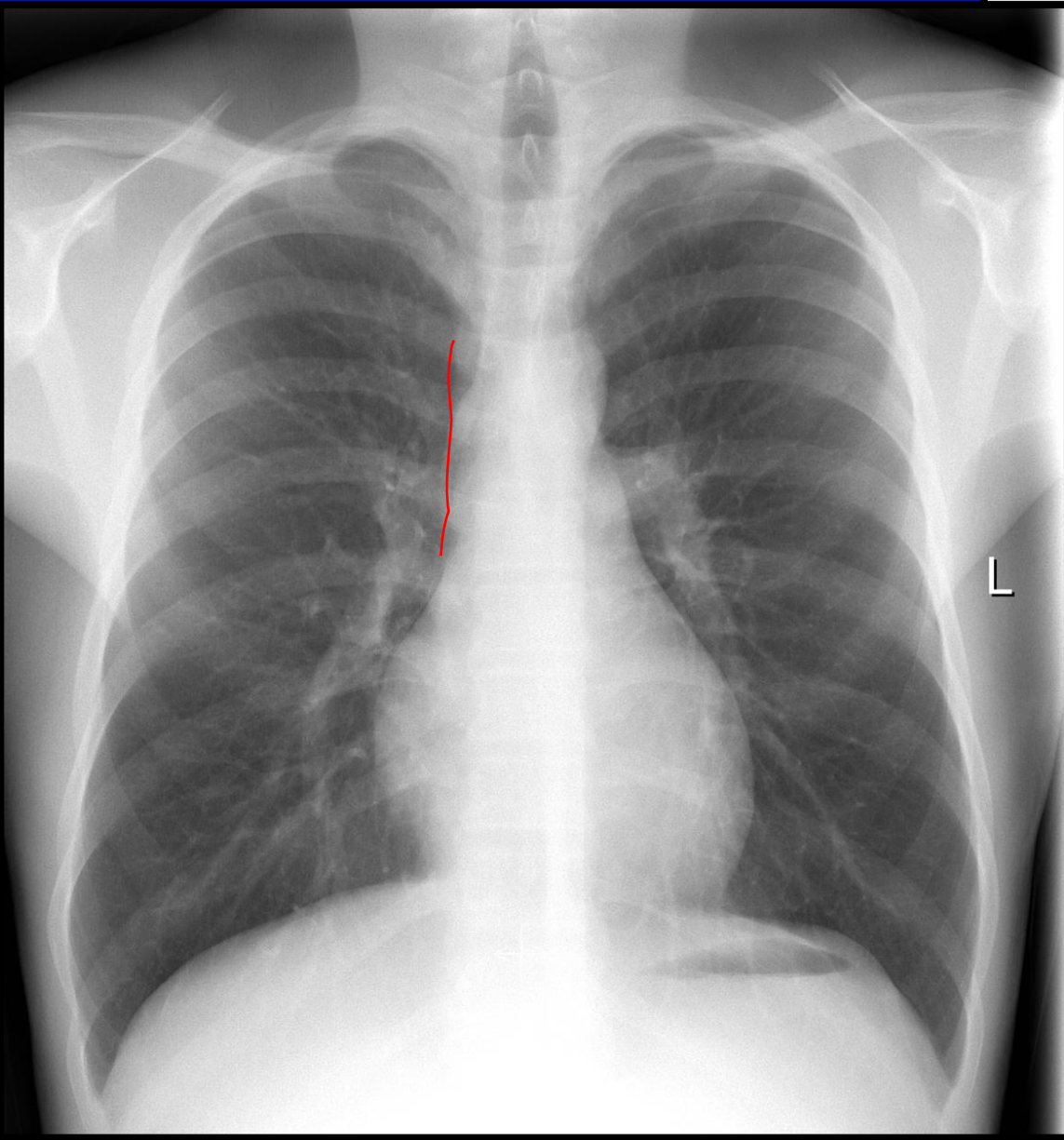


Mellem de to lungefelter ses posteriort columna og anteriort mediastinum



- Højre side:
1 V. cava superior
2 Højre atrium
- Venstre side:
3 Aortabuon
4 Truncus pulmonalis
5 Venstre atrium
6 Venstre ventrikel

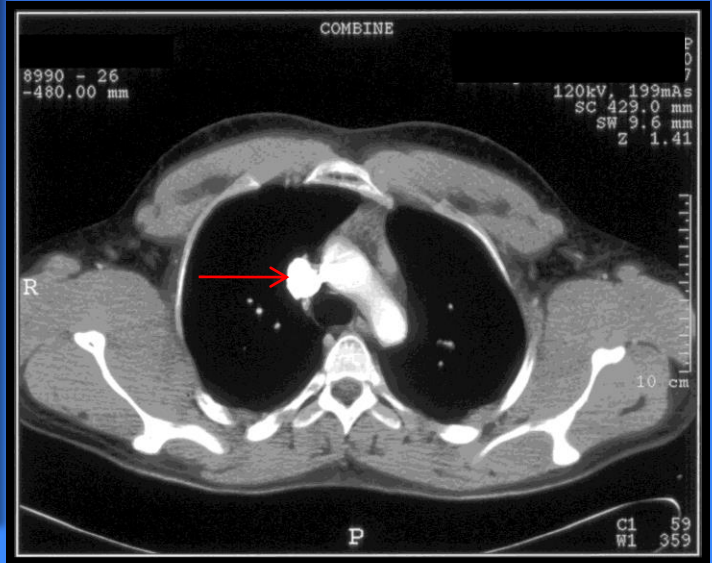
Andreasen

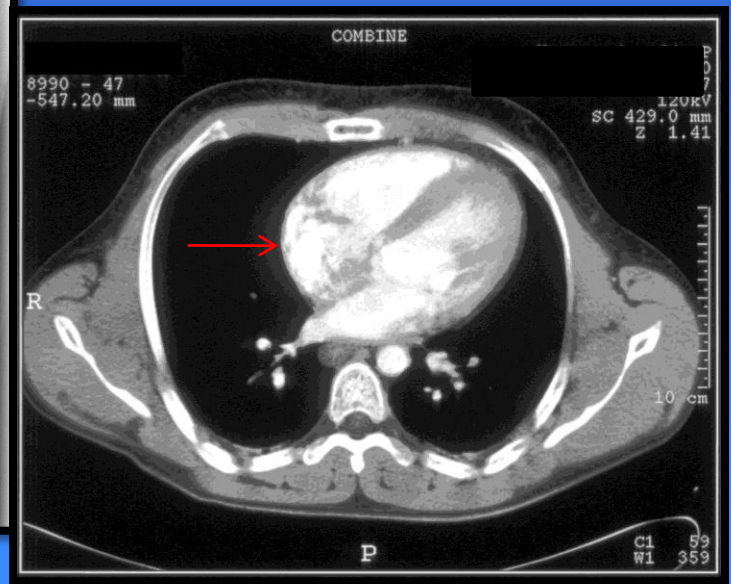
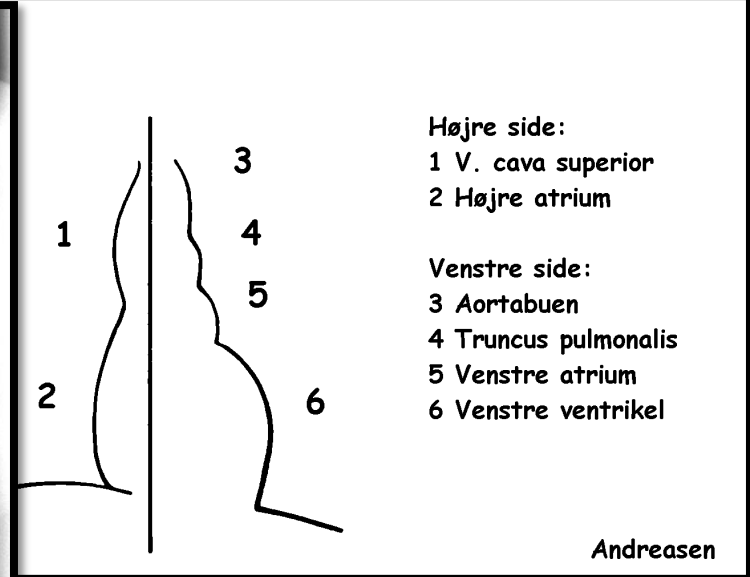
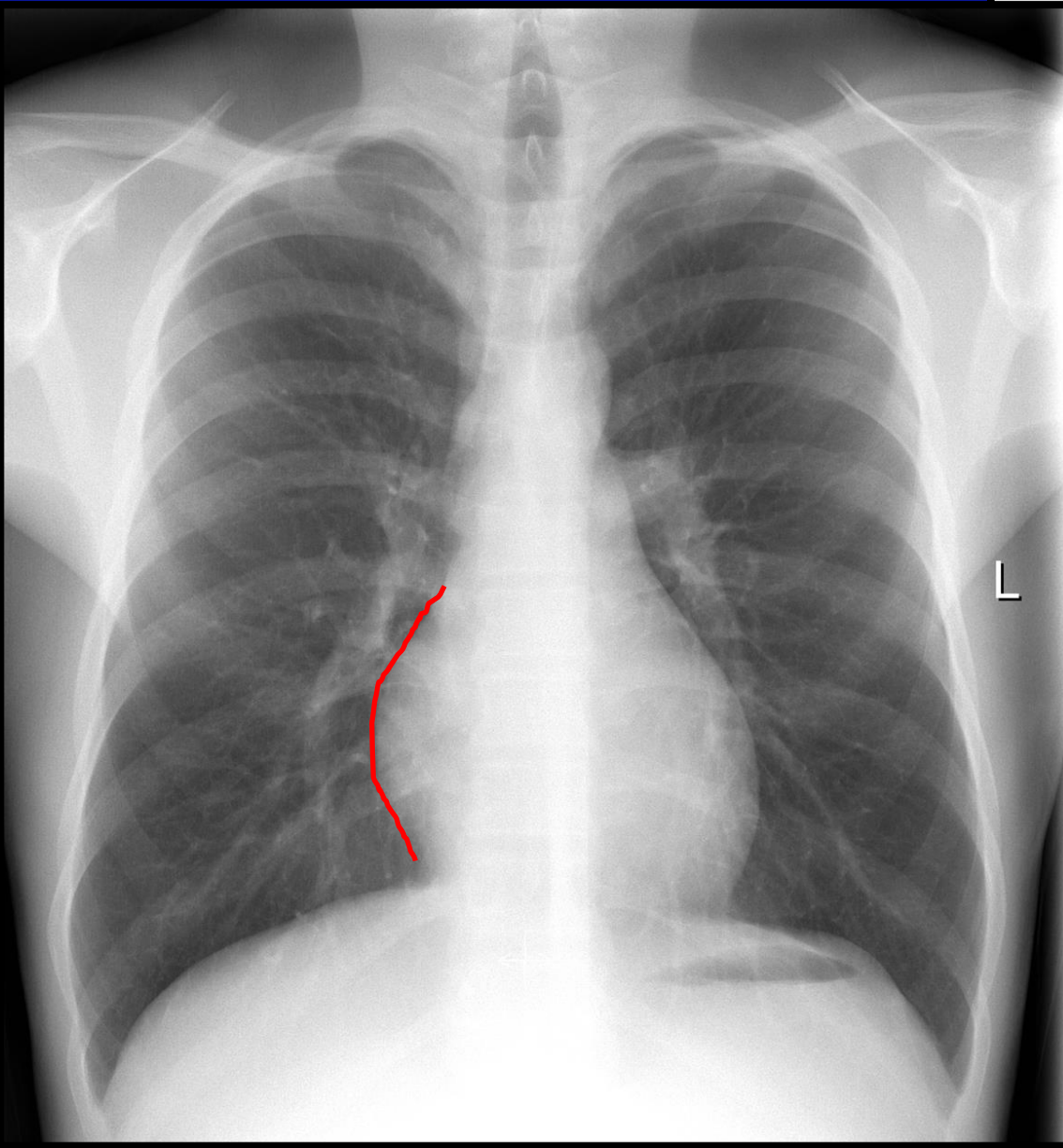


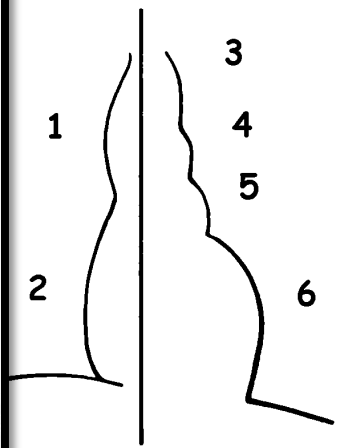
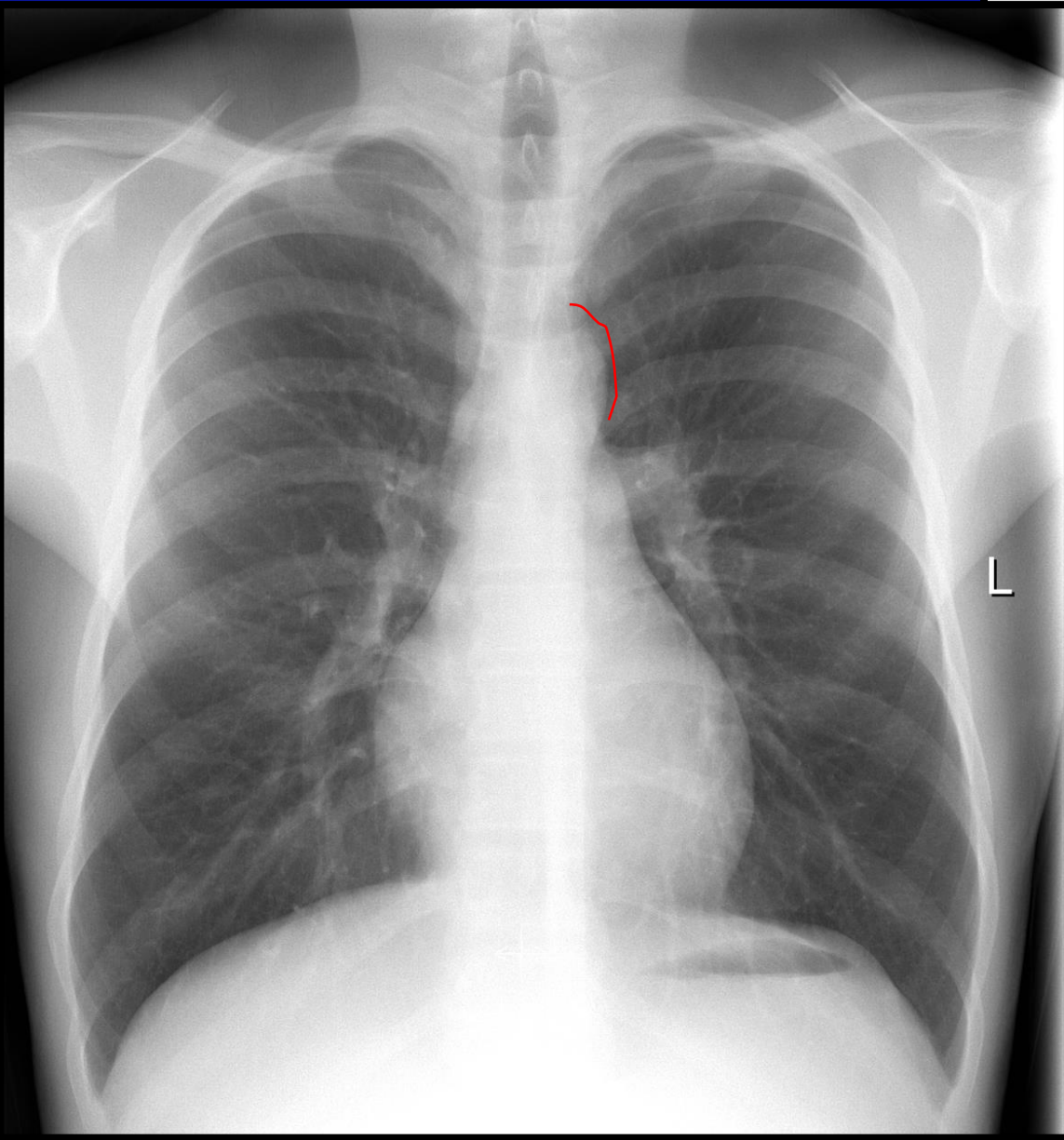
Højre side:
1 V. cava superior
2 Højre atrium

Venstre side:
3 Aortabuven
4 Truncus pulmonalis
5 Venstre atrium
6 Venstre ventrikel

Andreasen

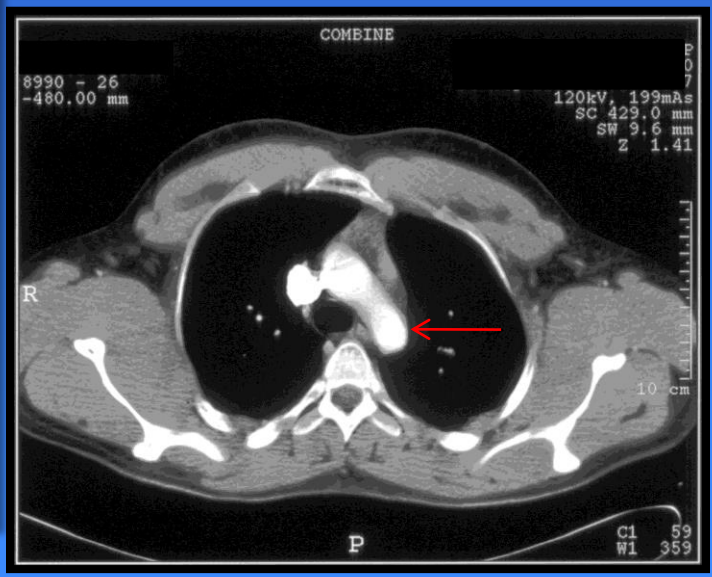






- Højre side:
1 V. cava superior
2 Højre atrium
- Venstre side:
3 Aortabuen
4 Truncus pulmonalis
5 Venstre atrium
6 Venstre ventrikel

Andreasen



6990 - 26
-480.00 mm

COMBINE

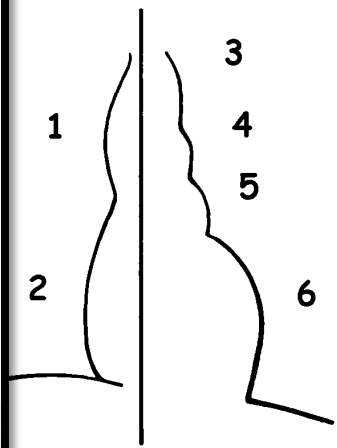
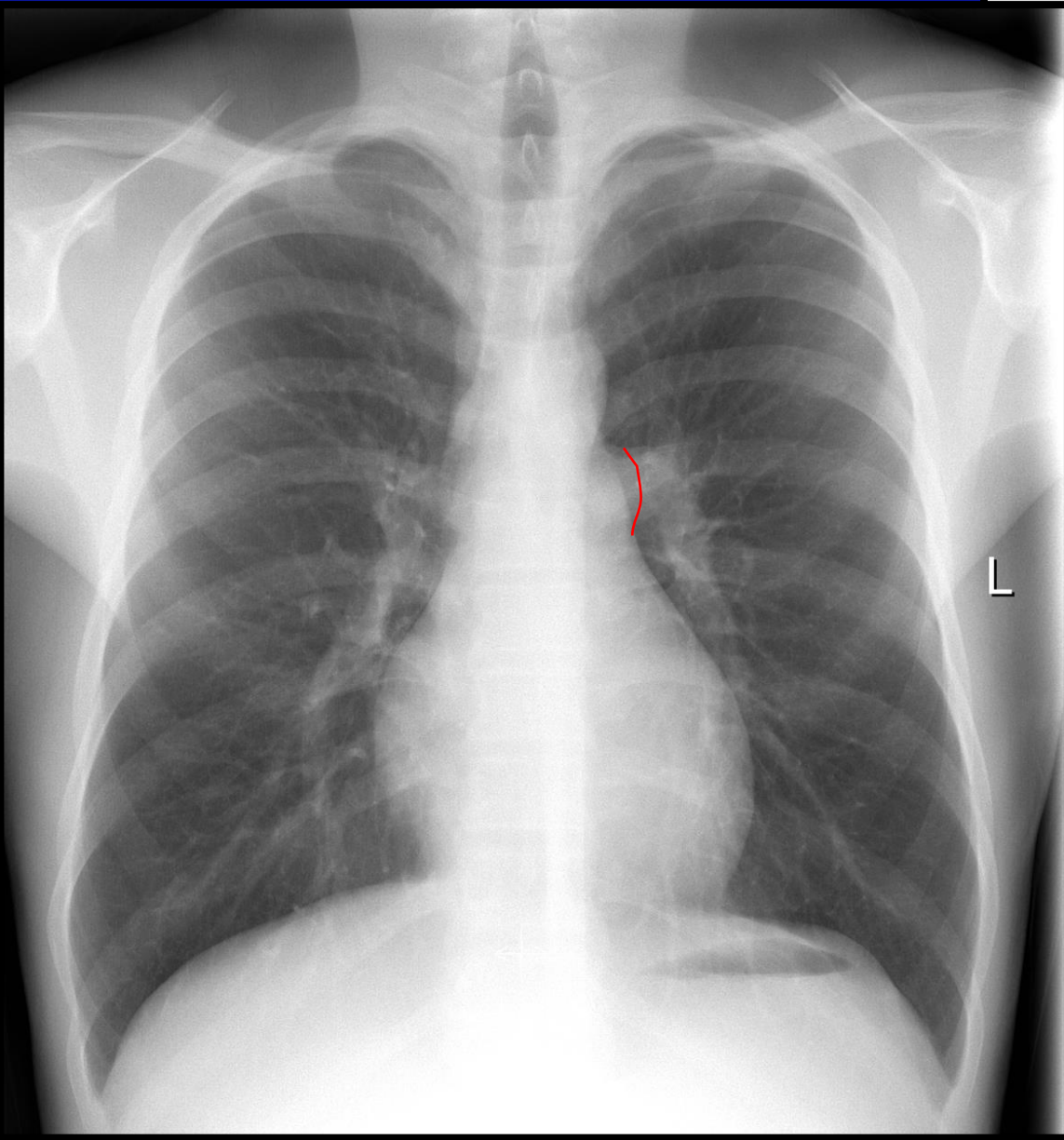
120kV, 199mAs
SC 429.0 mm
SW 9.6 mm
Z 1.41

R

10 cm

P

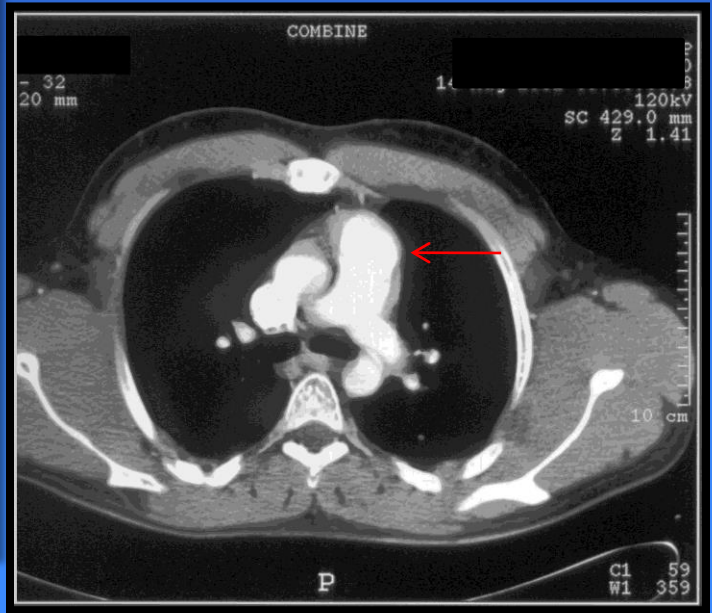
C1 59
W1 359

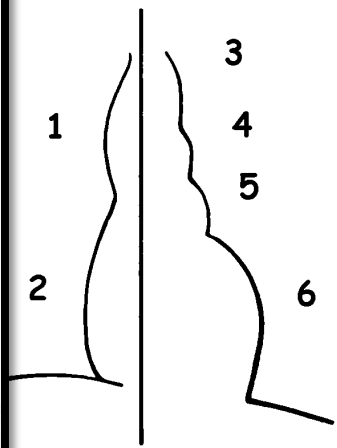
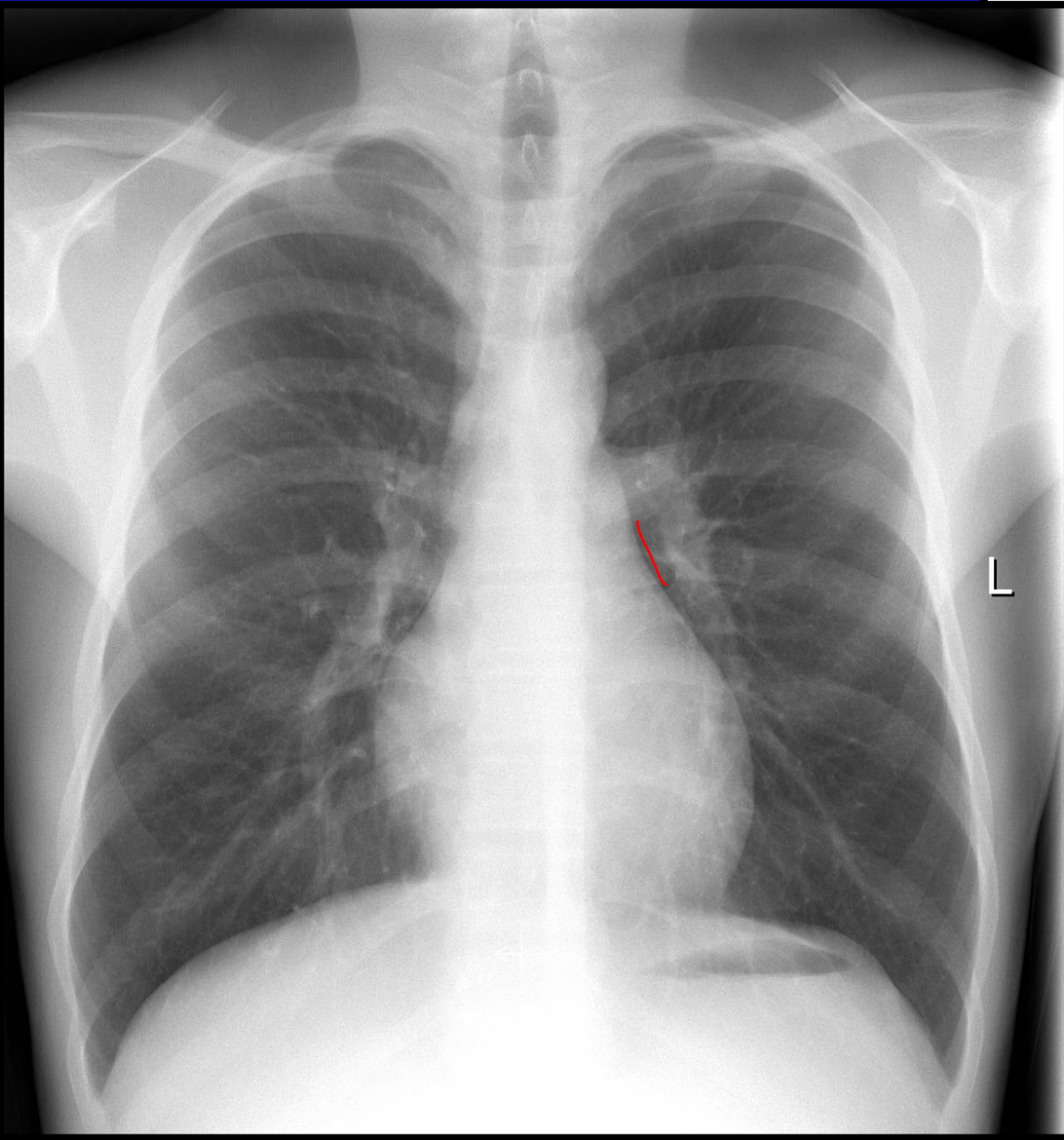


Højre side:
1 V. cava superior
2 Højre atrium

Venstre side:
3 Aortabuven
4 Truncus pulmonalis
5 Venstre atrium
6 Venstre ventrikel

Andreasen

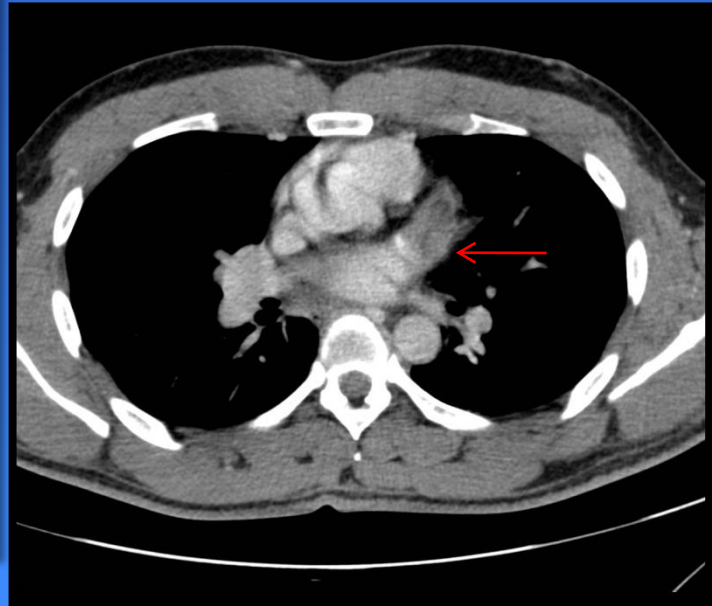


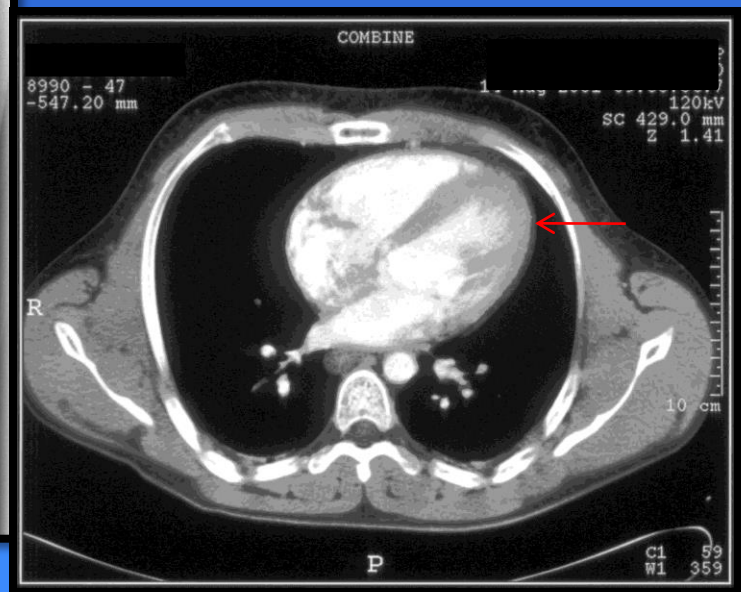
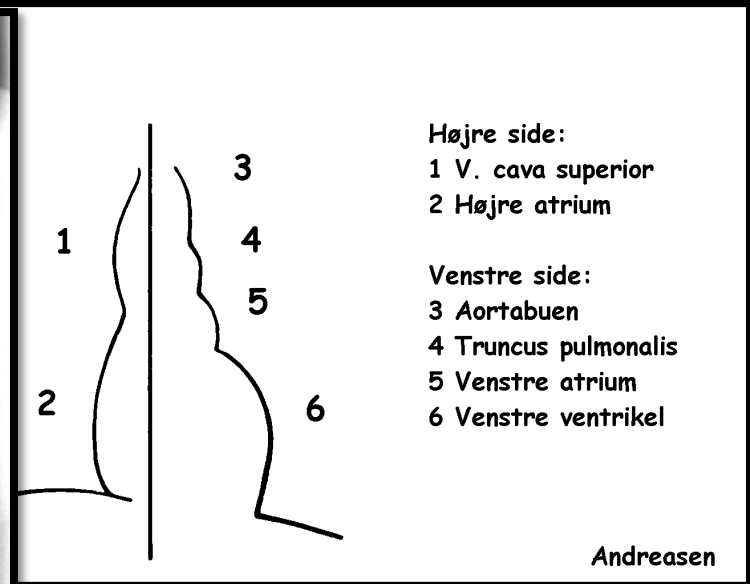
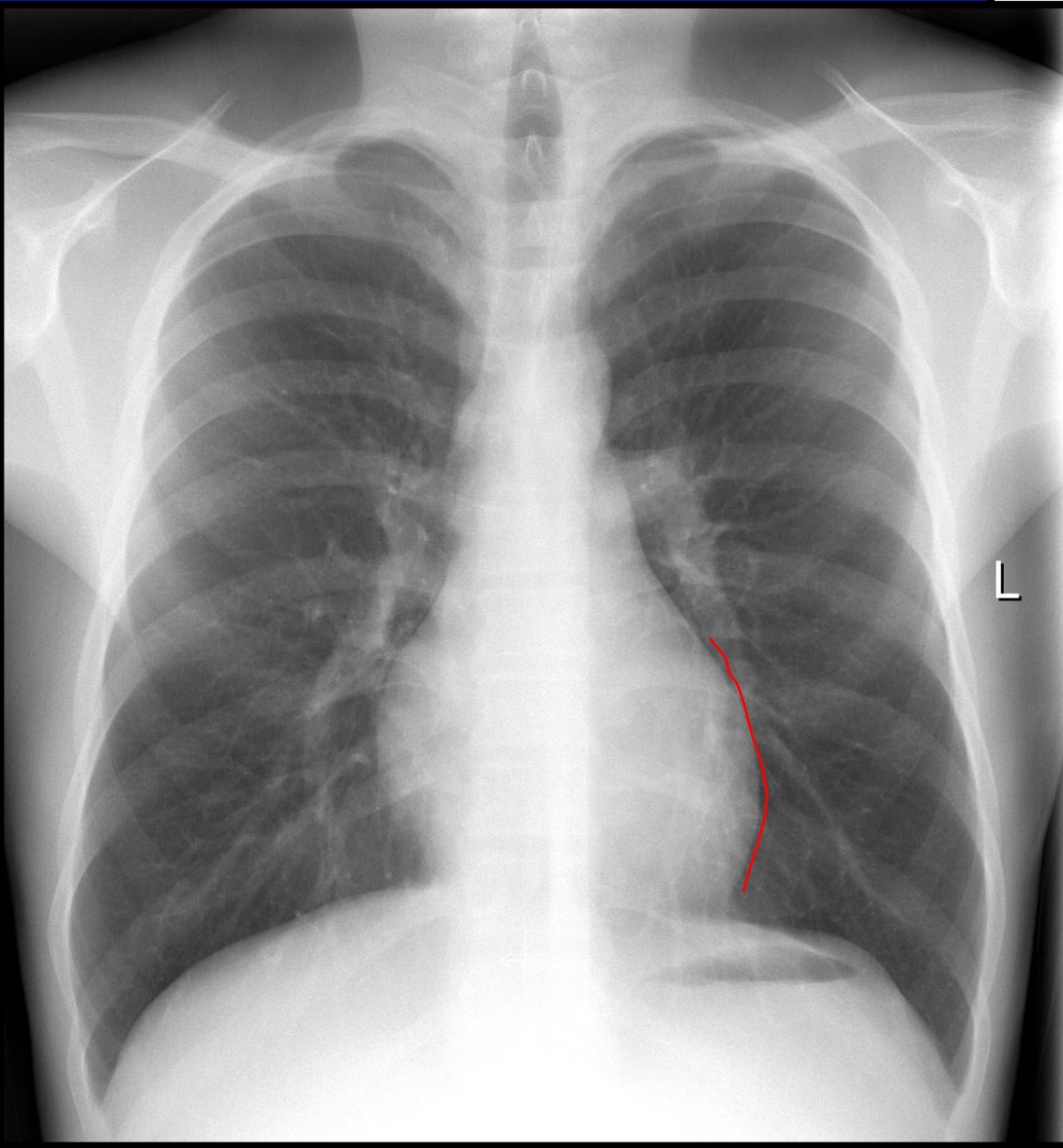


Højre side:
1 V. cava superior
2 Højre atrium

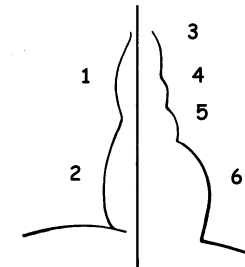
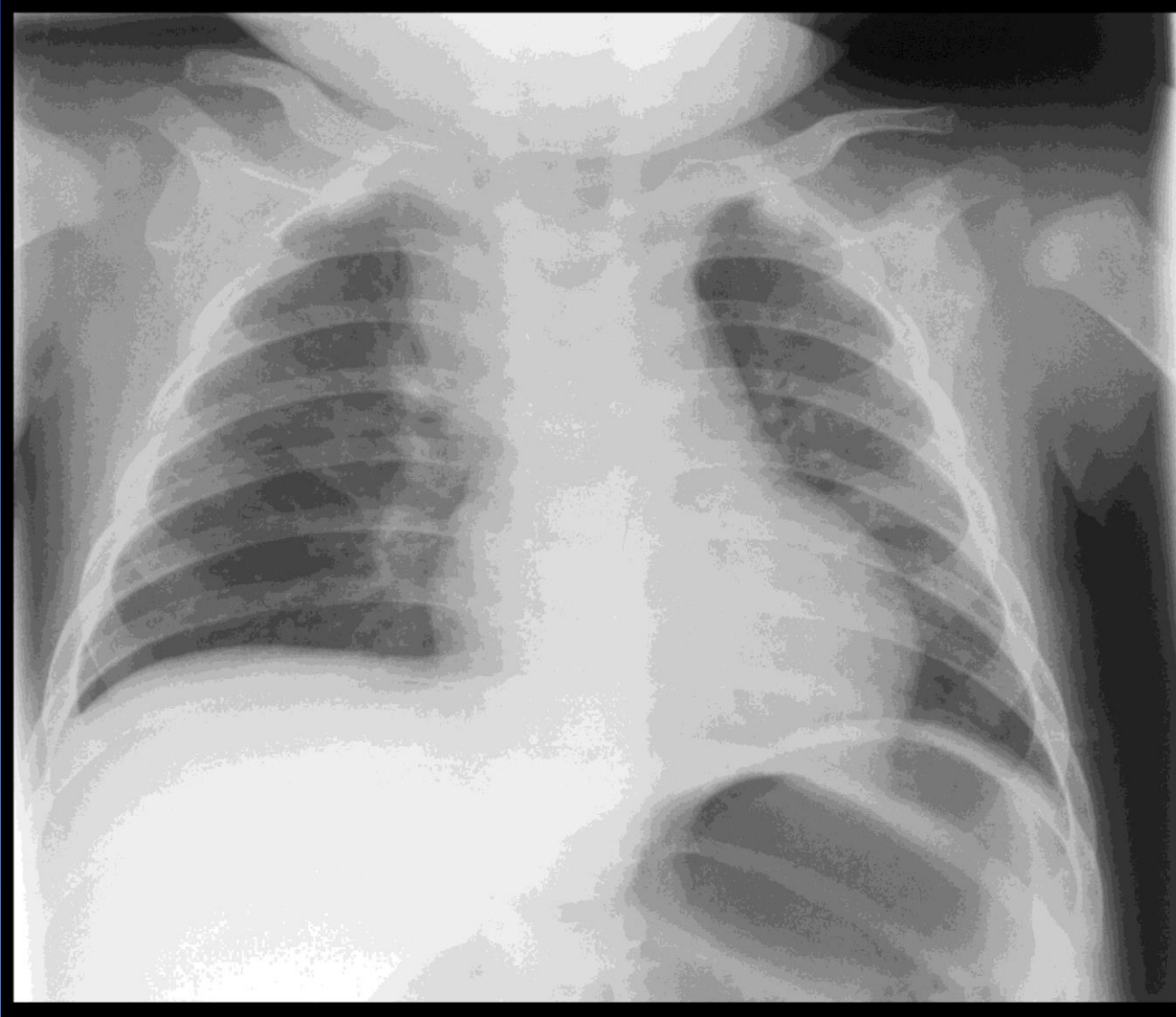
Venstre side:
3 Aortabuen
4 Truncus pulmonalis
5 Venstre atrium
6 Venstre ventrikel

Andreasen





Liggende røntgen af thorax, barn 11 måneder gammel.

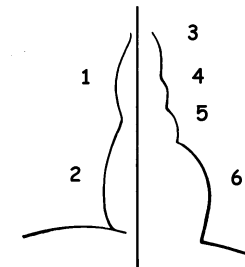
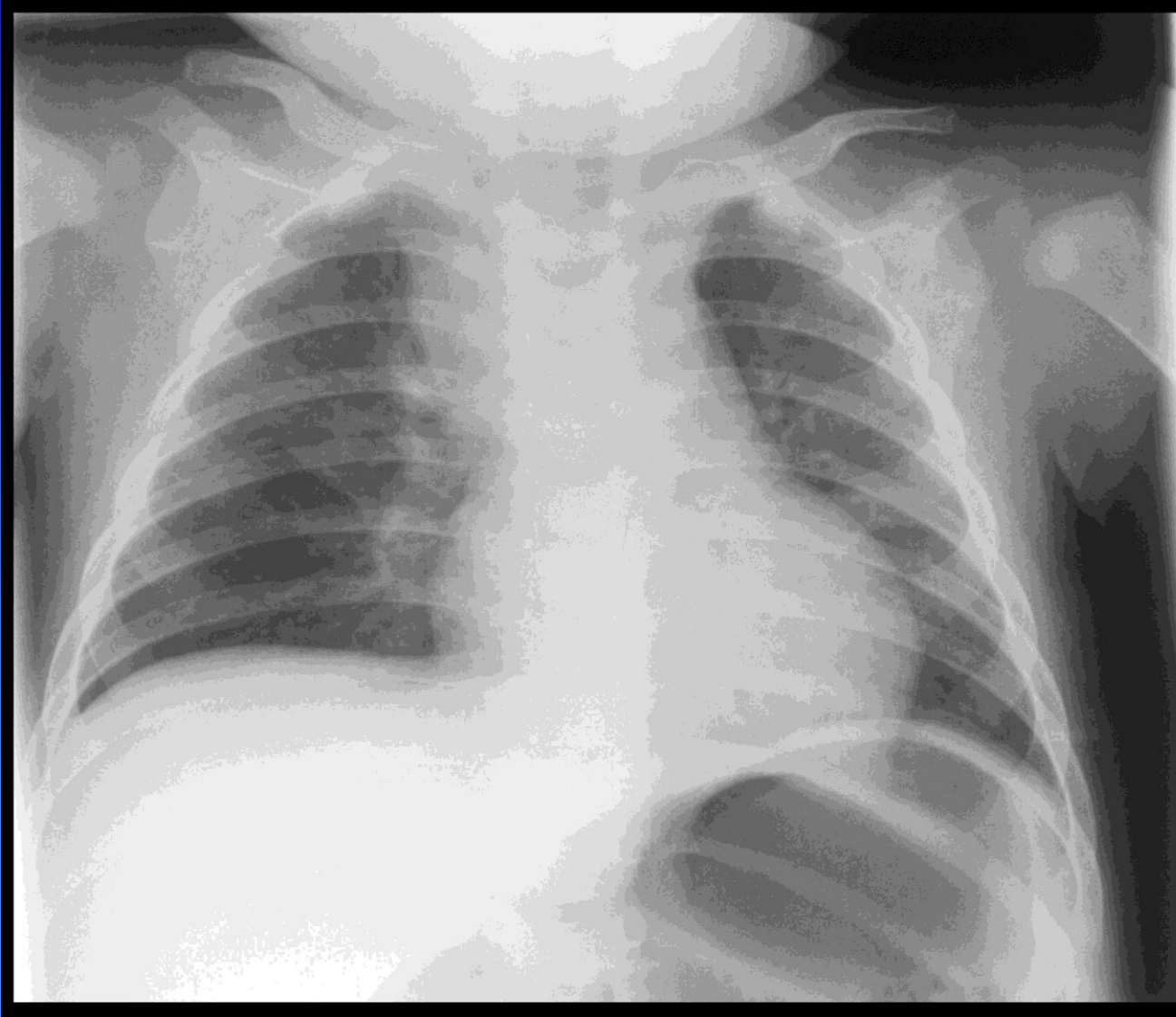


Højre side:
1 V. cava superior
2 Højre atrium

Venstre side:
3 Aortabuen
4 Truncus pulmonalis
5 Venstre atrium
6 Venstre ventrikel

Andreasen

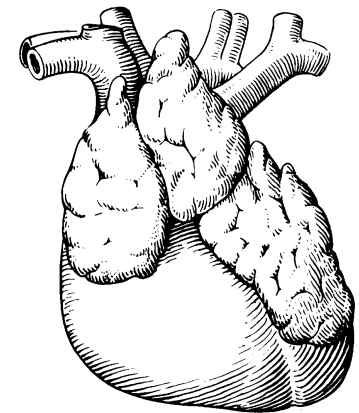
Liggende røntgen af thorax, barn 11 måneder gammel.



Højre side:
1 V. cava superior
2 Højre atrium

Venstre side:
3 Aortabuen
4 Truncus pulmonalis
5 Venstre atrium
6 Venstre ventrikel

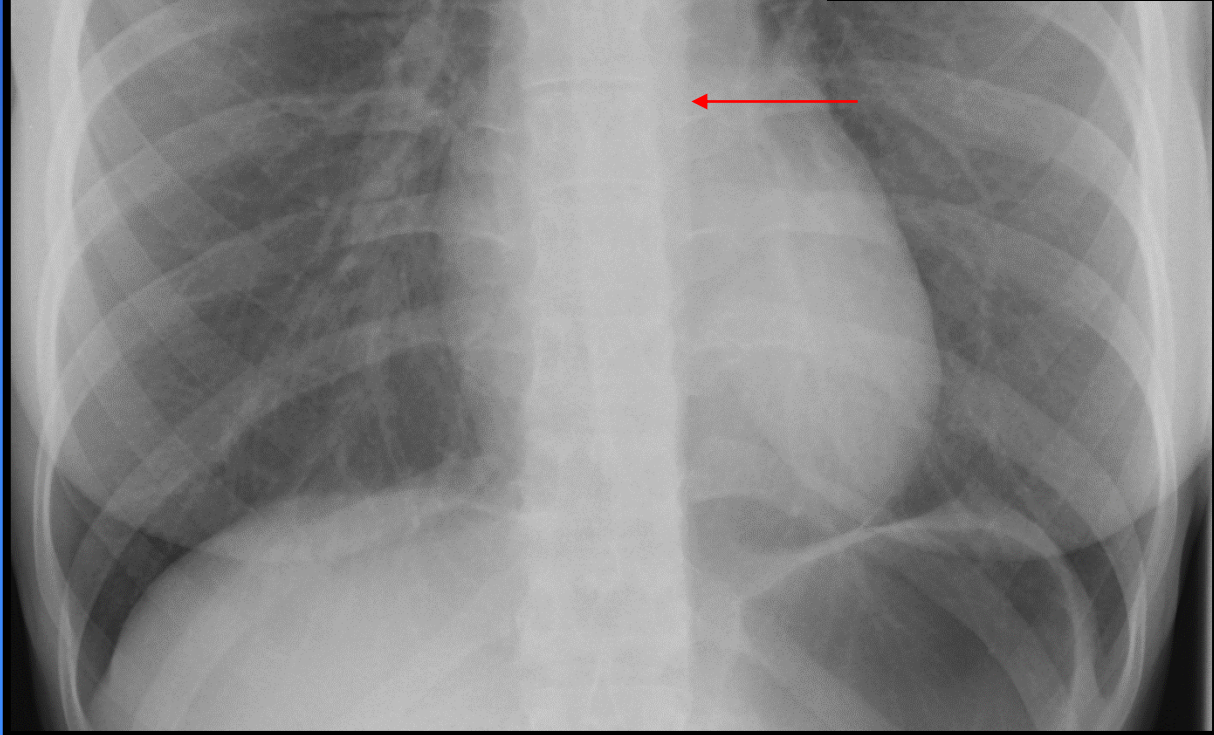
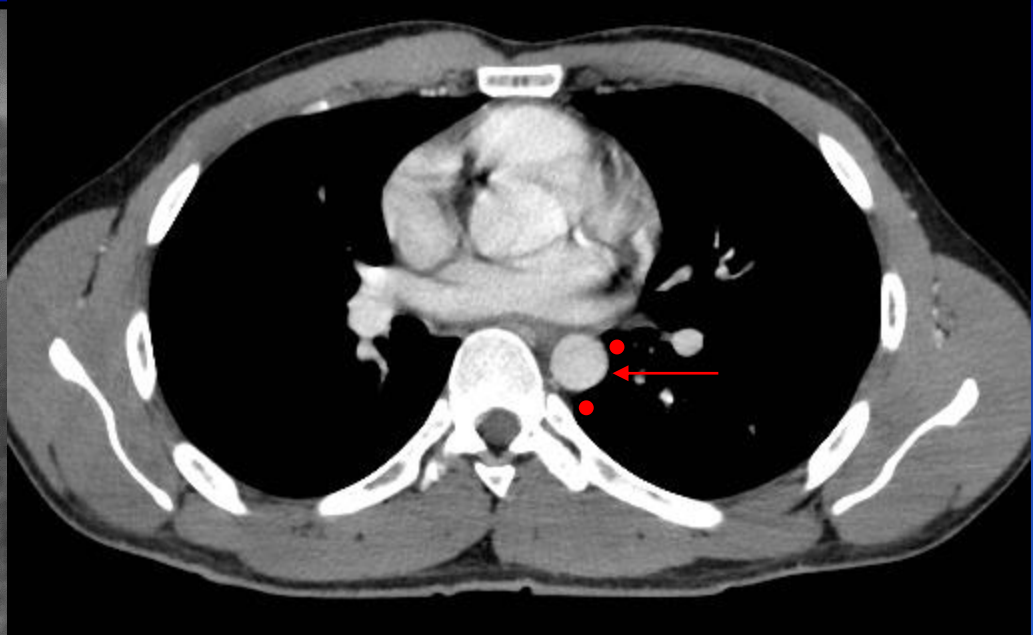
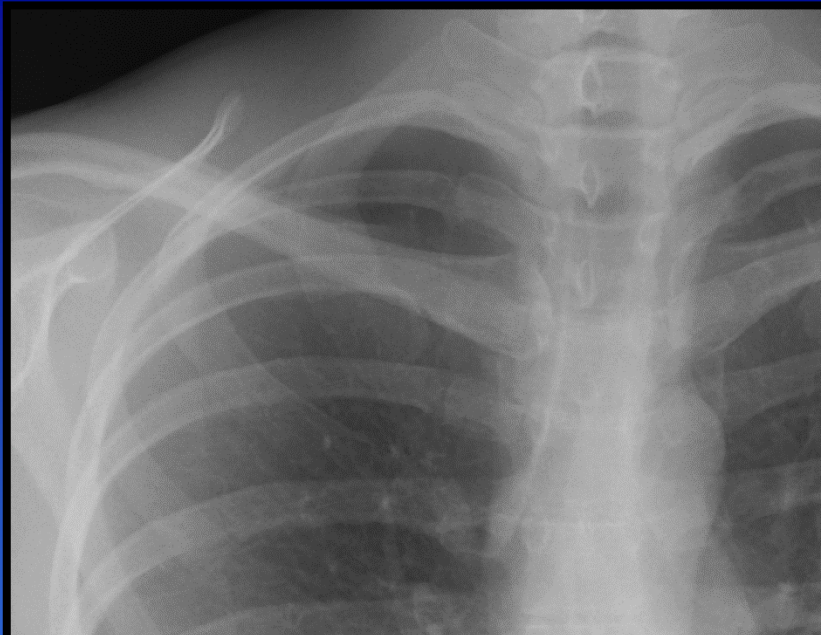
Andreasen

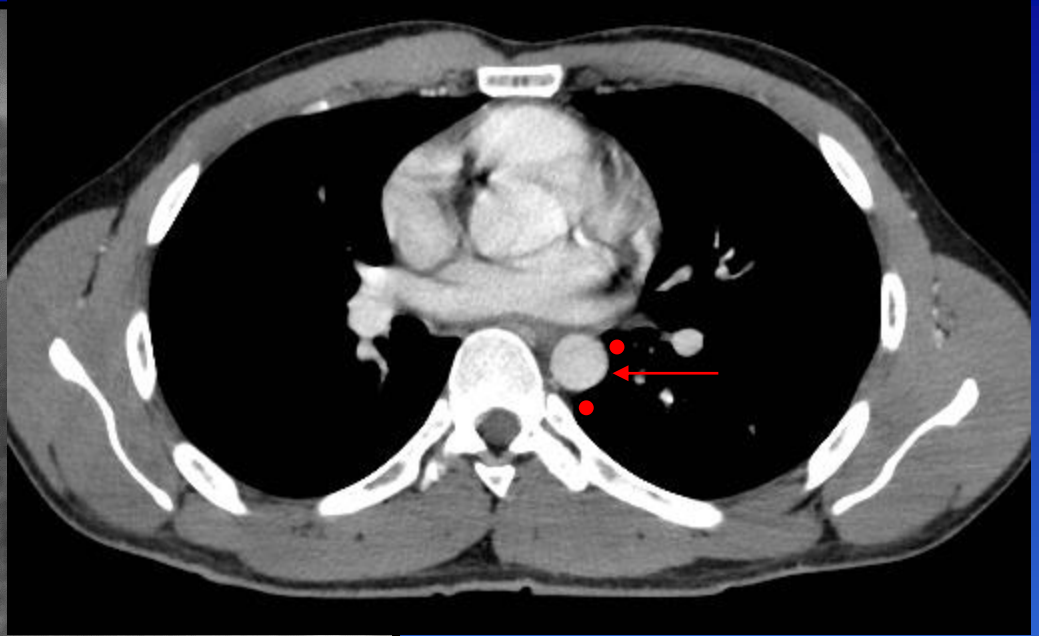
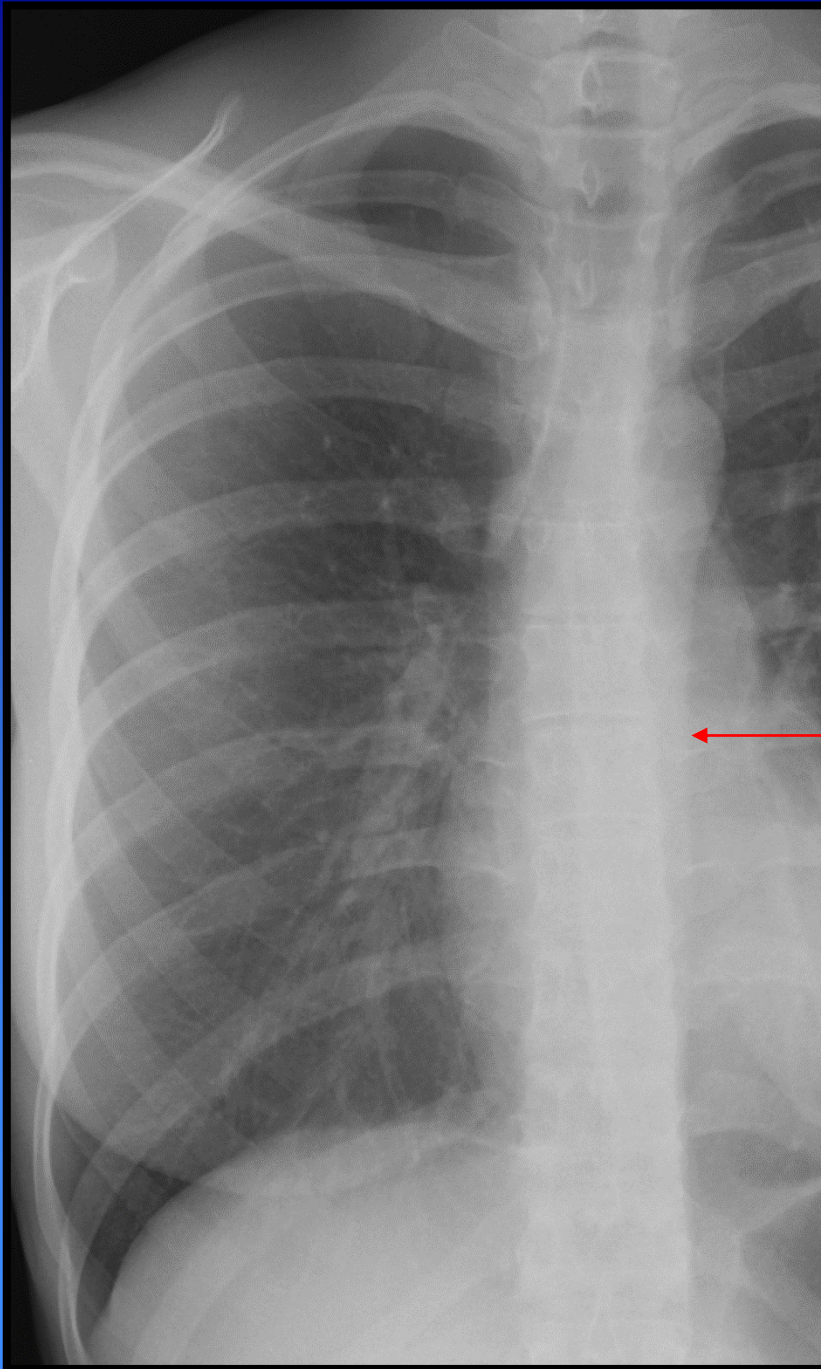


Thymus

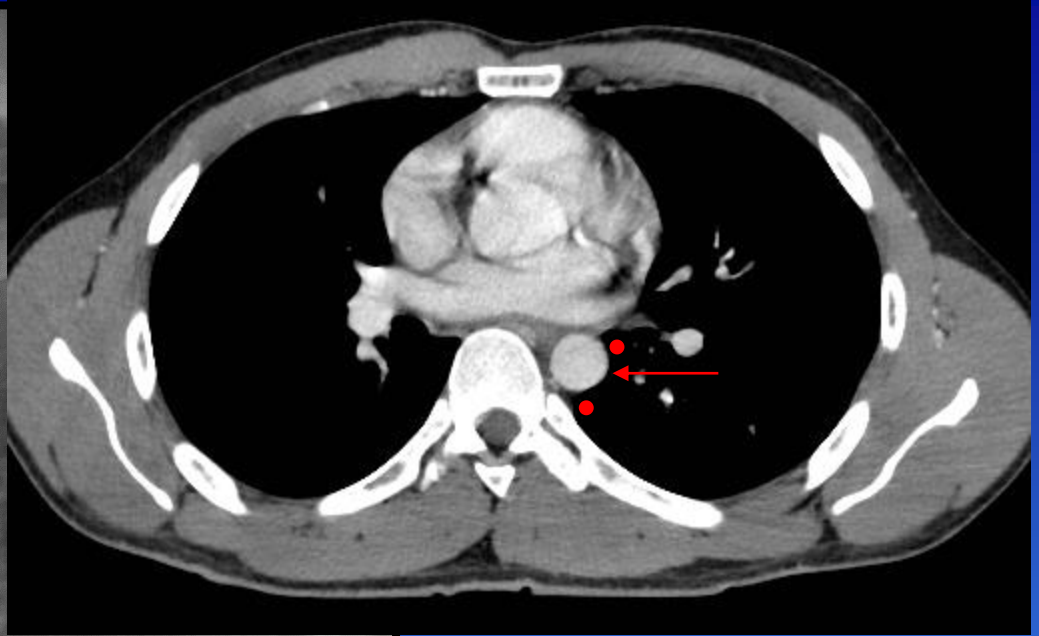
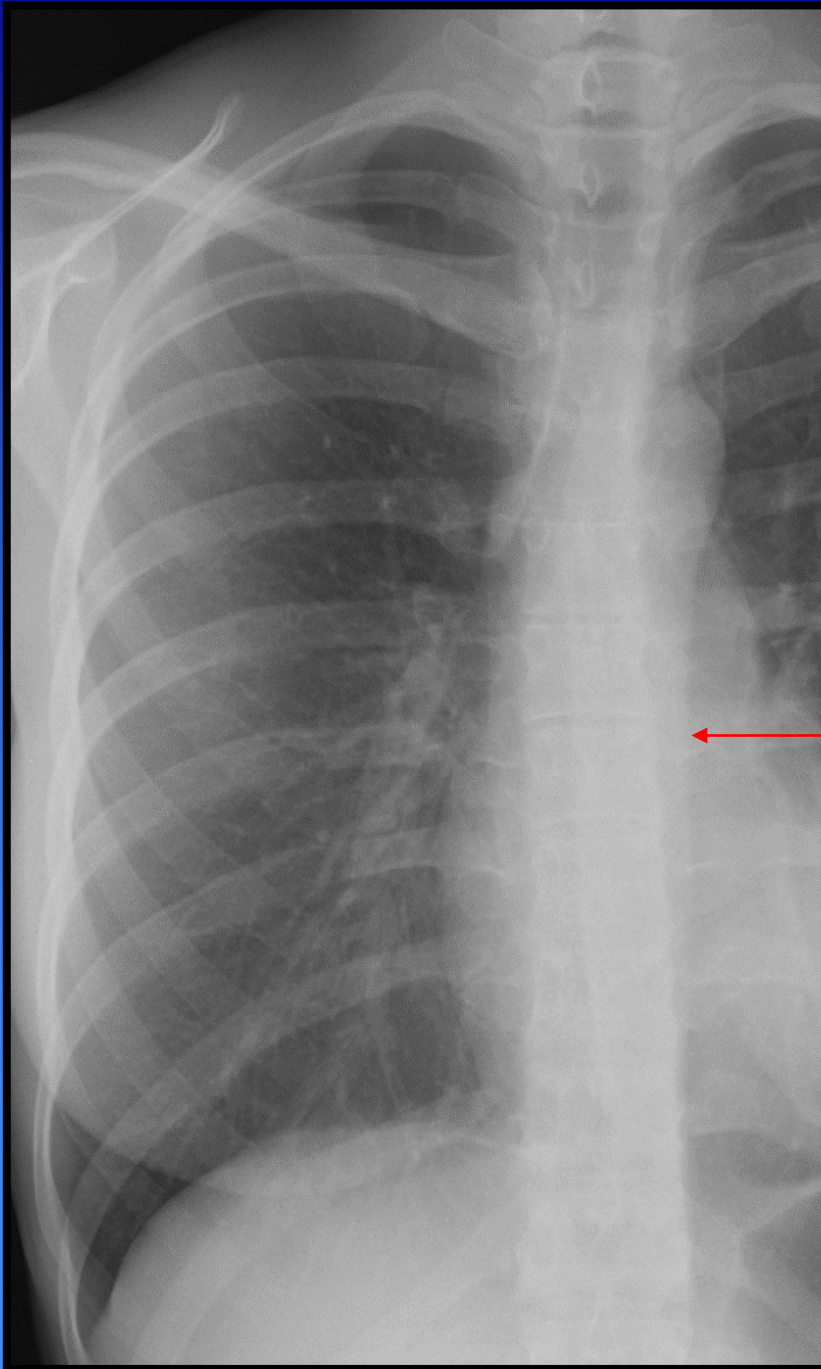
Feneis

Aorta på røntgen af thorax

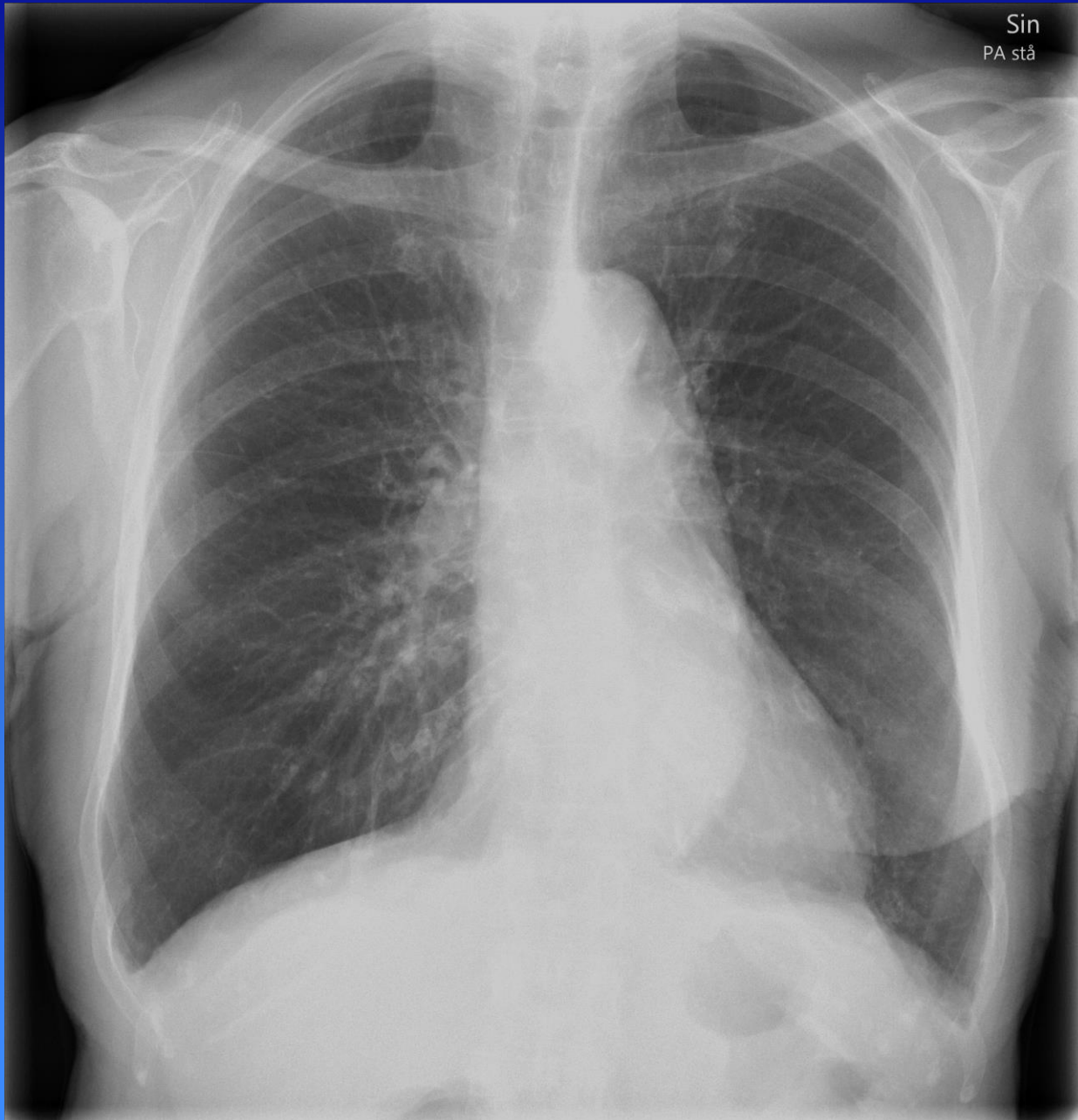




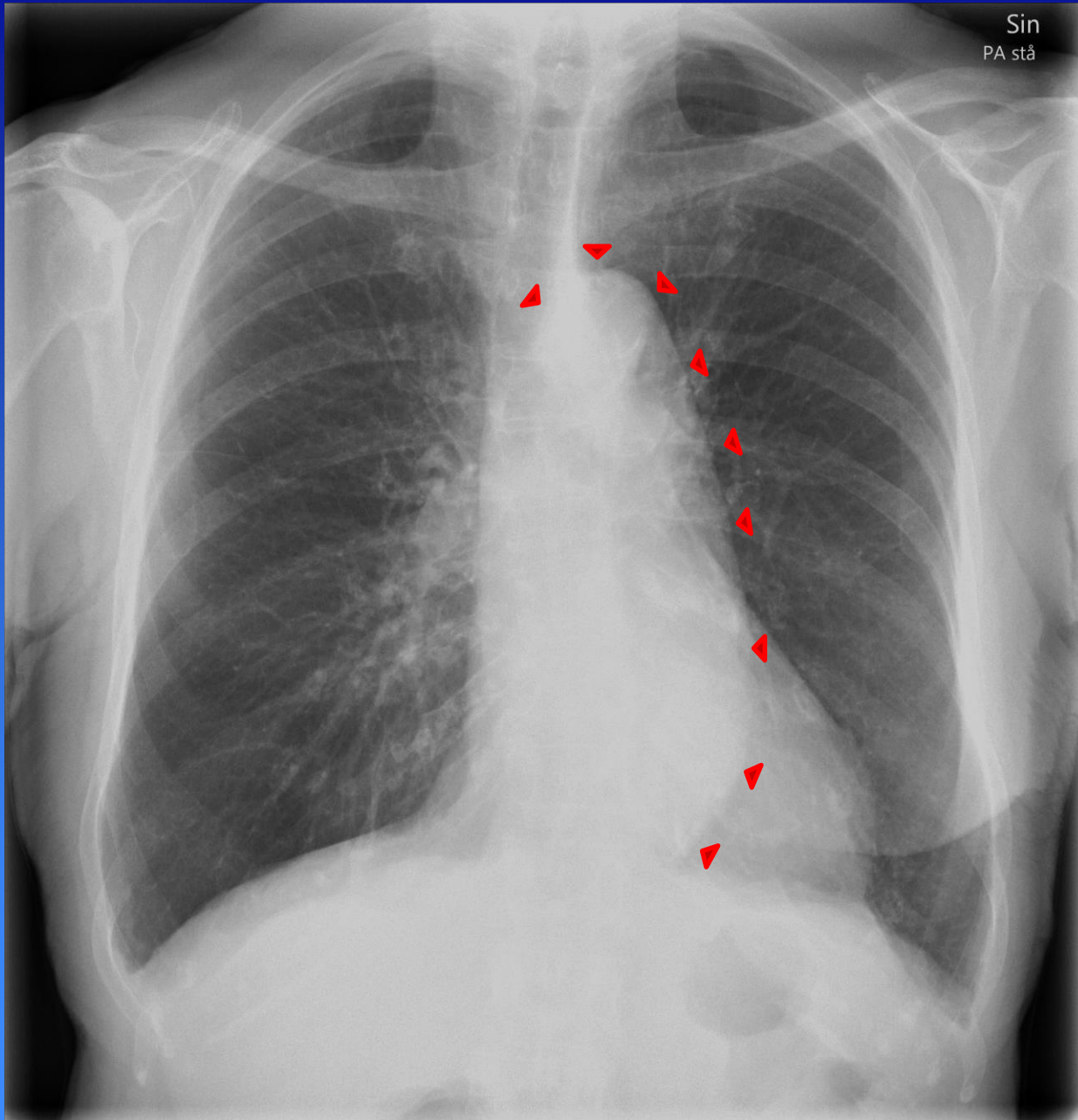
Aorta ses veldefineret lateralt, fordi der er luftfyldt lungevæv, såvel anteriort som posteriort for aorta, se CT billedet ovenfor. Er det den samme person der er undersøgt på røntgenbilledet og CT skanningen? (Svar på næste side).



Aorta ses veldefineret lateralt, fordi der er luftfyldt lungevæv, såvel anteriort som posteriort for aorta, se CT billedet ovenfor. Er det den samme person der er undersøgt på røntgenbilledet og CT skanningen? Nej for røntgenbilledet er af en kvinde og CT skanningen er af en mand.



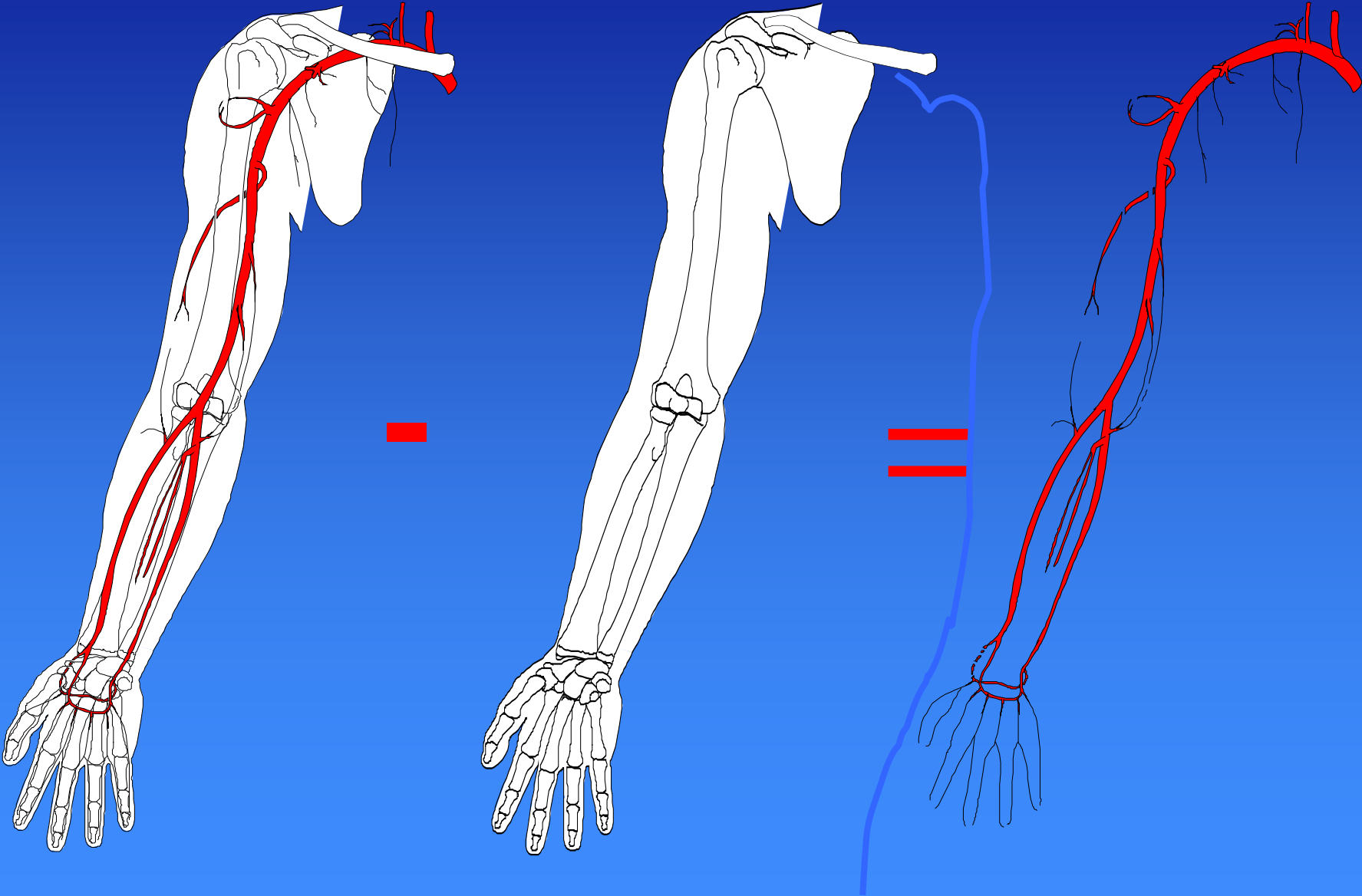
Ældre kvinde.



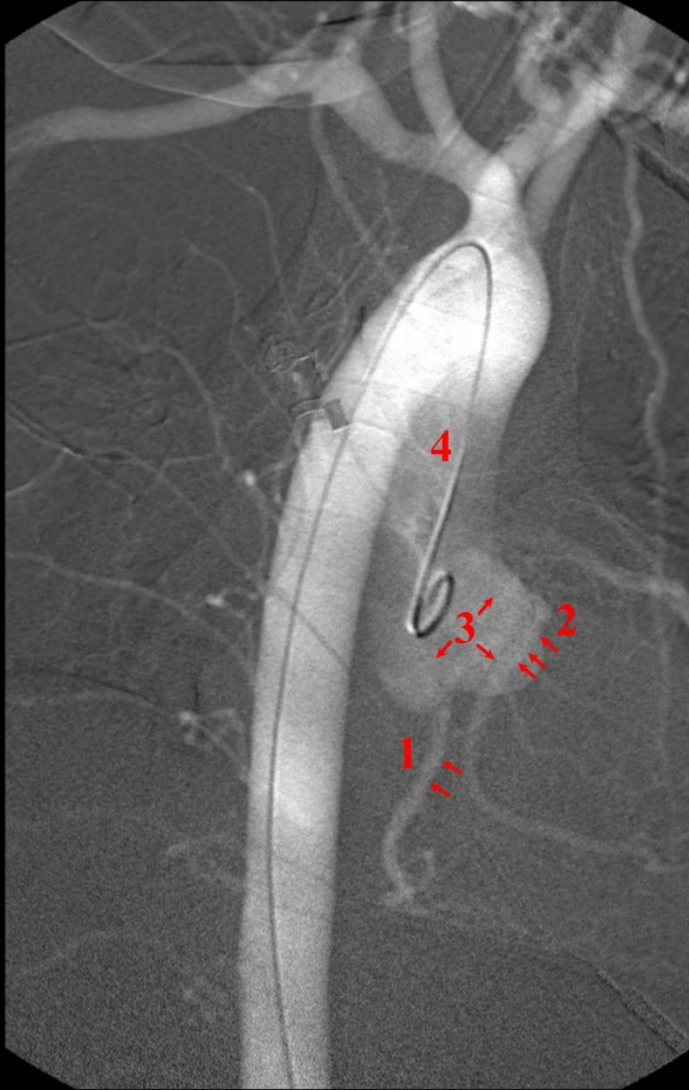
Ældre kvinde med
ectasia aortae:
Aldersbetinget
udvidelse af aorta.

Undersøgelse af aorta

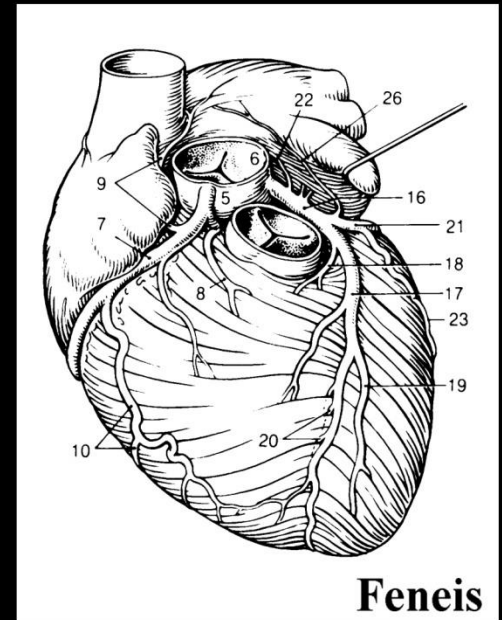
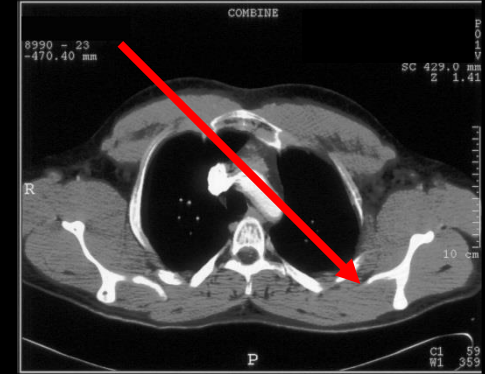
DSA: Digital subtraktions angiografi

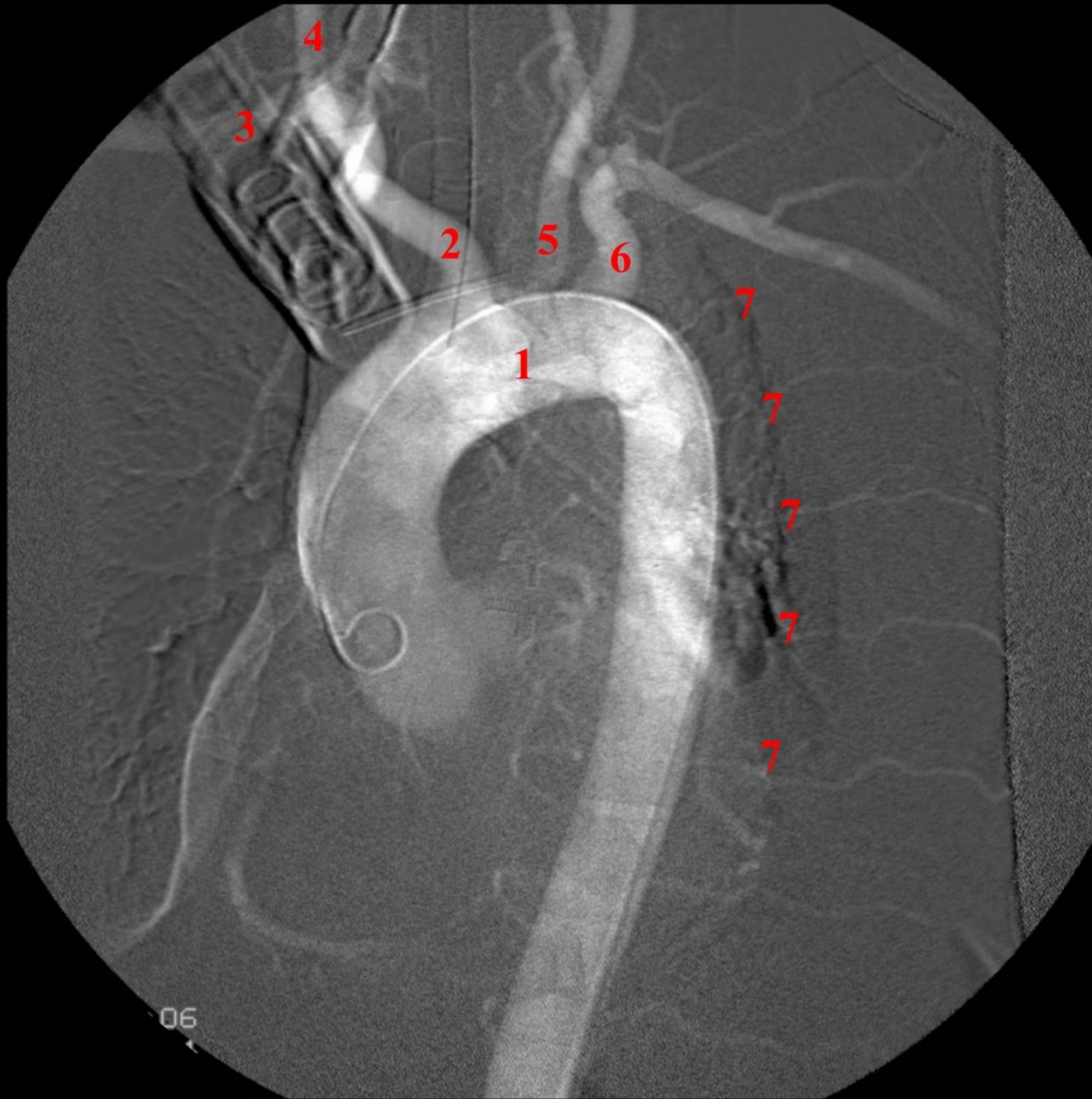


Aortografi

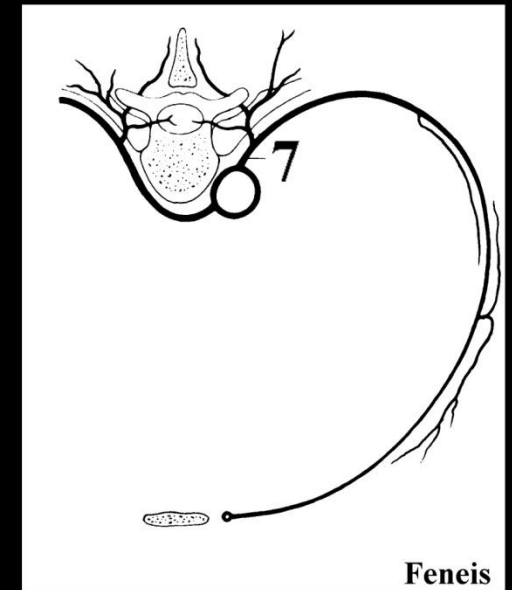


- 1) A. coronaria dextra
- 2) A. coronaria sinistra
- 3) Bulbus aortae
- 4) Pars ascendens aortae



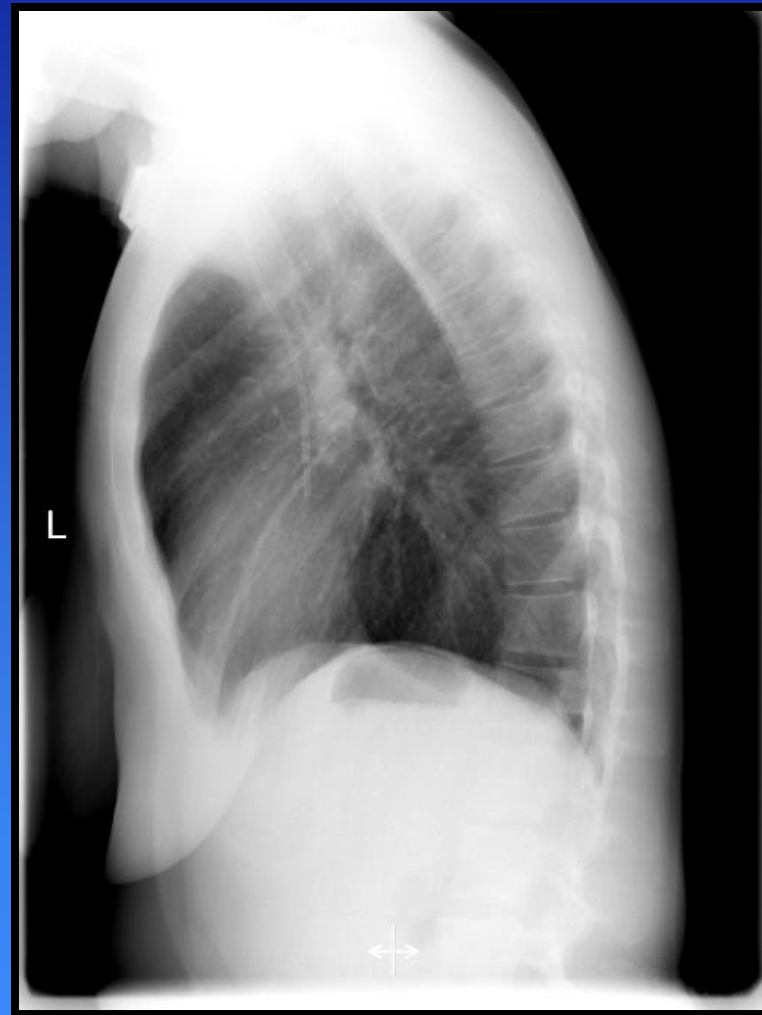
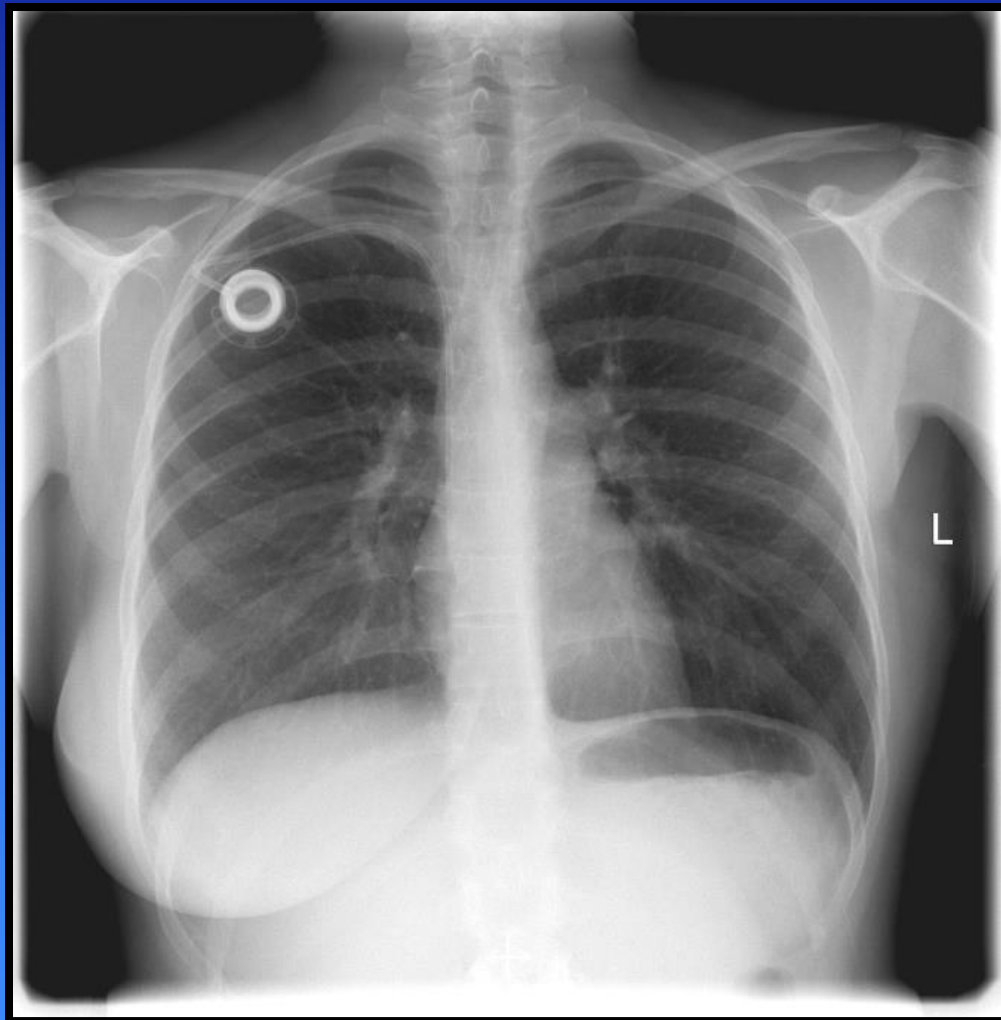


- 1) Arcus aortae
- 2) Truncus brachiocephalicus
- 3) A. subclavia dextra
- 4) A. carotis communis dextra
- 5) A. carotis communis sinistra
- 6) A. subclavia sinistra
- 7) A. intercostales posteriores

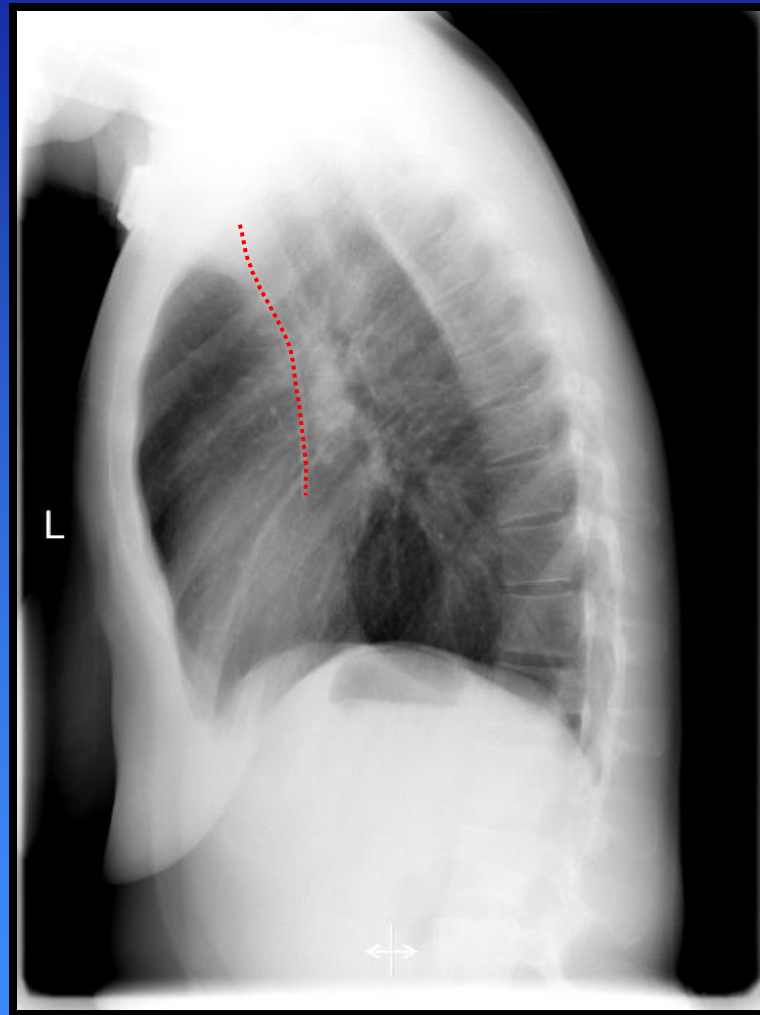
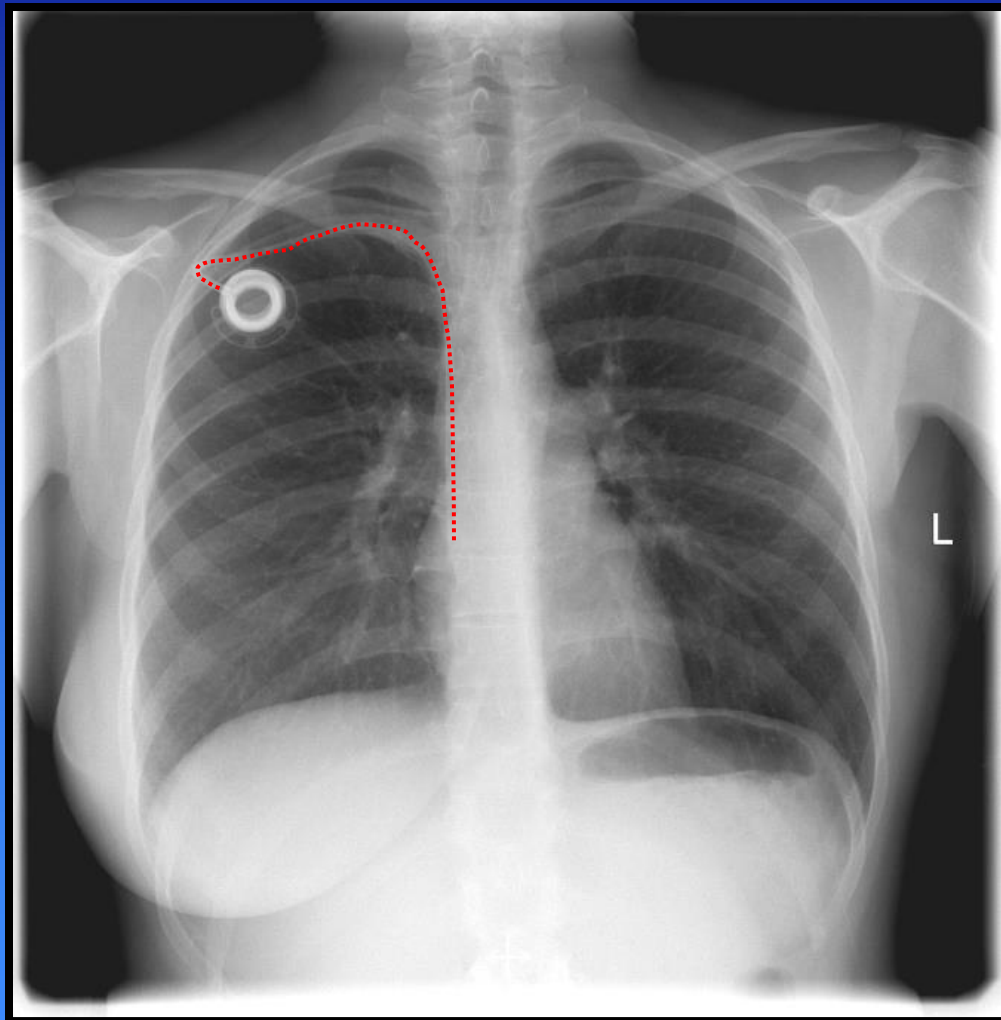


De centrale venter

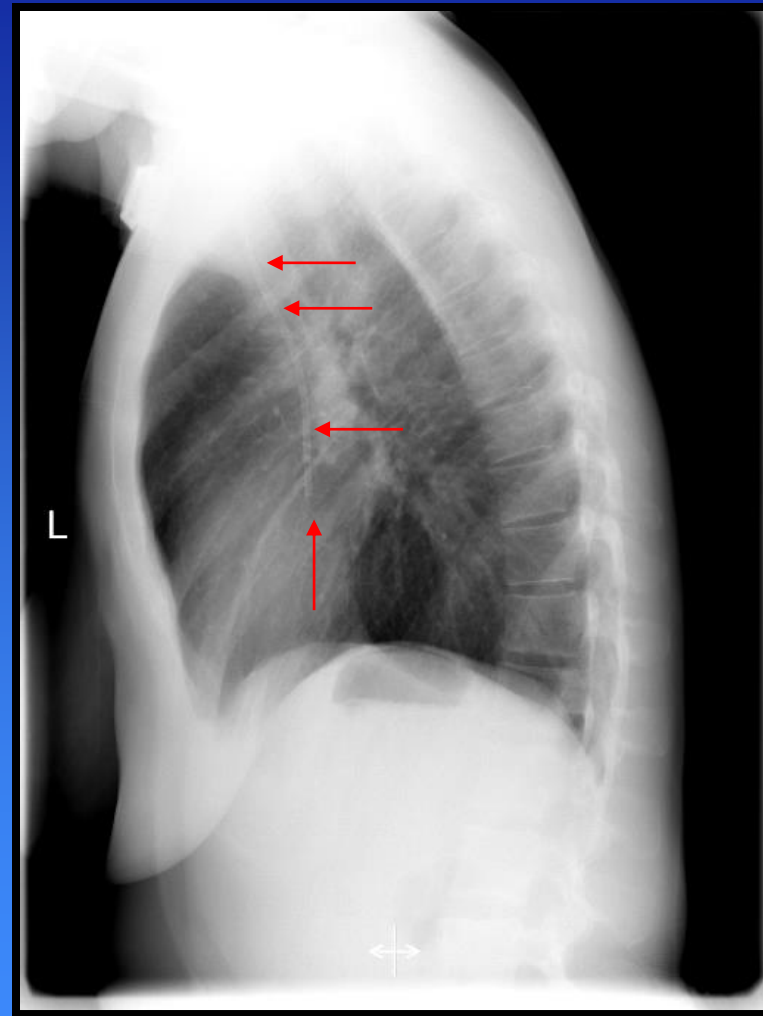
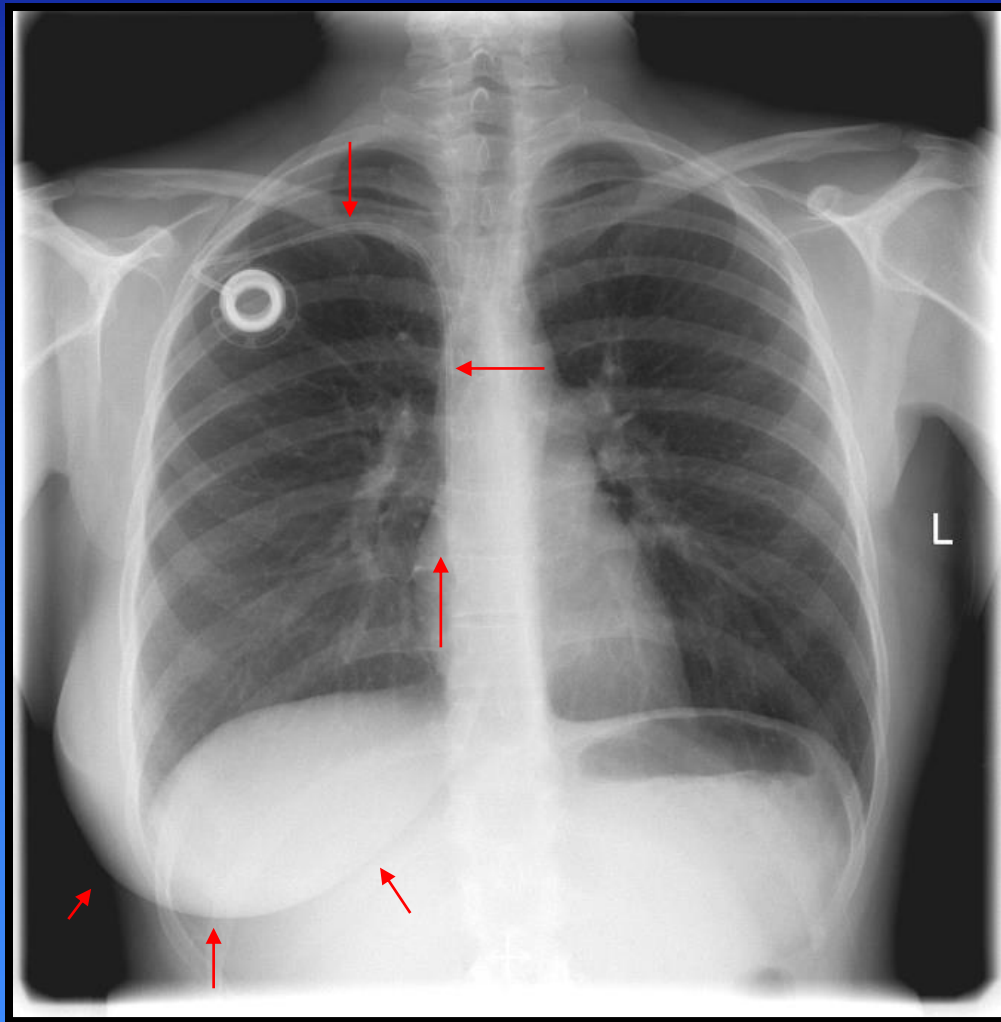
Afvigelser fra normalanatomi?



33 årig kvinde, c. mammae, masectomia sin., injektionskapsel dx.

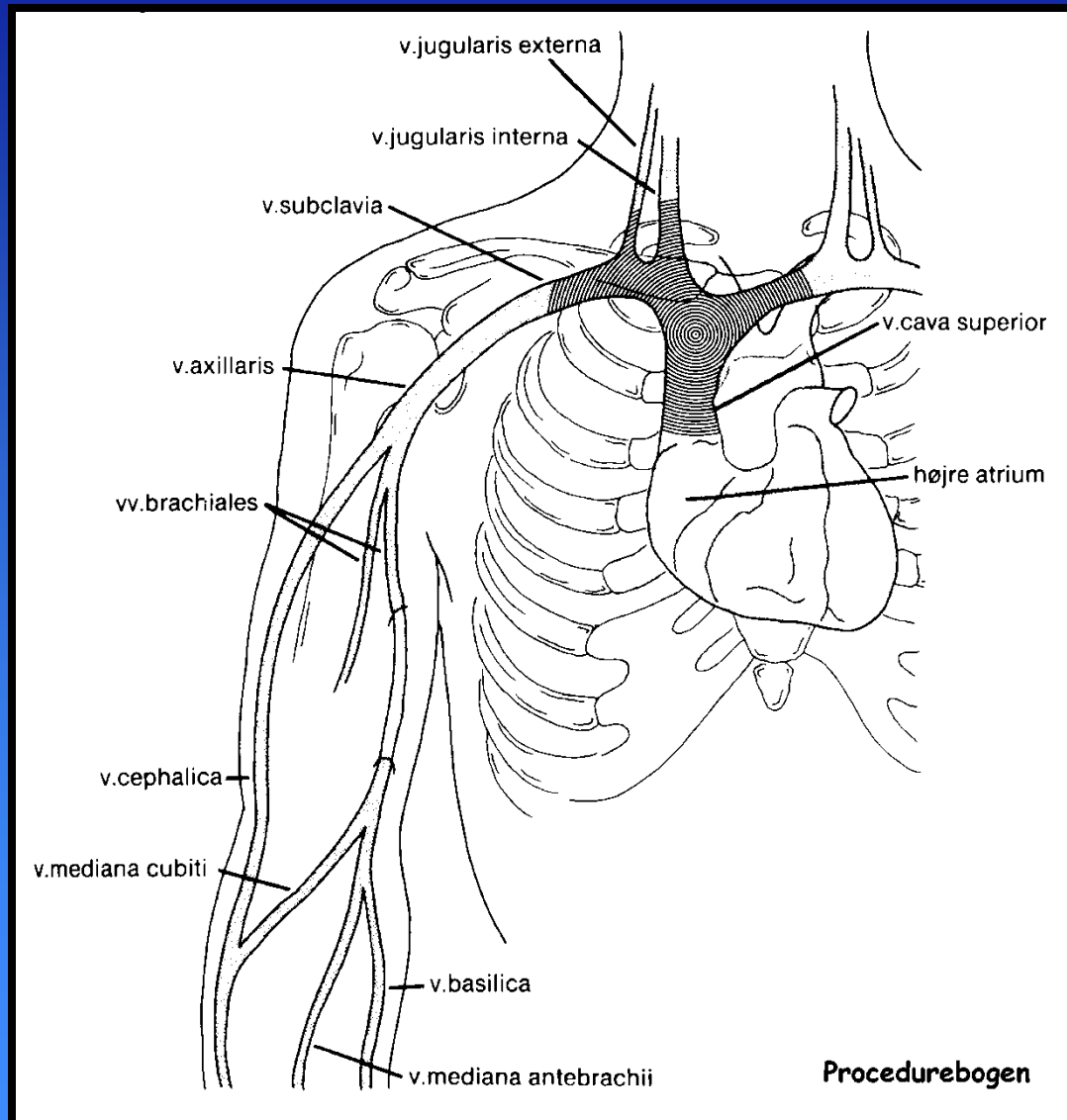


33 årig kvinde, c. mammae, masectomia sin., injektionskapsel dx.



Centralt venekateter med kateterspidsen i højre atrium. Ingen mamma sløring på venstre side

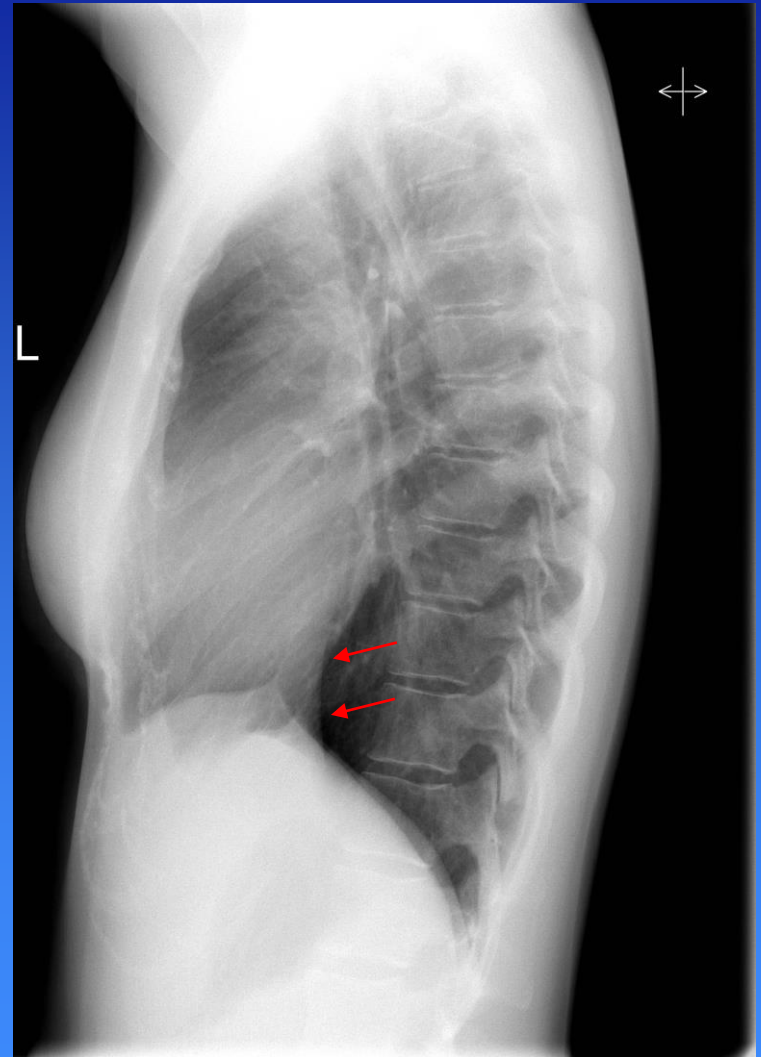
Anlæggelse af CVK (Centralt venekateter)



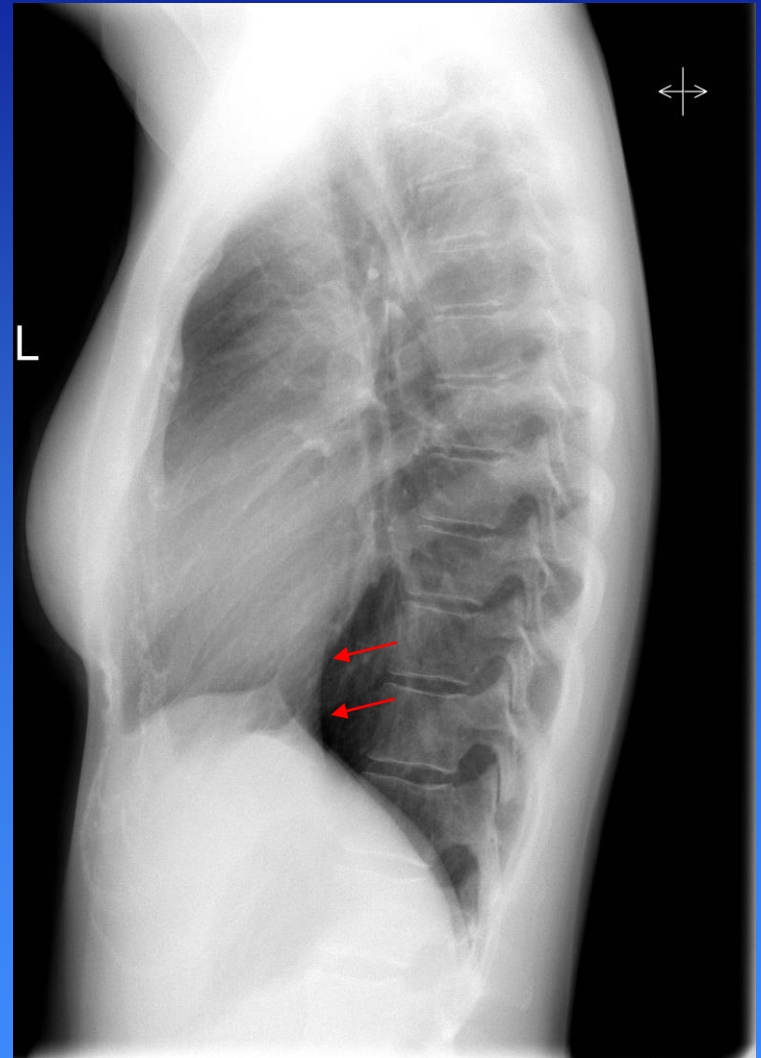
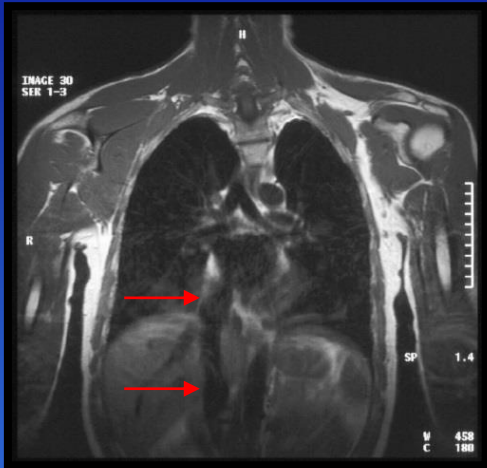
Procedurebogen

Vena cava inferior

Vena cava inferior



Vena cava inferior

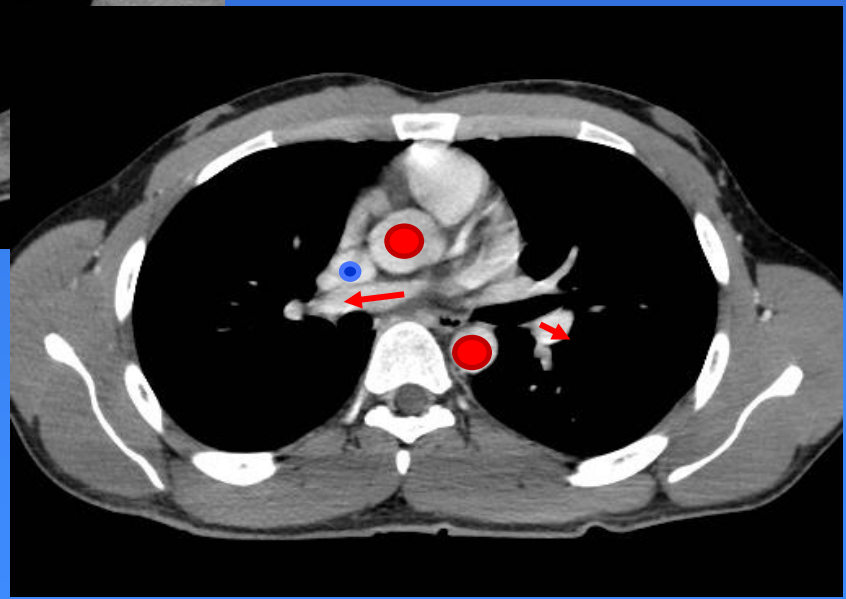
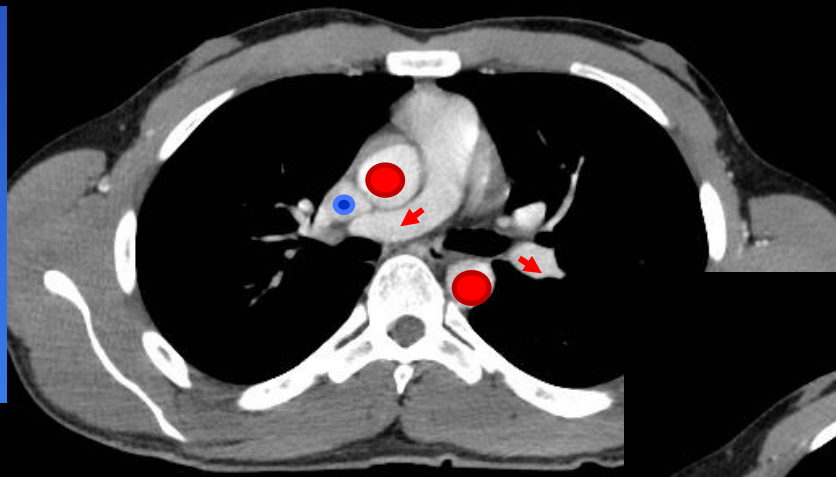
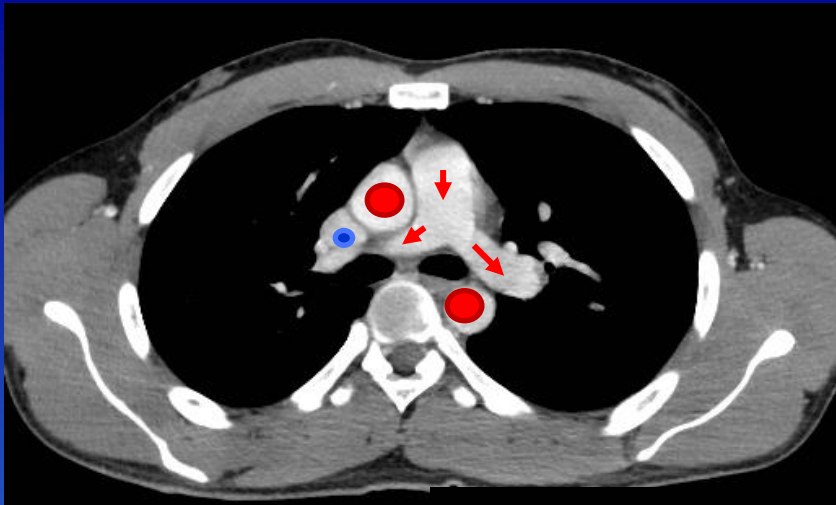


Truncus pulmonalis og lungekar



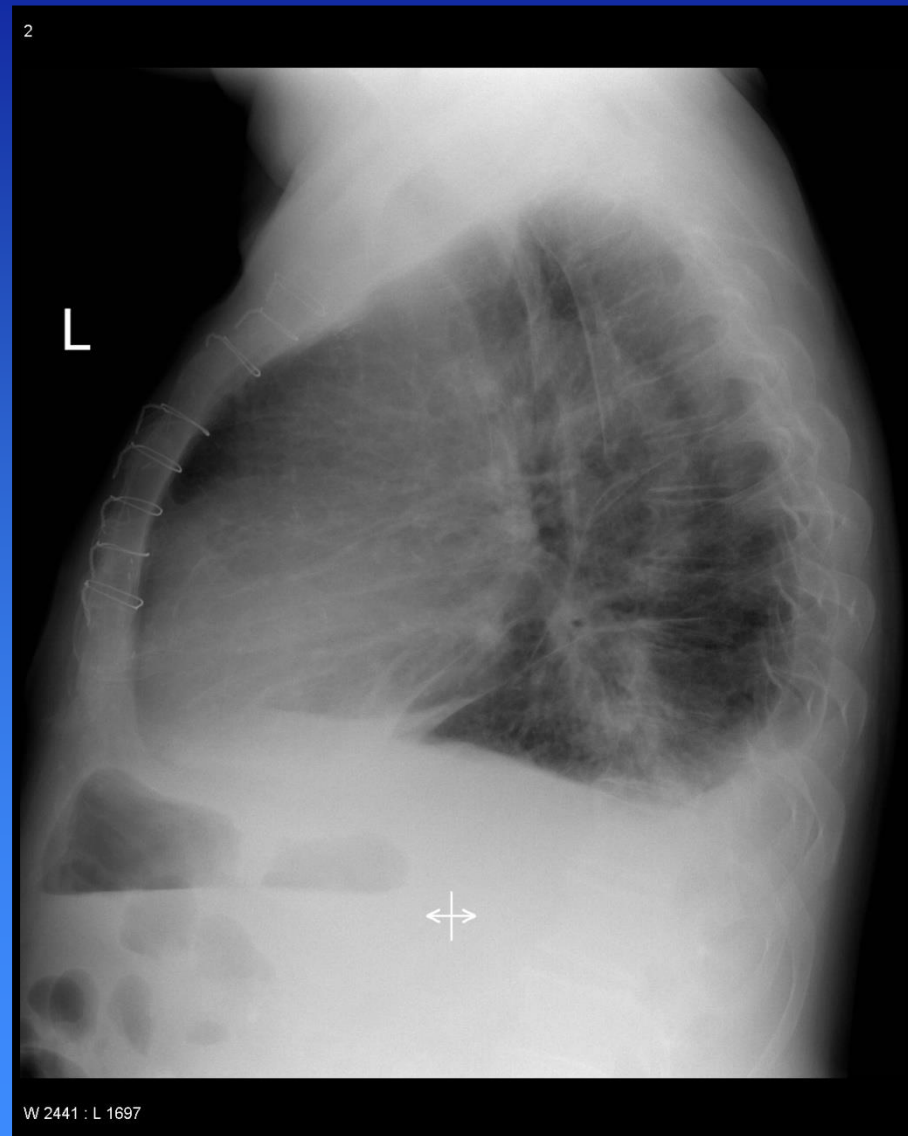
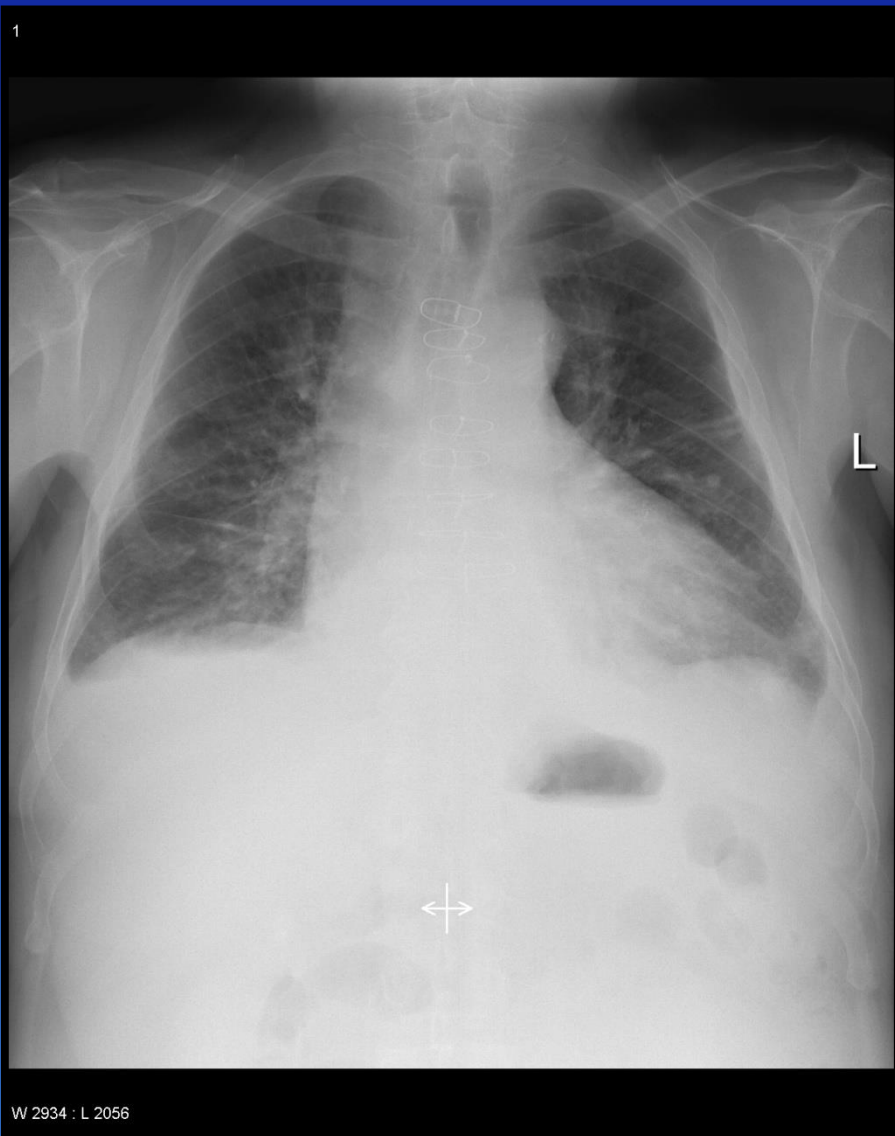
L

pa

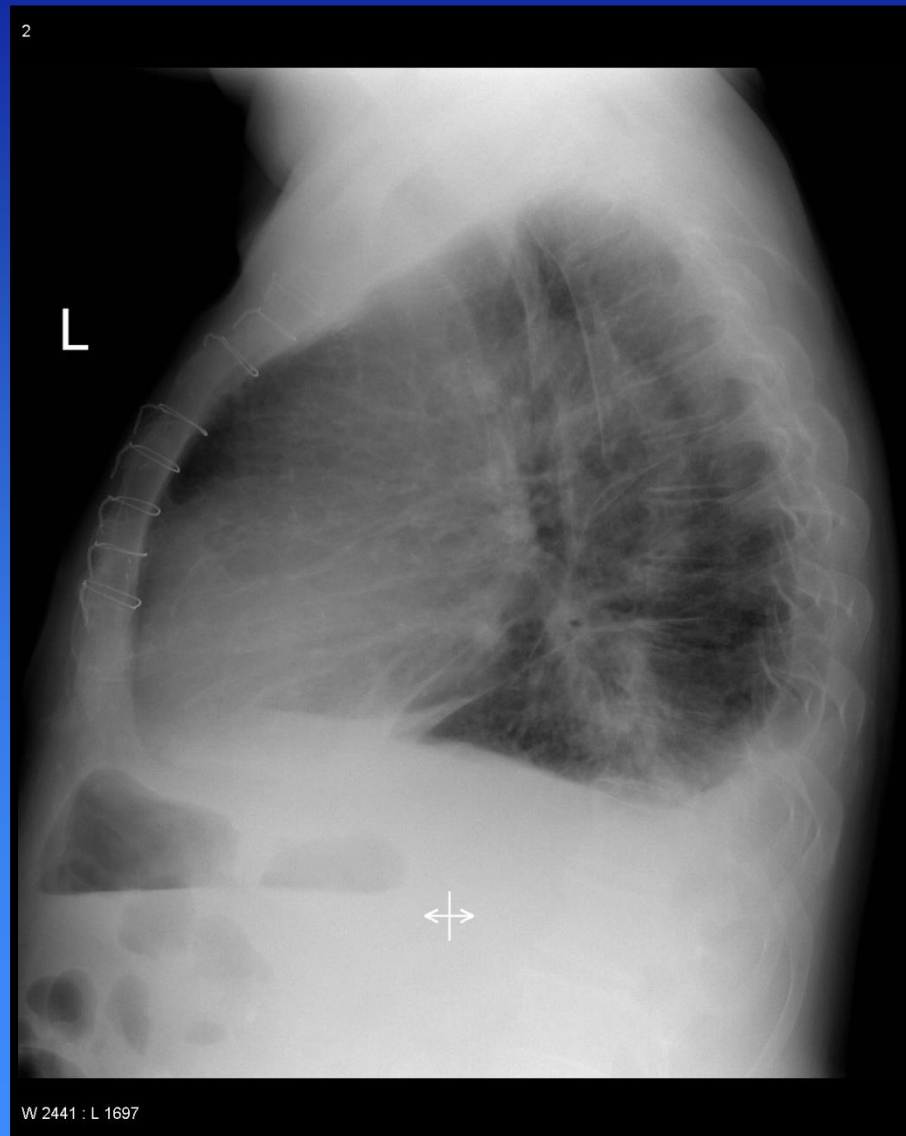
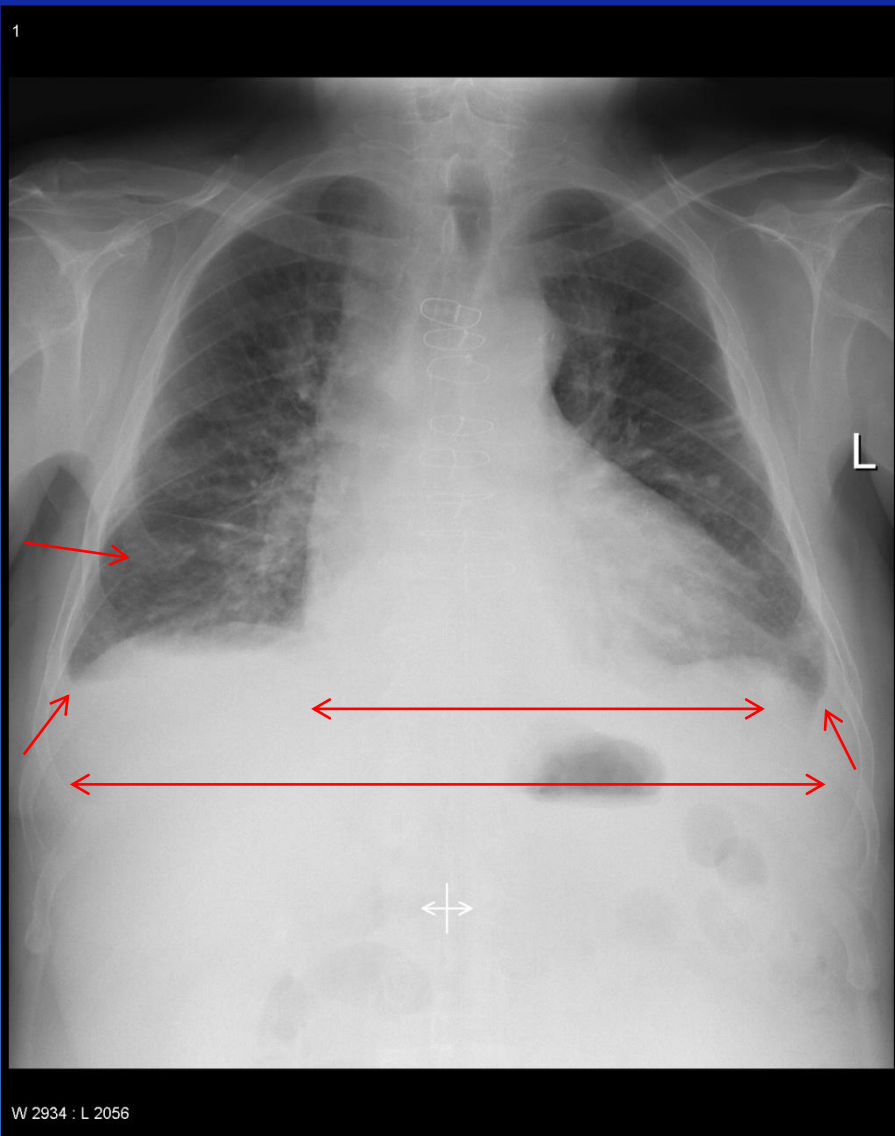


Cor

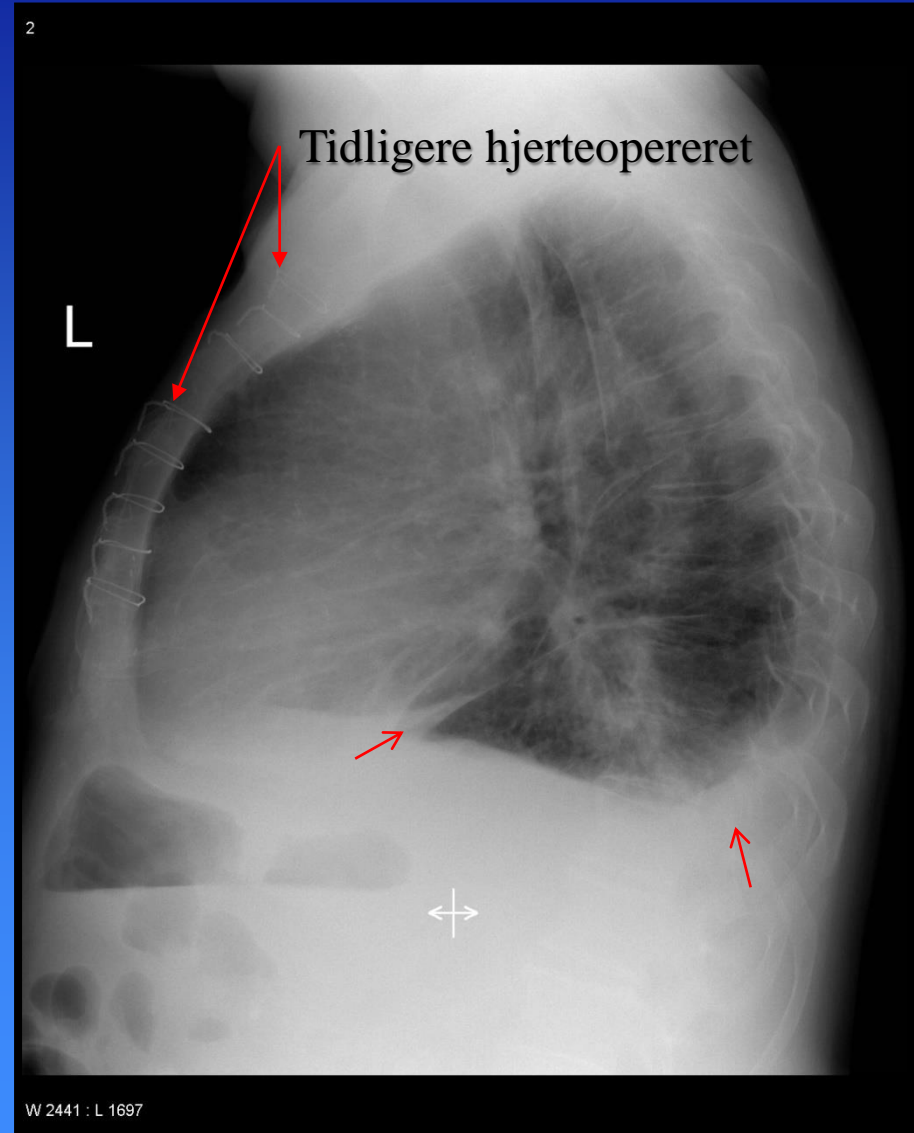
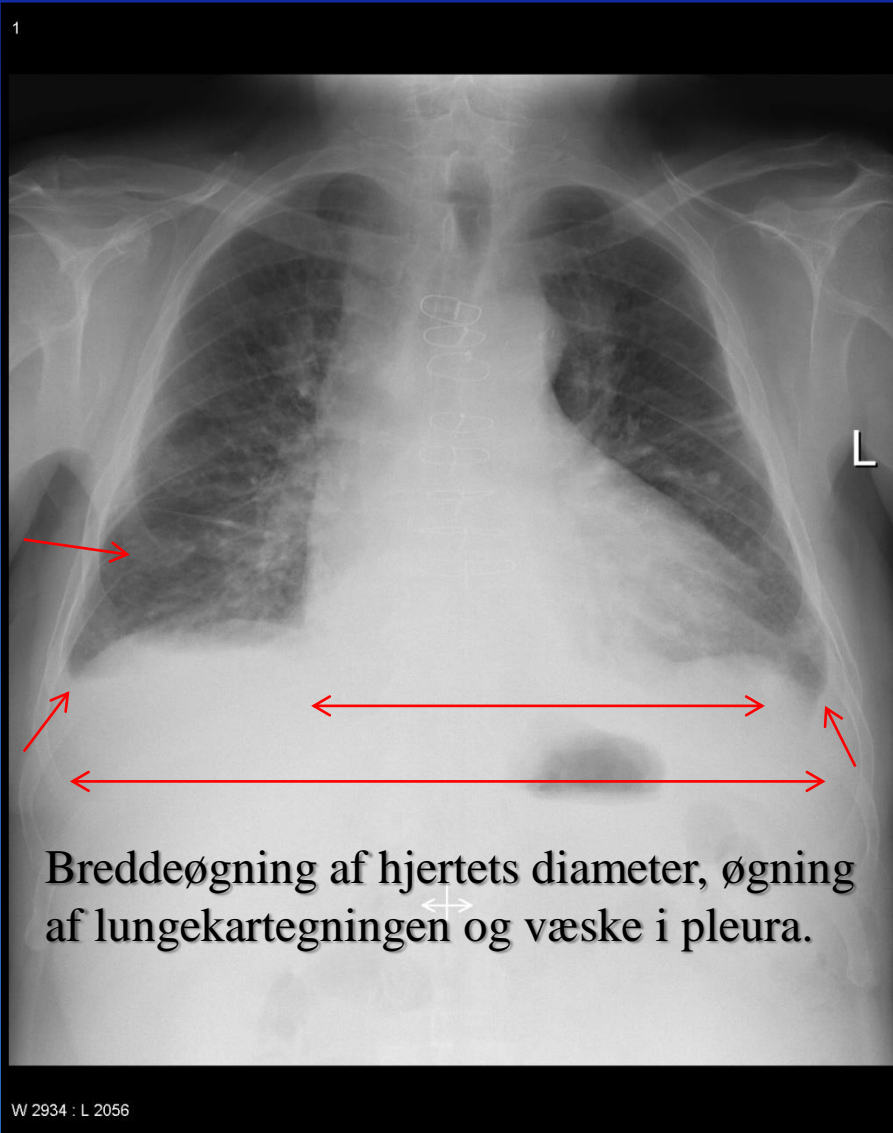
Stasis pulmonum, 82-årig mand



Stasis pulmonum, 82-årig mand



Stasis pulmonum (lungestase), 82-årig mand



58 årig mand: 4 kammer billede.

SIEMENS

S

MI 0 8

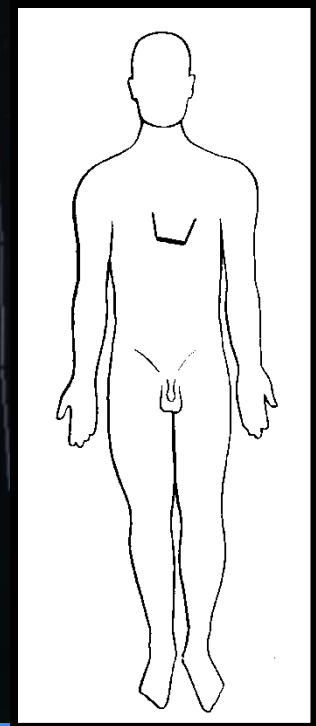
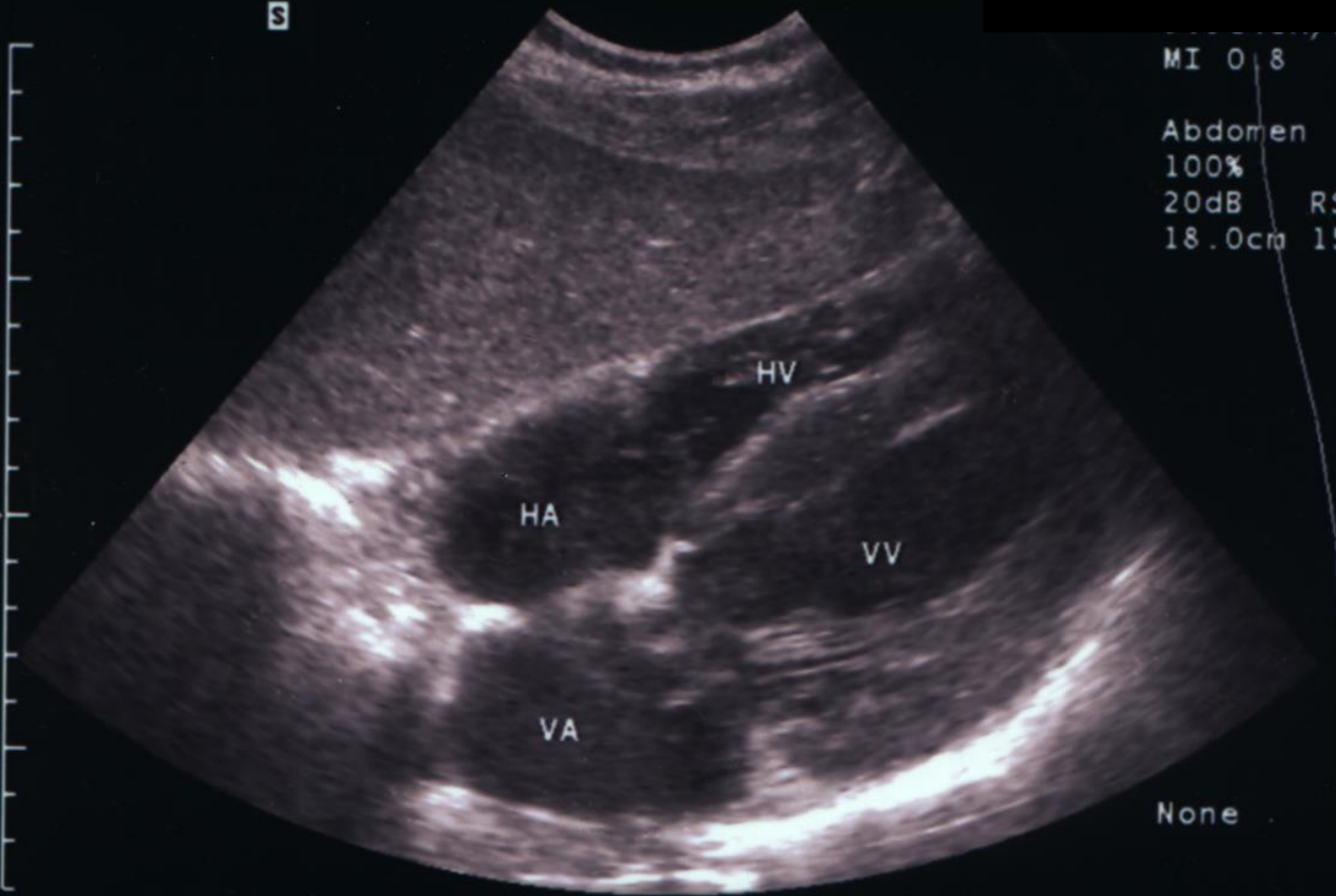
Abdomen

100%

20dB

RS3

18.0cm 15 fps



Ultralyd

58 årig mand: 4 kammer billede.

SIEMENS

Transducer

S

Hepar

HV

HA

VV

VA

MI 0 8

Abdomen

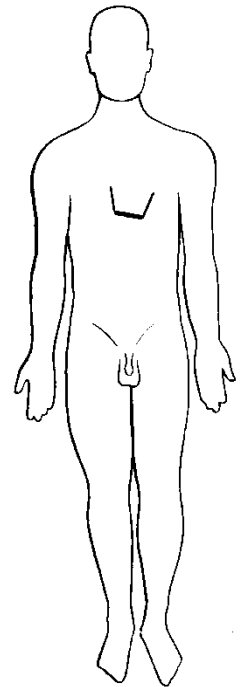
100%

20dB

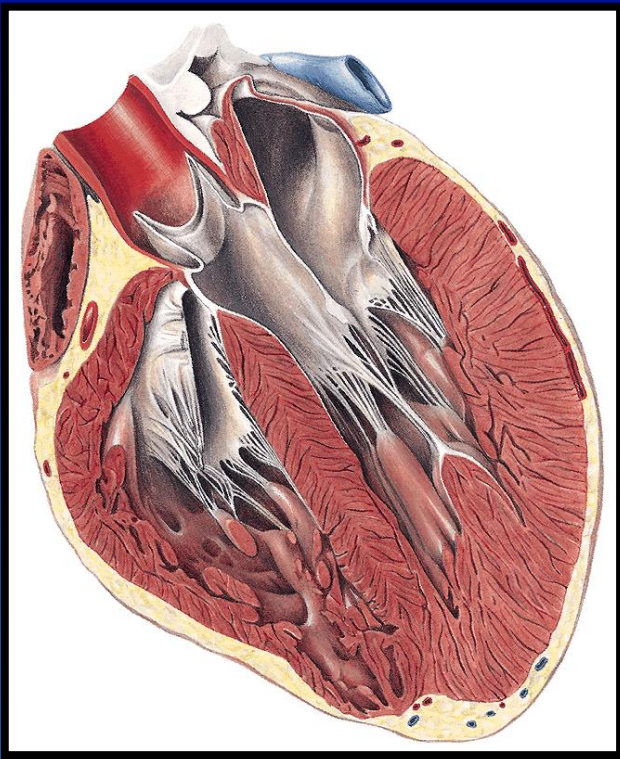
RS3

18.0cm 15 fps

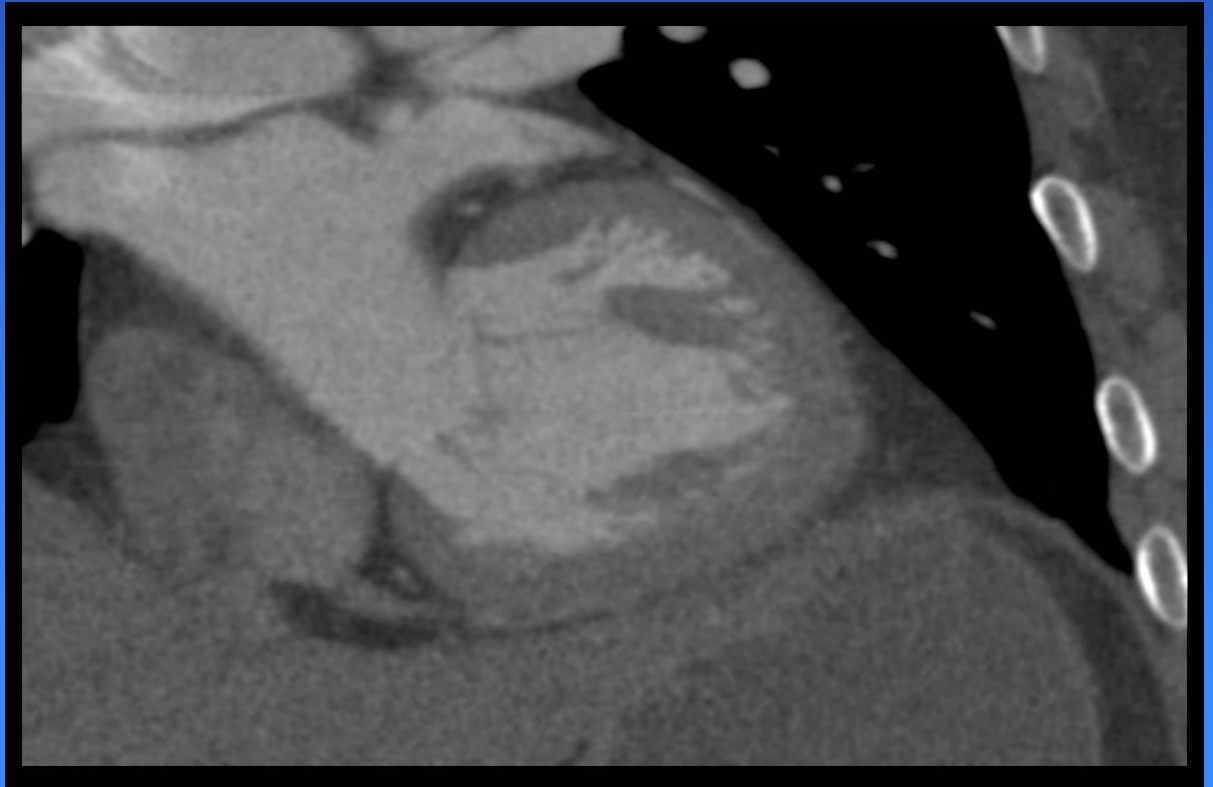
None

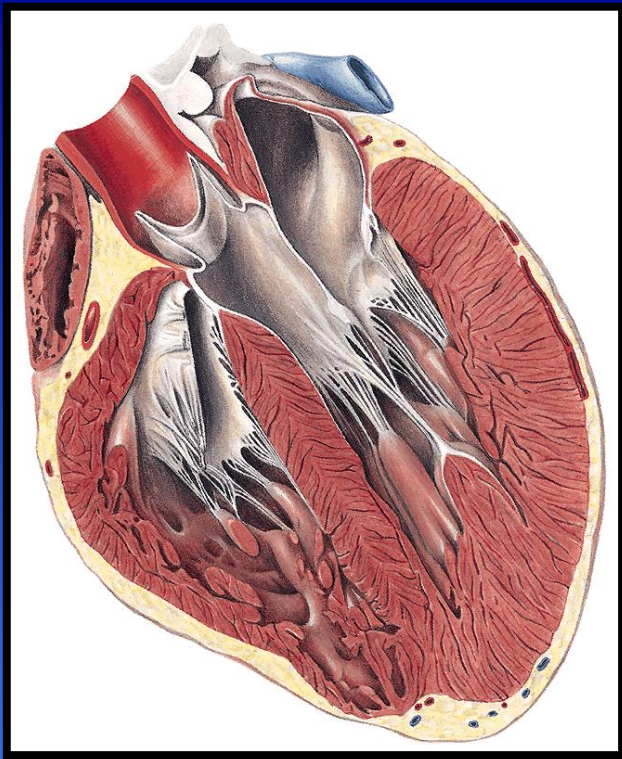


Hhv. højre og venstre atrium (HA og VA) samt højre og venstre ventrikel (HV og VV). Bemærk den tykke væg i venstre ventrikel i forhold til højre.

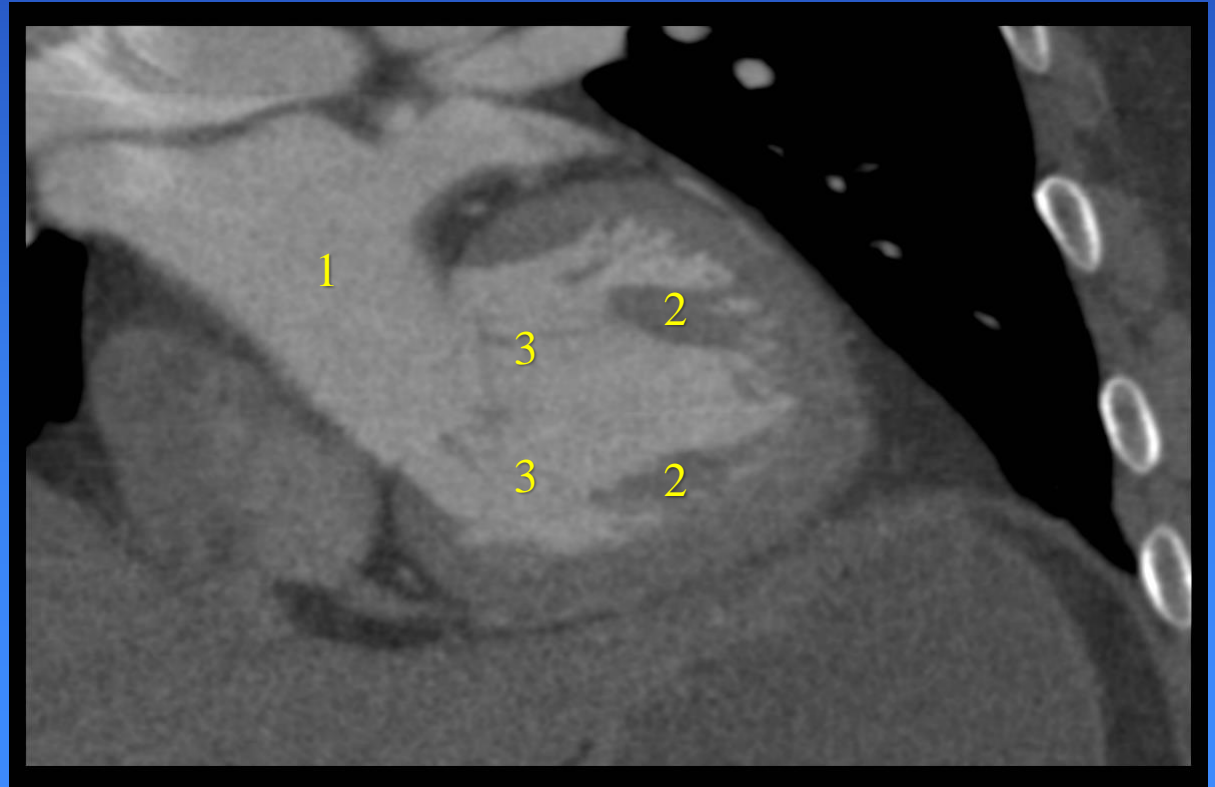


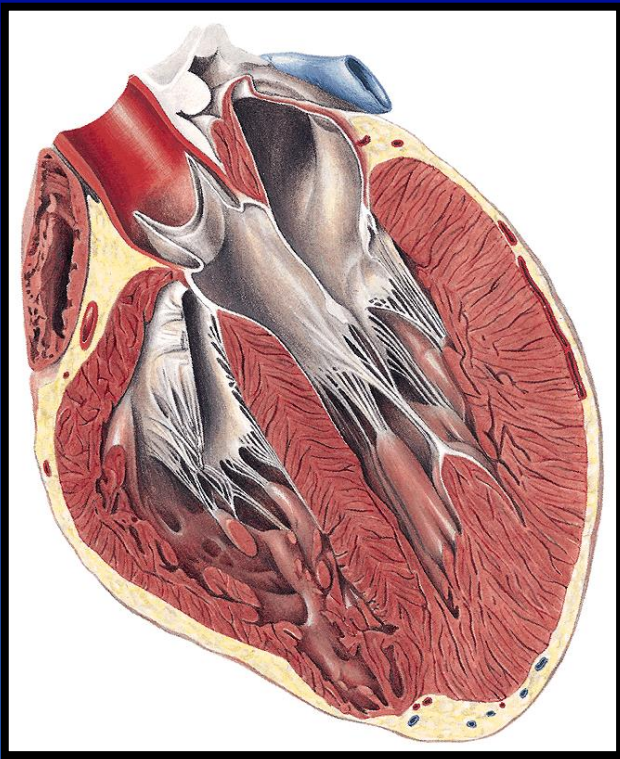
Musculi papillares
Chordae tendineae





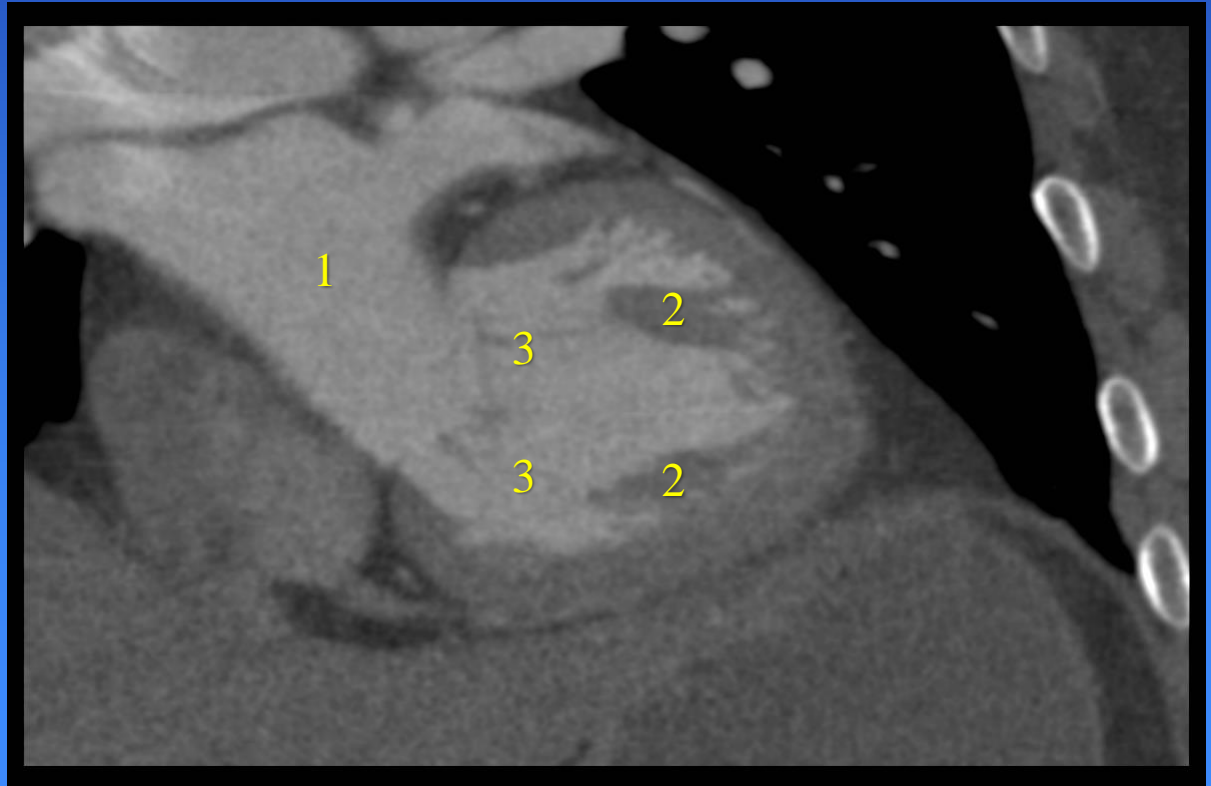
Musculi papillares
Chordae tendineae





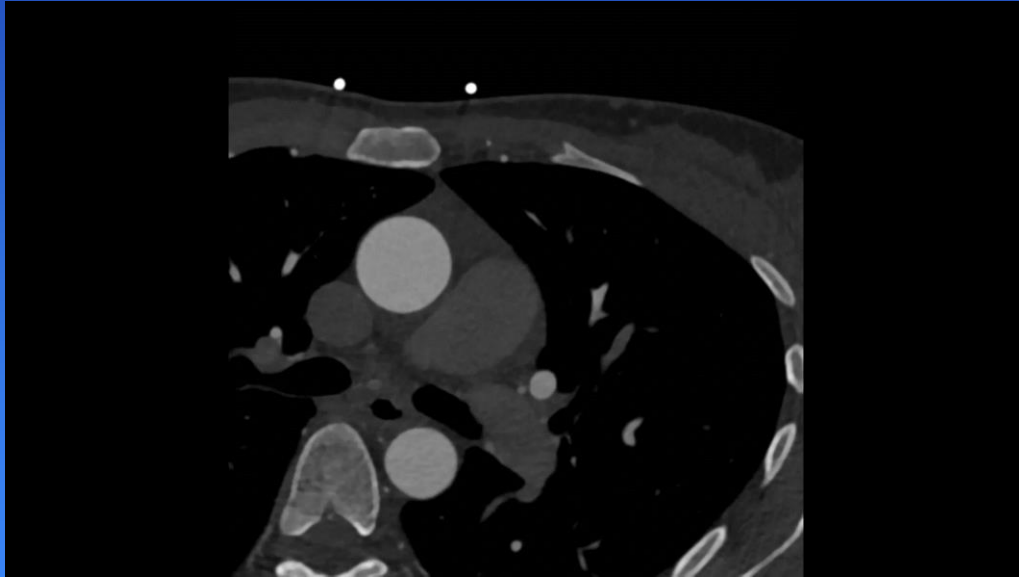
Musculi papillares Chordae tendineae

- 1) Kontrastfyldt blod i lumen
- 2) Musculus papillare
- 3) Chorda tendinea

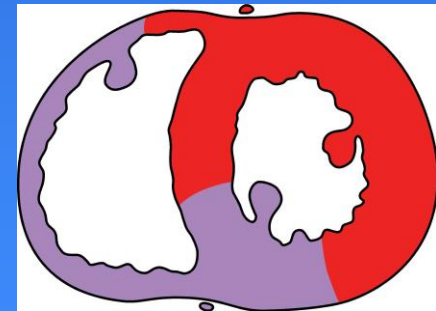
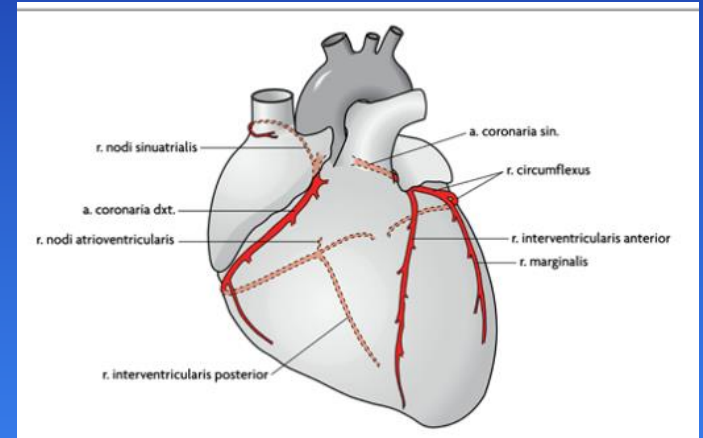


Coronar arterierne

Se videoen på www.radiology.dk



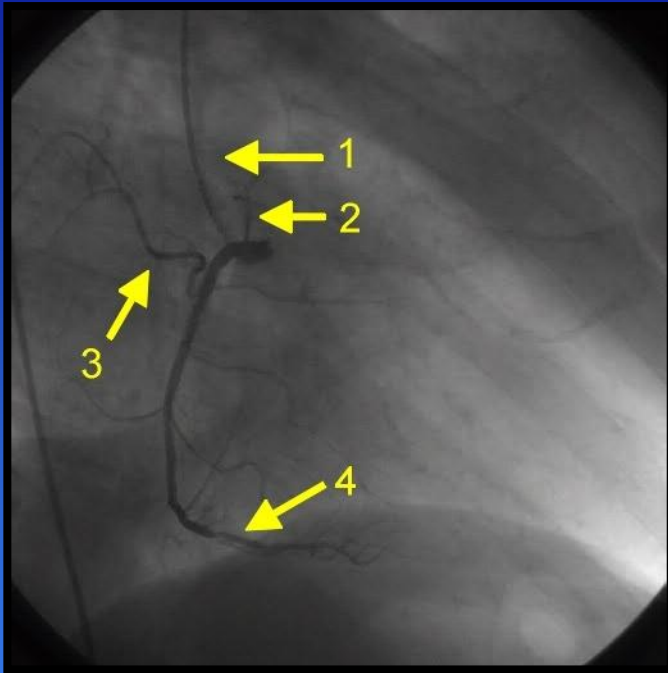
CT af cor



KAG: Koronar angiografi

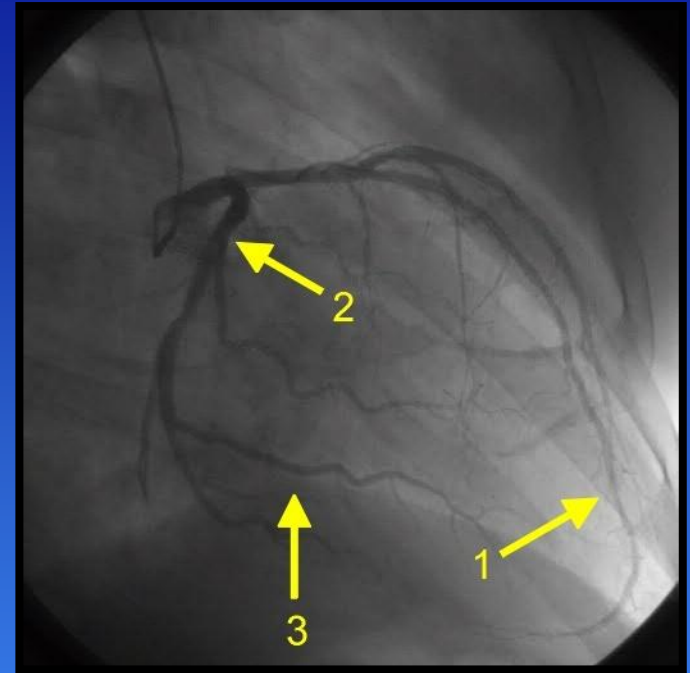


A. coronaria dextra



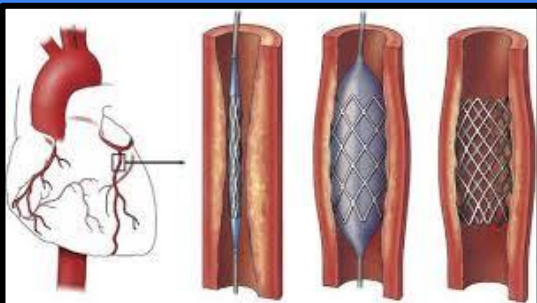
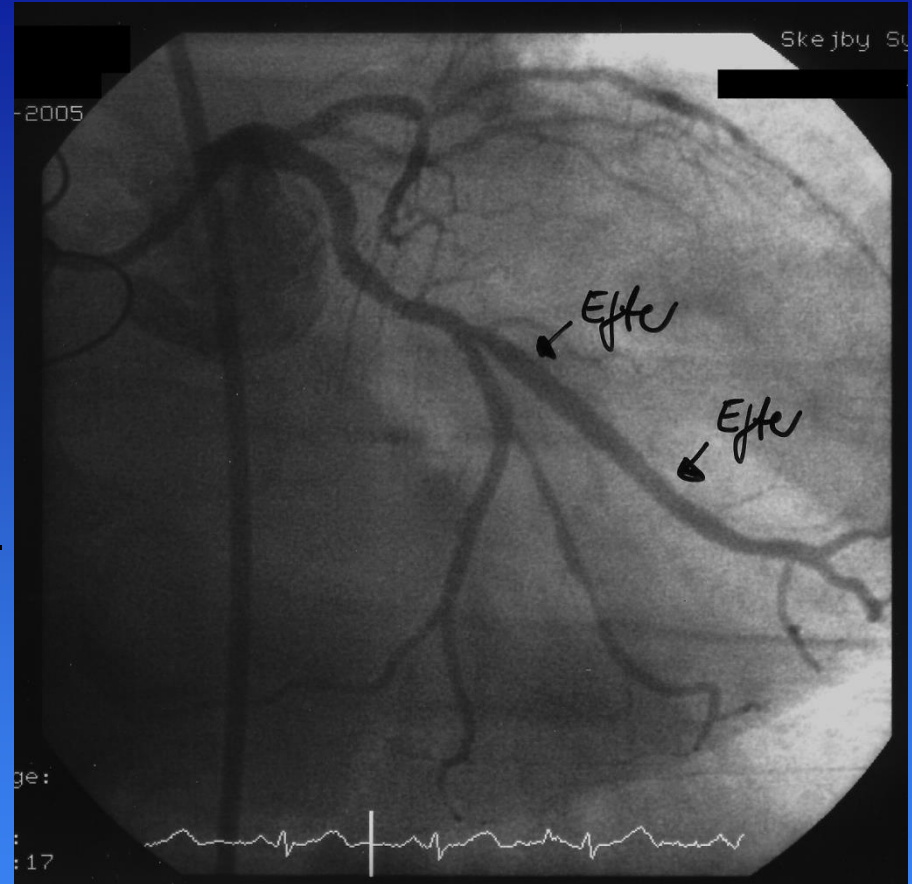
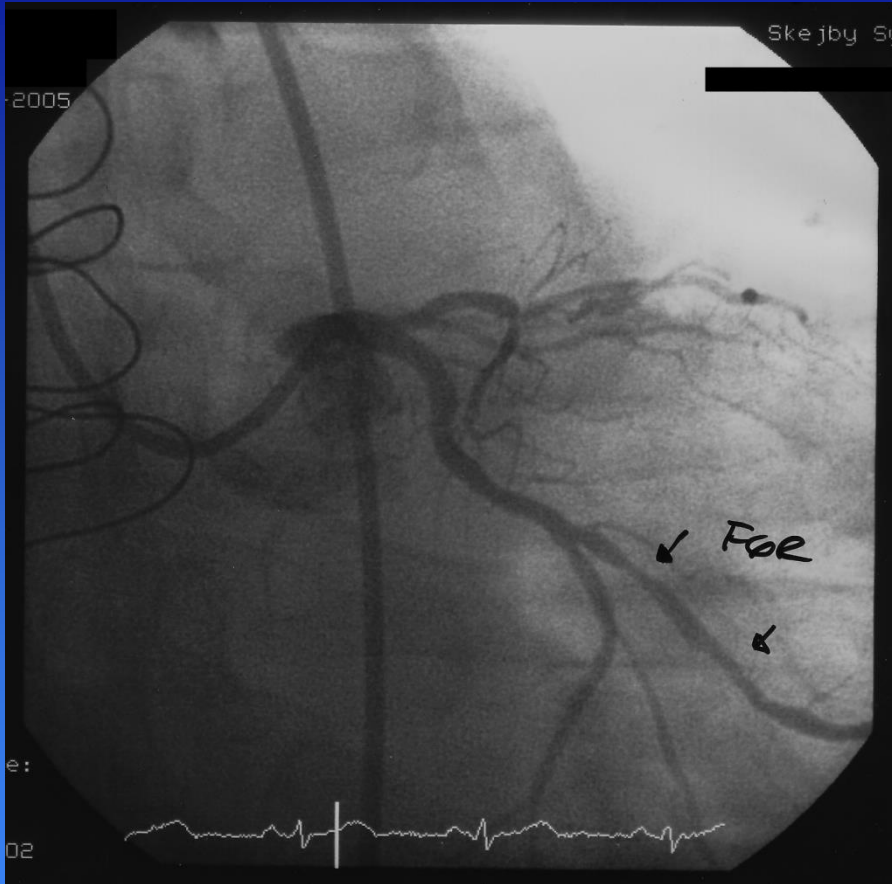
- 1: Kateter
- 2: Conus gren
- 3: R. nodi sinuatrialis
- 4: R. interventricularis post

A. coronaria sinistra



- 1: Ramus interventricularis ant.
- 2: Ramus circumflexus
- 3: Ramus marginalis

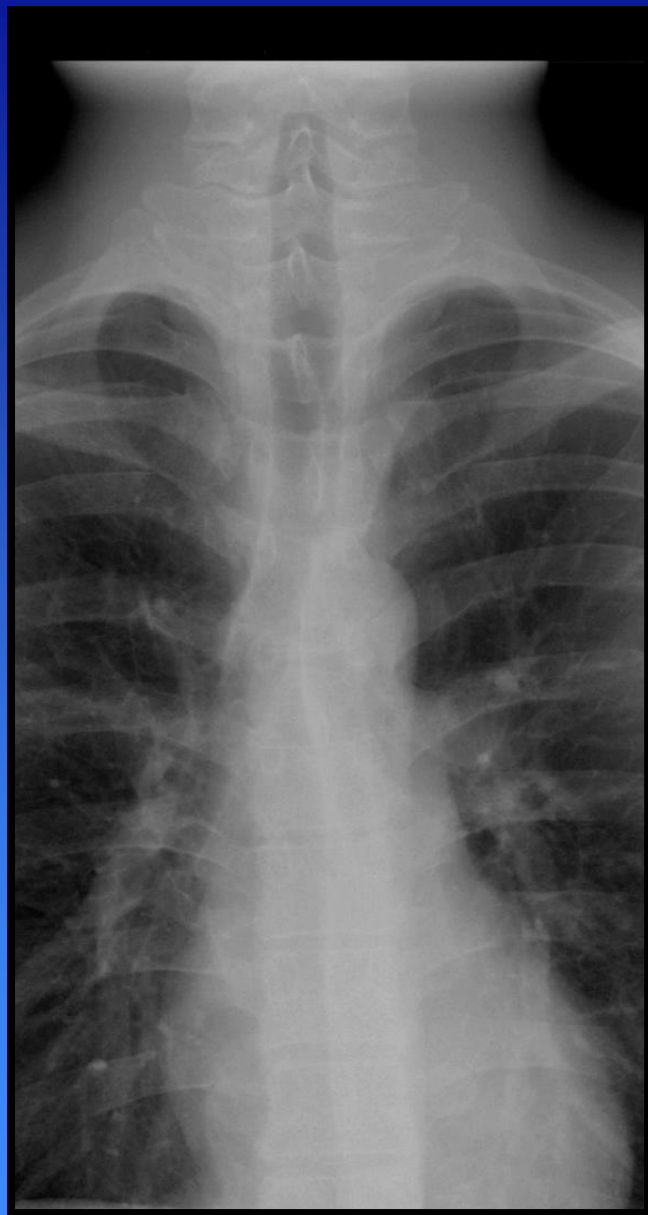
KAG før og efter ballon dilatation (udvidelse).

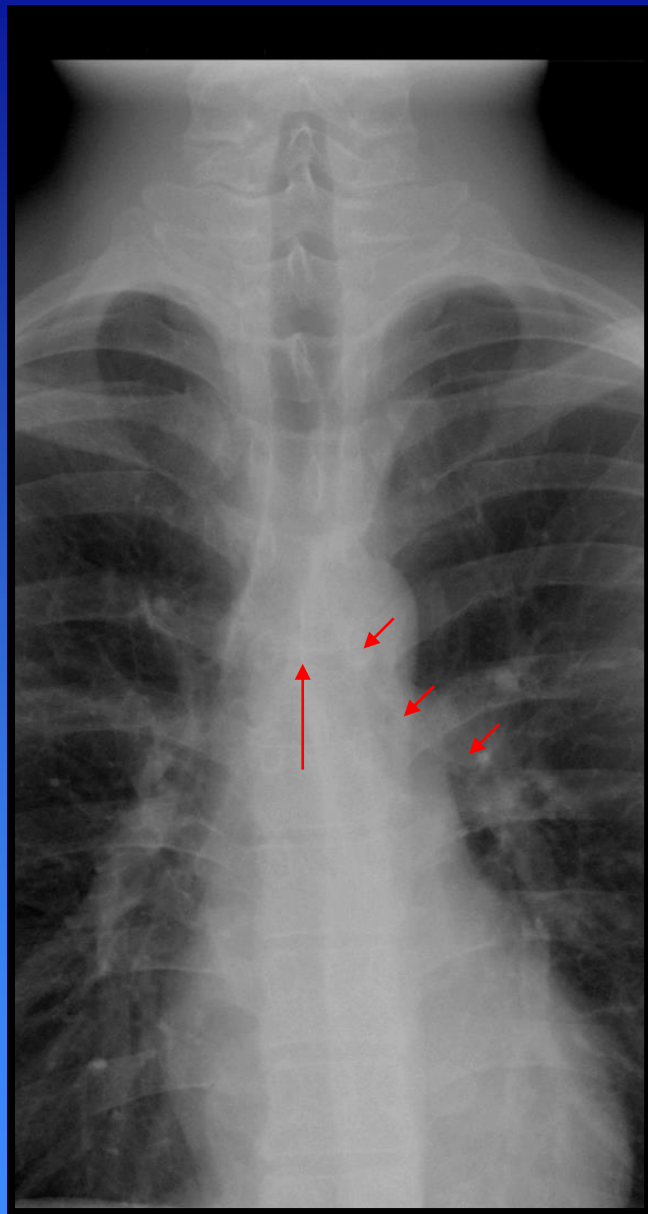
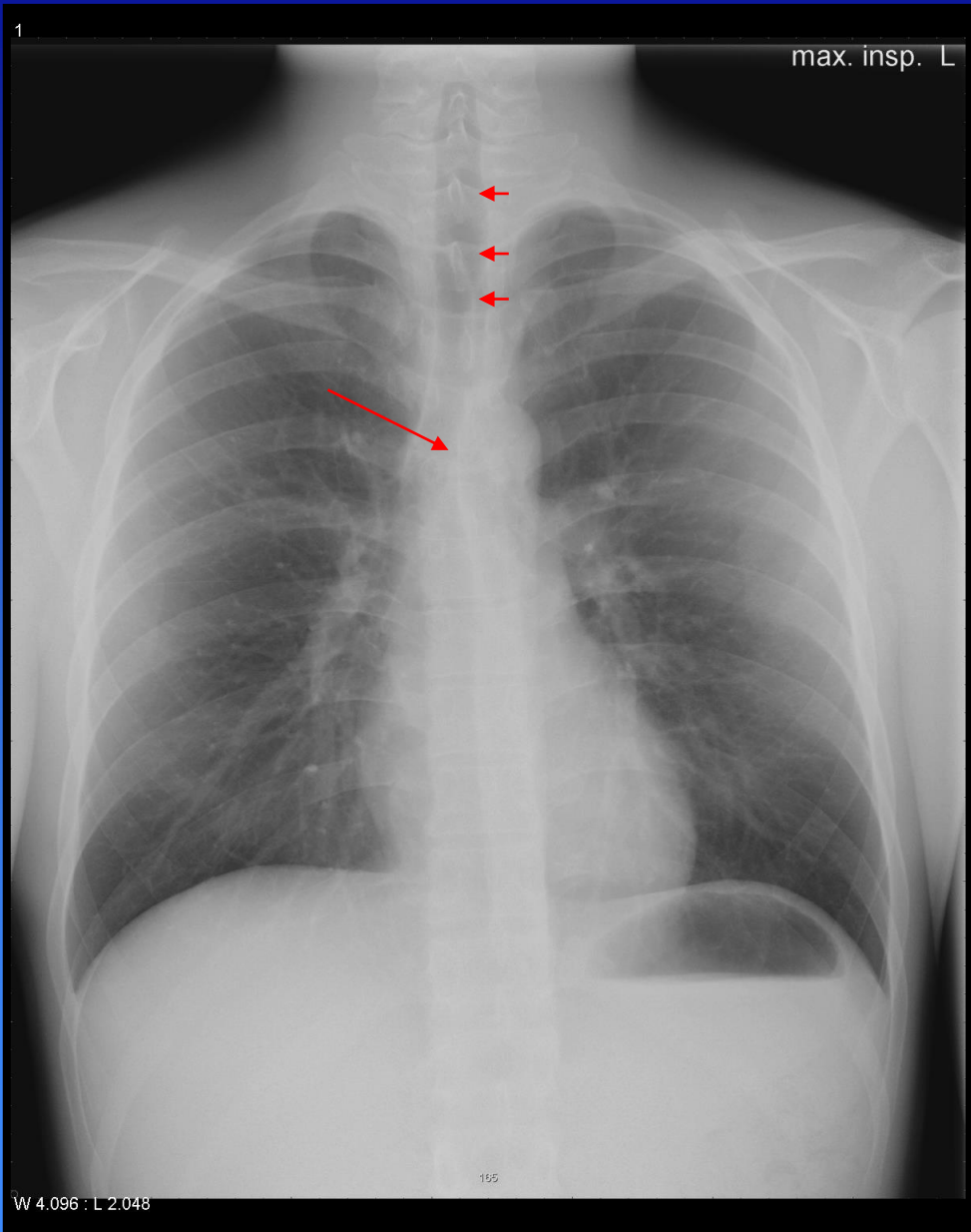


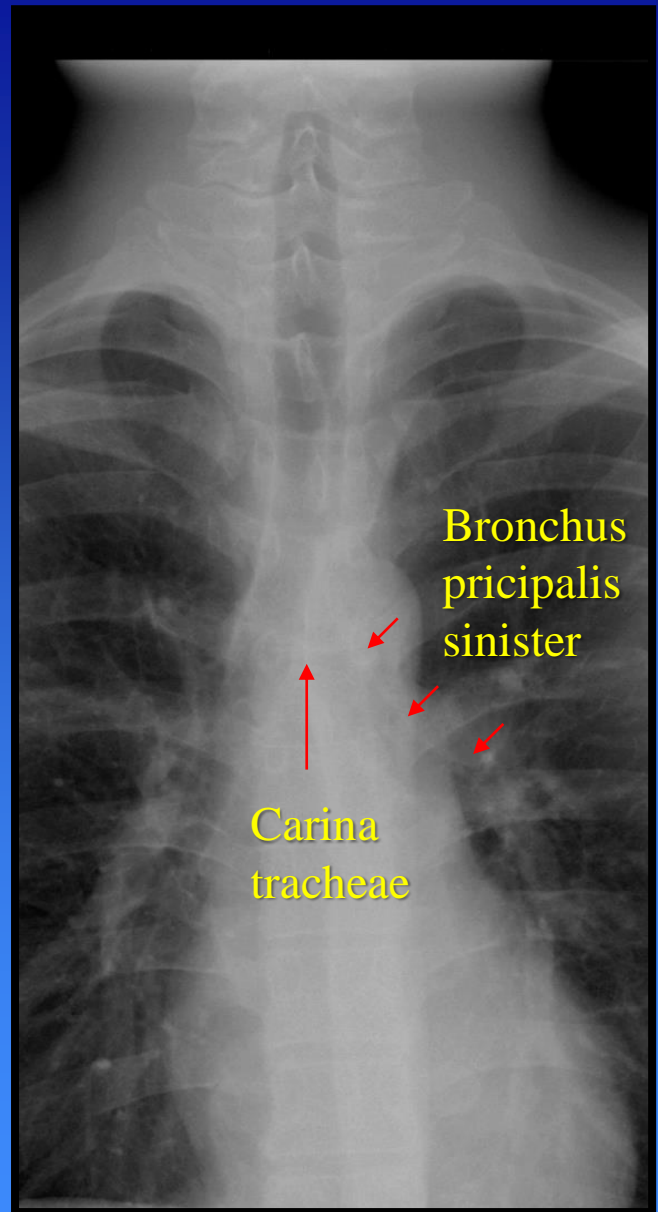
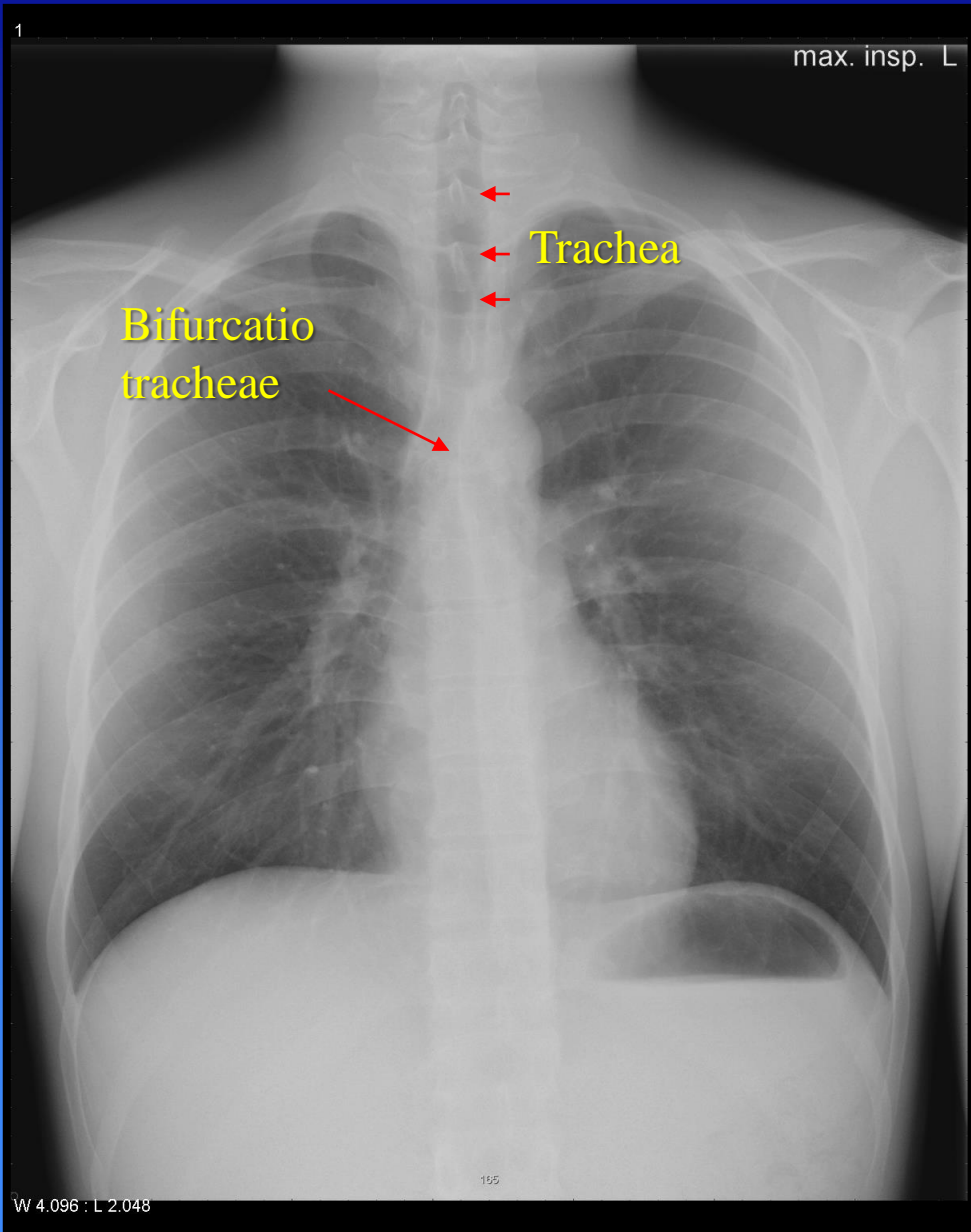
Ballon kateter føres ind igennem forsnævringen, hvorefter ballonen pustes op og udvider metalgitteret (stenten).

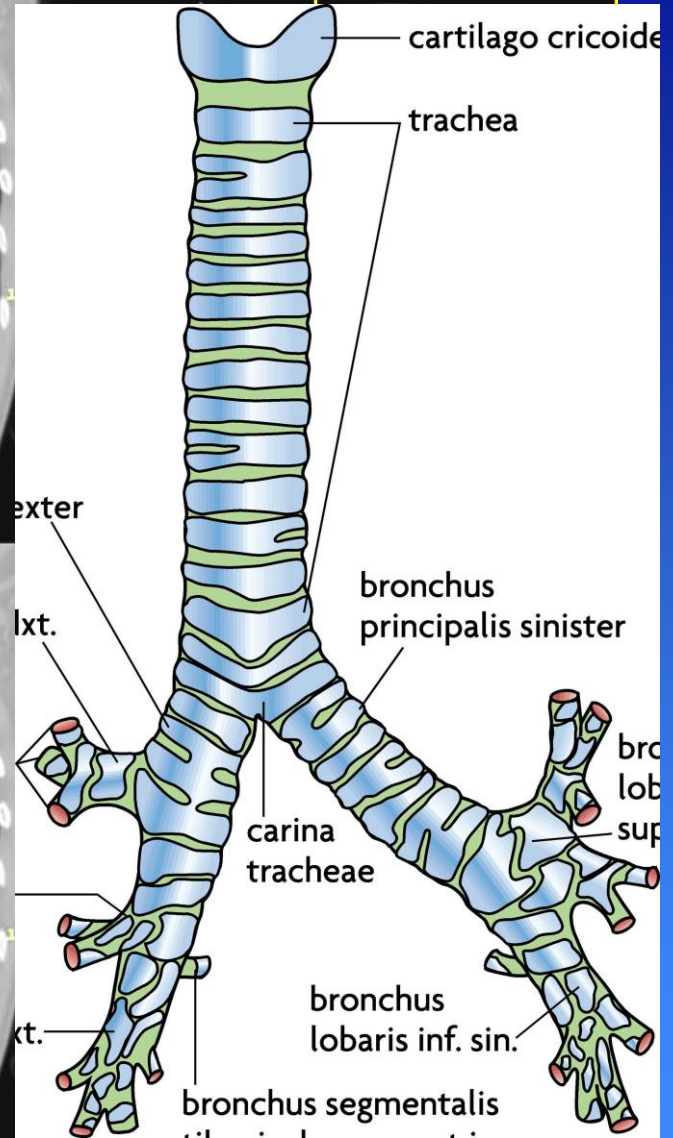
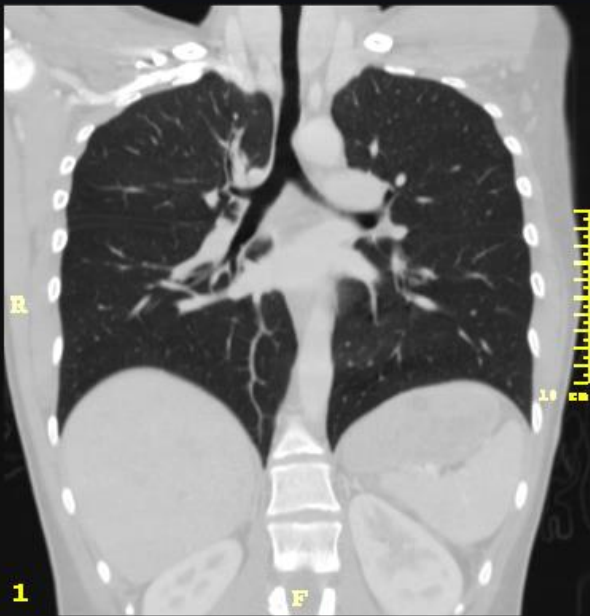
Billede: Sundhedsstyrelsen

Trachea og bronchiesystem

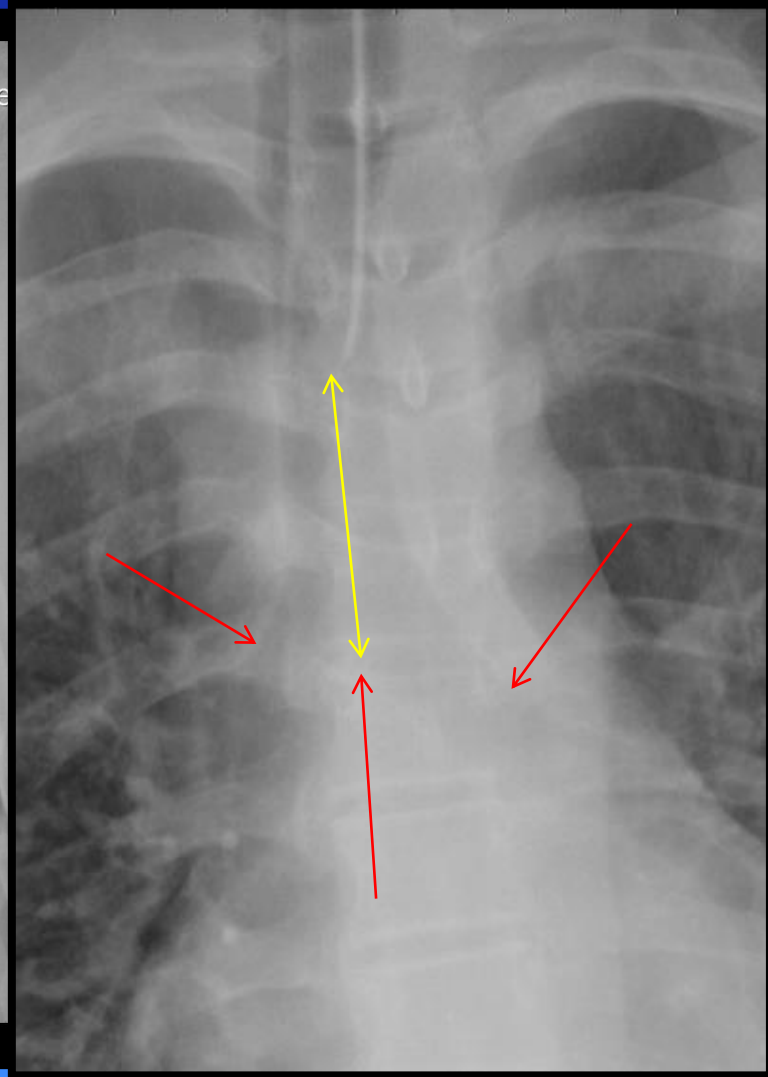
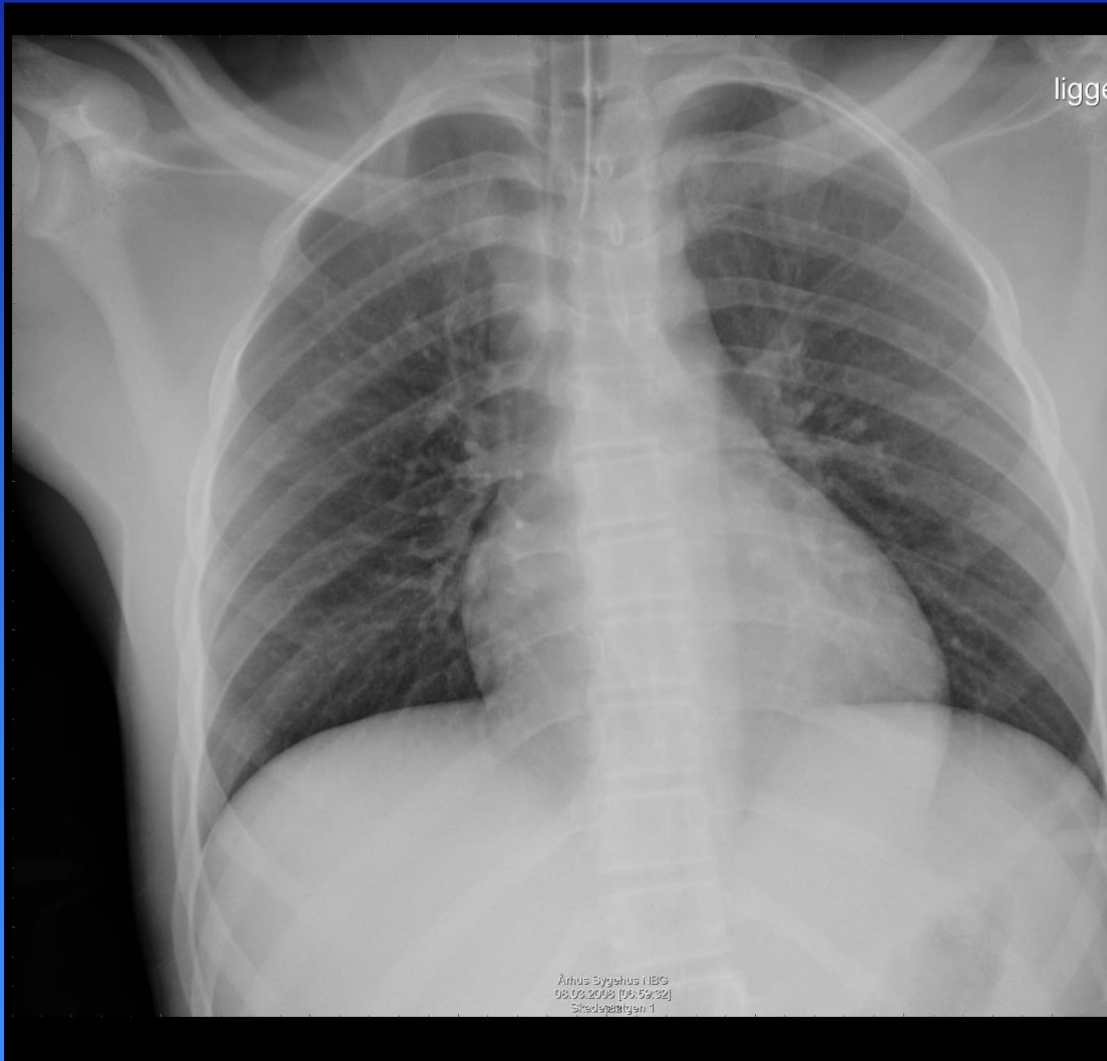


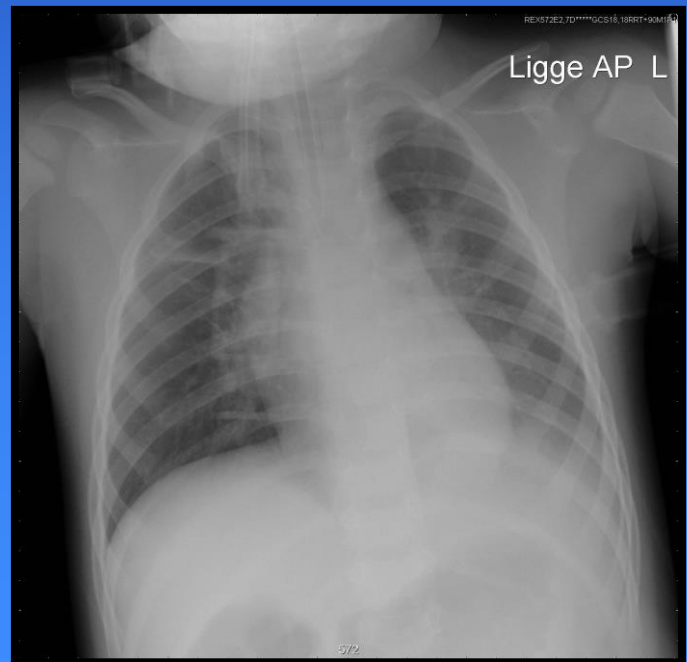
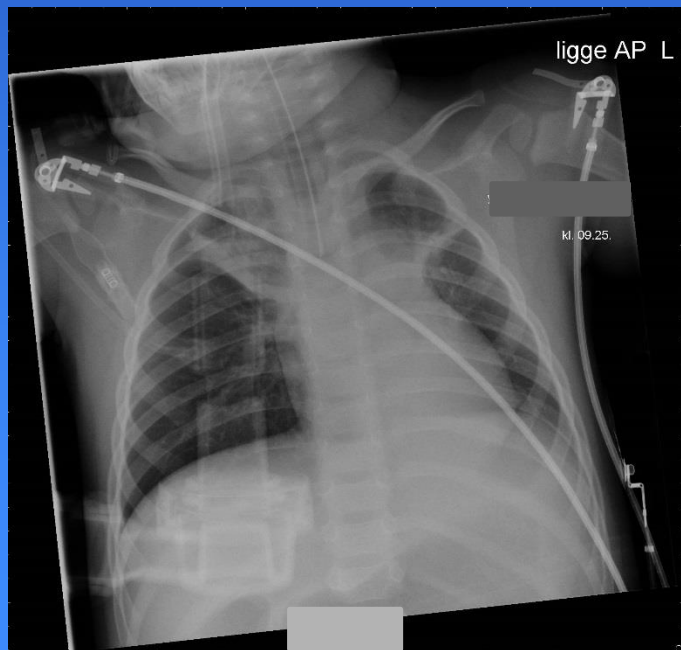
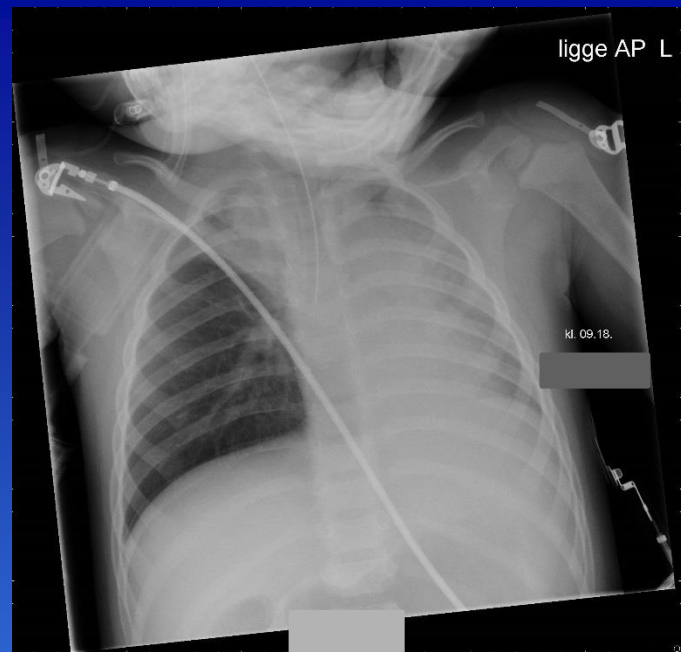
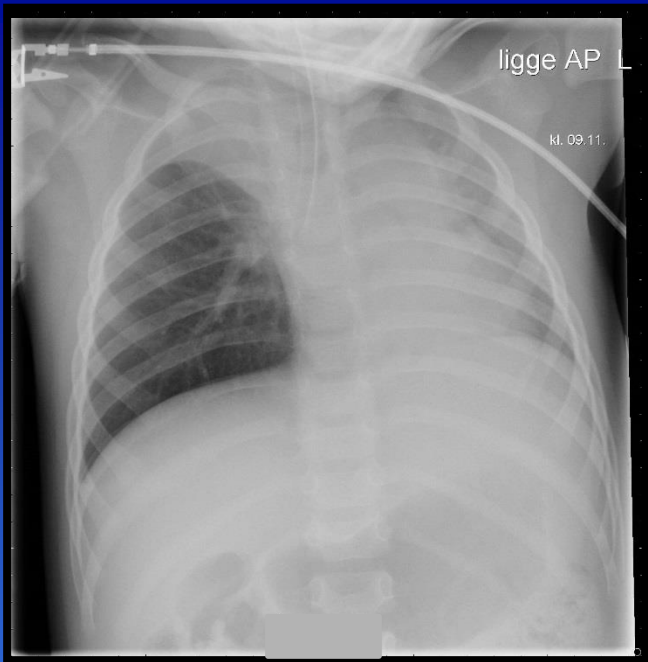






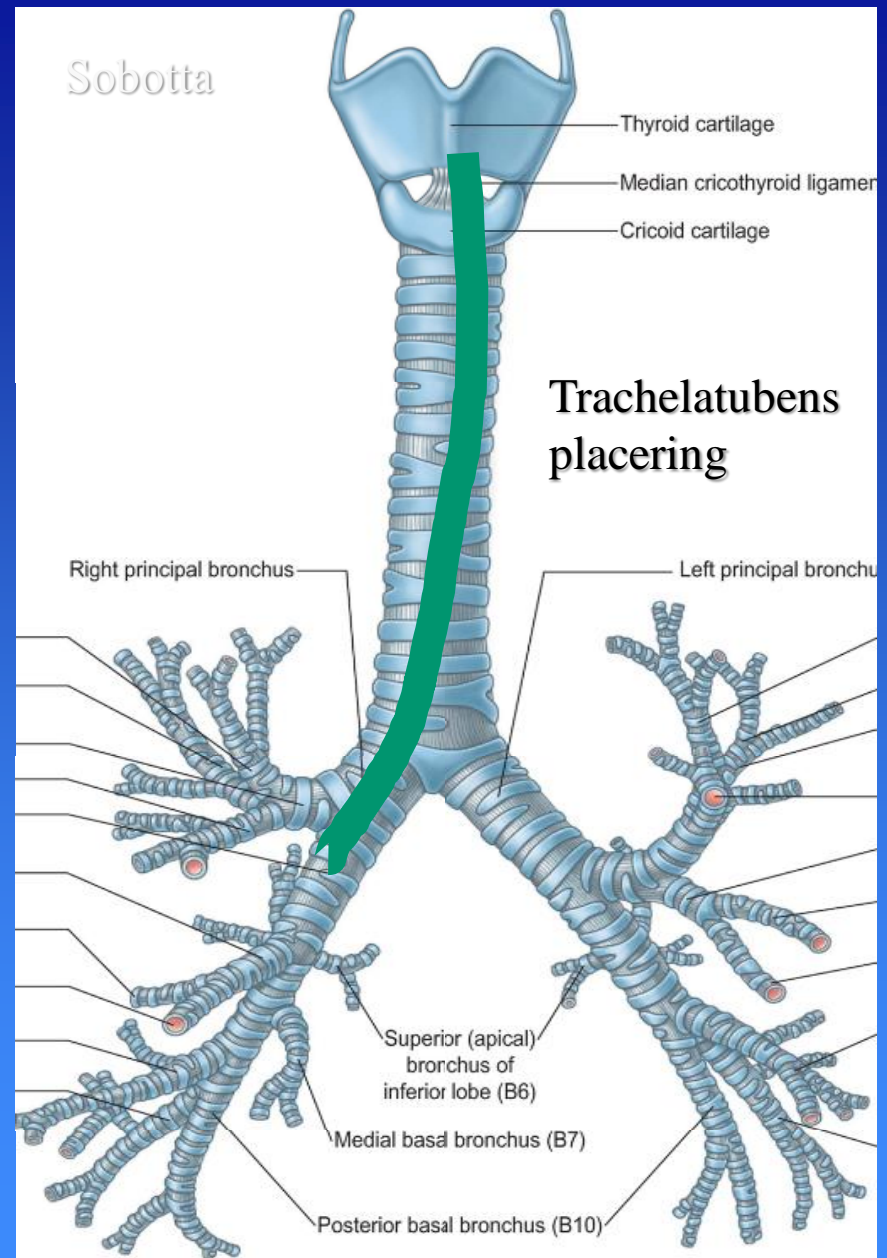
Intuberet patient

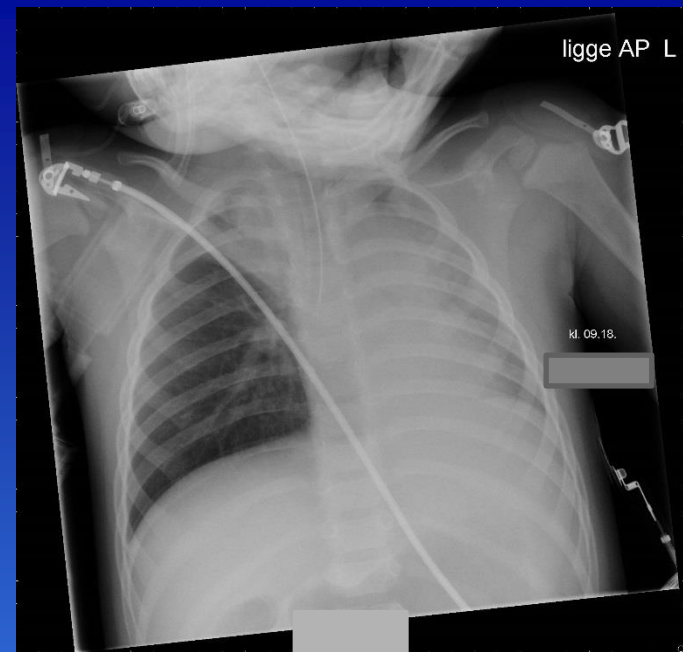
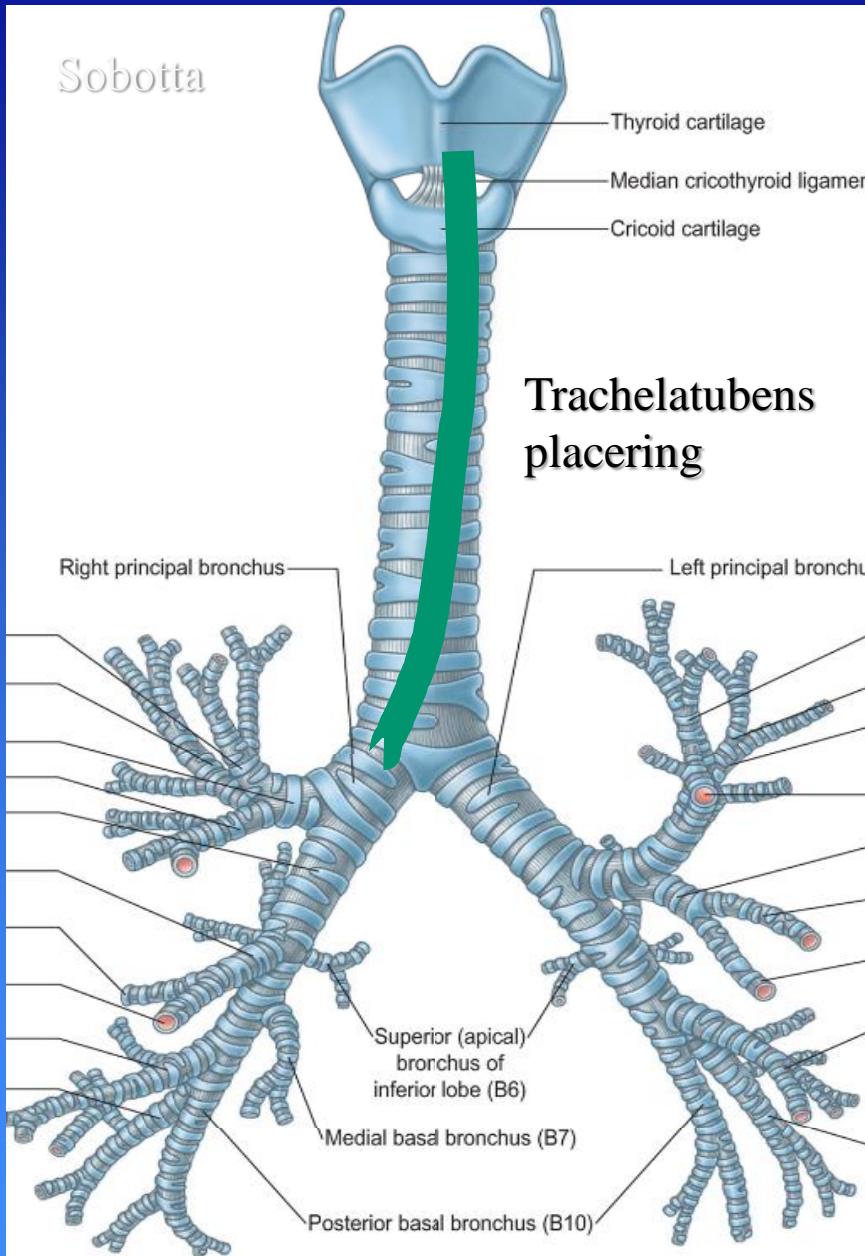






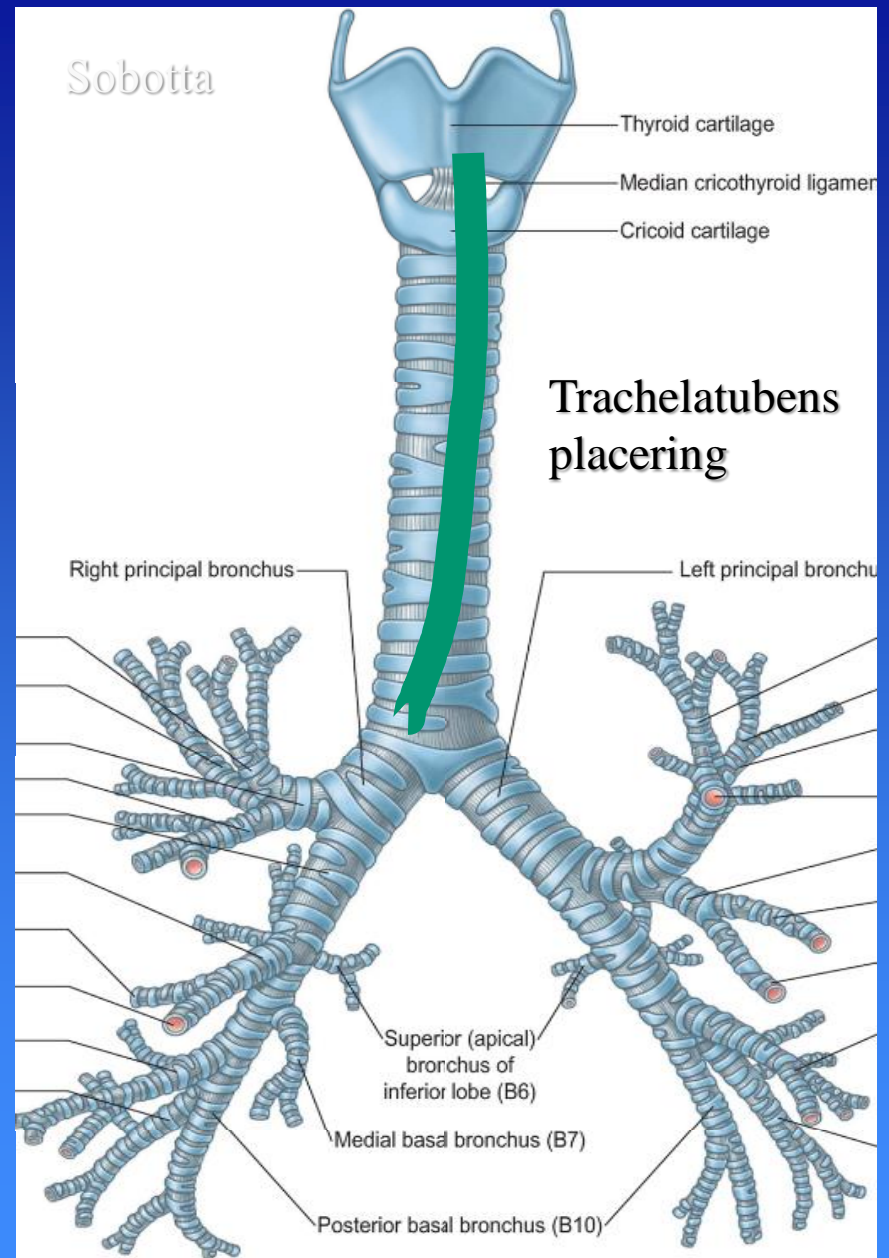
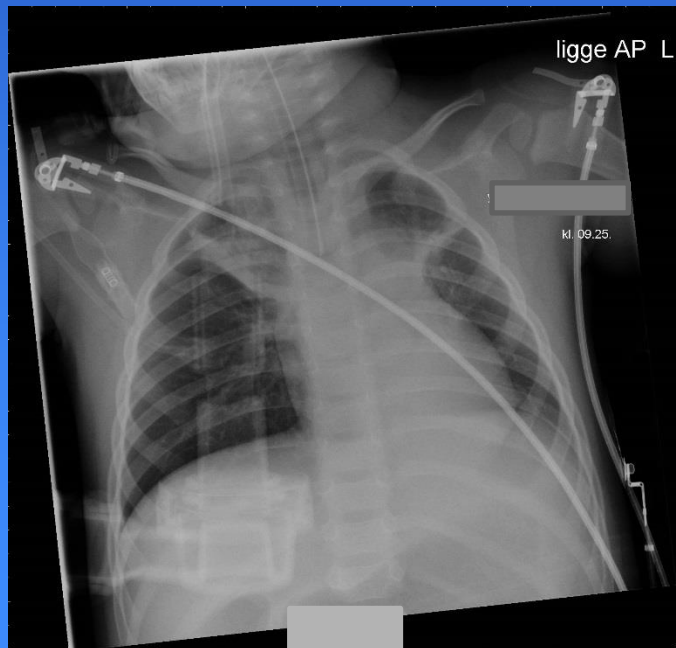
Traumepatient, der netop er blevet intuberet. Røntgenundersøgelsen viser atelektase (sammenfald af lungevæv pga. manglende ventilering) af venstre lunge og højre lunges overlap. Dette fortæller at tuben ligger forbi afgangen af overlaps bronchus (bronchus lobaris superior dexter). Bemærk at hjertet rykker over mod den atelektatiske (sammenfaldne) venstre lunge, der fylder mindre end vanligt.





Tube er nu trukket lidt tilbage, atelektasen i overlappen regredierer. Fortsat dårlig ventilation af venstre lunge.

Tuben trukket yderligere tilbage, venstre lunge ventileres nu også.



Pulmones

Lungernes topografi og relationer : CT 3D

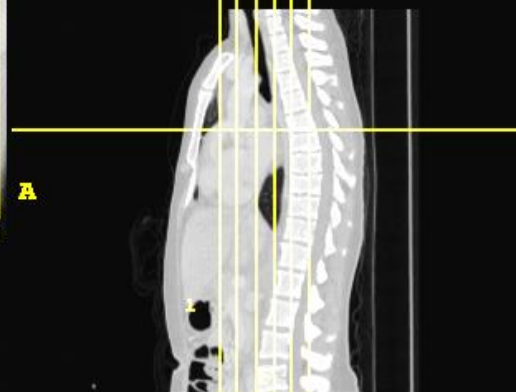
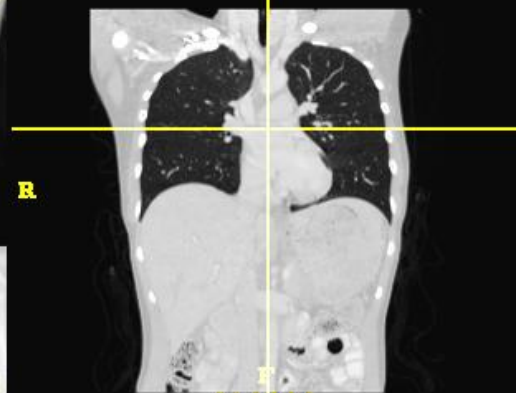
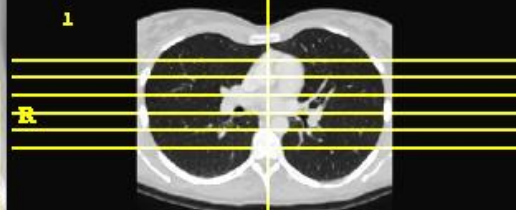


3000
10846
32623
OV mm

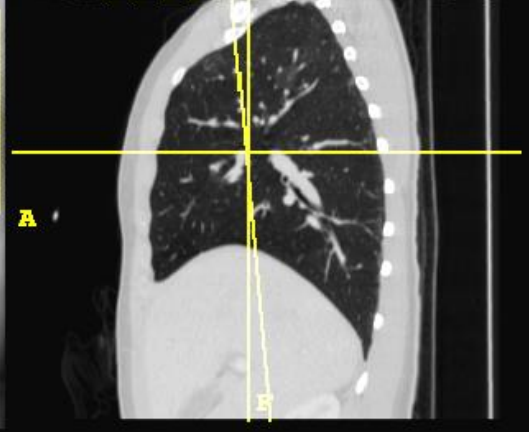
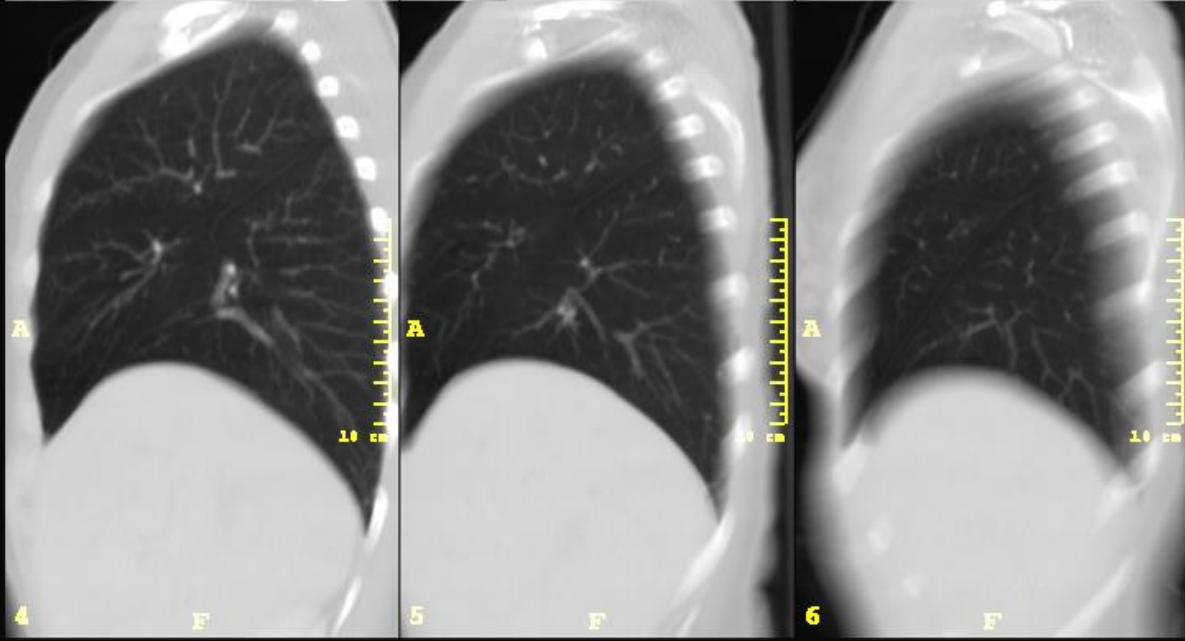
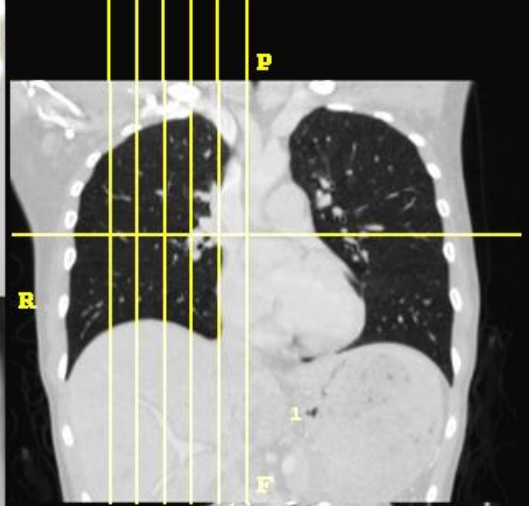
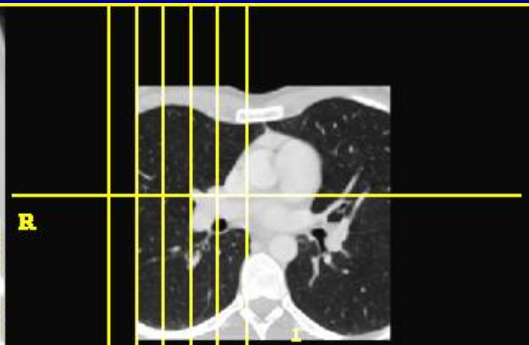
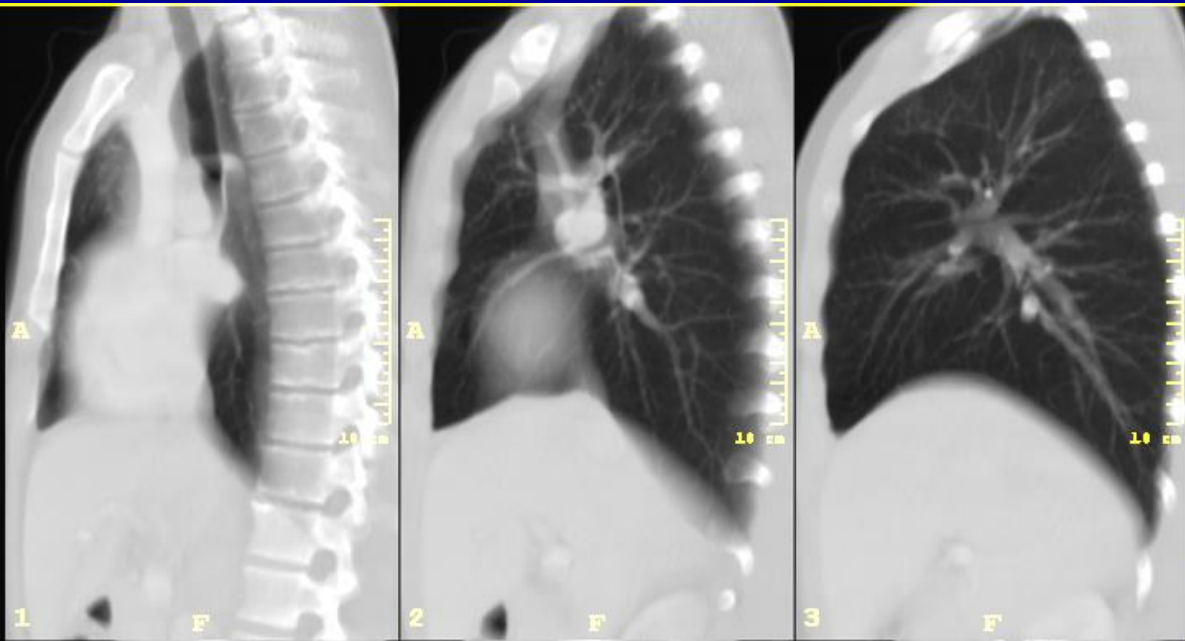
kV
mA
mm
Tilt: degrees
ms
W=250, L=128

Apex pulmonis.
Basis pulmonis.
Facies diaphragmatica.
Facies costalis.
Facies medistinalis.
Margo anterior.
Margo inferior.





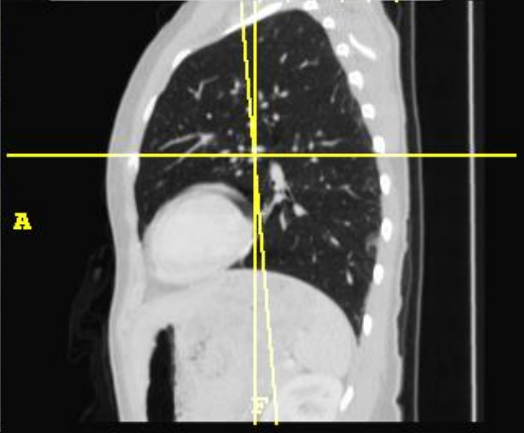
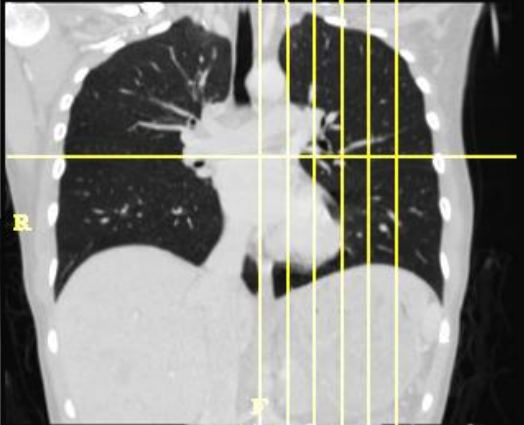
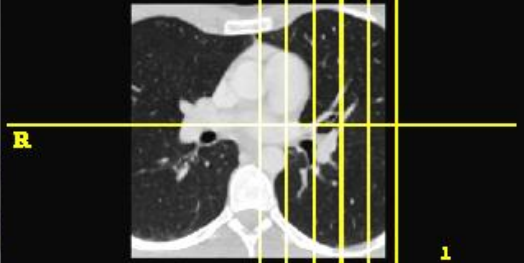
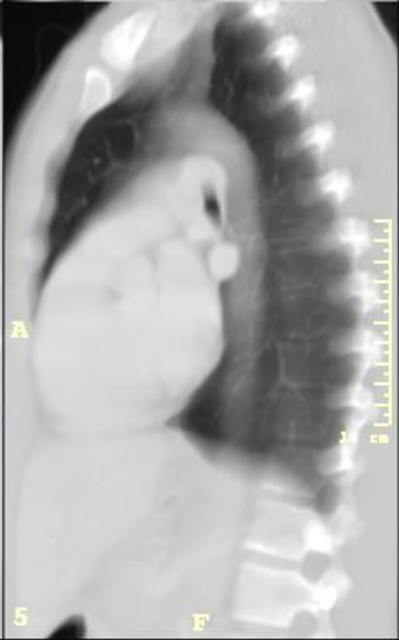
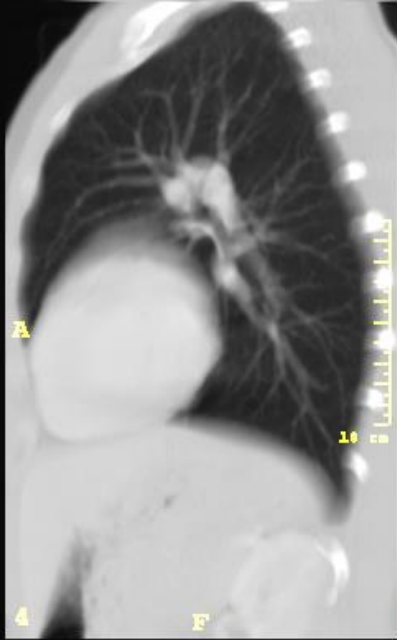
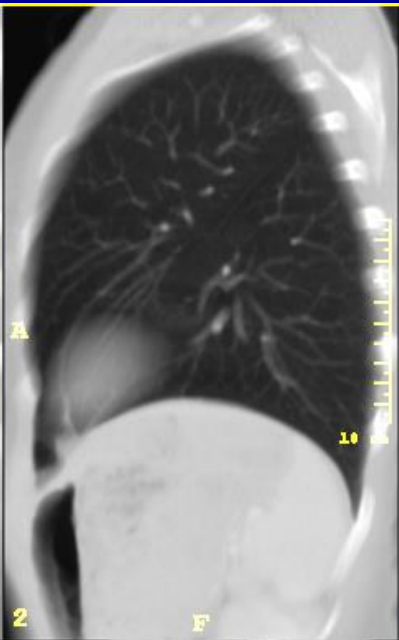
Højre lunge sagittalt



CT

C1 -359
W1 1392

Venstre lunge sagittalt

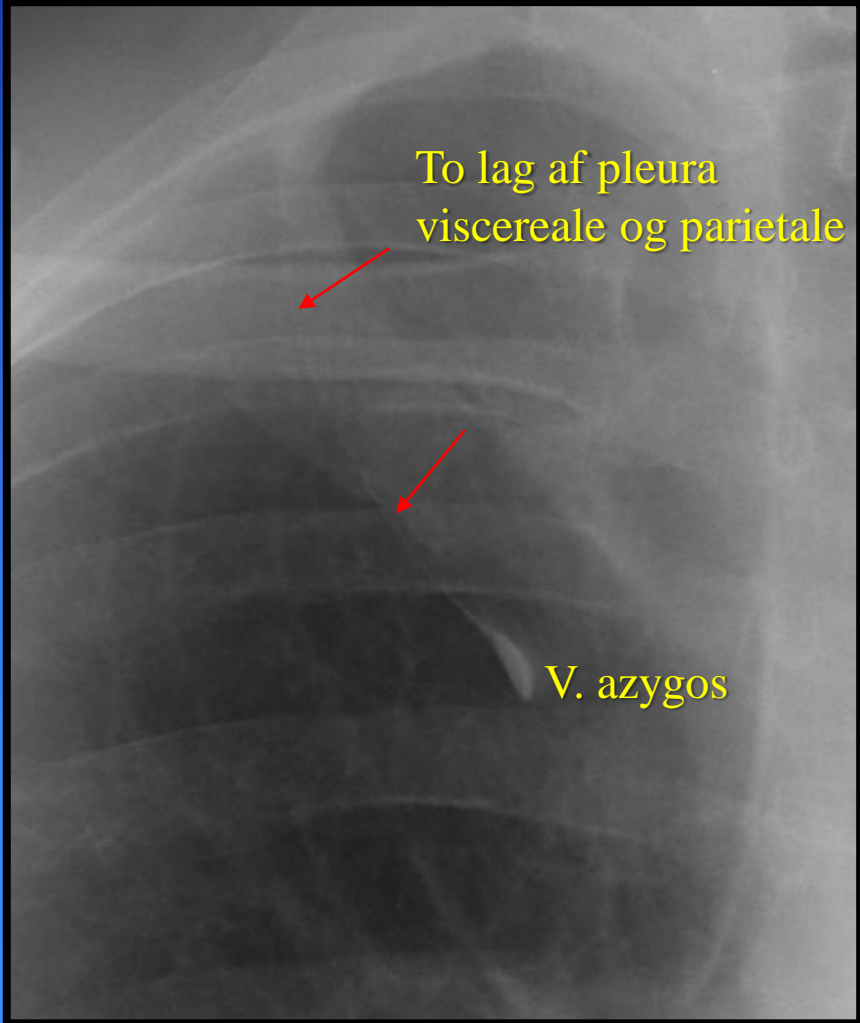


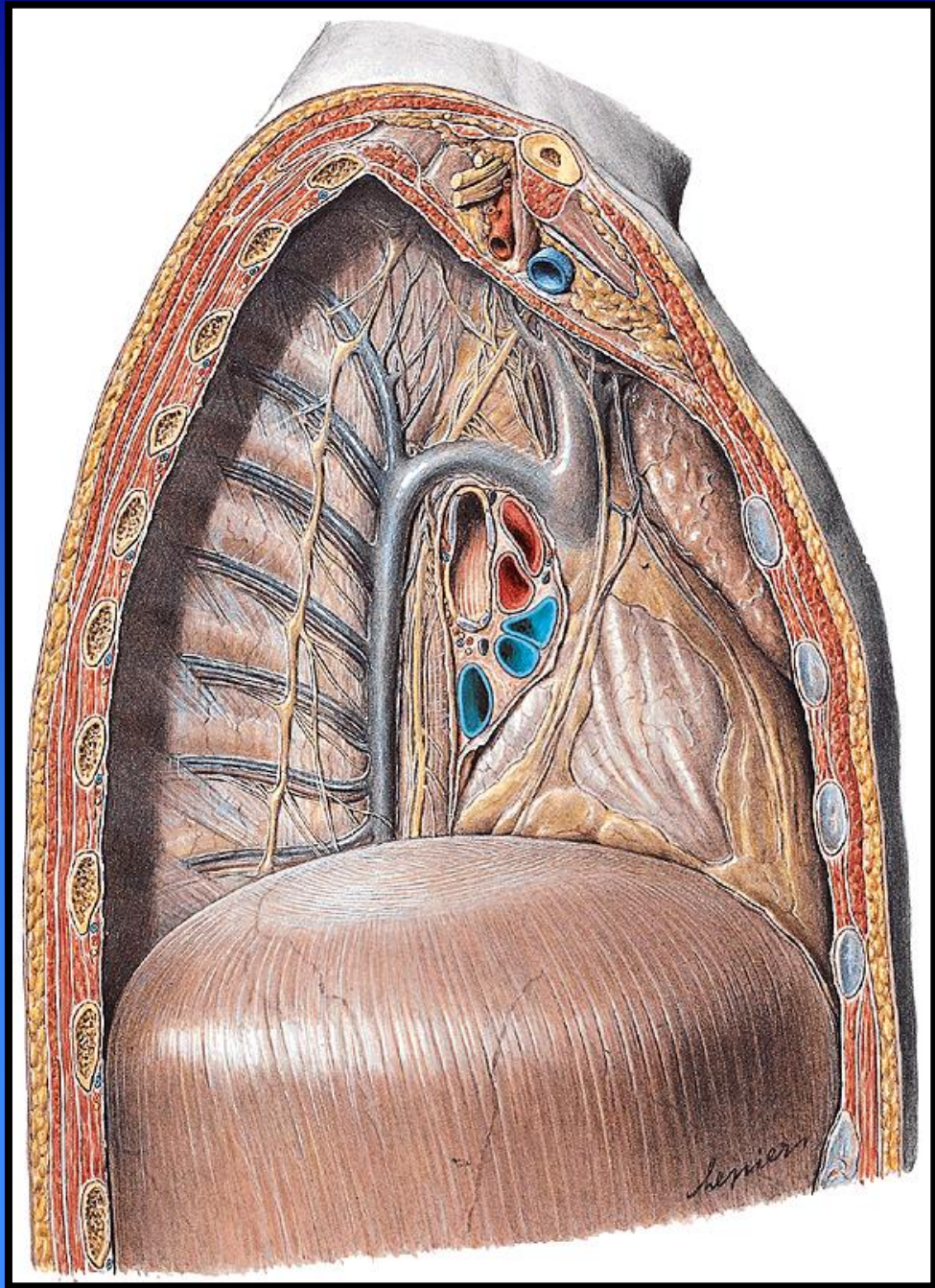
Pleura

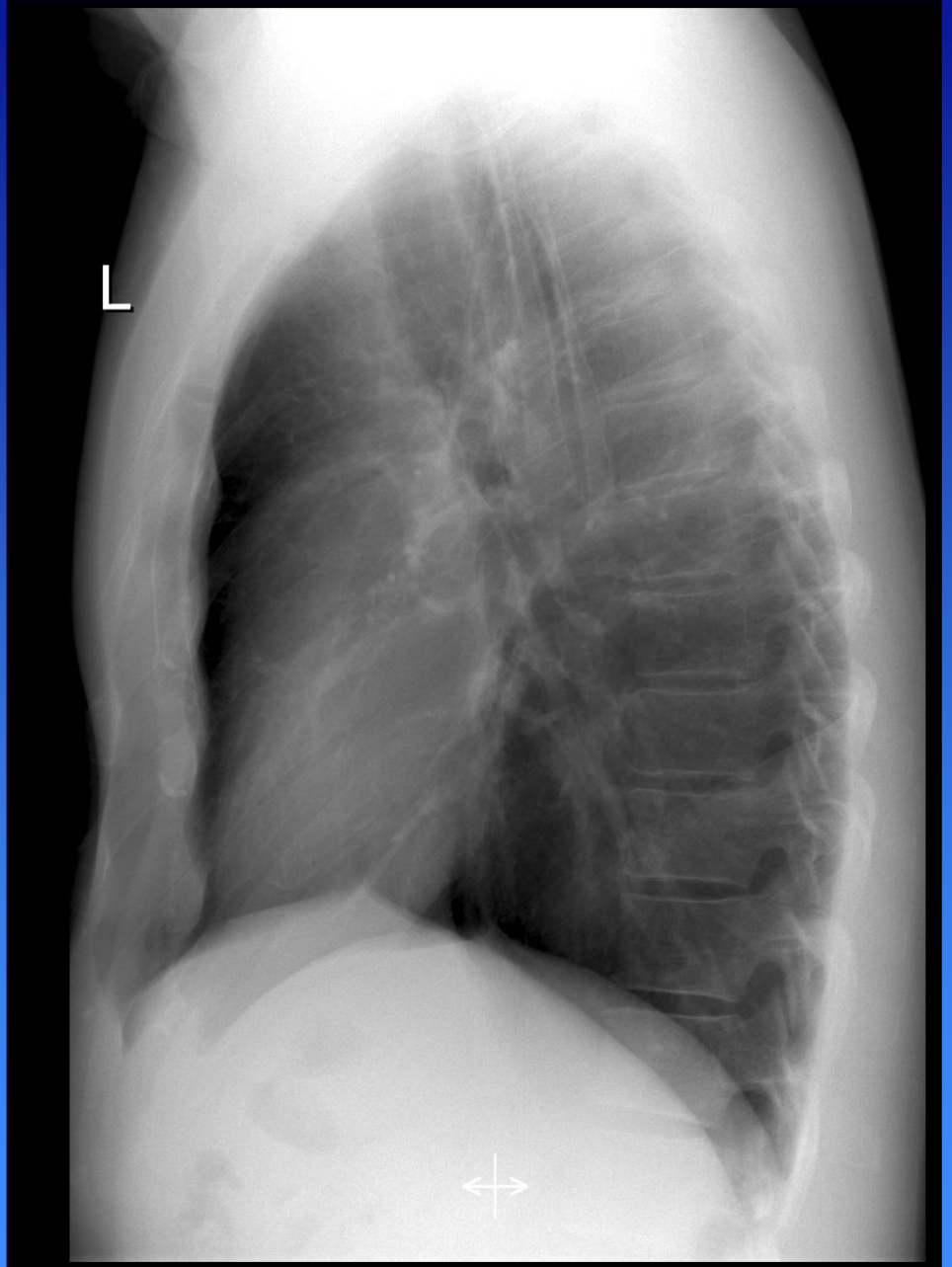
Lobus vena azygos: Anatomisk normalvariant

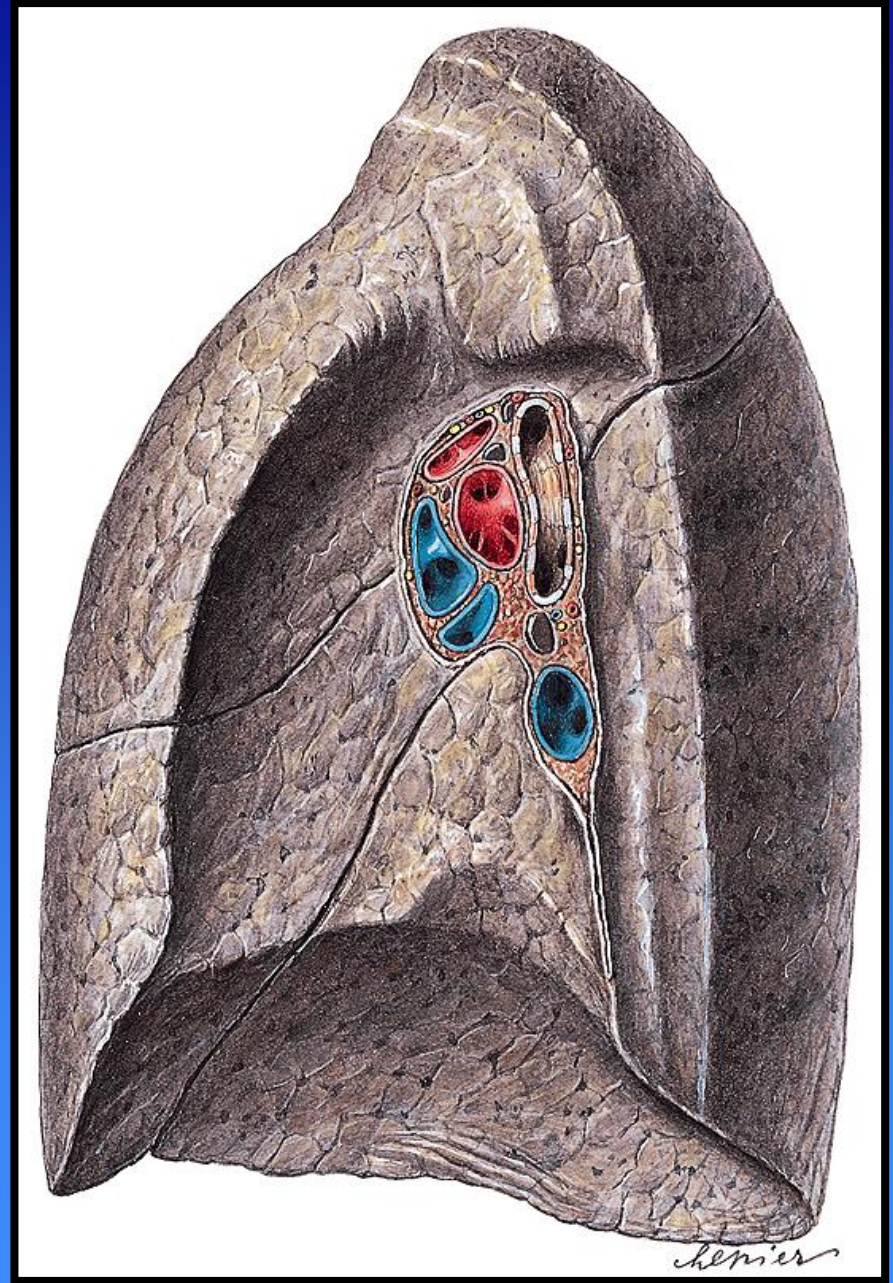


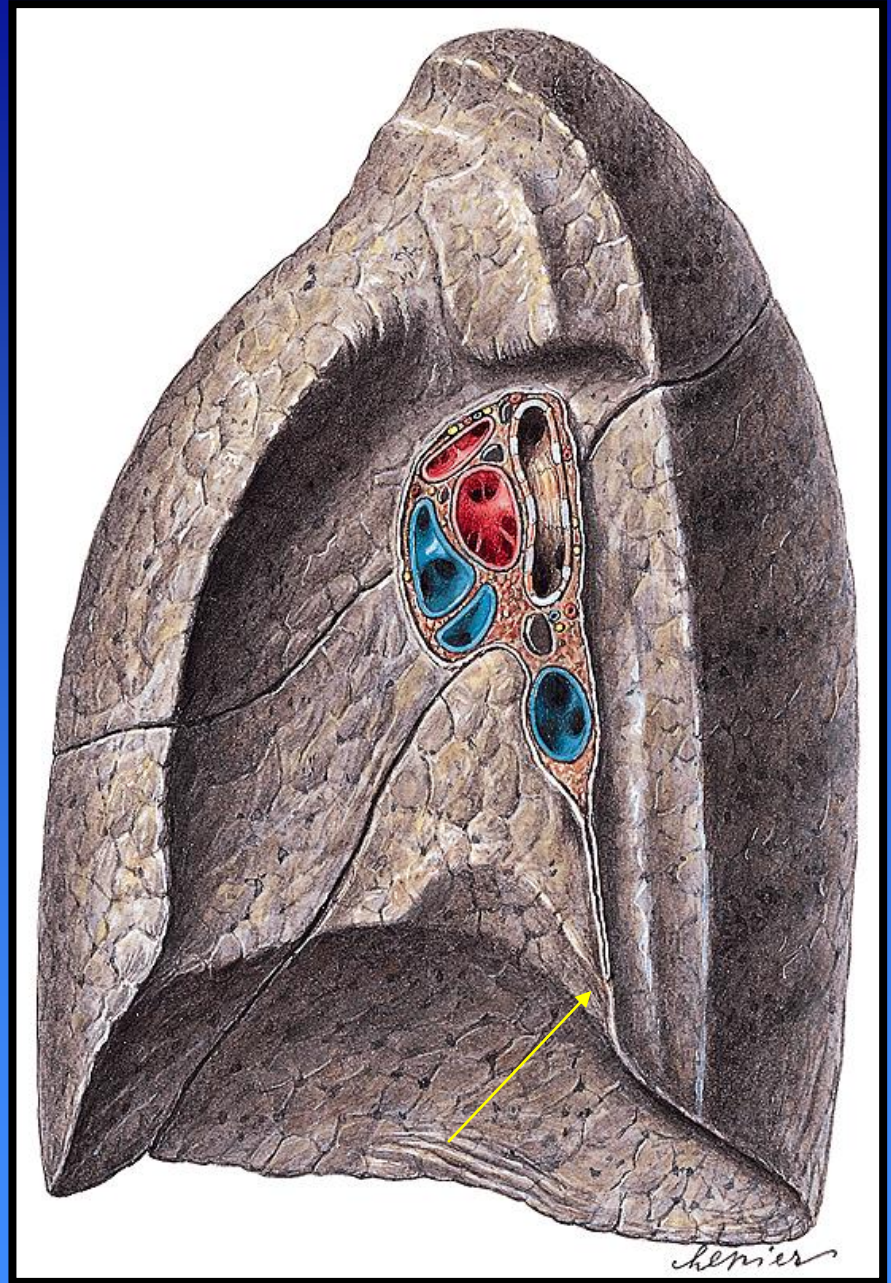
Lobus vena azygos











Ligge AP L

Kl. 19.04

Normal
undersøgelse?
1) Ja
2) Nej

REX32E2V2*****00216 11001-9-211100

Ligge AP L

Luftfyldt
højre
pleura

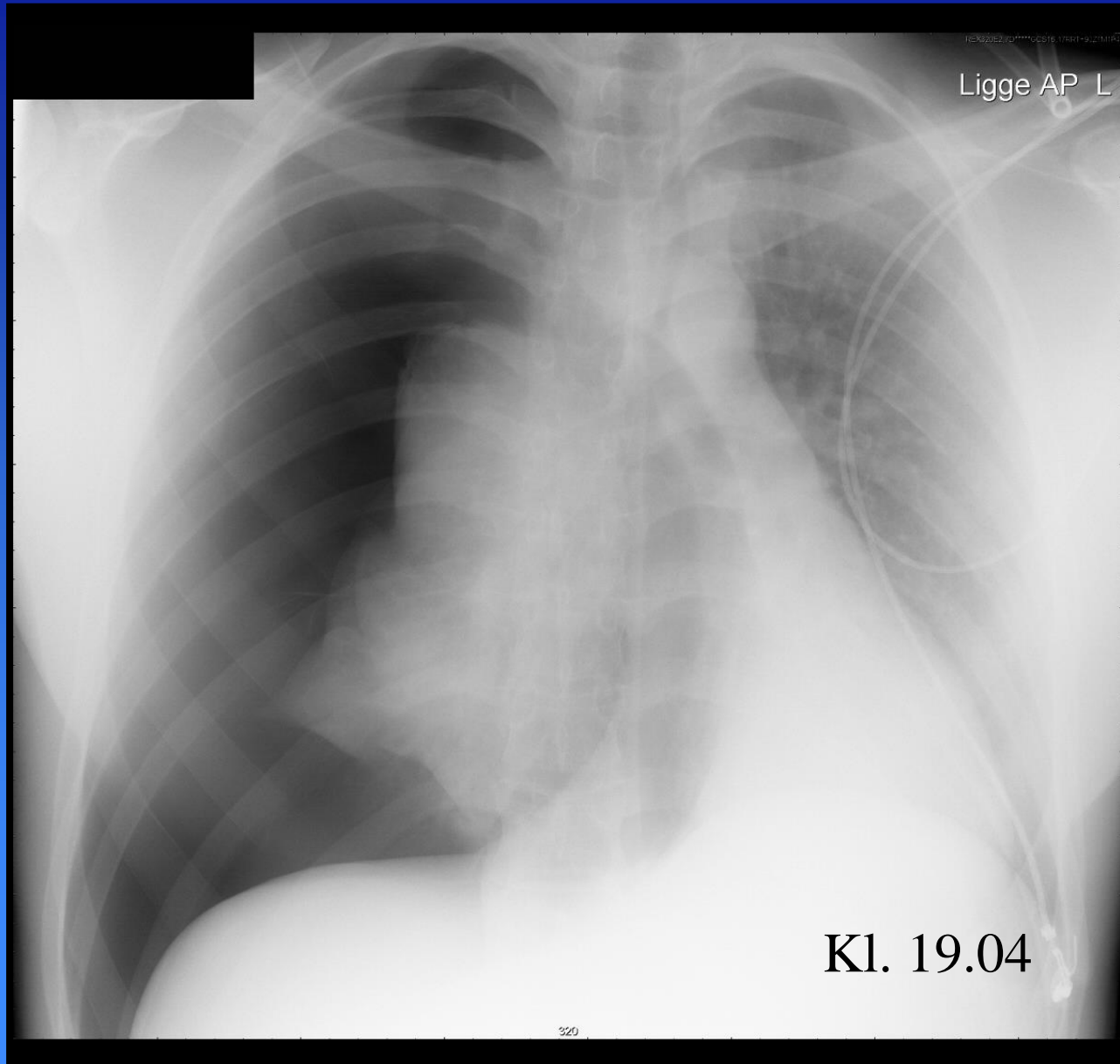
Højre lunge

Cor

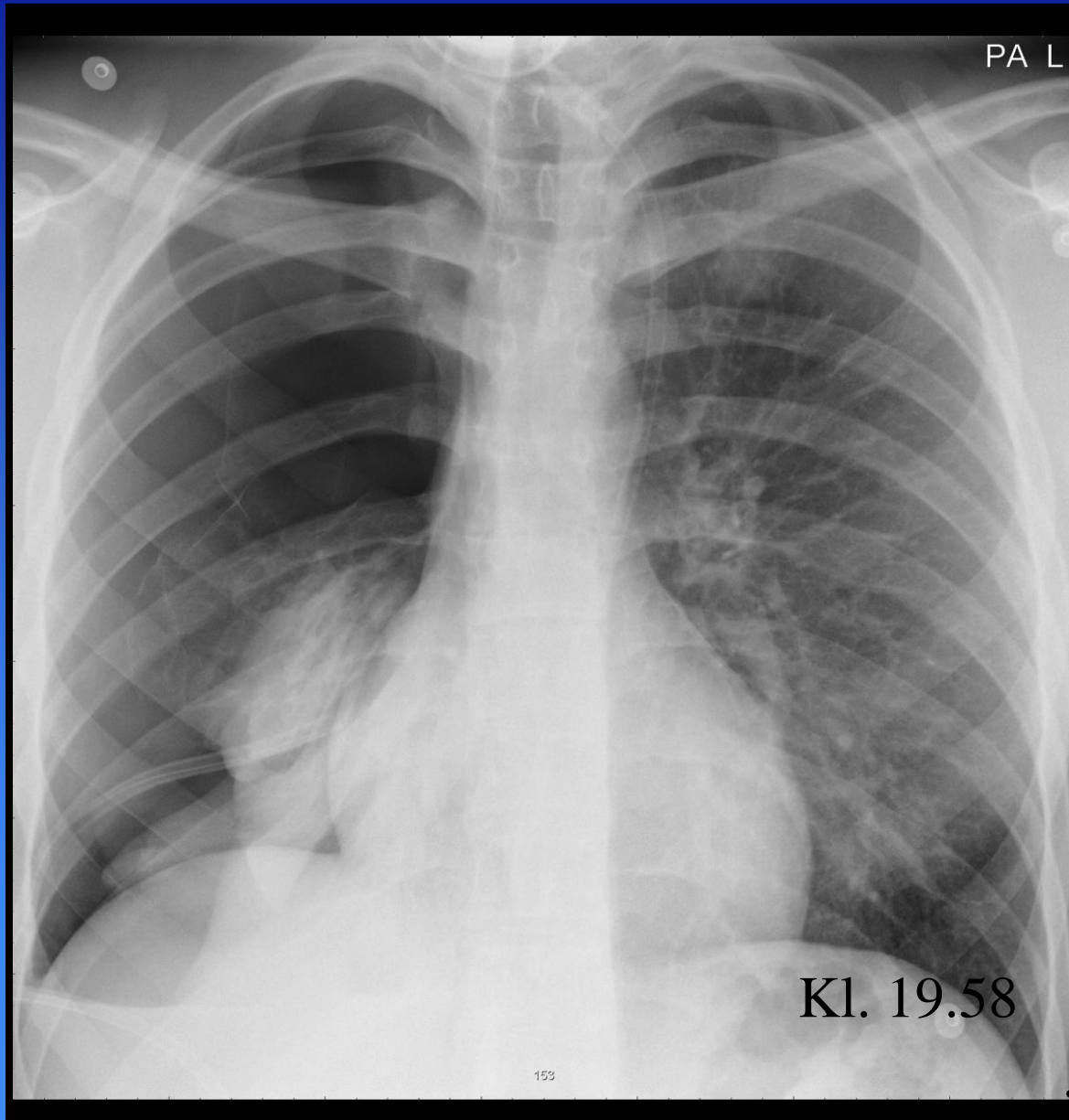
Kl. 19.04

Trykpneumothorax:
Luft under tryk i højre pleura hule, presser den venstre lunge sammen. Den højre lunge er faldet sammen pga. luft i pleura. Hjertet presses mod venstre. Der er tale om en potentielt livstruende tilstand, der kræver hurtig dekompression, med dræn i højre pleurahule.

19-årig mand med trykpneumothorax.



19-årig mand med trykpneumothorax.



19-årig mand med trykpneumothorax.

