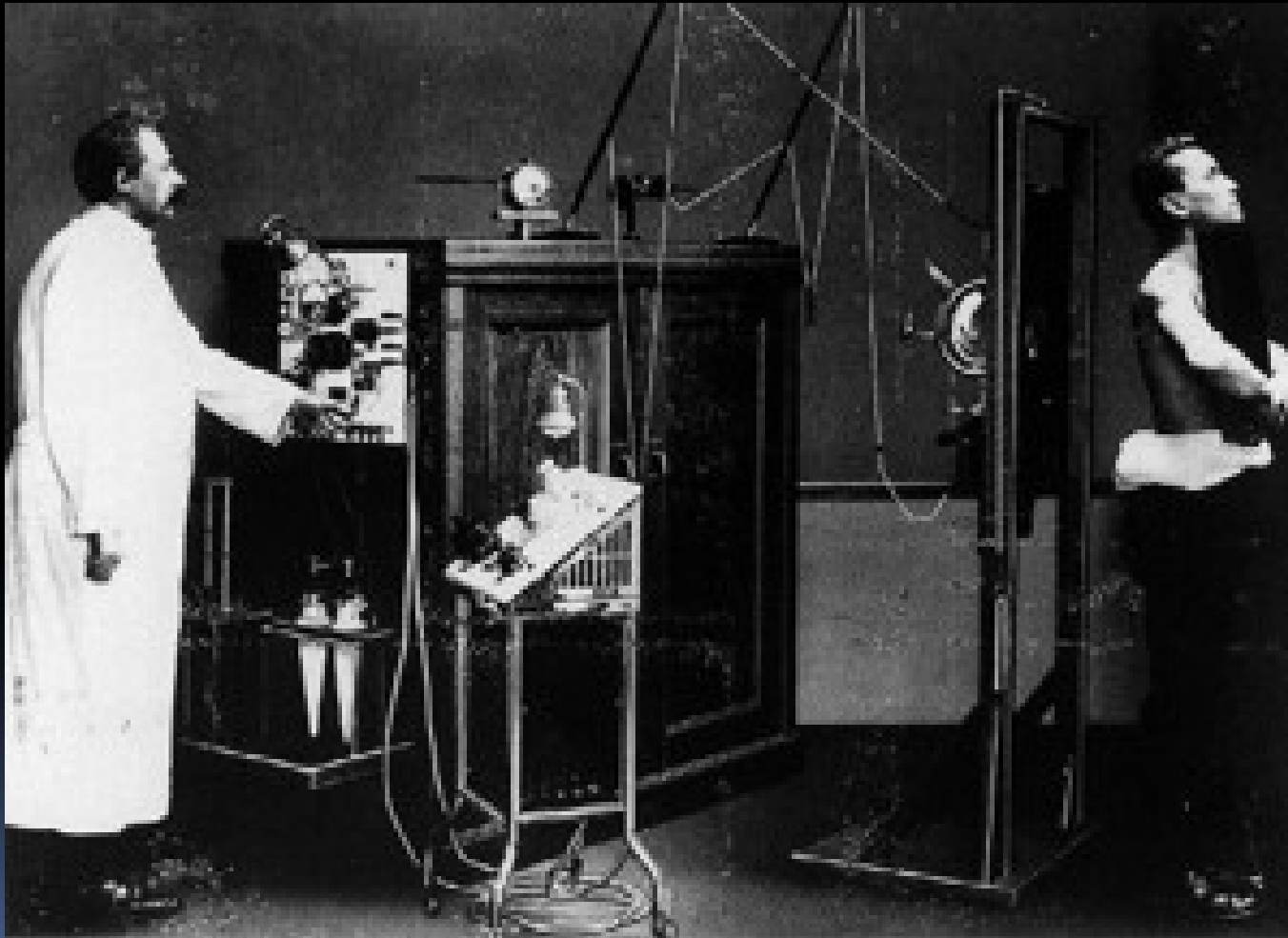


CARDIOVASCULAR H & E



LOCATION OF THE HEART

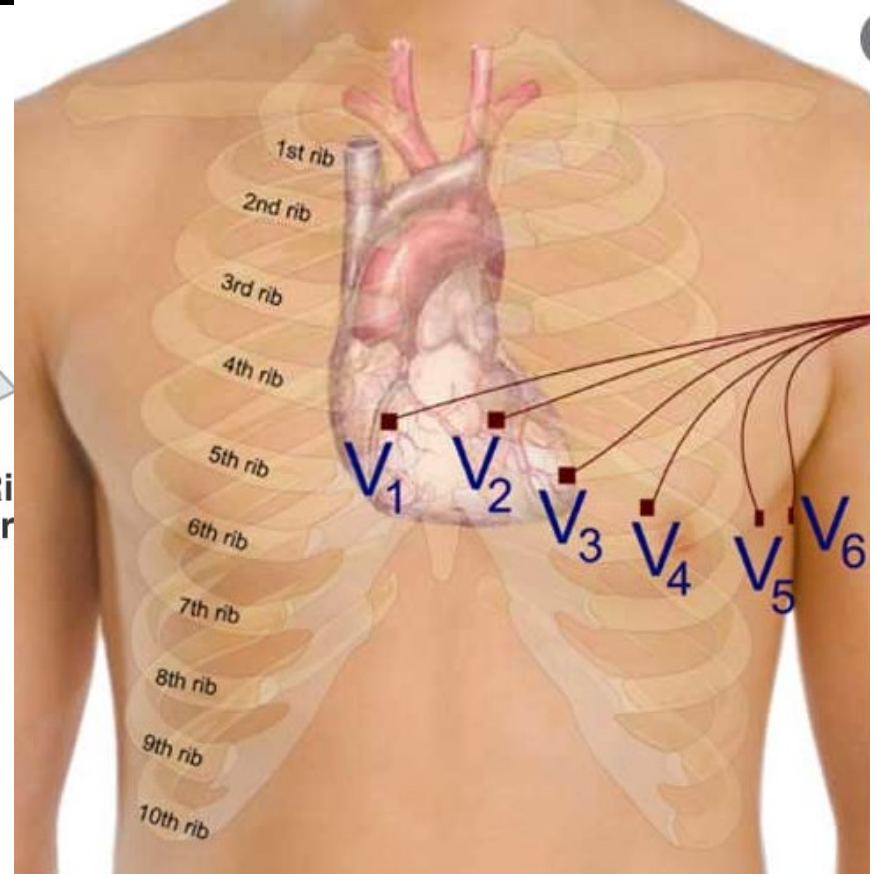
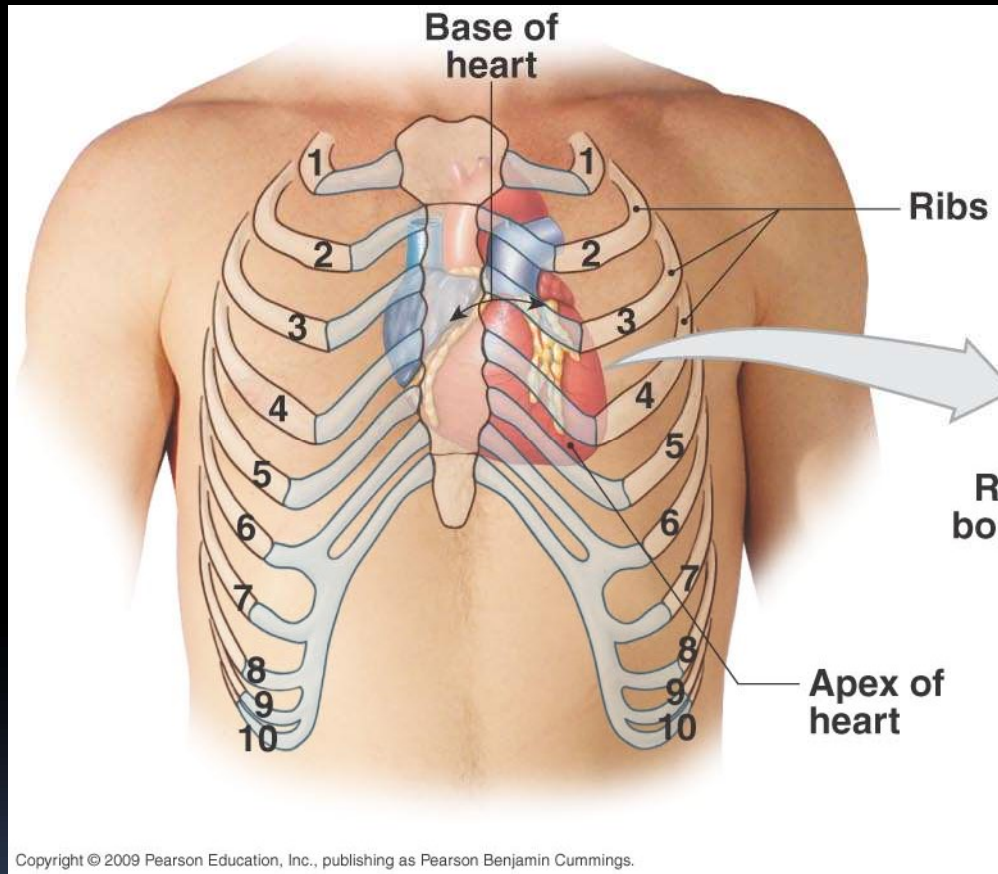
- RESTS ON THE DIAPHRAGM
- NEAR THE MIDLINE OF THE THORACIC CAVITY
- RV IS IN THE FRONT(!), LV IS BACK



Εκπαιδευτικός Στόχος (ΕΣ): Όρια της καρδιάς στην απλή ακτινογραφία

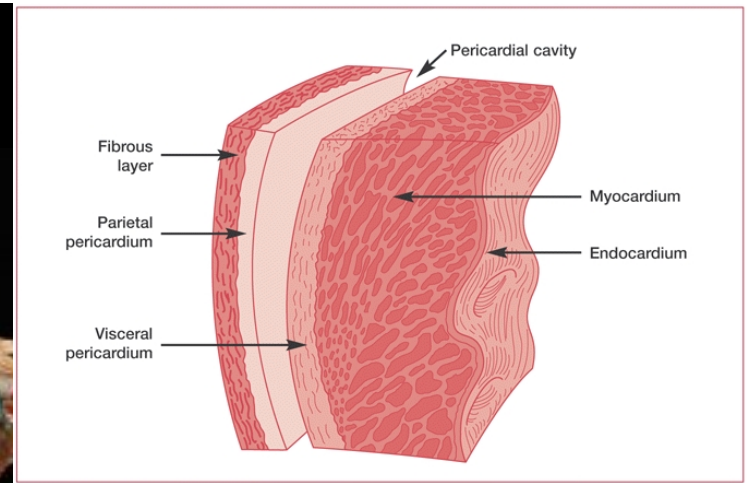
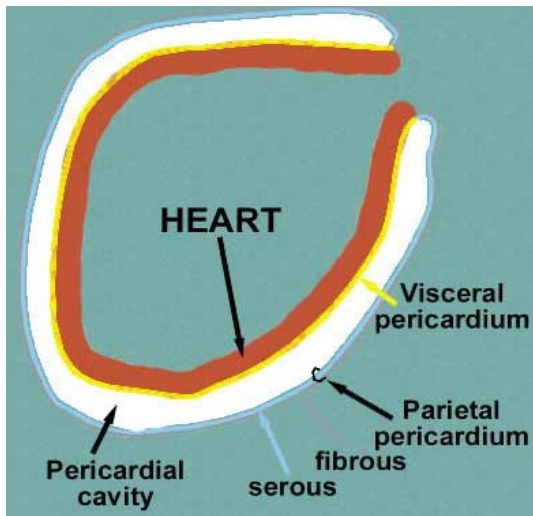


Heart's position in thorax



ΕΚΠΑΙΔΕΥΤΙΚΟΣ ΣΤΟΧΟΣ (ΕΣ): Όρια της καρδιάς στην απλή ακτινογραφία, θέσεις ηλεκτροδίων στο ΗΚΓ



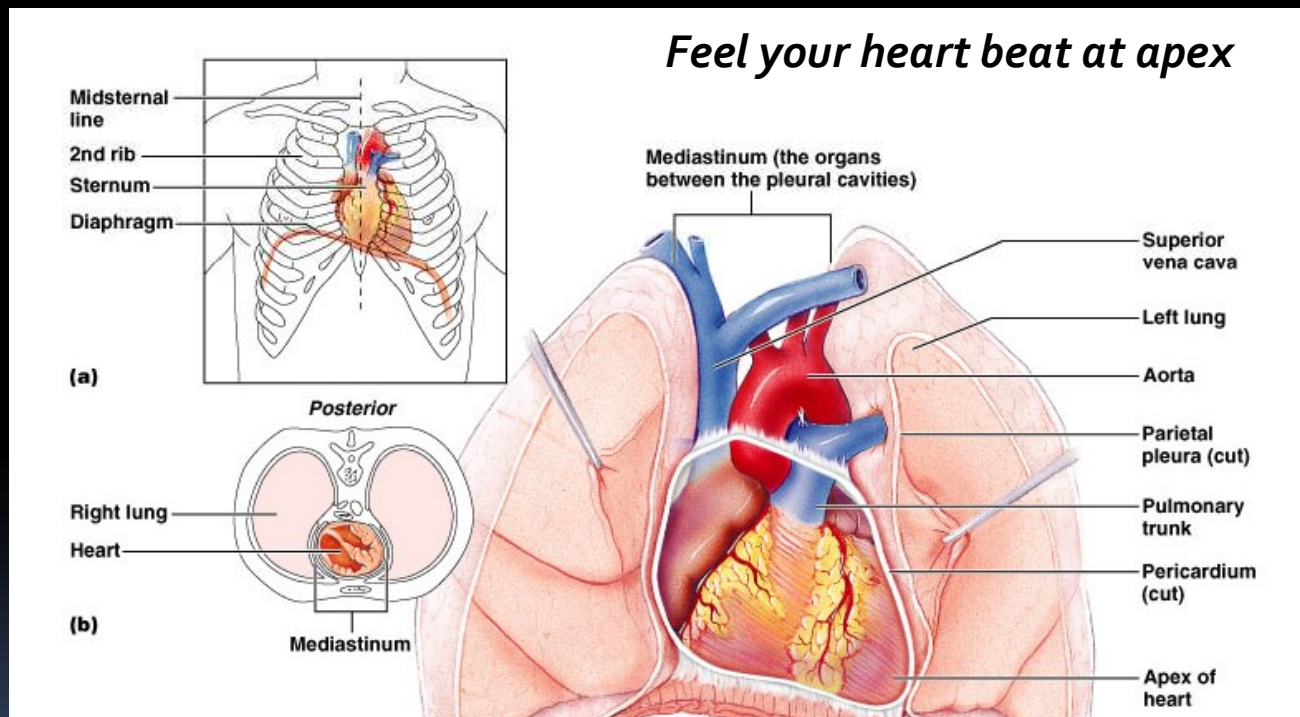


ΕΚΠΑΙΔΕΥΤΙΚΟΣ ΣΤΟΧΟΣ (ΕΣ): Ρόλος περικαρδίου. Περικαρδίτιδα, ΠΚ συλλογή



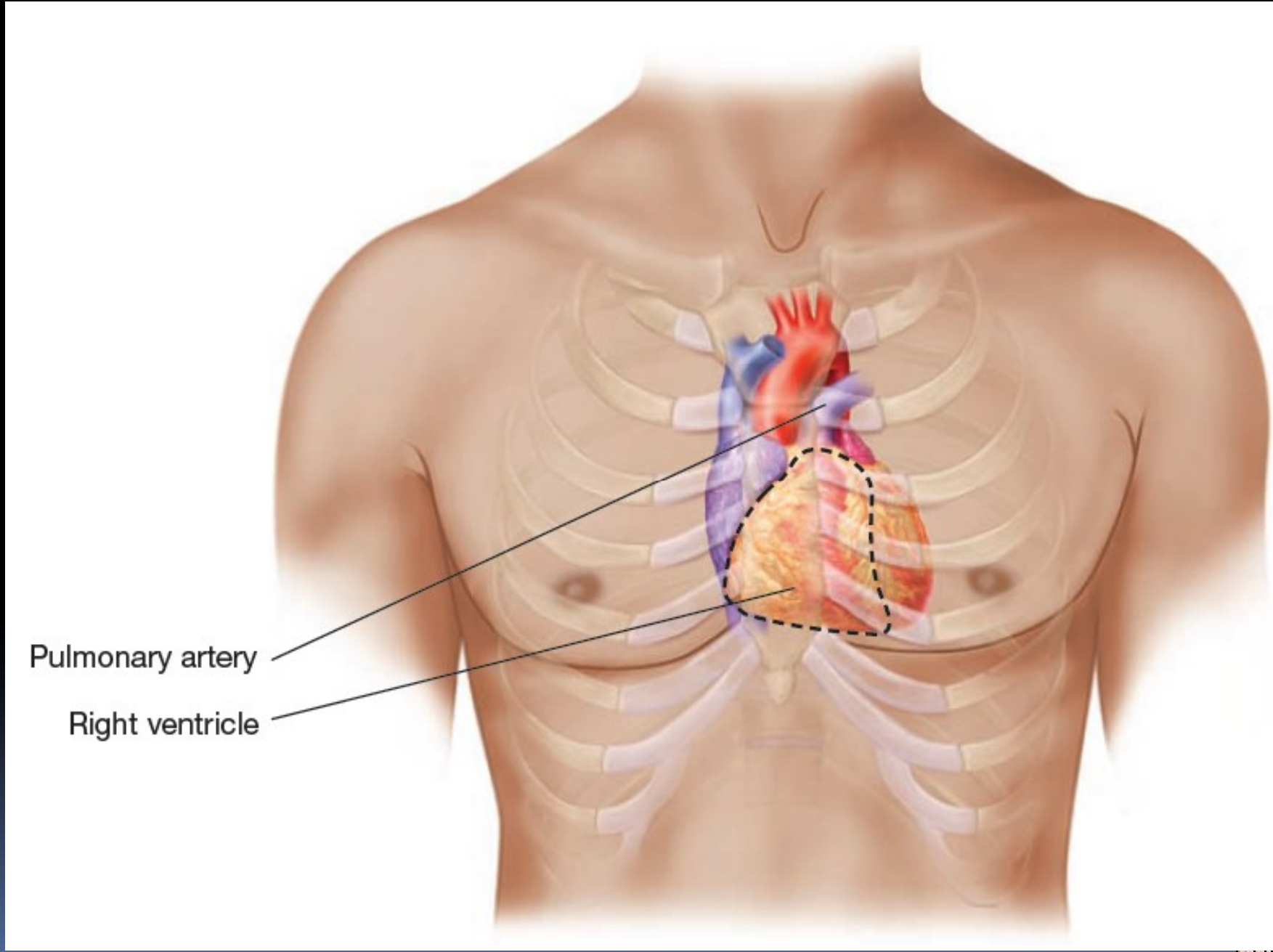
Heart's position in thorax

- In mediastinum – behind sternum and pointing left, lying on the diaphragm
- It weighs 250-350 gm (about 1 pound)



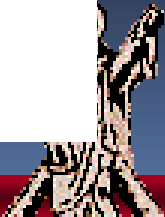
ΕΚΠΑΙΔΕΥΤΙΚΟΣ ΣΤΟΧΟΣ (ΕΣ): Η δεξιά κοιλία είναι πρόσθια δομή, Θέση της καρδιακής ώσης





Pulmonary artery

Right ventricle

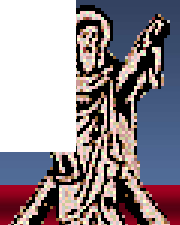
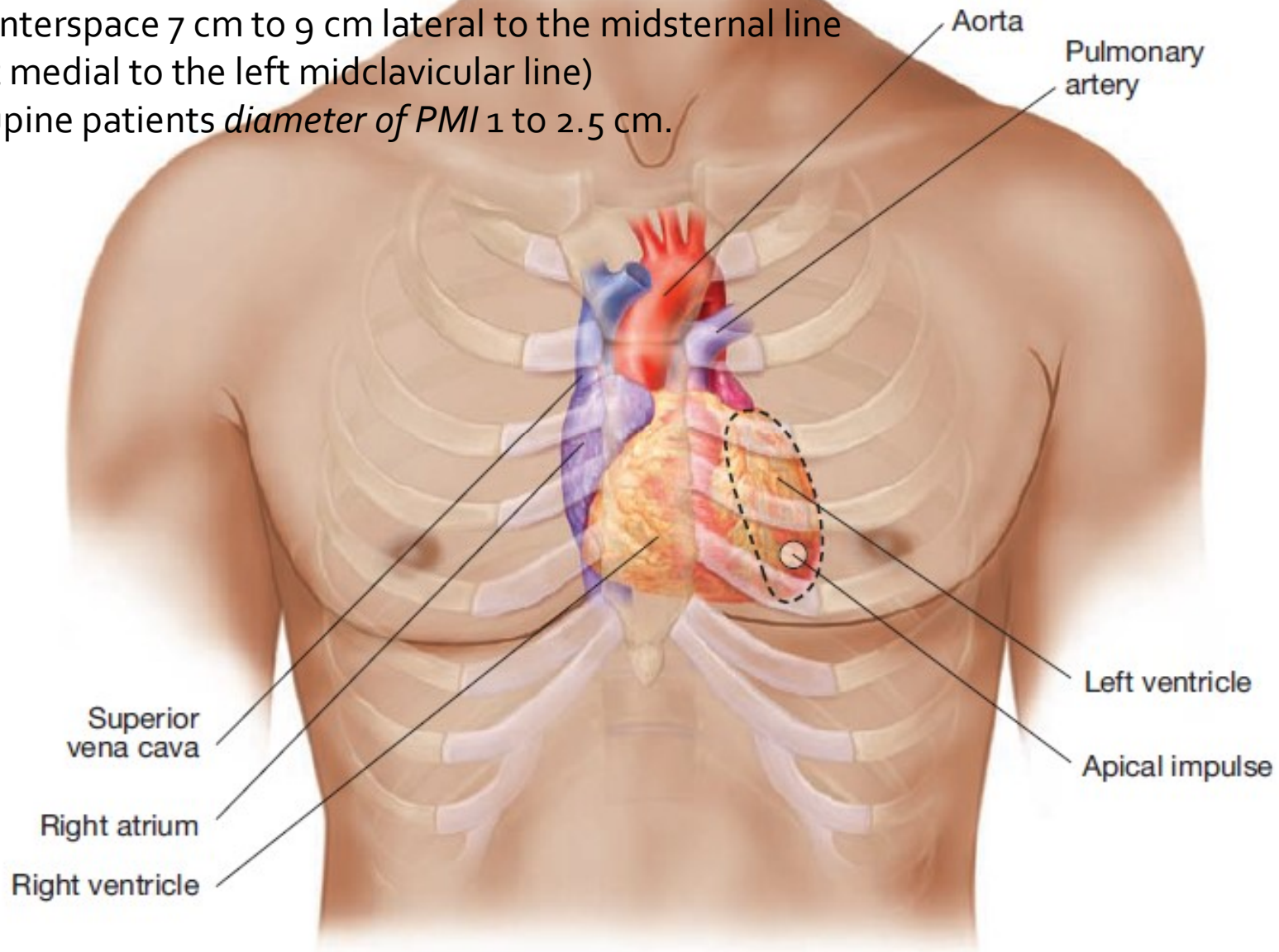


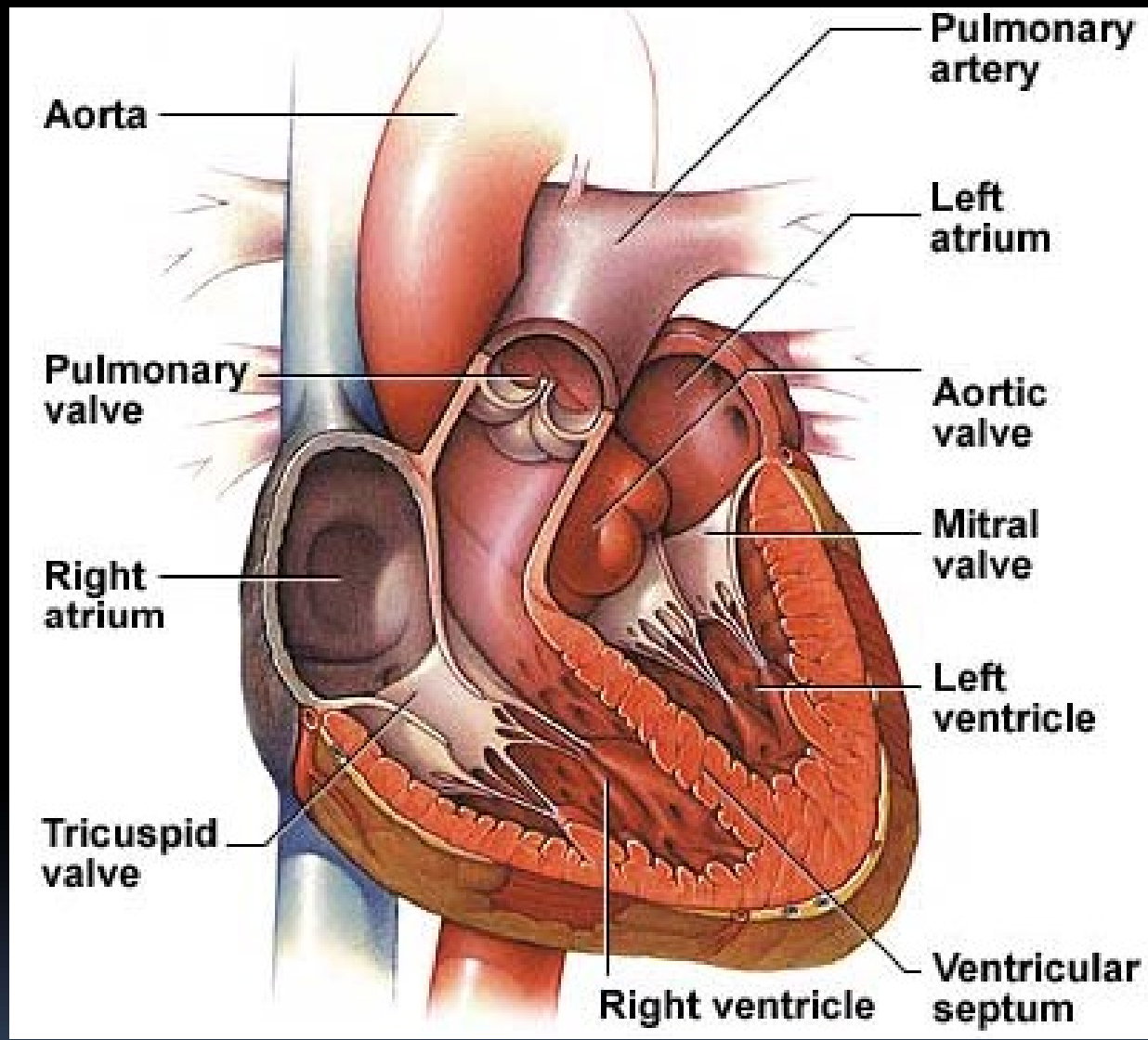
Point of maximal impulse, or PMI.

Locates the left border of the heart

*5th interspace 7 cm to 9 cm lateral to the midsternal line
(just medial to the left midclavicular line)*

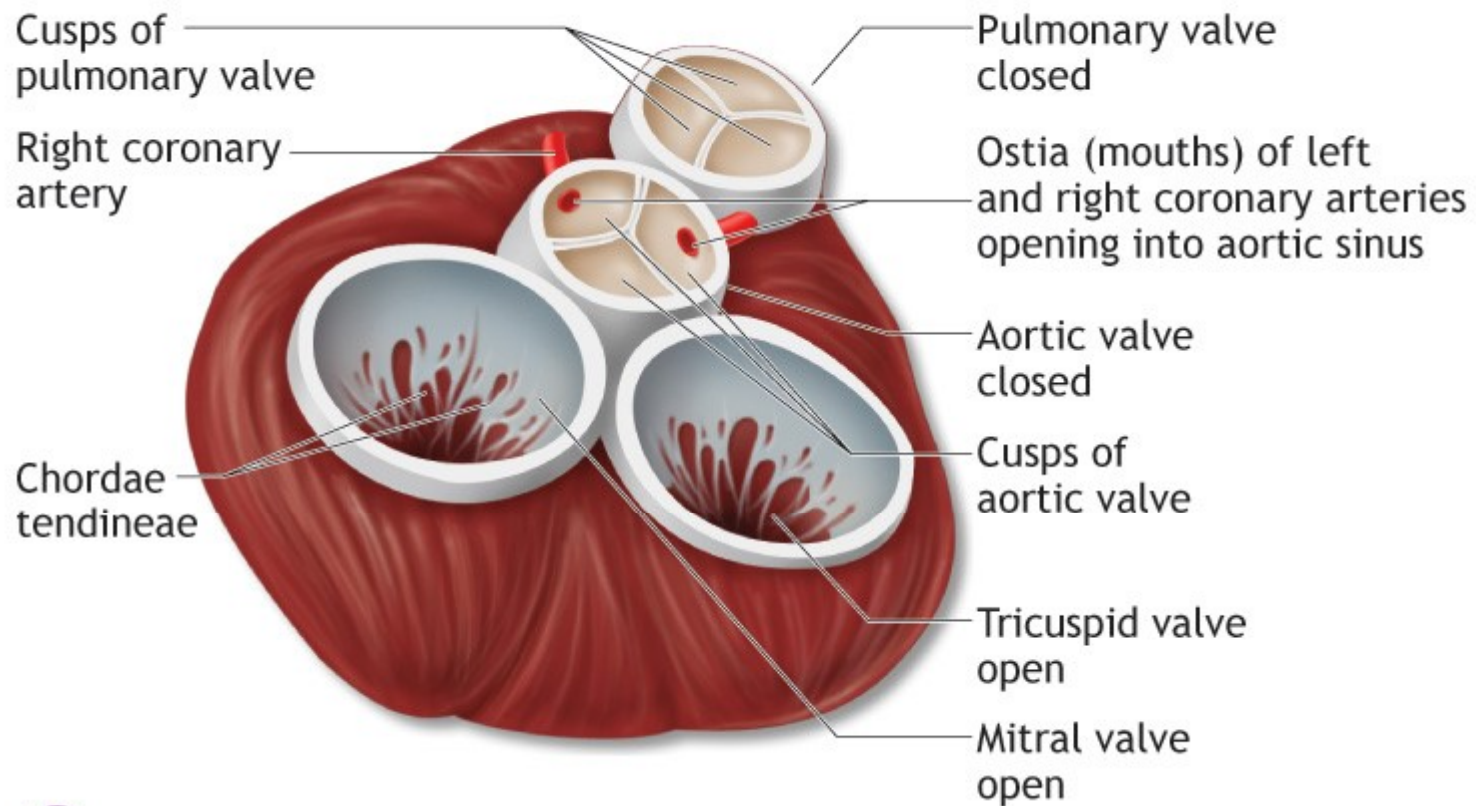
In supine patients diameter of PMI 1 to 2.5 cm.





ΕΚΠΑΙΔΕΥΤΙΚΟΣ ΣΤΟΧΟΣ (ΕΣ): Ανατομική σχέση των μεγάλων αγγείων και των βαλβίδων. Σημασία για τις θέσεις ακρόασης.





B

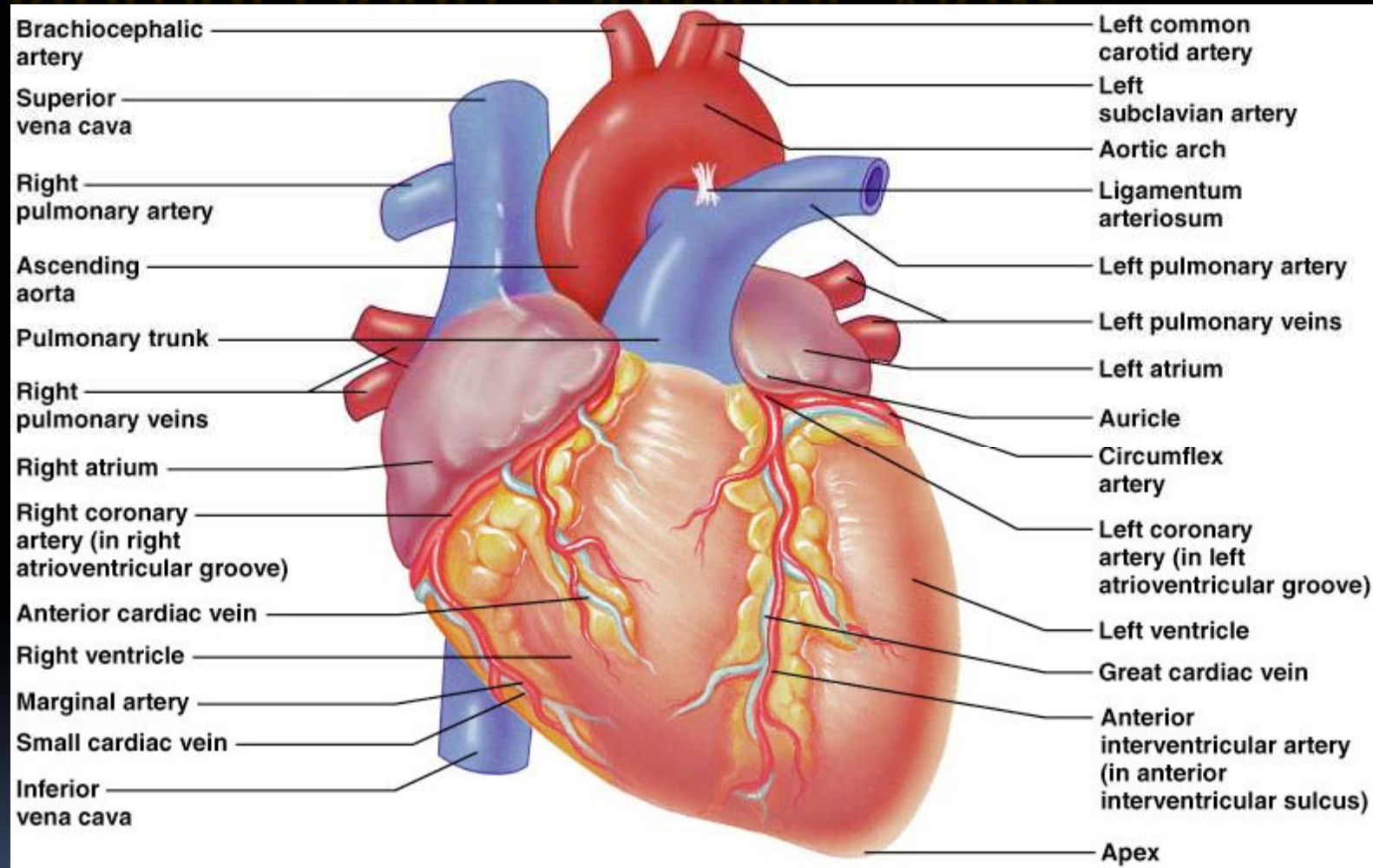
Diastole

Figure 15.3. B. In diastole, the aortic and pulmonary valves snap close; shortly thereafter, the mitral and tricuspid valves open and blood flows into the ventricular cavities.

Copyright © 2001 Lippincott Williams & Wilkins

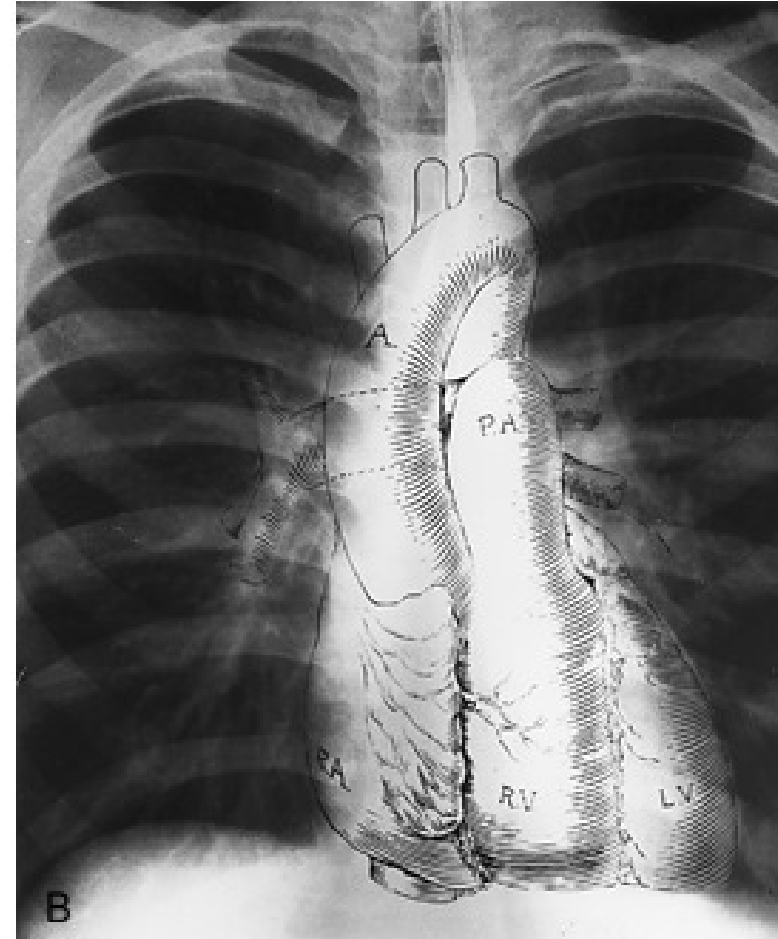
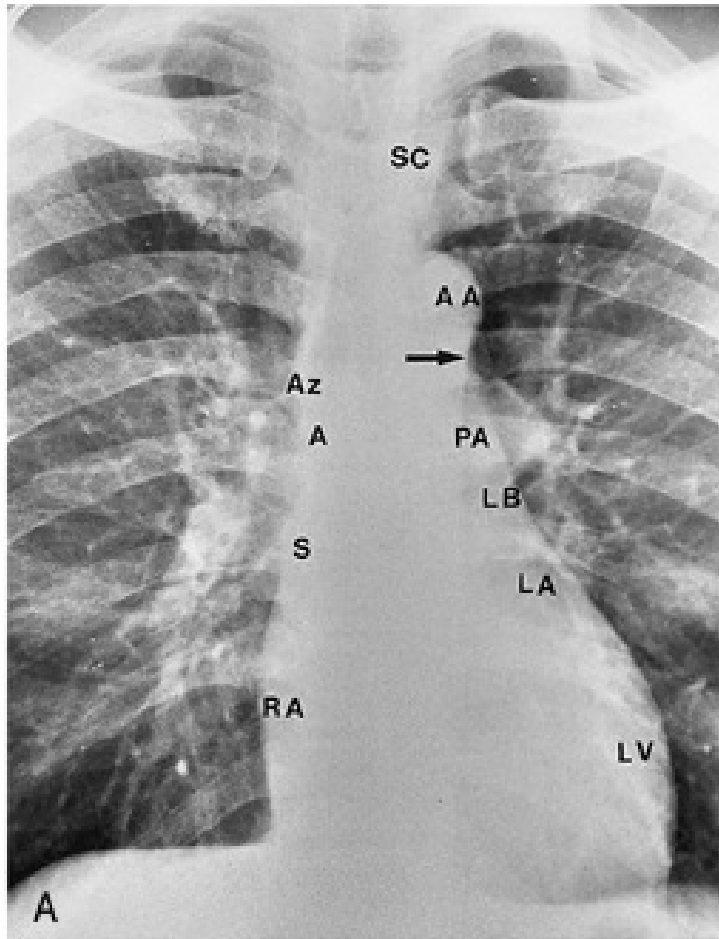


External Heart: Anterior View



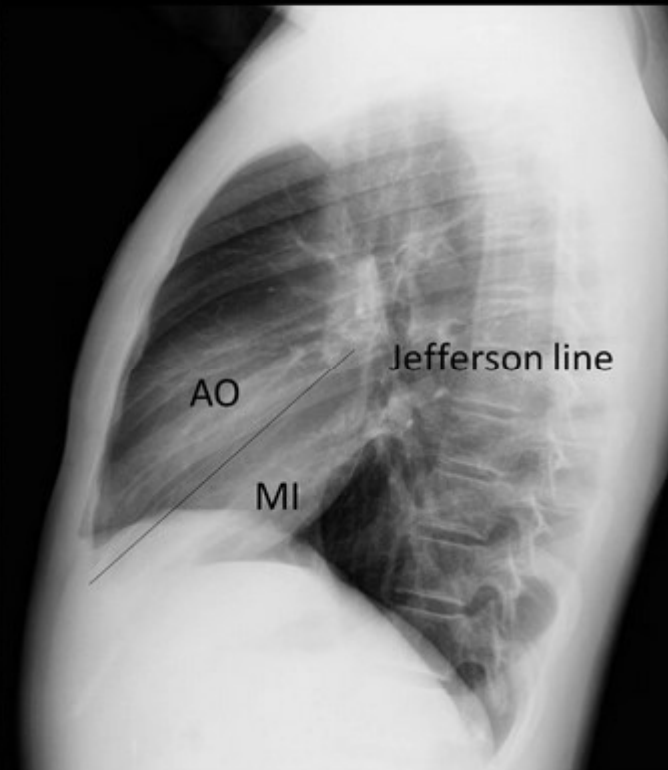
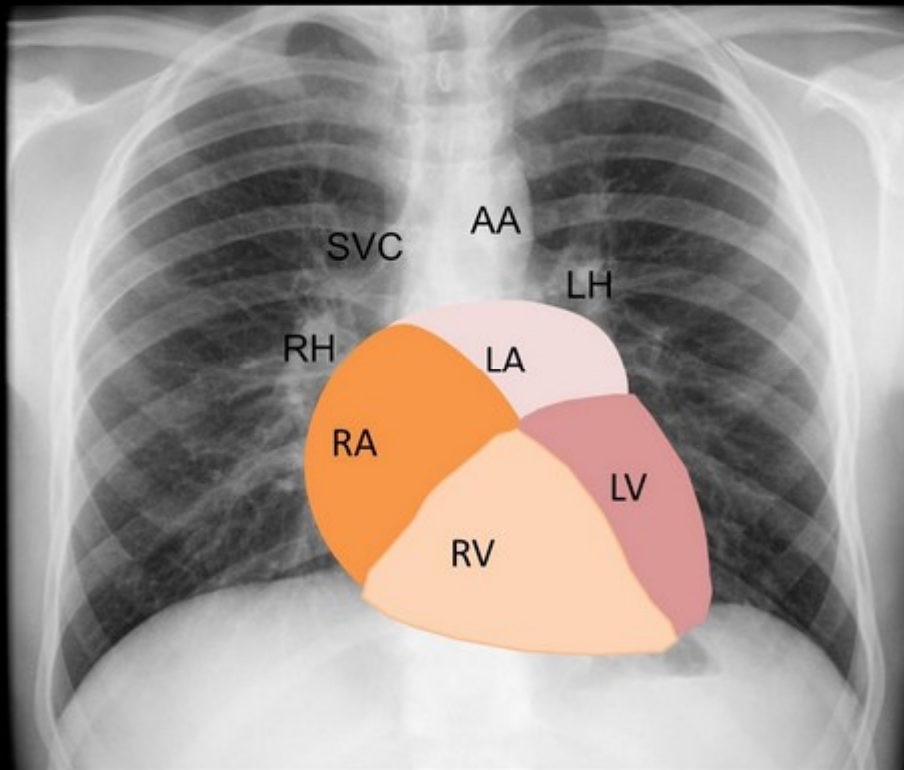
ΕΚΠΑΙΔΕΥΤΙΚΟΣ ΣΤΟΧΟΣ (ΕΣ): Τα στεφανιαία αγγεία, τα ωτία των κόλπων (σχέση με ακτινογραφία), ο χιασμός των αγγείων, ο βοτάλειος πόρος





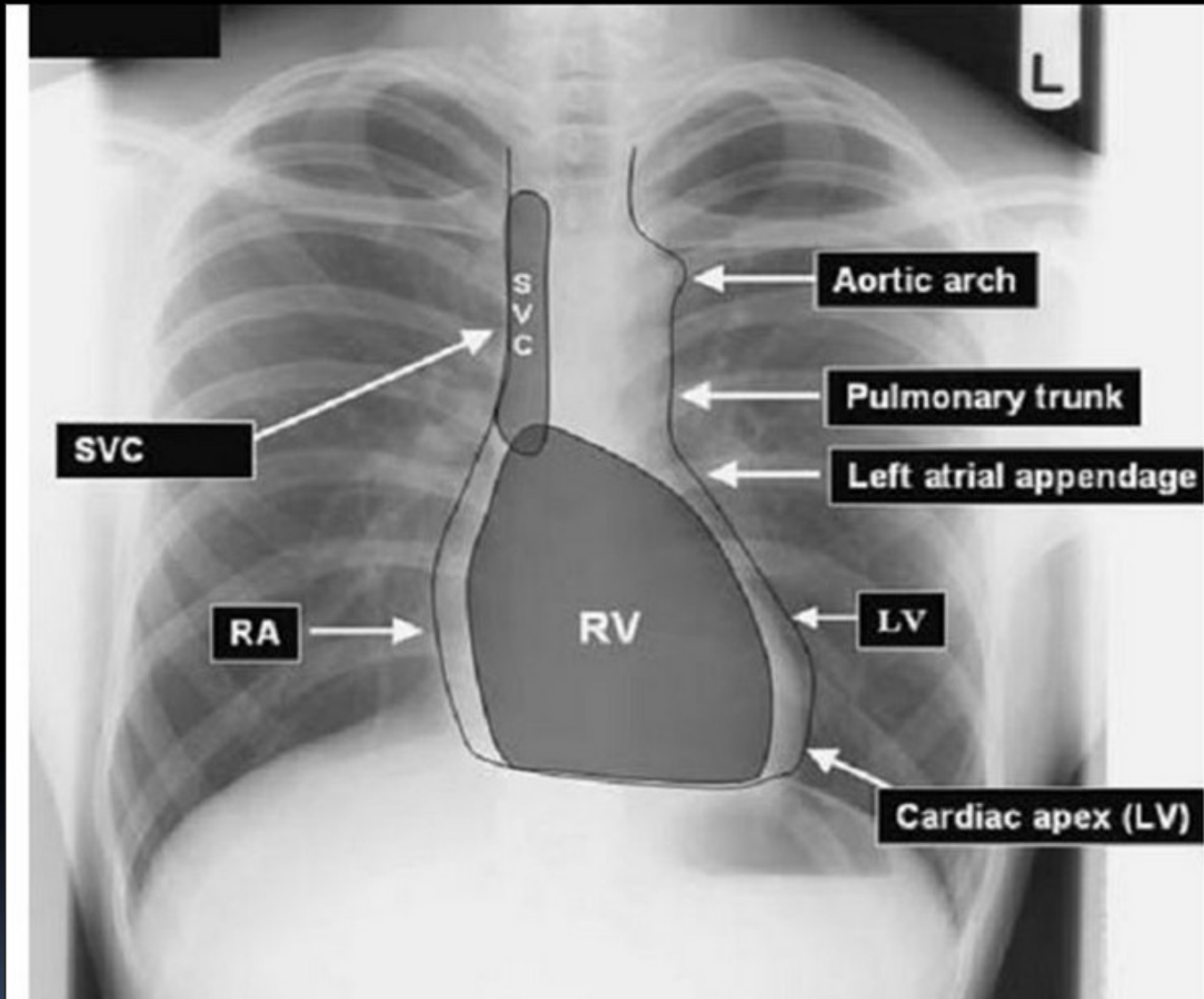
Εκπαιδευτικός Στόχος (ΕΣ): Καρδιακά όρια στην ακτινογραφία





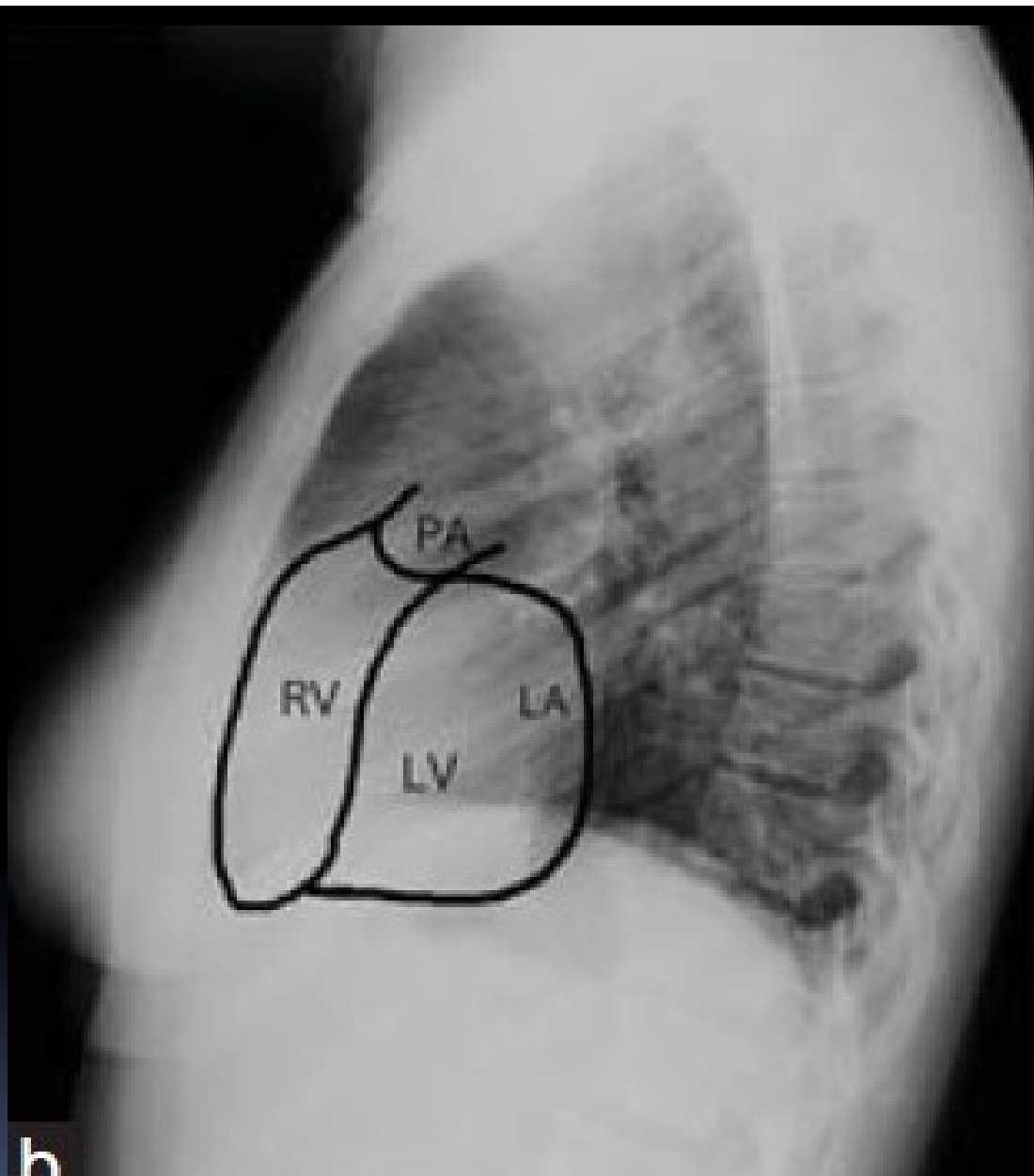
Εκπαιδευτικός Στόχος (ΕΣ): Καρδιακά όρια στην ακτινογραφία





Εκπαιδευτικός Στόχος (ΕΣ): Καρδιακά όρια στην ακτινογραφία





h

Εκπαιδευτικός Στόχος (ΕΣ): Καρδιακά όρια στην ακτινογραφία



Cardiac shadow



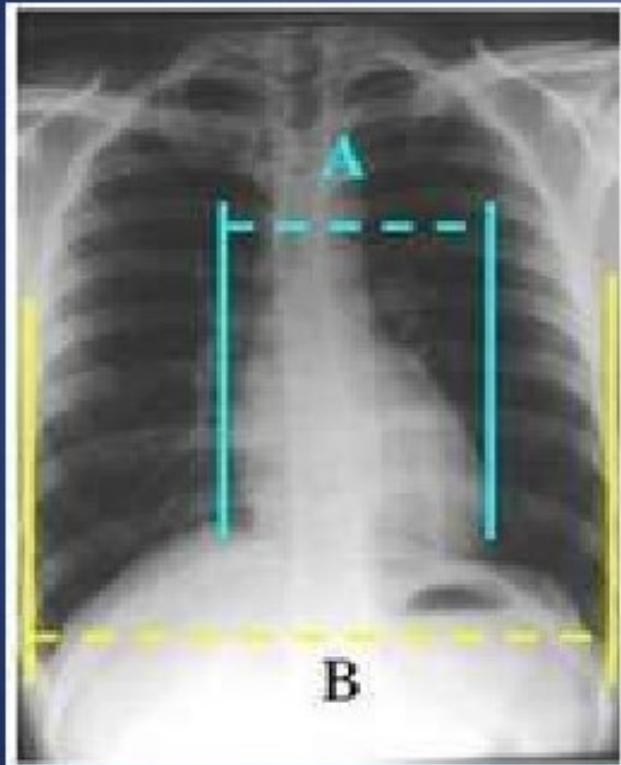
Heart Size

- Cardiac Transverse Diameter (CTD) = $a+b$
< 15.5cm (males)
< 15.0cm (females)
- Cardio-Thoracic Ratio (CTR) = $a+b \div c+d$
< 0.5

Εκπαιδευτικός Στόχος (ΕΣ): ΚΘΔ δείκτης (Πότε η καρδιά είναι διατεταμένη;)



Cardio-thoracic ratio



- seen on **postero-anterior (PA) view only**
- >50% is considered abnormal in an adult; more than 66% in a neonate.
- Possible causes of a ratio greater than 50% include:
 - cardiac failure
 - pericardial effusion
 - left or right ventricular hypertrophy

AP views make heart appear larger than it actually is.

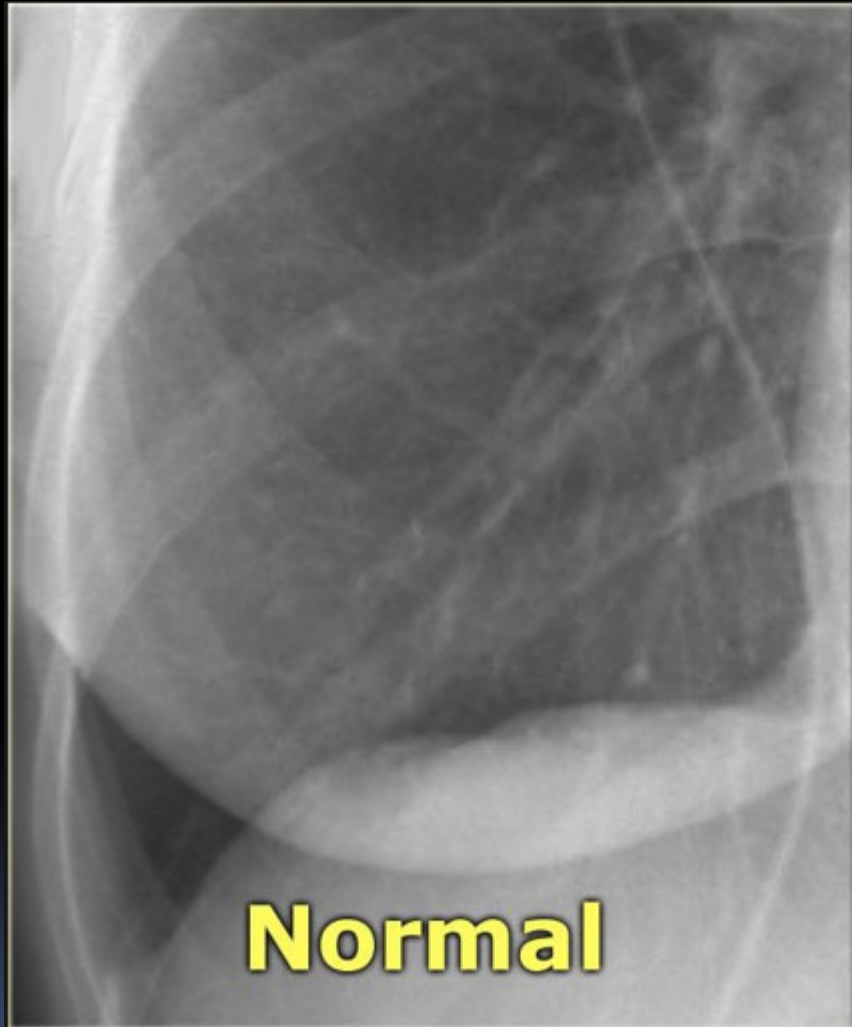
ΕΚΠΑΙΔΕΥΤΙΚΟΣ ΣΤΟΧΟΣ (ΕΣ): ΚΘΔ δείκτης (Πότε η καρδιά είναι διατεταμένη;)



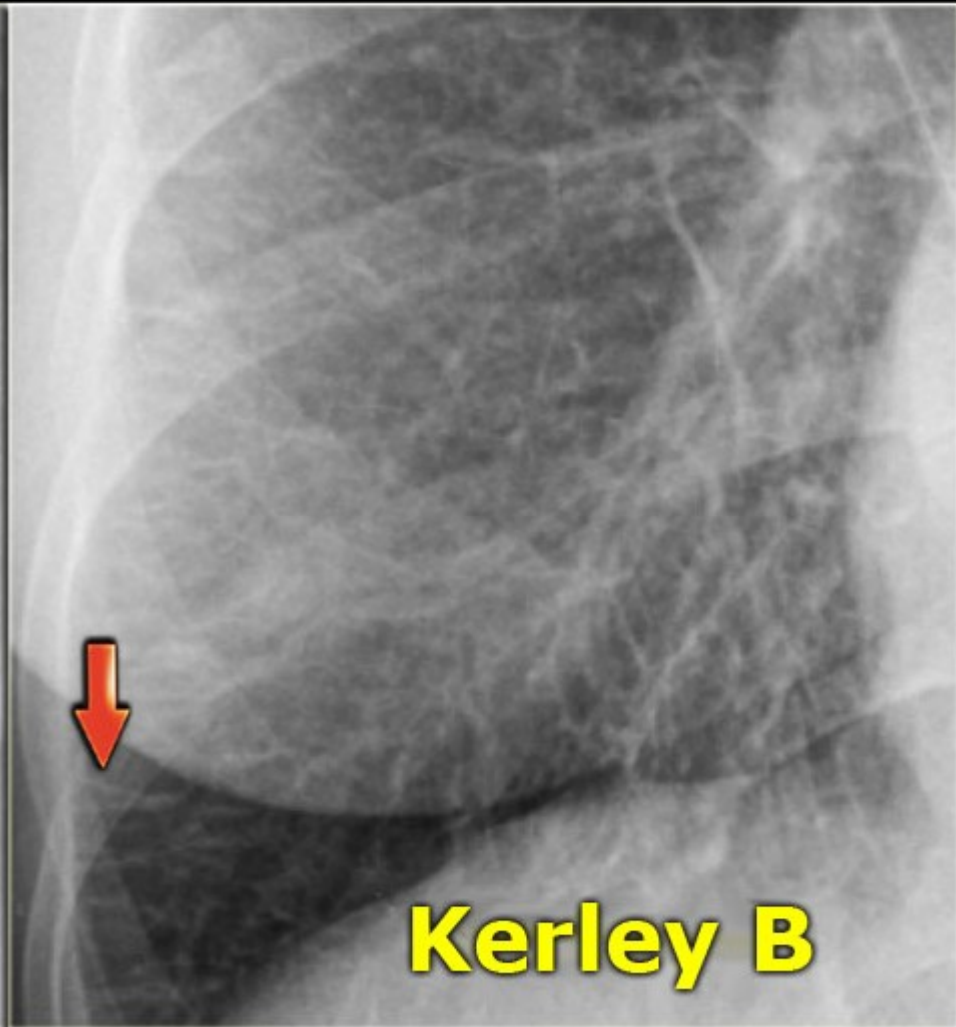


Εκπαιδευτικός Στόχος (ΕΣ): ΚΘΔ δείκτης (Πότε η καρδιά είναι διατεταμένη;),
Πνευμονικό οίδημα → Διάταση καρδιακών πυλών, φλεβική διάταση και
ανακατανομή αιμάτωσης





Normal



Kerley B

Εκπαιδευτικός Στόχος (ΕΣ): Πνευμονικό οίδημα



Stage of Congestive Heart Failure

Stage 1
Redistribution
PCWP 13-18 mmHg



Redistribution pulmonary vessels
Cardiomegaly
Broad vascular pedicle
(non acute CHF)

Stage 2
Interstitial edema
PCWP 18-25 mmHg



Kerley lines
Peribronchial cuffing
Hazy contour of vessels
Thickened interlobar fissure

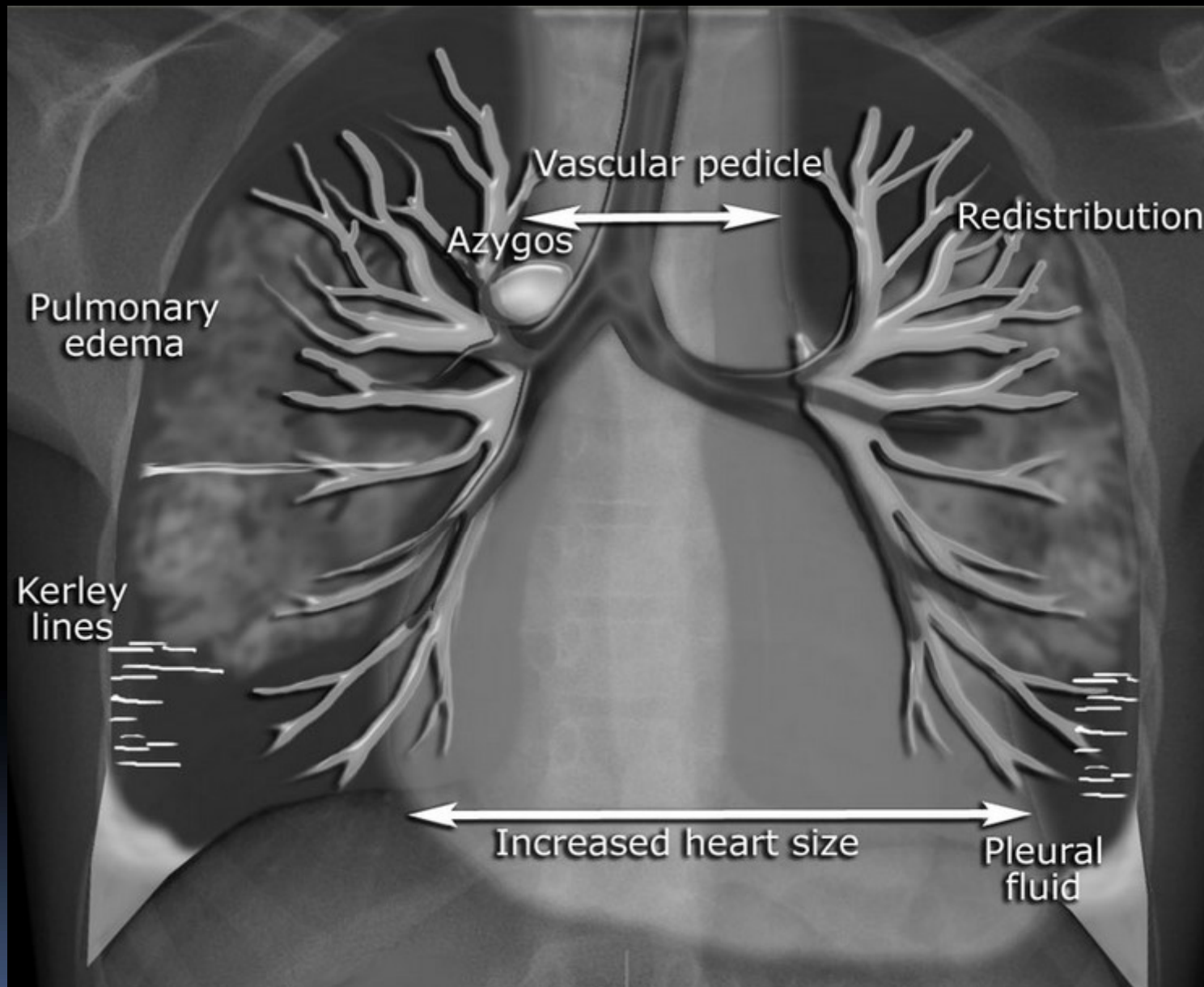
Stage 3
Alveolar edema
PCWP > 25 mmHg

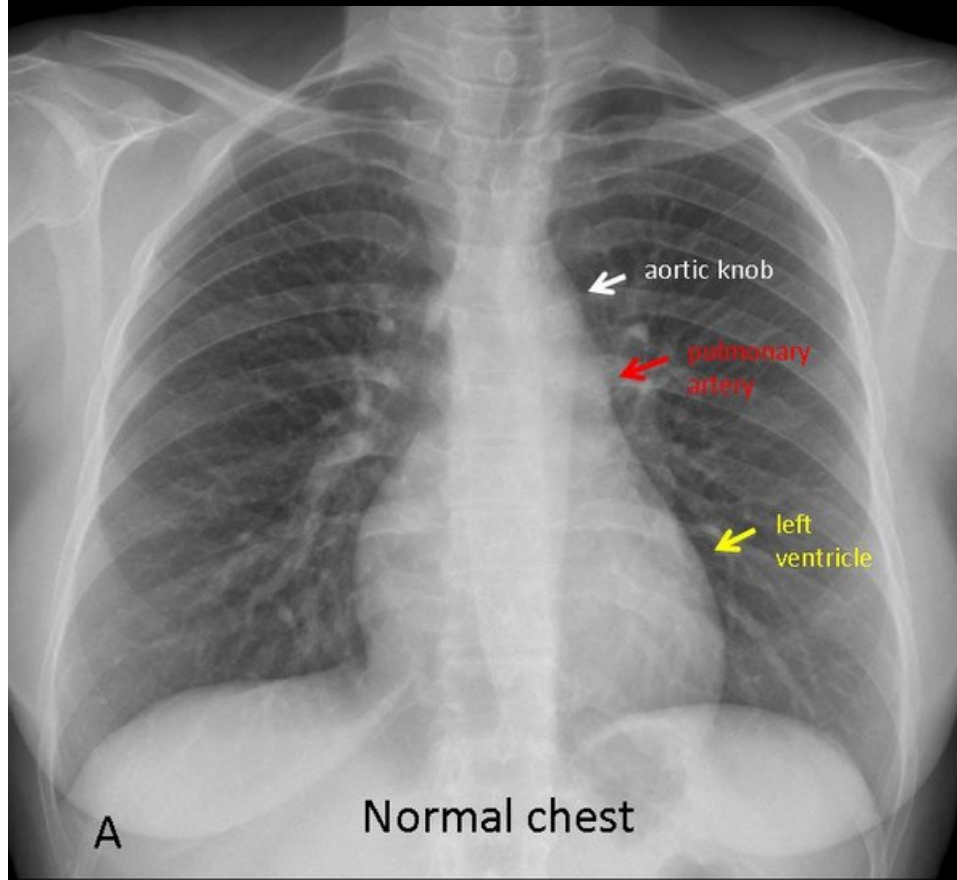


Consolidation
Air bronchogram
Cottonwool appearance
Pleural effusion



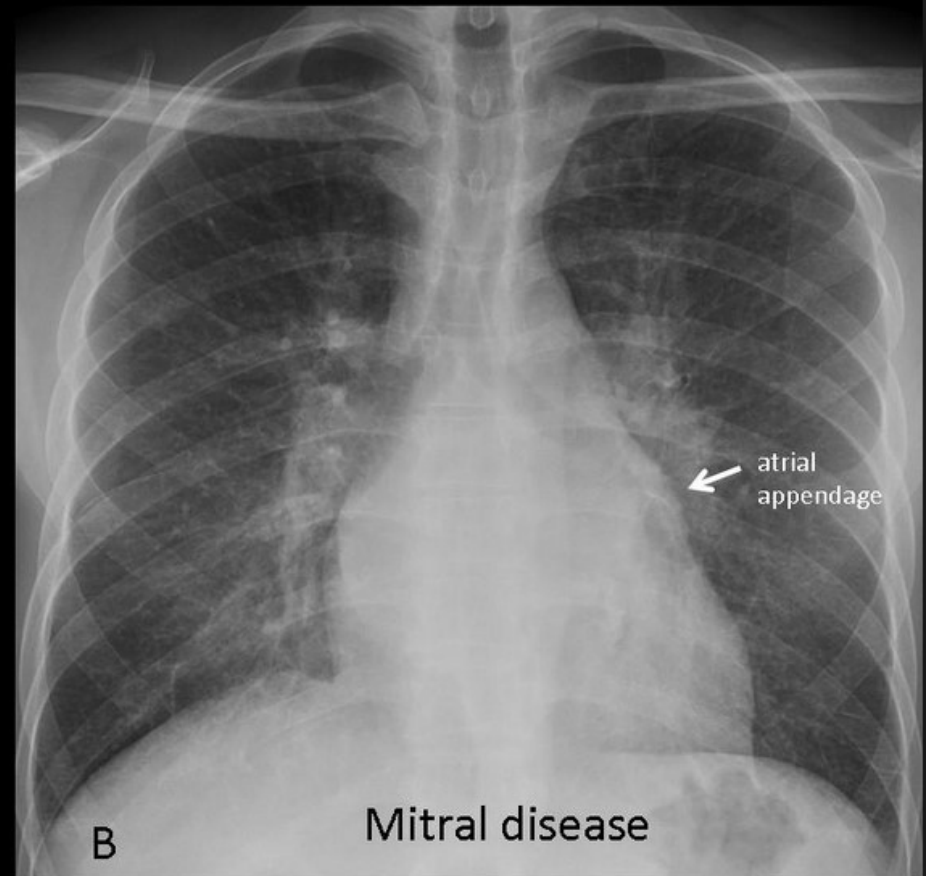






Normal chest

A

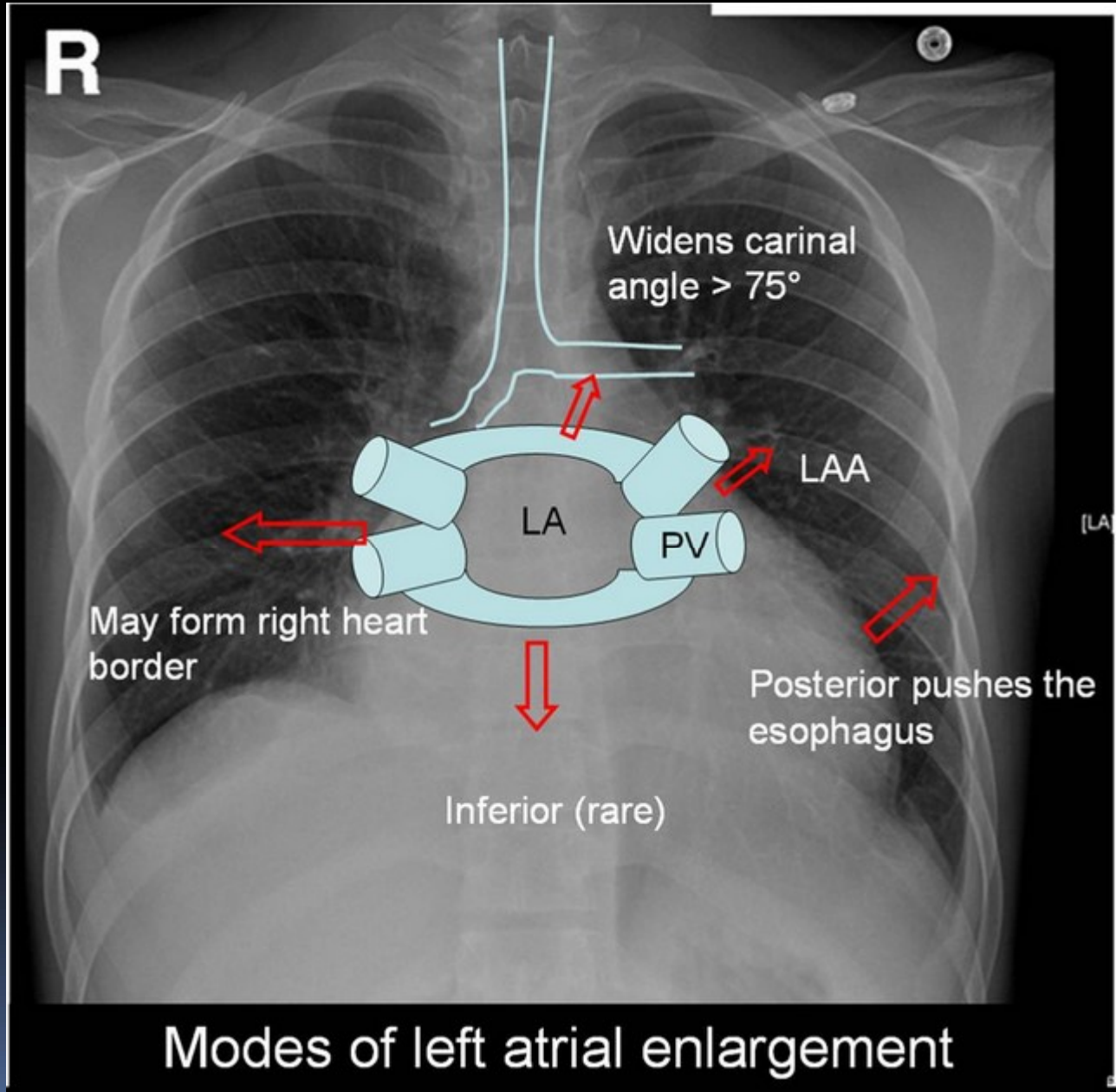


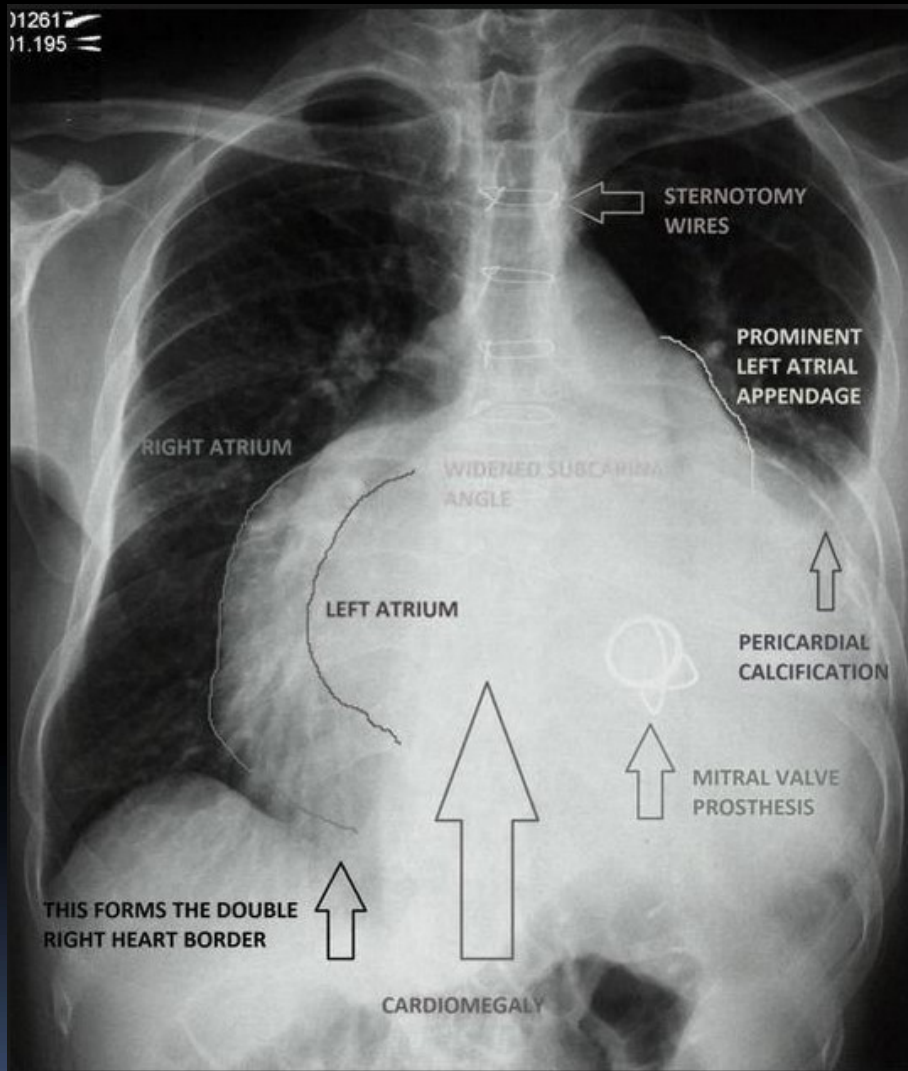
Mitral disease

B

Εκπαιδευτικός Στόχος (ΕΣ): Διάταση αρ. κόλπου







Εκπαιδευτικός Στόχος (ΕΣ): Αμφικολπική διάταση



Ιστορικό

ιστορικό

- Αιτία εισόδου
- Παρούσα νόσος
- Ατομικό αναμνηστικό και ανασκόπηση συστημάτων → Συνοσηρότητες...
- Άλλεργίες, χειρουργεία, μεταγγίσεις
- Έξεις συνήθειες
- Φάρμακα



Problem-Oriented Records

- S - Subjective - What the patient tells you
- O - Objective - What you observe
- A - Assessment - What you think is going on
- P - Plan - What you intend to do

Εκπαιδευτικός Στόχος (ΕΣ): Γρήγορη αξιολόγηση ασθενούς



Left Ventricular Failure or High Left Atrial Pressure Possibilities

- Dyspnea, cough, or wheeze on exertion, on hills or on stairs?
- Orthopnea?
- Paroxysmal nocturnal dyspnea?
- Heart failure symptoms in pregnancy? (If in first trimester, may be due to placental product)
- Therapy with low-salt diet or drugs?
 - Why stopped? Side effects? If digitalis, did patient have gastrointestinal symptoms, weakness, faintness, dizziness, visual disturbances, or palpitations?
 - If diuretics were there muscle cramps or weakness?



Peripheral Venous Congestion or Pseudo Right Heart Failure Possibilities

- Peripheral edema, maximum and minimum weight?
- Abdominal swelling?
- Right upper abdominal pain with exercise or bending discomfort? (Suggests hepatomegaly)



Low Output State Possibilities

- Weakness or fatigue? Afternoon nap necessary? When last able to do normal activities comfortably? Most strenuous activity in past few months?
- Cold extremities? How long?
- Excess perspiration? (A sign of failure in infants.) With warm hands, suggests hyperthyroidism; with cold hands, suggests neurocirculatory asthenia (psychoneurosis) or failure.
- Insomnia? (May indicate **Cheyne-Stokes respiration with hyperpnea**)
- Nocturia with polyuria? (May be daytime failure compensating at rest)
- Orthostatic faintness



High Output Failure Possibilities

- Anemia: under treatment? Heavy periods, bleeding piles or melena? Upper gastrointestinal surgery (B12 deficiency)? Sickle cell disease history? Radiation or anticancer drugs?
- Thyrotoxicosis: heat intolerance, warm skin, weight loss, polydipsia, polyuria, excess perspiration, frequent stools, restlessness, muscle weakness on climbing, or palpitations?



Φυσική Εξέταση Καρδιαγγειακού...

Φυσική Εξέταση Καρδιαγγειακού...



Φυσική Εξέταση

- Επισκόπηση
- Ψηλάφηση
- Επίκρουση
- Ακρόαση





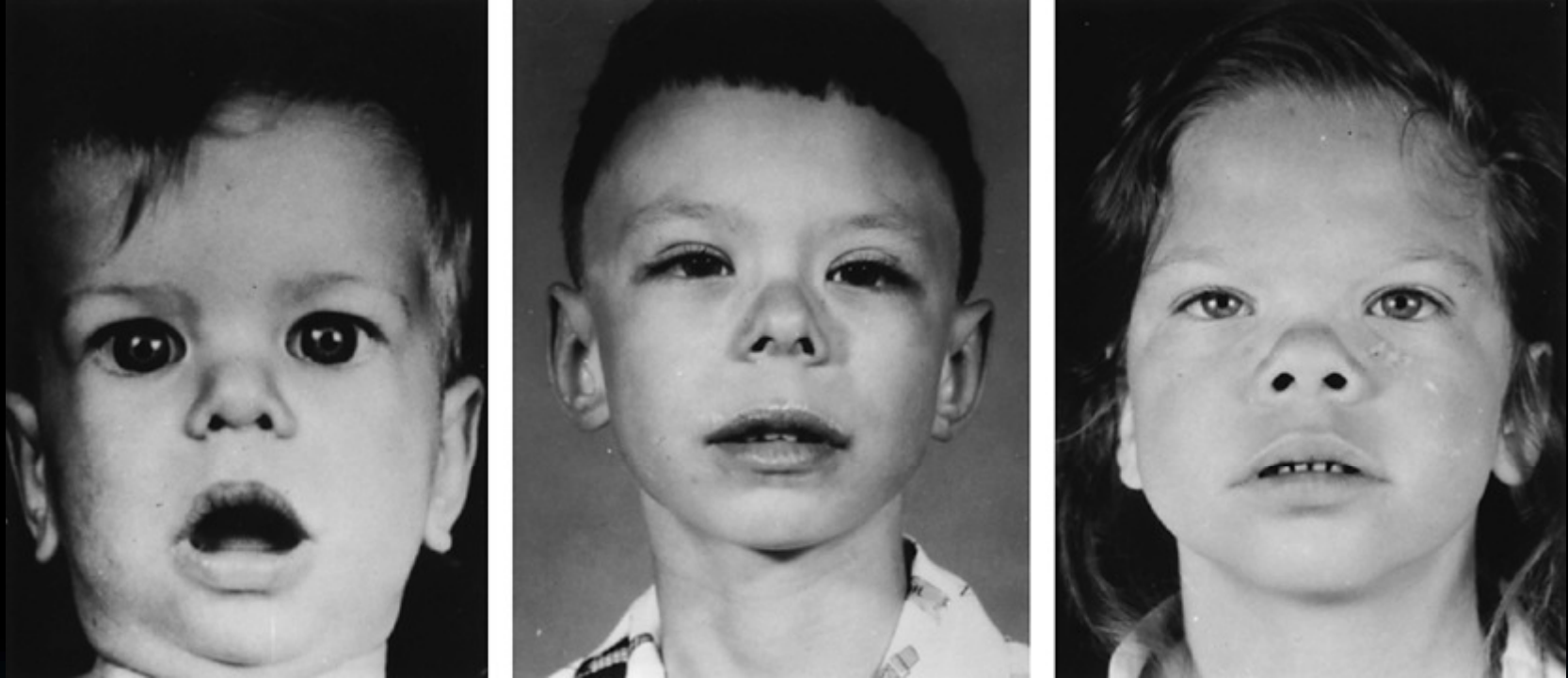
Di George...

1. **Chromosome 22q11 deletion syndrome.**

2. **CATCH 22.**

- **C**ardiac anomalies.
- **A**bnormal facies.
- **T**hymic hypoplasia.
- **C**left palate.
- **H**ypocalcemia.





Υπερβαλβιδική στένωση αορτής (Elfin facies)





Σύνδρομο Kearns-Sayre





Marfan





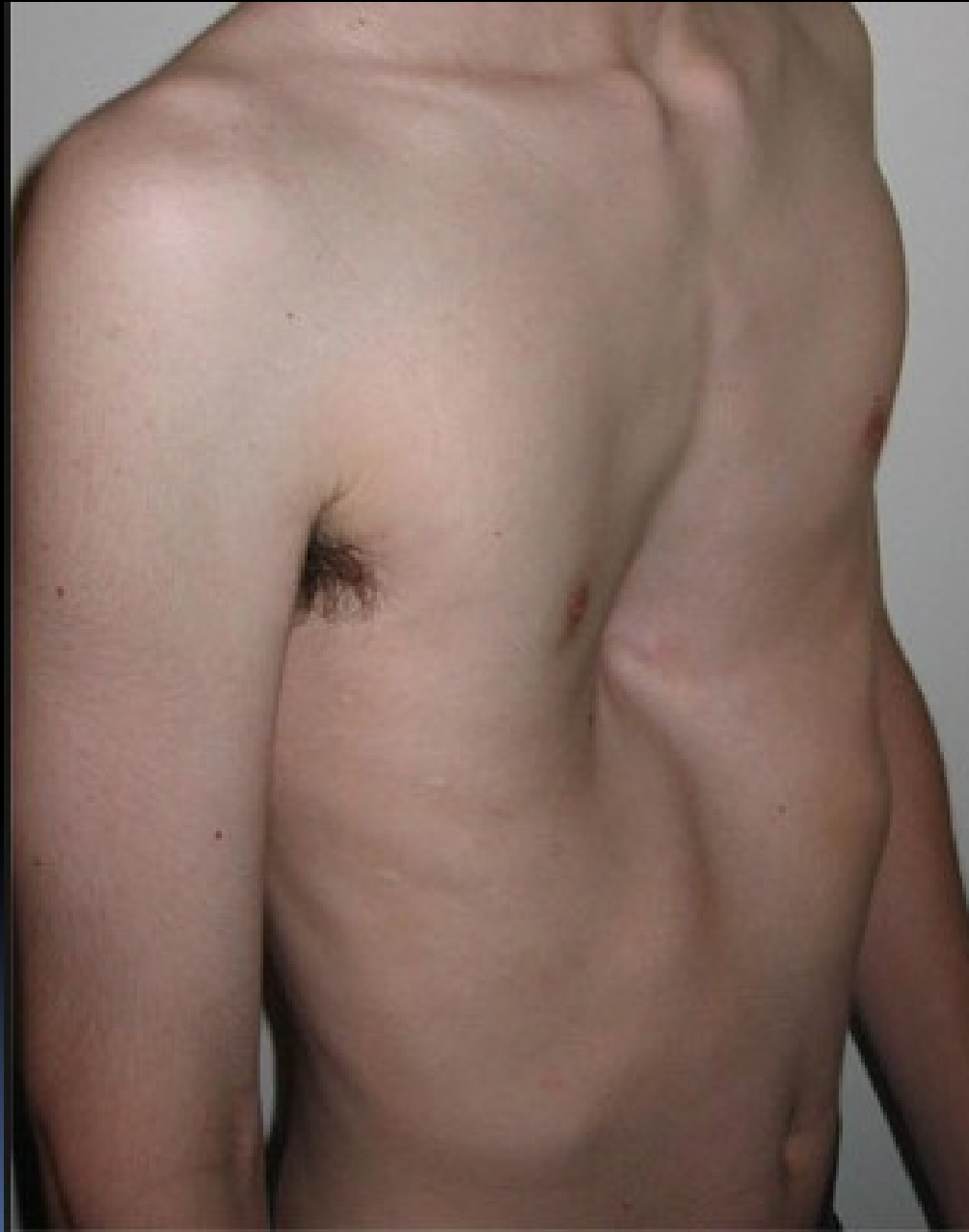
At left is a normal subject, who is unable to protrude his thumb beyond his clenched fingers, as can the patient with the Marfan syndrome at right, who can do this because of a long thumb and lax joints.





The normal patient at left cannot overlap his thumb and little finger around his wrist because, unlike the patient with the Marfan syndrome at right, his fingers are not long relative to his wrist.

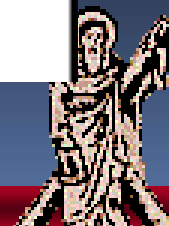




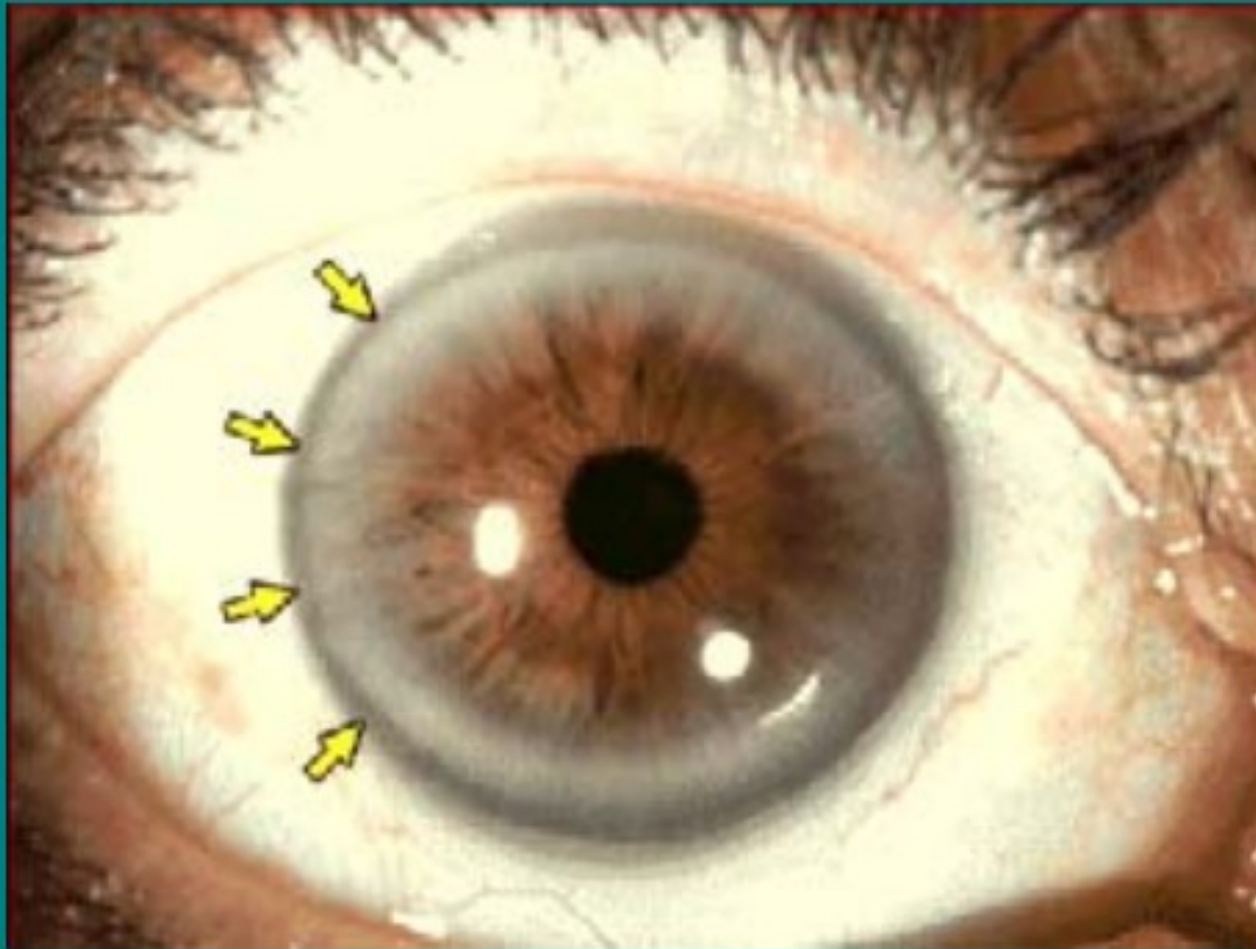


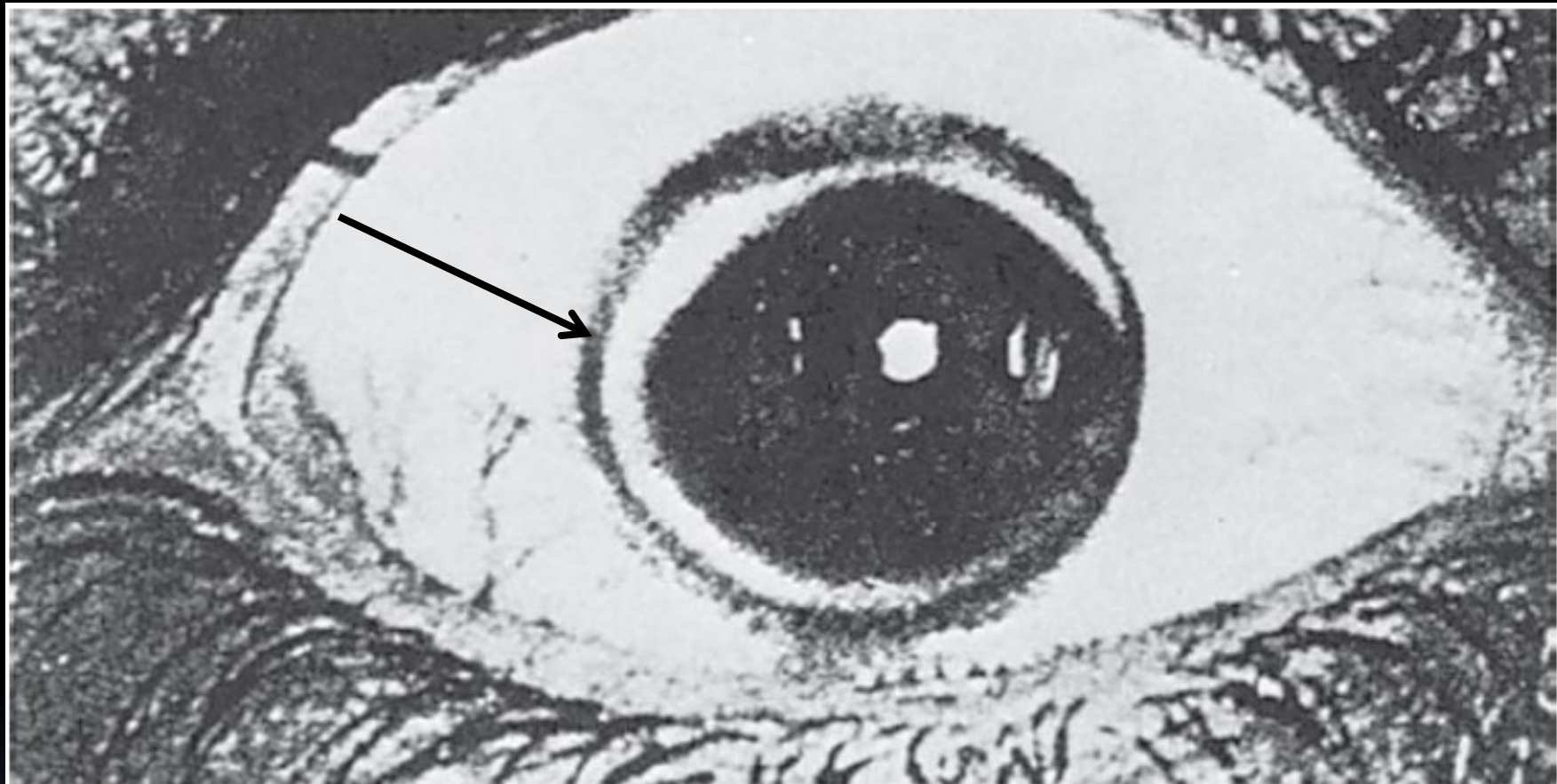


Xanthelasma Yellow plaques are present bilaterally. With permission from Slomovits, TL (Ed), Basic and clinical science courses section, American Academy of Ophthalmology, San Francisco 1996.



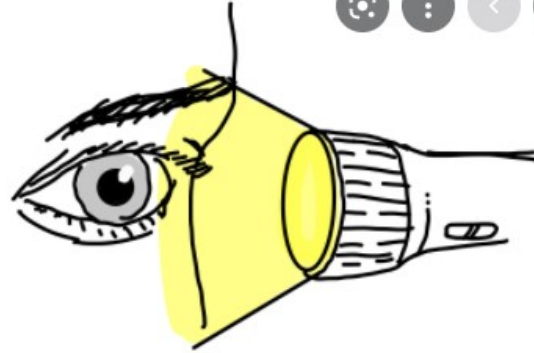
Arcus juvenilis. This ring is associated with premature atherosclerosis



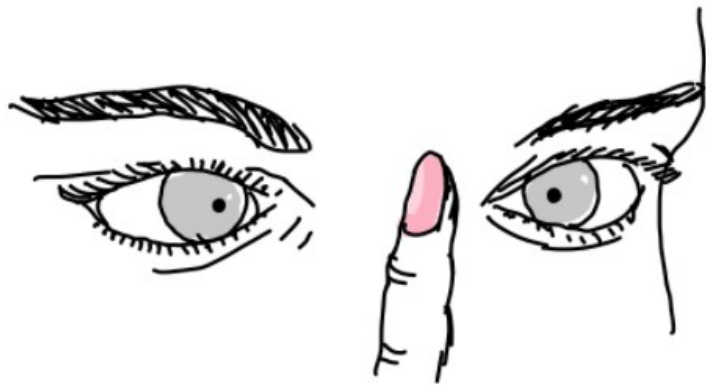


This type of arcus is a thick band of yellowish material surrounded by peripheral pigment and suggests a high serum cholesterol. It is not an arcus senilis, which has little known significance. (Courtesy Ayerst Laboratories.)





Pupils DO **NOT** constrict when exposed to bright light. ("light reflex")



Pupils DO constrict on a near object. ("accommodation reflex")

1146 x 1280



Argyll Robertson

Luetic aortic aneurysm or Luetic AR with coronary ostial stenosis

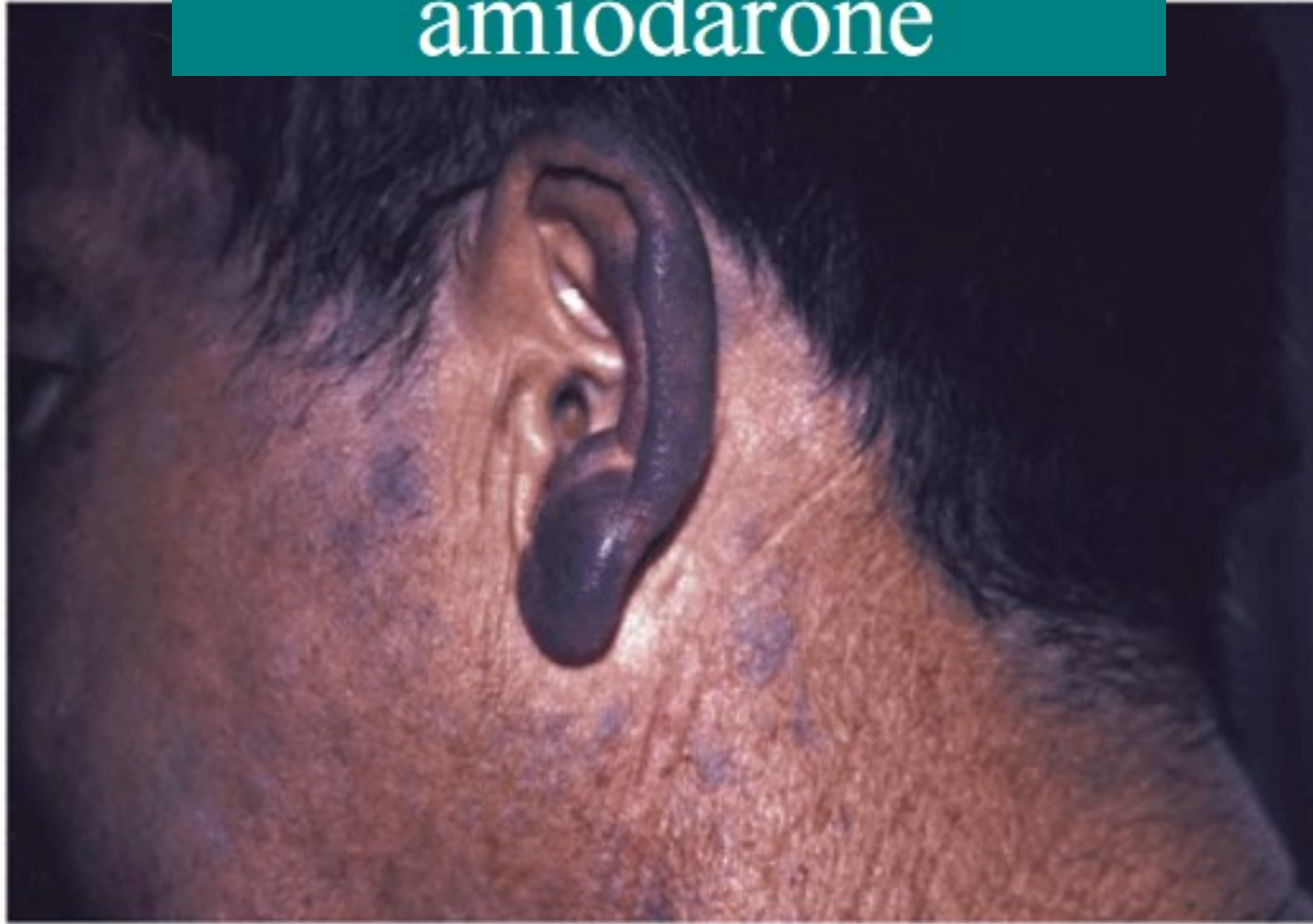




This 47-year-old man had this deep ear crease bilaterally. Although he had no significant coronary disease, his cholesterol-to-HDL ratio was 8 to 1, and he had sinus node dysfunction. He was about 50 lb overweight.



Pigmentation due to amiodarone

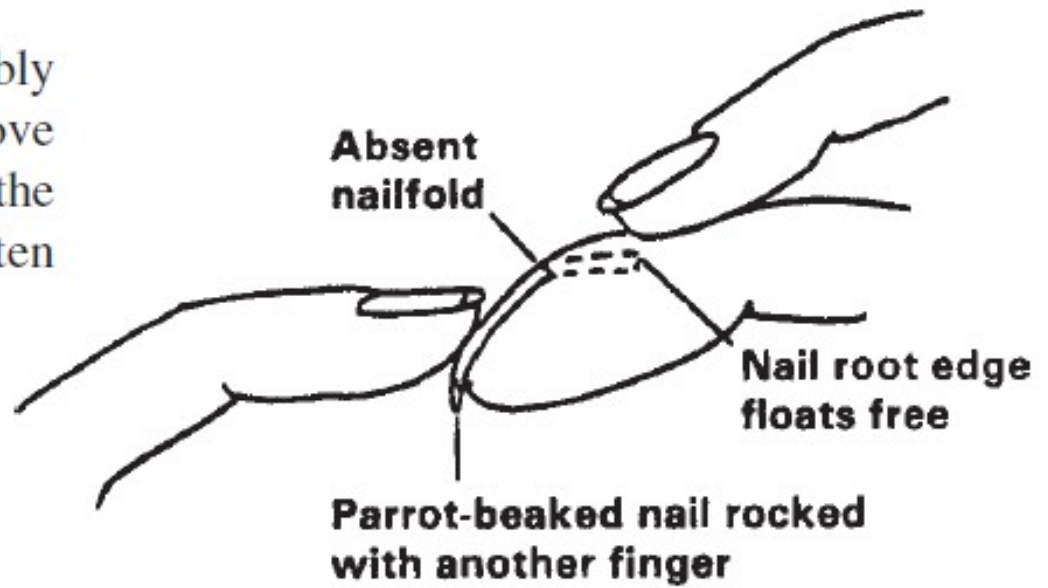


What is meant by cyanosis?

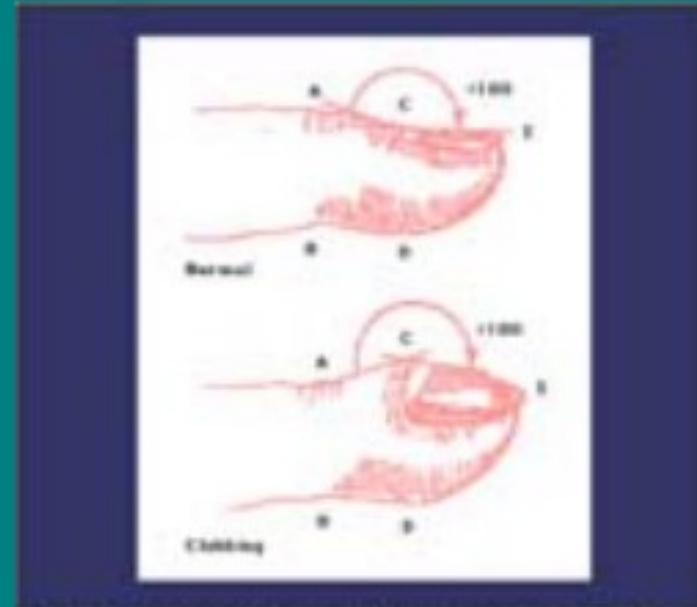
- Bluish or purplish color imparted to the skin and mucous membranes, usually the result of at least 5 mg per dL of reduced hemoglobin in the surface capillaries, but occasionally due to an abnormal hemoglobin such as sulfmethemoglobin.
- Central cyanosis: SAT < 80%
- Peripheral cyanosis: slow flow decreases the amount of hemoglobin in the surface capillaries.
- If clubbing is present or if the hands are warm, the cyanosis is probably central...



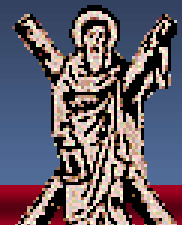
The earliest sign of clubbing is probably the reduction or absence of the groove where the root of the nail slips under the skin. Moist, warm fingertips are often associated signs.

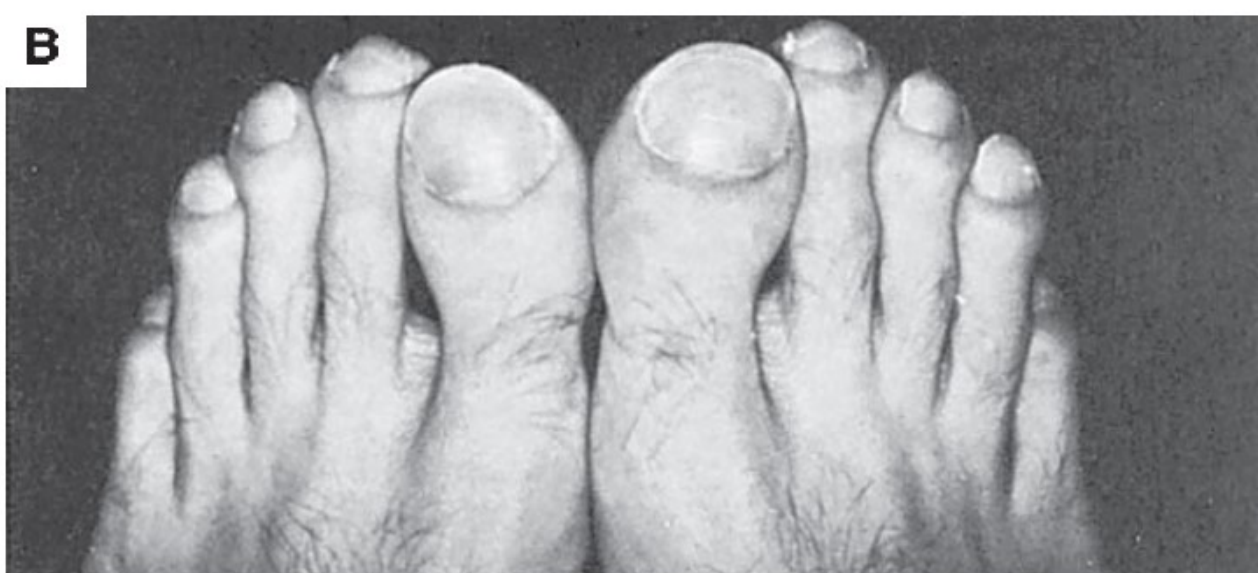
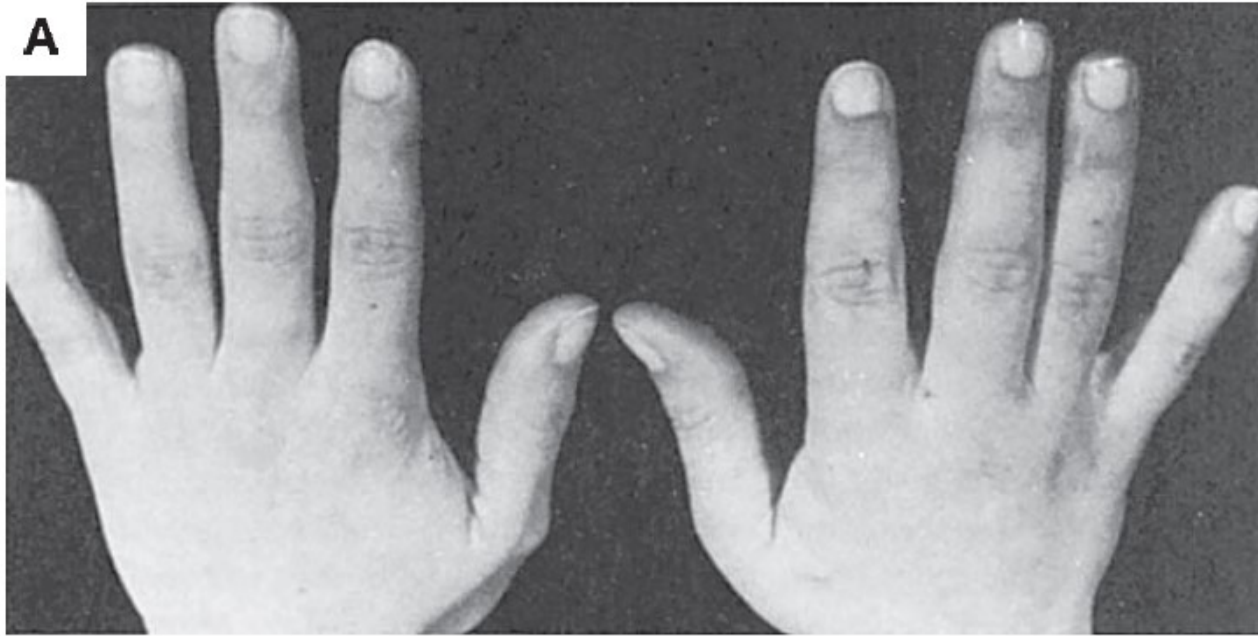


- Cyanotic congenital heart disease
- Lung disease
 - Cystic fibrosis
 - Interstitial fibrosis
 - Malignancy
 - Sarcoidosis
 - Bronchiectasis
- Hyperthyroidism



Clubbing of the fingers In a normal finger, the length of the a perpendicular dropped from point A to point B should be greater than a similar line from C to D. In clubbing, the relationships are reversed – that is, the distance C-D is greater than the distance A-B. The other important change is the angle described by A-C-E. In the normal finger this is usually < 180 degrees whereas in clubbing it is > 180 degrees. Redrawn from DeLamex, RA. Facets of the algorithmic synthesis. In DeLamex, RA, (Ed), Clinical profiles of diffuse interstitial pulmonary disease, Mount Kisco, NY, Futura Publishing Company, Inc, 1990, pp. 9-44





Eisenmenger PDA



What are the skin signs secondary to the small emboli of IE?

ΕΥΡΩΠΑΪΚΗ ΟΜΟΣΠΟΝΔΙΑ ΙΑΤΡΩΝ

- Clubbing
- Splinter hemorrhages
- Osler's nodes
- Janeway lesions





Splinter hemorrhages in the nails

Most splinter hemorrhages are not embolic and are due to repeated jarring.

Since they are in the nail substance, they move with the nail as it grows and they extend to the distal nail edge.

Embolic splinters are subungual and usually do not extend to the distal nail edge



Osler Node



Janeway Lesion



Osler's nodes (painful, tender, reddish-brown raised areas 3–15 mm in diameter, occasionally with a whitish center, on the palms or soles).

Janeway lesions (painless, circular or oval, pink to tan macules about 5 mm in diameter on the palms and soles that do not blanch with pressure).





Κηλίδες Roth σε ασθενή με ΛΕ (αιμορραγία με καθαρό κέντρο)

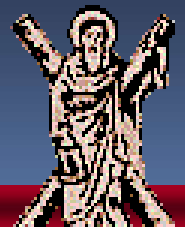


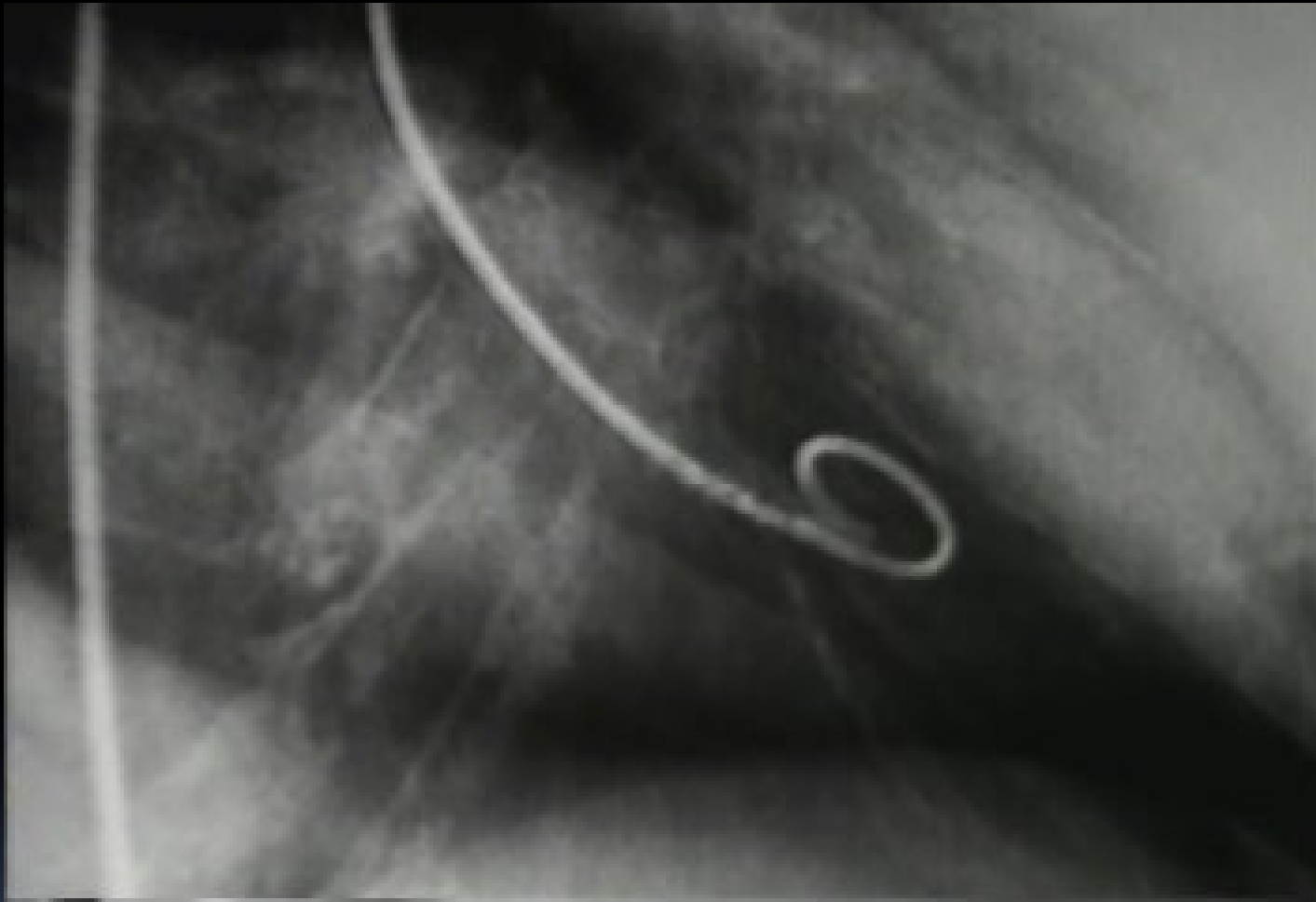
Πετέχειες σε ασθενή με ΛΕ



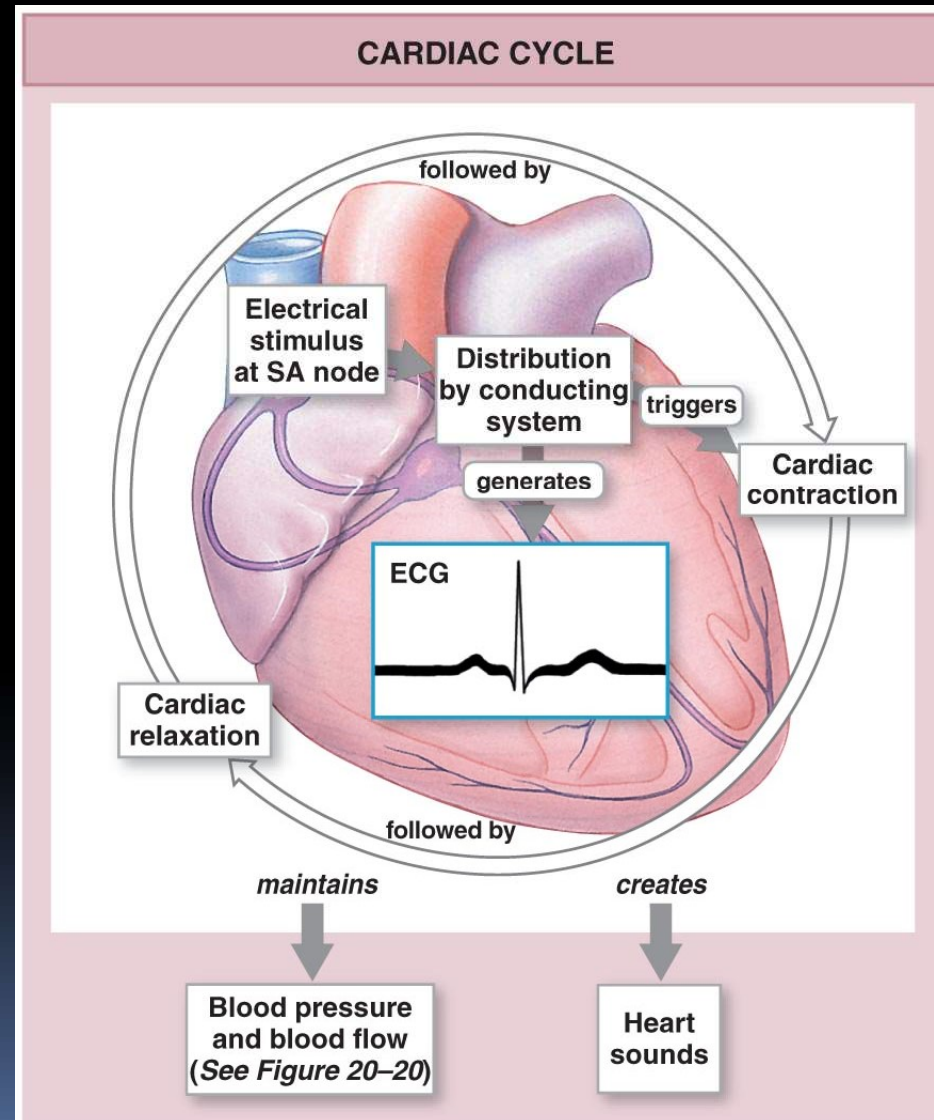
The Cardiac Cycle

- Cardiac cycle = The period between the start of one heartbeat and the beginning of the next
- Includes both contraction and relaxation





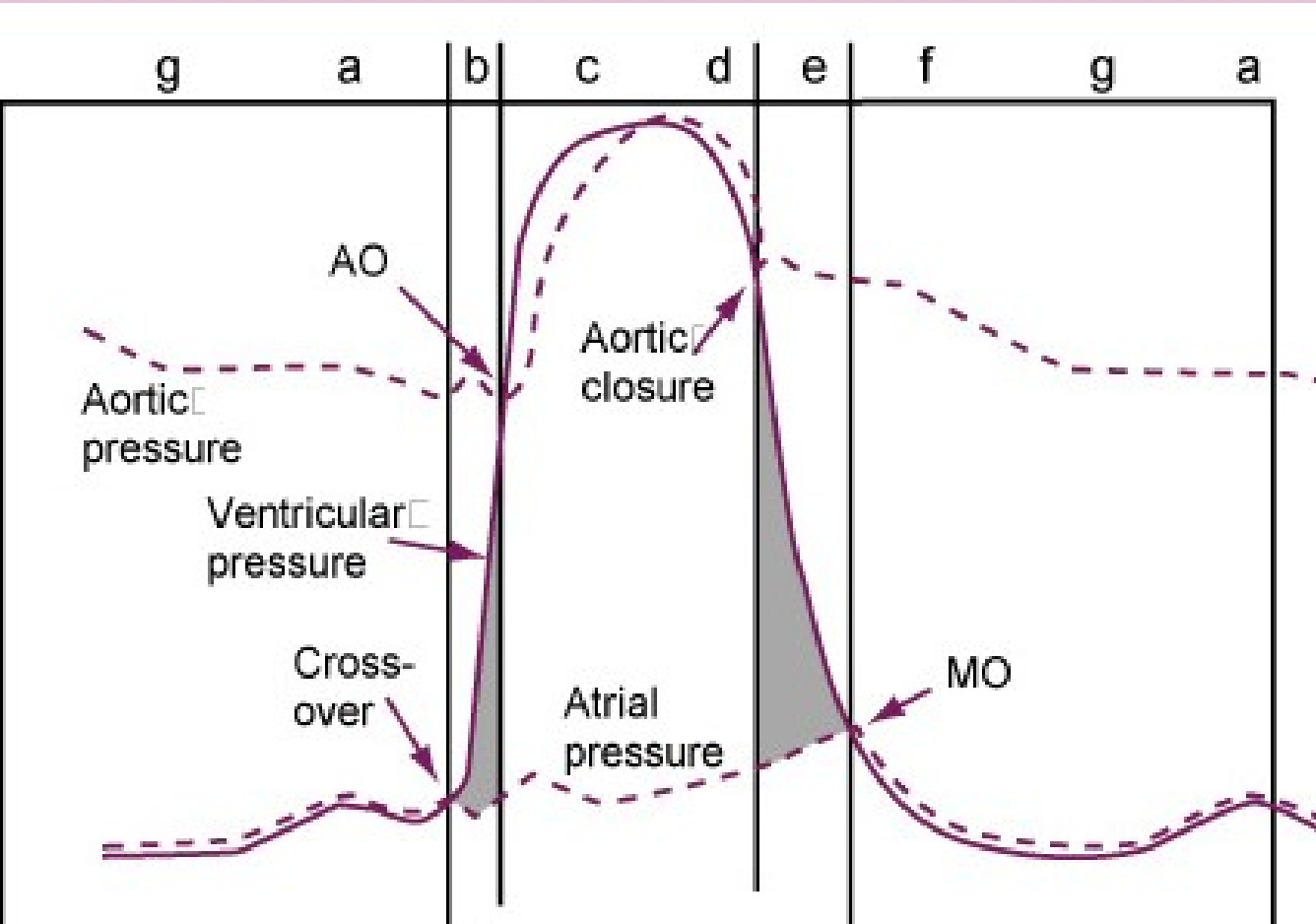
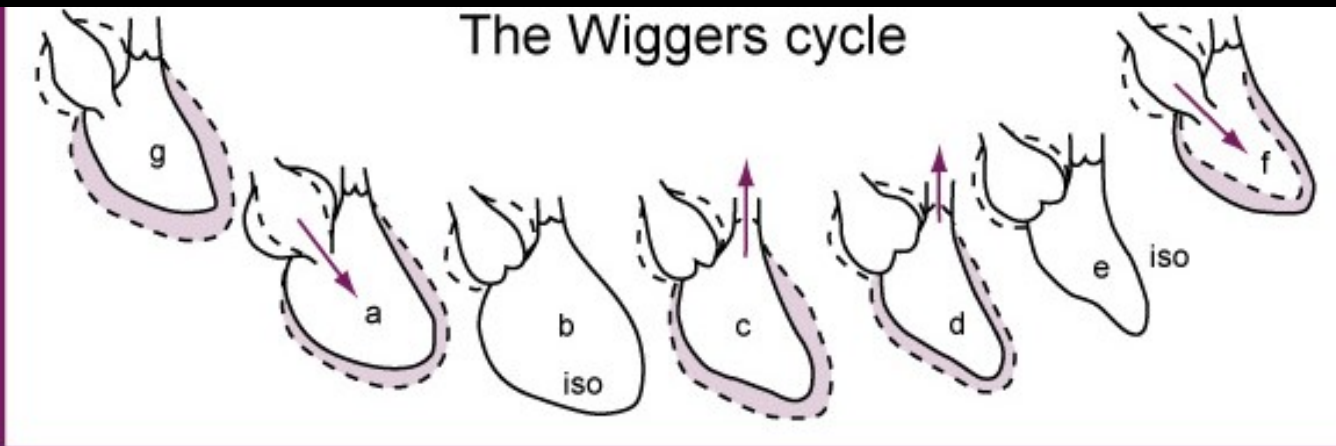
The Cardiac Cycle



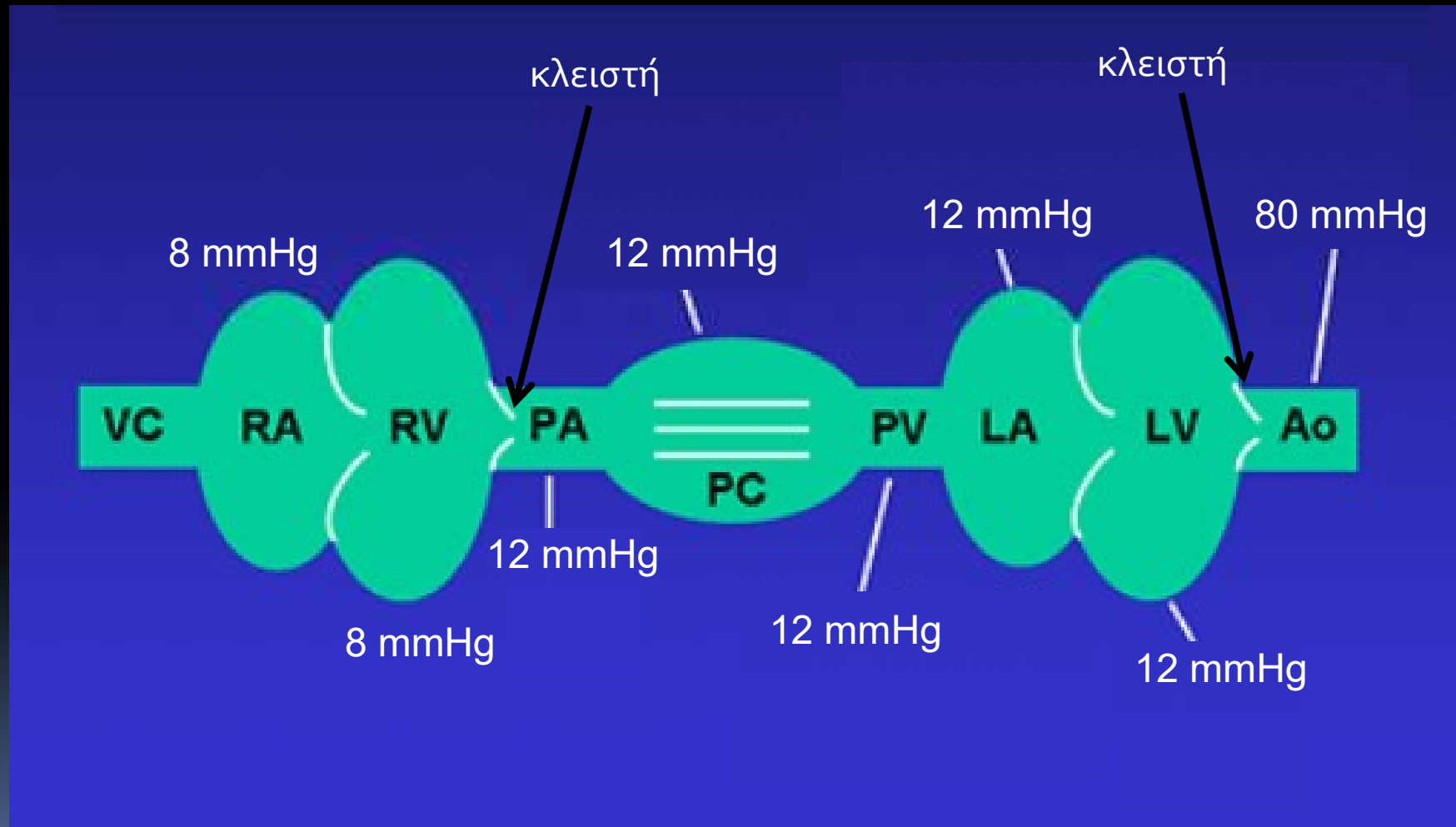
Φάσεις του καρδιακού κύκλου

- Ισο-ογκωτική συστολή
- Εξώθηση
- Ισο-ογκωτική χάλαση
- Ταχεία πλήρωση (Πρωτοδιαστολή)
- Διάσταση
- Κολπική συστολή (Τελοδιαστολή, ή Προσυστολή)

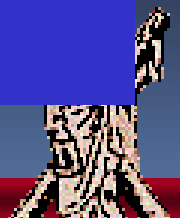
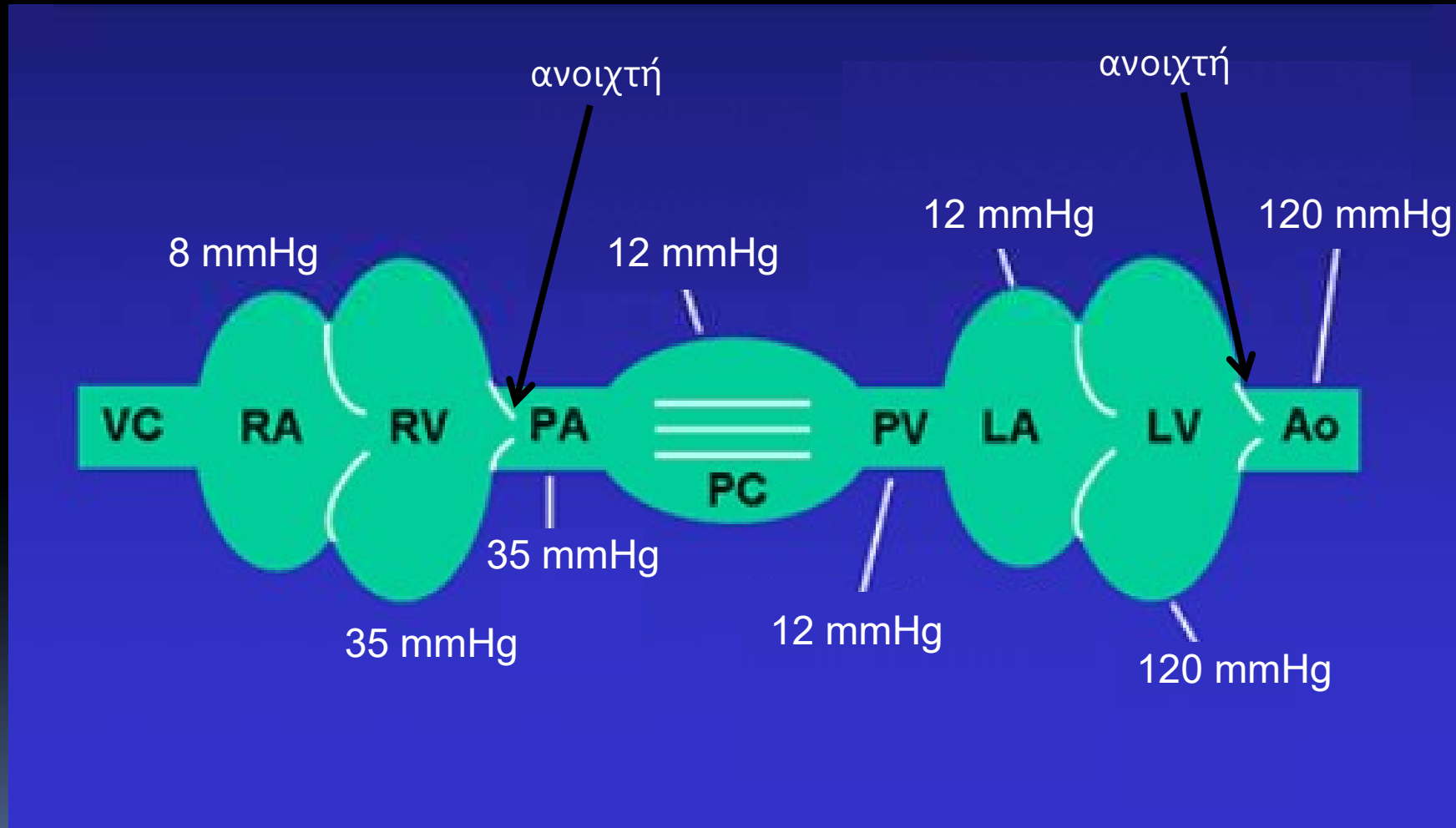




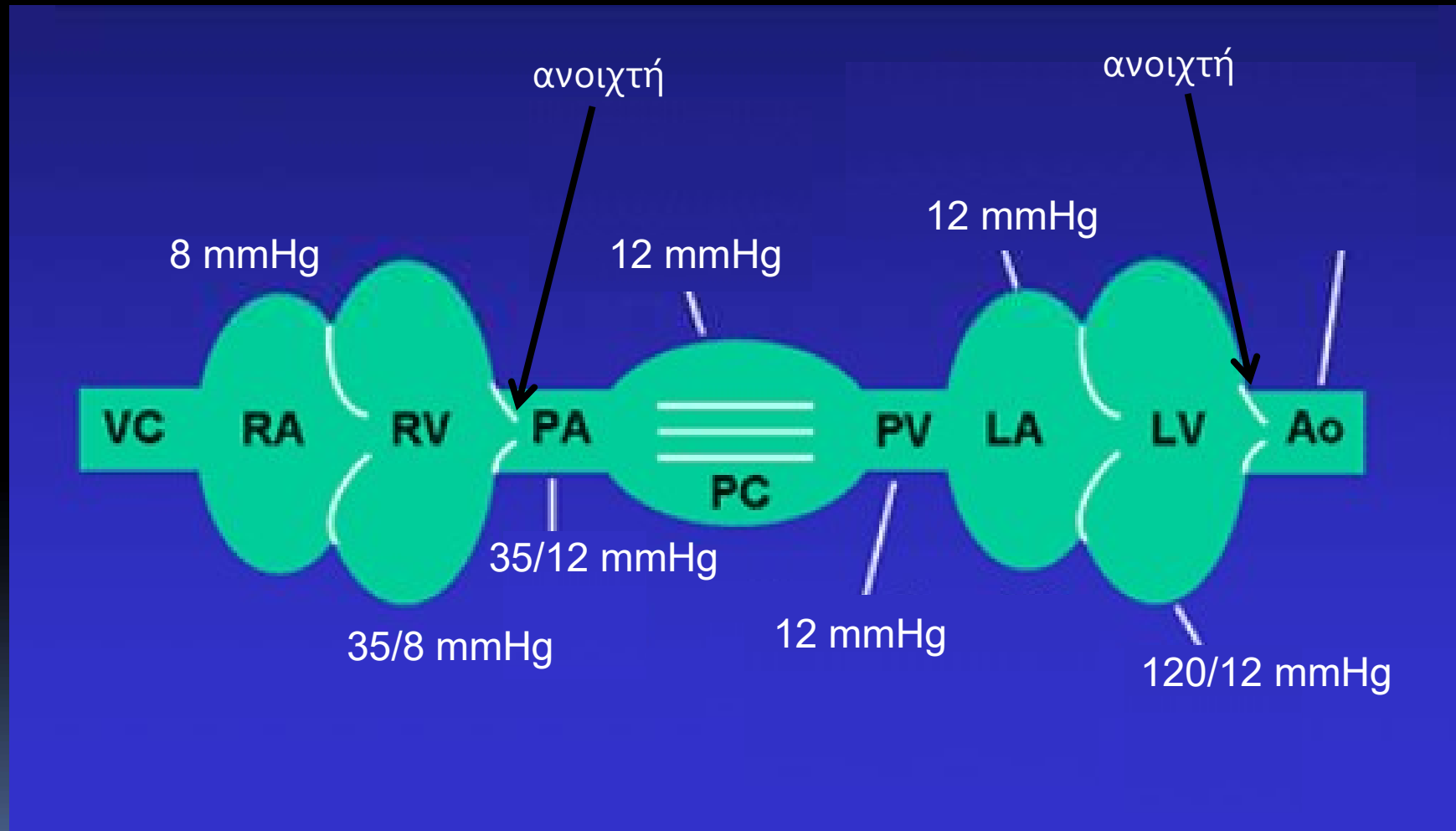
Η πίεση στη διαστολή...

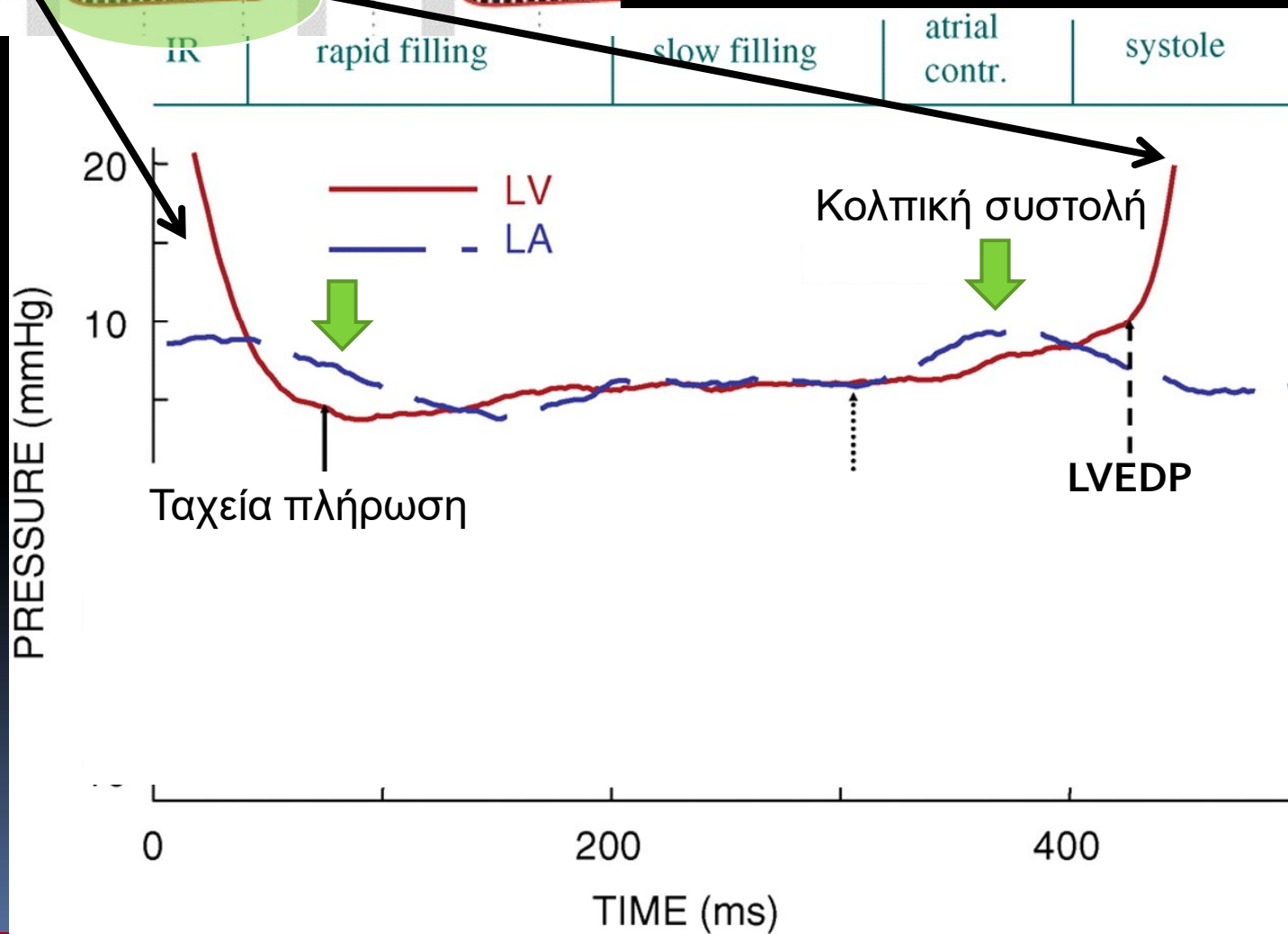
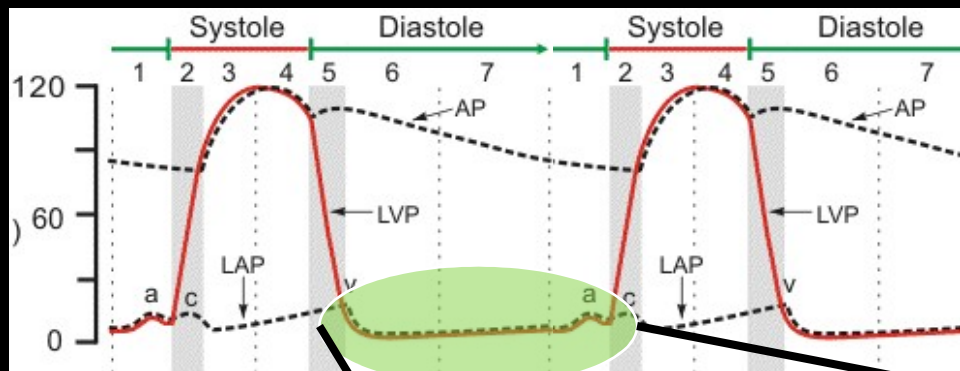


Η πίεση στη συστολή...



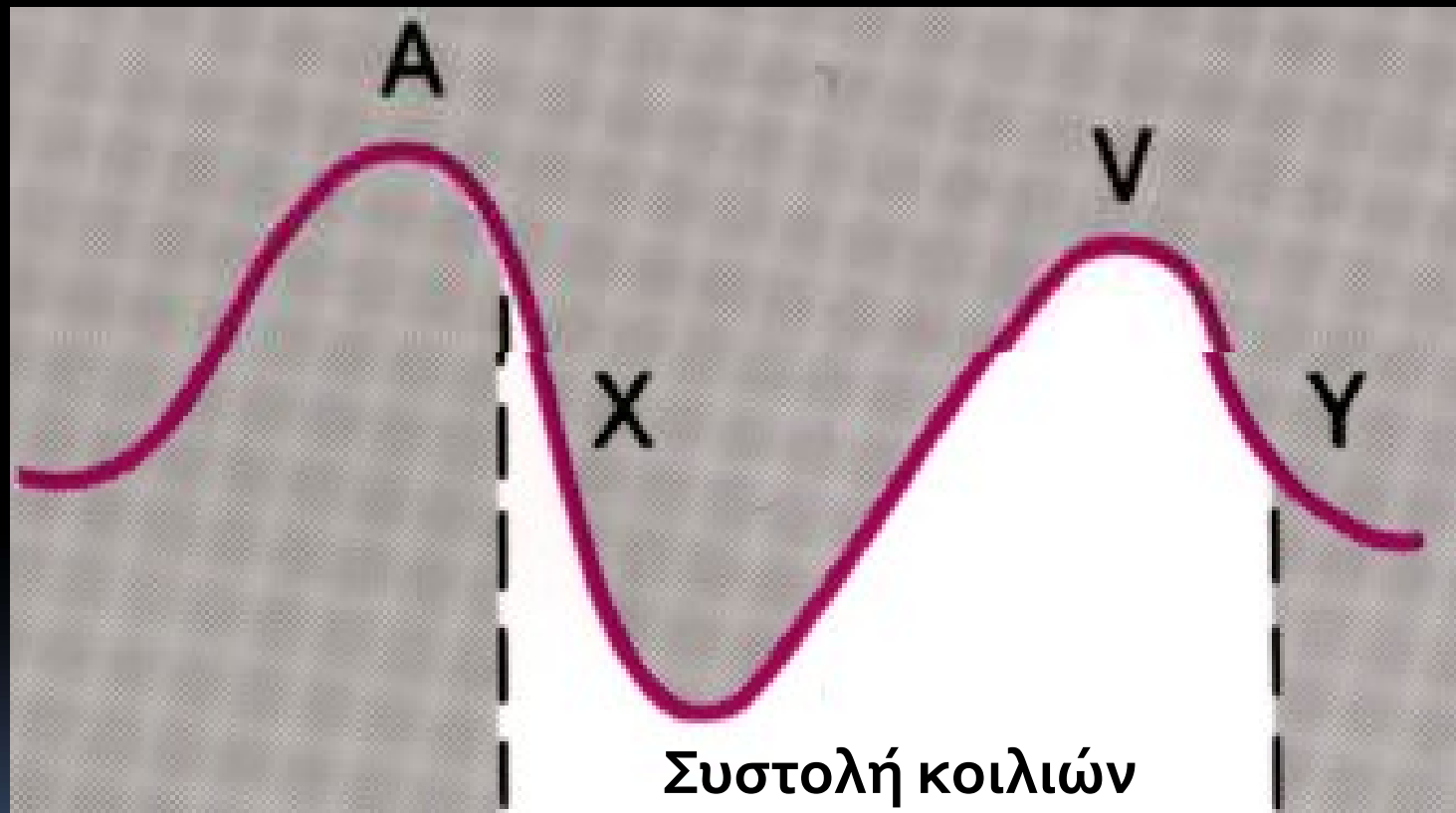
Η πίεση στη συστολή & διαστολή...





Η πίεση των κόλπων...

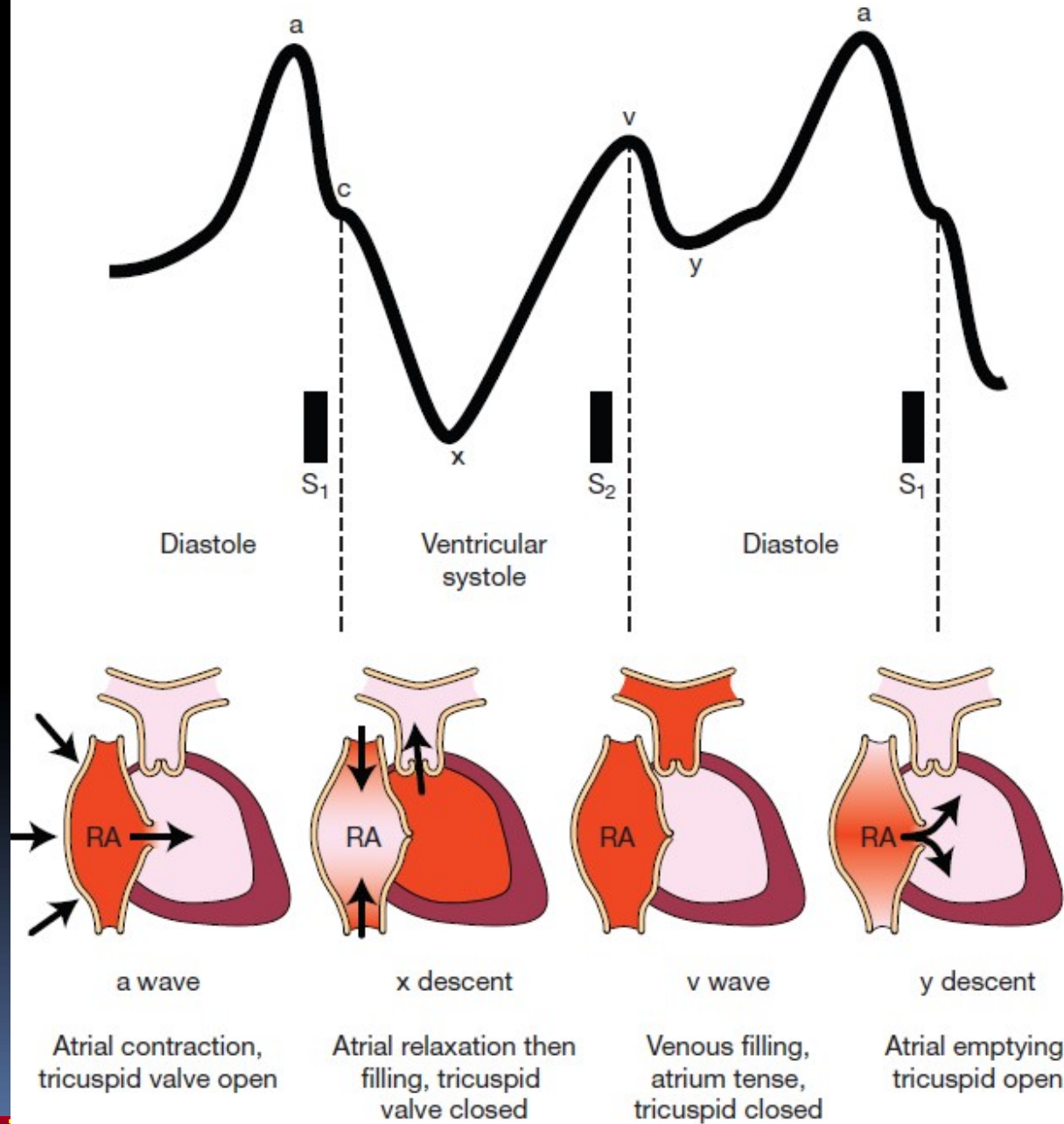
Η μισή ώρα κομμάτι...

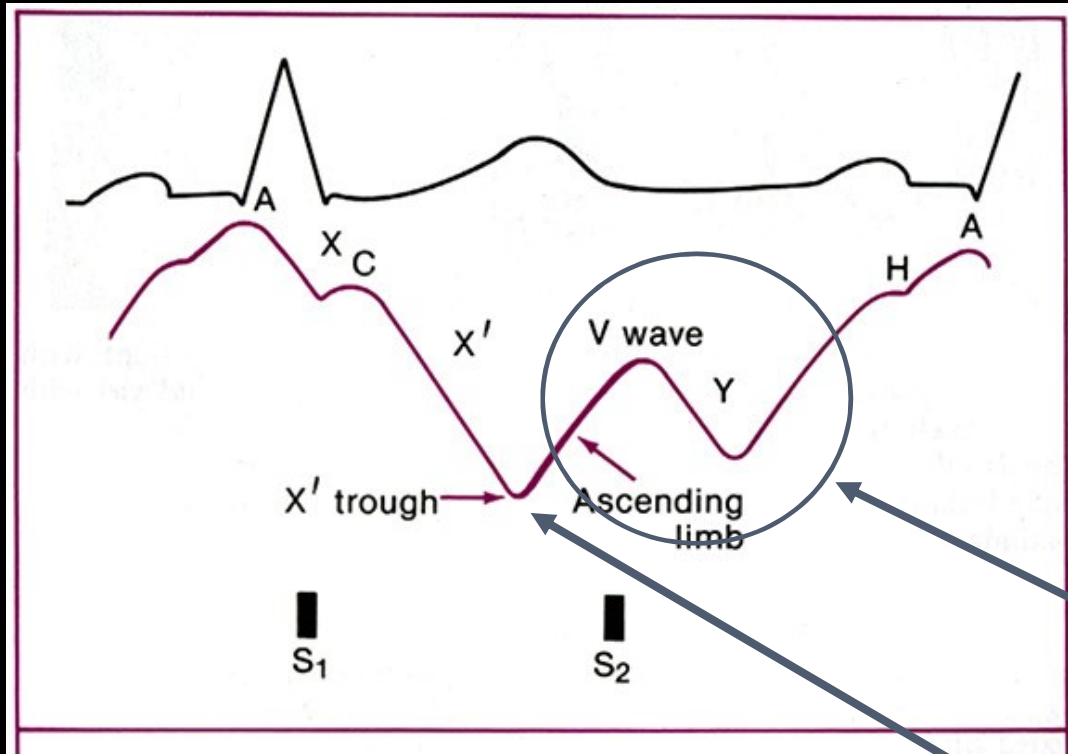


MAP: mean atrial pressure



Jugular Venous Pulsations





a wave: Κολπική συστολή

x, x' descent: Κολπική
χάλαση, Κοιλιακή συστολή

c wave: Καρωτιδικός σφυγμός
πιέζει τη σφαγίτιδα

V & Y μικρού εύρους
(RA distensibility)

v wave: Κολπική πλήρωση – κοιλιακή συστολή

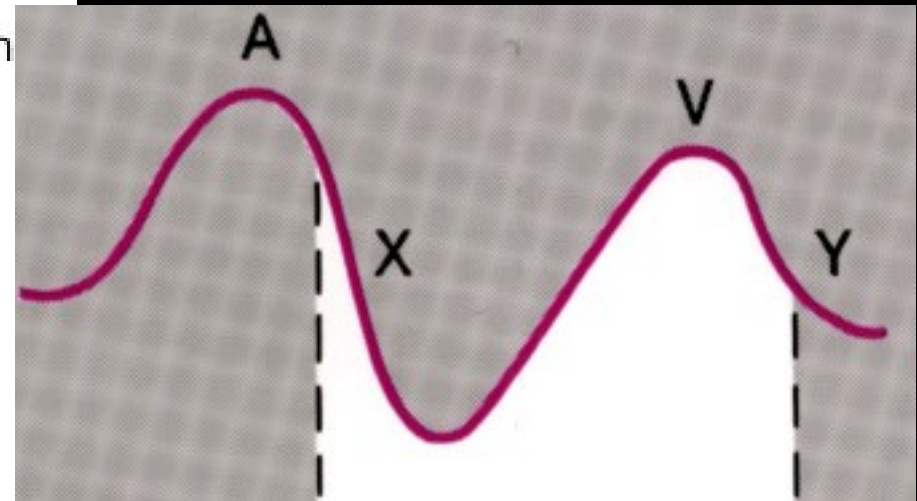
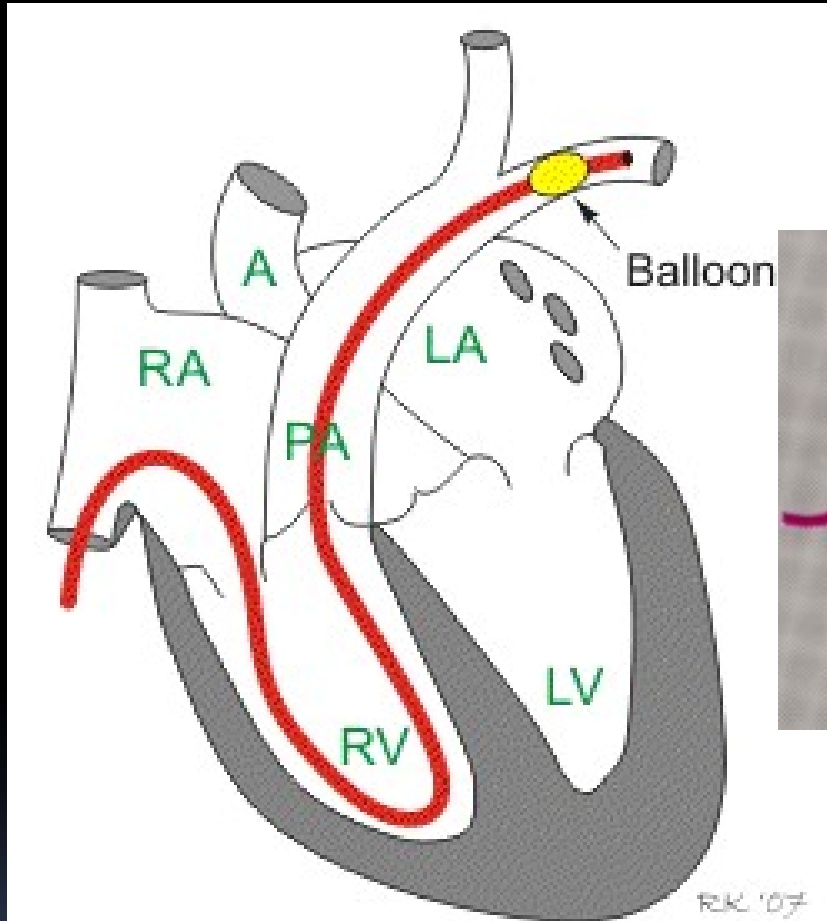
y descent: Ταχεία κοιλιακή πλήρωση

H wave: Διάσταση

X' deeper than Y (↑
φλεβική ροή στη
συστολή)

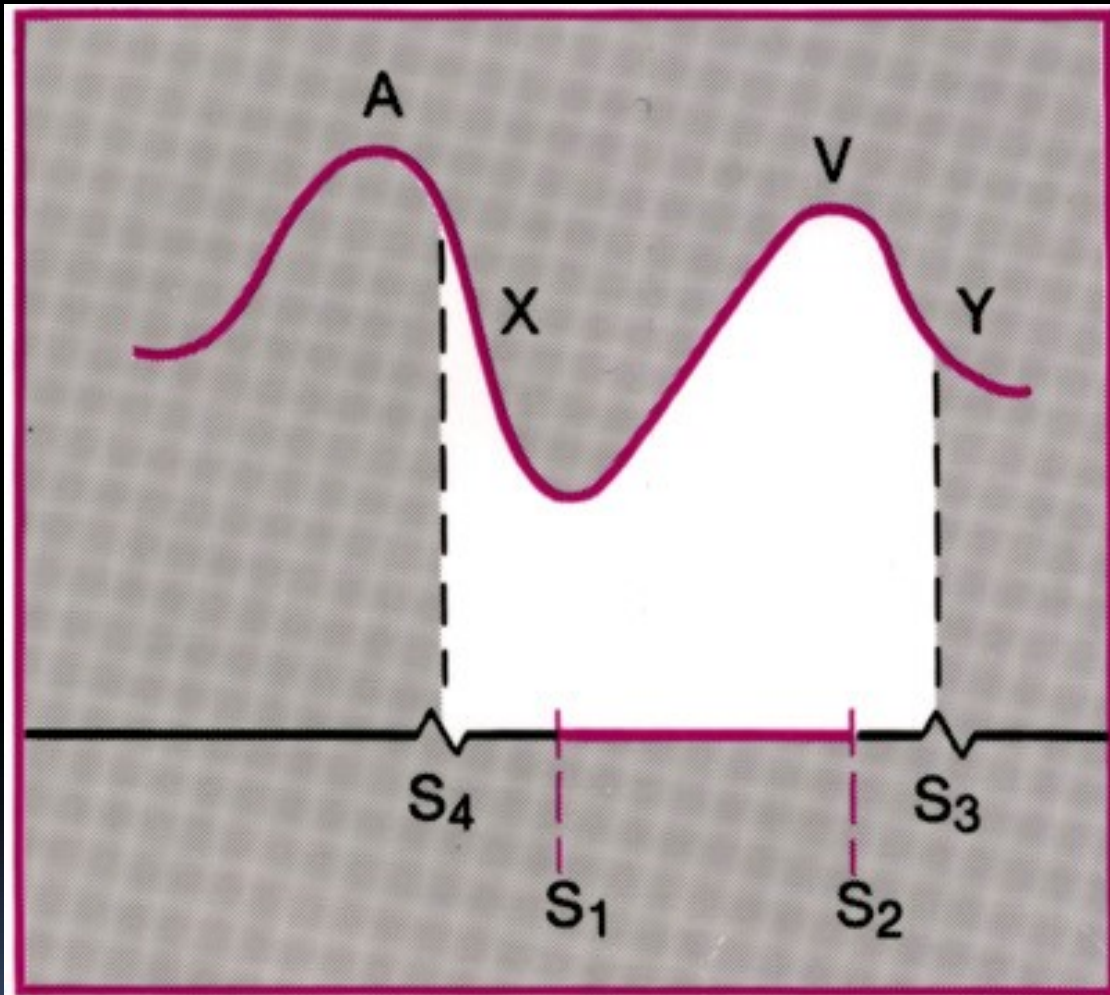


Right Heart Catheterization and PCWP...



Balloon-tipped, Swan-Ganz catheter for measuring pulmonary capillary wedge pressure (PCWP).



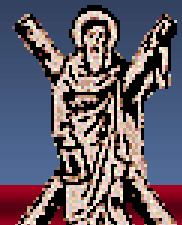
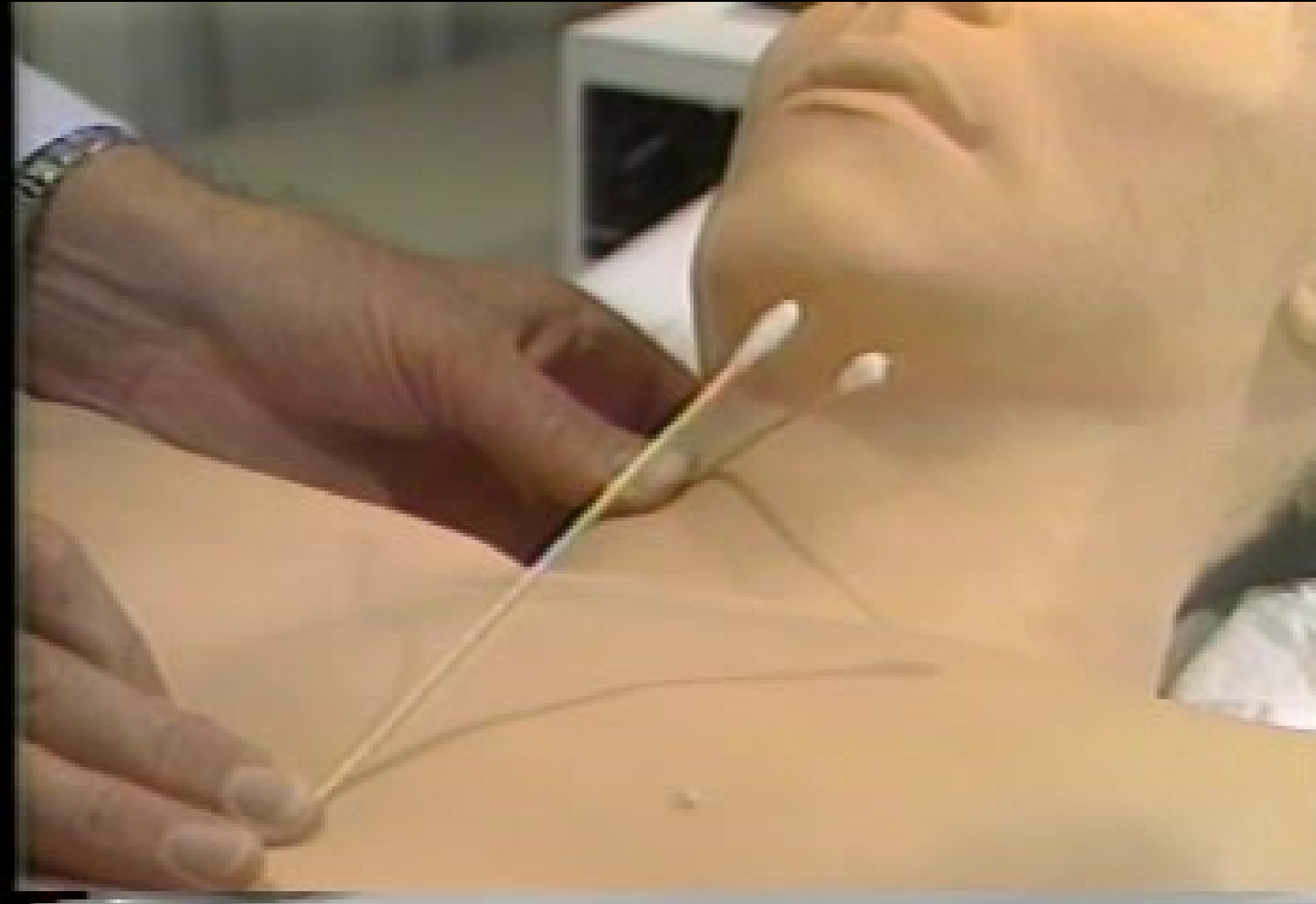


The fourth heart sound (S4) coincides with the phase of ventricular filling following atrial contraction.

The third heart sound (S3) coincides with the y descent (the phase of rapid ventricular filling).



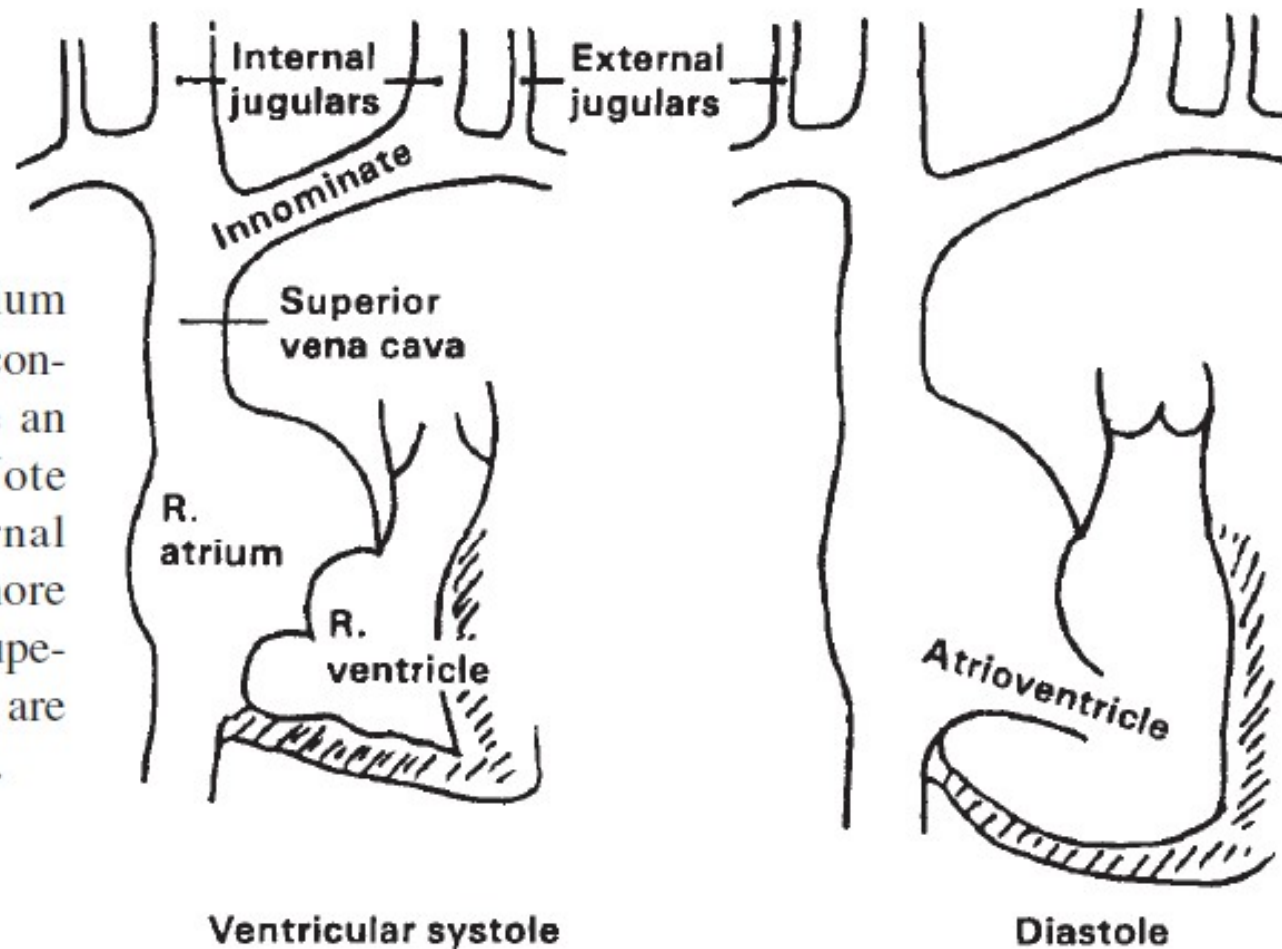
Επισκόπηση Προκαρδίου

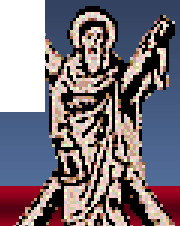
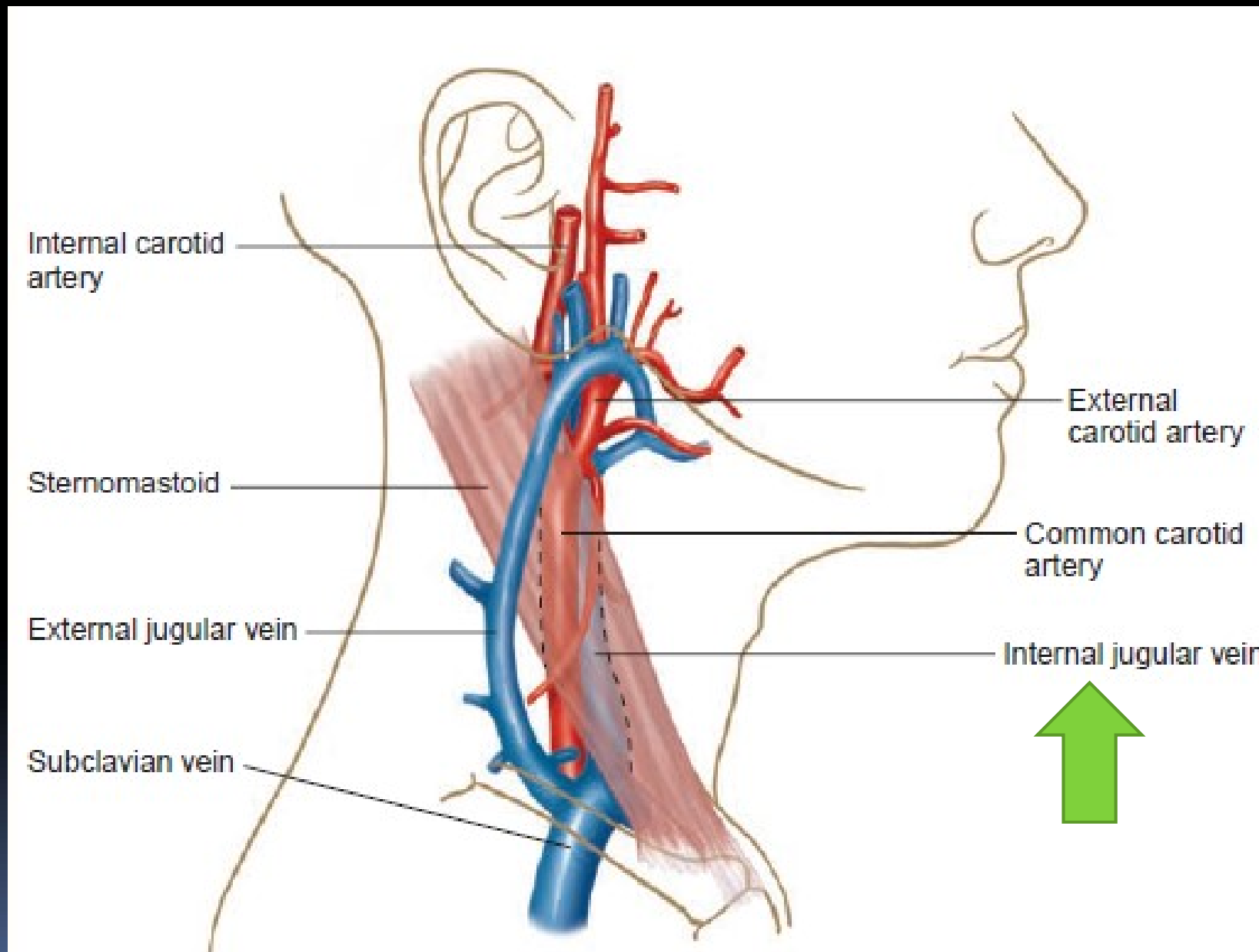


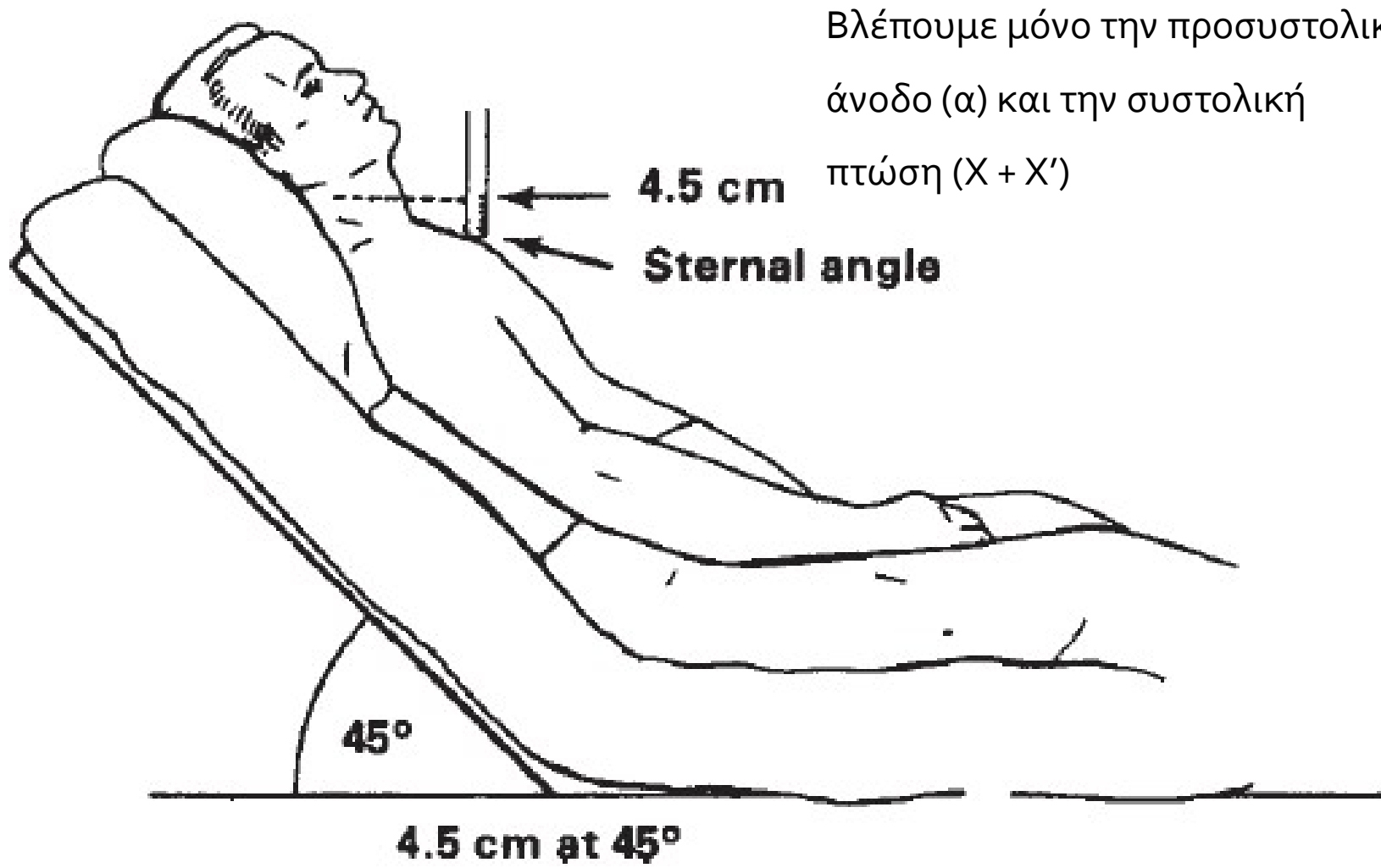
Σφαγιτιδικός σφυγμός



In diastole, the atrium and ventricle are in continuity and become an “atrioventricle.” Note also that the internal jugulars are in a more direct line with the superior vena cava than are the external jugulars.







Βλέπουμε μόνο την προσυστολική
άνοδο (α) και την συστολική
πτώση (X + X')



Σφαγιτιδικός σφυγμός

- Ασθενής ύπτιος με τη ράχη στις 45°
- Εφαπτόμενη πηγή φωτός
- Αναζητήστε ταχεία, διπλή (ενίοτε τριπλή) κυματομορφή με κάθε καρδιακό κύκλο
 - Ελαφρά πίεση πάνω από την κλείδα: Αν οι κυματομορφές δεν εξαφανίζονται, πρόκειται για τις καρωτίδες...



What the Dc really sees...

- To the naked eye, the two descents are the most obvious events in the normal jugular pulse.
- ***Of the two, the sudden collapse of the x descent late in systole is more prominent, occurring just before S2.***
- *The y descent follows S2 early in diastole*



Σφαγιτιδικός σφυγμός



Βλέπουμε μόνο την προσυστολική άνοδο (α) και την συστολική πτώση (X + X')

Στυλεός: καρωτιδικός σφυγμός...Προσέξτε την διαφορά με τον φλεβικό...



- It's easier than it looks !!!
- Look for descents not waves
- Time deepest descent with systole
- **This is the x' (prime) descent !!!**
 - Occurs during systole due to RV contraction pulling down the TV valve ring “descent of the base”
 - A measure of RV contractility
 - If the dominant descent is systolic-this is the x' descent- and JVP waveform is normal



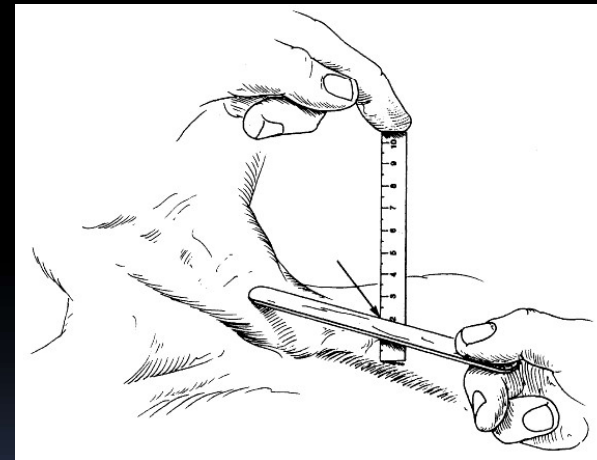
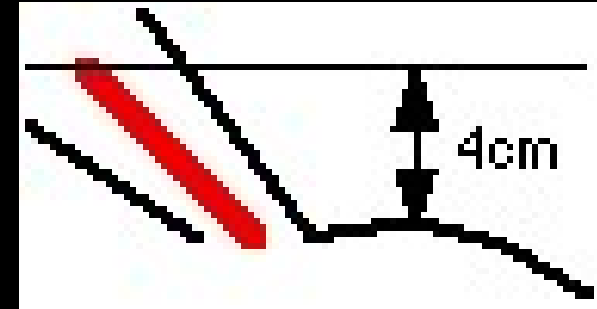
Καρωτιδικός σφυγμός:

- Ισχυρός
- Μία μόνο κορυφή,
- Δεν αλλάζει με την θέση ή την αναπνοή,
- Πίεση στη βάση του τραχήλου δεν τον εξαφανίζει.



Σφαγιτιδικός σφυγμός

- Αναγνωρίστε το υψηλότερο σημείο (κορυφή) των κυμάτων
- Οριζόντια γραμμή από αυτό το σημείο
- Μέτρηση της κάθετης απόστασης από τη στερνική γωνία
- Ανώτερο όριο 4 cm (CVP=9 cm H₂O), RA 5 cm κάτω από την στερνική γωνία στις 45 μοίρες



Σφαγιτιδικός σφυγμός



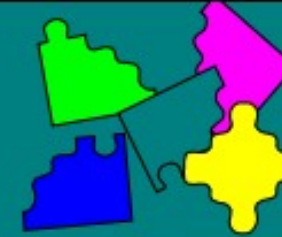
Elevated JVP...

- Highly correlated with both acute and chronic heart failure
- Tricuspid stenosis
- Pulmonary Arterial Hypertension (PAH)
- SVC (superior vena cava) obstruction
- Tamponade and constrictive pericarditis





Hepato-Jugular reflux and Kussmaul's sign



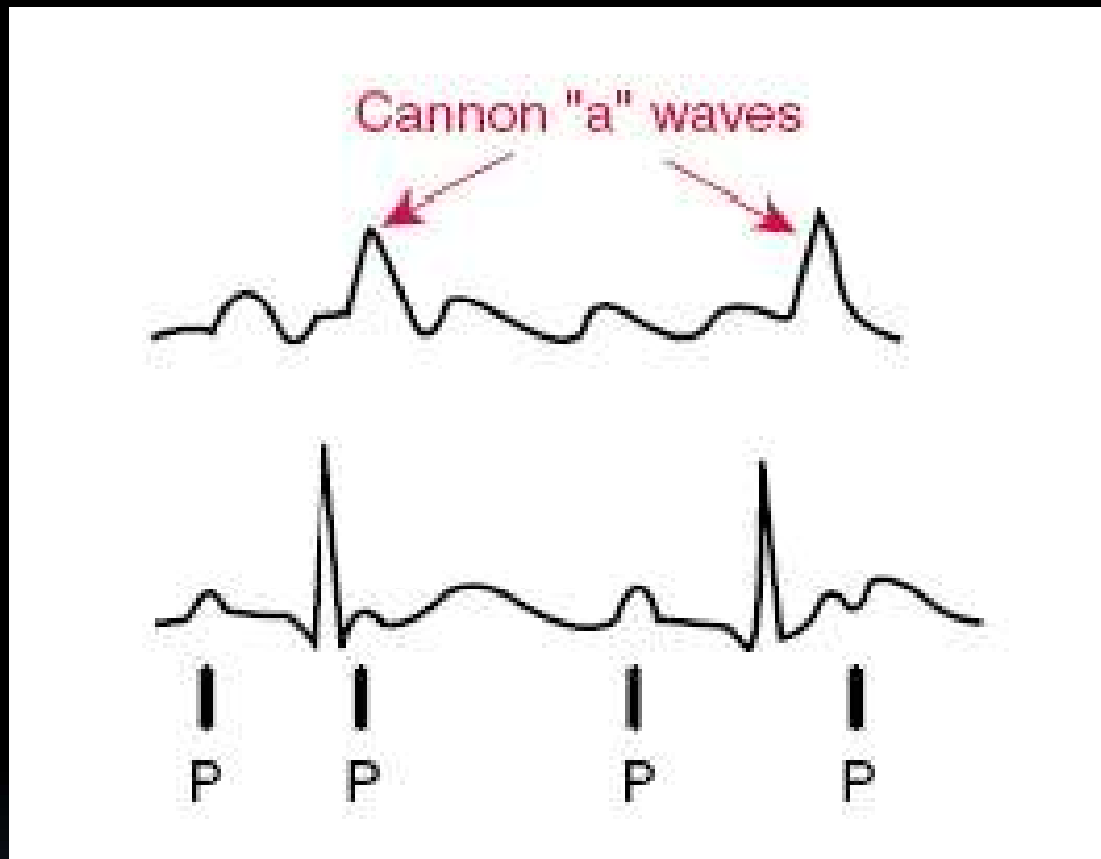
- Hepato-jugular reflux (various definitions)
 - sustained rise 1 cm for 30 sec.
 - ↑ venous tone & SVR
 - ↓ RV compliance
- Positive HJR correlates with $LVEDP > 15$
- JVP normally falls with inspiration
- Kussmaul's sign
 - inspiratory ↑ in JVP
 - constriction
 - rarely tamponade
 - RV infarction



Abnormalities of the a-wave

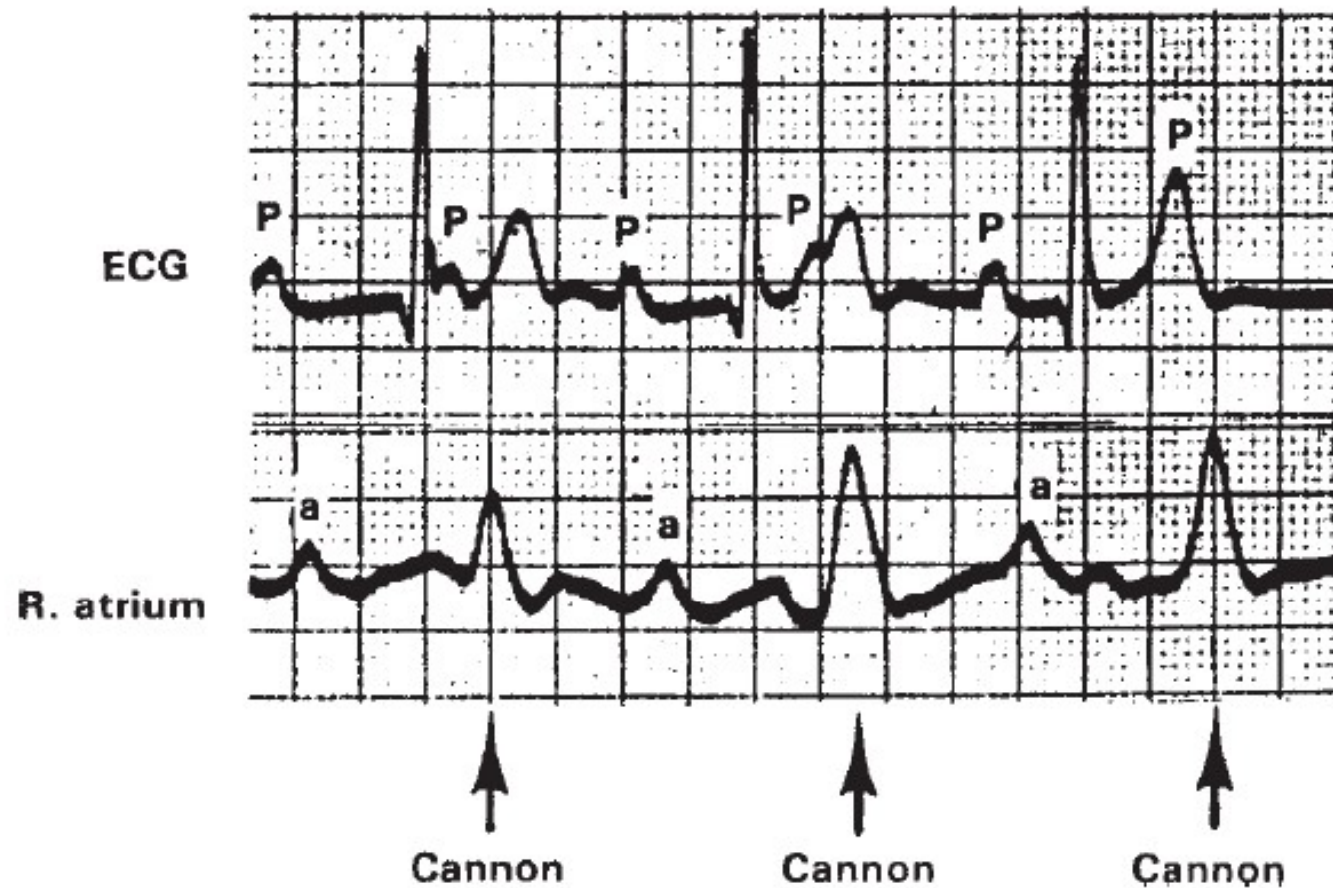
- **Prominent *a waves* occur in increased resistance to right atrial contraction, as in:**
 - *Tricuspid stenosis*
 - *Pulmonic stenosis*
 - *Pulmonary hypertension*
 - AV-dissociation...
 - 3rd-degree atrioventricular block (cannon waves)
 - Supraventricular tachycardia
 - Junctional rhythms
- **Absent *a waves* occur in atrial fibrillation.**





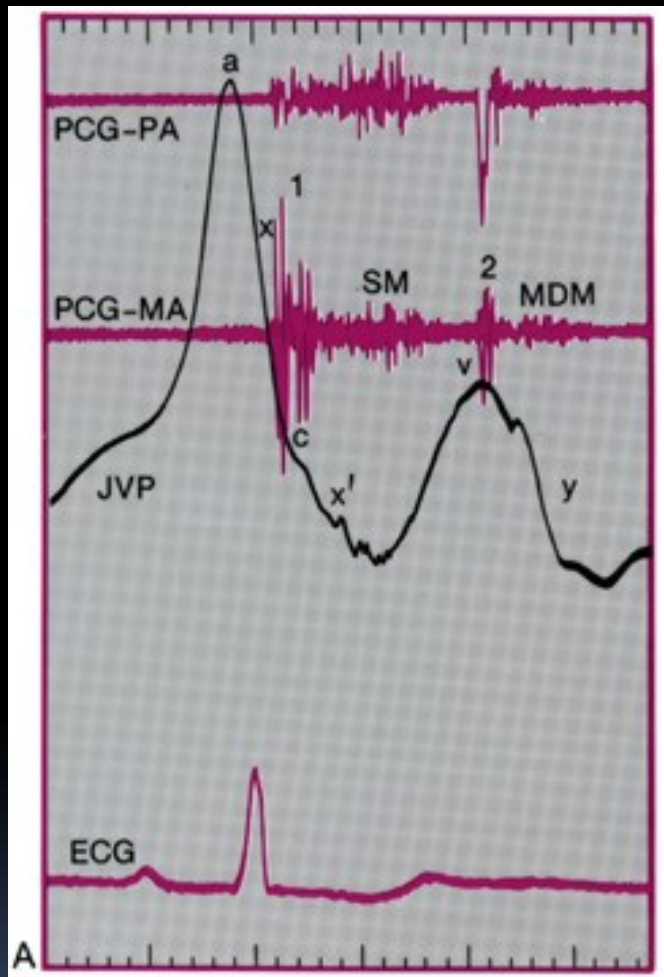
- Cannon a wave: AV dissociation





Note that in this patient with complete atrioventricular block, every other P wave happens to fall on a T wave, i.e., it occurs during ventricular systole when the tricuspid valve is closed. Thus, there is a cannon A wave with every other P wave.





- **a wave:** Ενισχυμένο όταν υπάρχει αντίσταση στην κοιλιακή συστολή (RVH, PHT, TS, LVH, myxoma)
- **RV failure & SR:** Ενίσχυση α & υ

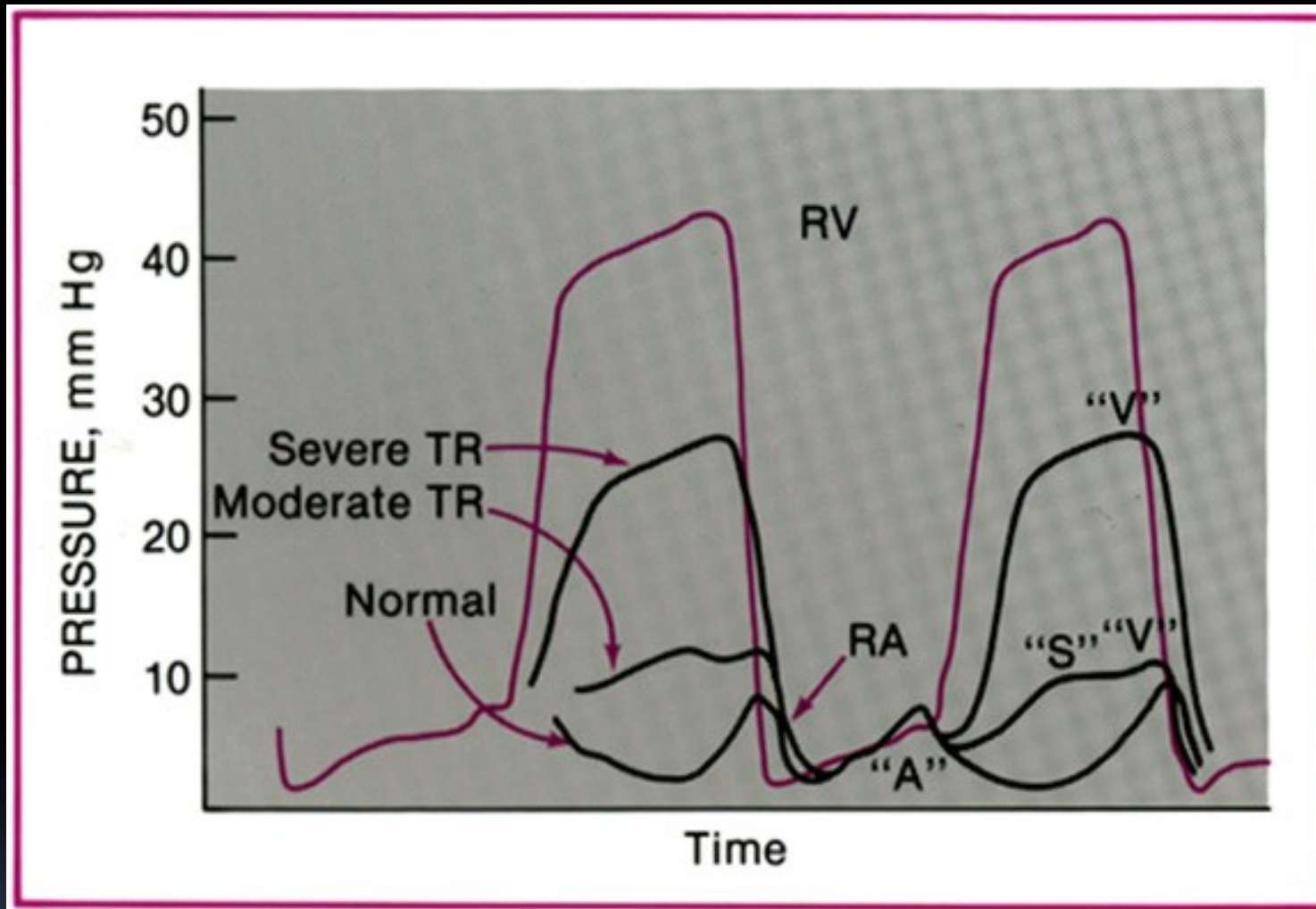
MS + PHT: ↑↑ α λόγω ↓ ενδοτικότητας RV



Σφαγιτιδικός σφυγμός

- **Ενισχυμένο ν ή c-v:** TR, συστολική κίνηση του λοβού του αυτιού και ενίοτε δεξιά προς τα αριστερά κίνηση της κεφαλής με κάθε συστολή.





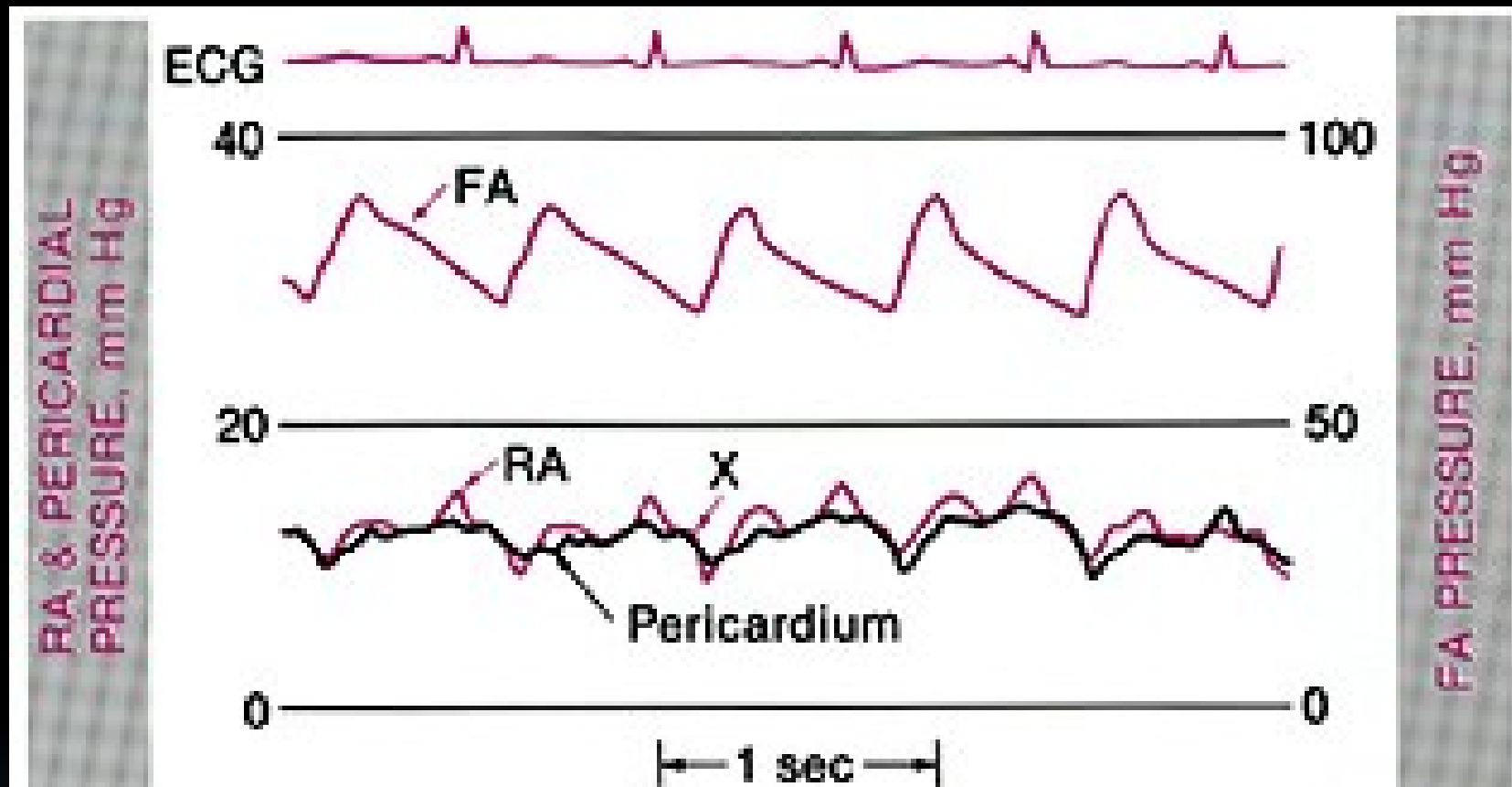
JVP in TR



Σφαγιτιδικός σφυγμός

- **x descent:** ενίσχυση σε ασθενείς με \uparrow α ή φόρτιση όγκου RV (ASD => Ενισχυμένα επίσης ν & γ), μείωση σε ασθενείς με RV failure ή Af
- **y descent:** βραδεία όταν υπάρχει αντίσταση (TS), ταχεία όταν υπάρχει απρόσκοπτη ροή (TR)....





- ✓ **Tamponade:** Εξίσωση διαστολικών πιέσεων
- ✓ Εξαφάνιση του Y λόγω περιορισμού στην πλήρωση από την αρχή της διαστολής...



Περιοριστική φυσιολογία...

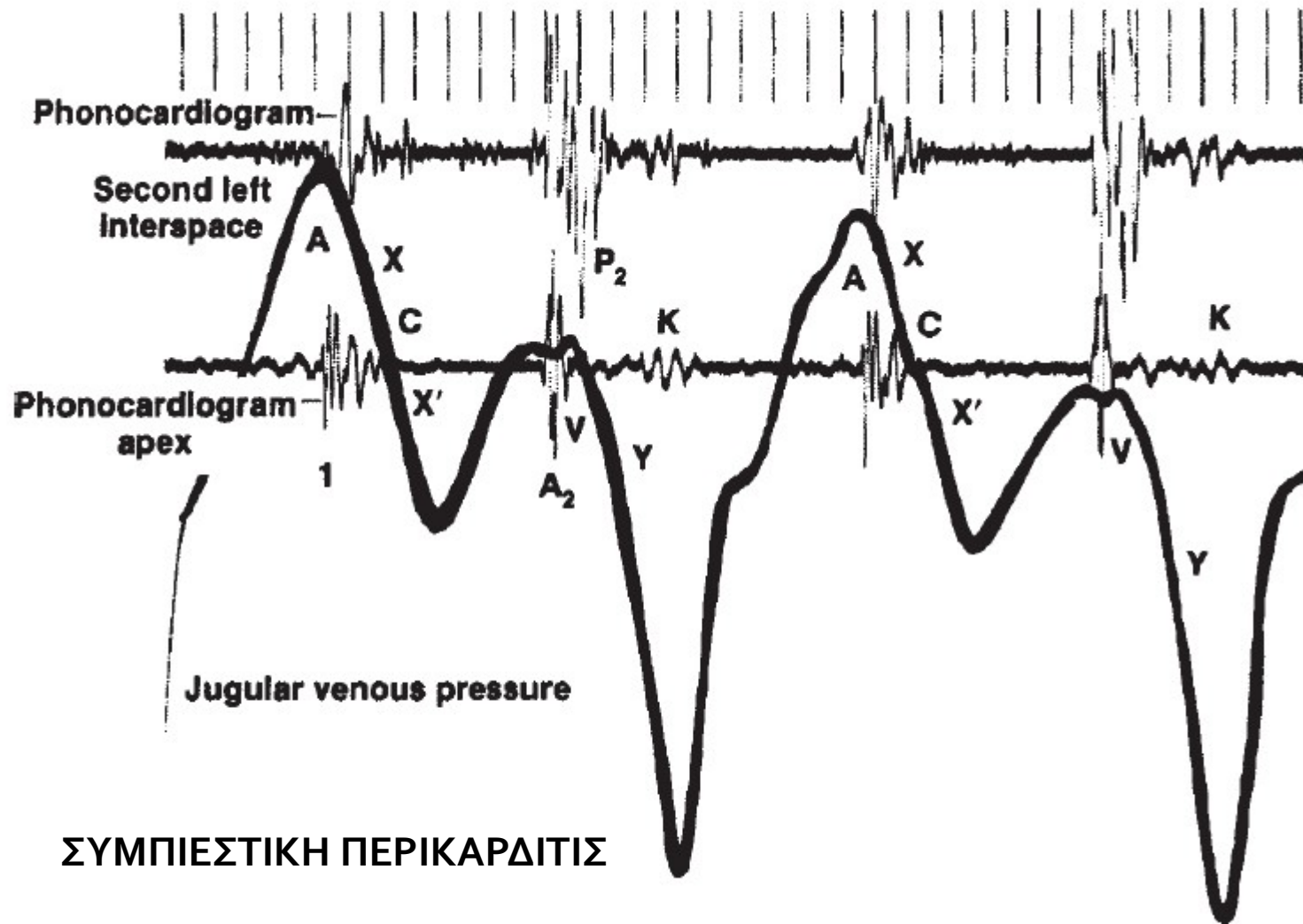
- Περιοριστική ΜΚΠ, συμπίεση, έμφραγμα RV, σοβαρή RV ή LV failure
- *Ταχύτατη κάθοδος του γ:* η κοιλία πληρώνεται μόνο στην πρωτοδιαστολή ...
- **Steeply rising H wave:** Μετά την πρωτοδιαστολή η ροή ↓ και η πίεση ↑ ...



Σφαγιτιδικός σφυγμός

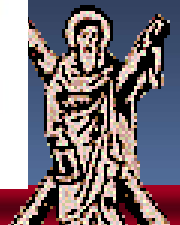
- **Συμπίεση:** Ενισχυμένη ταχεία πλήρωση (y) και ταχεία αύξηση πίεσης σε ένα διαστολικό plateau (H wave) χωρίς ενίσχυση του a. Ενίοτε το χ' ενισχύεται επίσης π.χ. Effusive-constrictive (κύμα "W"). Στον επιπωματισμό το χ είναι πιο έντονο.
- Σημείο Kussmaul...

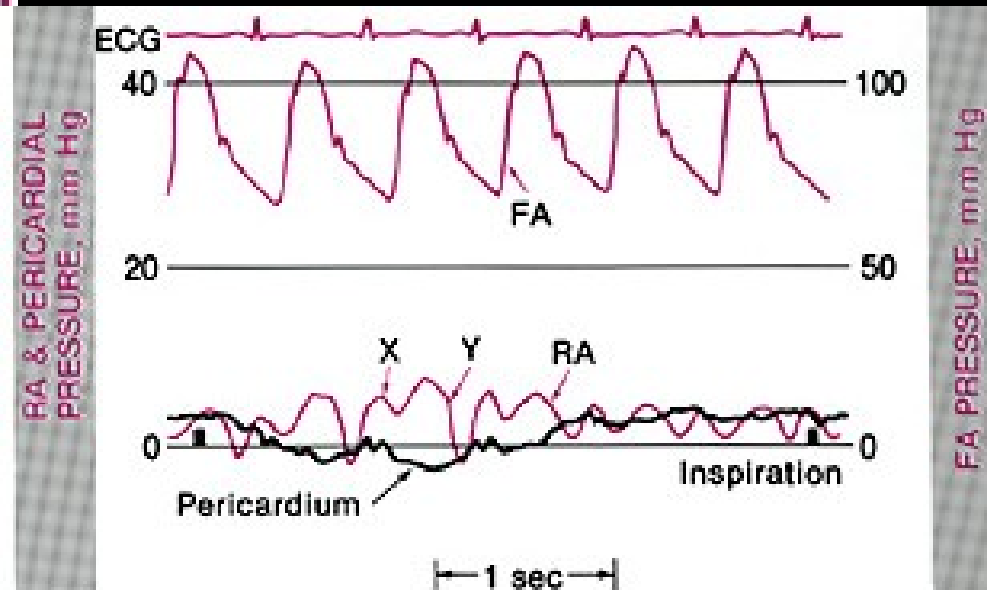
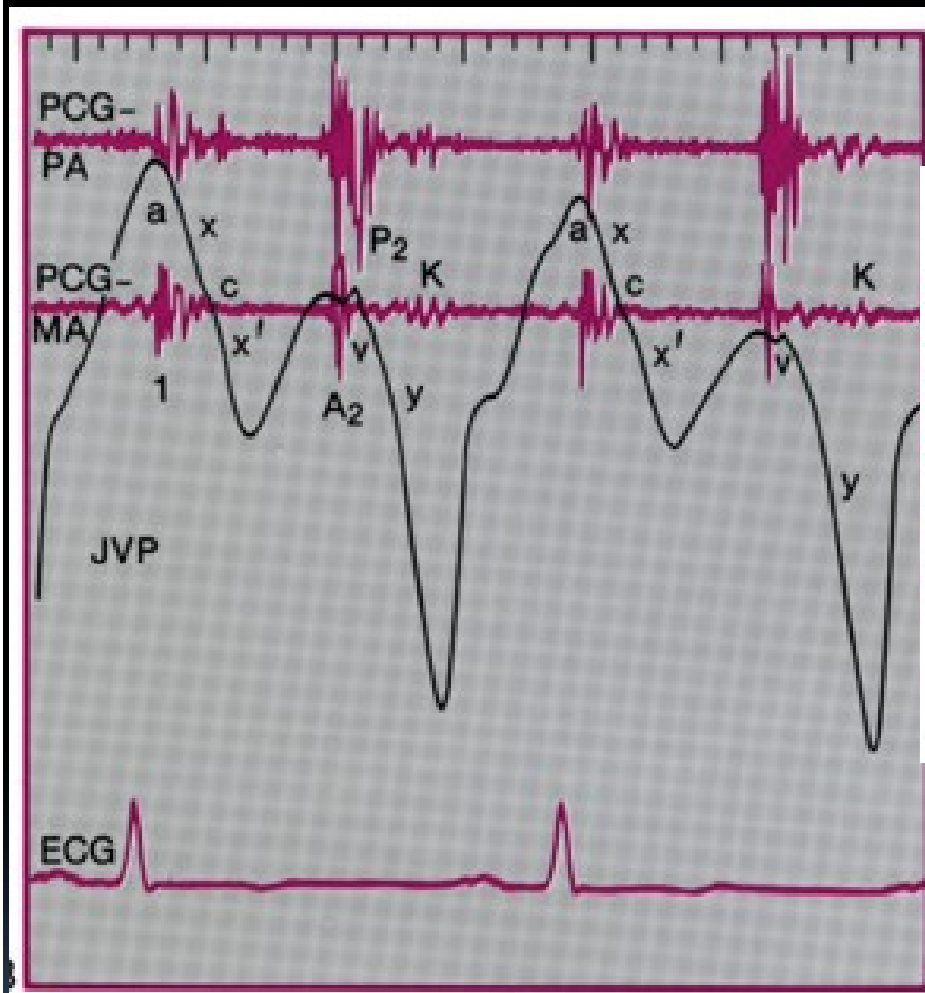




ΣΥΜΠΙΕΣΤΙΚΗ ΠΕΡΙΚΑΡΔΙΤΙΣ

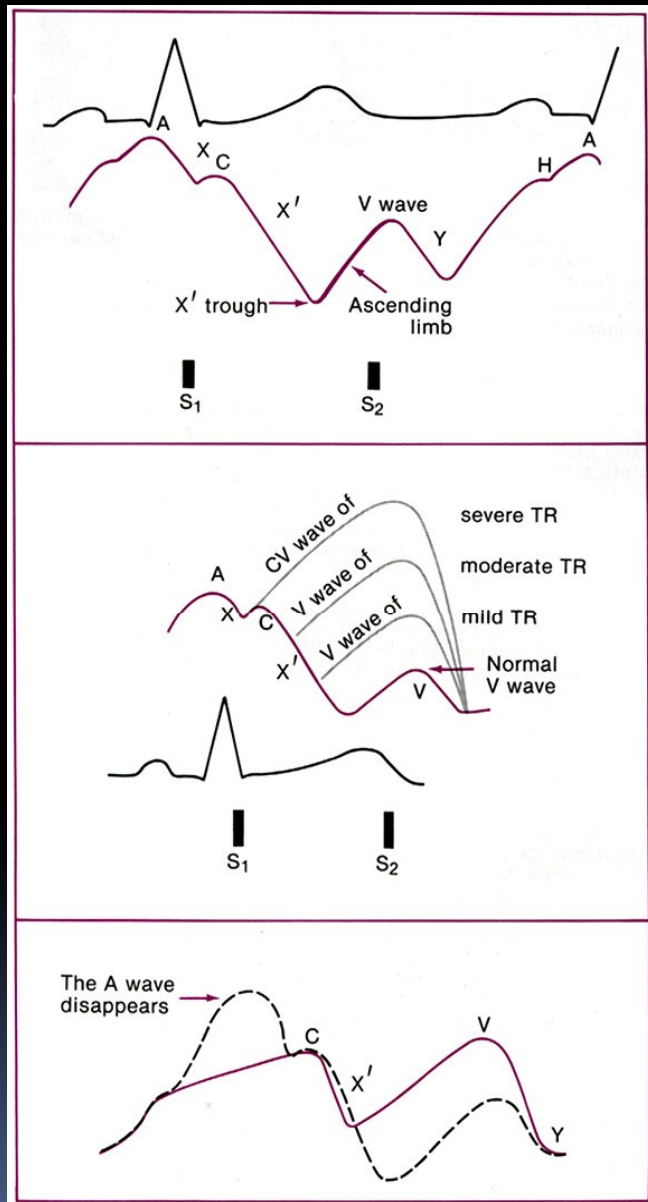
Severe constrictive pericarditis. Shown is a jugular pulse tracing from a patient with severe constrictive pericarditis. Note the double descent with a dominant Y descent and relatively small X' descent. K indicates a pericardial knock sound. (From E. Craige, Heart Sounds. In E. Braunwald [ed.], *Heart Disease* [2nd ed.]. Philadelphia: Saunders, 1984).





Συμπίεση, Περιοριστική ΜΚΠ, RV infarction...

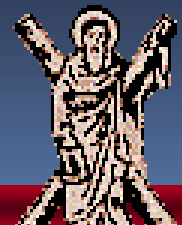




Το κύμα Η εξαρτάται από την ενδοτικότητα του κόλπου

TR: Το x' προοδευτικά εξαφανίζεται και τη θέση του λαμβάνει το V

Σε κοιλιακή μαρμαρυγή, εξαφανίζεται το A και X, επικρατεί το Y και η κυματομορφή ομοιάζει με TR...



Σφαγιτιδικός σφυγμός

- **a wave:** Prominent when resistance to RA contraction is increased (RVH, PHT, TS, LVH, myxoma). Cannon (amplified) a waves=> AV dissociation
- **Atrial fibrillation:** a wave and x descent disappear, x' descent & v wave become more prominent.
- **RV failure & SR:** increases in prominence of both the a and v waves.
- **Steeply rising H wave:** restrictive cardiomyopathy, constrictive pericarditis, and RV infarction.
- **x descent:** may be prominent in patients with large a waves, or RV volume overload (atrial septal defect).

