



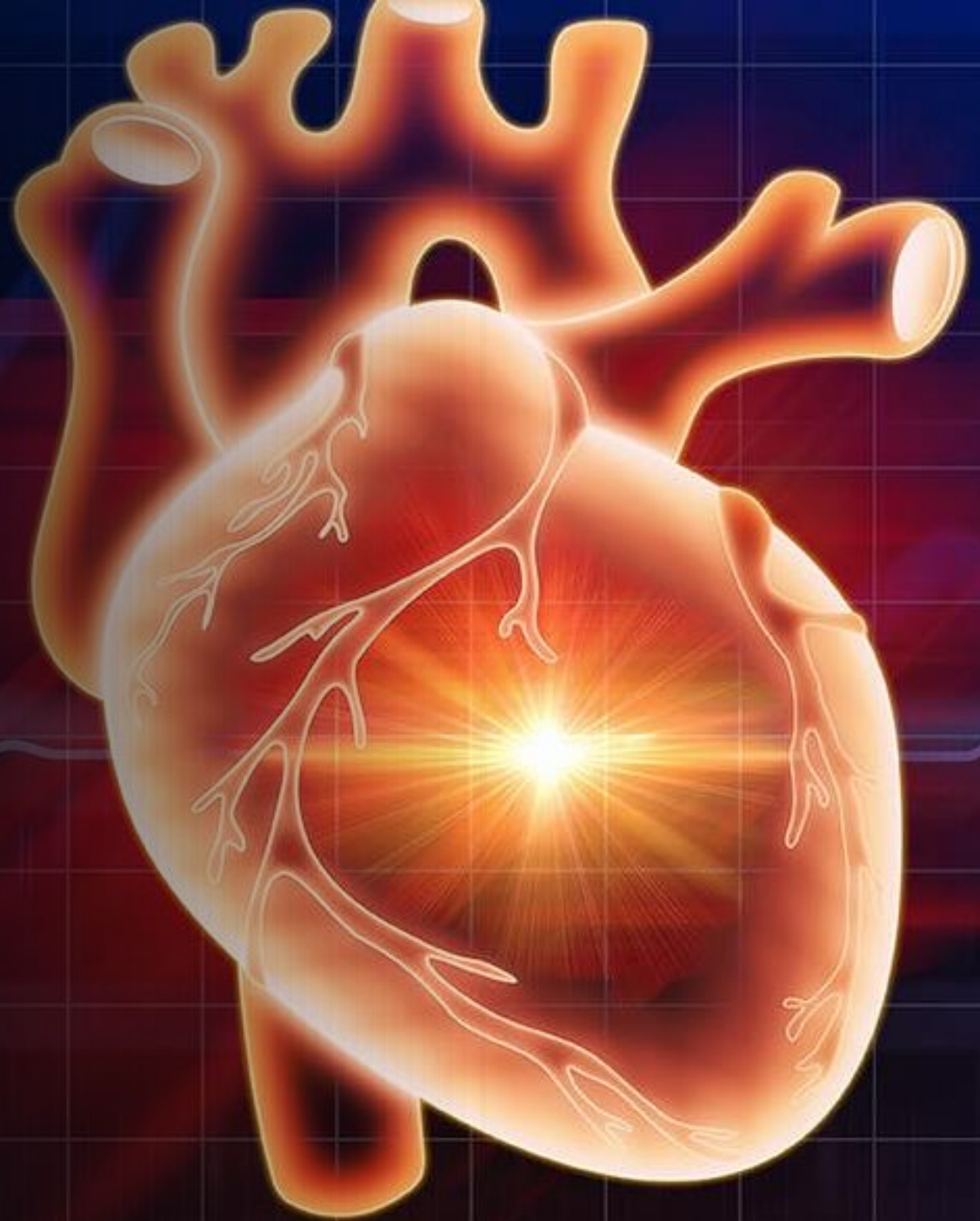
How to review CAG before CABG

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Contents



Coronary artery anatomy

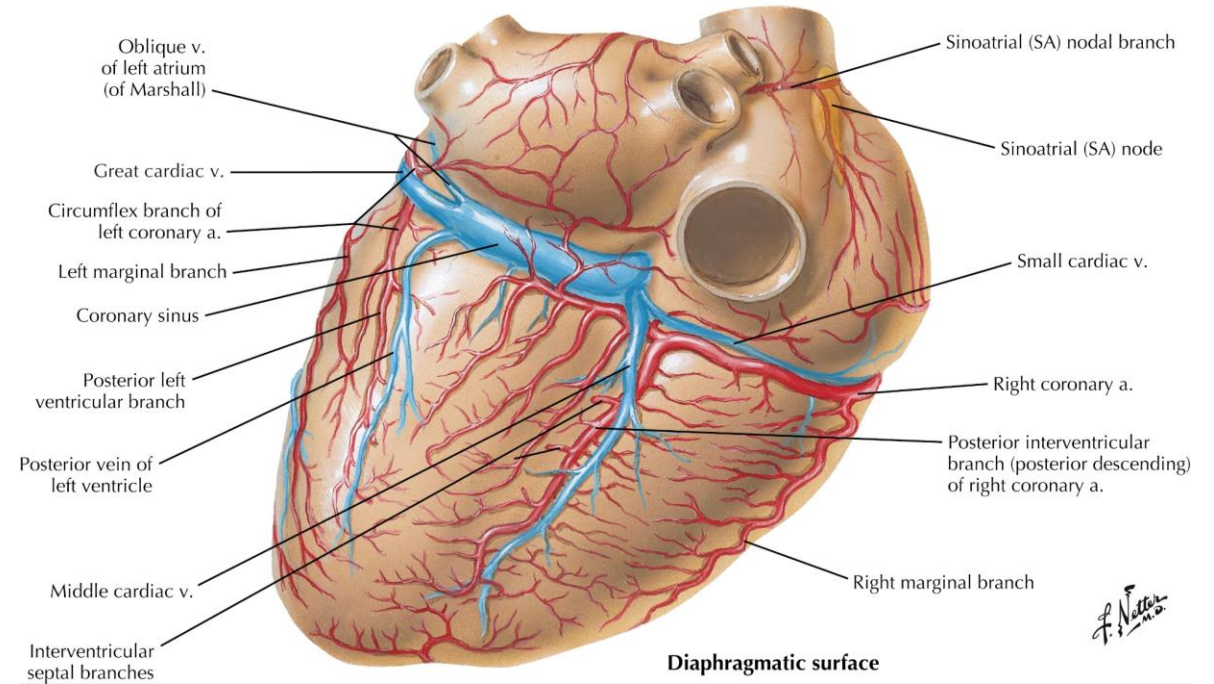
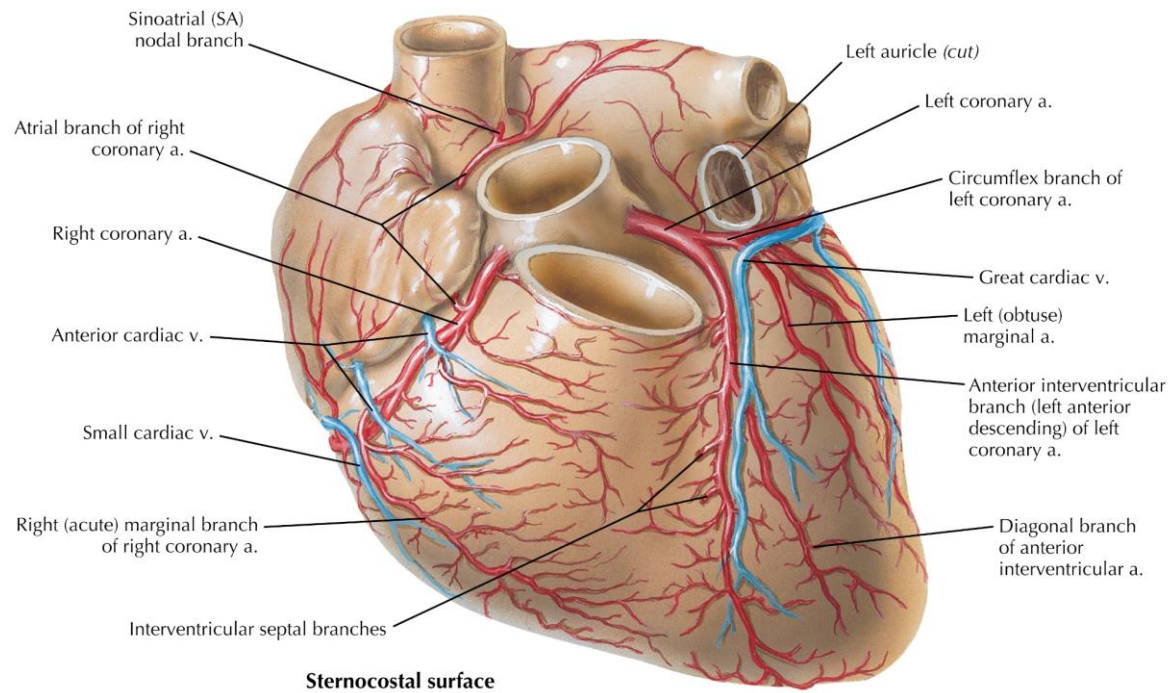


Coronary angiography



Cases

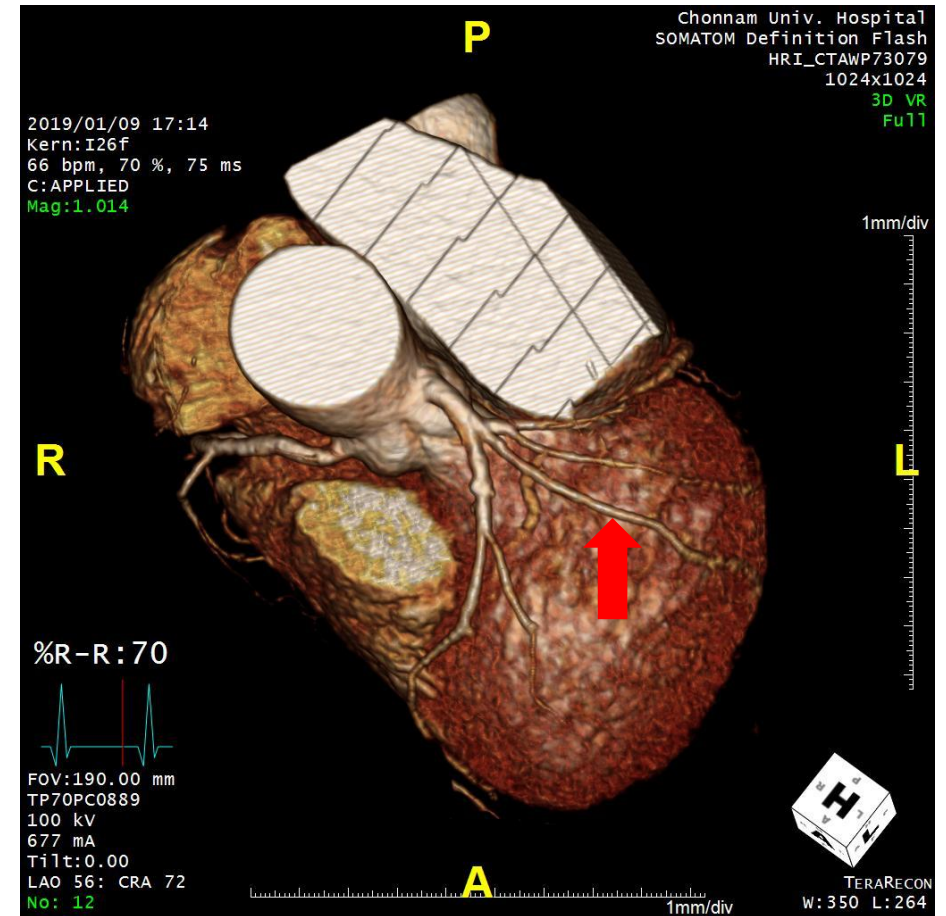
Coronary Artery Anatomy



F. Netter

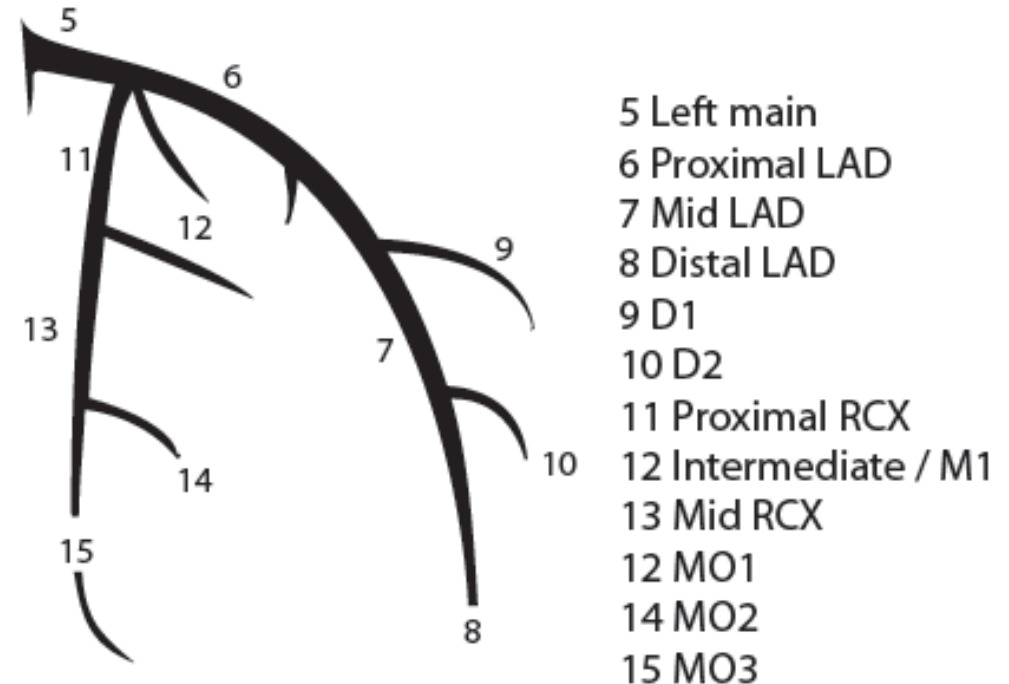
Left Main Coronary Artery (LM)

- Length : 10~20mm (~40mm)
- Left anterior descending (LAD)
- Left circumflex (LCx)
- Ramus intermedius (1st diagonal branch)



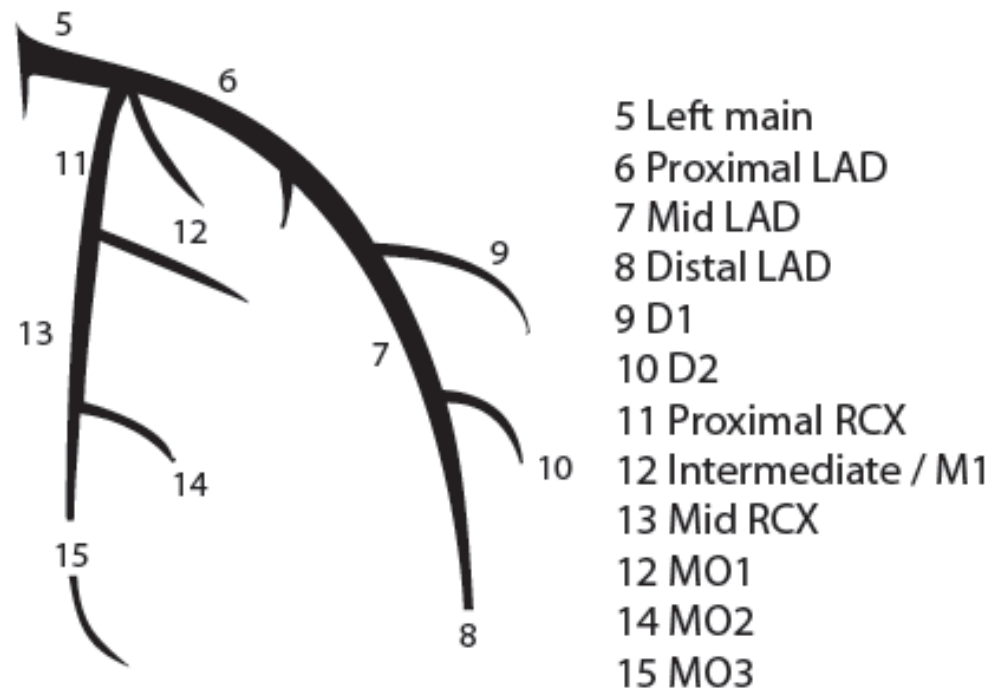
Left Anterior Descending Artery (LAD)

- Anterior interventricular sulcus
- Right ventricular branches
- Diagonal arteries : 2~6
- Septal perforators : 3~5
- Proximal-, middle, distal-



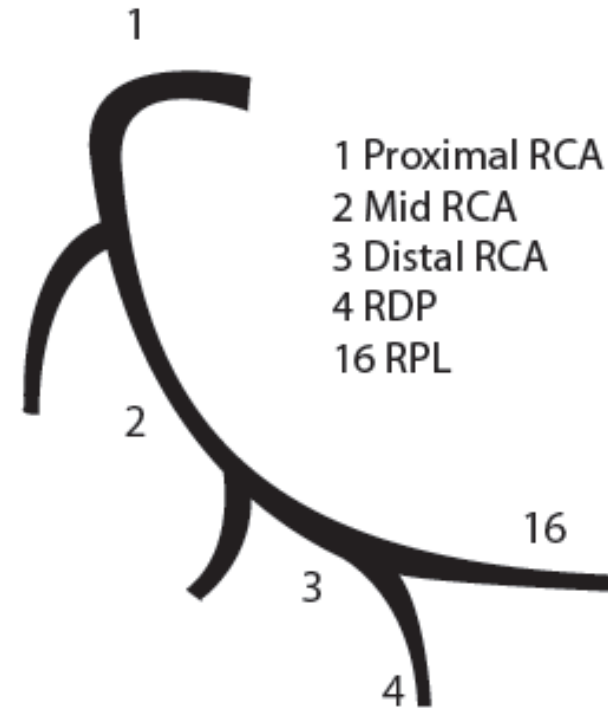
Left Circumflex Artery (LCx)

- Left AV groove
- Obtuse marginal arteries
- Sinus nodal artery : 40~50%
- Posterior descending artery : 10~15%
- Proximal-, distal-

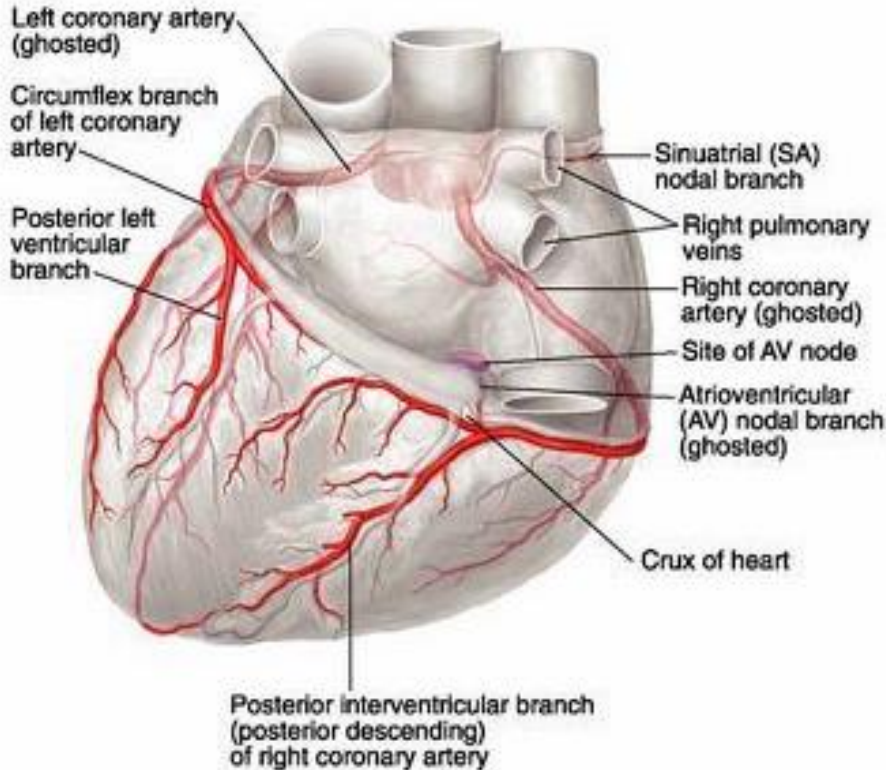


Right Coronary Artery (RCA)

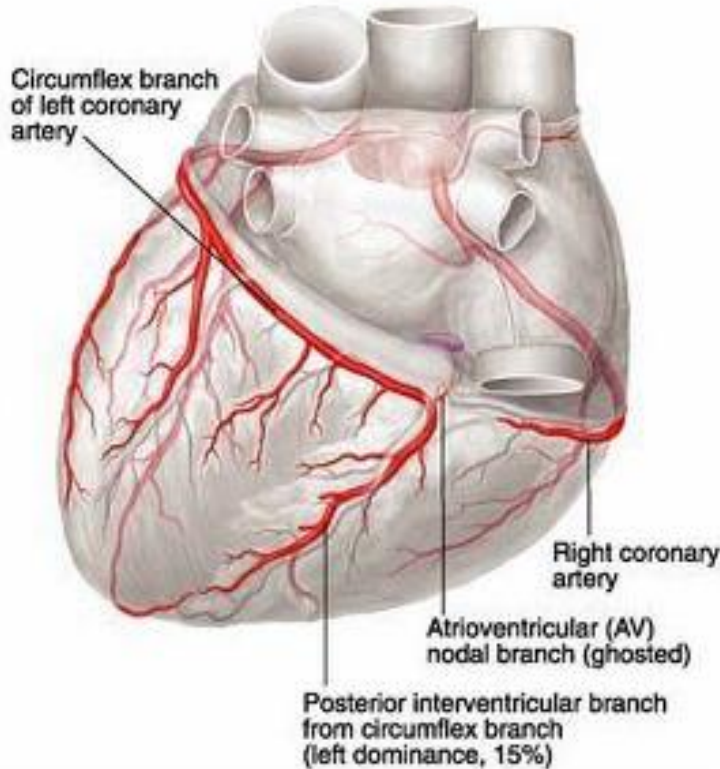
- Right AV groove
- Acute marginal arteries
- Conal (infundibular) branch
- Sinus nodal artery : 50~60%
- Posterior descending artery : 85~90%
- Posterolateral segment artery
- Proximal-, middle-, distal-



Coronary Artery Dominance

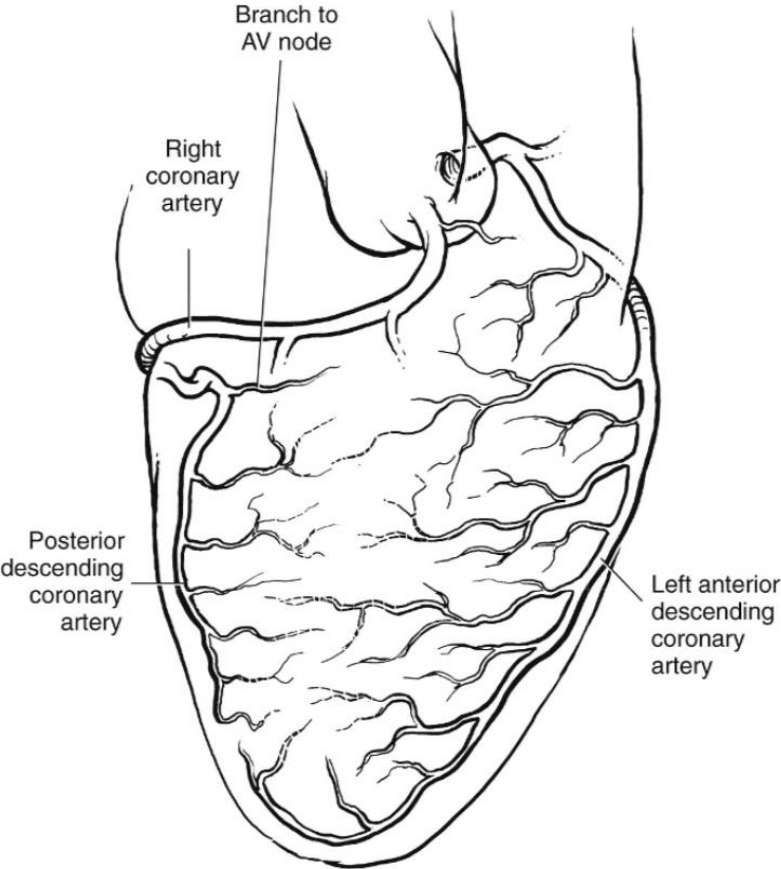


85~90%

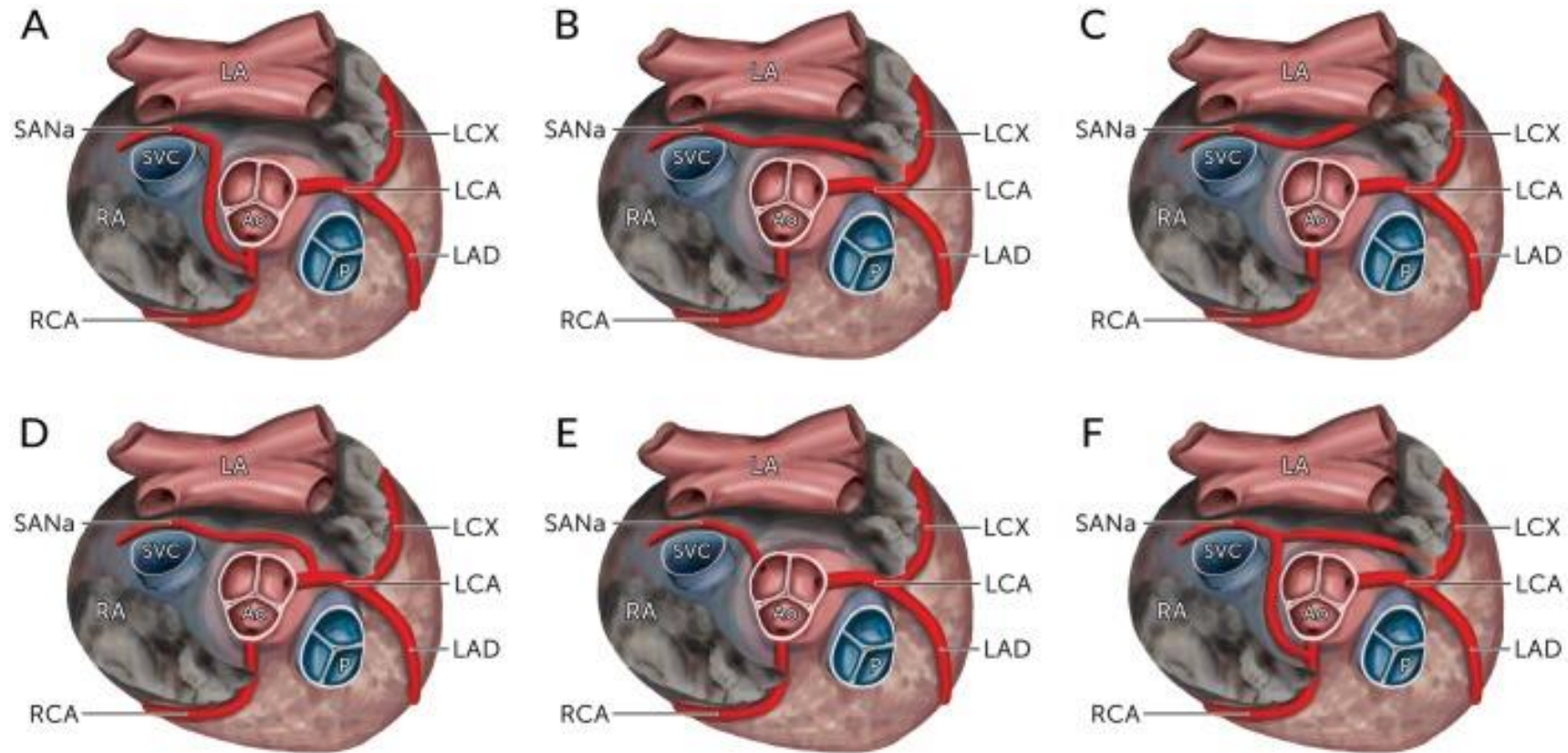


10~15%

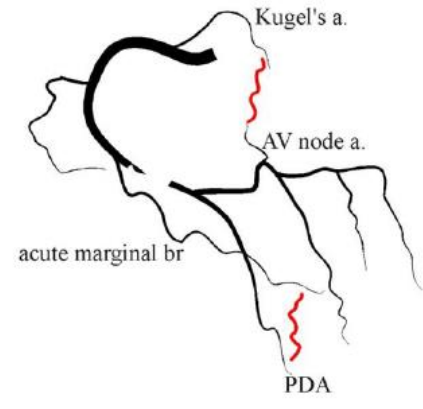
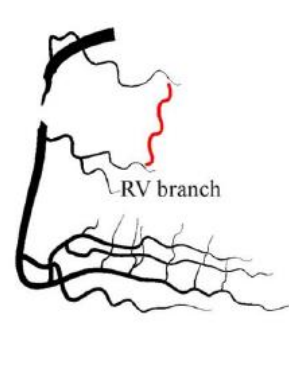
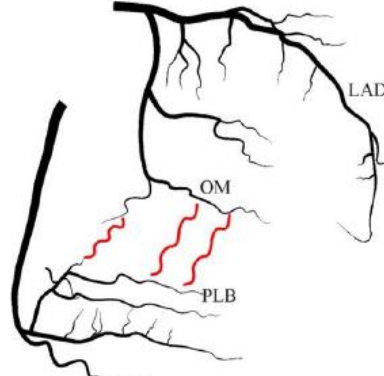
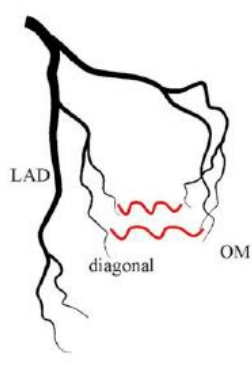
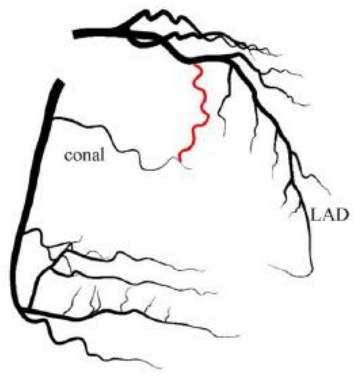
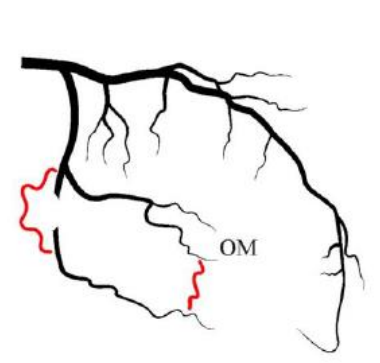
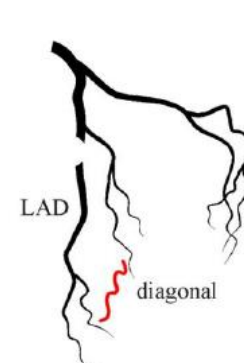
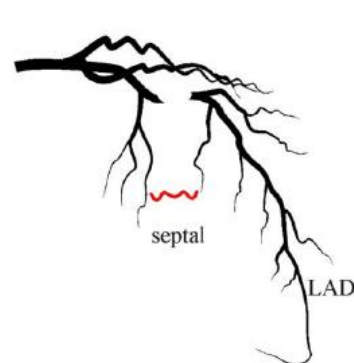
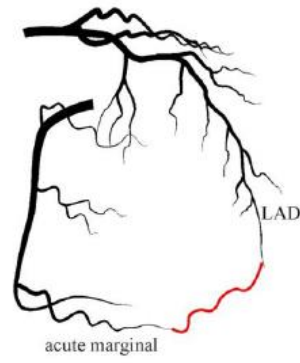
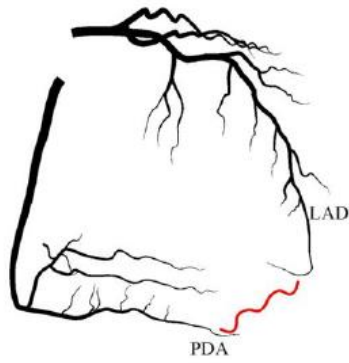
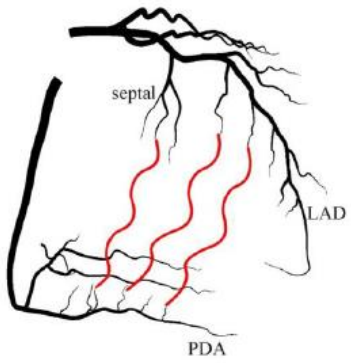
Blood Supply of Ventricular Septum



Various Origins of the SA nodal artery

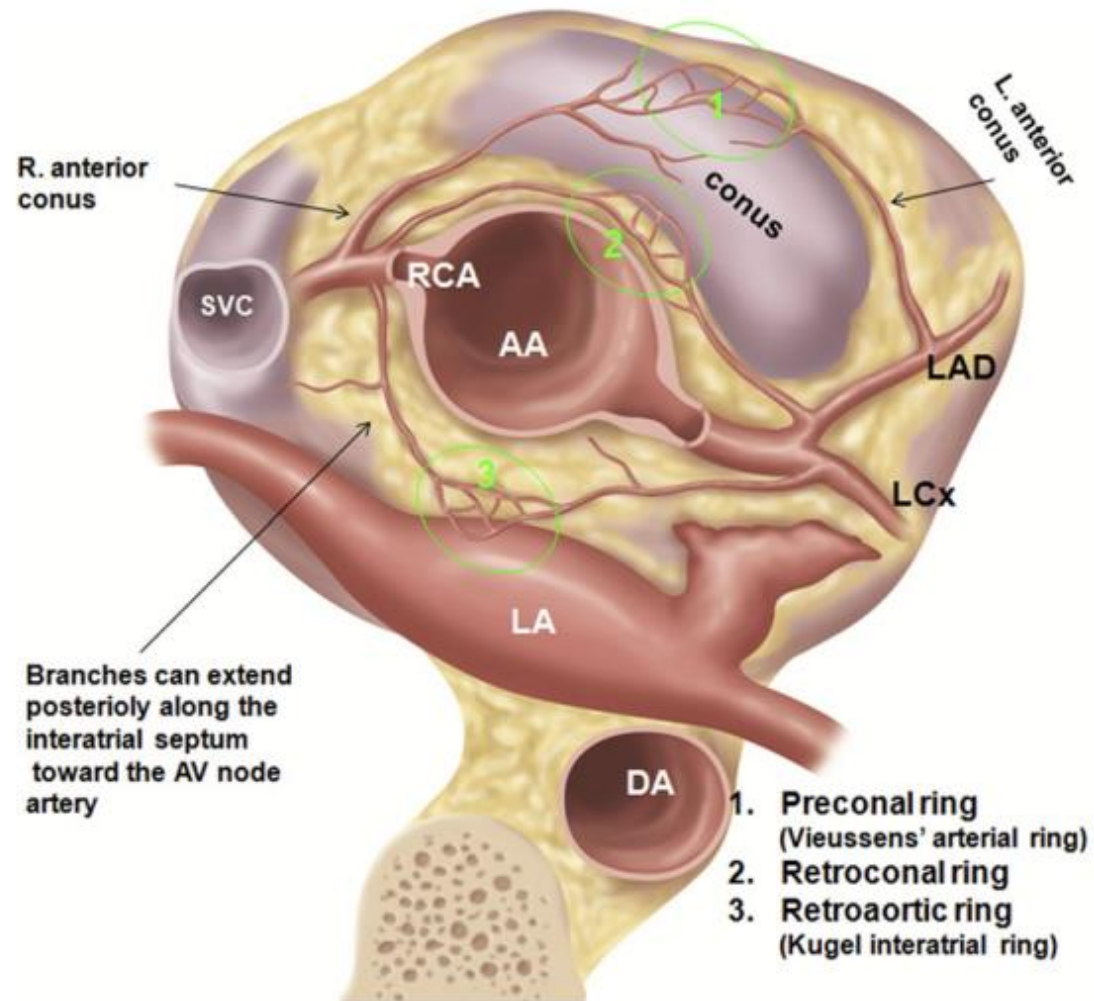


Coronary Collaterals



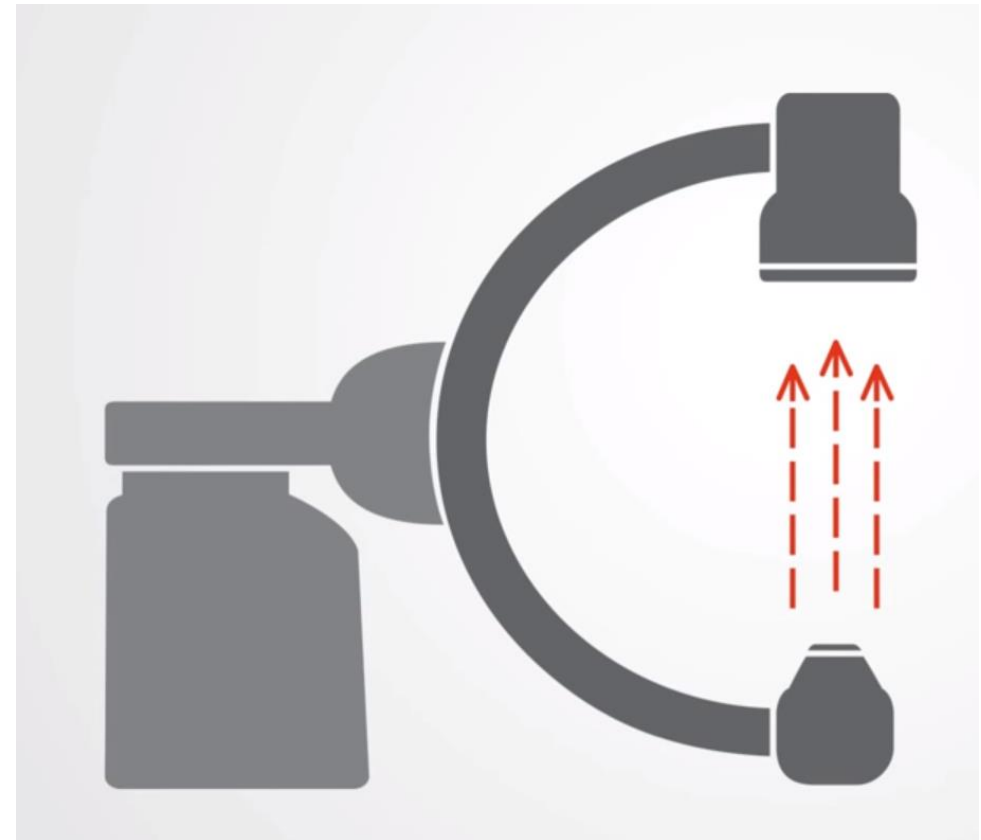
Intercoronary

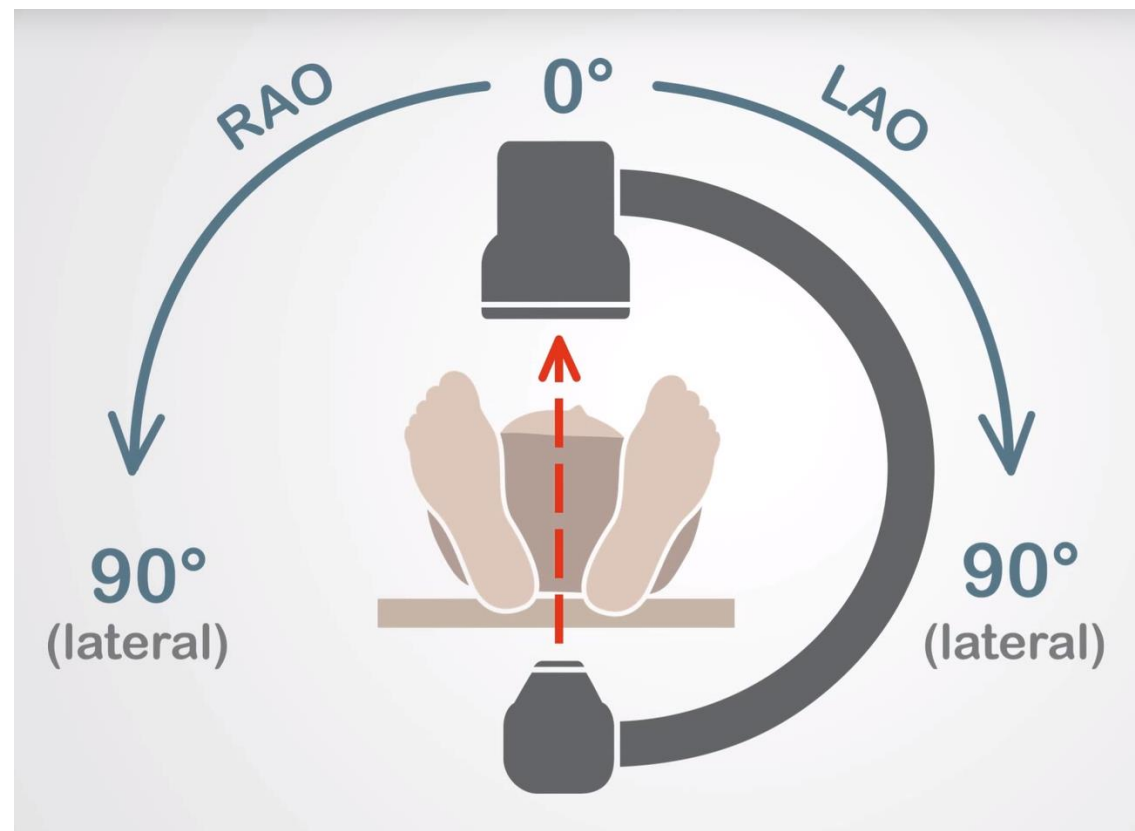
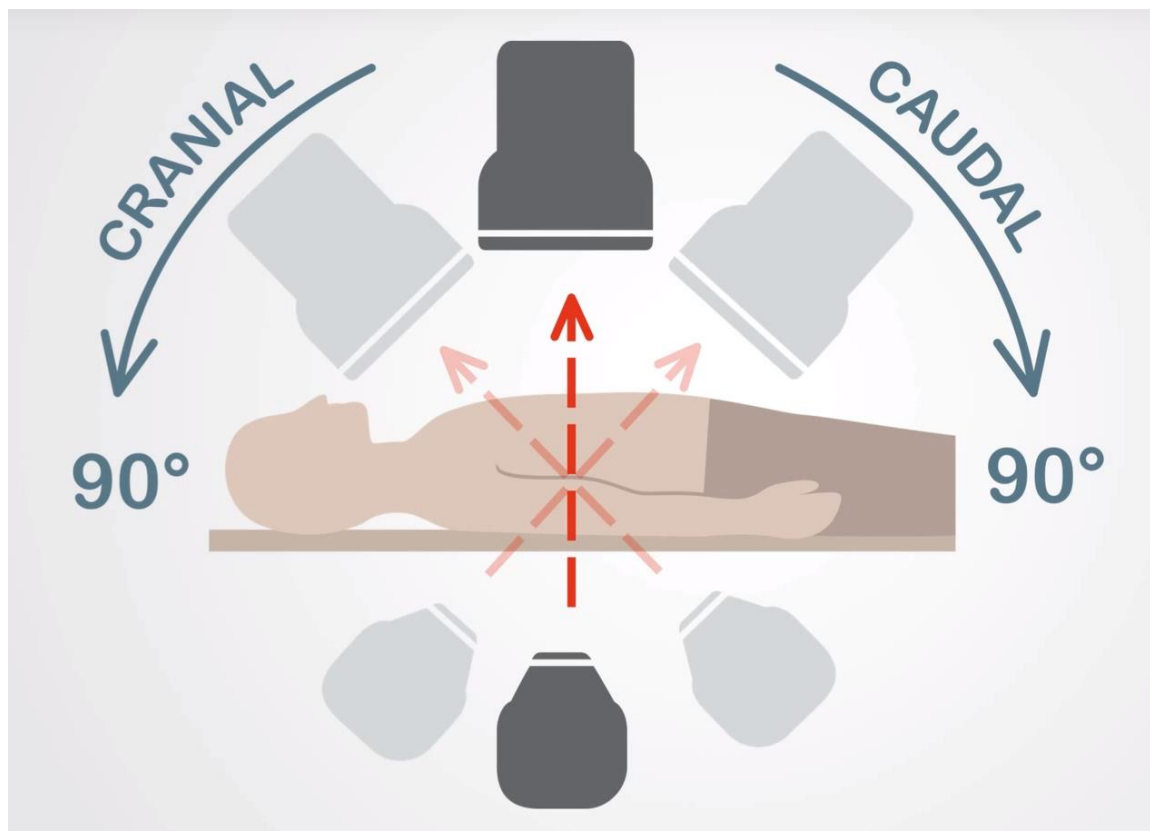
Intracoronary



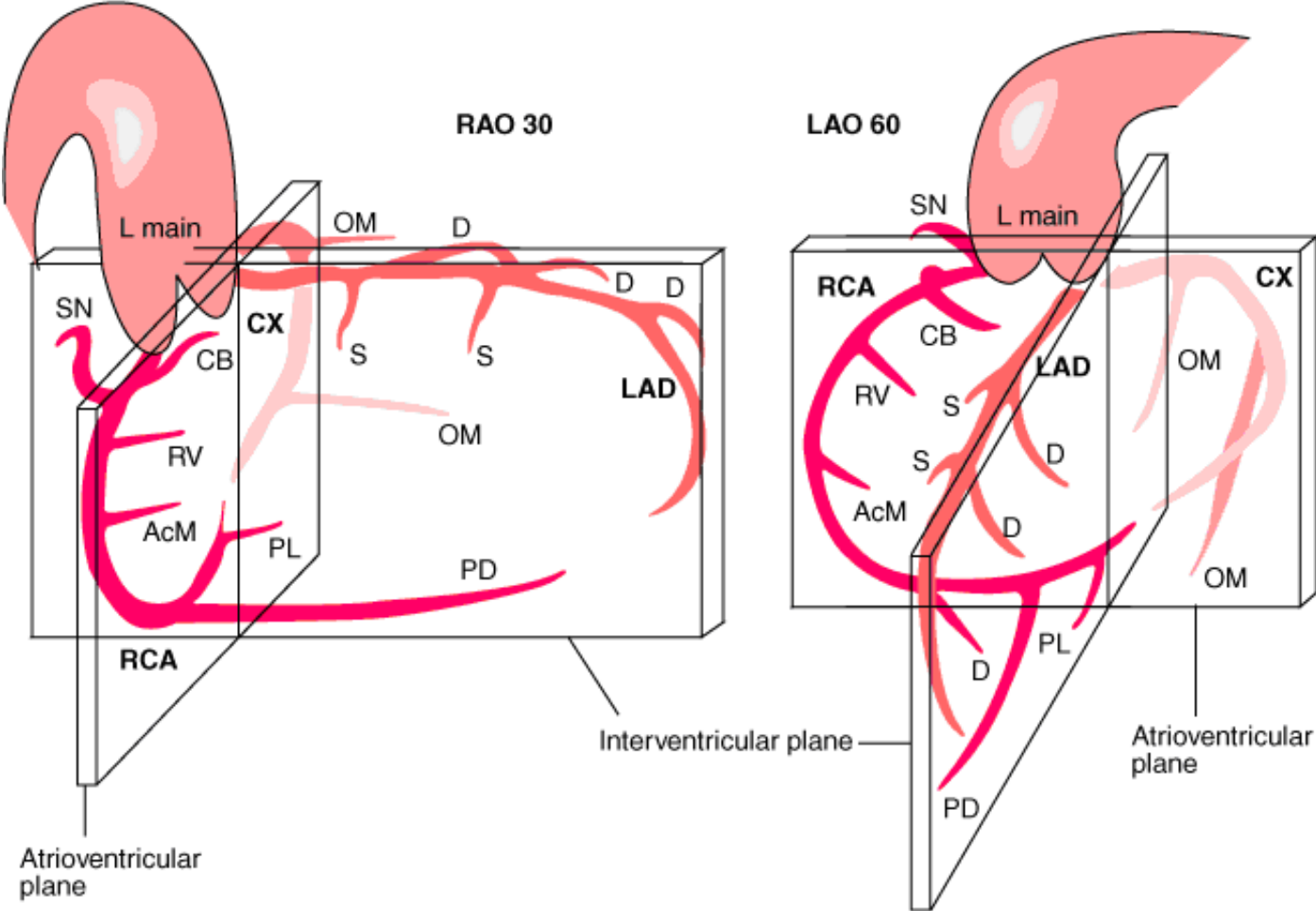
Coronary Angiography (CAG)

- **Gold standard** for the diagnosis of CAD
- Target vessels
 - Location
 - Severity
 - Calcification or stent
 - Relationship with adjacent branches
 - Collaterals
 - Myocardial viability
- Grafts
 - Numbers
 - Length
 - Configuration of conduit

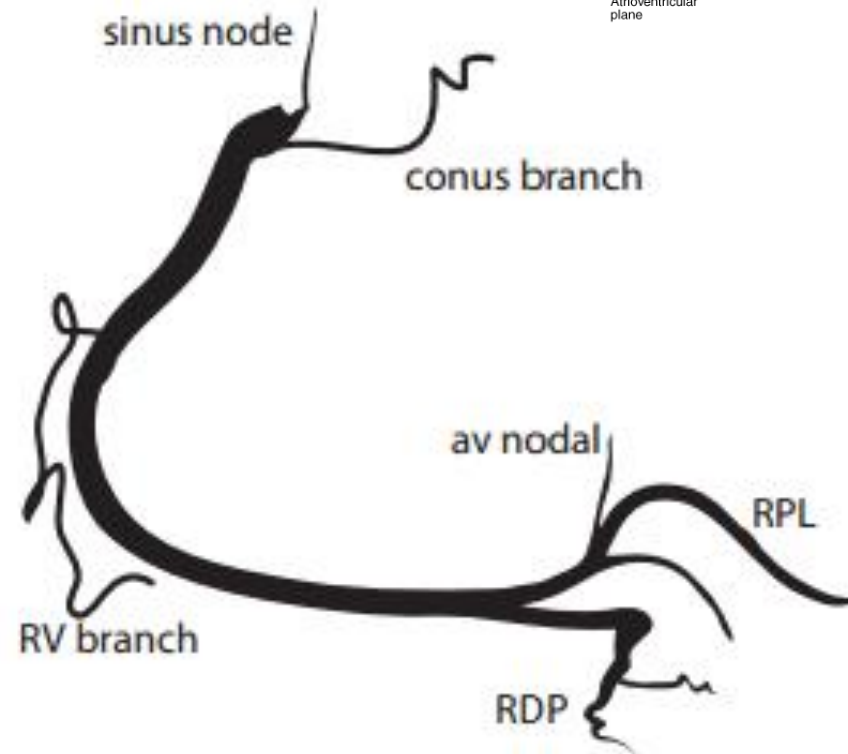
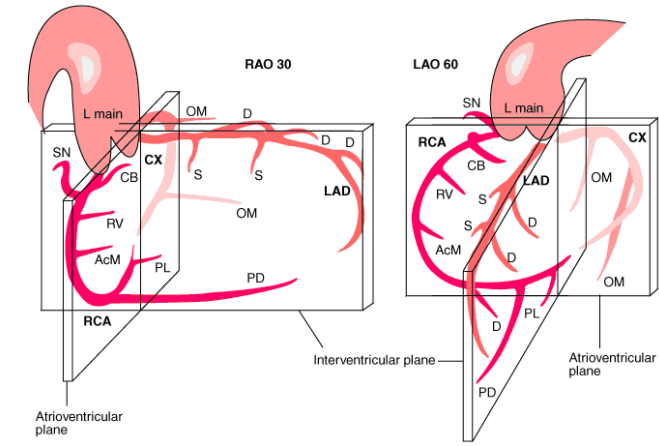




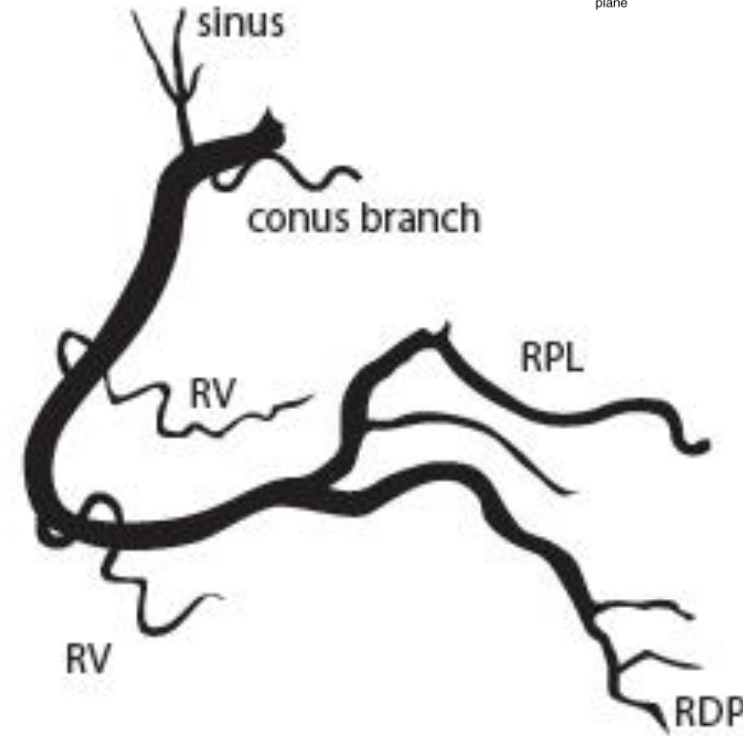
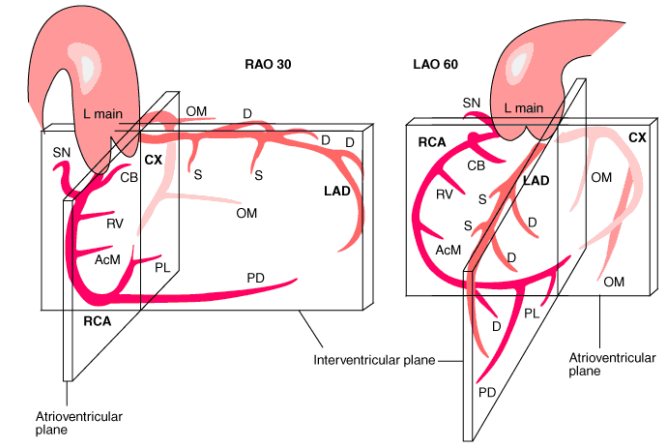
Atrioventricular and Interventricular Planes



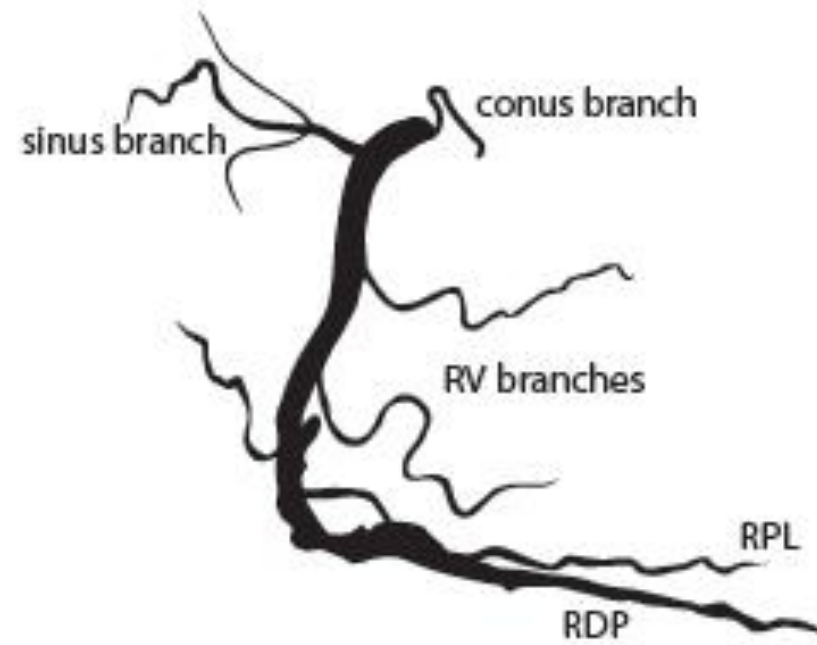
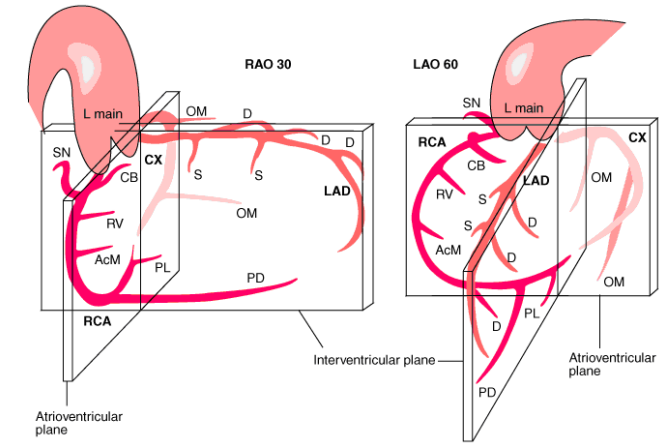
LAO 45



LAO 20 Cranial 25



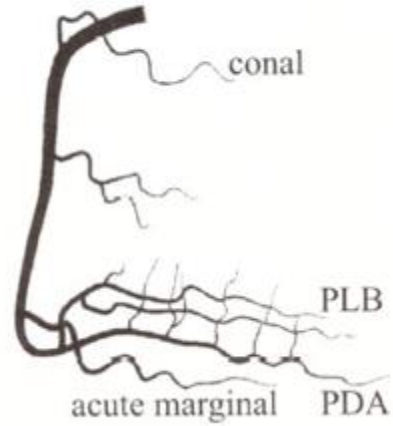
RAO 30



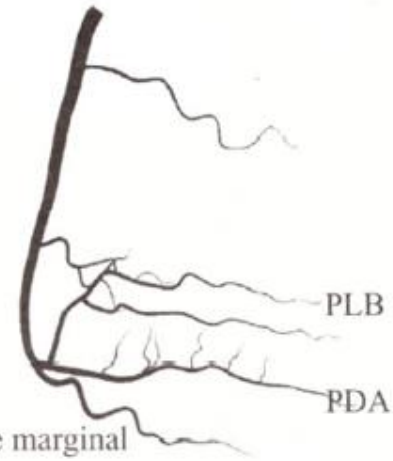
Right Coronary Angiogram

RAO

Straight

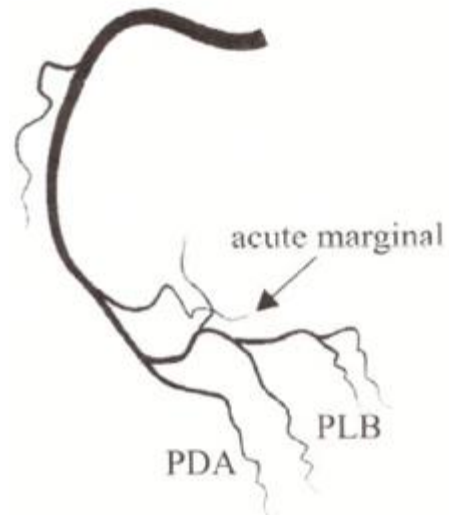


Cranial

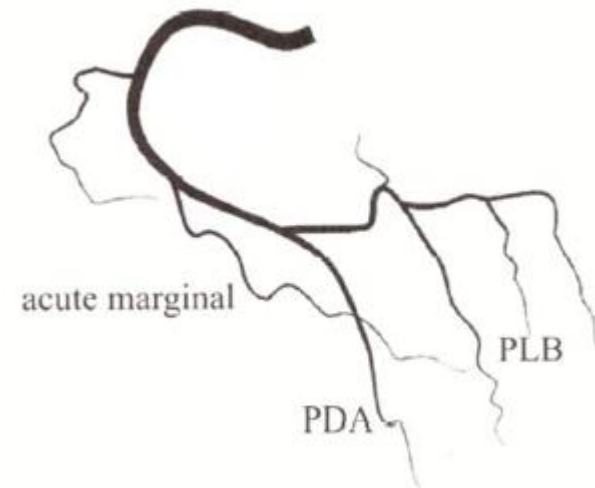


LAO

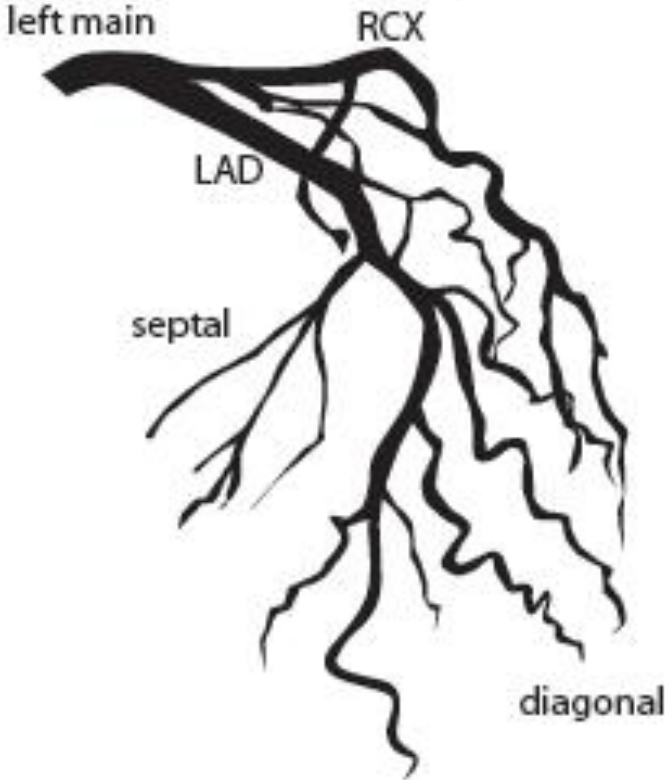
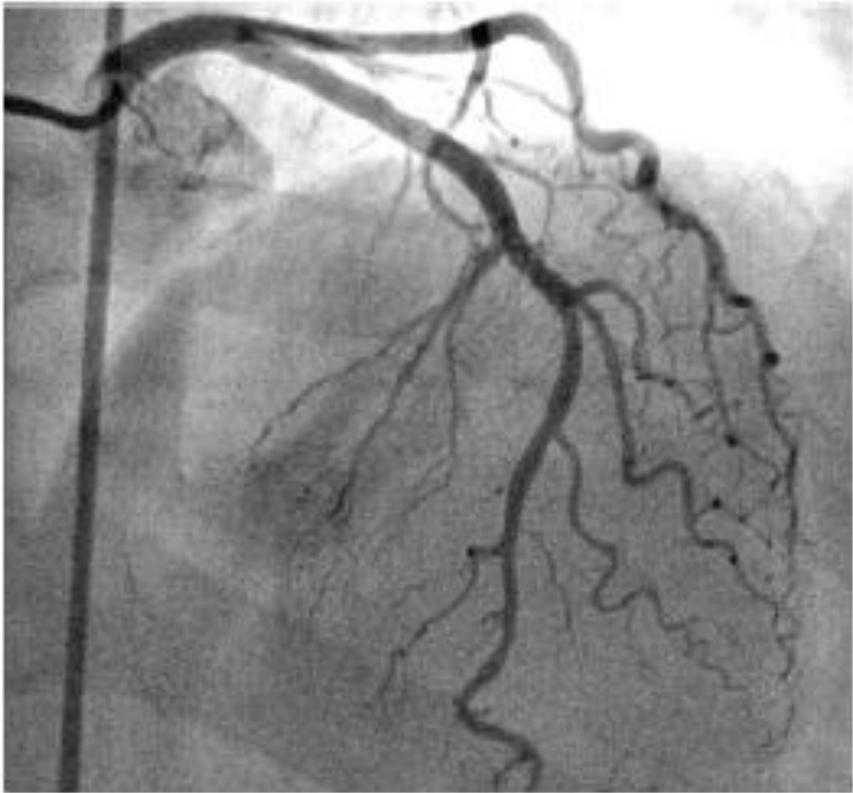
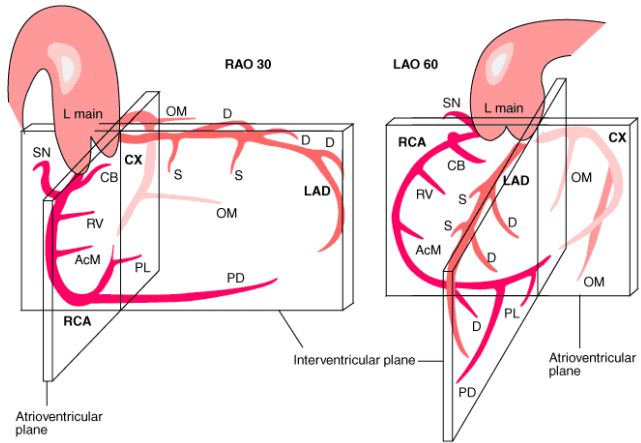
Straight



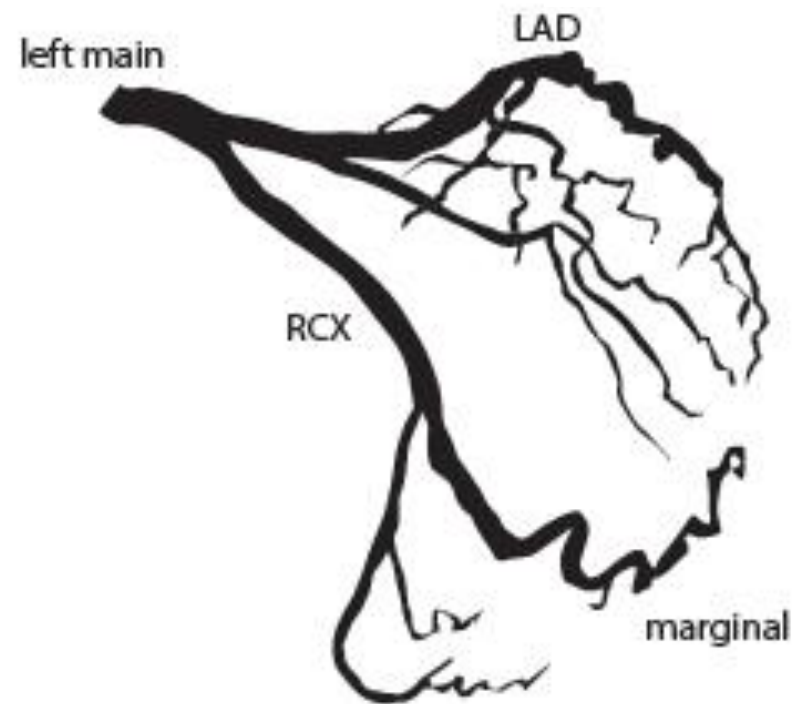
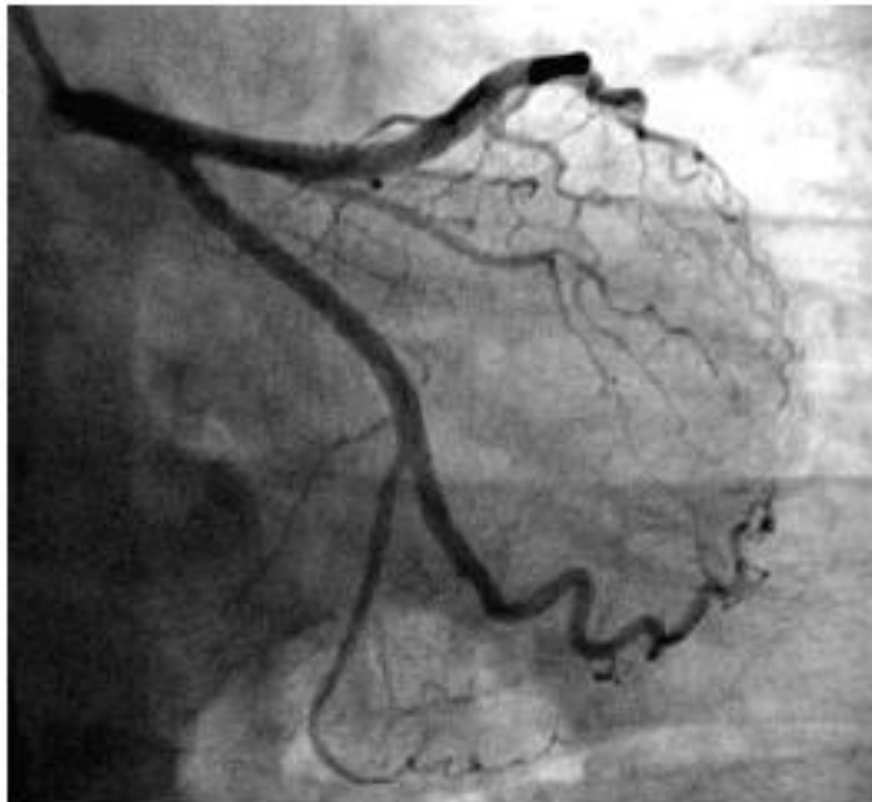
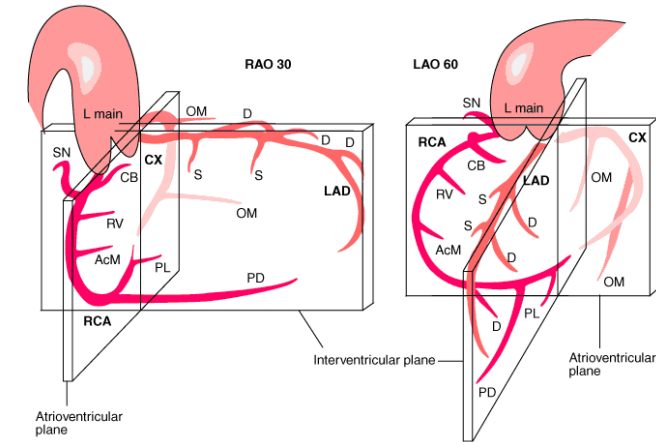
Cranial



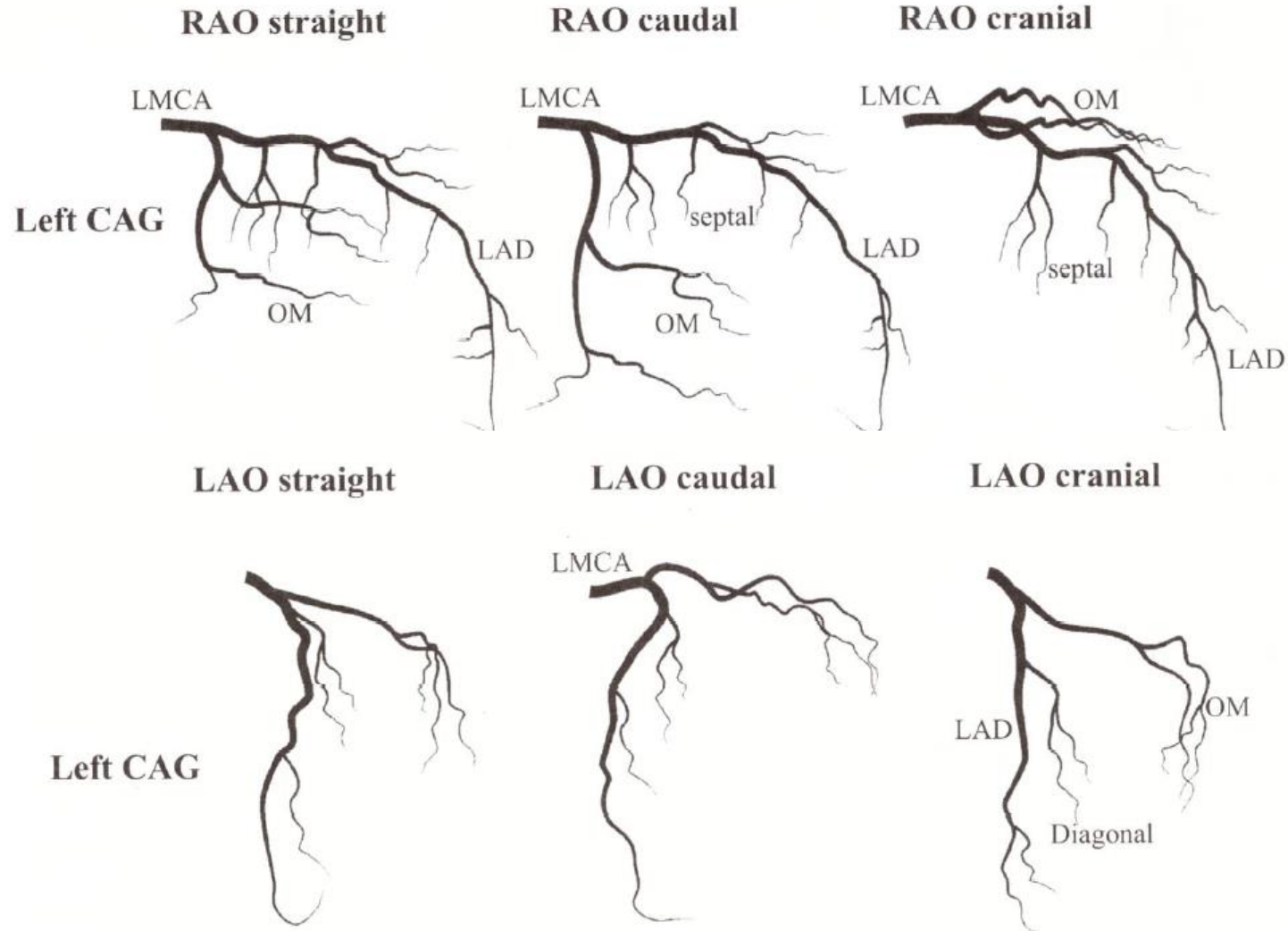
RAO 5 Cranial 40

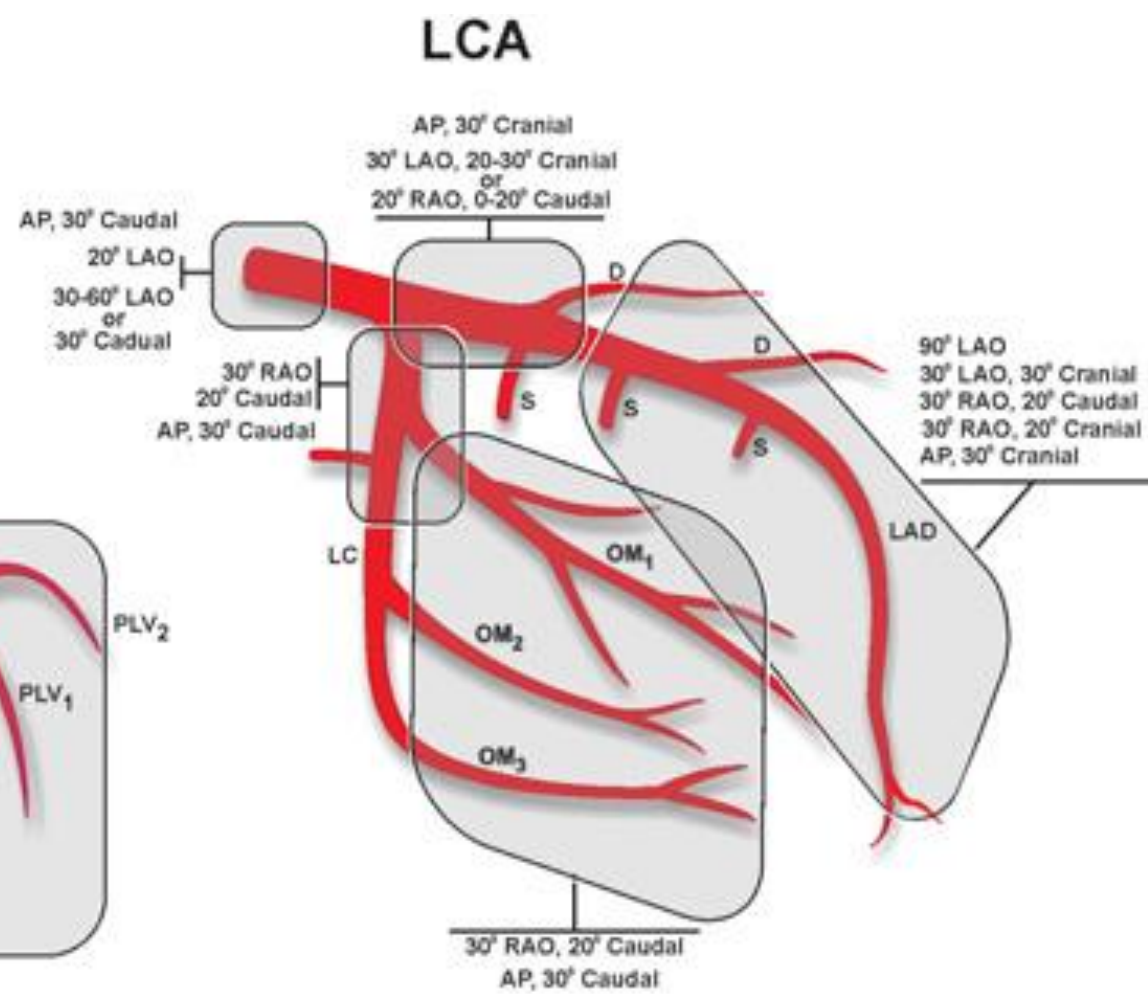
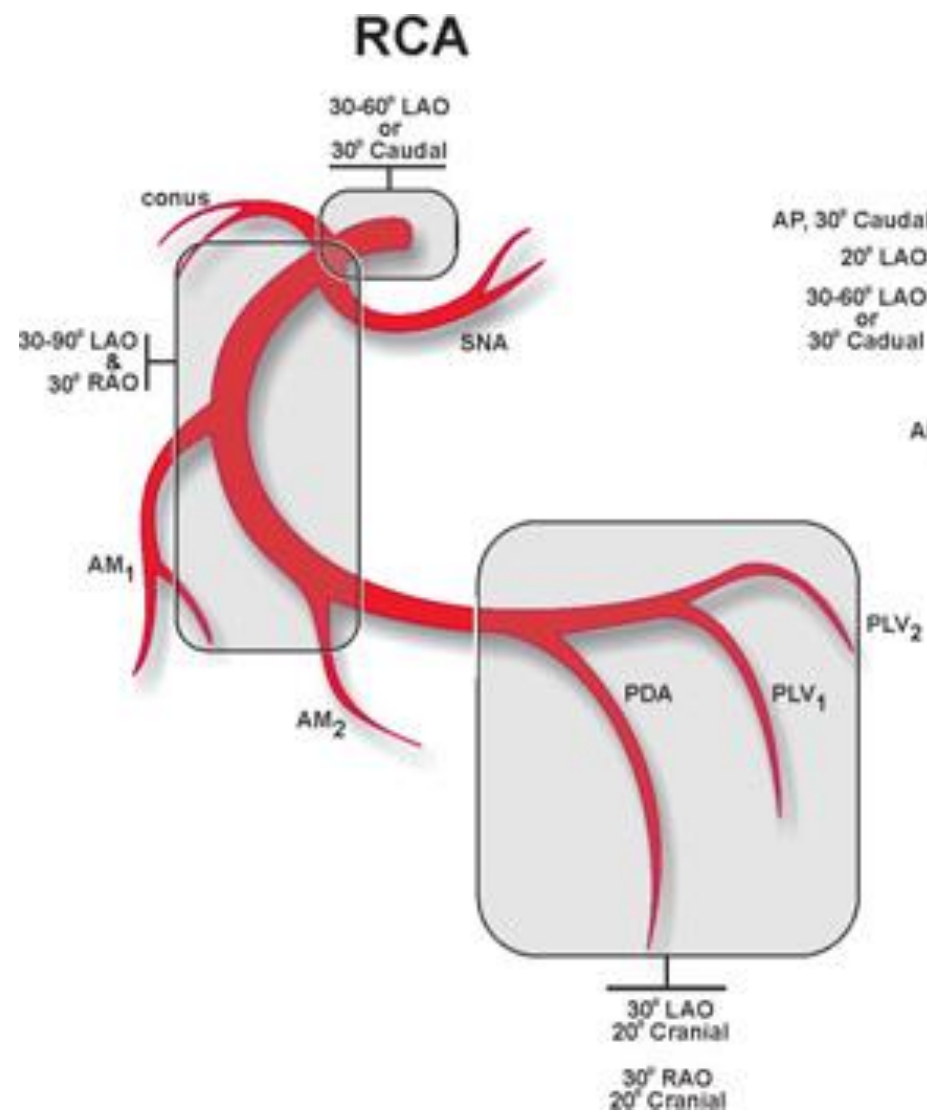


RAO 30 Caudal 40



Left Coronary Angiogram





Helpful Hints !

LAO

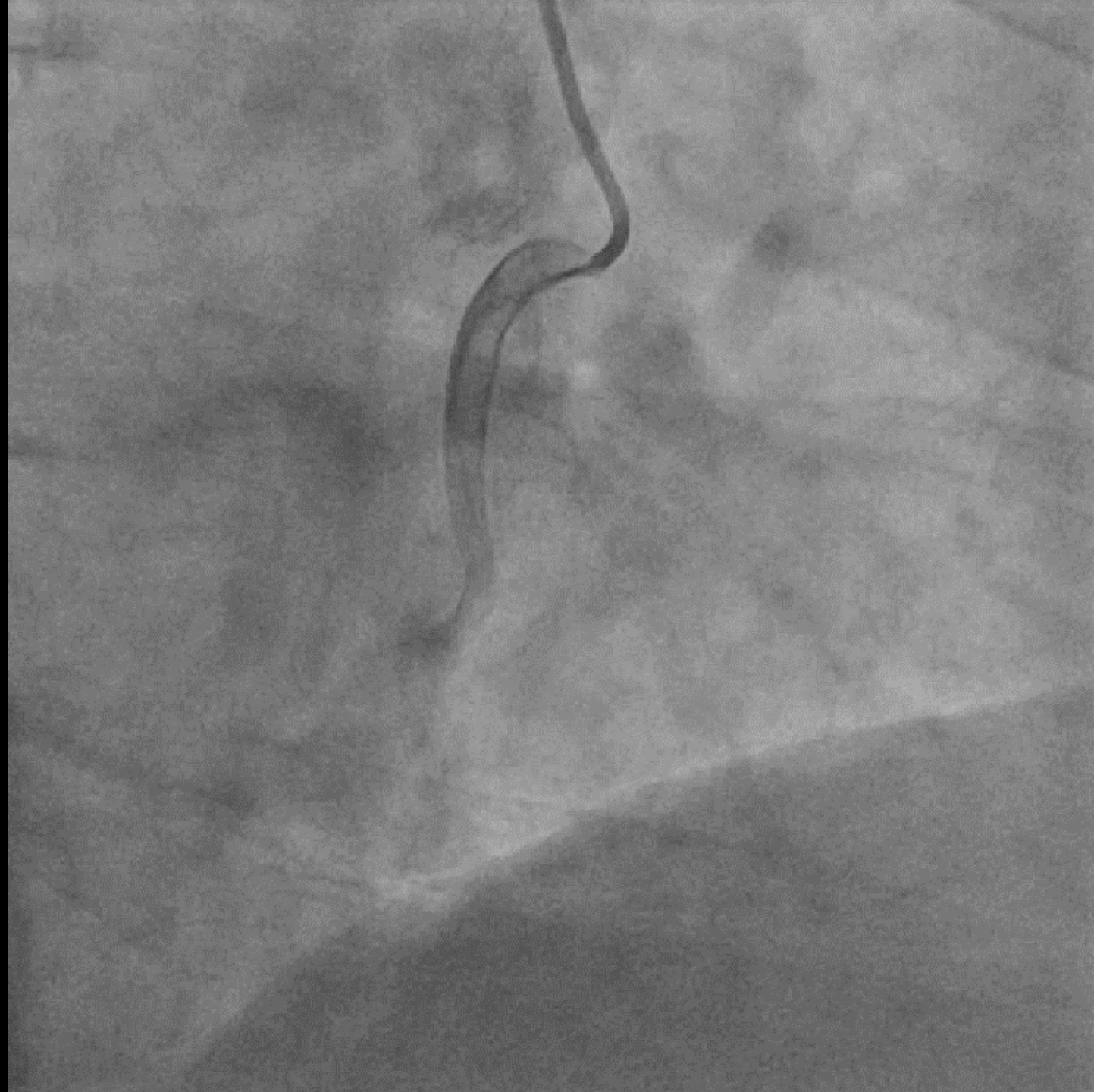
- Spine (or catheter shaft) appears on the right
- LAD appears on the left, LCx appears on the right
- RCA resembles the letter “C”

RAO

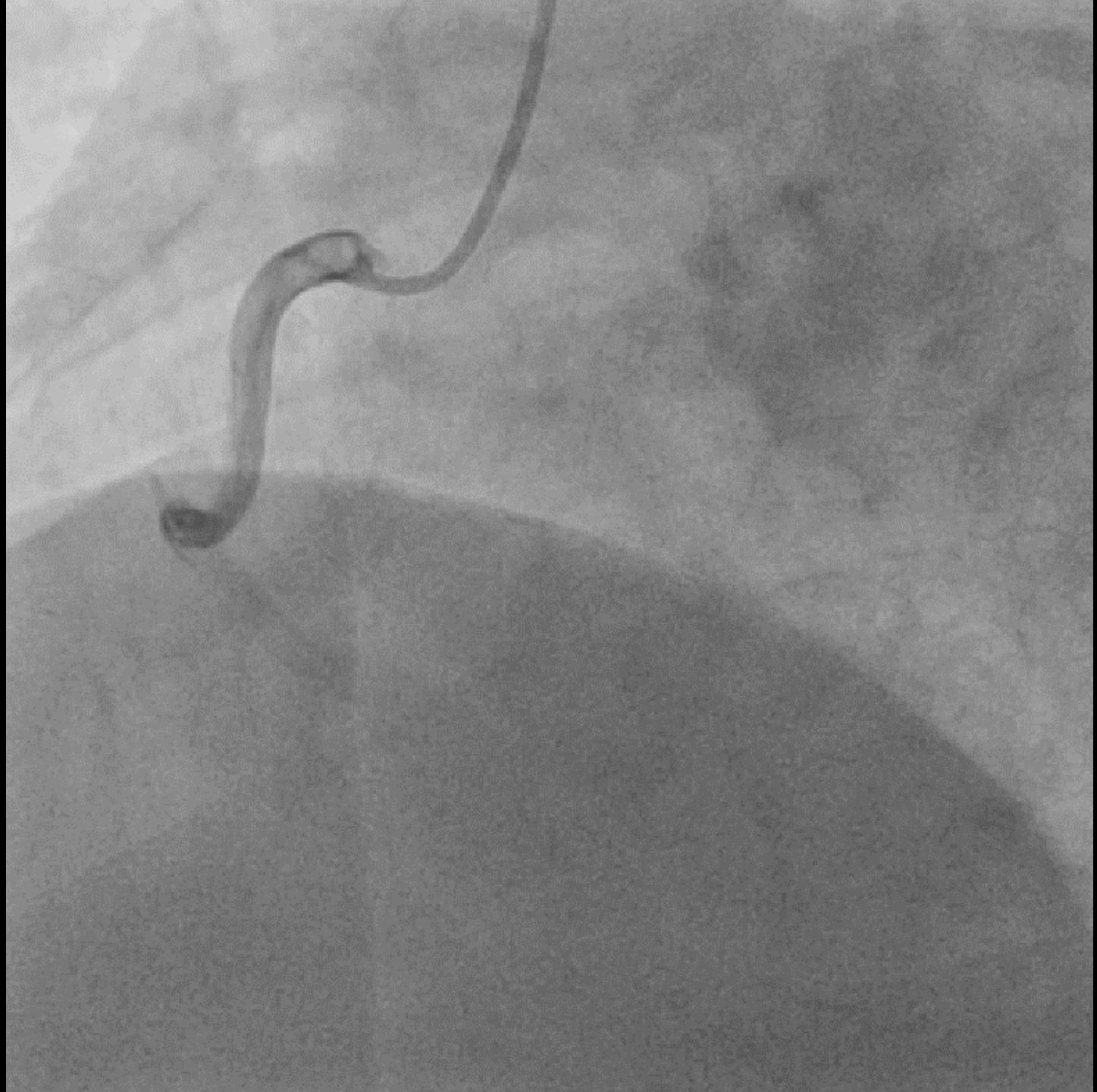
- Spine (or catheter shaft) appears on the left
- LAD appears on the right, LCx appears on the left
- RCA resembles the letter “L”

LCx lies closest to the spine

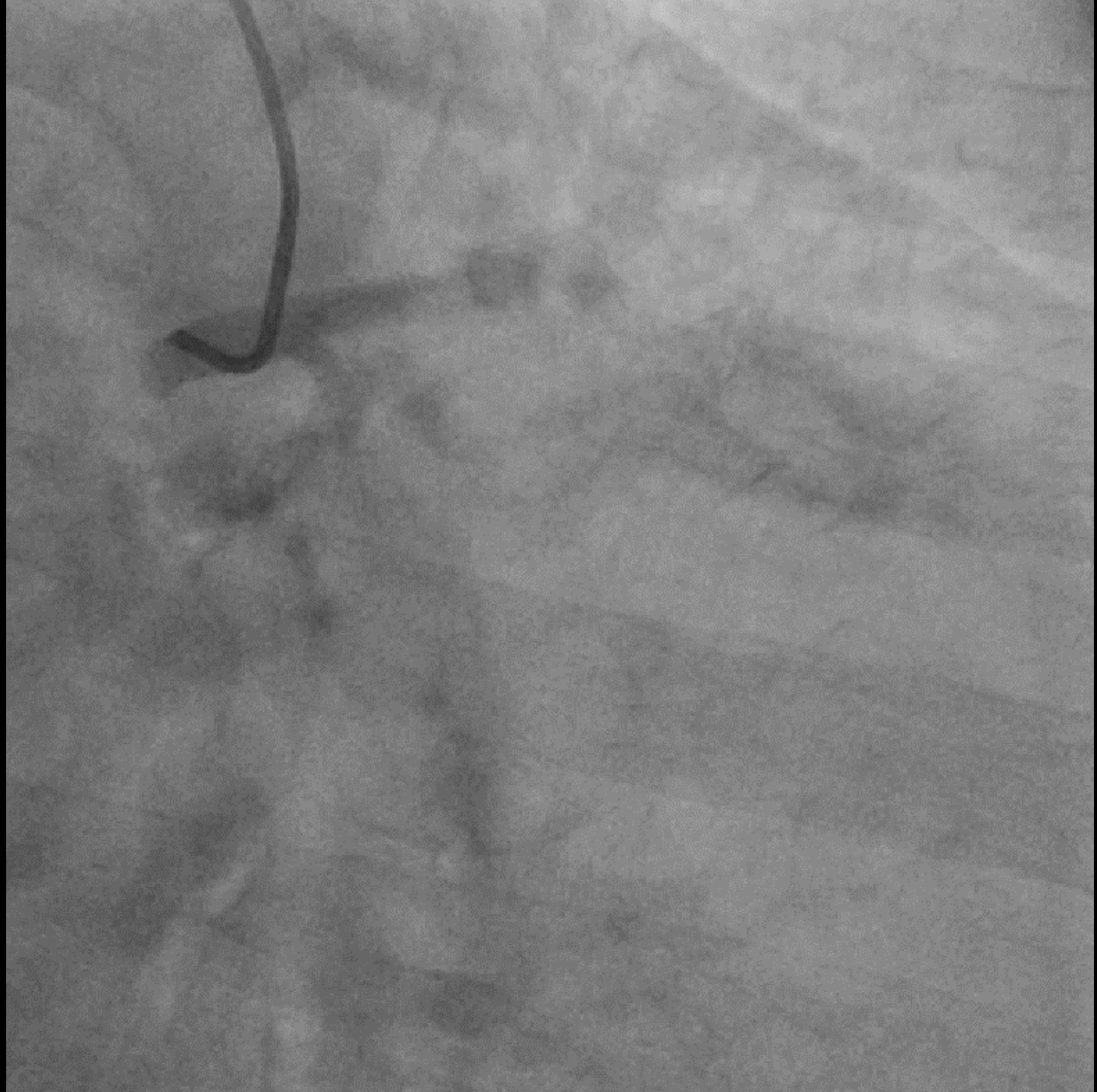
RAO 30



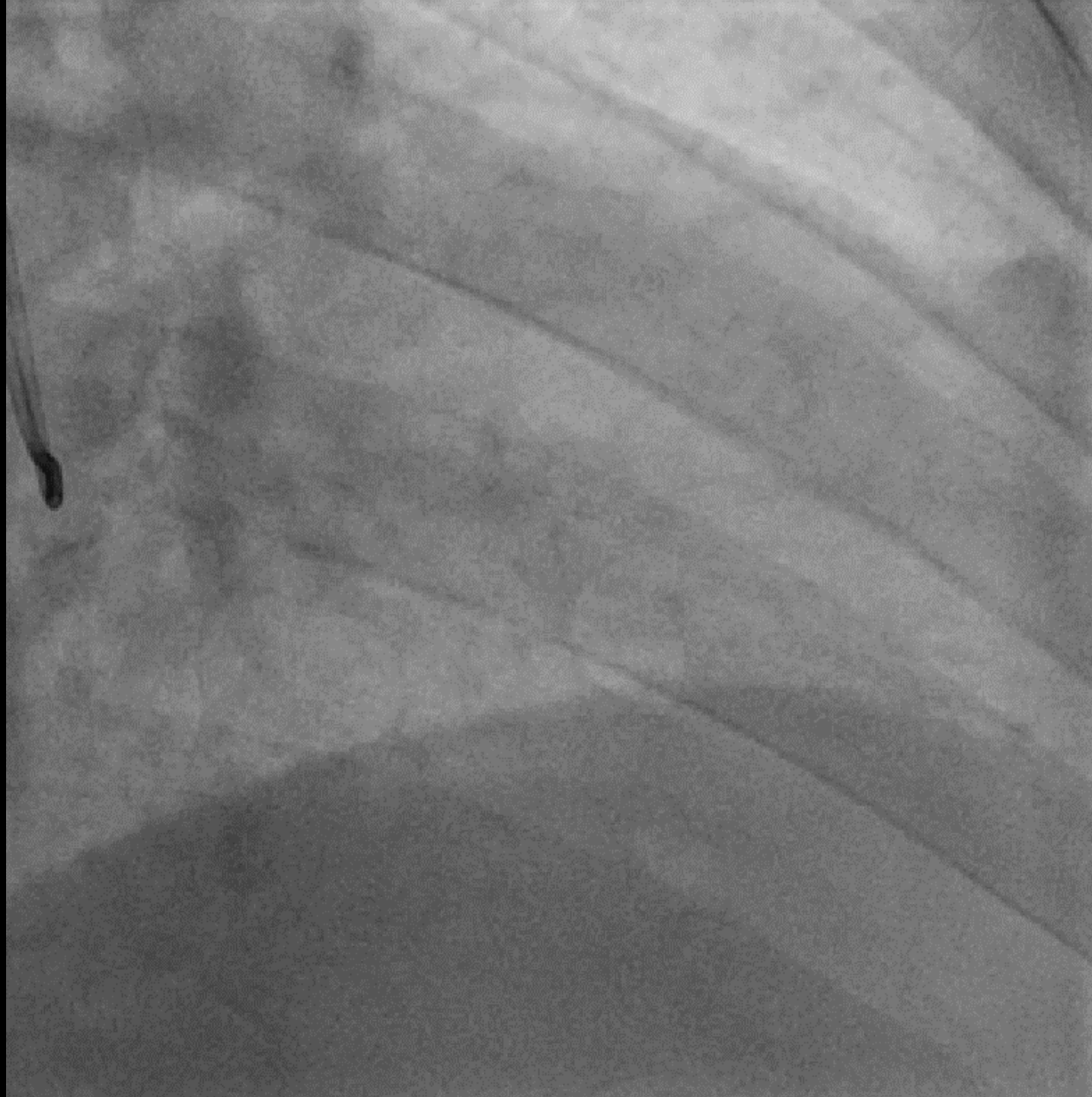
LAO 45



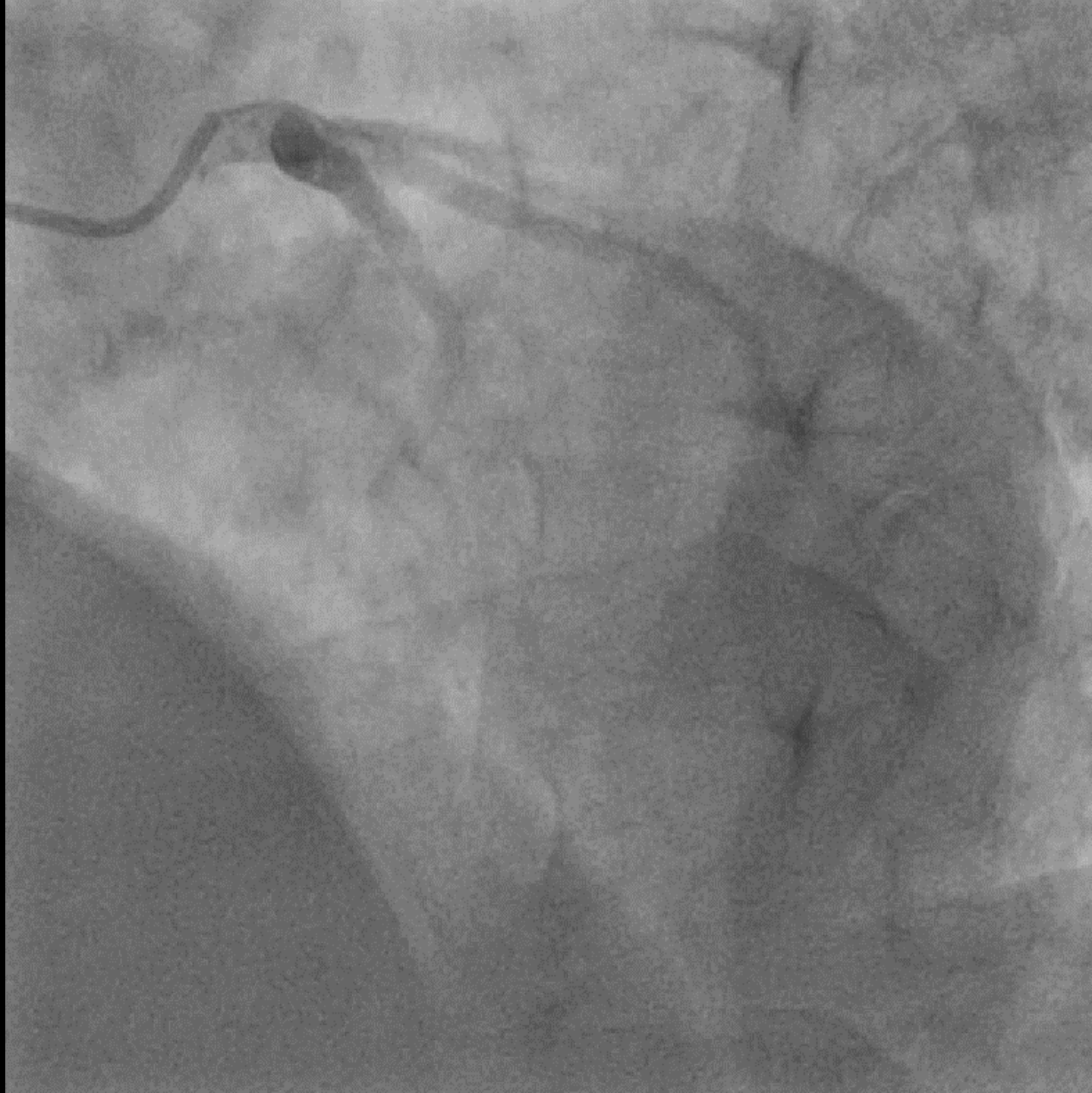
RAO 30
Caudal 15



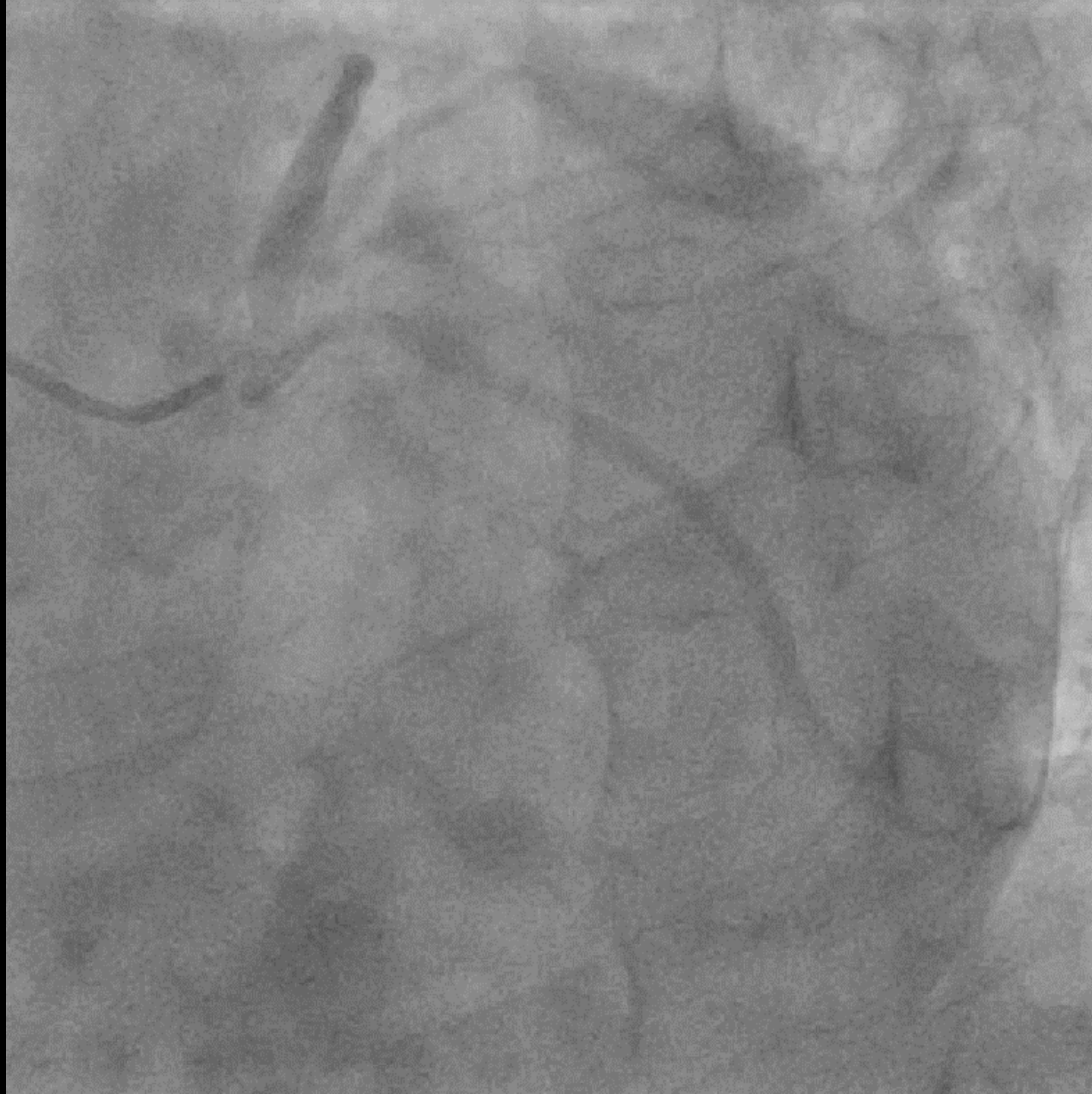
RAO 30
Cranial 15



LAO 45
Cranial 20


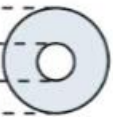

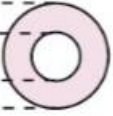




LAO 45
Caudal 20



Lesion Severity

- Minimal or mild CAD : narrowing < 40%
- Moderate : stenosis 40~70%
- Severe : stenosis 70~95%
- Total occlusion : 100%

Average diameter loss	Cross-sectional area loss
$\frac{2}{3}=67\%$ 	 90%
$\frac{1}{2}=50\%$ 	 75%
$\frac{1}{3}=33\%$ 	 50%

TIMI Flow Grade

TIMI 0 flow : Absence of any antegrade flow beyond a coronary occlusion

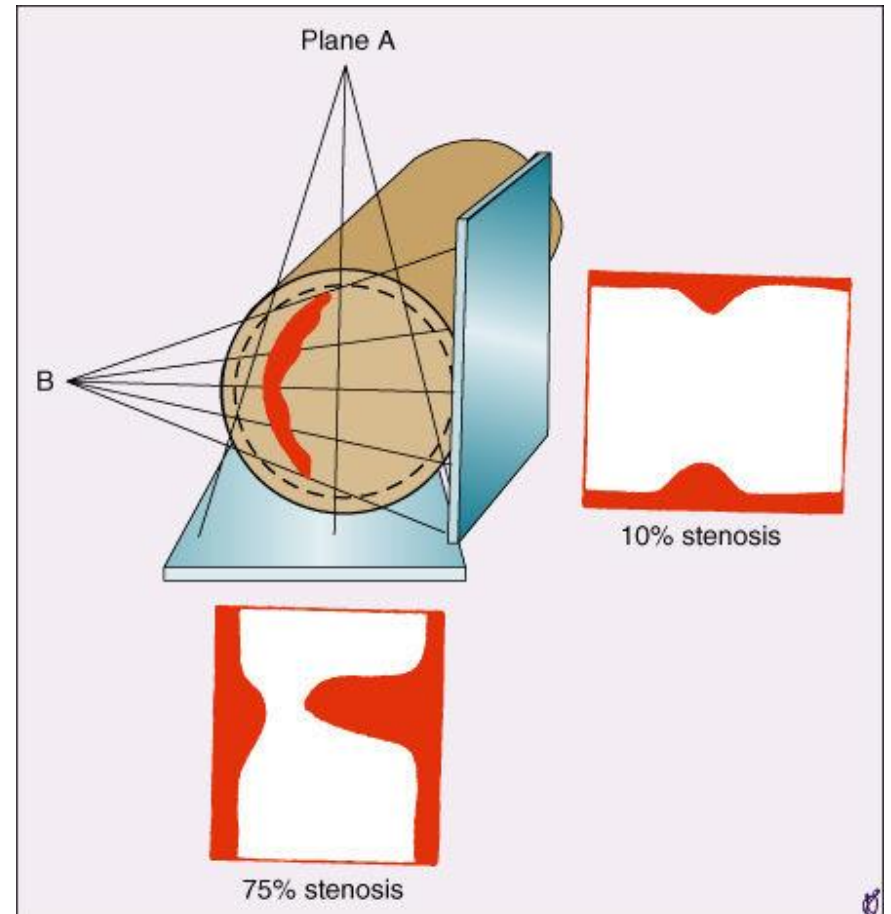
TIMI 1 flow : (penetration without perfusion) Faint antegrade coronary flow beyond the occlusion, with *incomplete filling* of the distal coronary bed

TIMI 2 flow : (partial reperfusion) Delayed or sluggish antegrade flow with *complete filling* of the distal territory

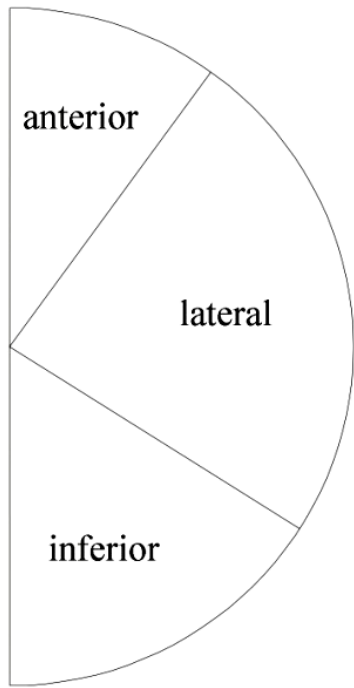
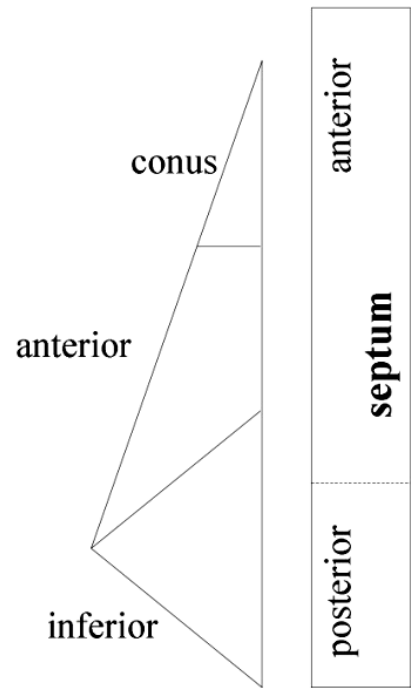
TIMI 3 flow : (complete perfusion) Normal flow which fills the distal coronary bed completely

Pitfalls of CAG

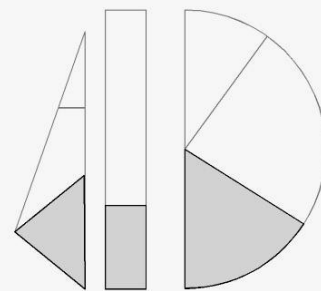
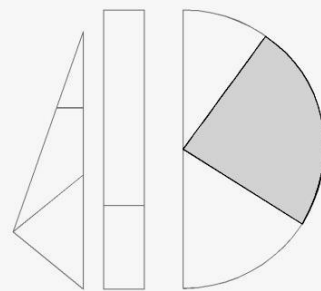
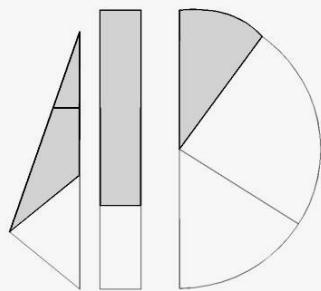
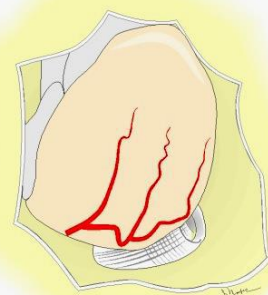
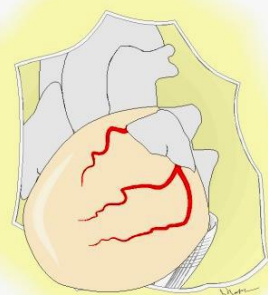
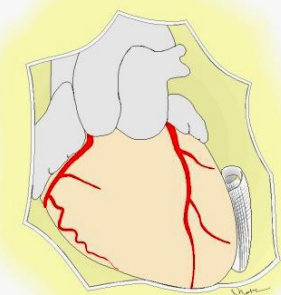
- Underestimation of lesion severity in diffusely stenotic coronary arteries
- Lack of correlation between diameter and blood flow by visual assessment
- Difficult assessment of condition of atherosclerotic plaque (stable or vulnerable)
- FFR or IVUS.....



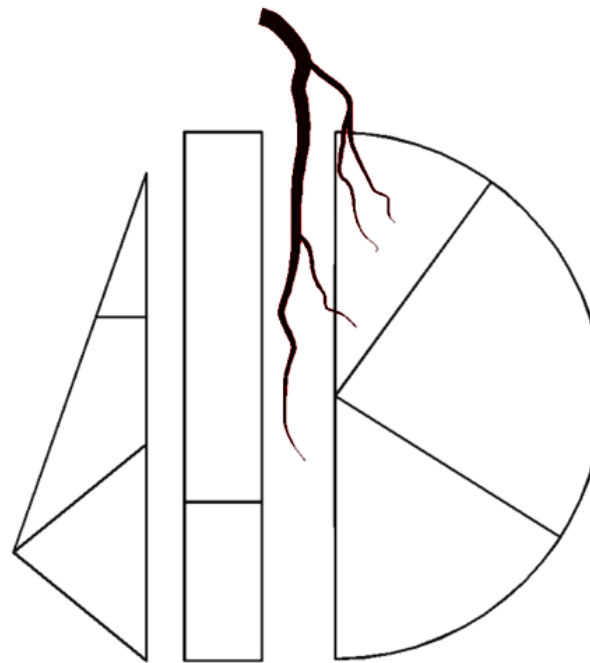
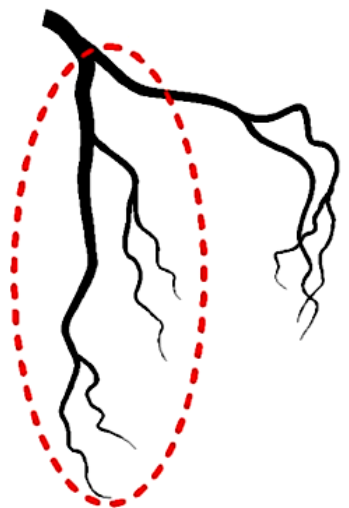
right ventricle



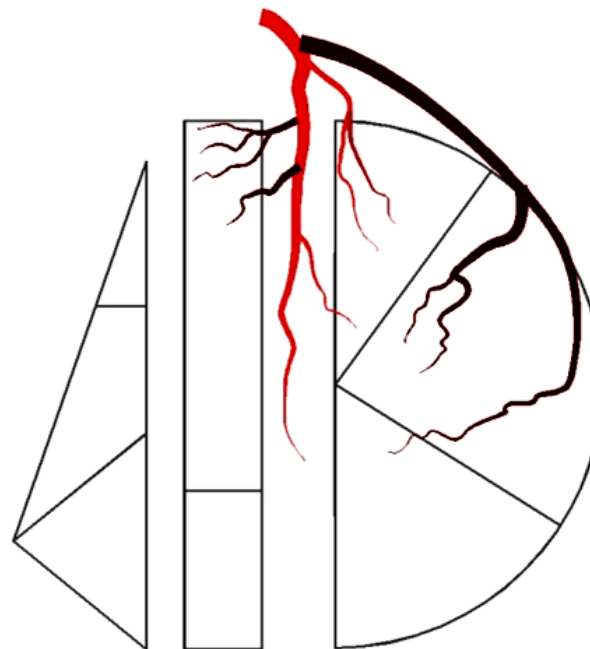
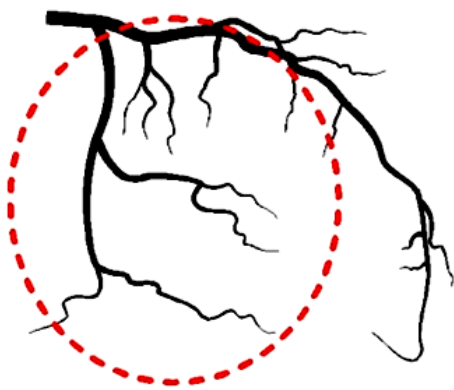
left ventricle



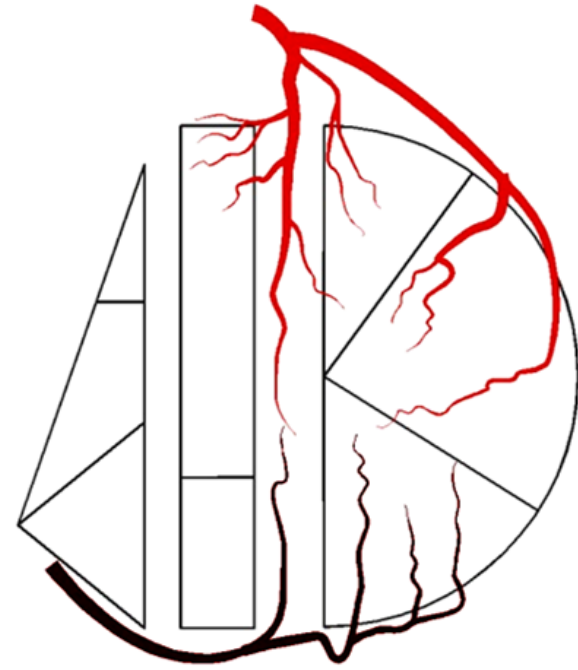
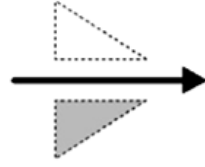
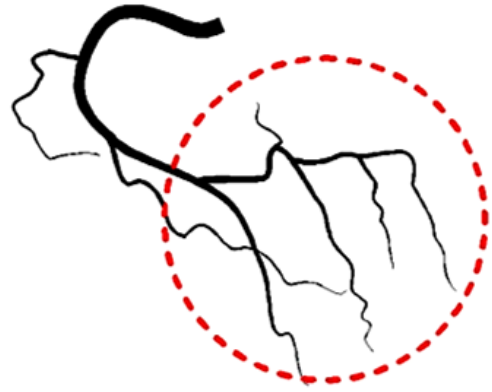
LAO cranial



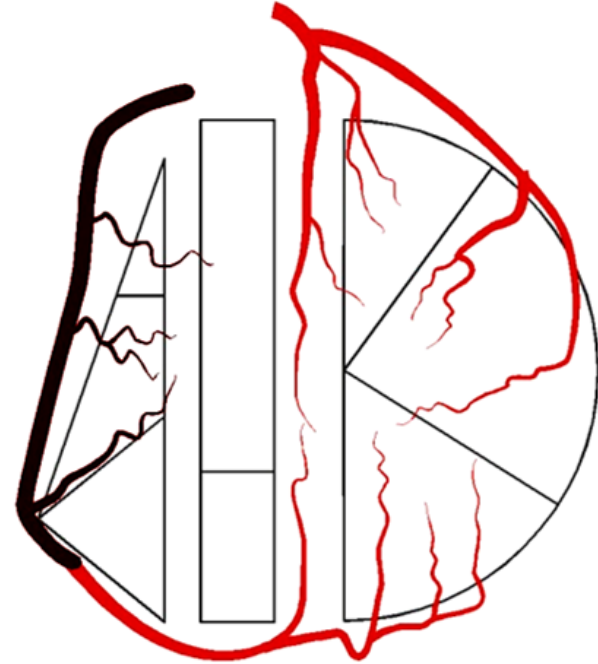
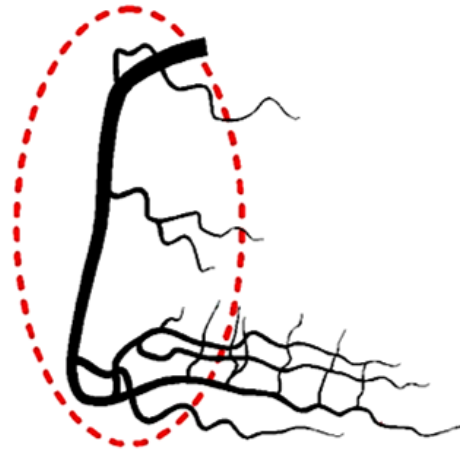
RAO cranial



LAO cranial



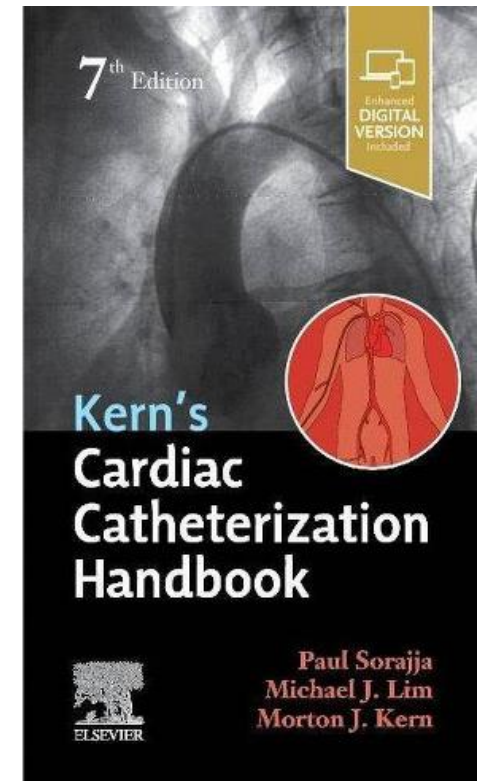
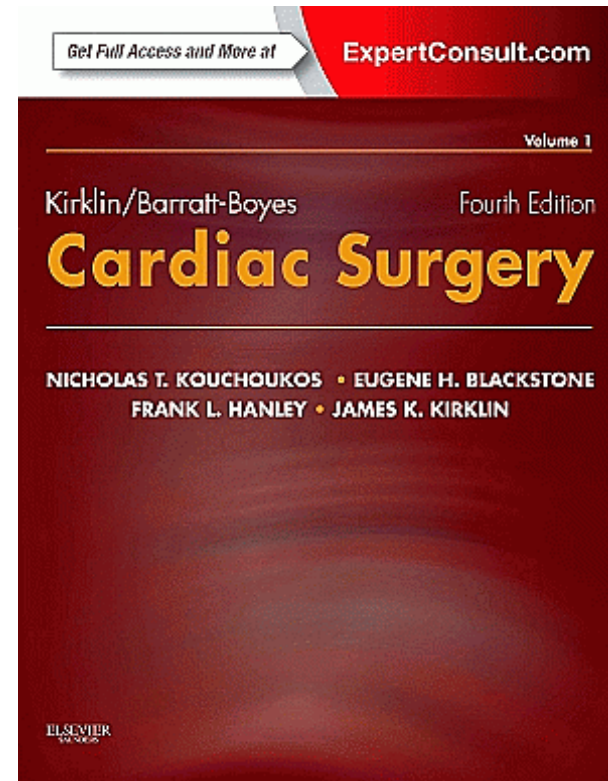
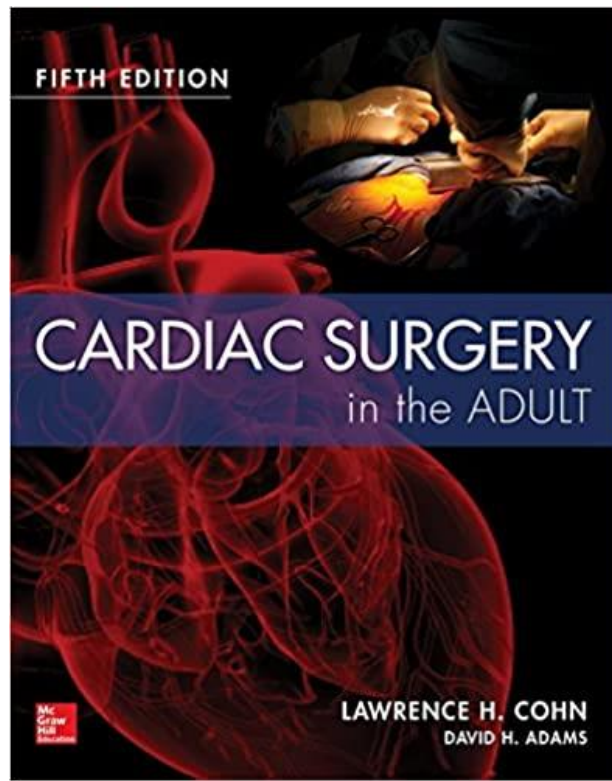
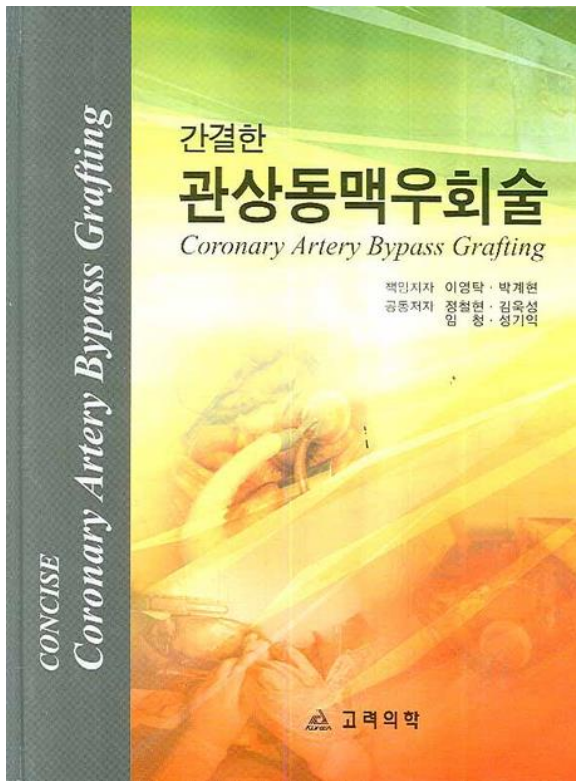
RAO



Take Home Messages

- The fastest way to master CAG is to practice
- The final goal should be a successful operation, not an interpretation of the CAG

References



Thank you !