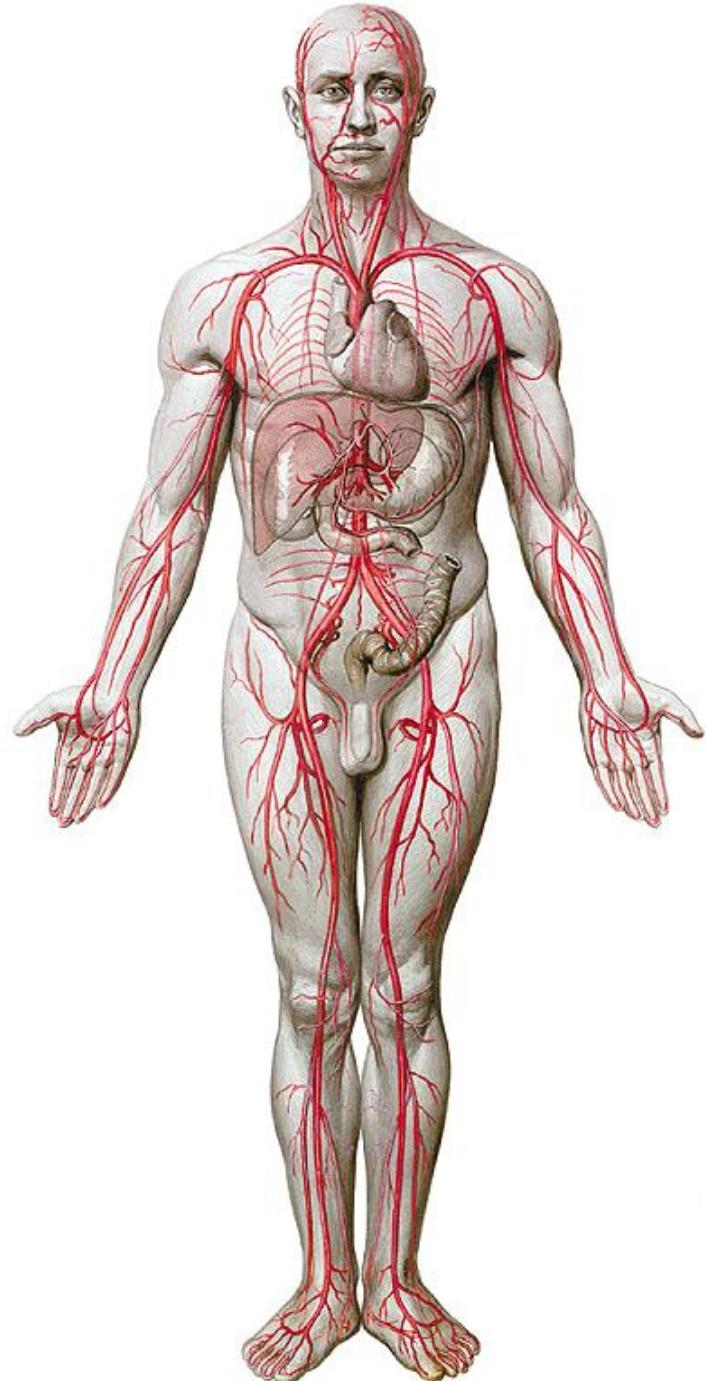


# Arterial system

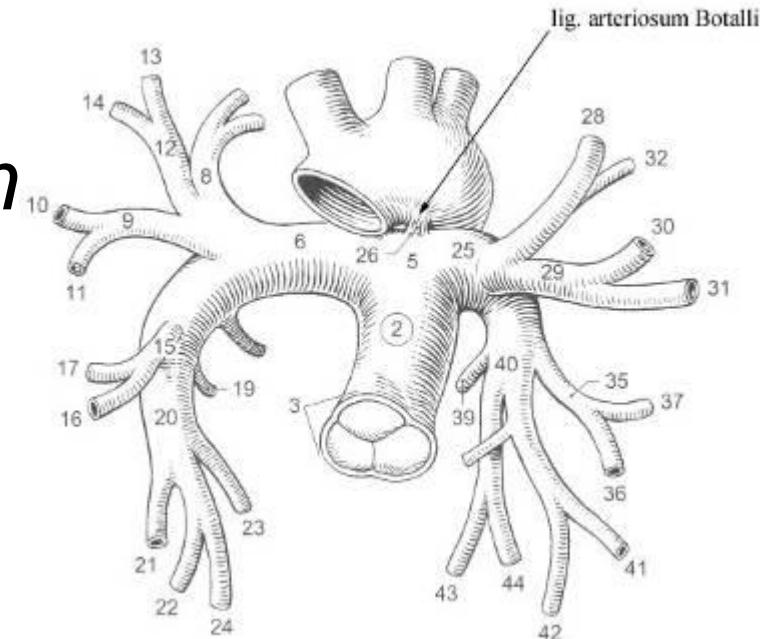
*Systema  
arteriarum*

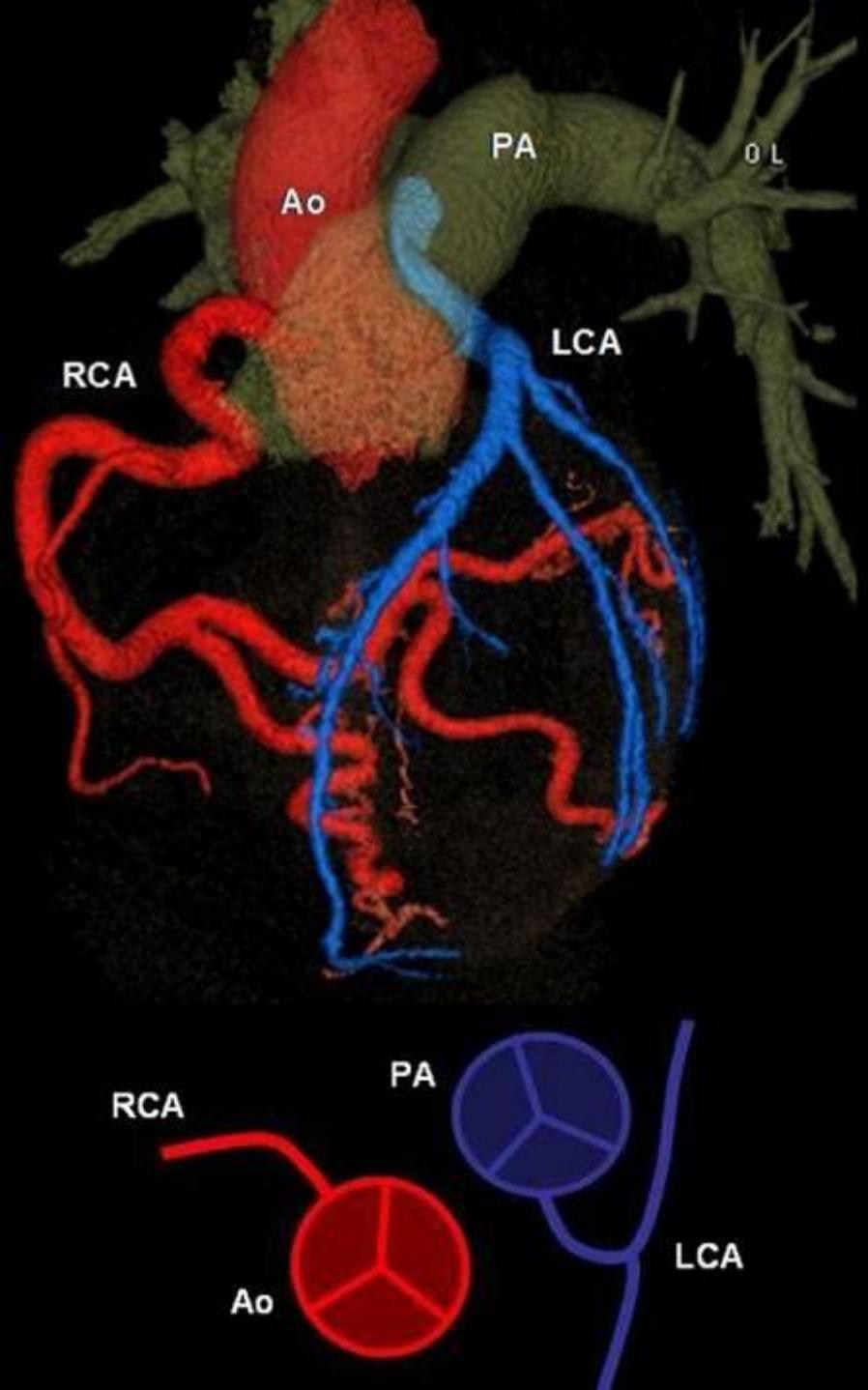


# Truncus pulmonalis

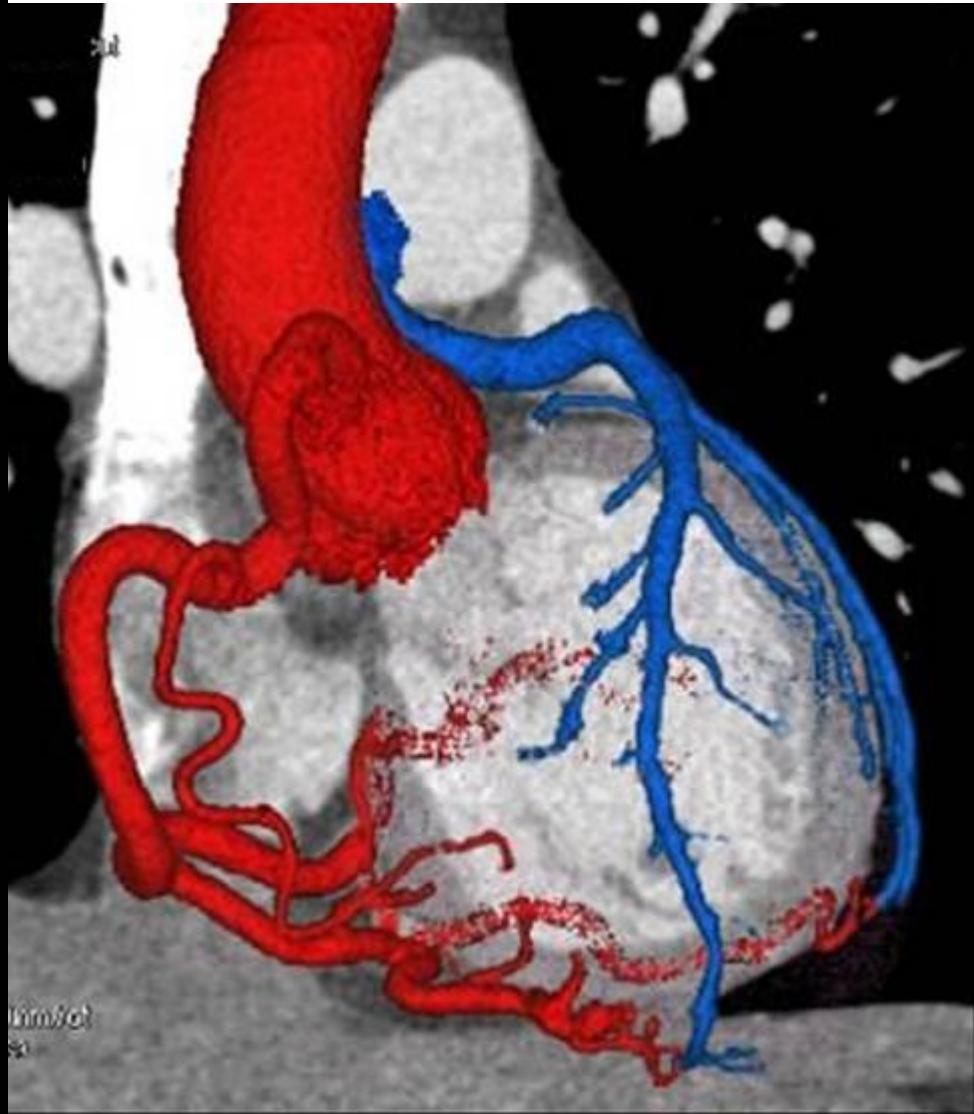
## = pulmonary trunk

- sinus trunci pulmonalis (dx., sin., ant.)
- crista supravalvularis
- bifurcatio trunci pulmonalis
  - arteria pulmonalis dx. + sin.
- lig. arteriosum (Botalli)
- *functional lung circulation*
- *pulmonary capillary wedge pressure (PCW)*
- *pulmonary embolia*

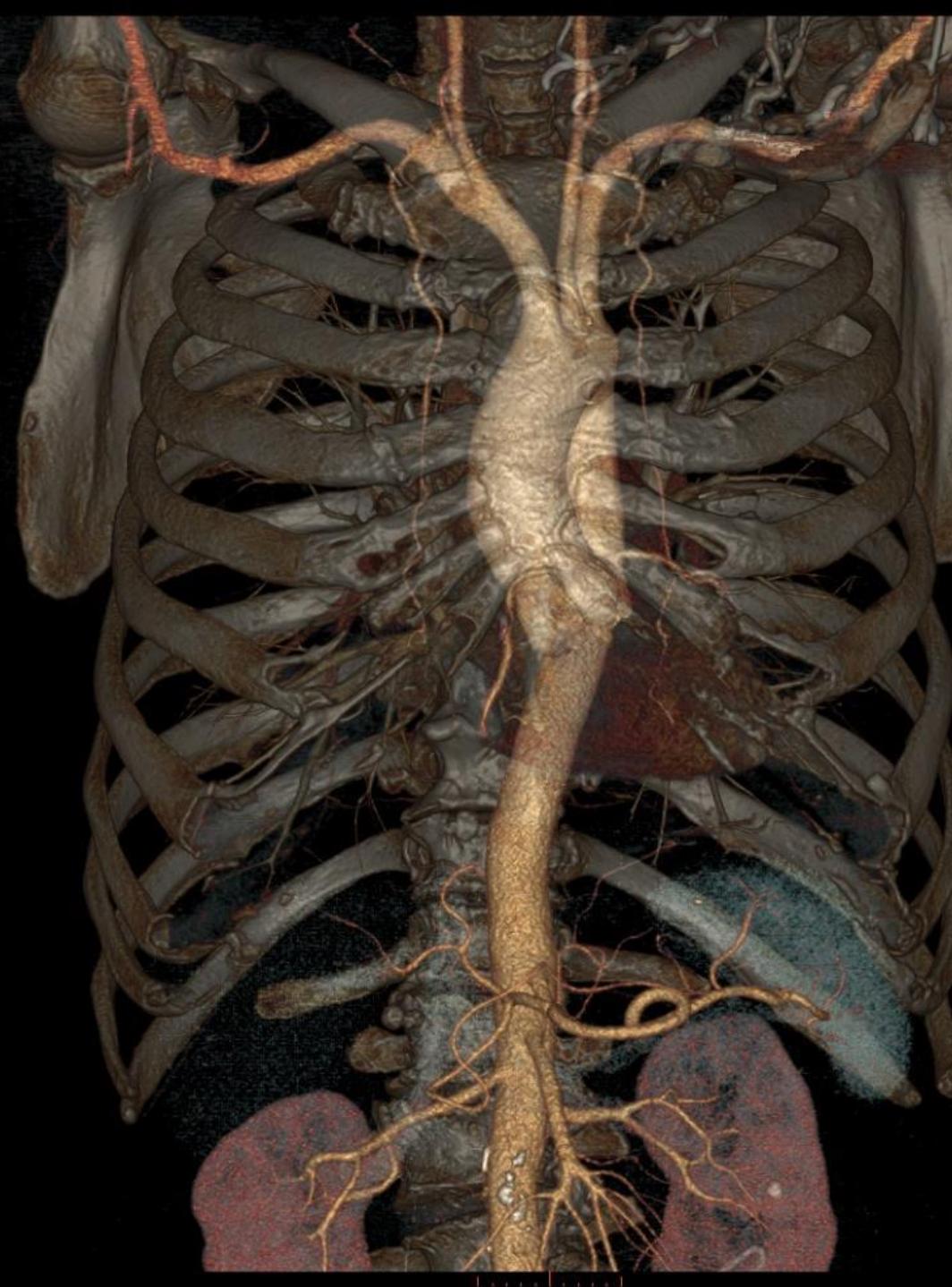




# ACS from TP

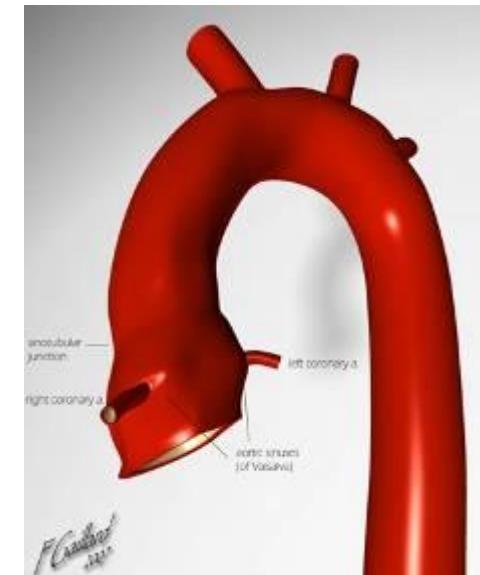
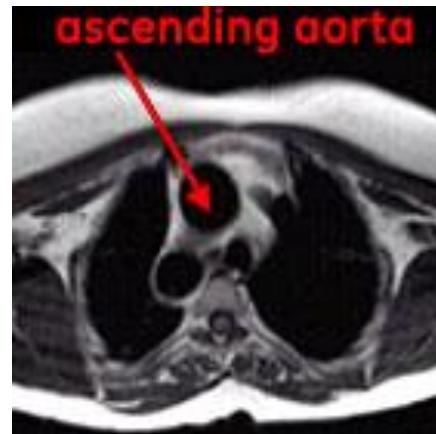




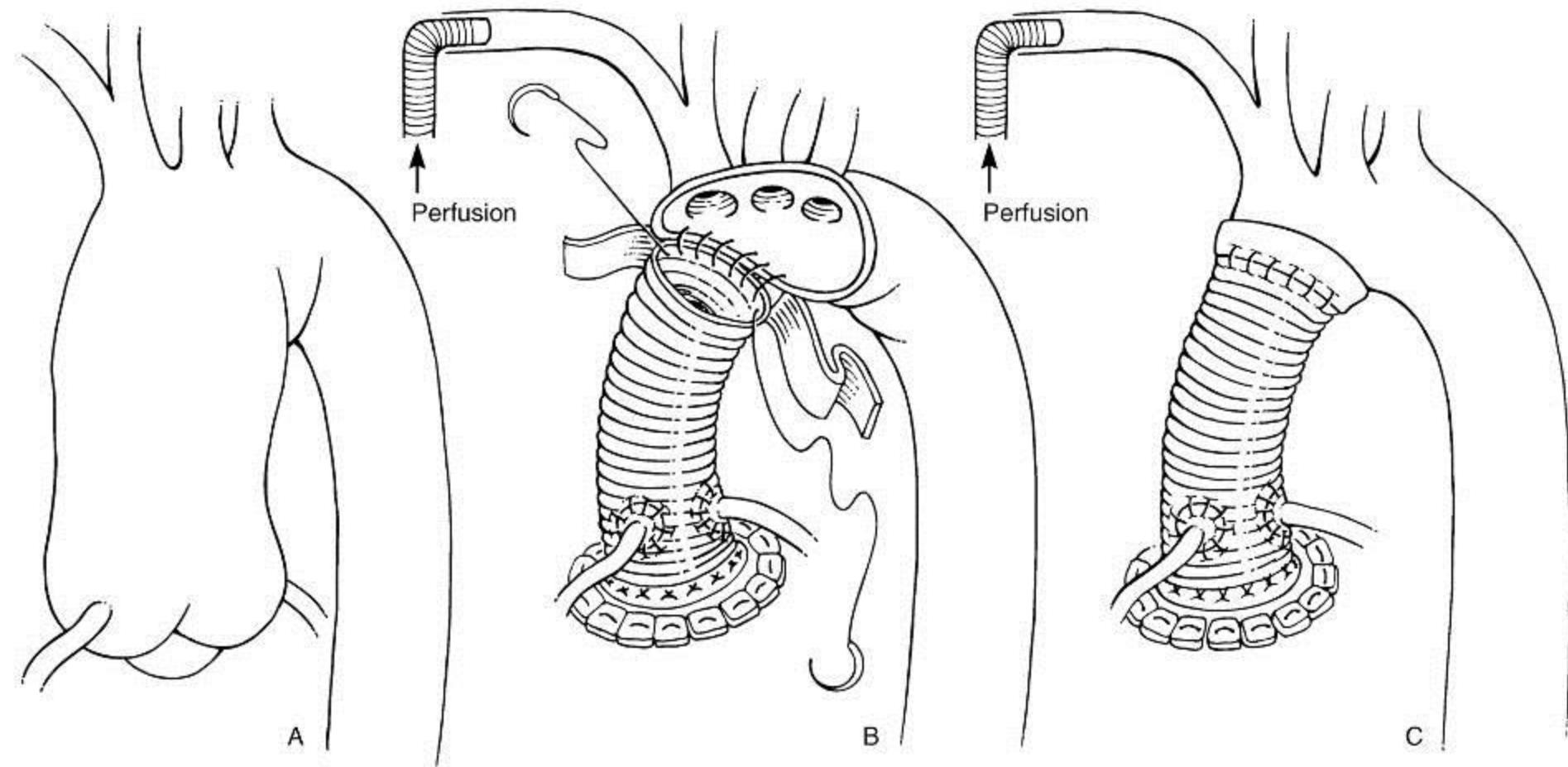
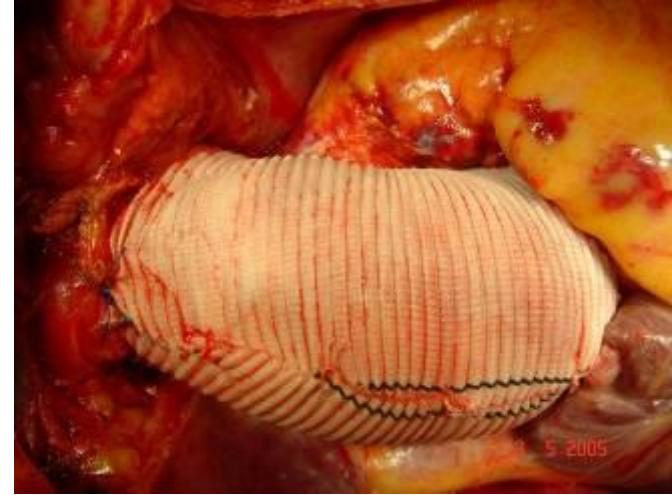


# Aorta ascendens; Pars ascendens aortae = Ascending aorta

- sinus aortae Valsalvae (dx., sin., ant.)
  - arteria coronaria dx. + sin.
- crista supravalvularis
- bulbus aortae
- *aneurysms*



# Aneurysma aortae ascendentis *surgical solution*



# Arcus aortae

left-sided (right-sided in birds)

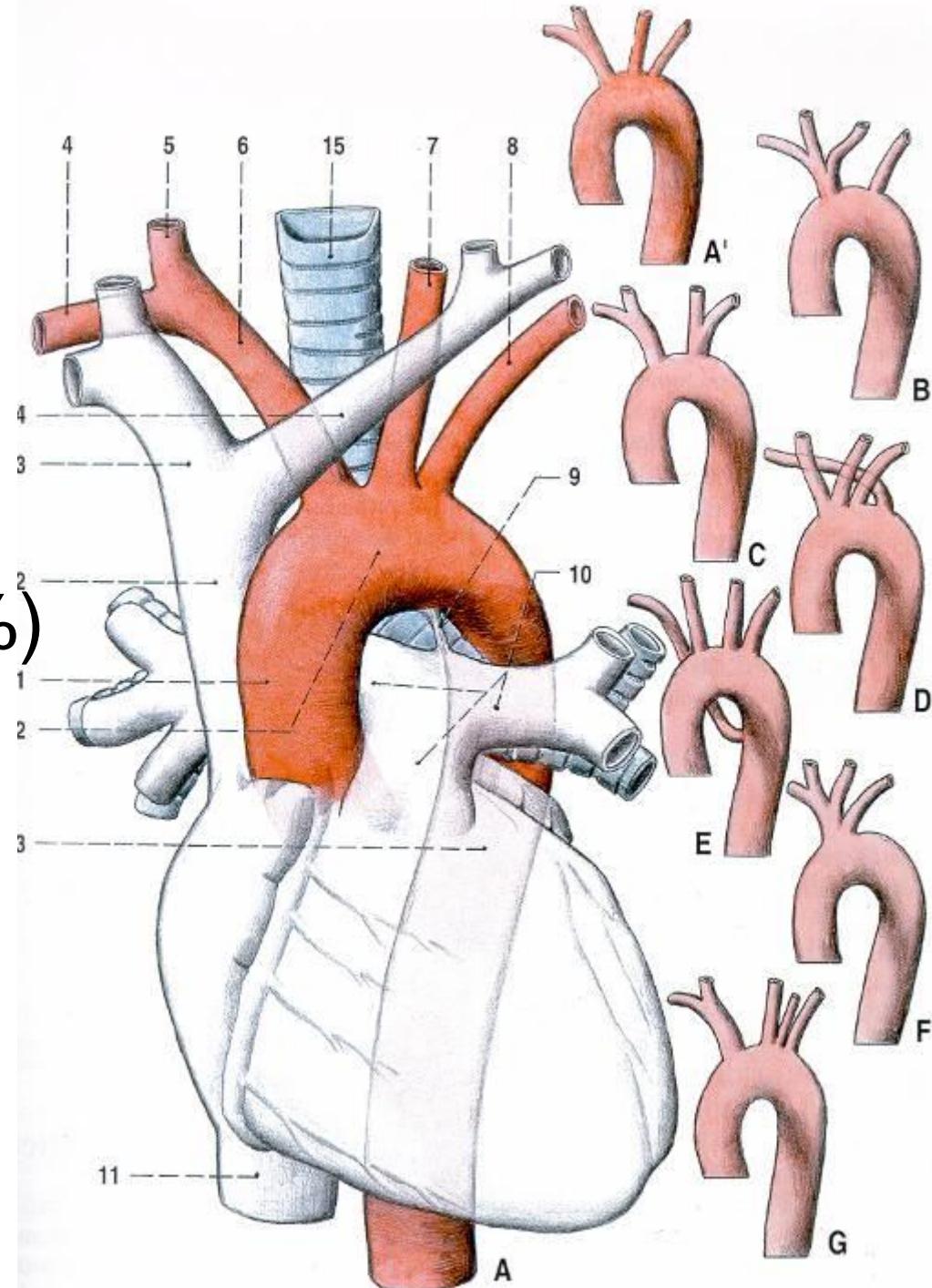
- truncus brachiocephalicus
  - a. subclavia dx.
  - a. carotis communis dx.
- a. carotis communis sin.
- a. subclavia sin.
- isthmus aortae
  - lig. arteriosum *Botalli*

glomera aortica (*chemoreceptors*)

topography: superior mediastinum, veins ventrally,  
trachea and oesophagus dorsally

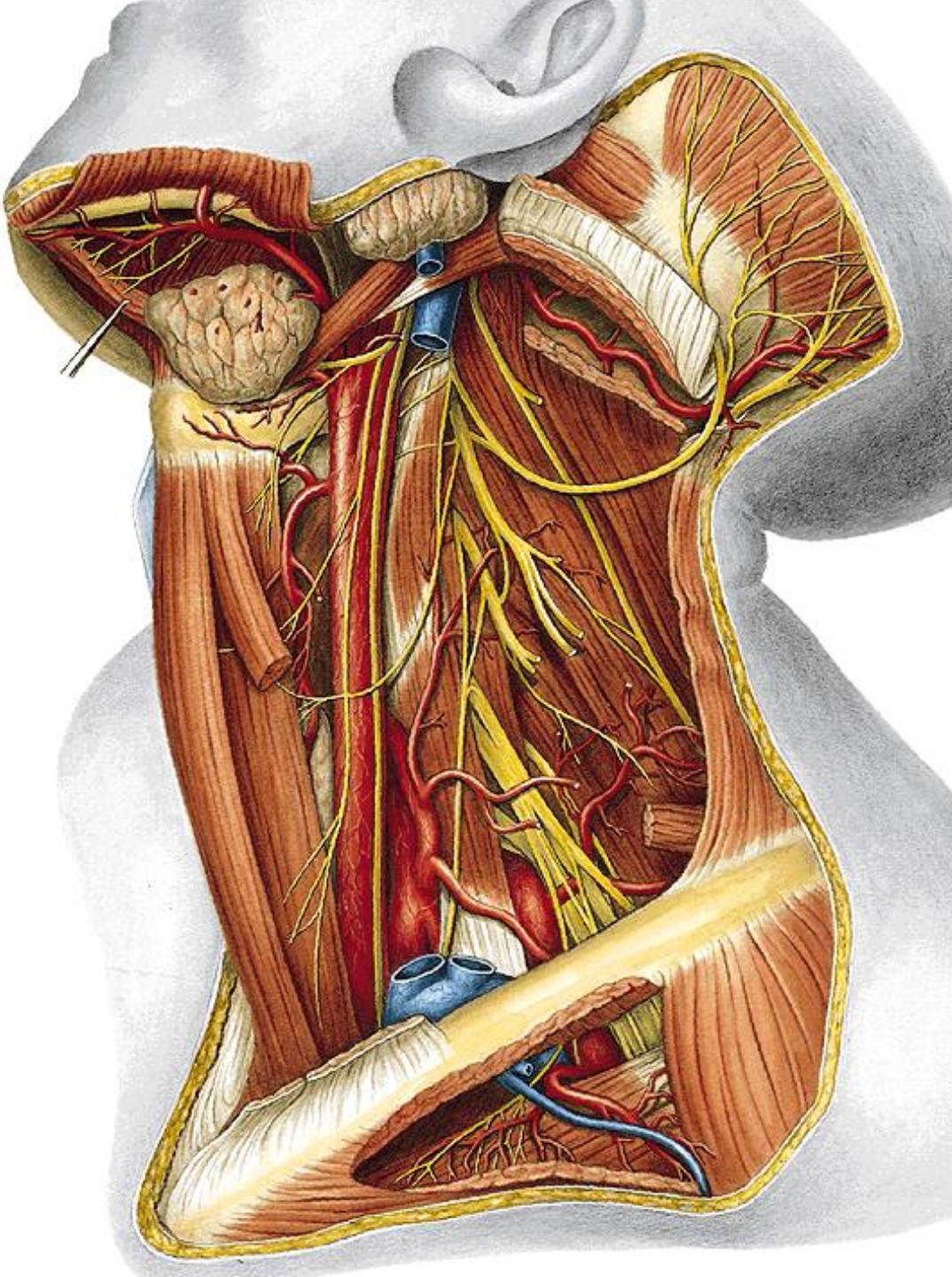
# Branching variants of arcus aortae

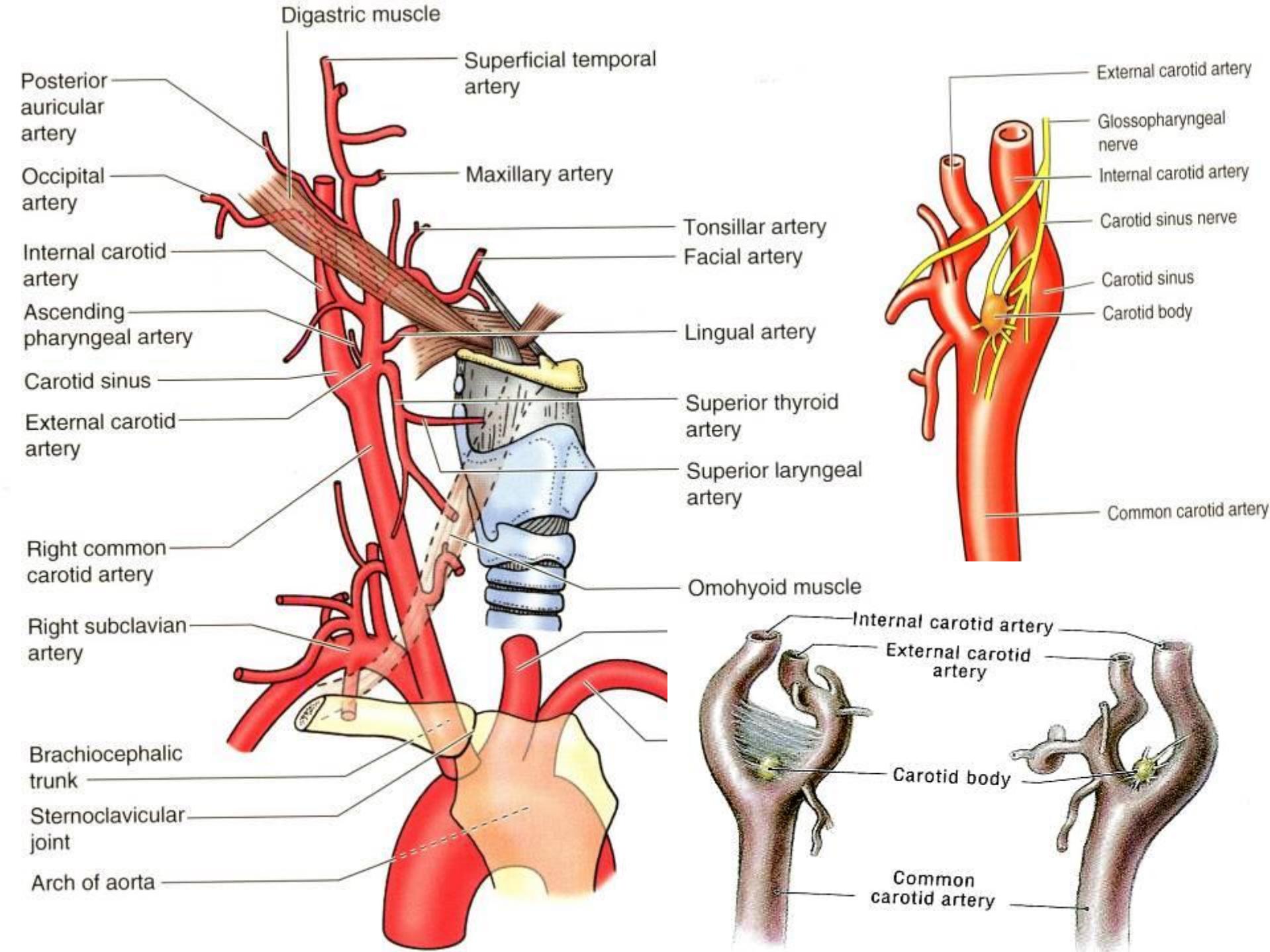
- a. thyroidea ima (2%)
- a. vertebralis (3%)
- a. lusoria (1.5%)

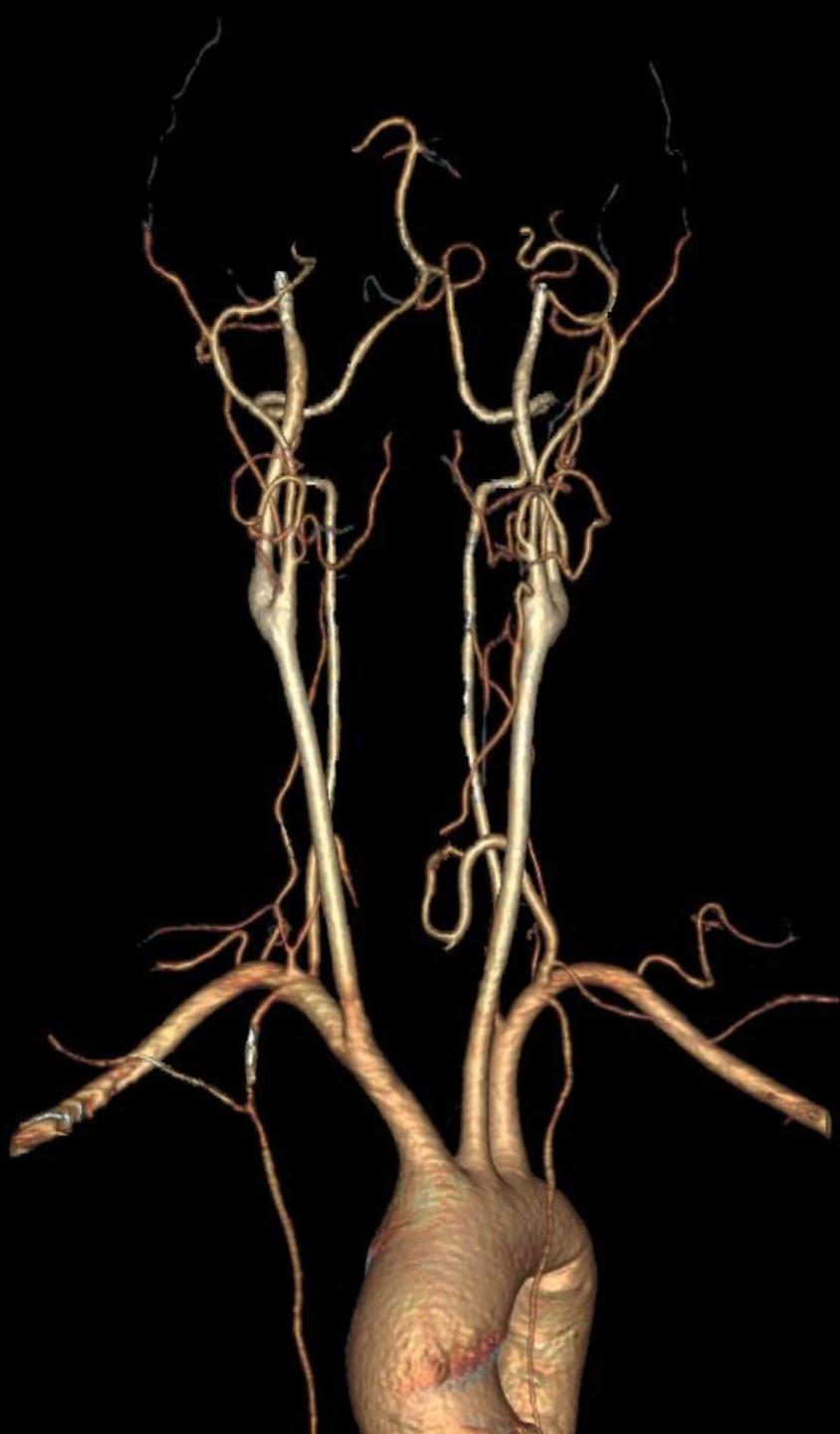
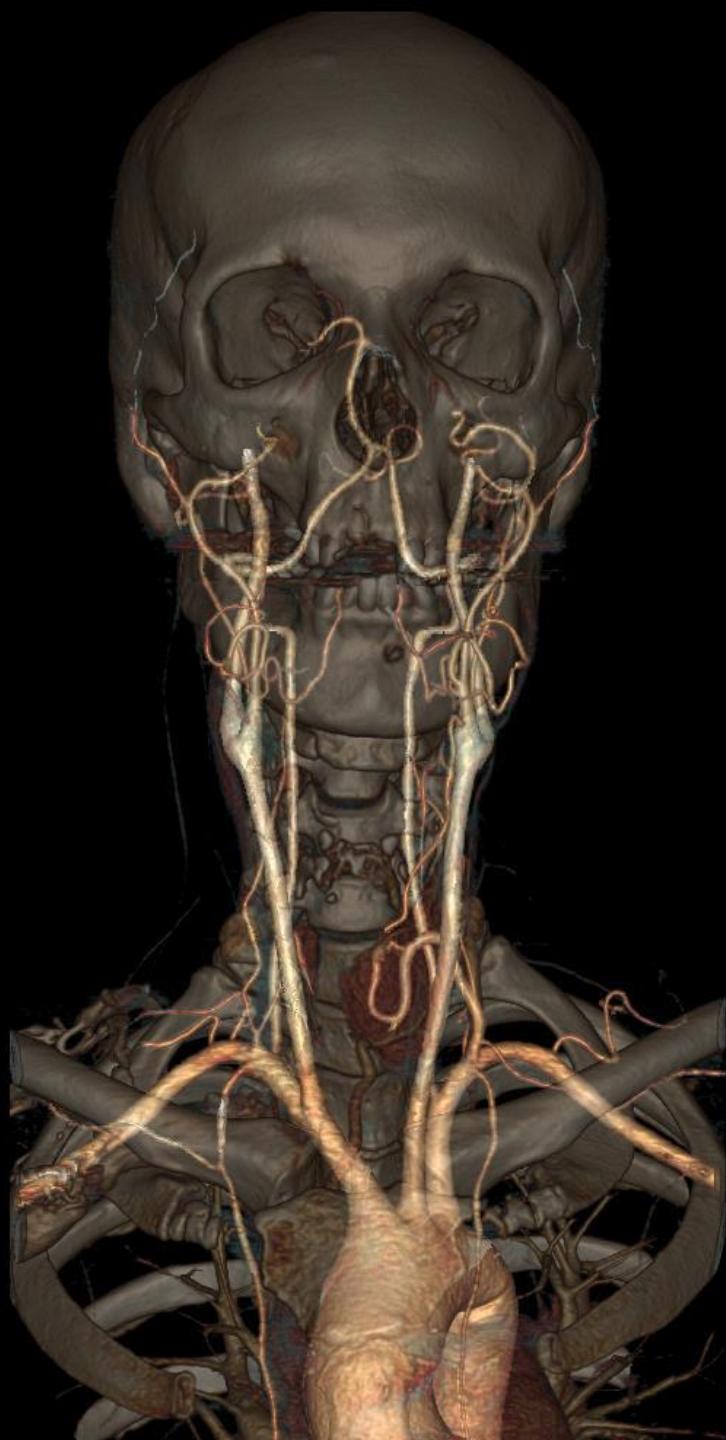


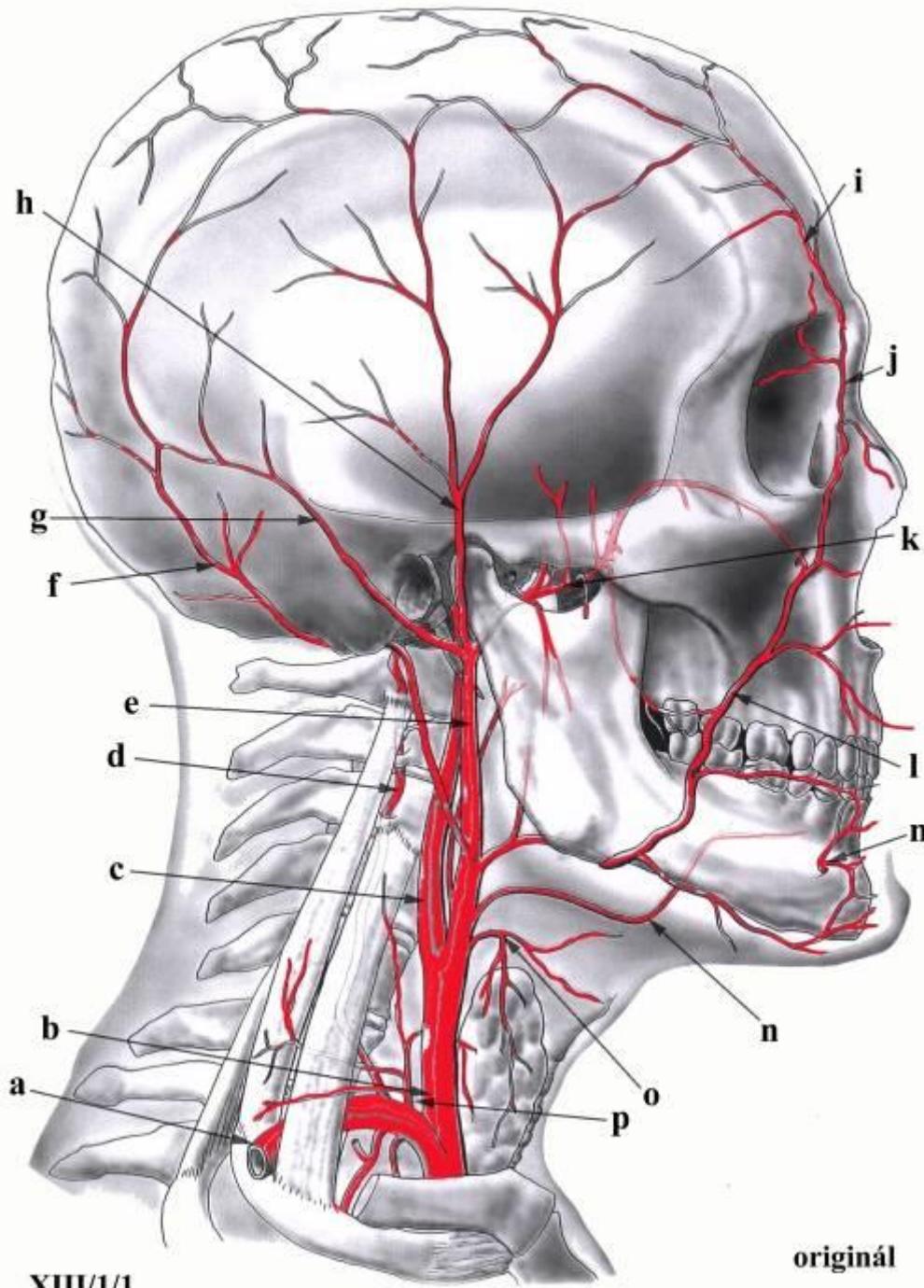
# A. carotis communis

- glomus caroticum (*chemoreceptor*)
- tuberculum caroticum (C6) Chassaignaci
- vagina carotica
- spatium parapharyngeum
- trigonum caroticum + omotracheale
- bifurcatio carotidis – C4
  - a. carotis interna
  - a. carotis externa







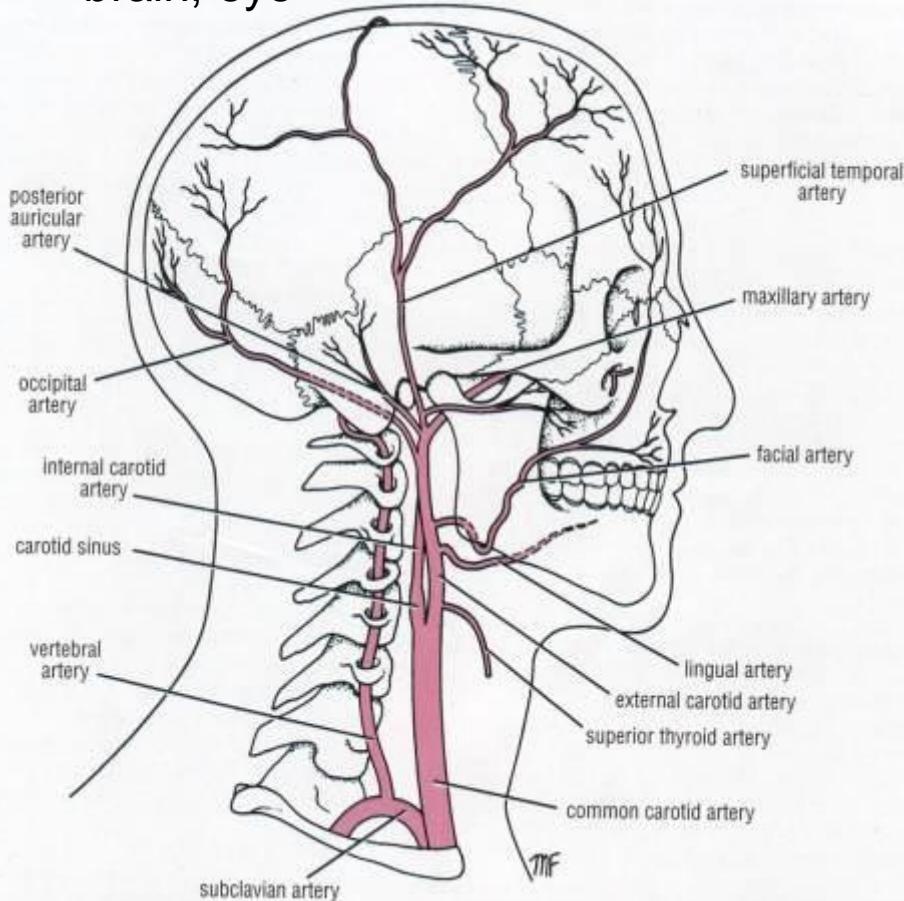


## A. carotis externa

- ventromedially
- 8 branches
- face, tongue, oral cavity, pharynx, meninges

## A. carotis interna

- dorsolaterally
- no branch within neck
- brain, eye



# Arteria carotis externa branches

ventral:

- a. thyroidea sup.
- a. lingualis
- a. facialis

dorsal:

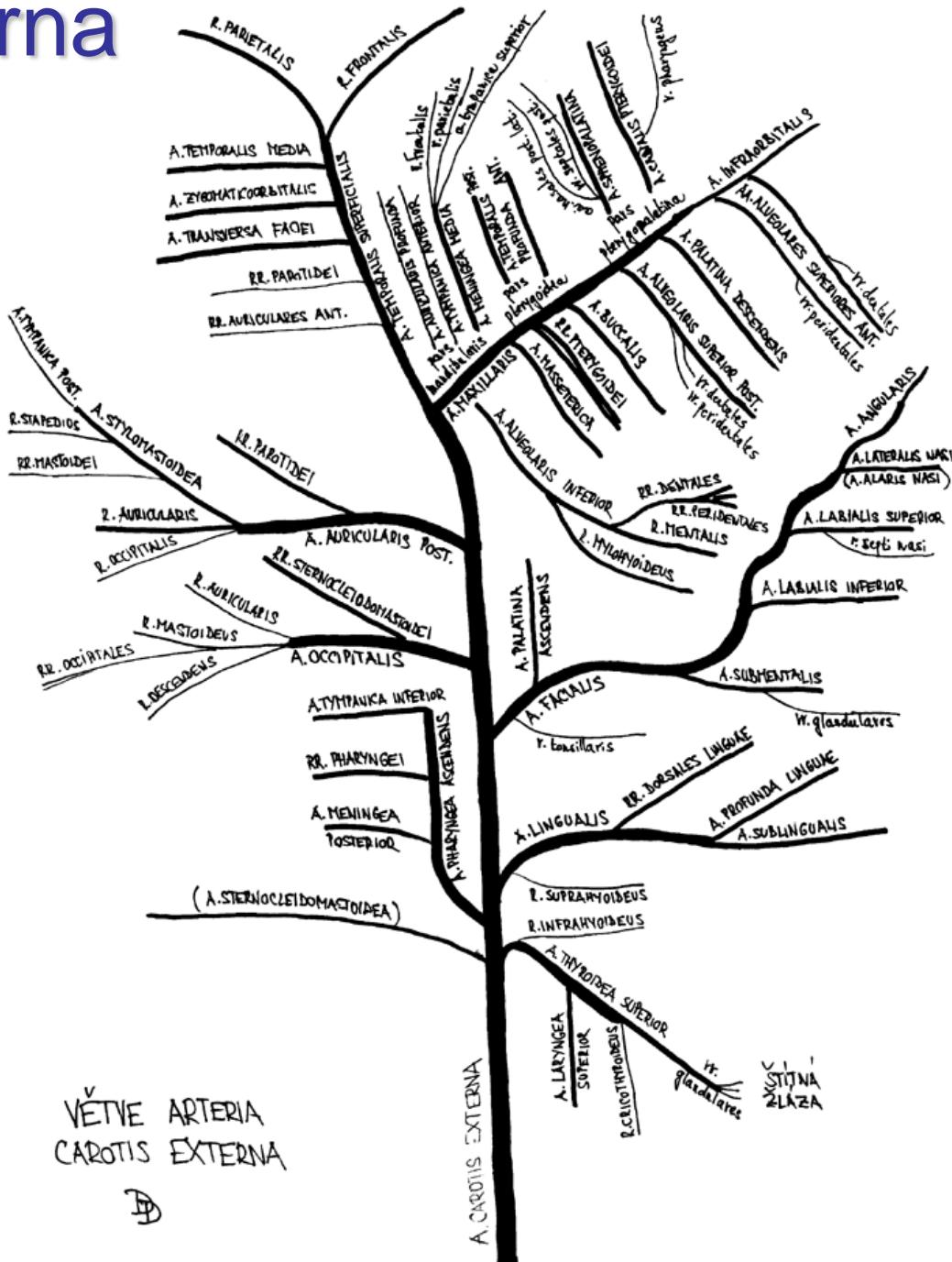
- a. occipitalis
- a. auricularis posterior

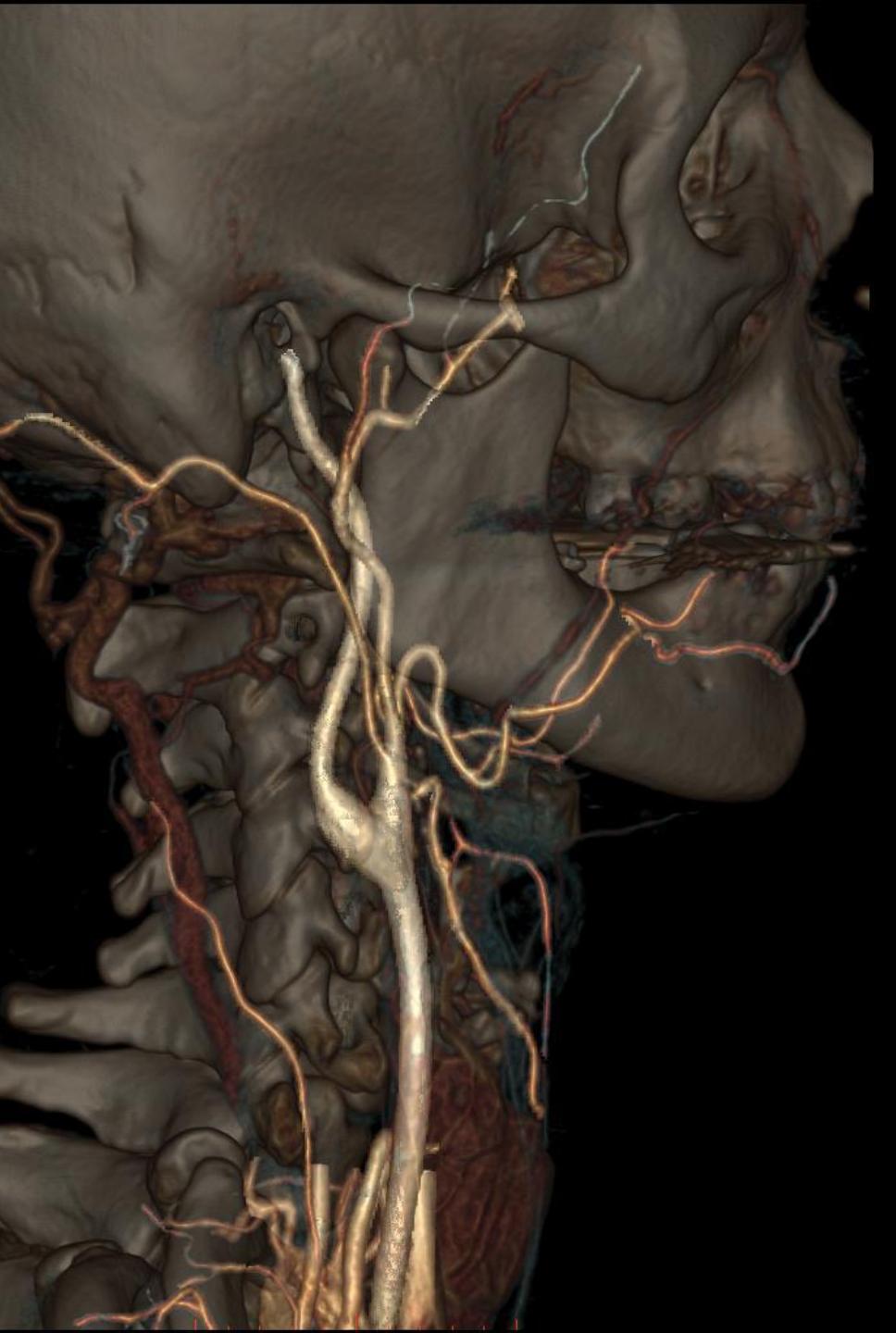
medial:

- a. pharyngea ascendens

terminal:

- a. temporalis superficialis
- a. maxillaris



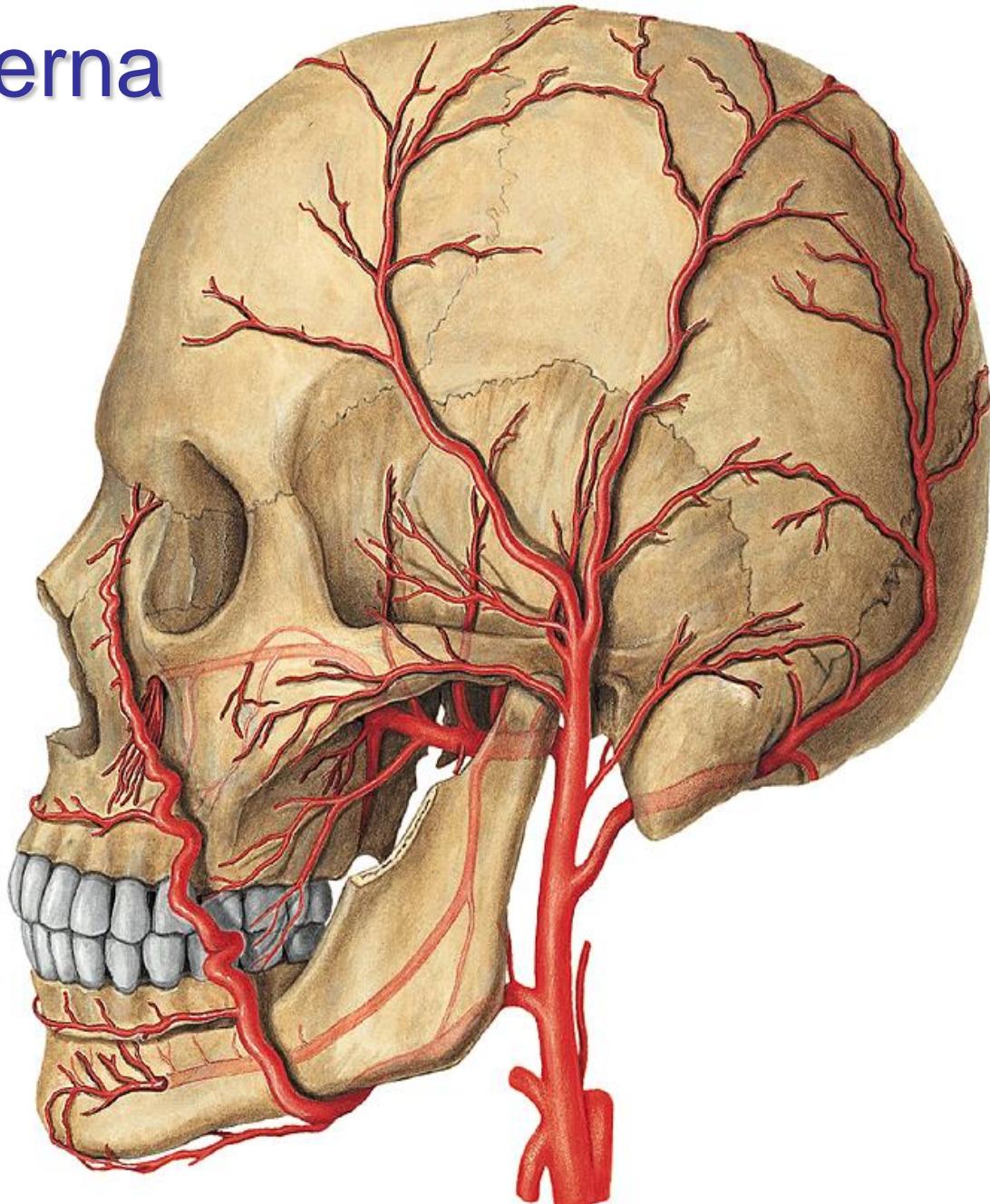


# Arteria carotis externa topography

- trigonum caroticum
  - spatiuum prestyloideum
- ventrolaterally:
- m. sternocleidomastoideus
  - n. XII
  - inside glandula parotis crossed by branches of n. VII

medially:

- pharynx
- a. carotis int.
  - first dorsolaterally
  - then dorsomedially
- m. stylopharyngeus

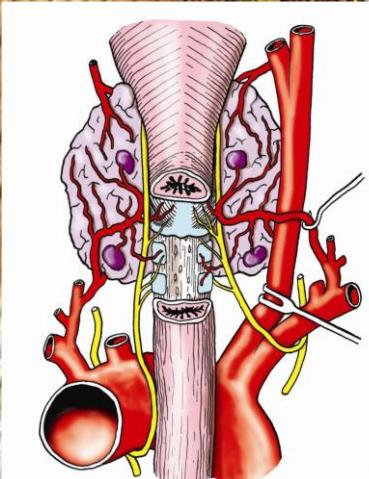
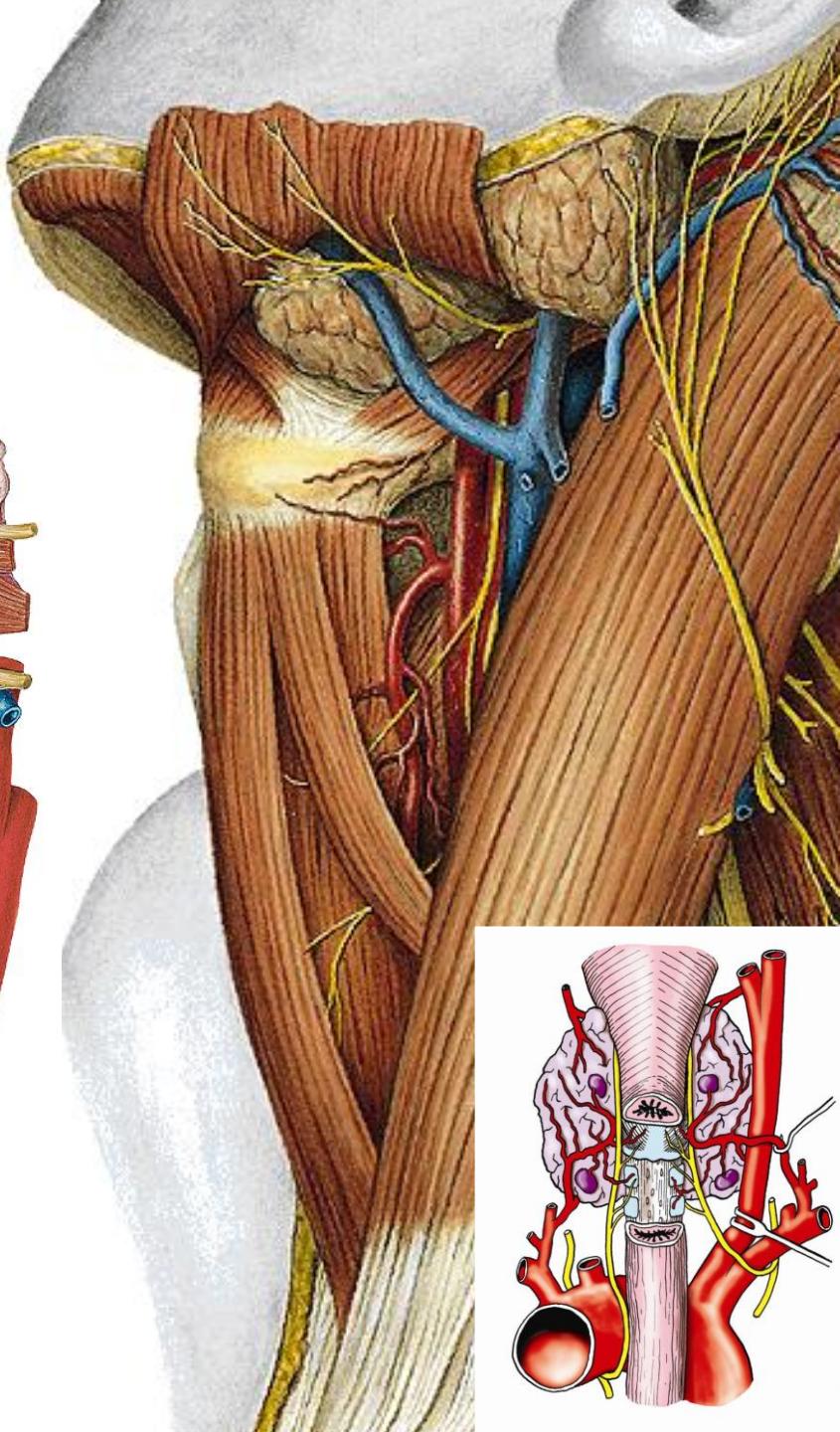
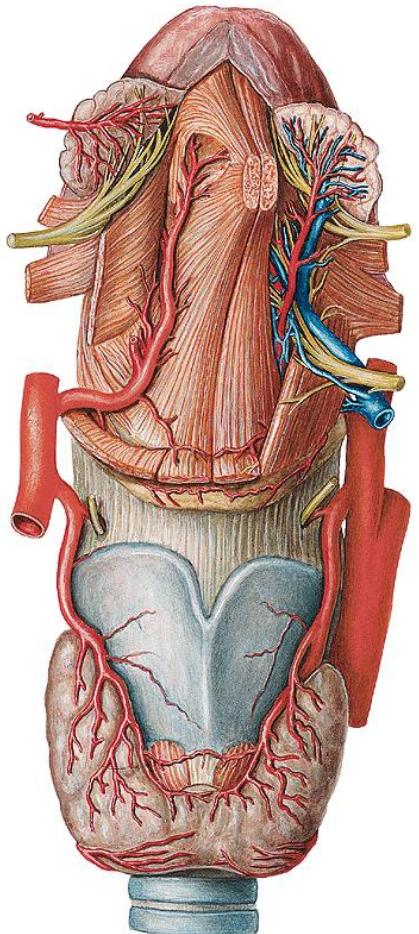


# A. thyroidea superior

- r. infrahyoideus
- r. sternocleidomastoideus
- **a. laryngea superior**
- r. cricothyroideus
- r. glandularis anterior
- r. glandularis posterior
- r. glandularis lateralis

together with n. laryngeus  
superior

can branch from ACC or  
bifurcatio ACC



# A. lingualis

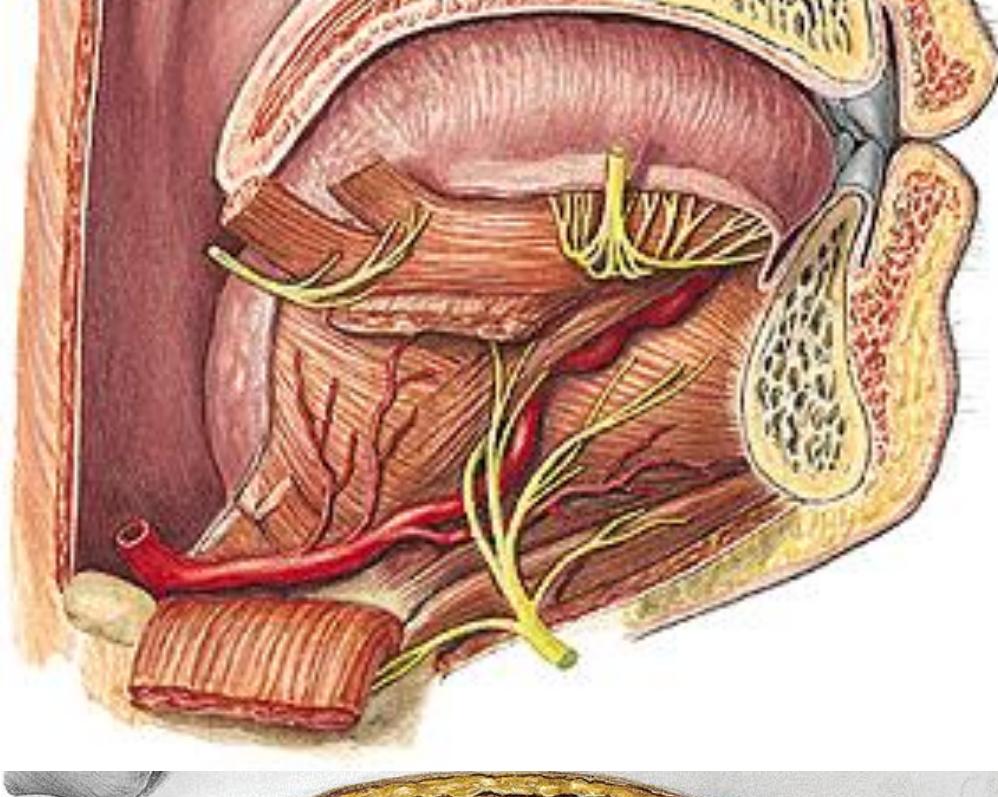
- r. suprathyoideus
- rr. dorsales linguae
- a. sublingualis
- a. profunda linguae

angulus Béclardi

trigonum a. lingualis Pirogovi

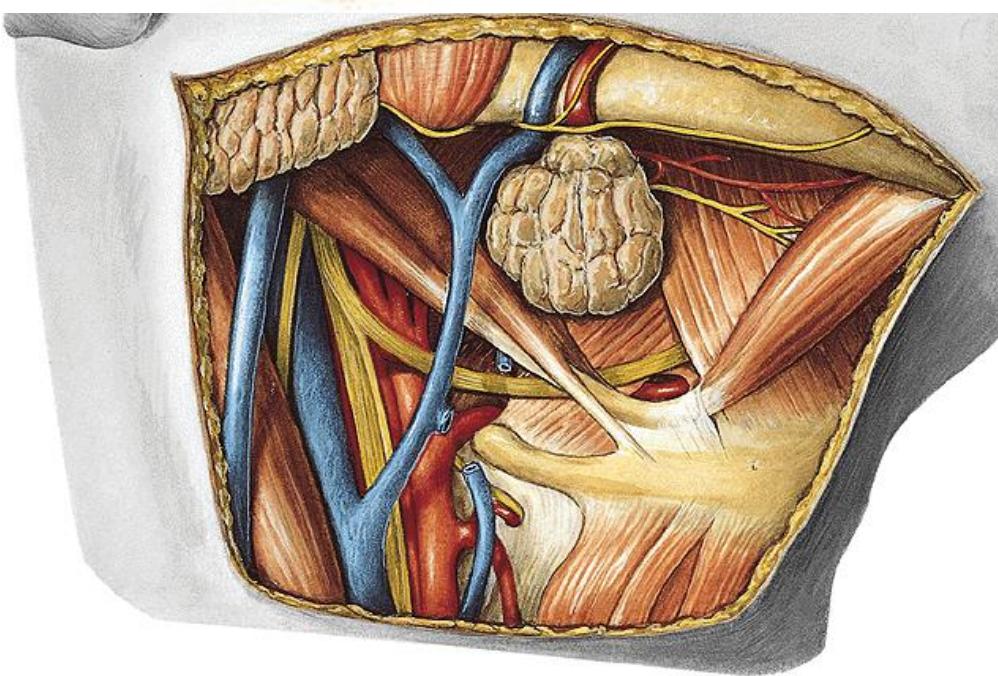
- ligation
- compression

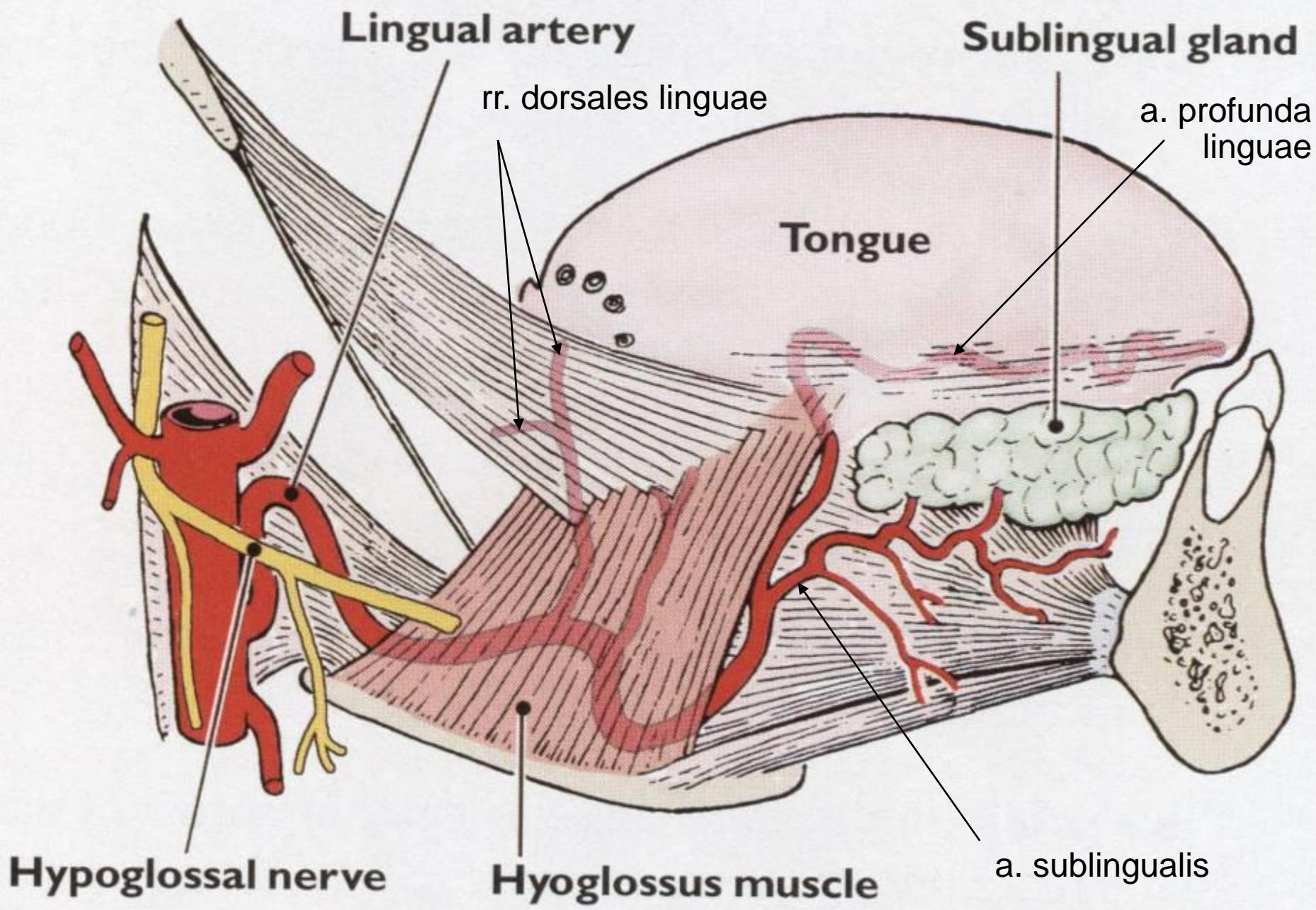
canalis paralingualis

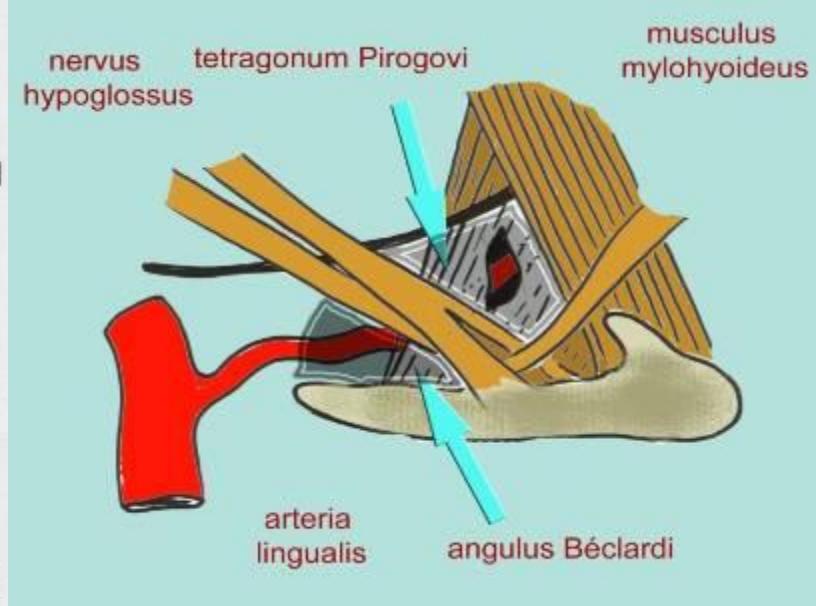
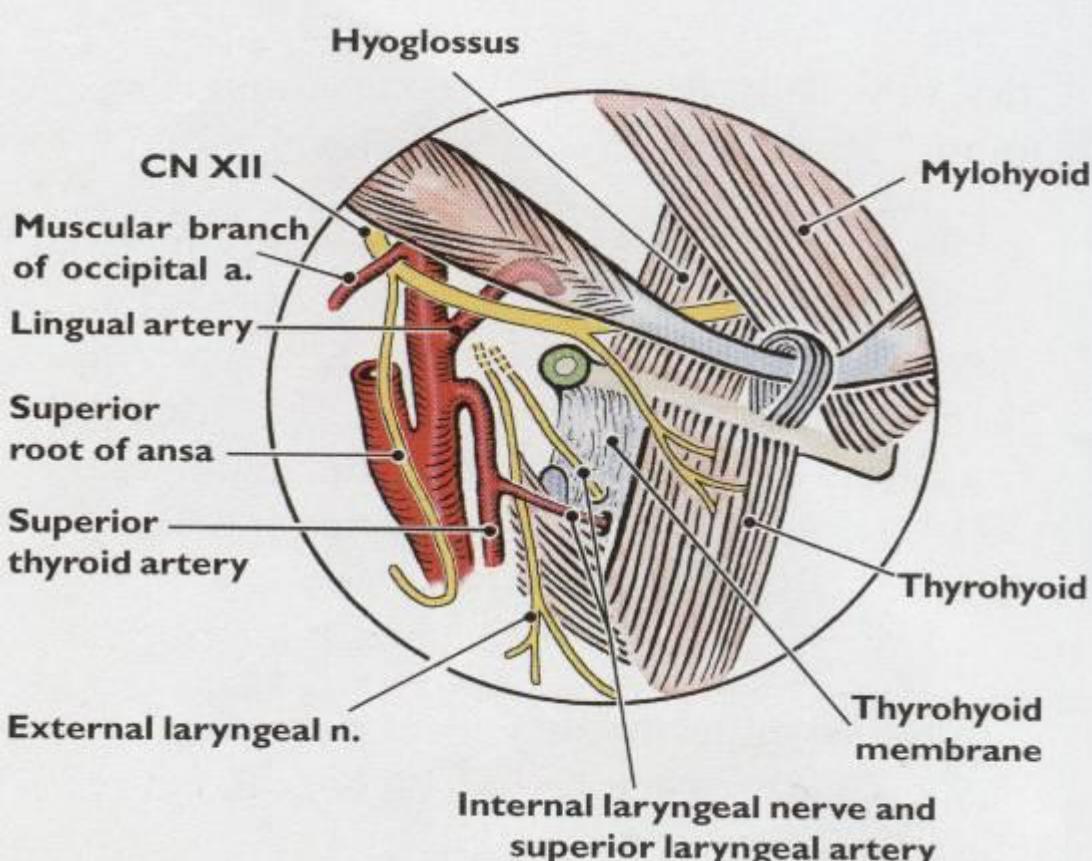


passes under:

- n. XII
- v. post. m. digastrici
- m. stylohyoideus
- m. hyoglossus

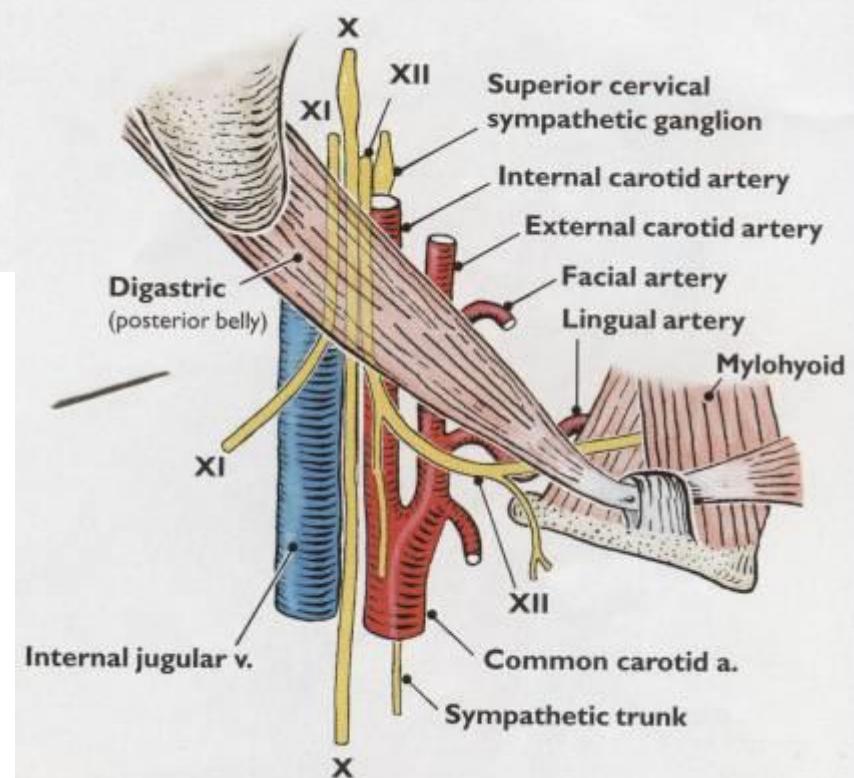






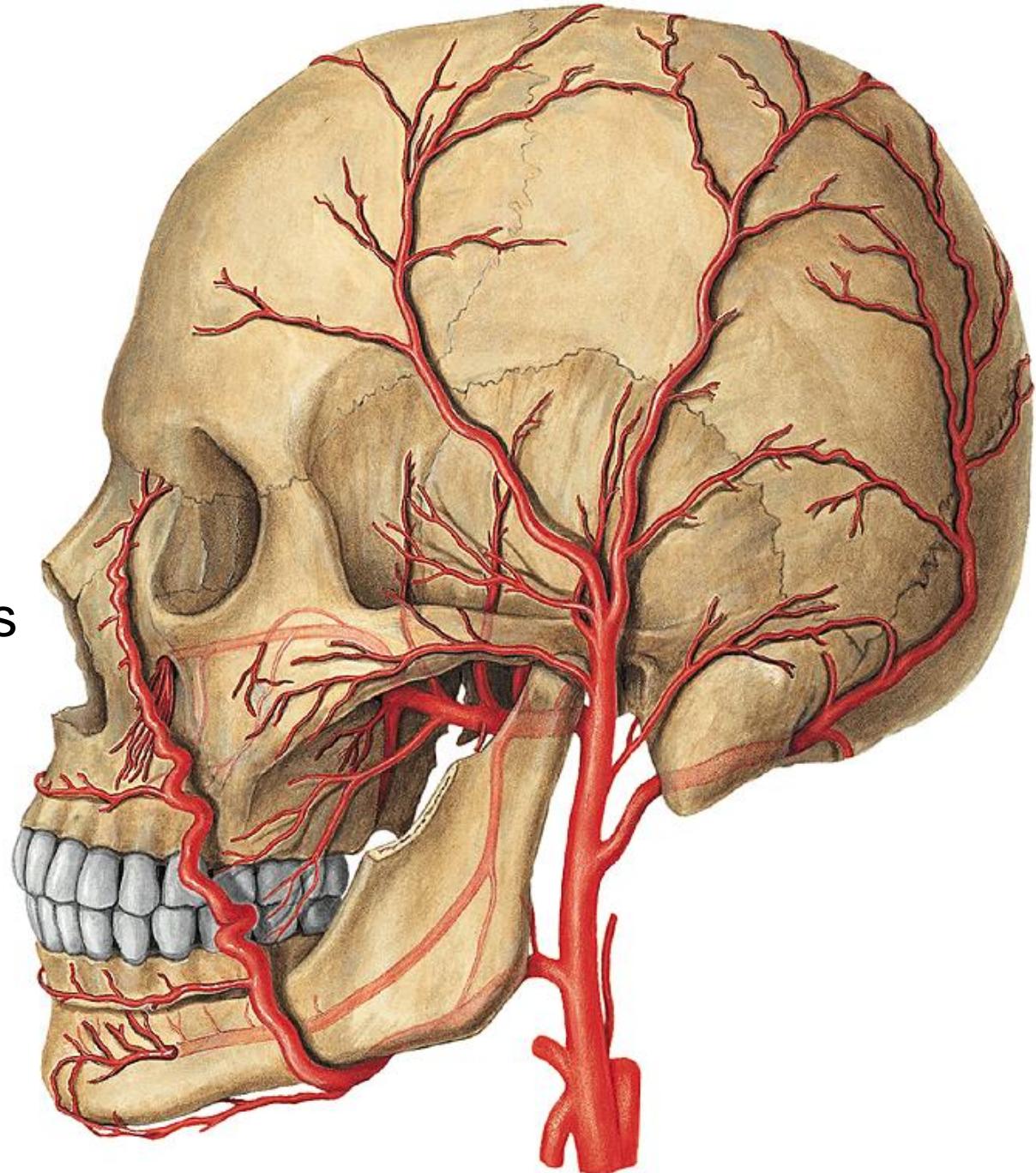
# Trigonum a. lingualis Pirogovi

Angulus Béclardi



# A. facialis

- a. palatina  
ascendens
- r. tonsillaris
- a. submentalis
- rr. glandulares
  - gl. submandibularis
- a. labialis inferior
- a. labialis superior
  - r. septi nasi
- r. lateralis nasi
- a. angularis
  - spojky do očnice



# A. facialis

trigonum submandibulare

truncus linguofacialis

passes under:

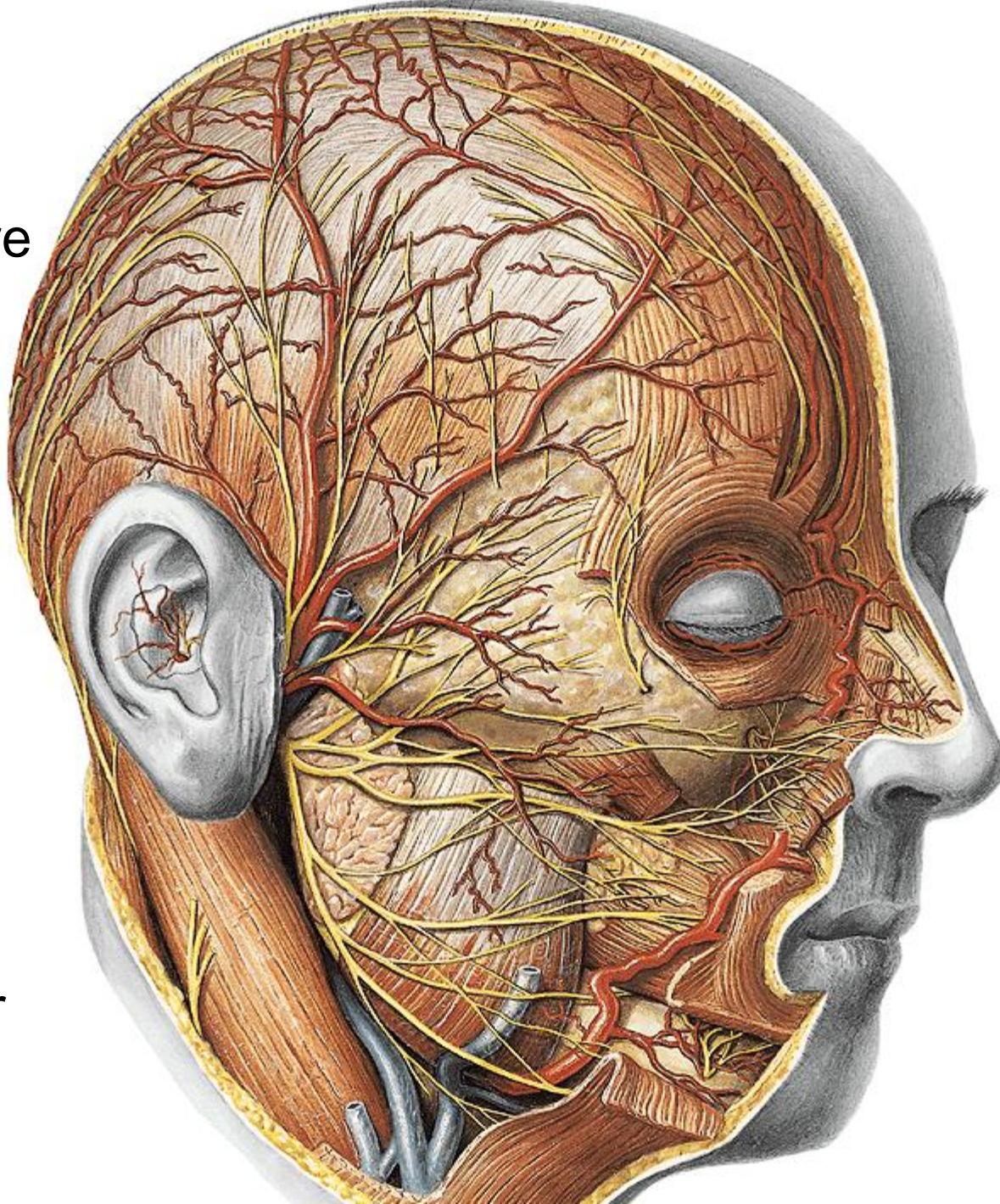
- venter post. m.  
digastrici
- m. stylohyoideus
- glandula  
submandibularis

compression point:

caudal margin of  
mandibula ventral to  
m. masseter

right-left anastomoses:

- arcus labialis superior
  - arcus labialis inferior
- sinous course in face



# A. occipitalis

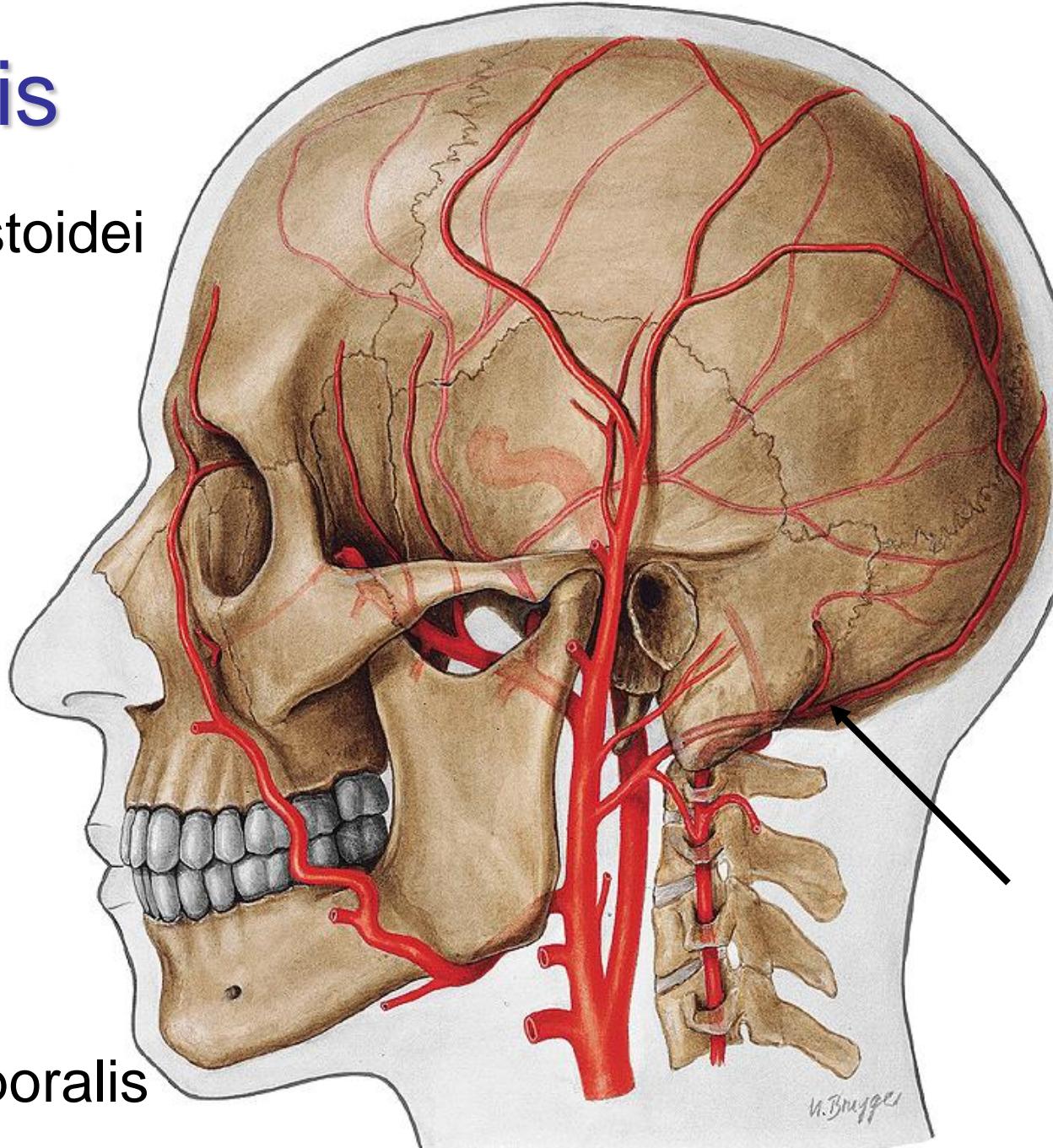
- rr. sternocleidomastoidei
- r. mastoideus
- r. descendens
- r. auricularis
- rr. occipitales
- r. meningeus

passes over:

n. XII

vagina carotica

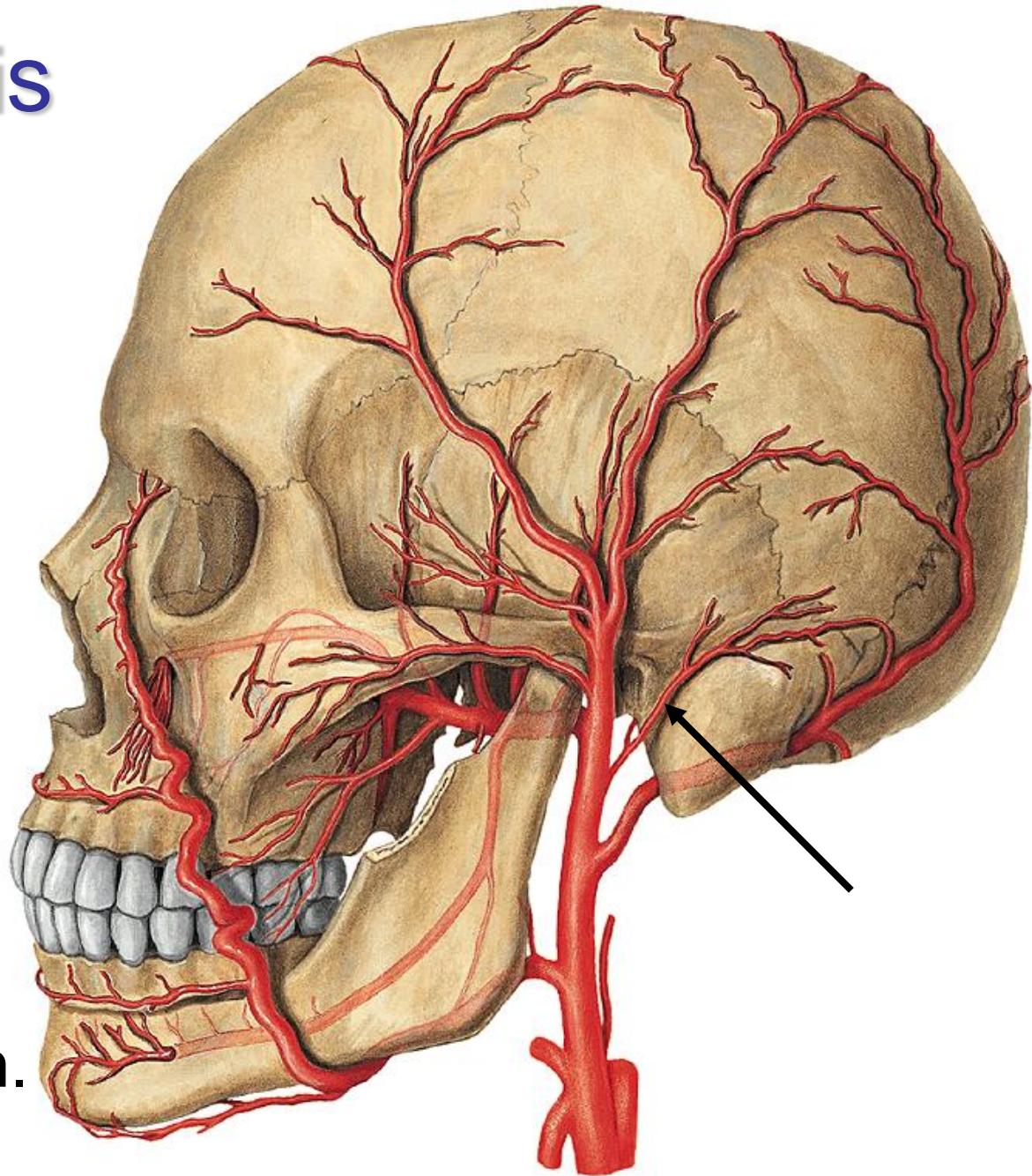
sulcus AO ossis temporalis



# A. auricularis posterior

- rr. parotidei
- r. auricularis
- r. occipitalis
- a. stylomastoidea
  - rr. mastoidei
  - a. tympanica post.
  - r. stapedius

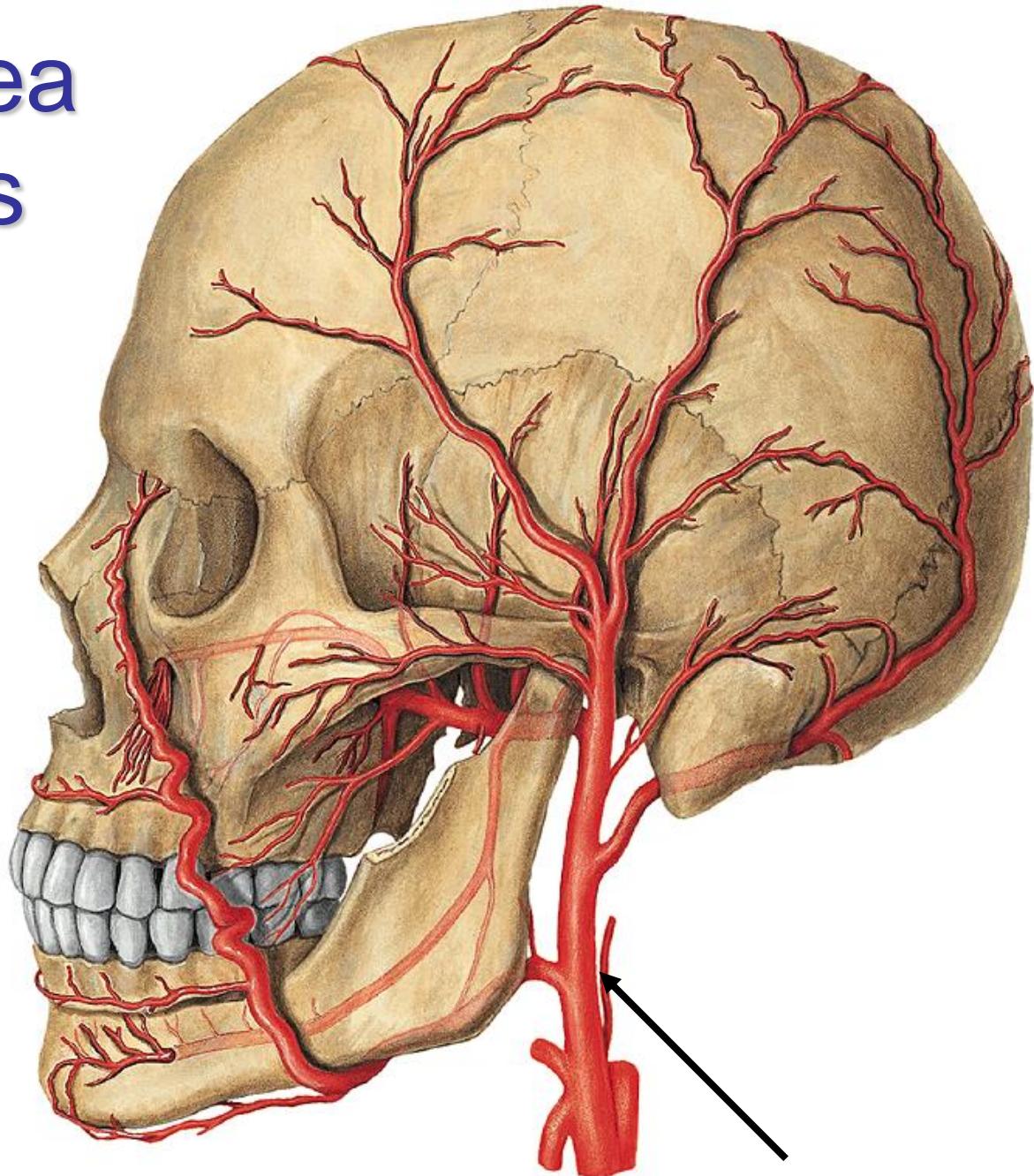
origin cranial to  
venter posterior m.  
digastrici



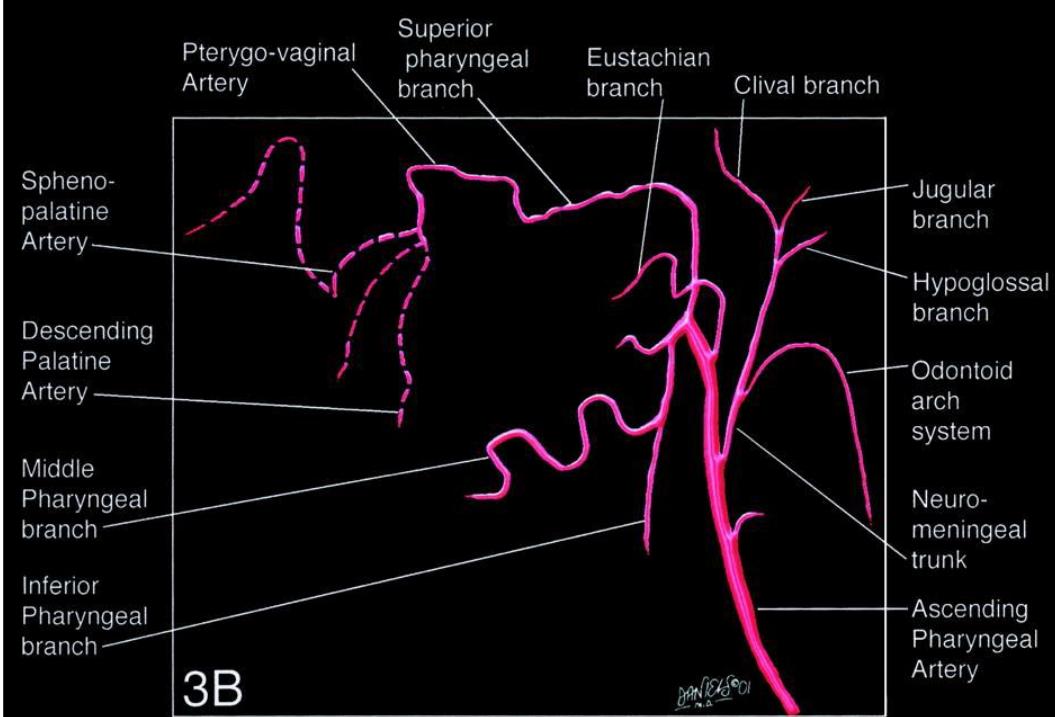
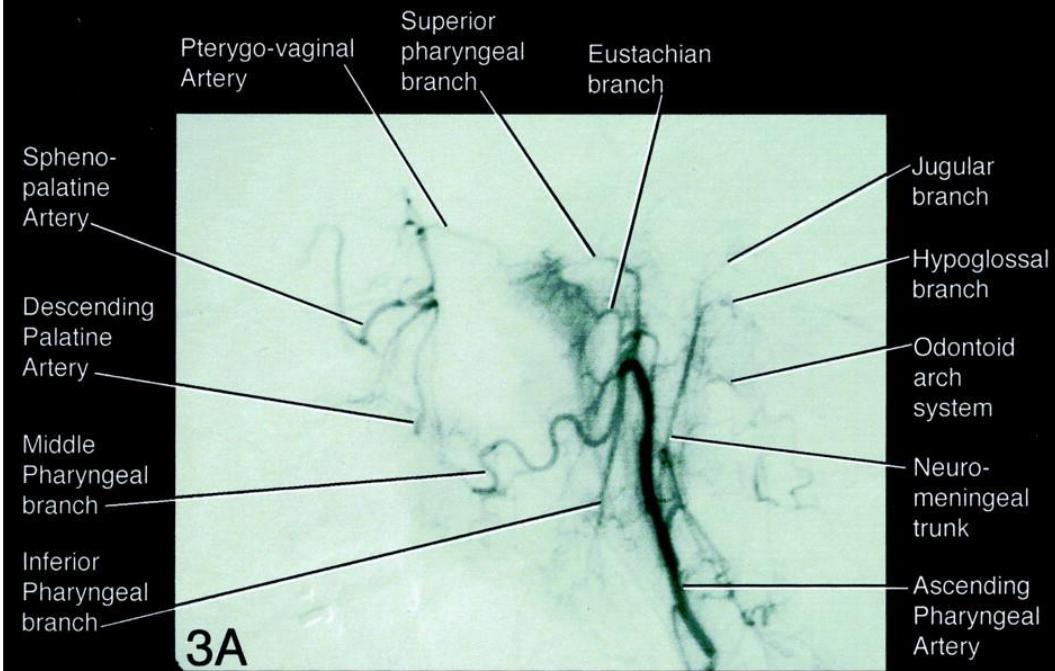
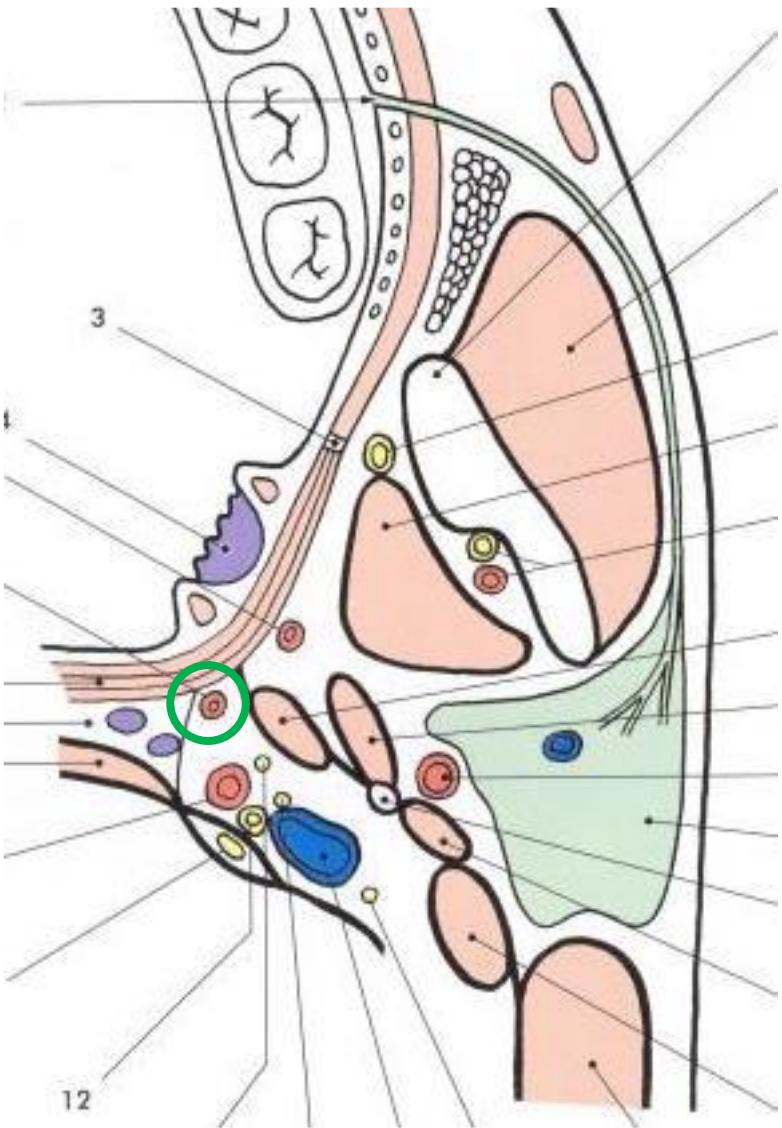
# A. pharyngea ascendens

- rr. pharyngei
- a. meningea post.
- a. tympanica inf.

thinnest branch of ACE  
ascends between ACI and pharynx  
spatium retrostyloideum



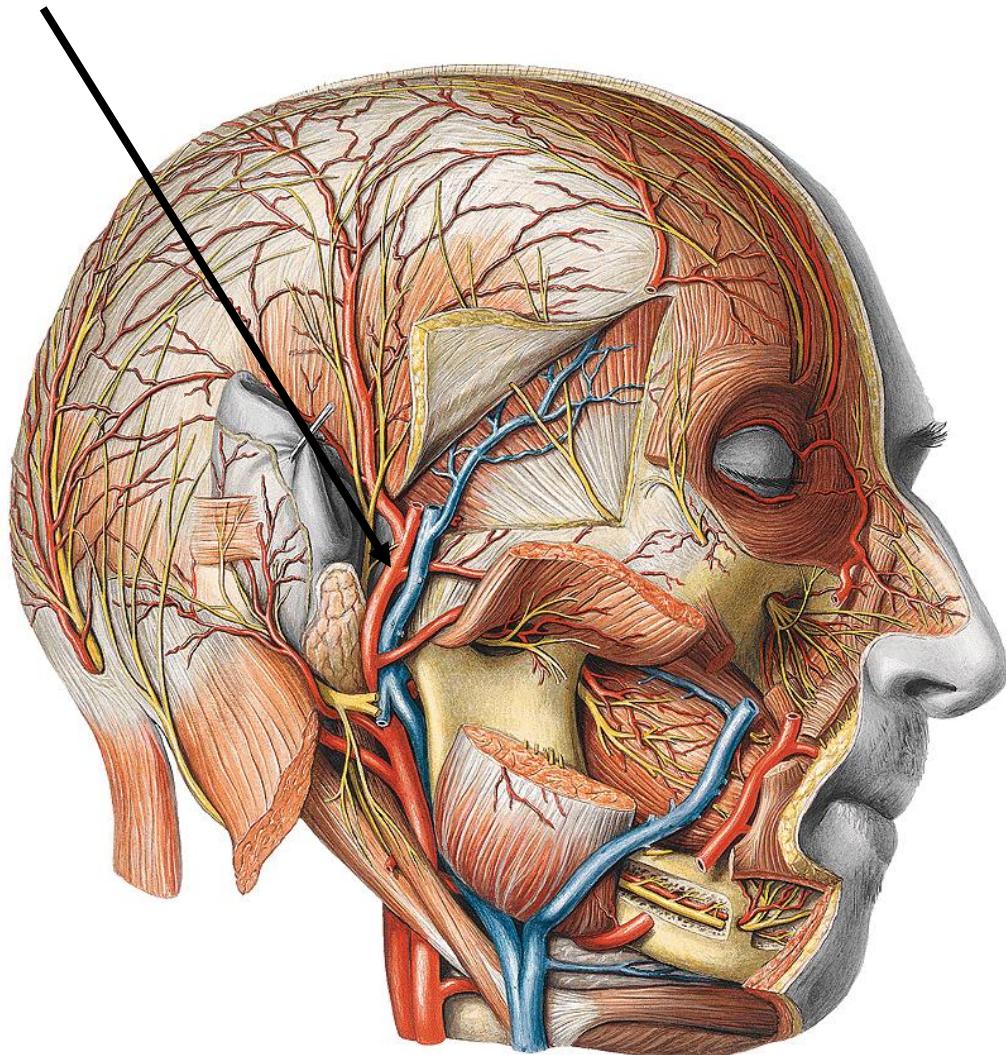
# A. pharyngea ascendens



# Arteria temporalis superficialis

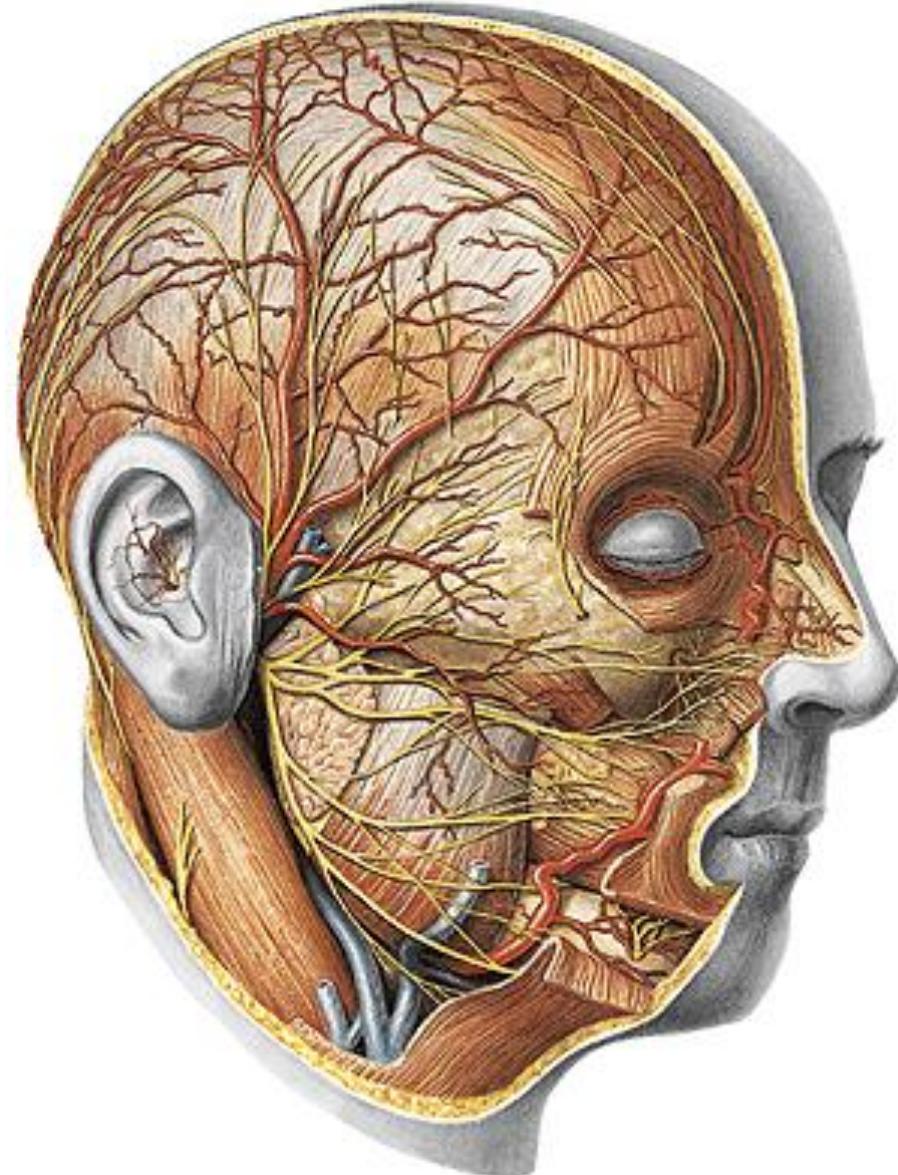
*terminal branch*

- r. parotideus
- a. transversa faciei
- rr. auriculares anteriores
- a. zygomaticoorbitalis
- a. temporalis media
- r. frontalis
- r. parietalis



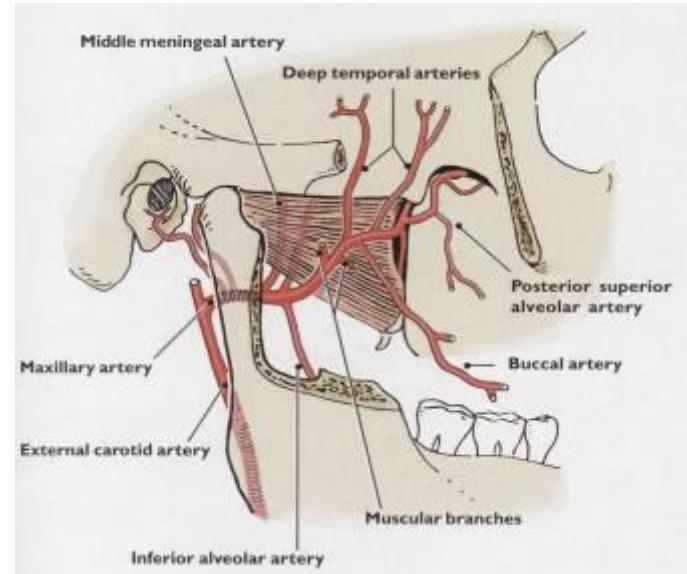
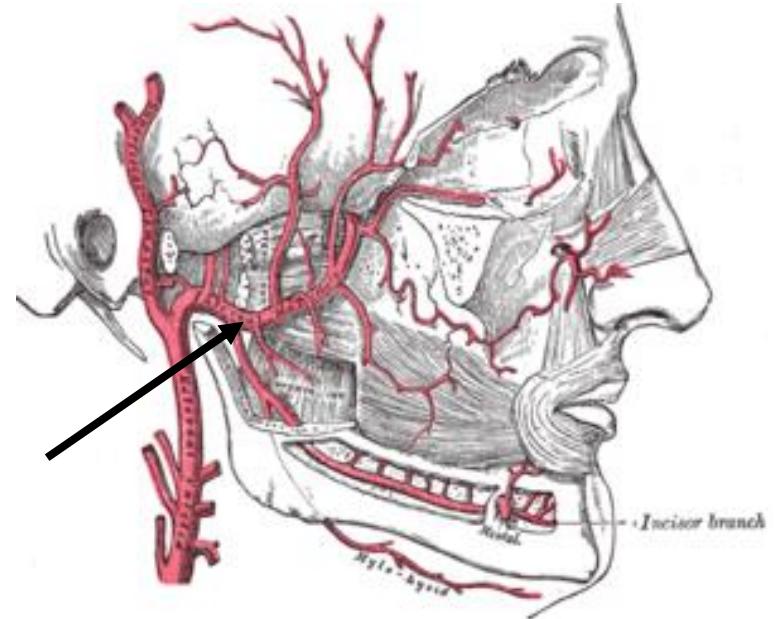
# Arteria temporalis superficialis

- compression point:  
ventral to auricula
- pedicle vessel for  
skin and  
musculocutaneous  
flaps
- *arteritis temporalis*  
*(Horton)*
  - *inflammatory  
rheumatic disease*

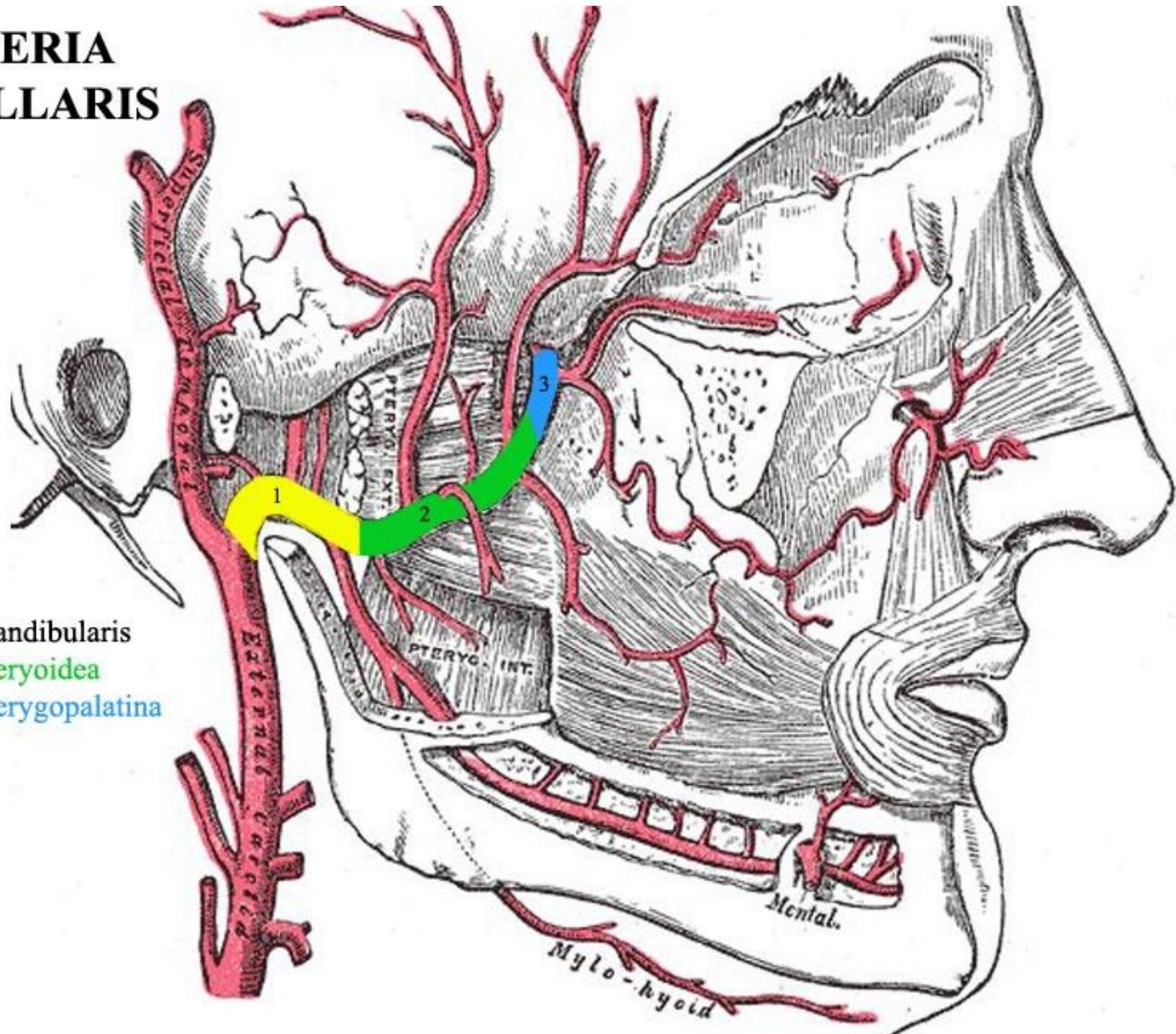


# Arteria maxillaris

- spatium prestylodeum
  - inside glandula parotidea
  - ventral to lig. sphenomandibulare
- fossa infratemporalis
  - ventral/dorsal to m. pterygoideus lat. (1:1)
- fissura pterygomaxillaris
- fossa pterygopalatina
- 3 parts
- 13 branches
- *maxillofacial surgery*



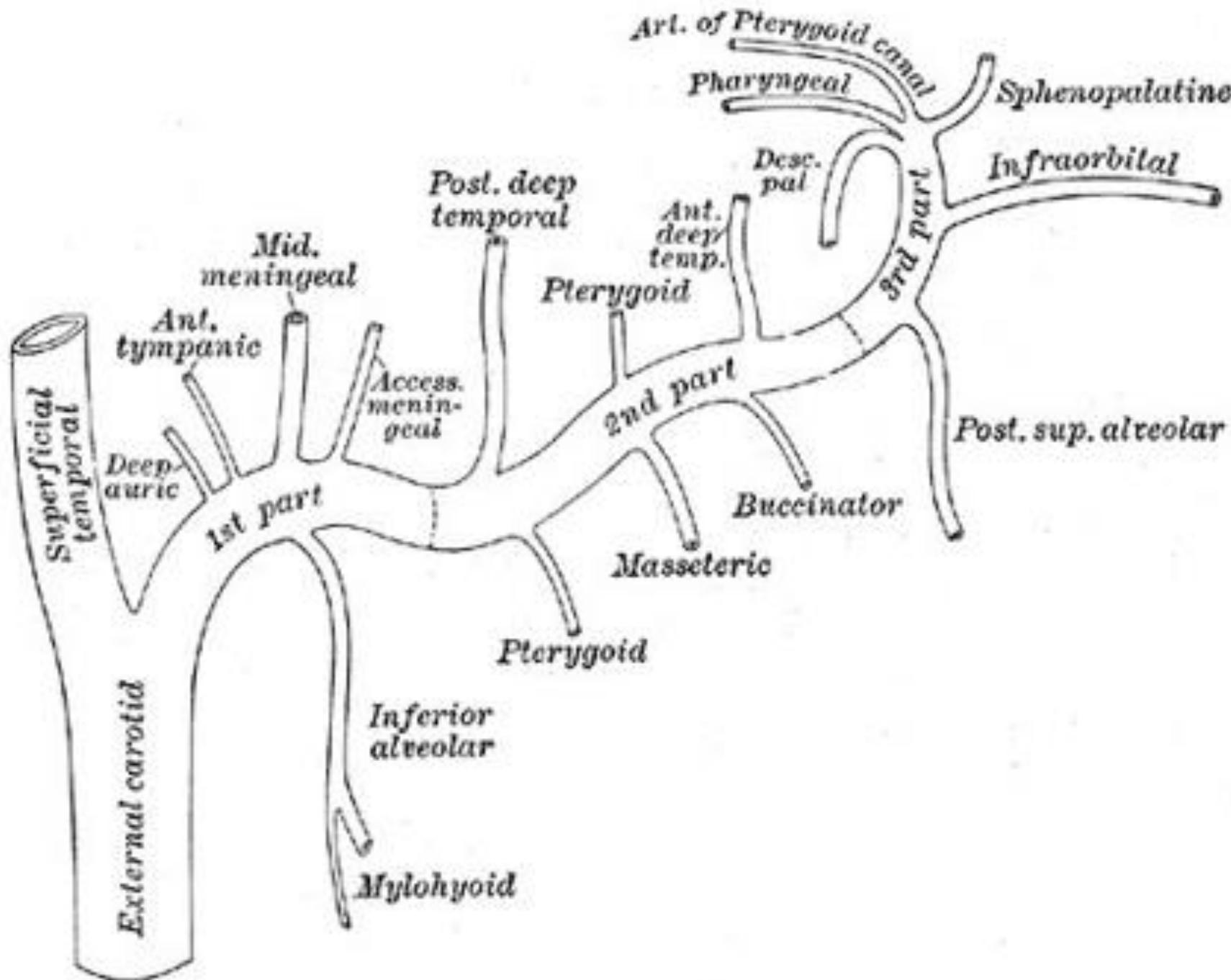
# ARTERIA MAXILLARIS



1 - pars mandibularis

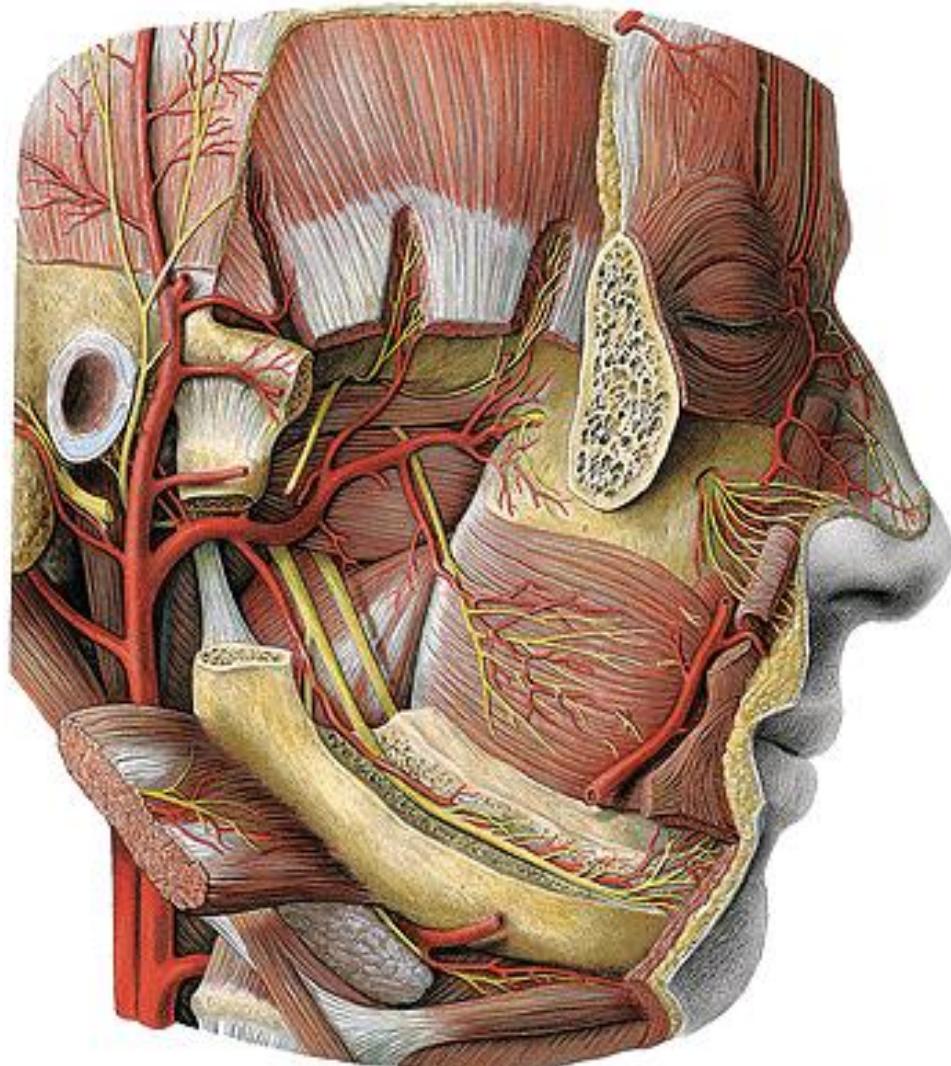
2 - pars pterygoidea

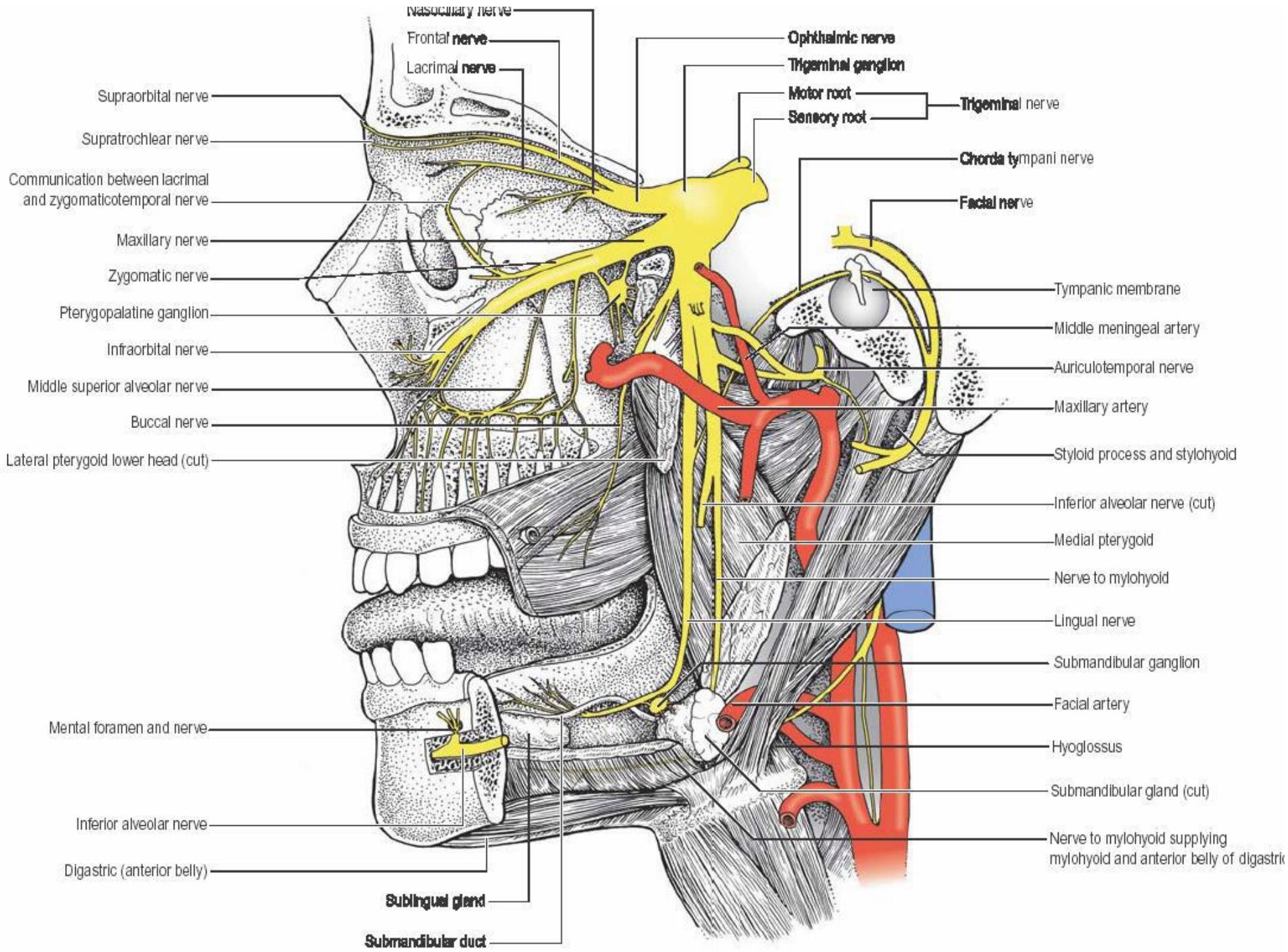
3 - pars pterygopalatina



- a. auricularis profunda
- a. tympanica anterior  
*fissura petrotympanica*
- a. alveolaris inferior  
*canalis mandibulae*
  - r. mylohyoideus
  - rr. dentales + peridentales
  - r. mentalis  
*foramen mentale*
- a. meningea media  
*foramen spinosum*
  - r. accessorius
  - r. frontalis
    - r. orbitalis
  - r. parietalis
    - r. petrosus  
*canalis n. petrosi majoris*
    - a. tympanica superior  
*canalis n. petrosi minoris*

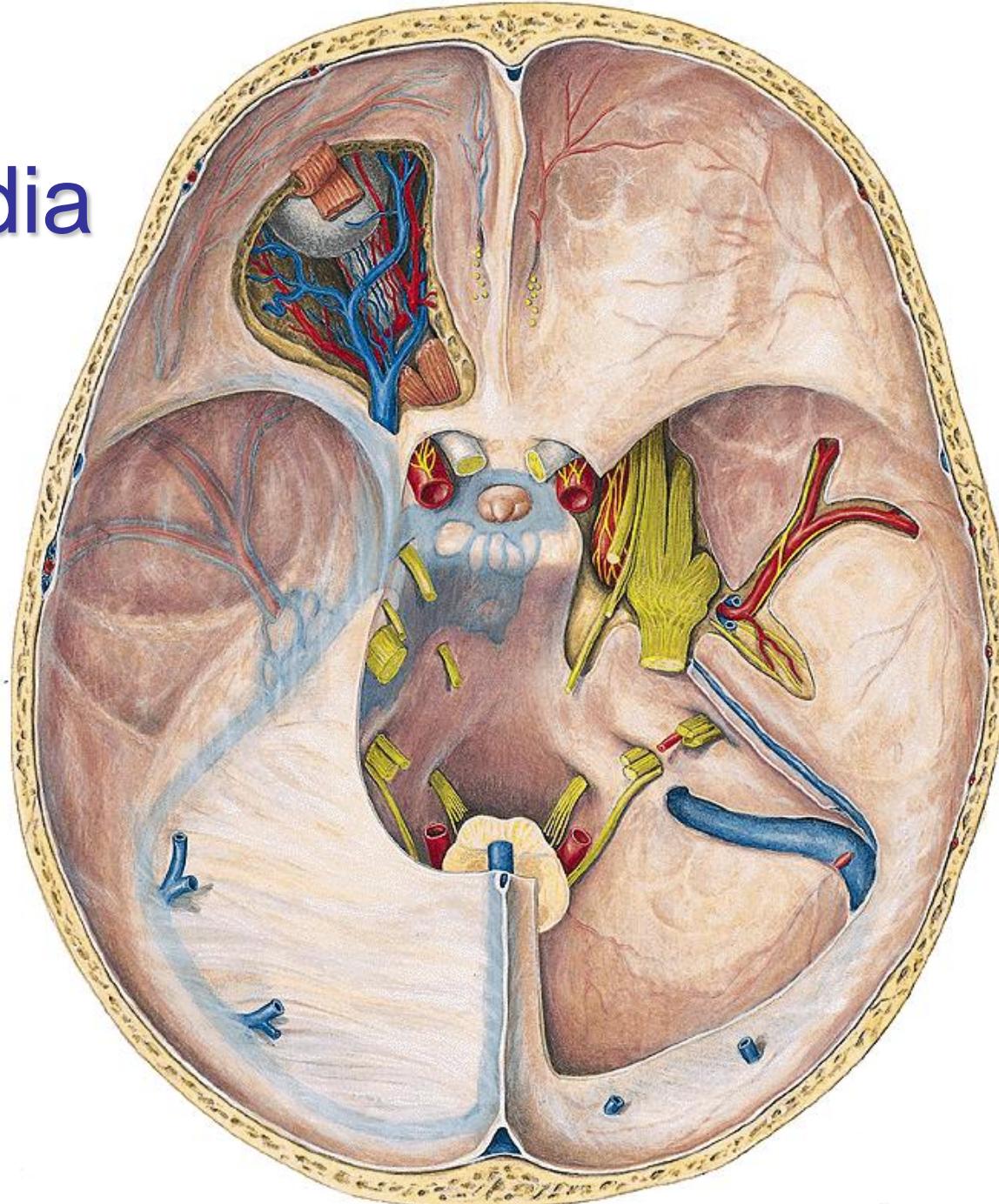
# Arteria maxillaris pars mandibularis

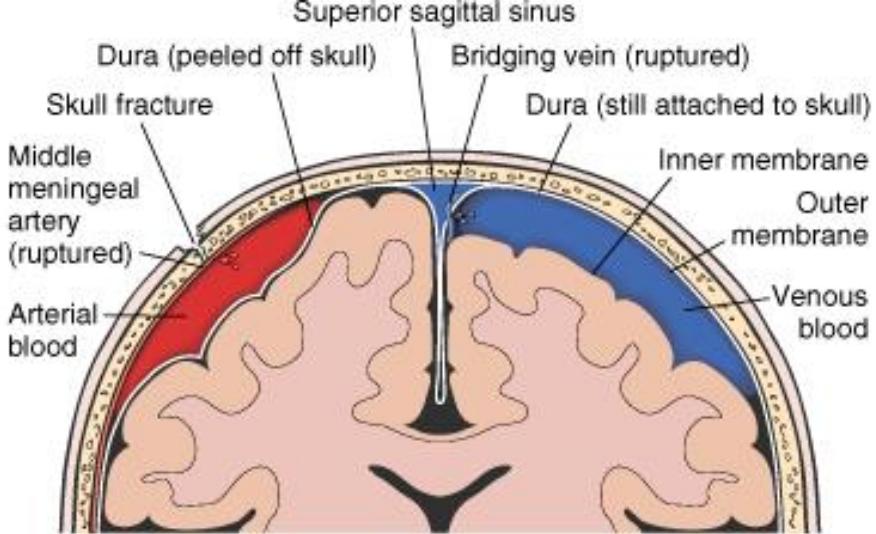




# Arteria meningea media

- epidural bleeding (trauma)
- lentiform shape
- rapid intervention
  - trepanation
  - removal of blood

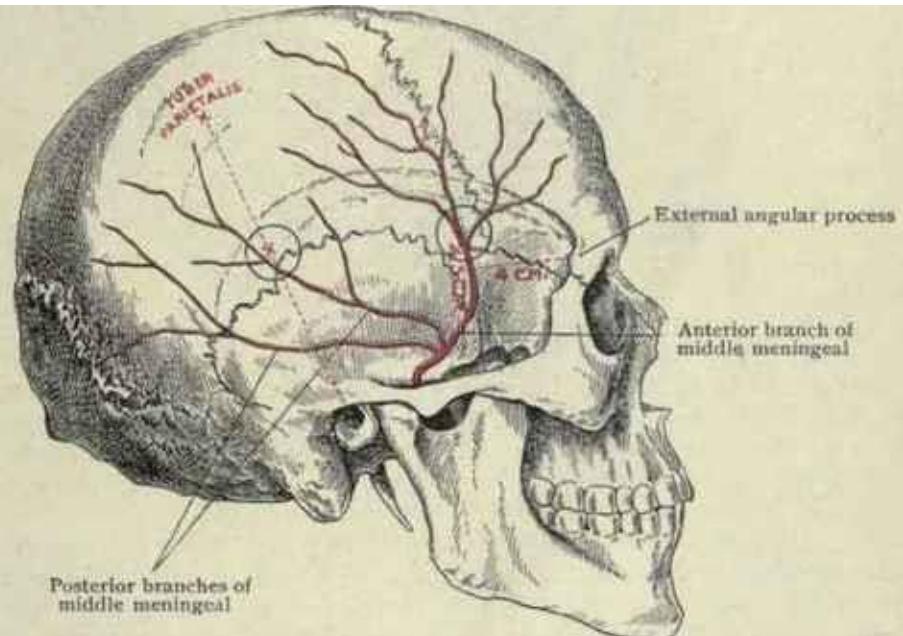
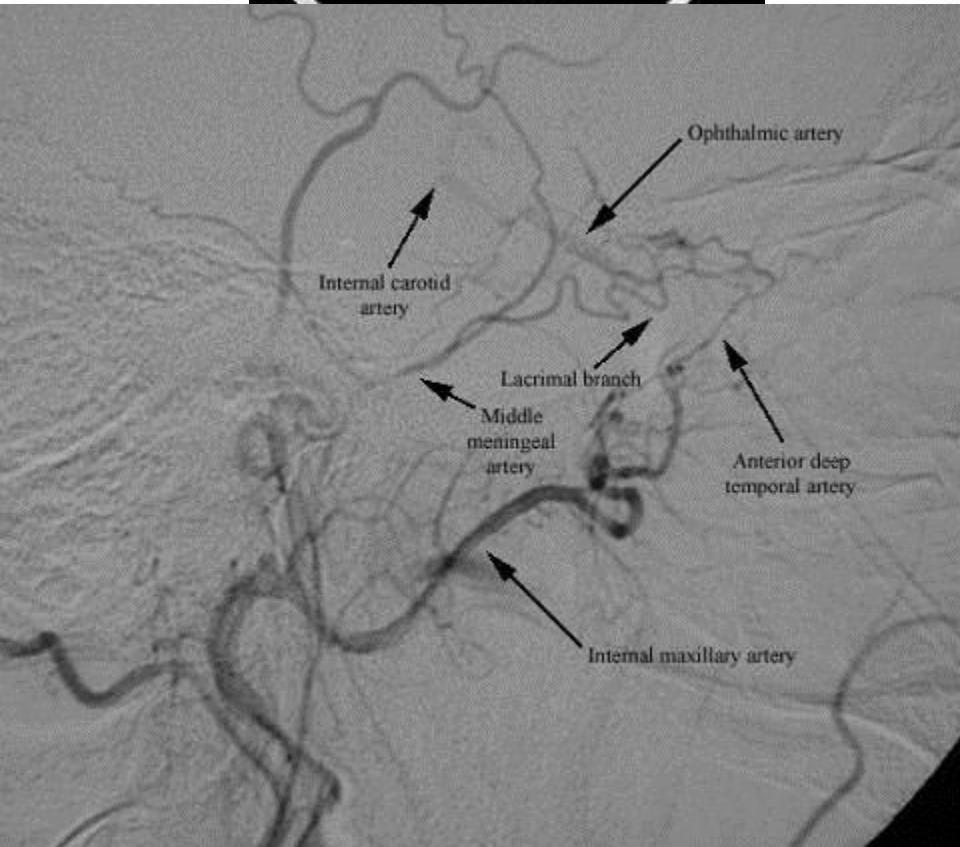




A. Epidural hematoma

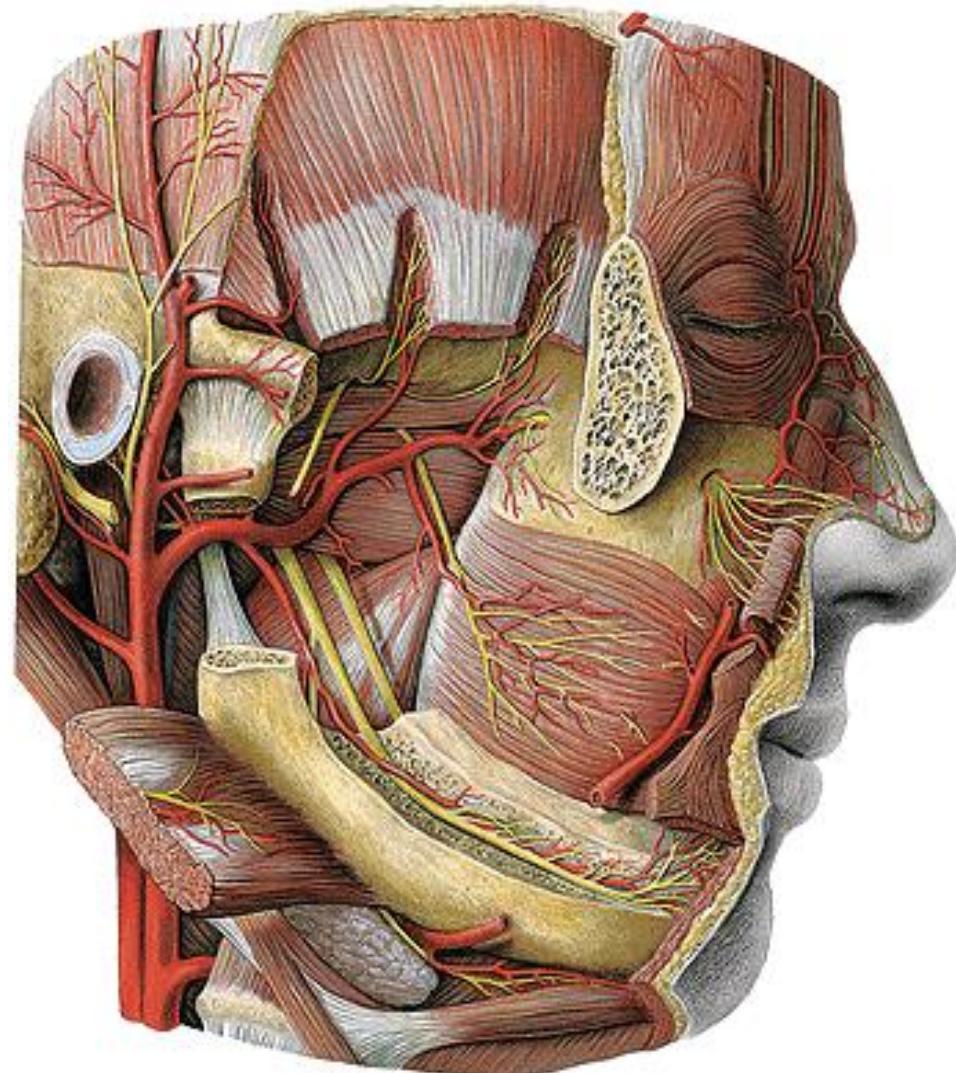
B. Subdural hematoma

Elsevier Ltd. Kumar et al: Basic Pathology 7E www.studentconsult.com



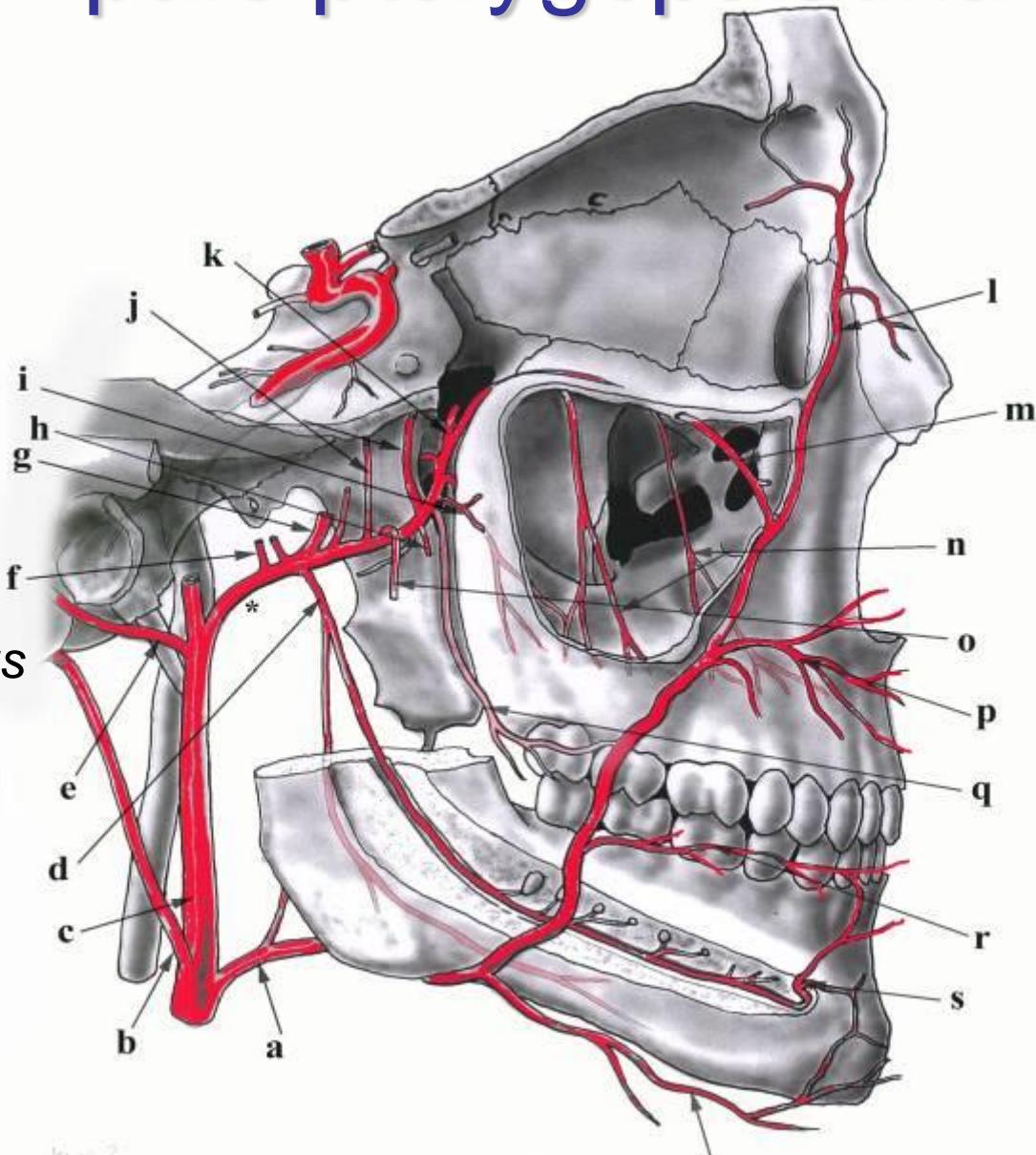
# Arteria maxillaris pars pterygoidea

- (a. pterygomeningea)
- a. masseterica  
*incisura mandibulae*
- a. temporalis profunda  
anterior + posterior  
– rr. pterygoidei
- a. buccalis



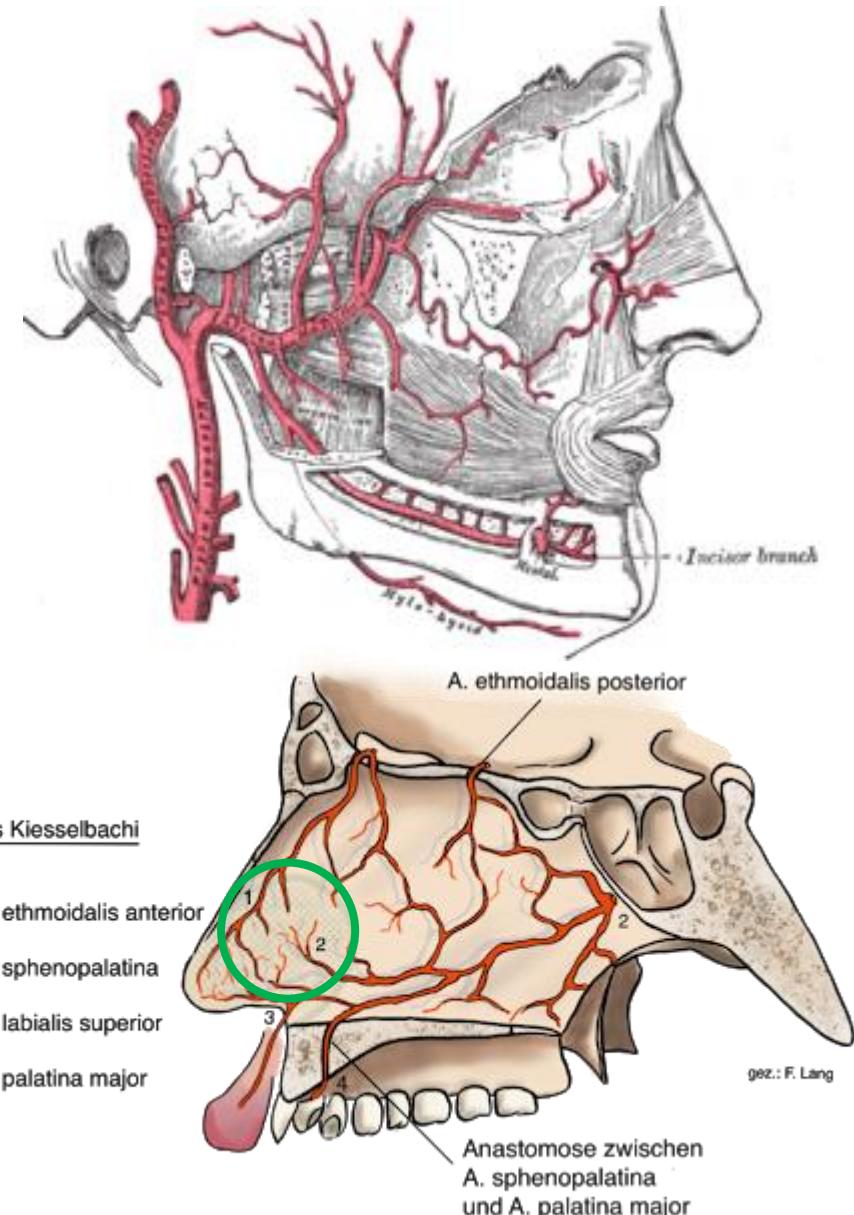
# Arteria maxillaris pars pterygopalatina

- aa. alveolares sup. post.  
*foramina + canales alveolares*
  - rr. dentales + peridentales
- a. infraorbitalis  
*sulcus + canalis infraorbitalis*
  - a. alveolaris sup. media
  - a. alveolaris sup. ant.
- a. canalis pterygoidei  
*canalis pterygoideus*
  - r. pharyngeus
  - canalis palatovaginalis*
- a. palatina descendens
  - a. palatina major
  - canalis + for. palatinum majus*
  - aa. palatinae minores
  - cann. + forr. palatina minora*
- a. sphenopalatina  
*foramen sphenopalatinum*
  - aa. nasales post. lat.
  - rr. septales post.
    - a. nasopalatina
  - can. + for. incisivum*



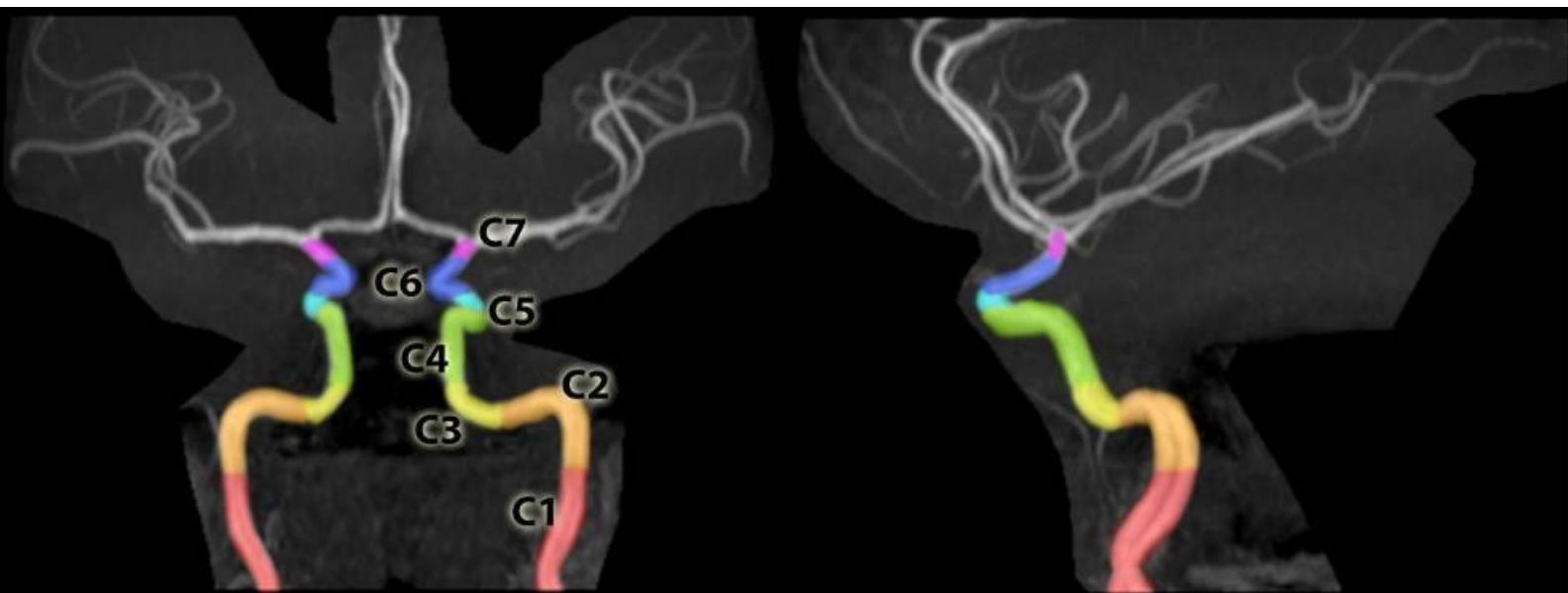
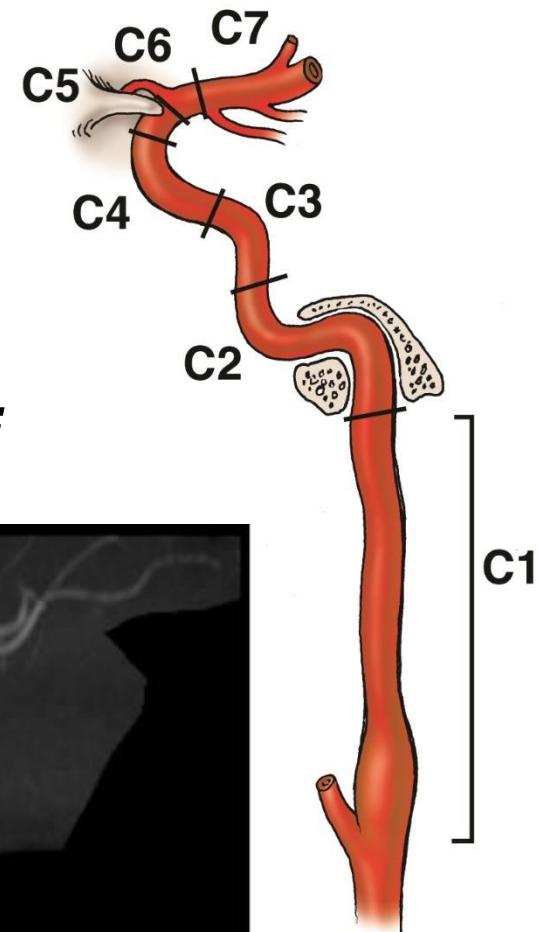
# Arteria maxillaris

- maxillofacial surgery
  - deep, difficult to reach
- a. sphenopalatina
  - bleeding in nasal cavity
  - *bleeding at septum from locus Kiesselbachi*
    - hypertension
    - *cauterization*
    - *embolization*



# Arteria carotis interna

- brain (80 % of blood), eye
- 7 parts/segments
- siphon caroticum
- circulus arteriosus cerebri *Willisi*



# ACI – 7 parts

C1 = pars cervicalis

C2 = pars petrosa

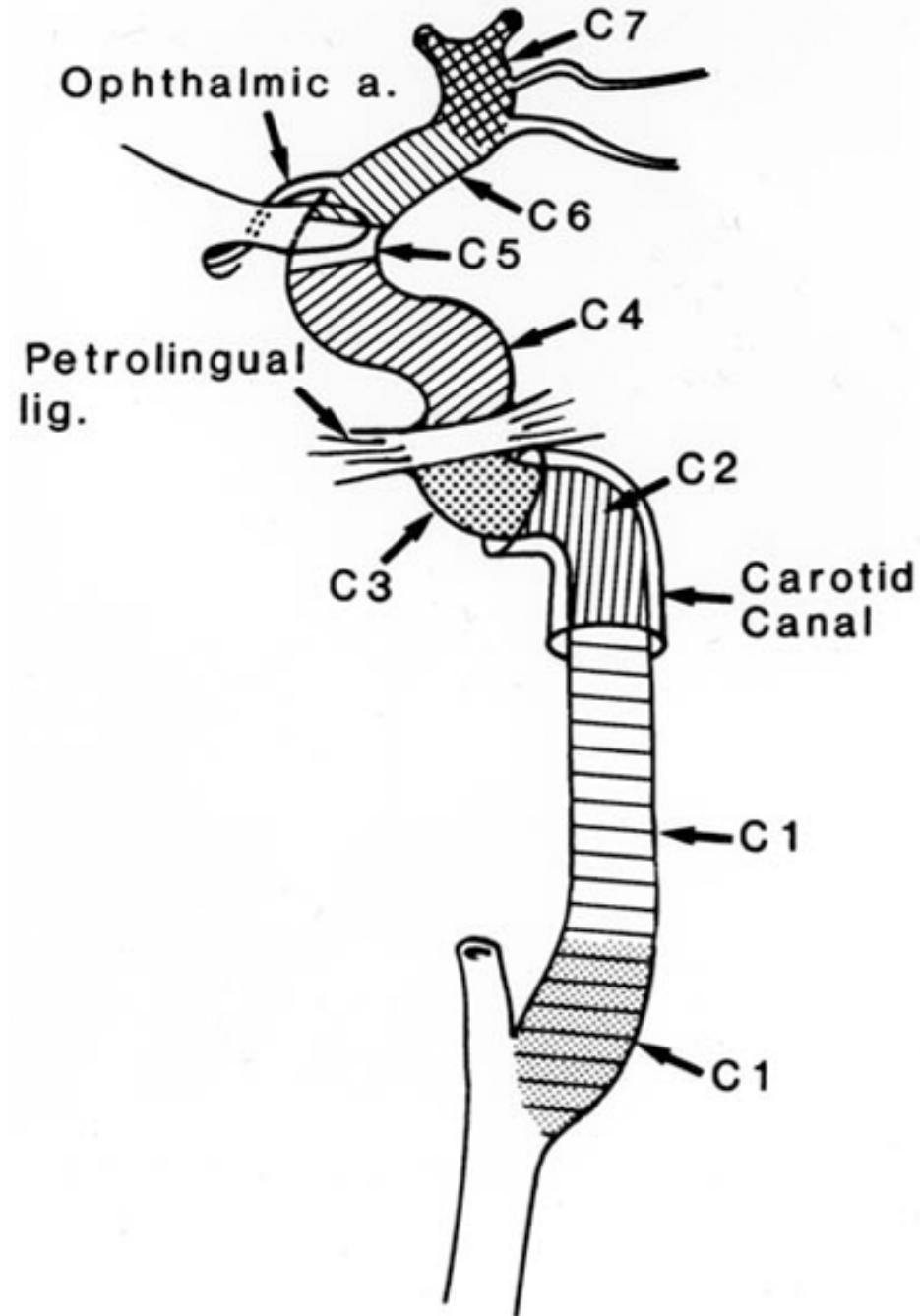
C3 = pars lacera

C4 = pars cavernosa

C5 = pars clinoida

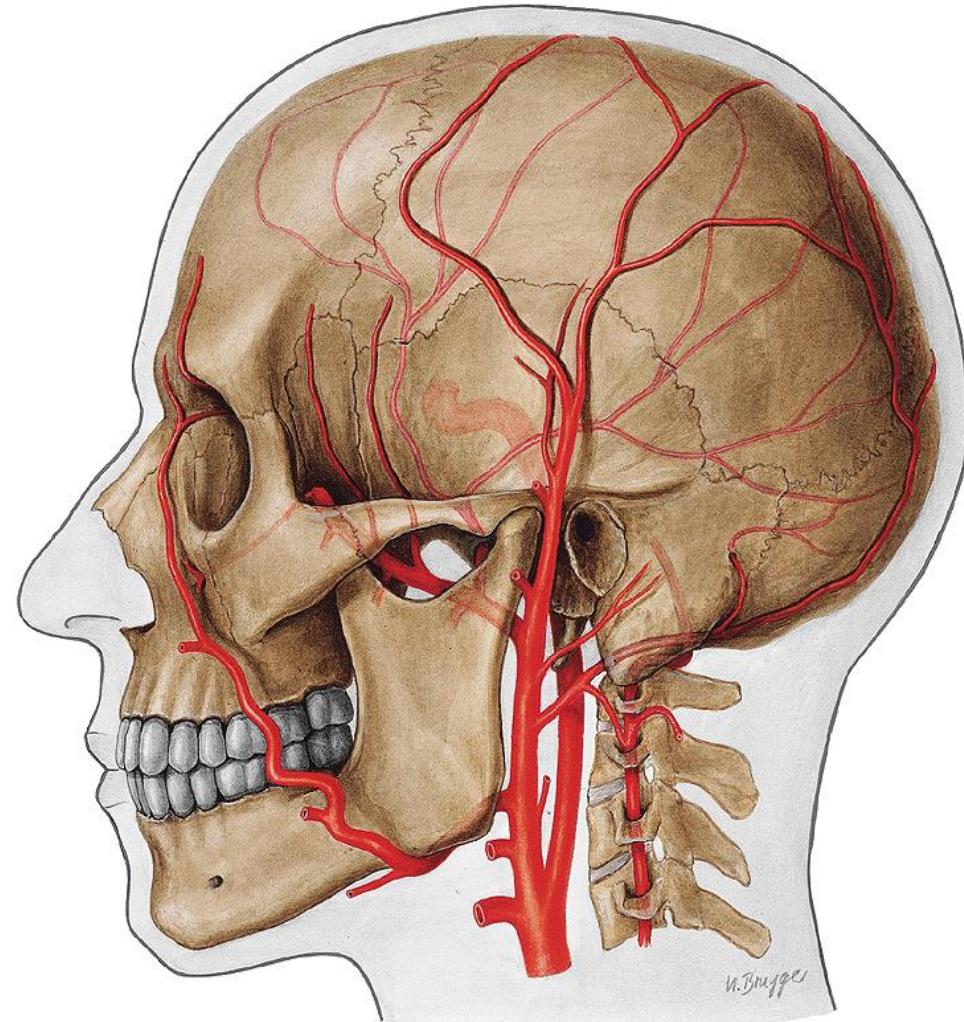
C6 = pars ophthalmica

C7 = pars communicans

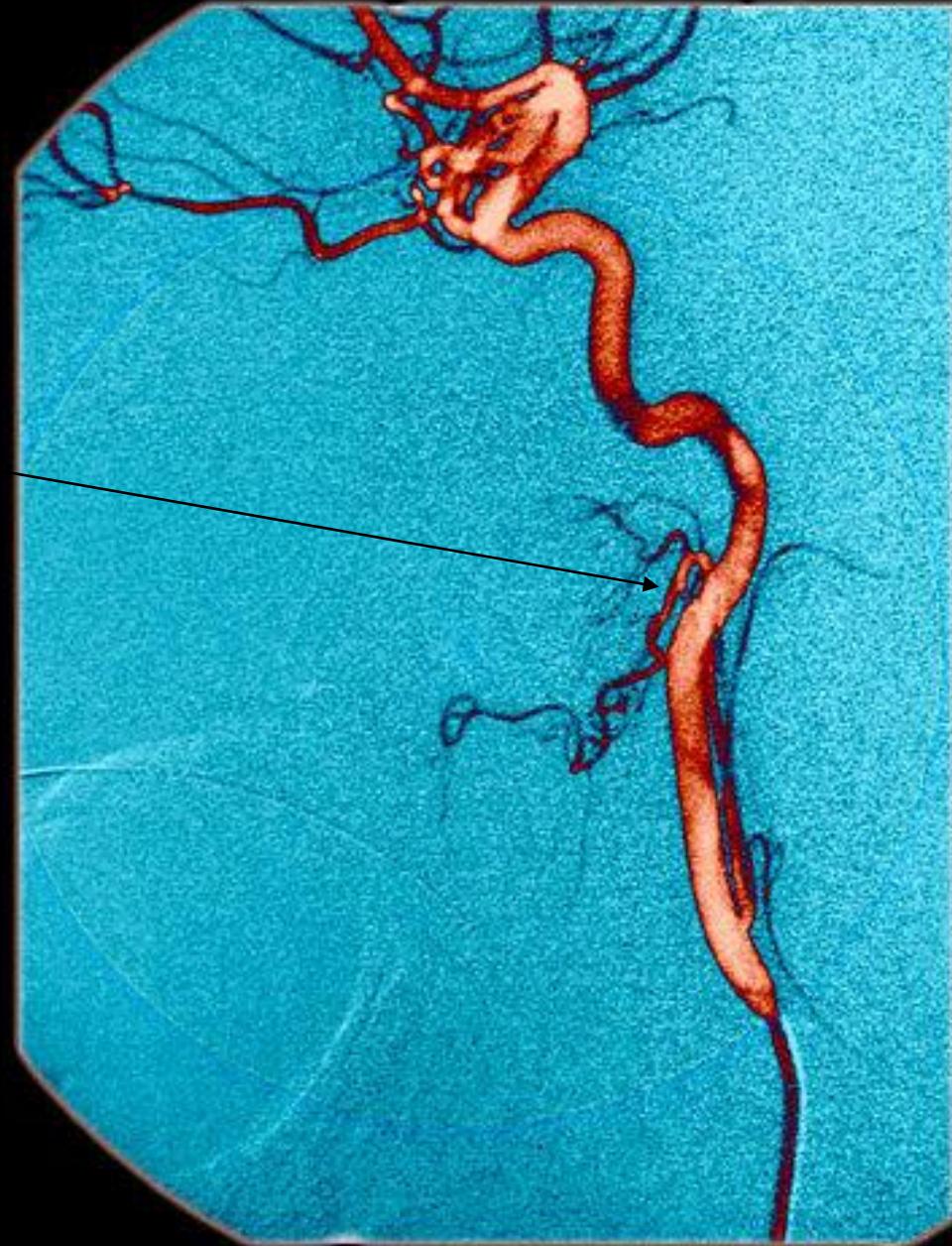


# ACI – pars cervicalis (segmentum C1)

- no branches in neck
- lateral → dorsal → dorsomedial to ACExt.
- vagina carotica
- sinus caroticus (*baroreceptor*)
- trigonum caroticum + spatium parapharyngeum
- spatium retrostyloideum
- *approach to ultrasound examination*



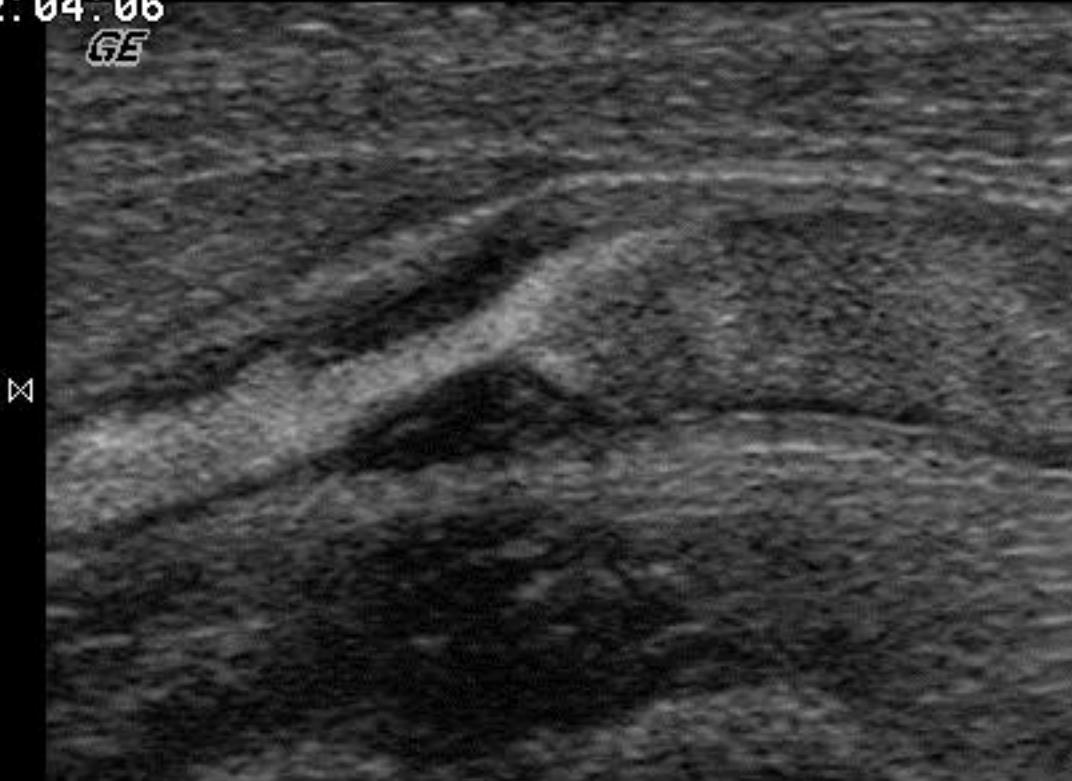
a. pharyngea  
ascendens



BAPTIST MED CTR  
IM#1 +2:04:06

GE

D0. 3cm 5739L  
RENAL  
CINE 0439  
29G  
60DR  
E3 ME A2

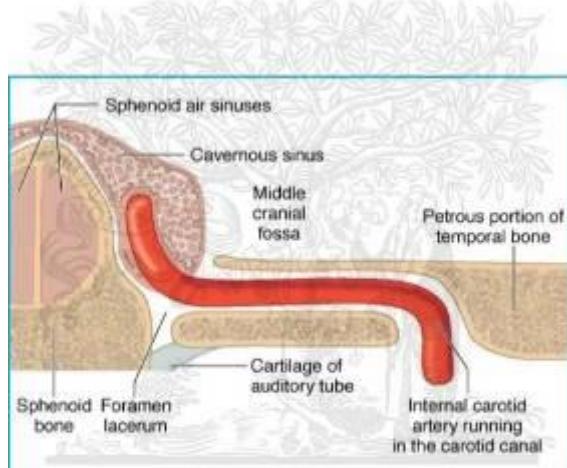


B - FLOW  
INTERNAL CAROTID STENOSIS

MI=0.7 AO=100%

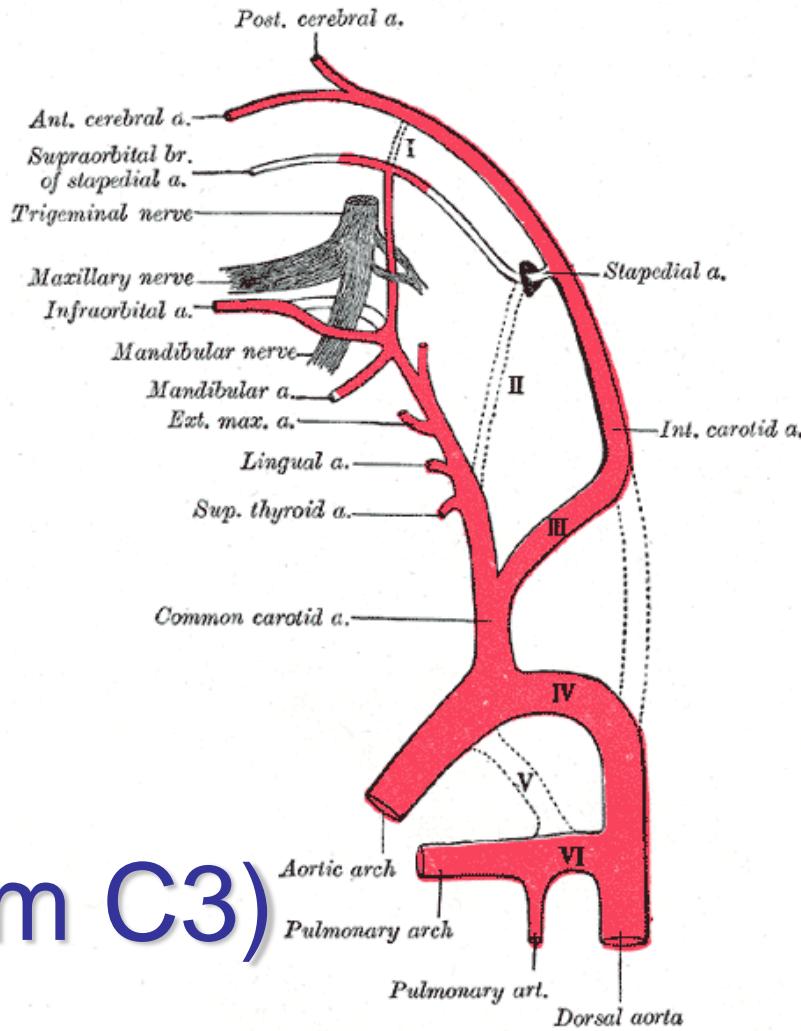
# ACI – pars petrosa (segmentum C2)

- aa. caroticotympanicae



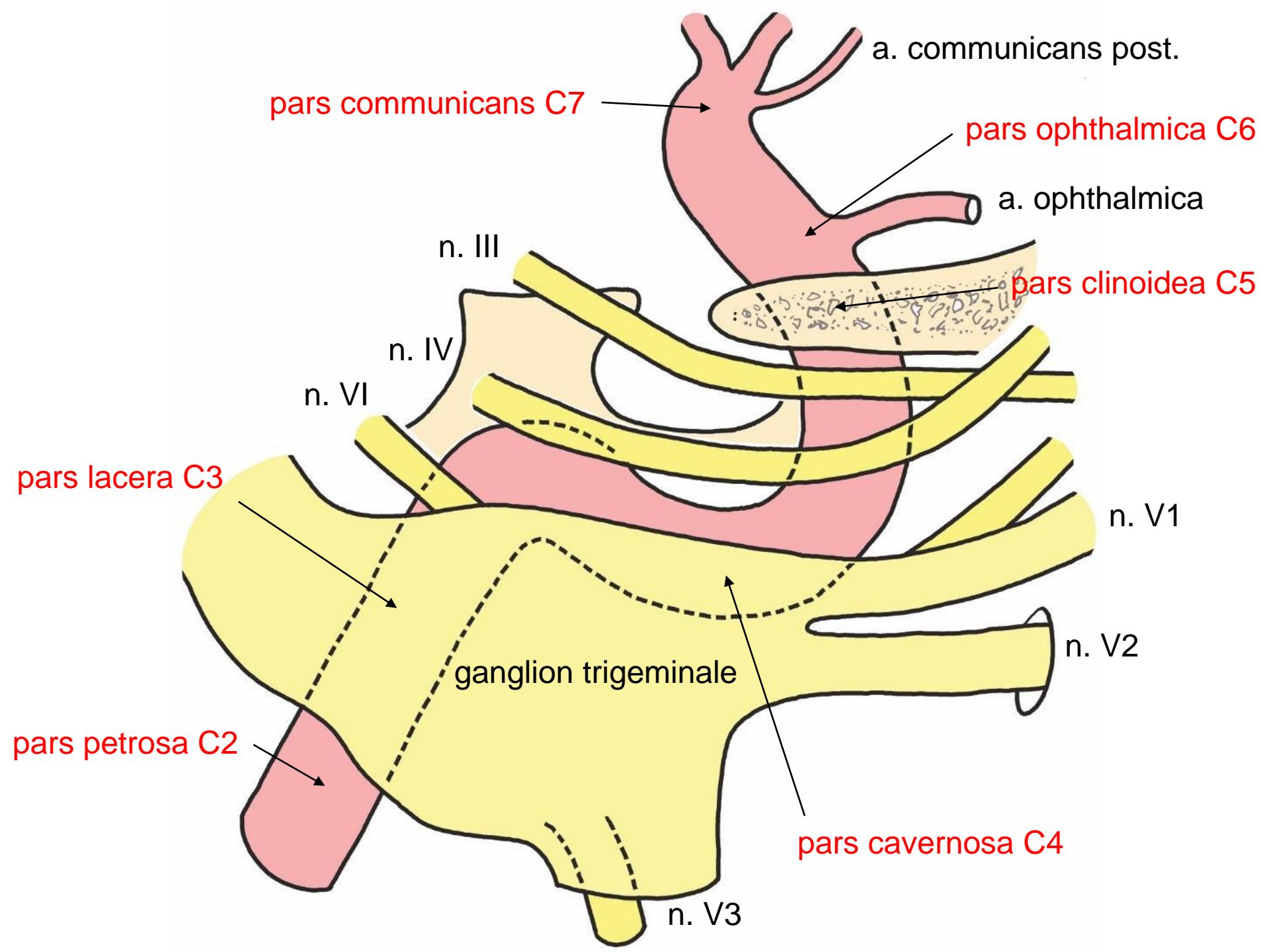
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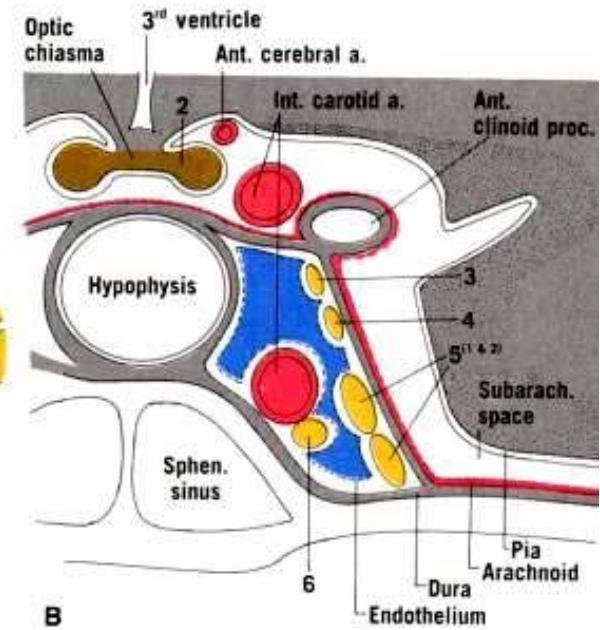
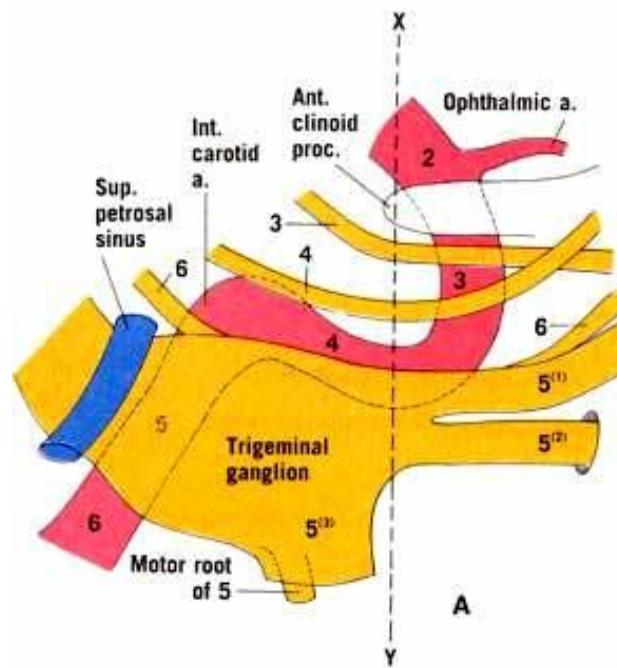
# pars lacera (segmentum C3)

- synchondrosis sphenopetrosa



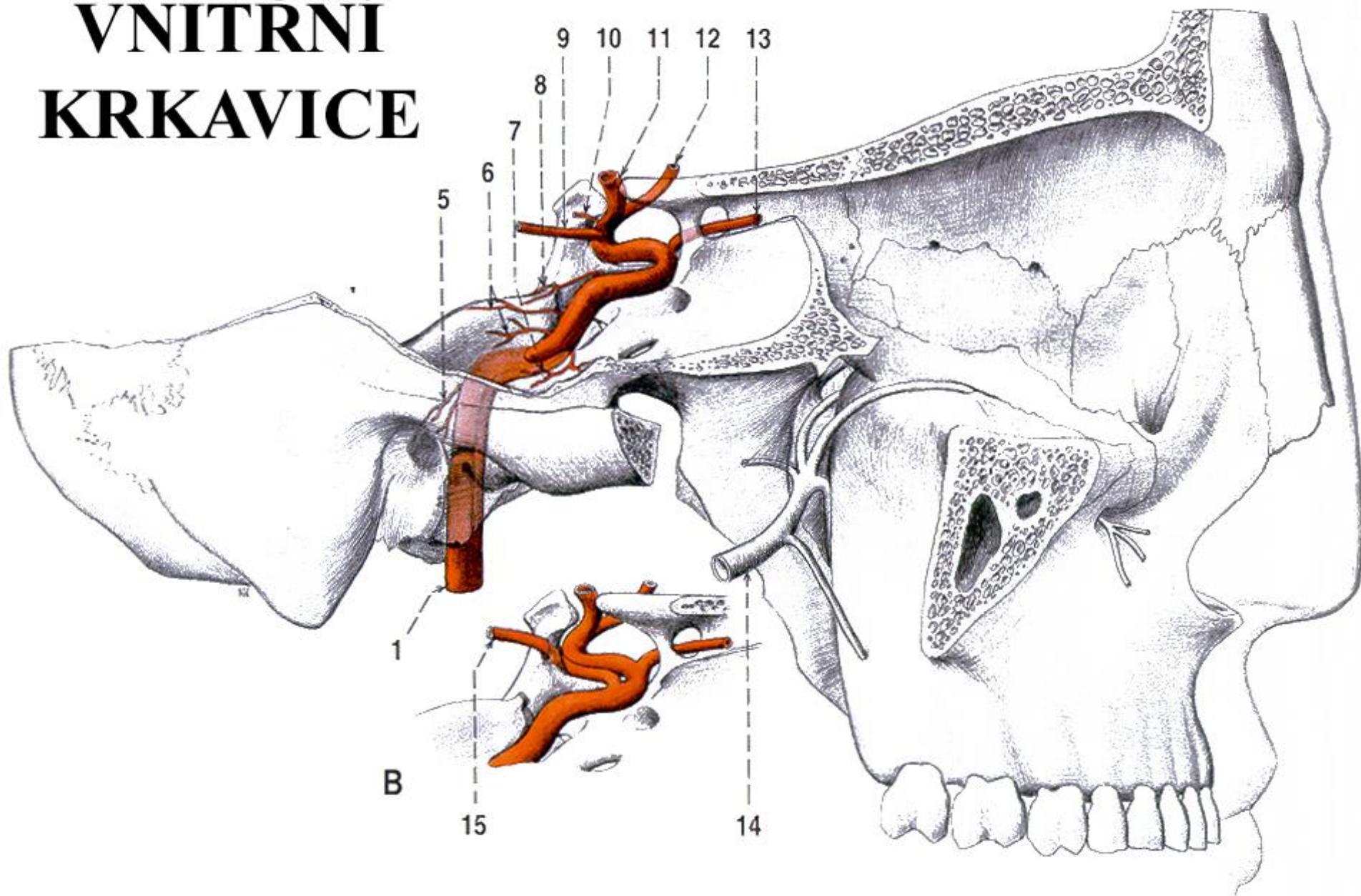
# ACI – pars cavernosa (segmentum C4)

- truncus caroticocavernosus post.
- truncus caroticocavernosus inf.
- a. hypophysialis inferior
- rr. ganglionares trigeminales



# A. carotis interna

## VNITŘNÍ KRKAVICE



# ACI – pars clinoides (segmentum C5)

- processus clinoides anterior

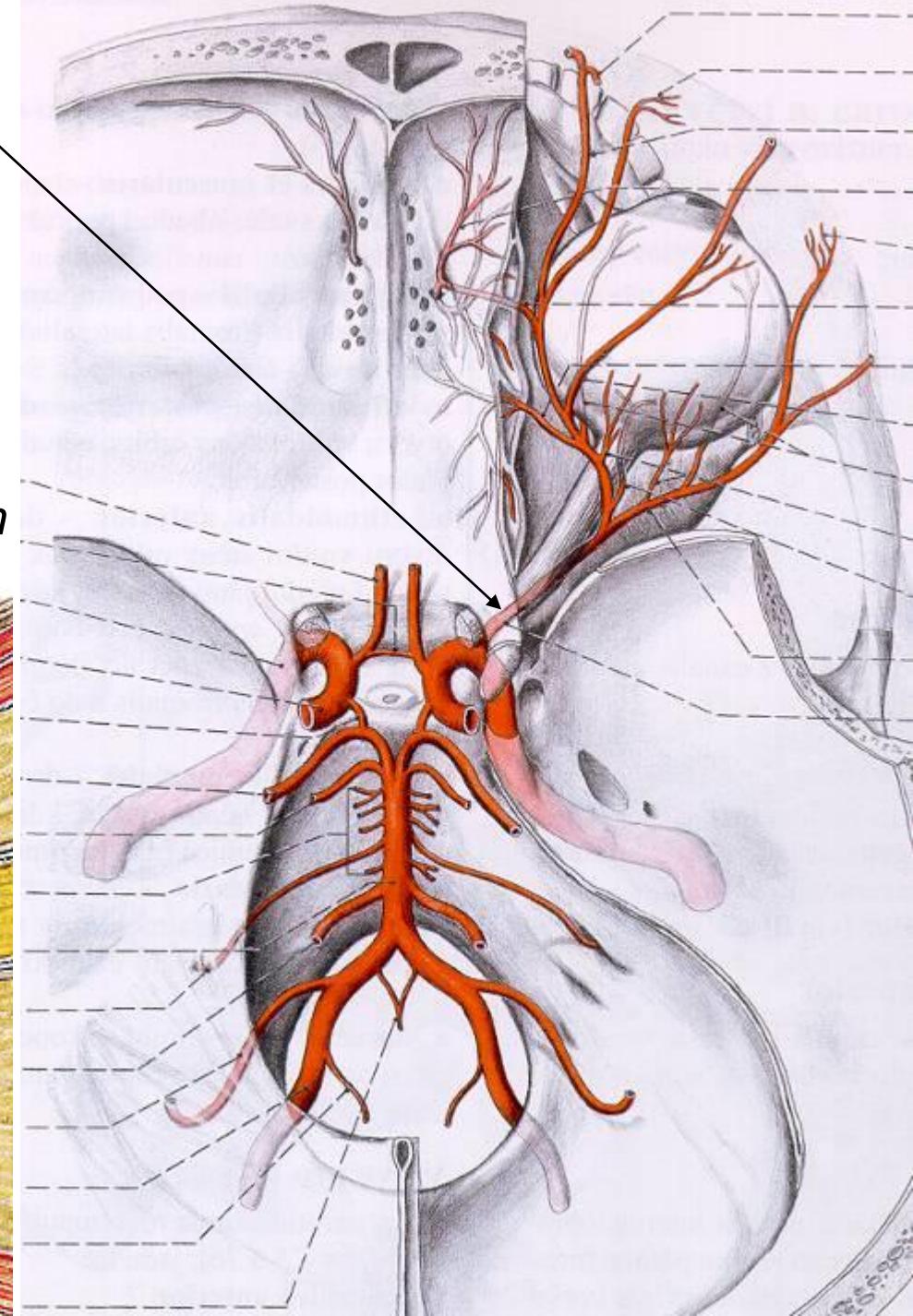
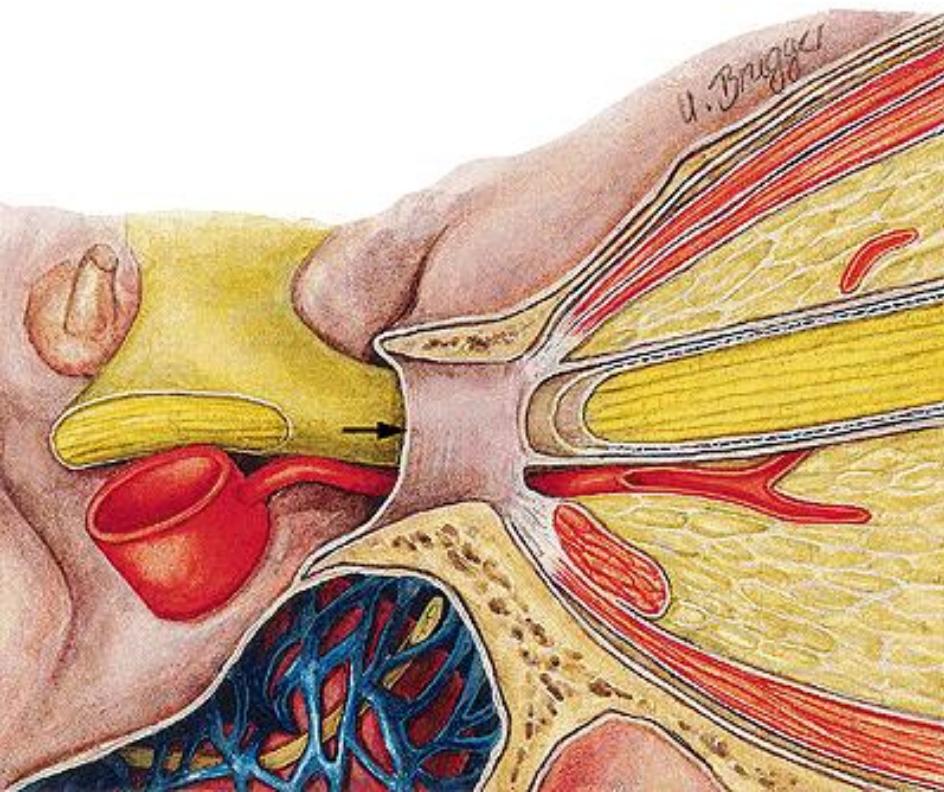
# ACI – pars ophthalmica (segmentum C6)

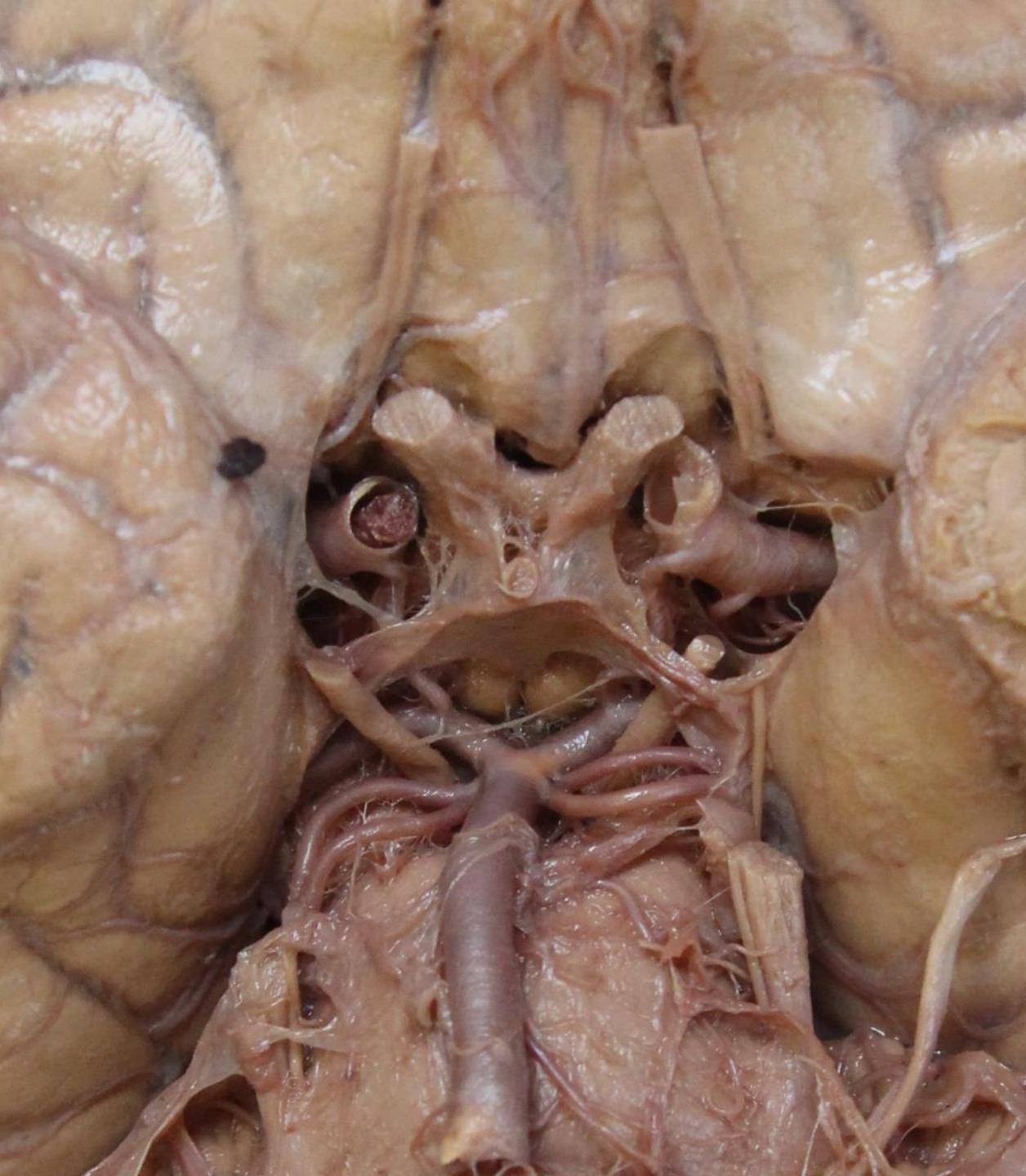
- r. meningeus
- a. ophthalmica
- rr. perforantes



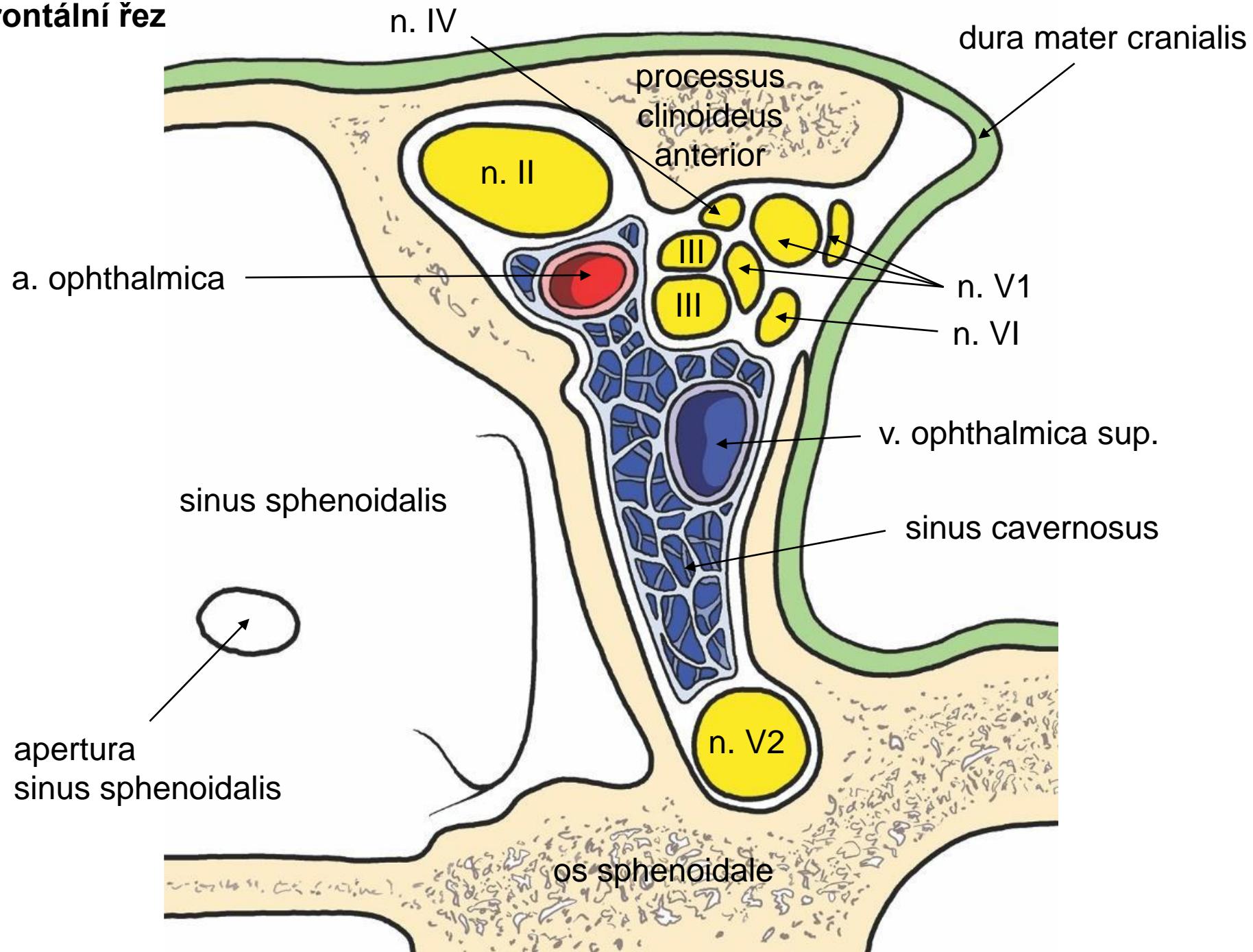
# A. ophthalmica

- origin in right angle
- *canalis opticus*
  - relation to n.II
- orbit and eyeball
- retina
  - arterioles' lesion in hypertension and diabetes mellitus





## Frontální řez

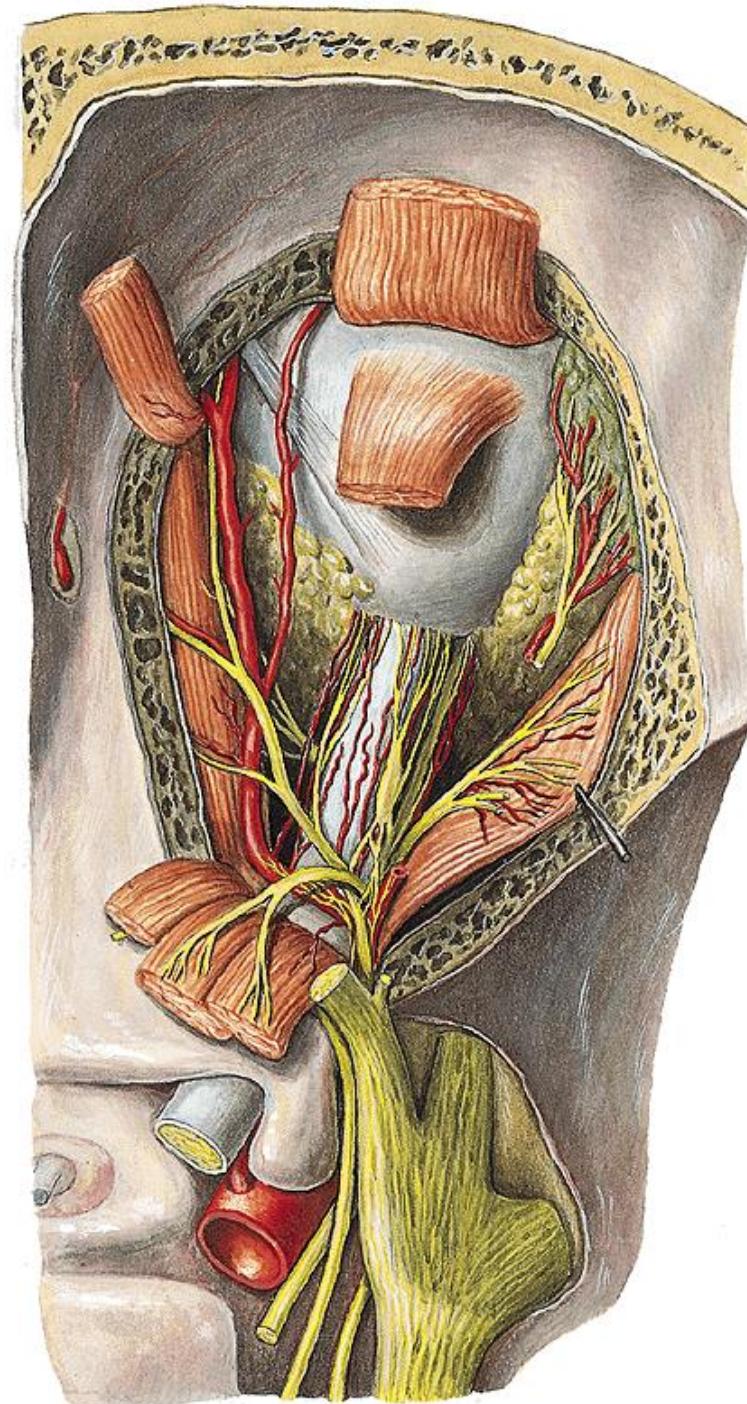


# Arteria ophthalmica

- a. centralis retinae
  - pars extraocularis + intraocularis
- a. lacrimalis
- aa. musculares
- a. supraorbitalis
- a. ethmoidalis anterior
  - r. meningeus anterior
  - rr. septales anteriores
  - rr. nasales anteriores laterales
- a. ethmoidalis posterior

koncové větve:

- a. supratrochlearis
- a. dorsalis nasi

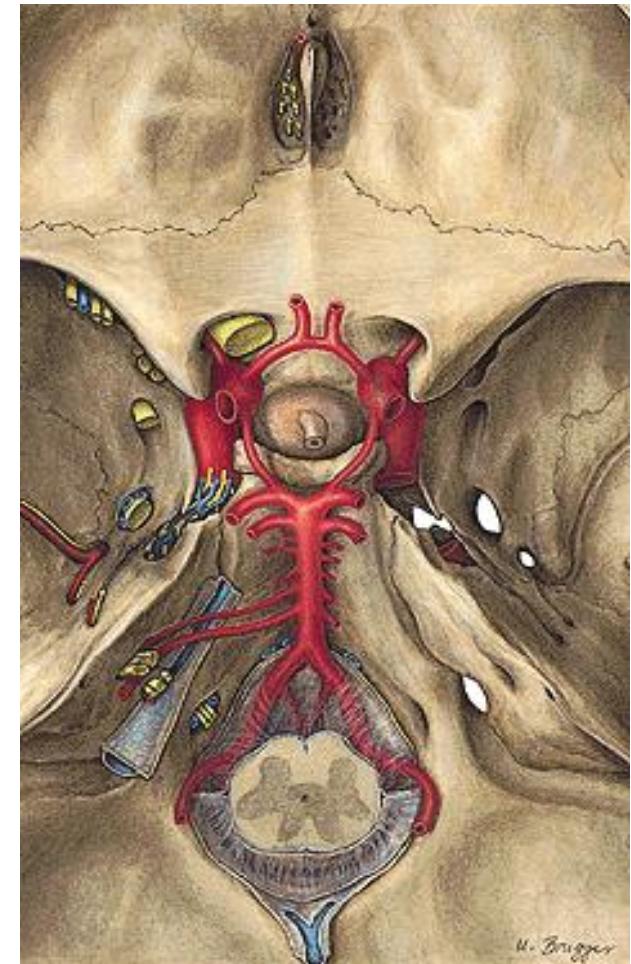


# ACI – pars communicans (segmentum C7)

- a. communicans posterior
- a. choroidea anterior
- a. hypophysialis superior
- rr. perforantes + r. corticalis
- r. corticalis

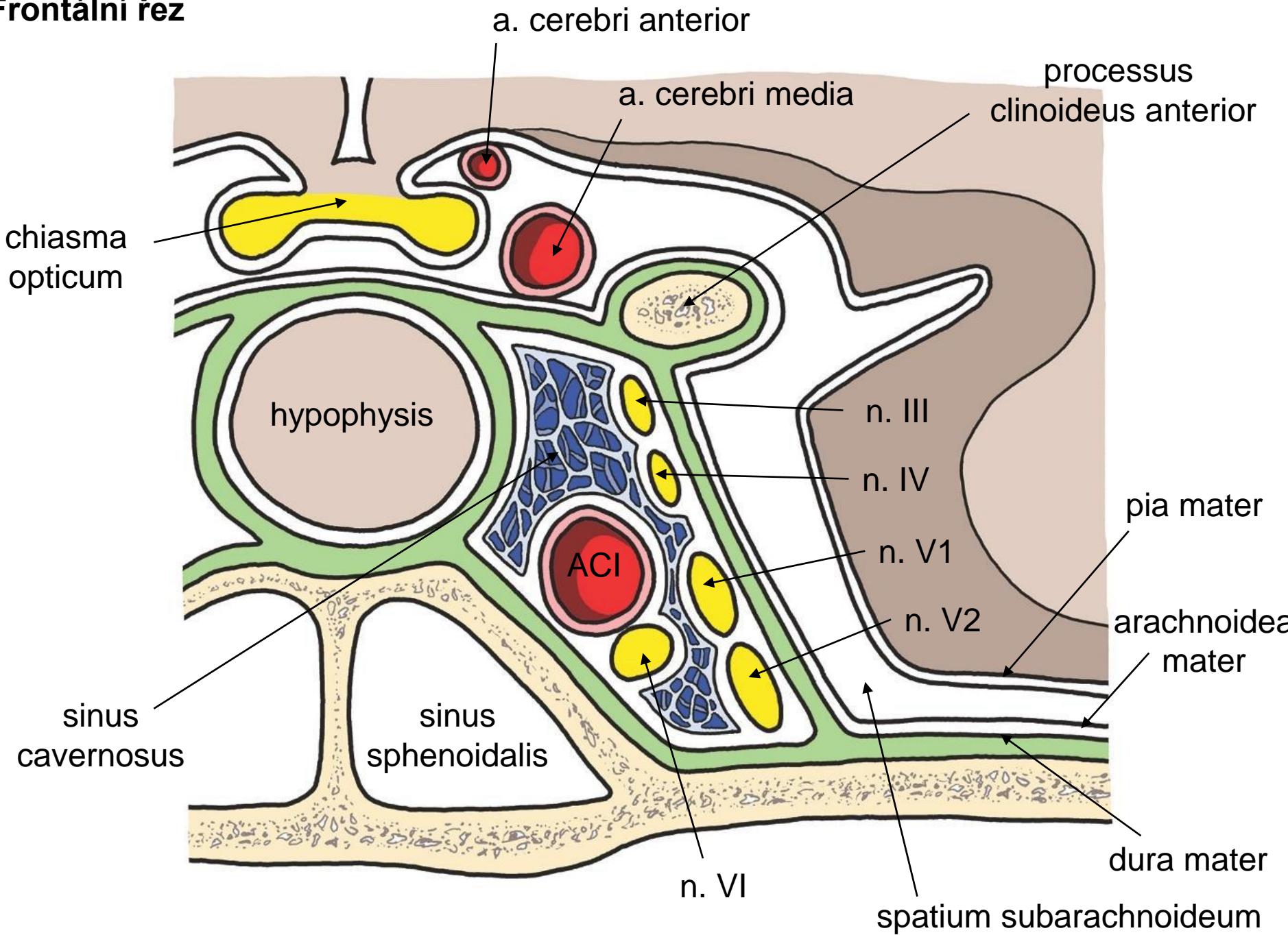
koncové větve:

- **a. cerebri anterior**
- **a. cerebri media**

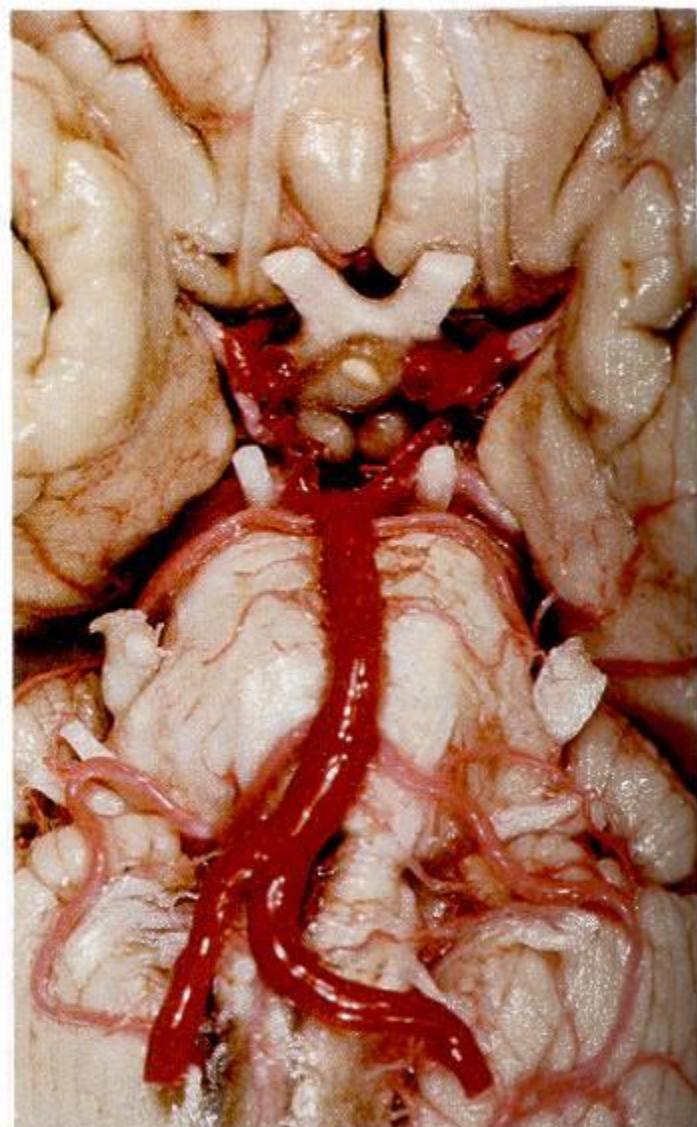
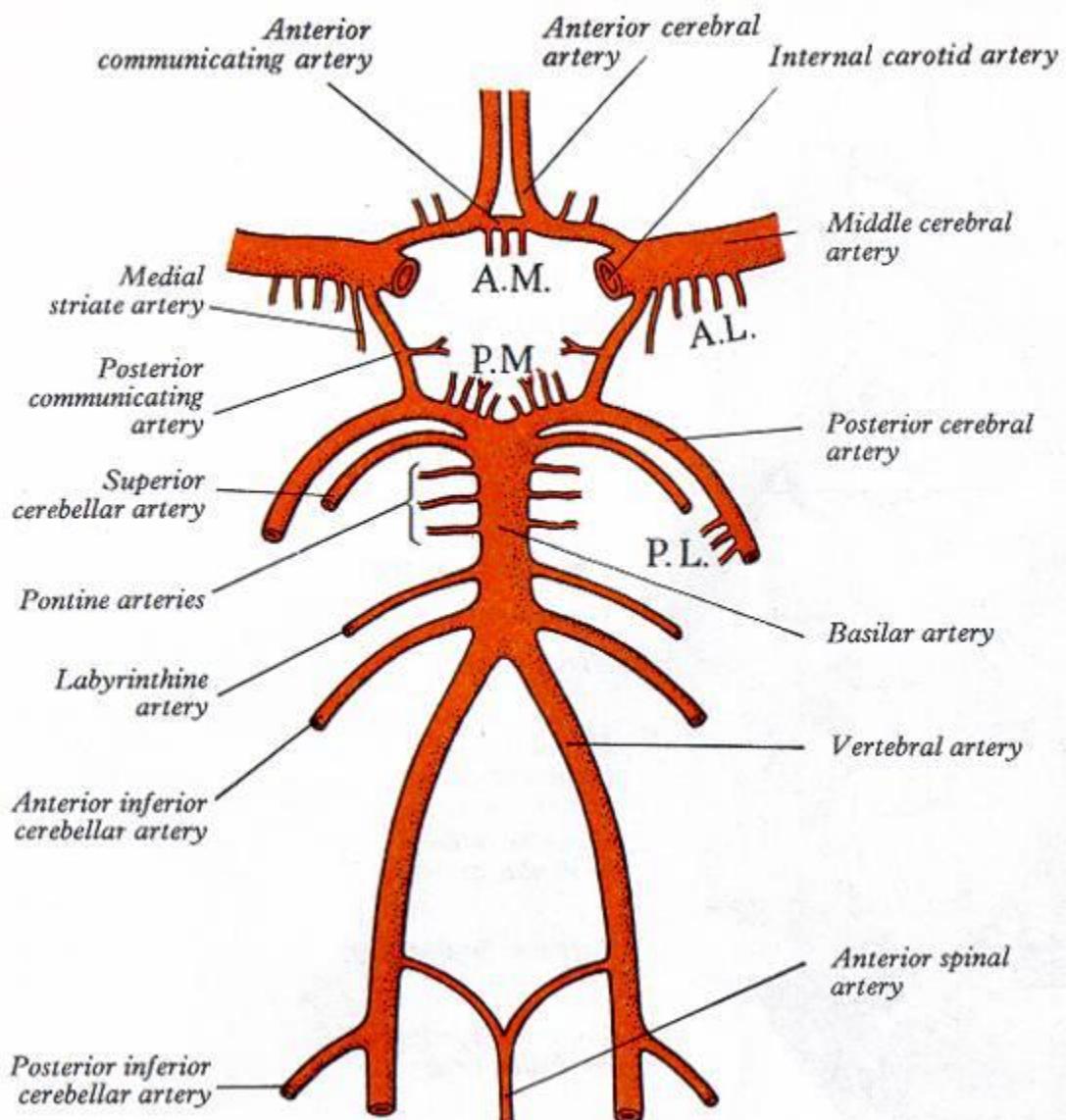


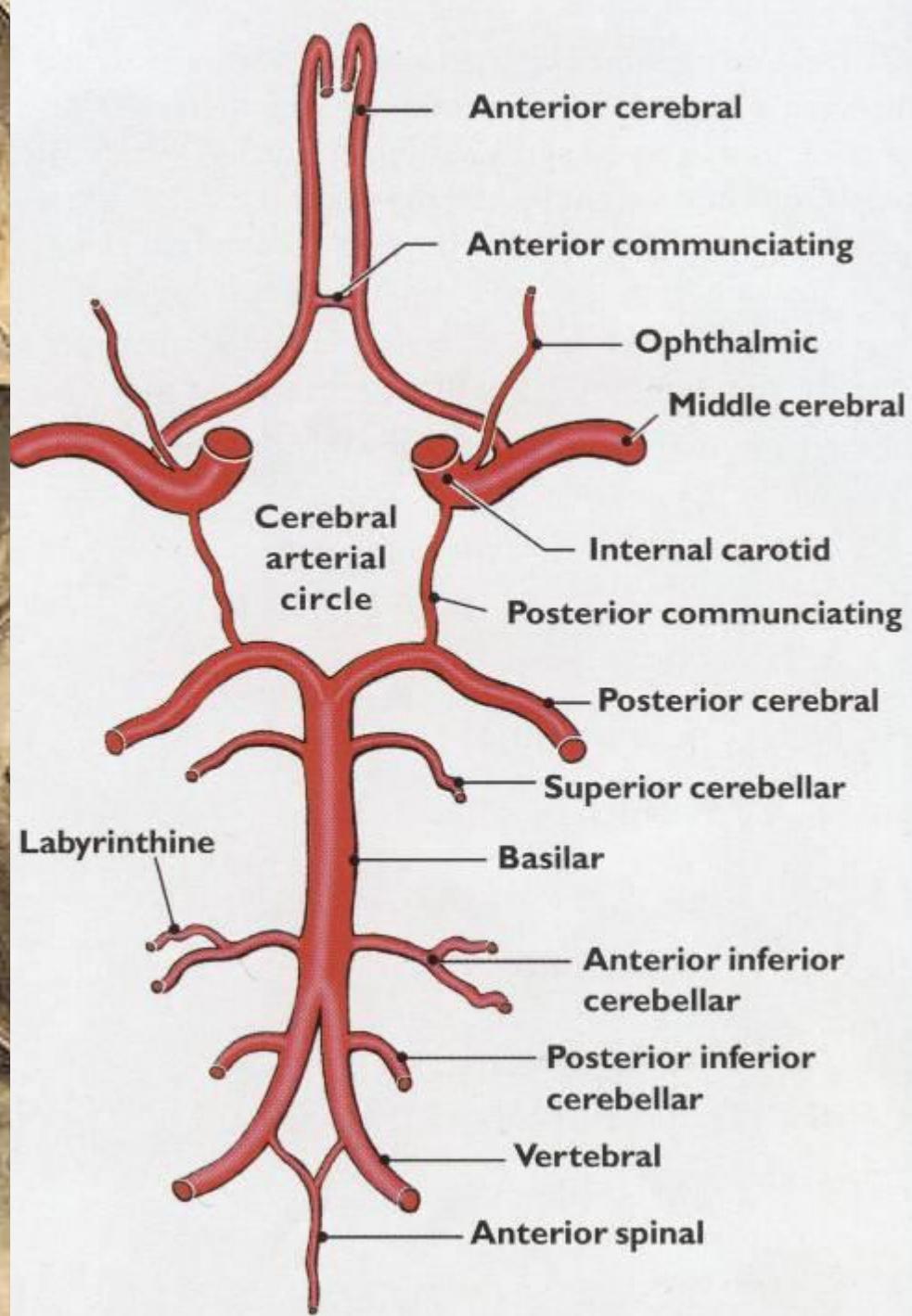
*circulus arteriosus cerebri Willisi*

# Frontální řez

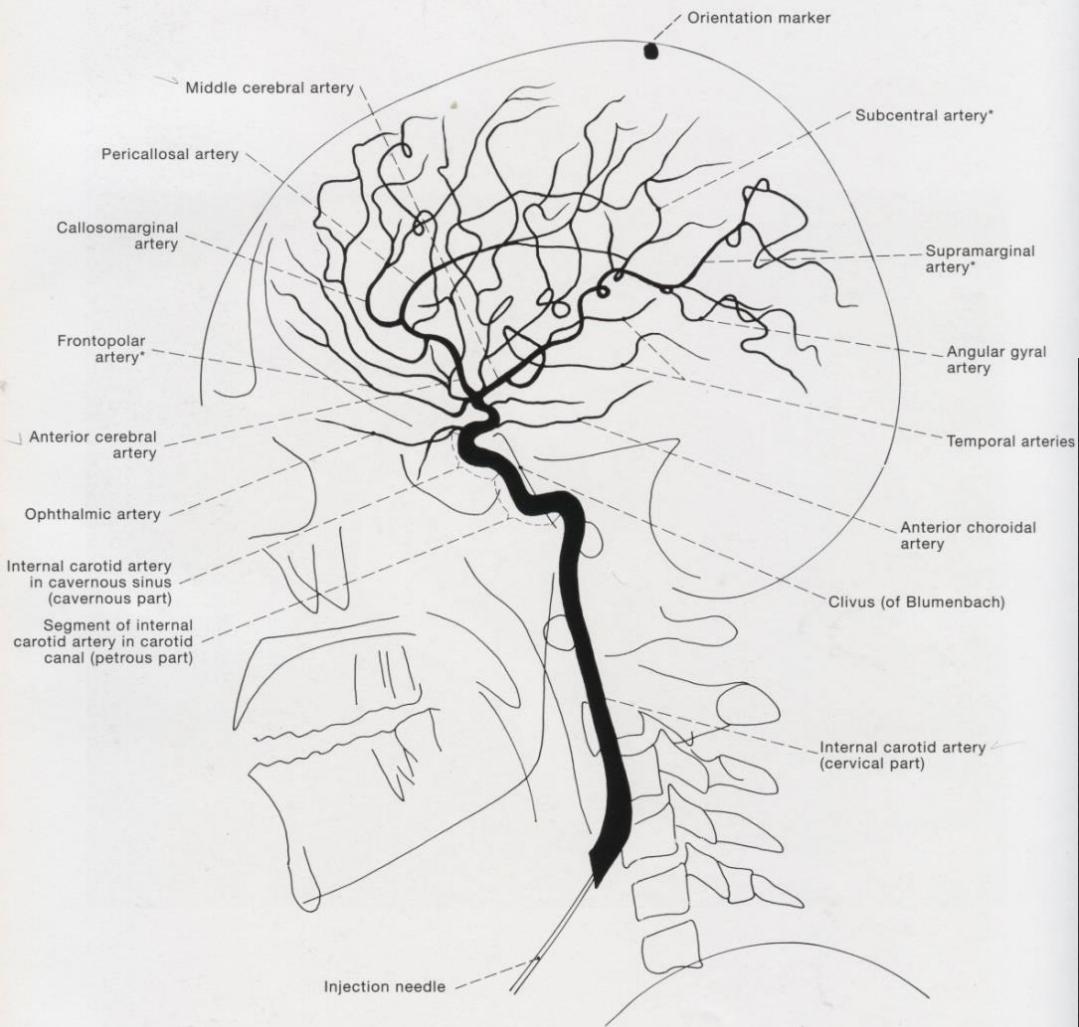


# CIRCULUS ARTERIOSUS CEREBRI WILLISI

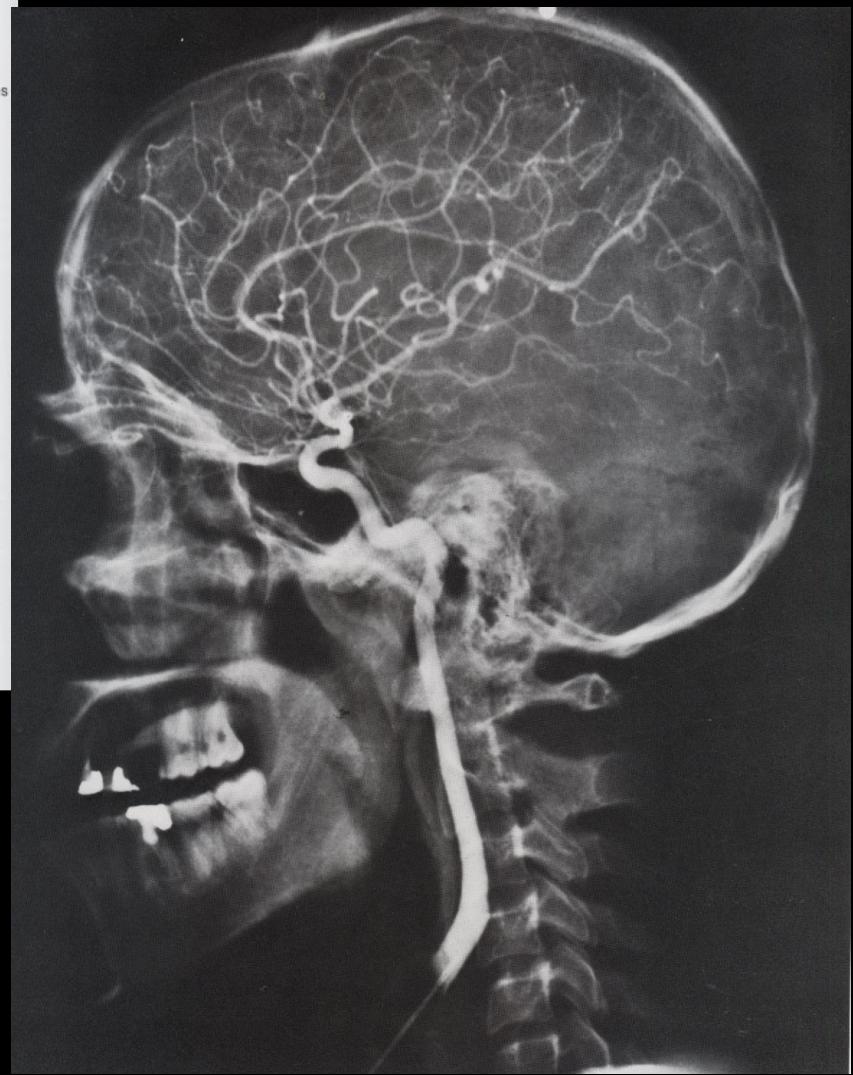




# Arteria carotis interna

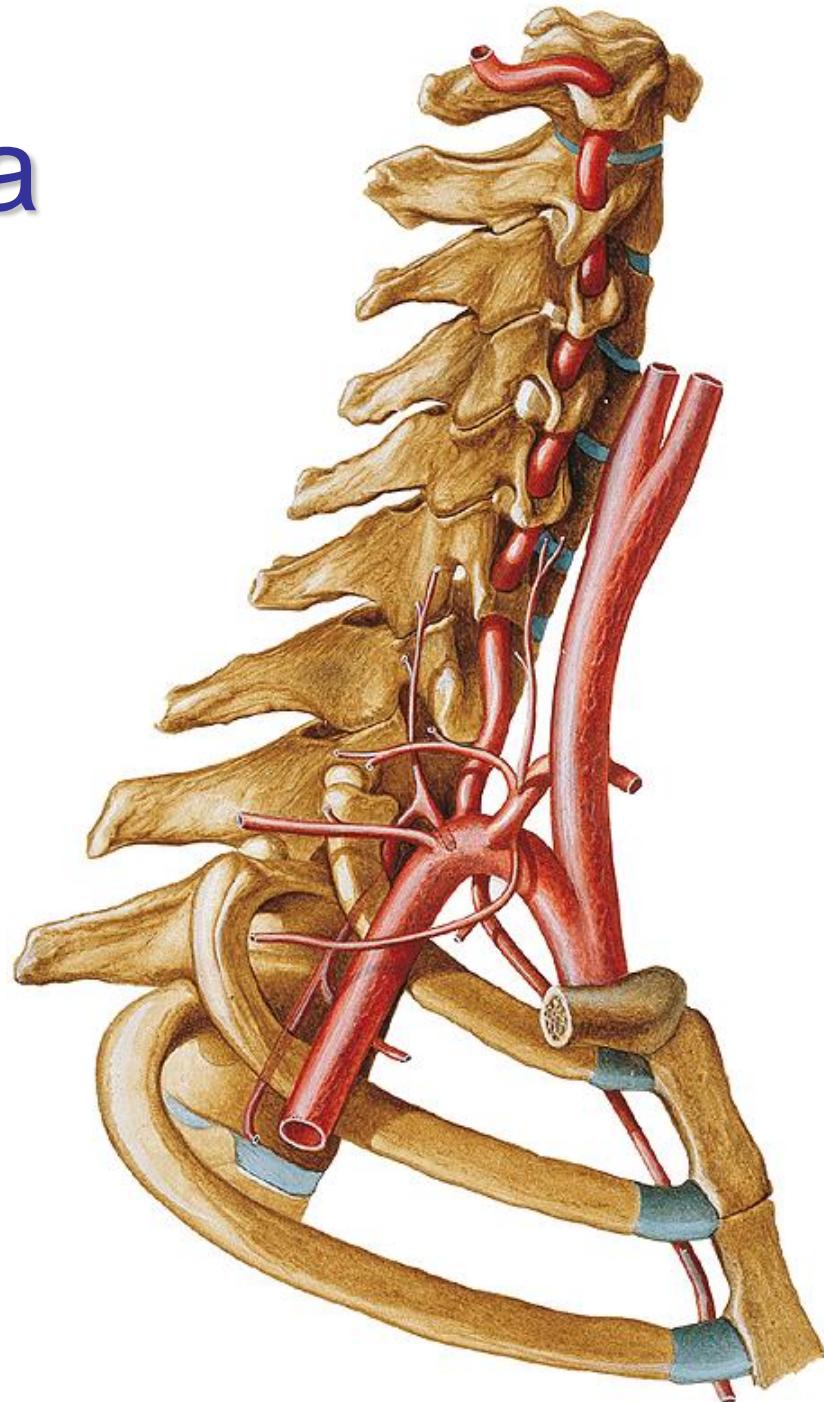


angiografie



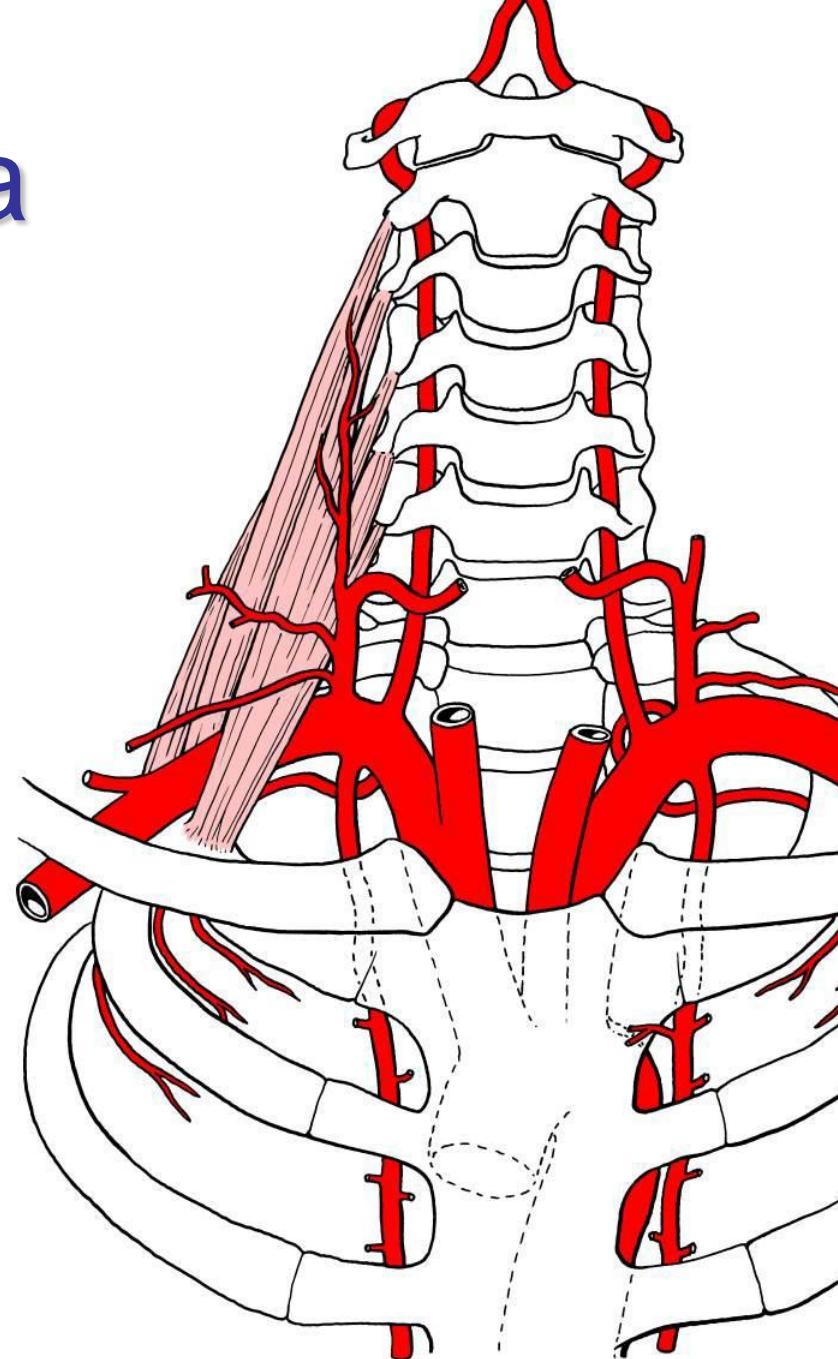
# Arteria subclavia

- pars intrascalenica
  - a. vertebralis
  - a. thoracica interna
  - truncus thyrocervicalis
- pars interscalenica
  - truncus costocervicalis
- pars extrascalenica
  - (a. transversa colli)



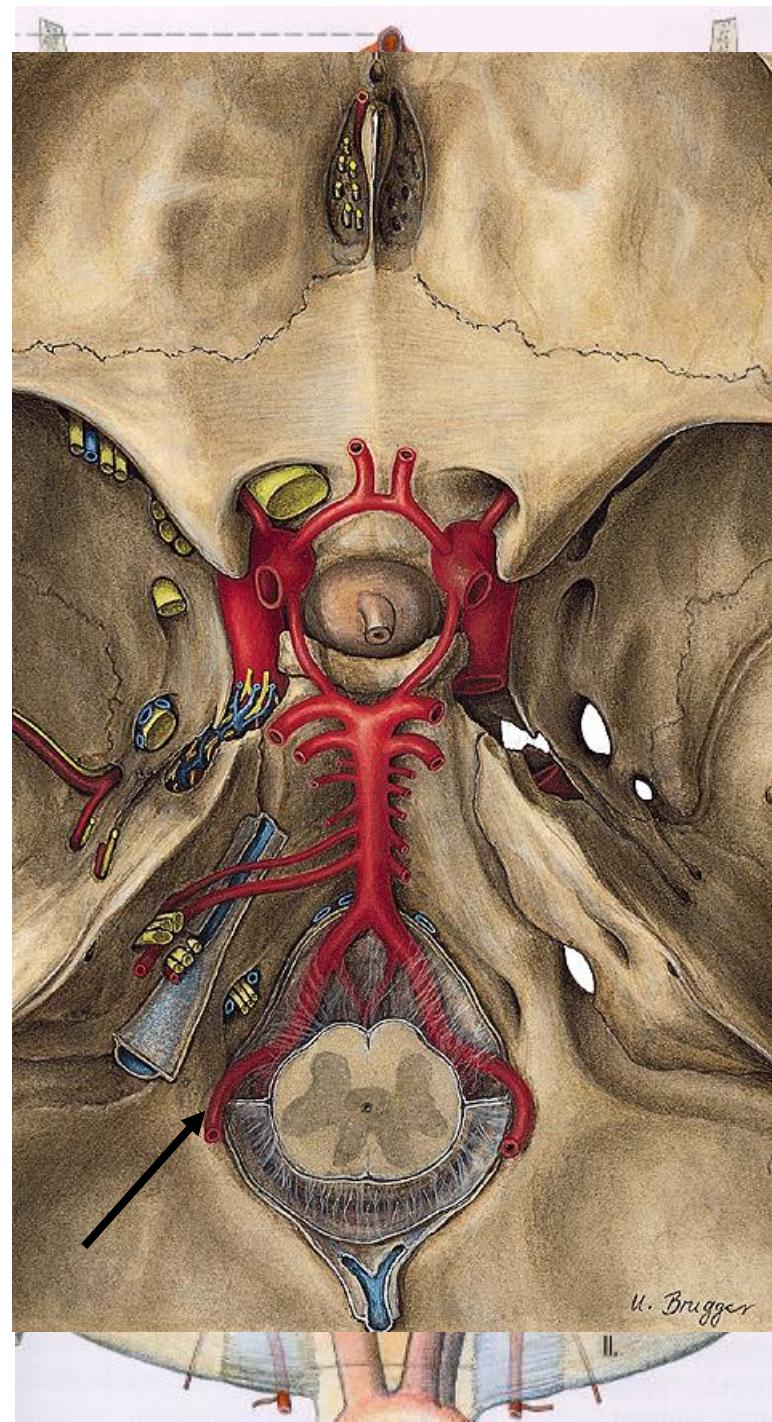
# Arteria subclavia

- pars intrascalenica
  - a. vertebralis
  - a. thoracica interna
  - truncus thyrocervicalis
- pars interscalenica
  - truncus costocervicalis
- pars extrascalenica
  - (a. transversa colli)

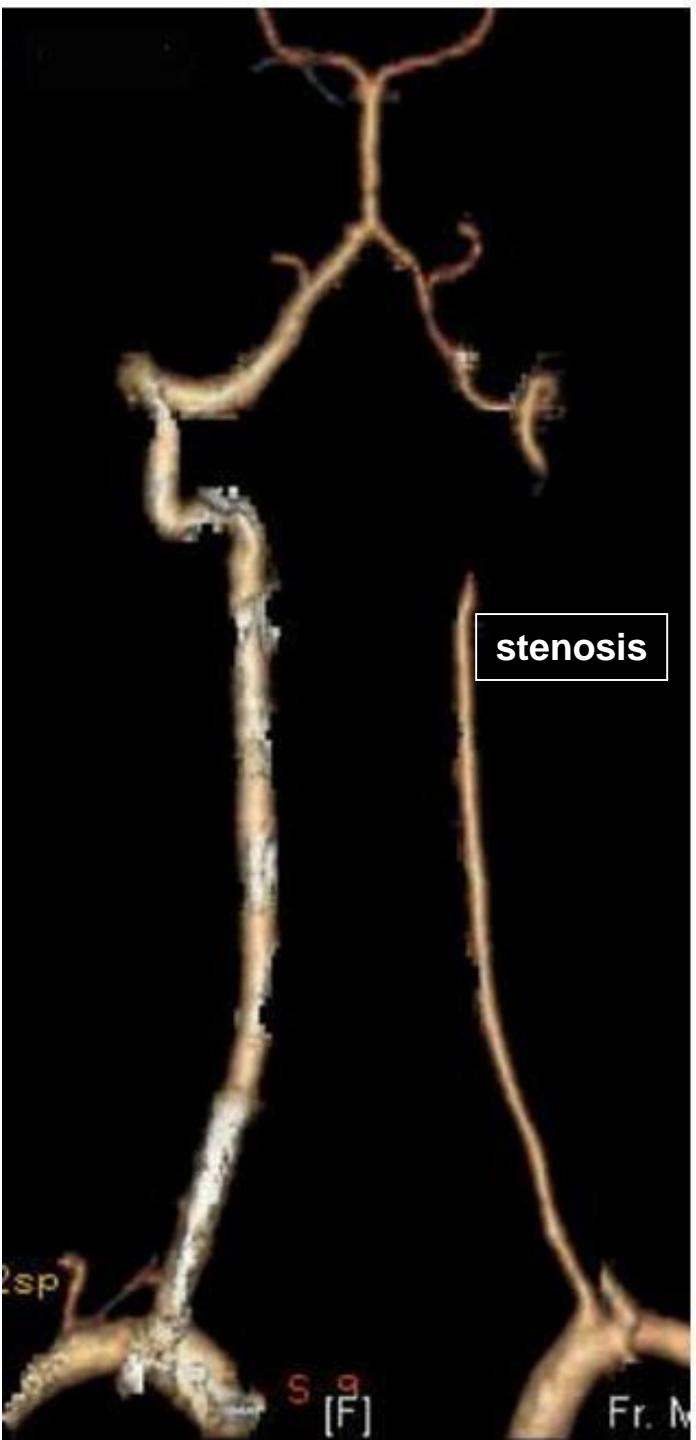
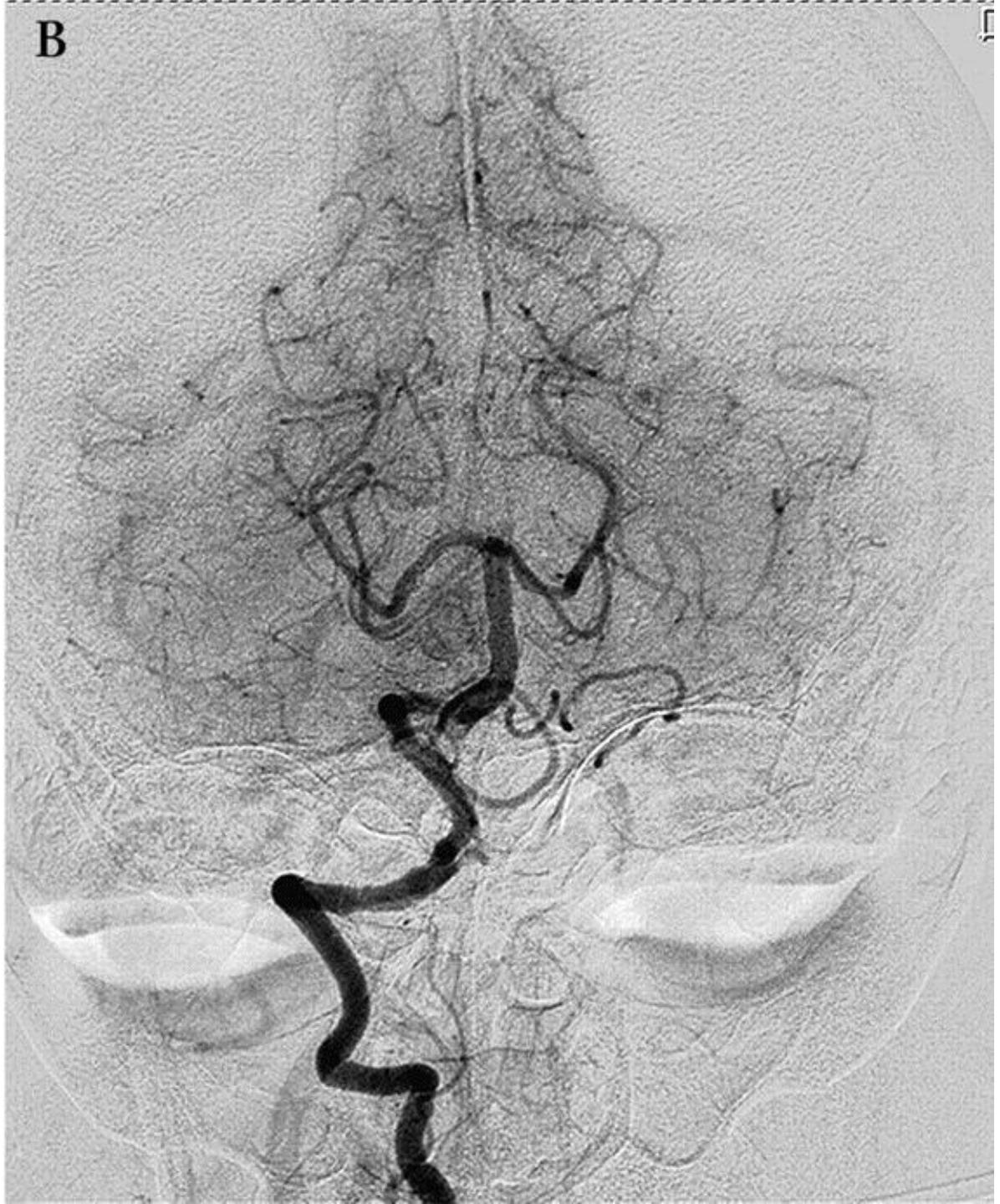


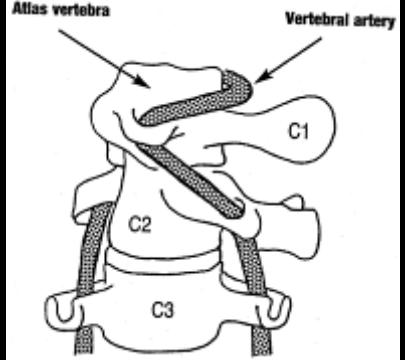
# Arteria vertebralis

- pars prevertebralis
- pars cervicalis s. transversaria
  - forr. transversaria C6-C1
  - rr. spinales et musculares
- pars atlantica
  - sulcus a.v. (canalis a.v.)
  - membrana atlantooccipitalis post.
  - foramen magnum
- pars intracranialis
  - rr. meningei
  - a. inferior posterior cerebelli
    - a. spinalis post.
  - a. spinalis ant.
    - unpaired from paired short innominate source arteries



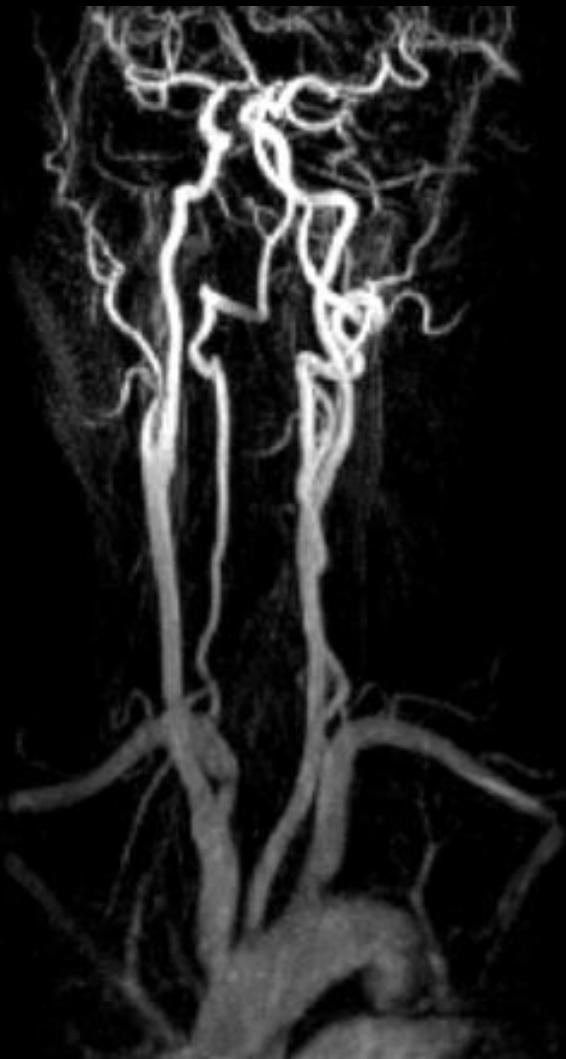
B





Posterior cerebral arteries

Basilar artery



V4 (intradural)

V3 (C2 to dura)

V2 (foraminal)

V1 (pre-foraminal)



F Gaillard  
2008

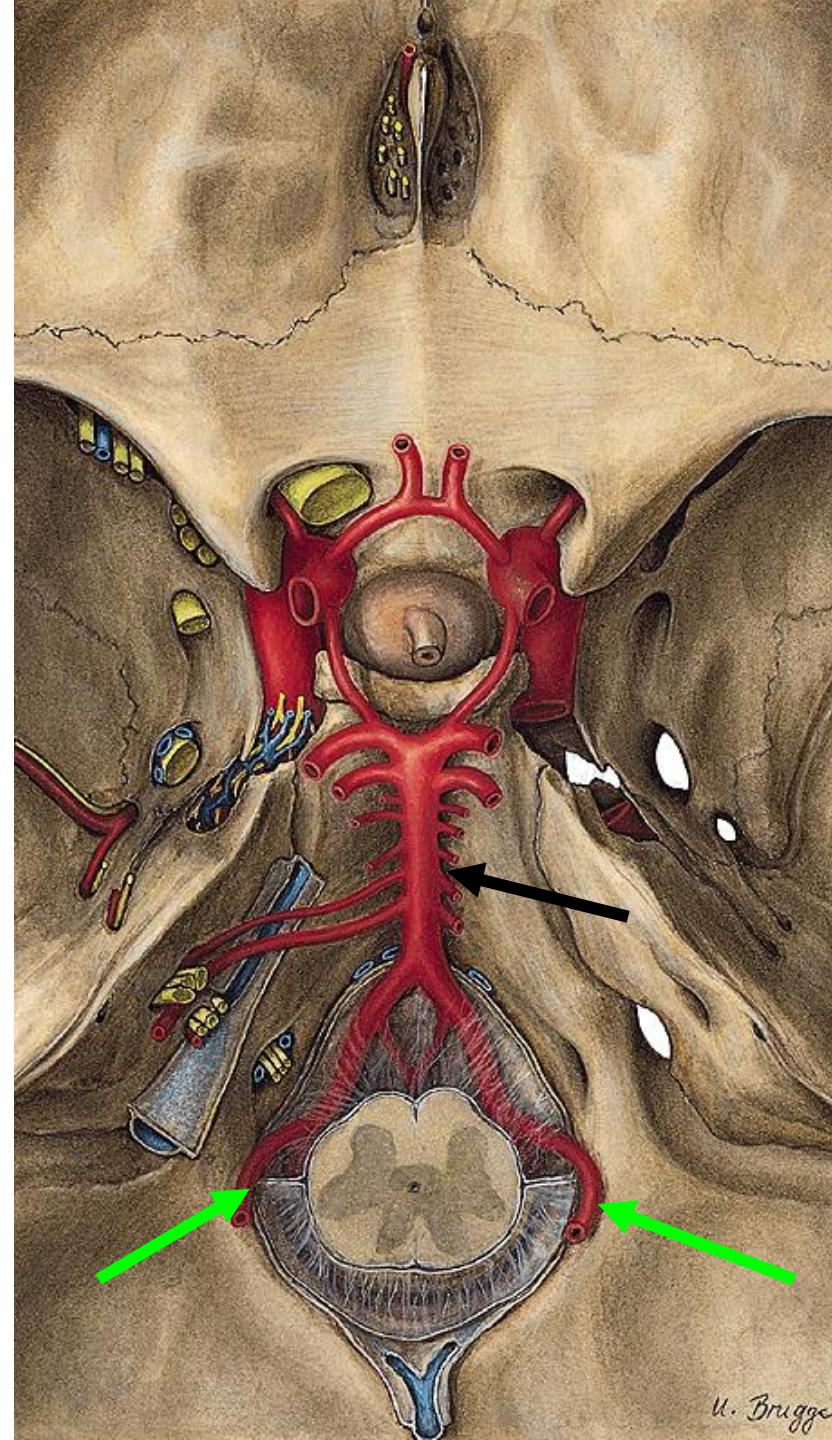
© Radiopaedia.org

# Arteria basilaris

2 aa. **vertebrales** → a. **basilaris**

- a. inferior anterior cerebelli
    - a. labyrinthi
  - aa. pontis
  - aa. mesencephalicae
  - a. superior cerebelli
- aa. cerebri posteriores

circulus arteriosus cerebri  
*Willisi*



# Clinical relevance

- *vertebrobasilar insufficiency*
- *beauty parlour syndrome*
  - vertigo
  - diplopia, blurred vision
  - Stroke



- *steal syndrome*

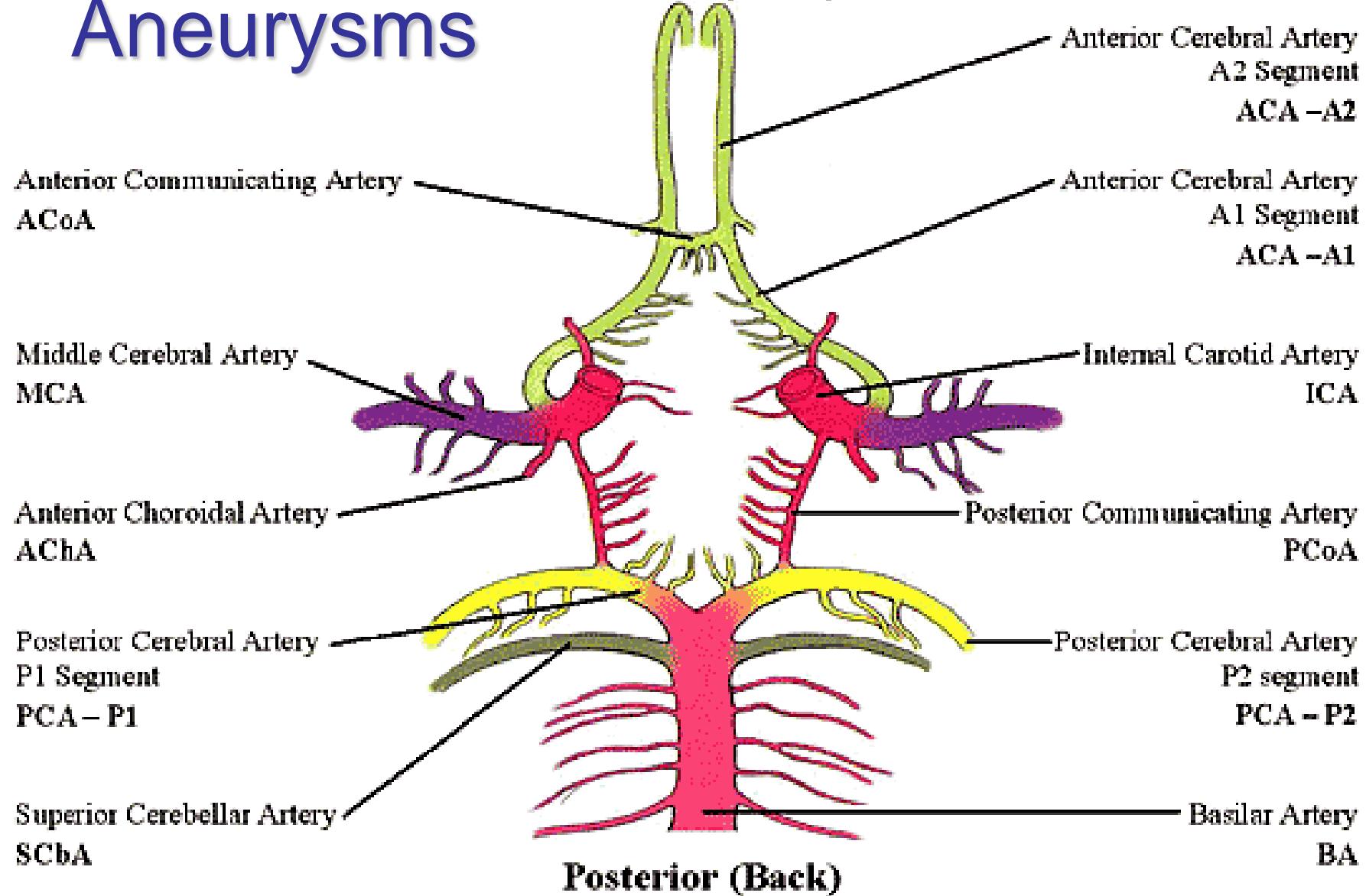
# Subclavian steal syndrome

- clinically significant reduction in blood supply to brain stem and cerebellum
- reversal of blood flow through a. vertebralis due to occlusion/stenosis of central part of AS or TBC
- symptoms:
  - vertigo
  - syncope
  - intermittent claudication of involved upper limb



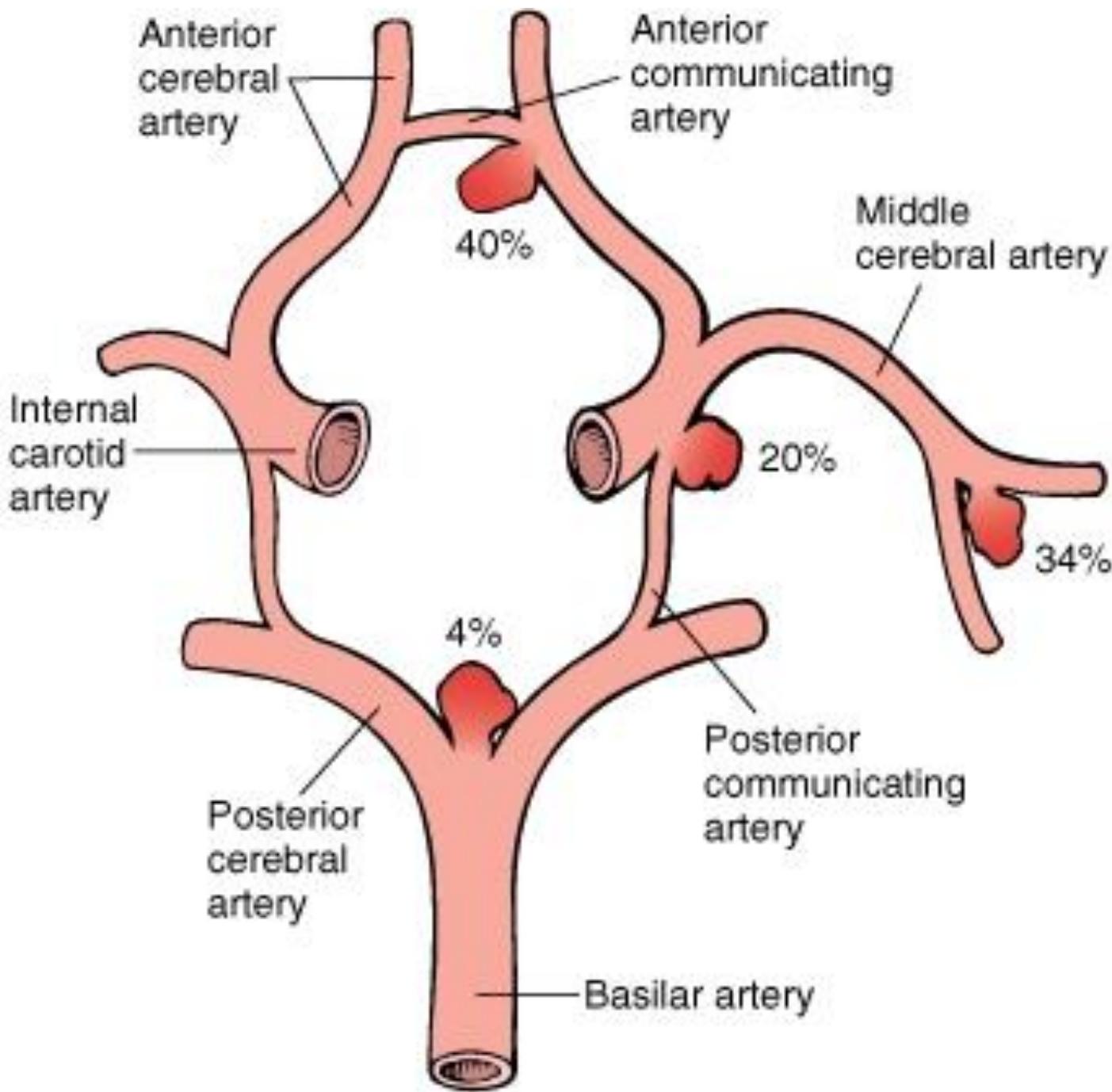
# Aneurysms

Anterior (Front)



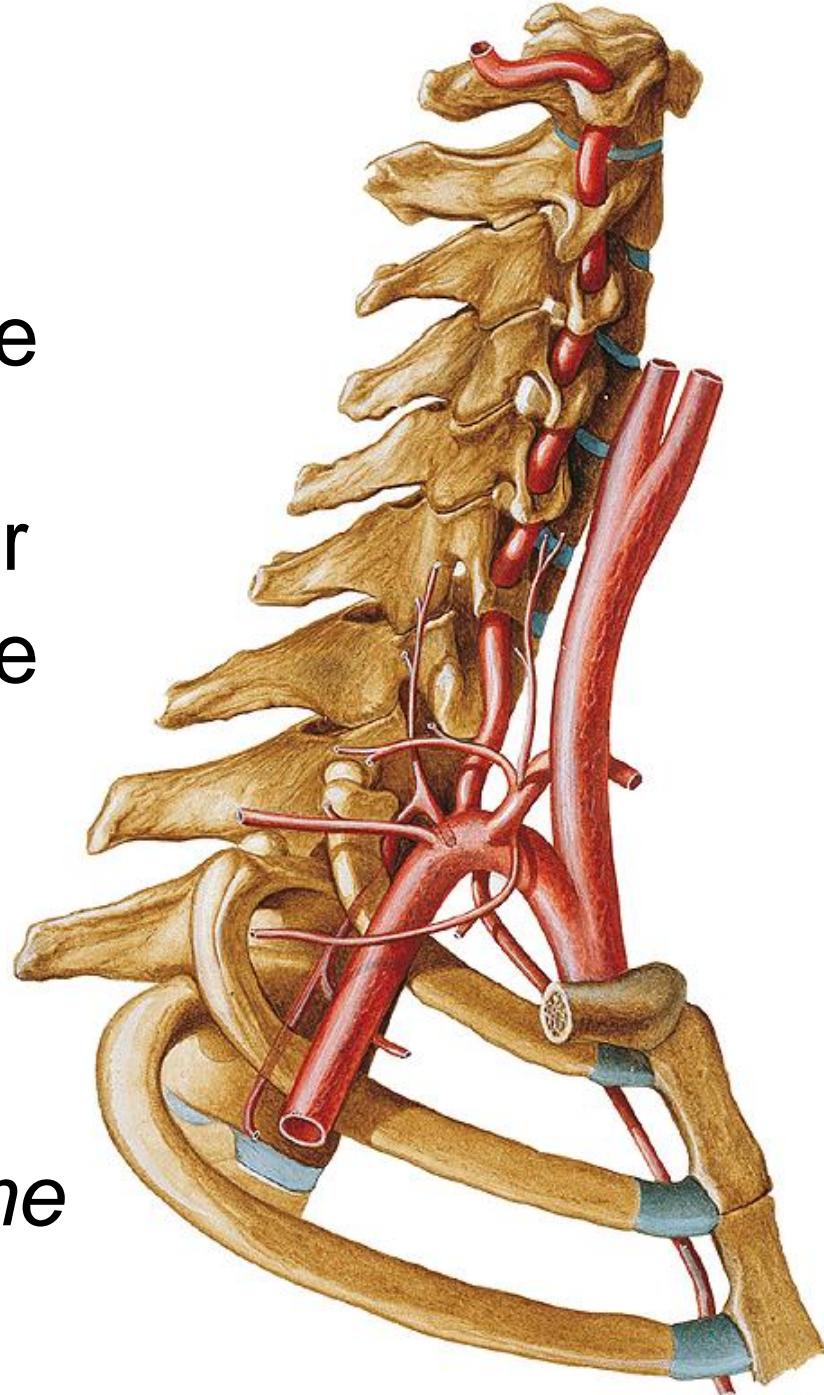
Left Side

Right Side



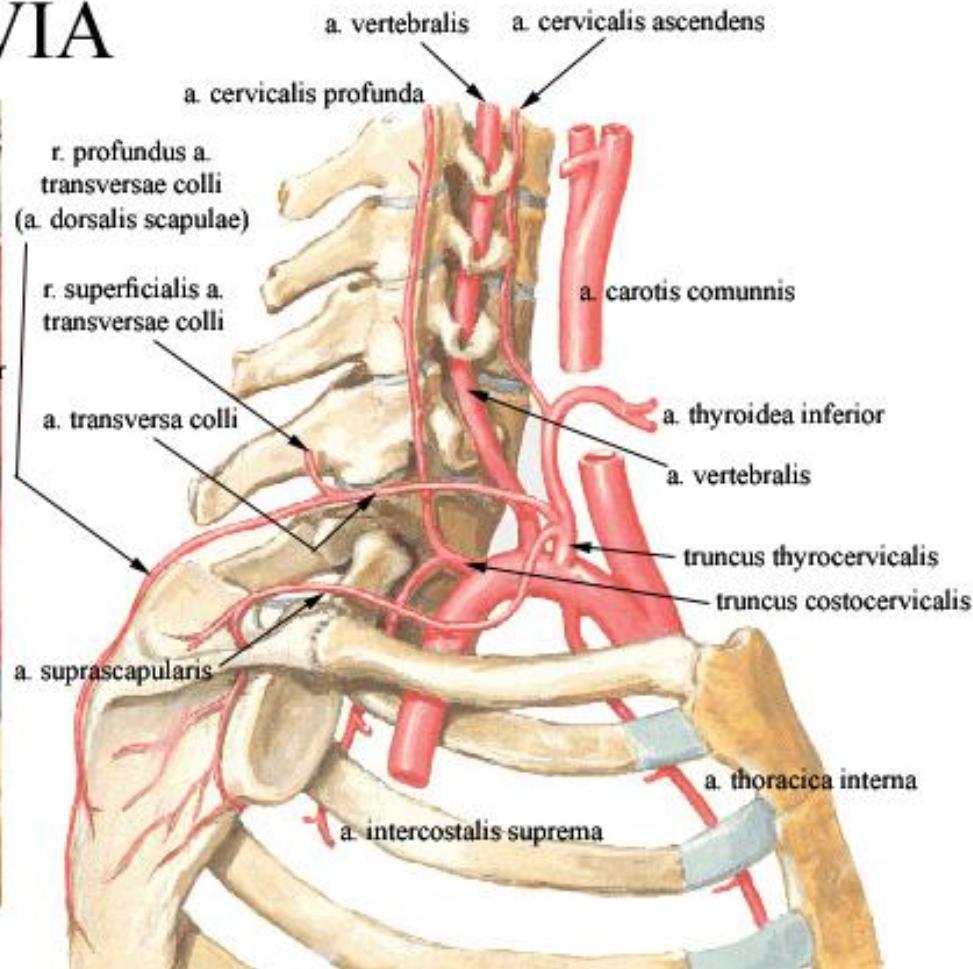
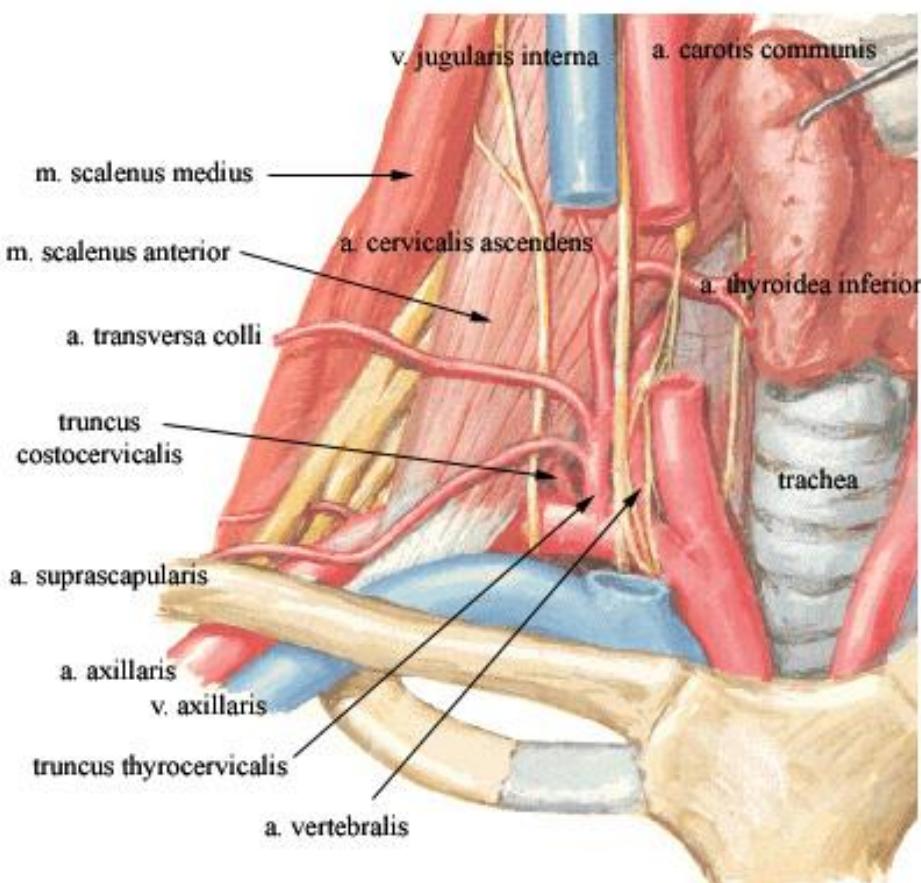
# Arteria subclavia

- sulcus arteriae subclaviae pulmonis
  - apertura thoracis superior
  - sulcus arteriae subclaviae costae primae
  - fissura scalenorum
- 
- *thoracic outlet syndrome*
  - *subclavian steal syndrome*  
(a. vertebralis)



# Arteria subclavia

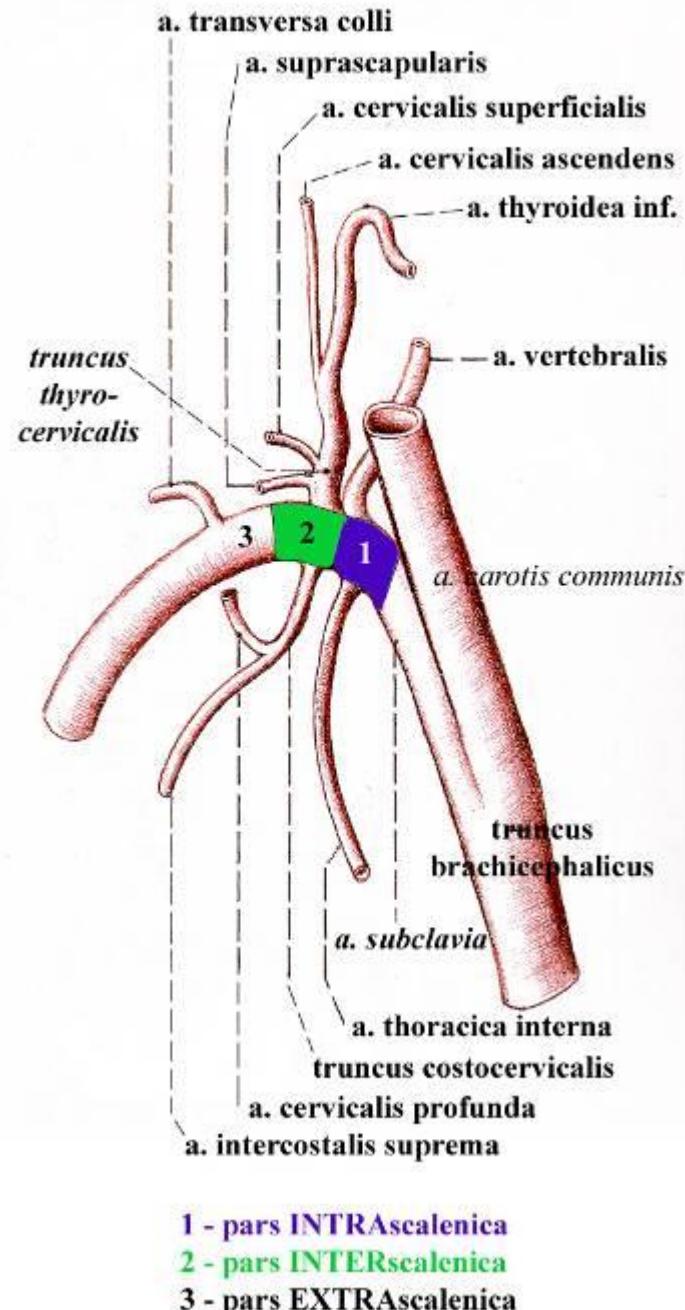
## ARTERIA SUBCLAVIA



# Arteria subclavia

- pars intrascalenica (1)
  - a. vertebralis
  - a. thoracica interna
  - truncus thyrocervicalis
- pars interscalenica (2)
  - truncus costocervicalis
- pars extrascalenica (3)
  - (někdy a. transversa colli)

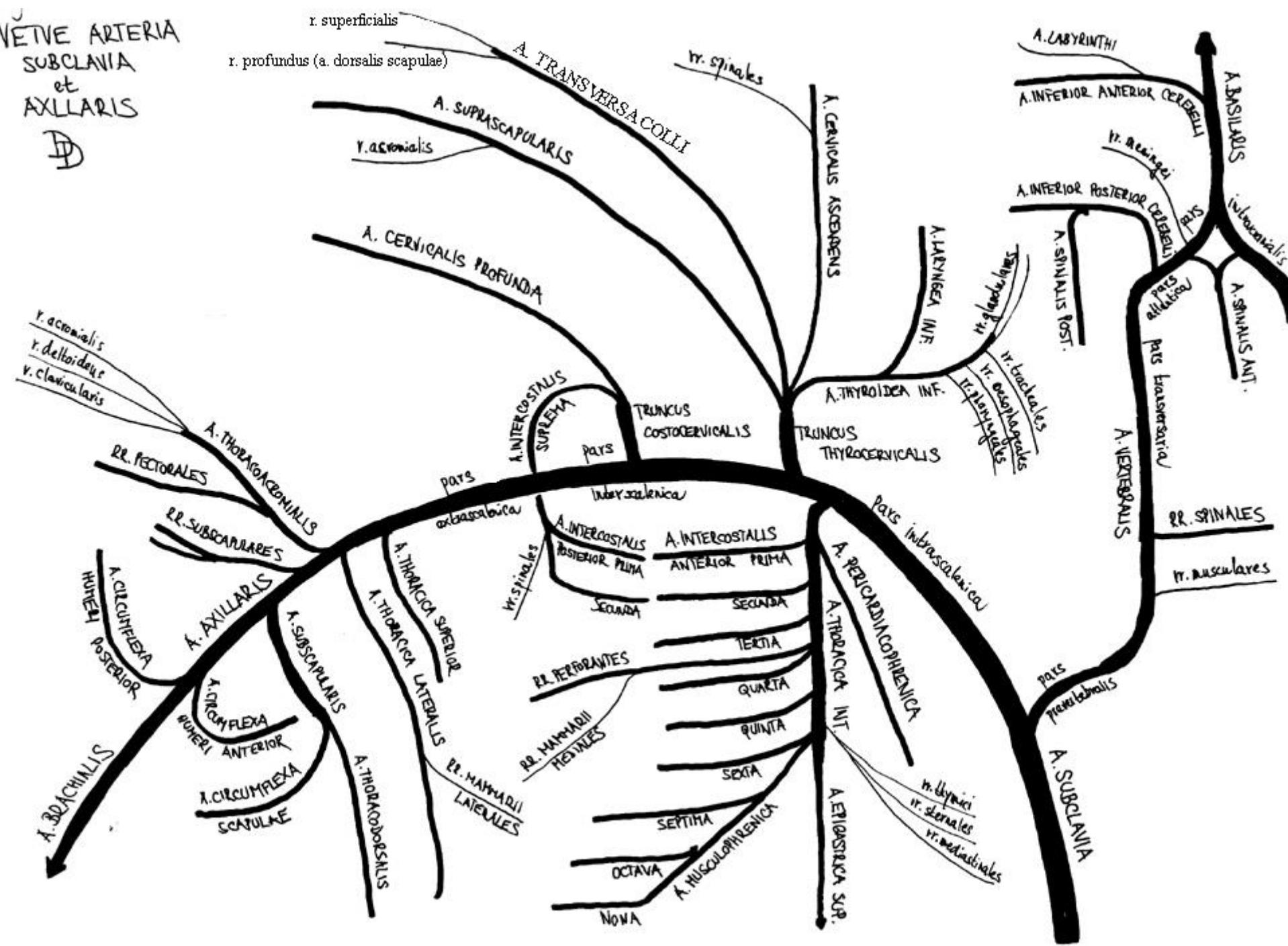
*some branches are variable*



1 - pars INTRAscalenica

2 - pars INTERscalenica

3 - pars EXTRAscalenica

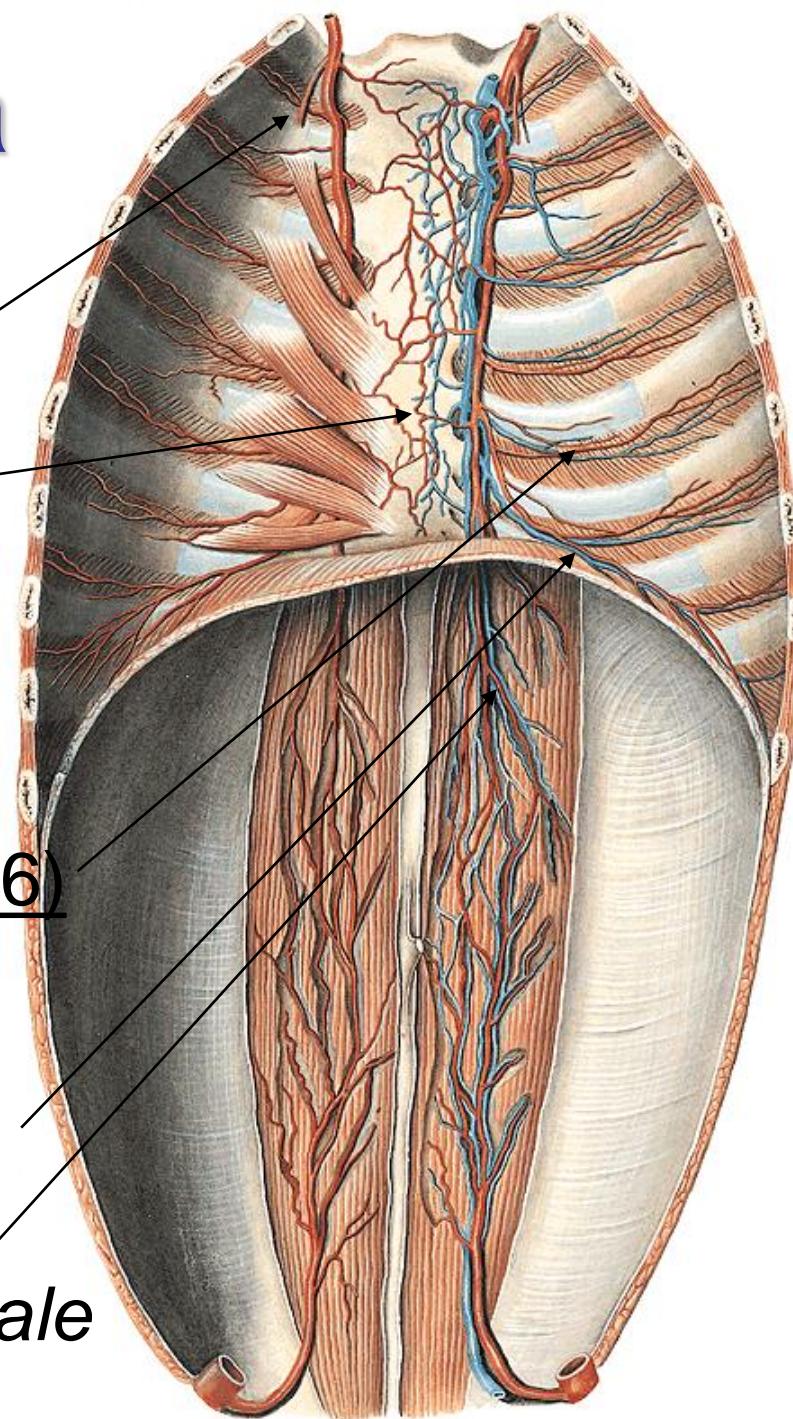


# A. thoracica interna

- rr. mediastinales
- rr. thymici
- a. pericardiophrenica
- rr. sternales
- rr. perforantes
  - rr. mammarii mediales
- (r. costalis lateralis)
- aa. intercostales anteriores (1-6)

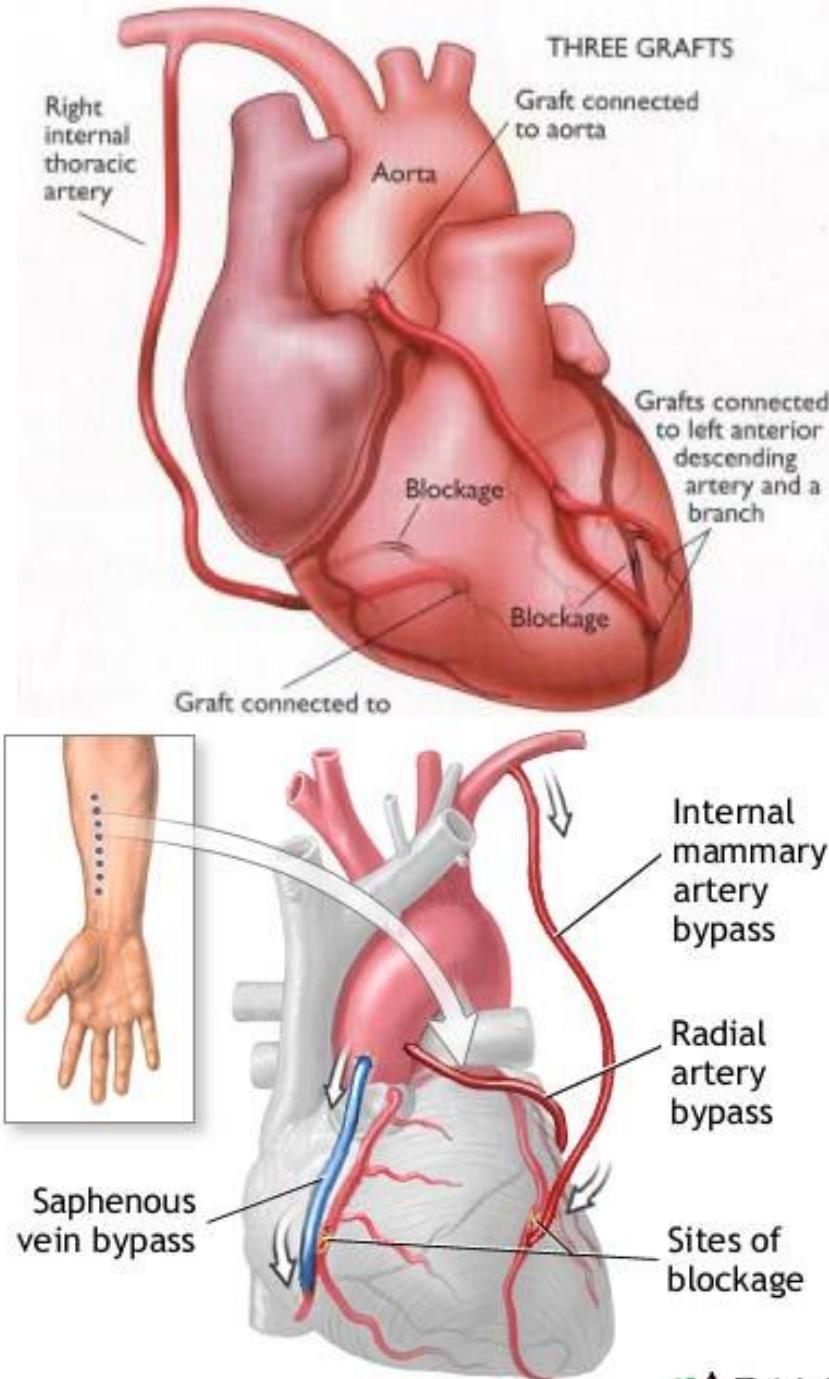
*terminal branches:*

- a. musculophrenica
  - aa. intercostales anteriores (7-9)
- a. epigastrica superior
  - in front of trigonum sternocostale*



# A. thoracica interna

- mediastinum superius
  - 1st layer
- mediastinum inf. anterius
- obsolete „a. mammaria int.“
- clinical abbreviation „LIMA, RIMA“
- elastic artery
- *by-pass of aa. coronariae*



# A. thoracica interna

## Coronary Artery Bypass Graft

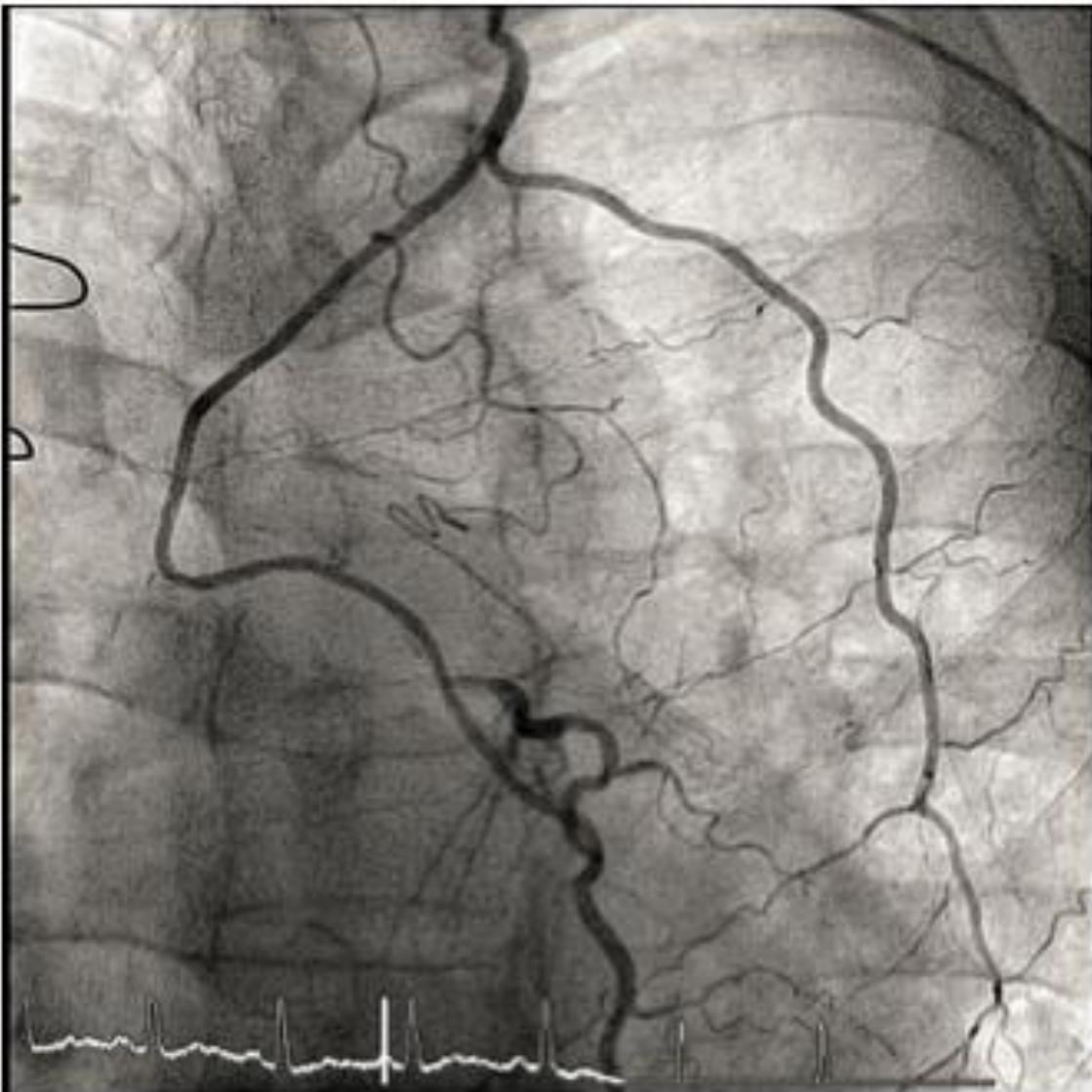
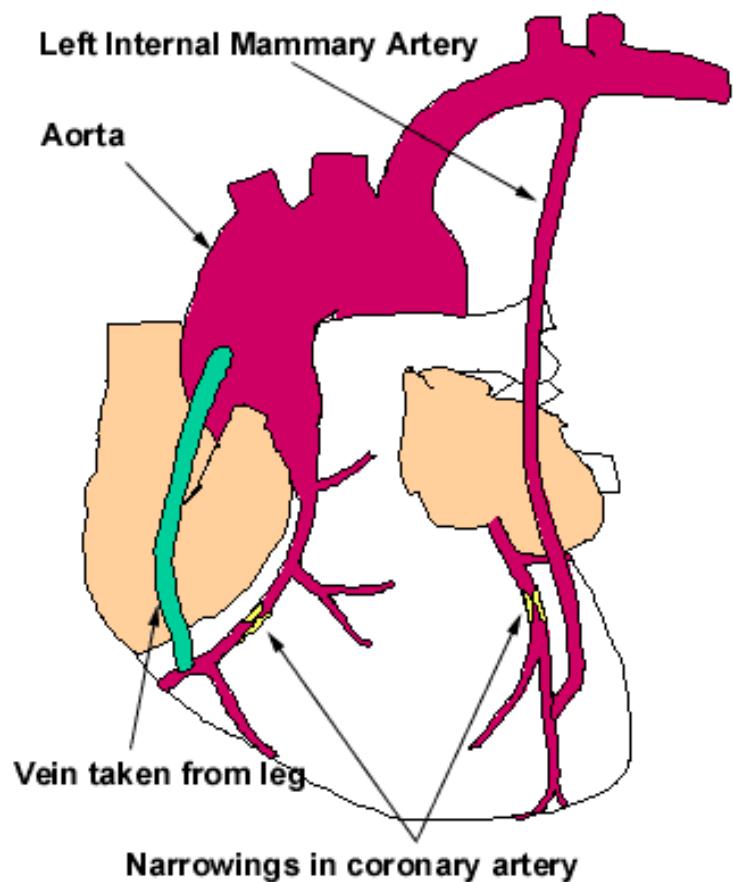
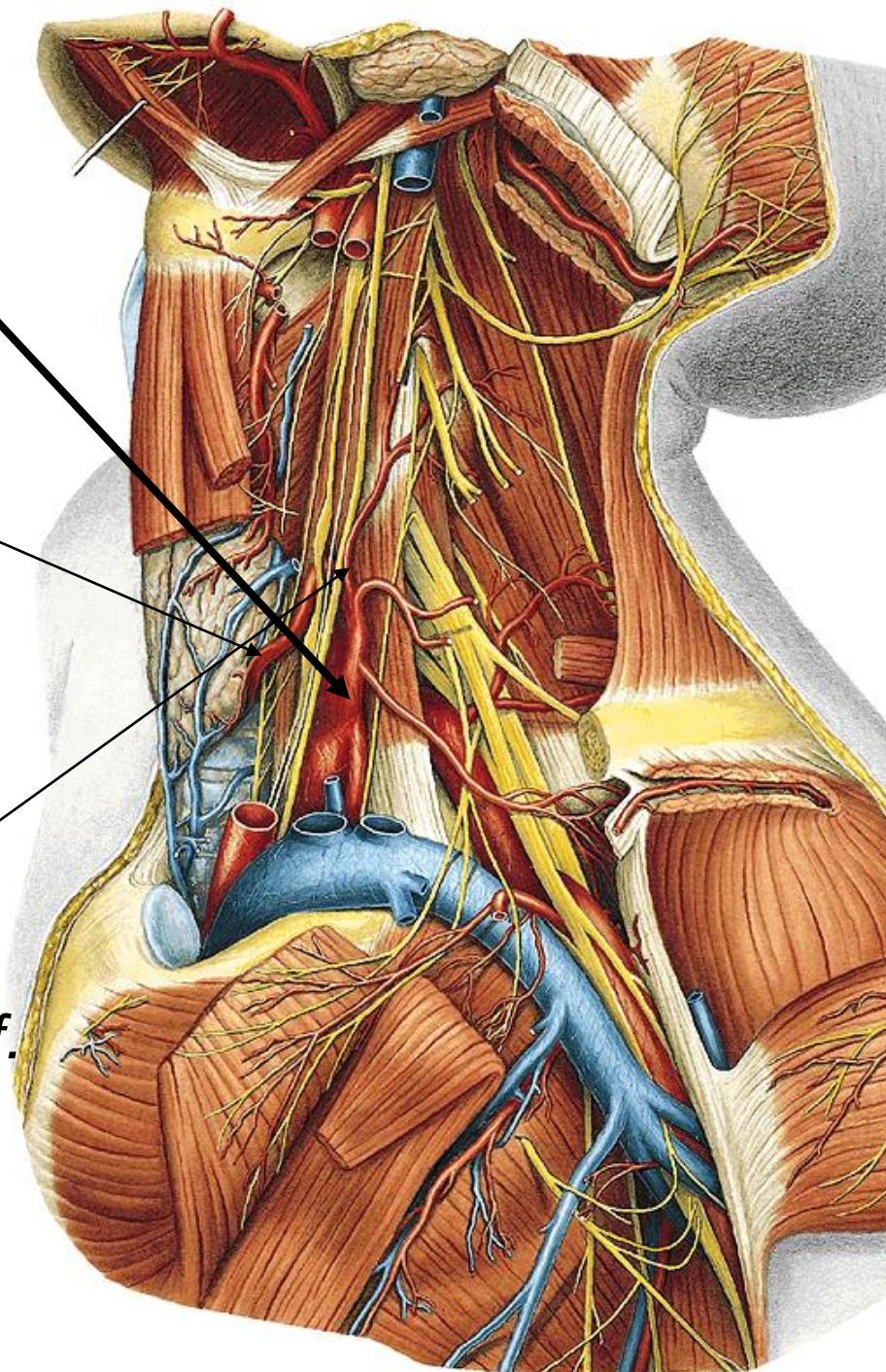


Figure 1. Cineangiogram with a 4 French Judkins Right catheter showing a patent left internal mammary artery (LIMA) graft to the left anterior descending coronary artery and a large intercostal branch arising from the proximal part of the LIMA.

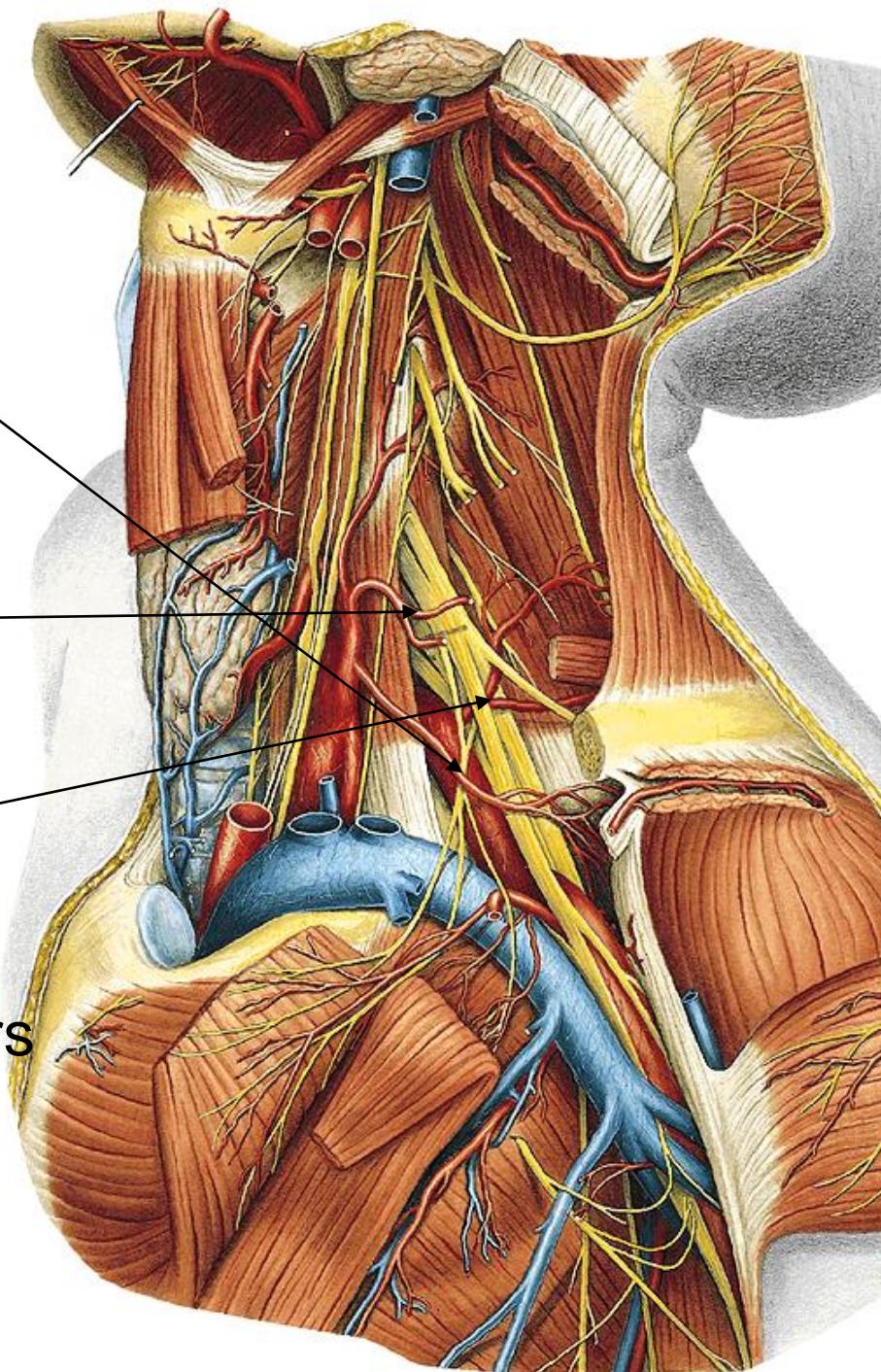
# Truncus thyrocervicalis

- a. thyroidea inf .
    - a. laryngea inf.
    - rr. glandulares
    - rr. oesophageae
    - rr. pharyngeae
- crossed with n. laryngeus recurrens*
- a. cervicalis ascendens
    - often branch from a. thyroidea inf.*
    - together with n. phrenicus on ventral aspect of m. scalenus anterior*



# Truncus thyrocervicalis

- a. suprascapularis (86% from TTC)
- a. transversa colli (36%)
  - r. superficialis (as a. cervicalis superficialis in 83% from TTC)
  - r. profundus (as a. dorsalis scapulae in 36% from TTC, otherwise from pars extrascalenica arteriae subclaviae)

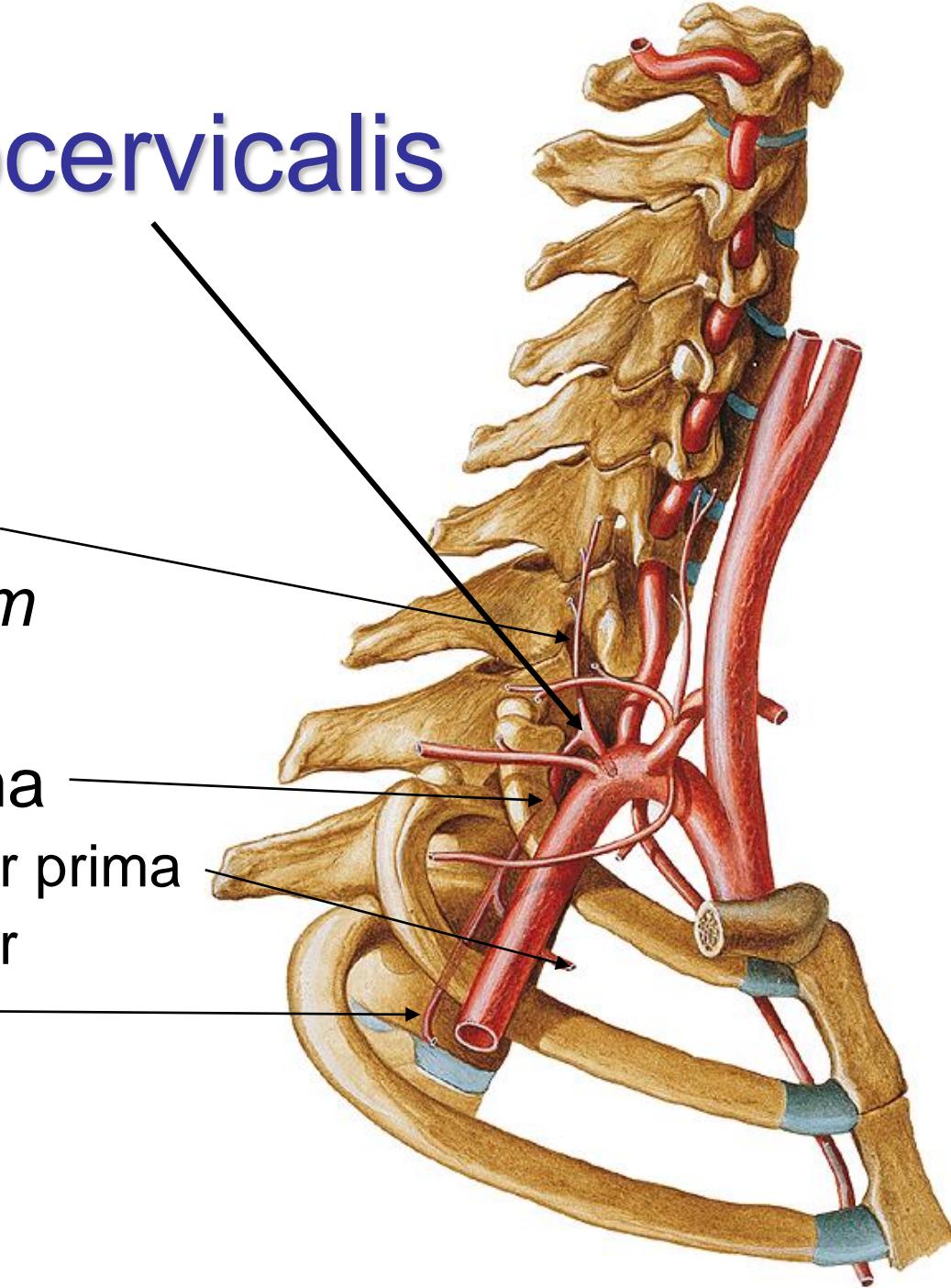


*great variability without clinical relevance*

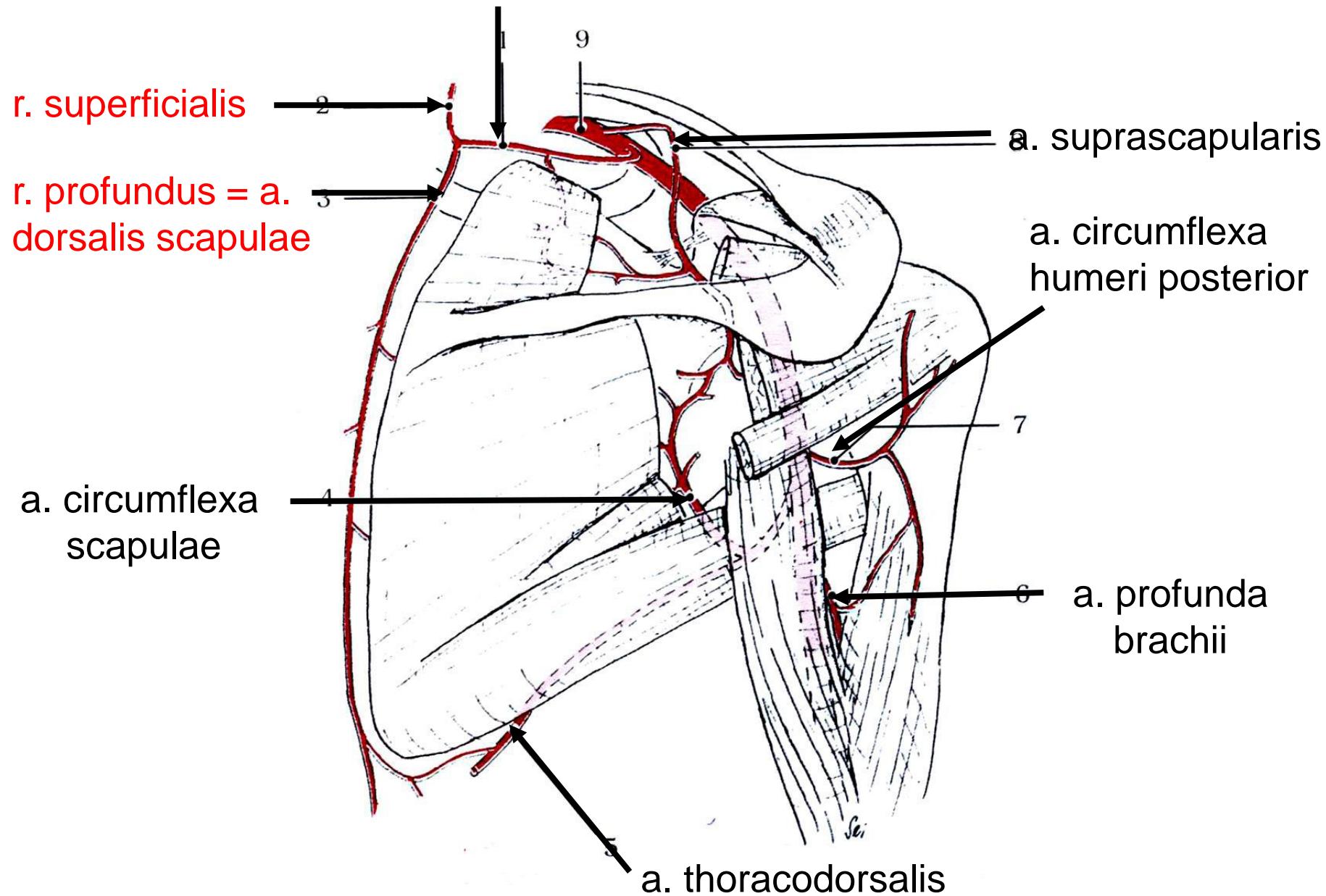
# Truncus costocervicalis

from pars interscalenica

- a. cervicalis profunda  
*trigonum omotrapezium*
- a. intercostalis suprema
  - a. intercostalis posterior prima
  - a. intercostalis posterior secunda



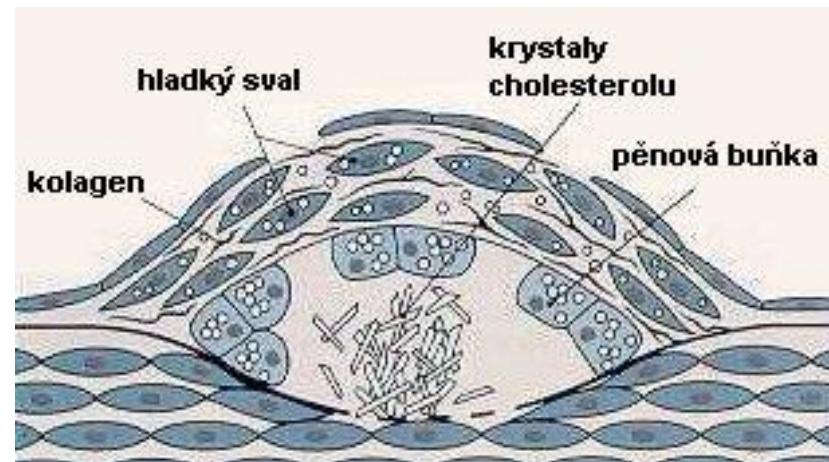
# A. transversa scapulae



# Clinical remarks

## *atherosclerosis\**

- causes 50% of death in civilized countries
- combination of: arterial tunica intima changes + deposits of lipids, polysacharides, thrombocytes
- subintimal thickening is formed = atheroma
- later fibrotization and calcification occur ► thrombotization ► vessel closure ► hypoxia



# Atherosclerosis\*

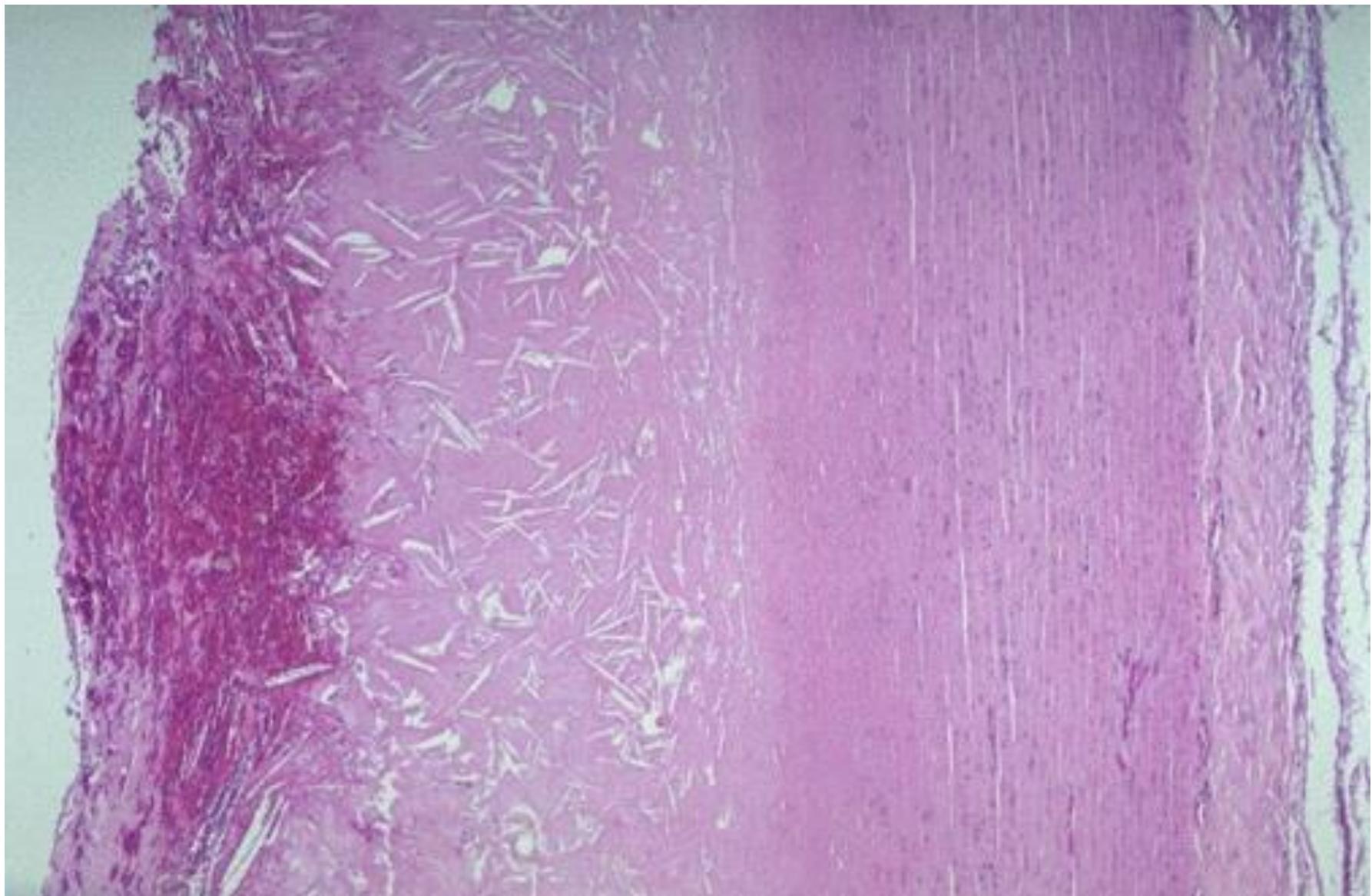
- AT is clinically silent until critical stenosis / thrombosis / aneurysma/ emboly occurs
- insufficient supply of peripheral tissue
  - intermittent claudication, angina pectoris
  - sudden closure: AIM, CMP

risk factors: ↑LDL, hypertension, smoking, DM, obesity, lack of movements

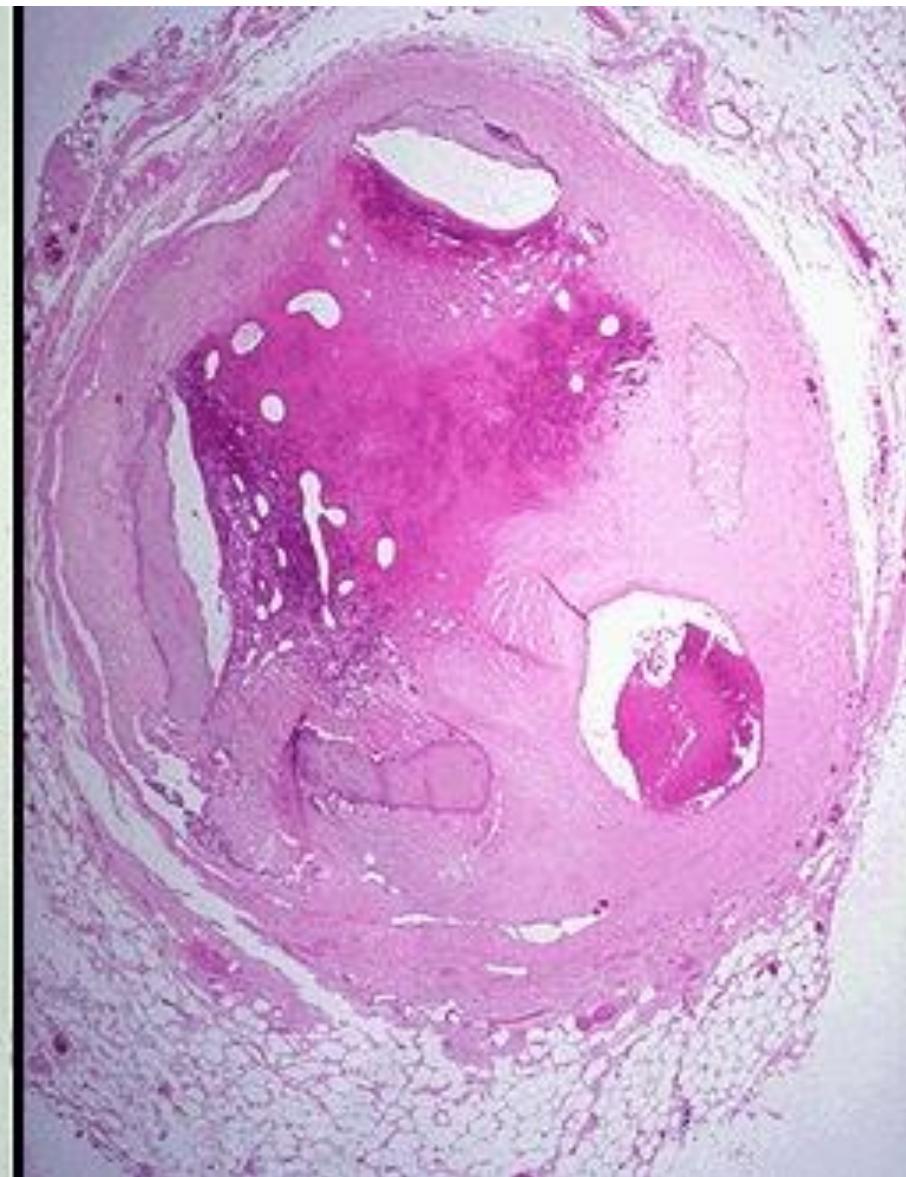
diagnosis: angiography, ultrasound examination

therapy: ↓ risk factors, ↓ LDL (statins)

# Aortal atheroma (HE) \*



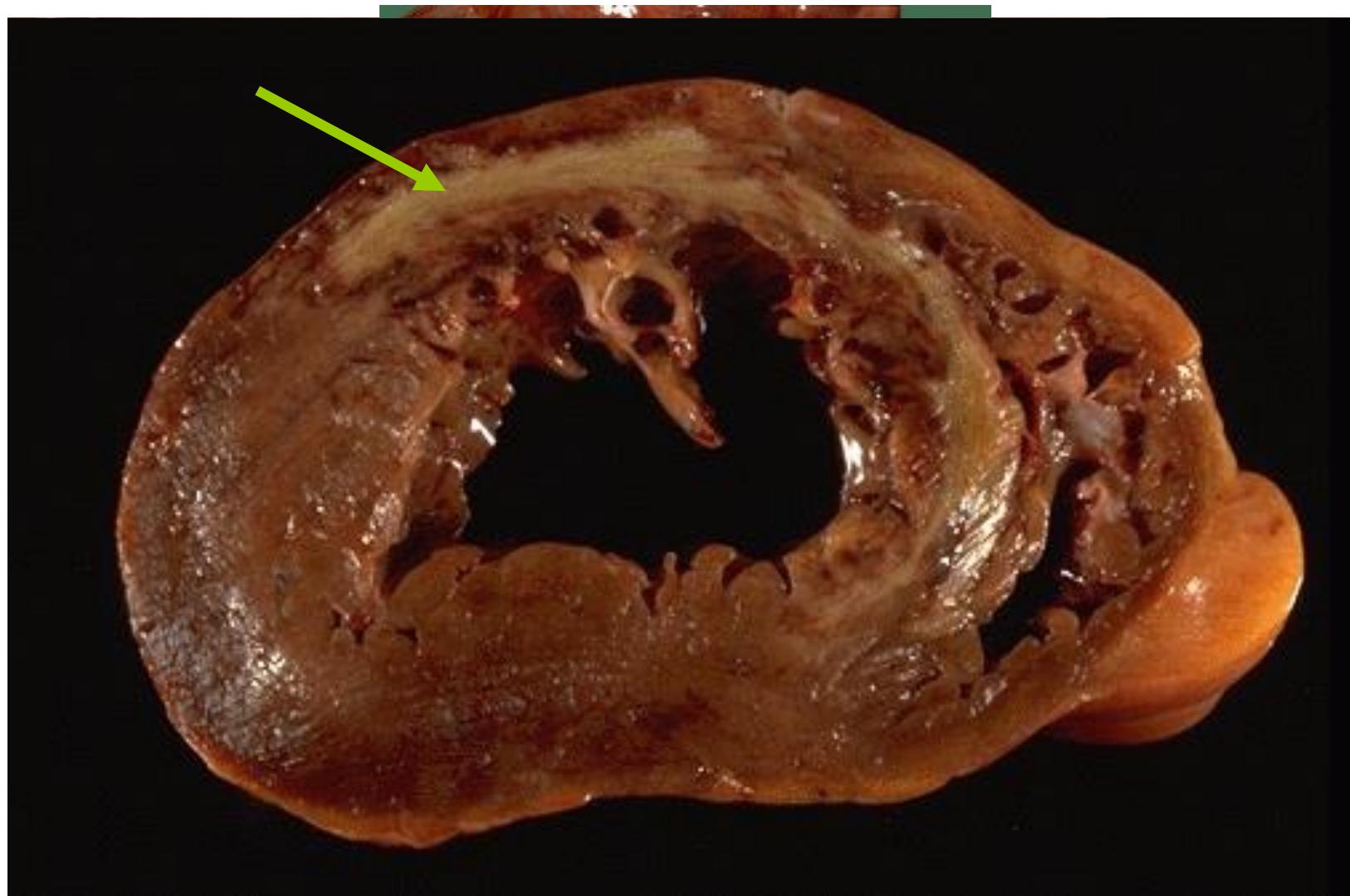
# Healthy a. coronaria\*    *Atheroma\**



# Lipid plaques \*



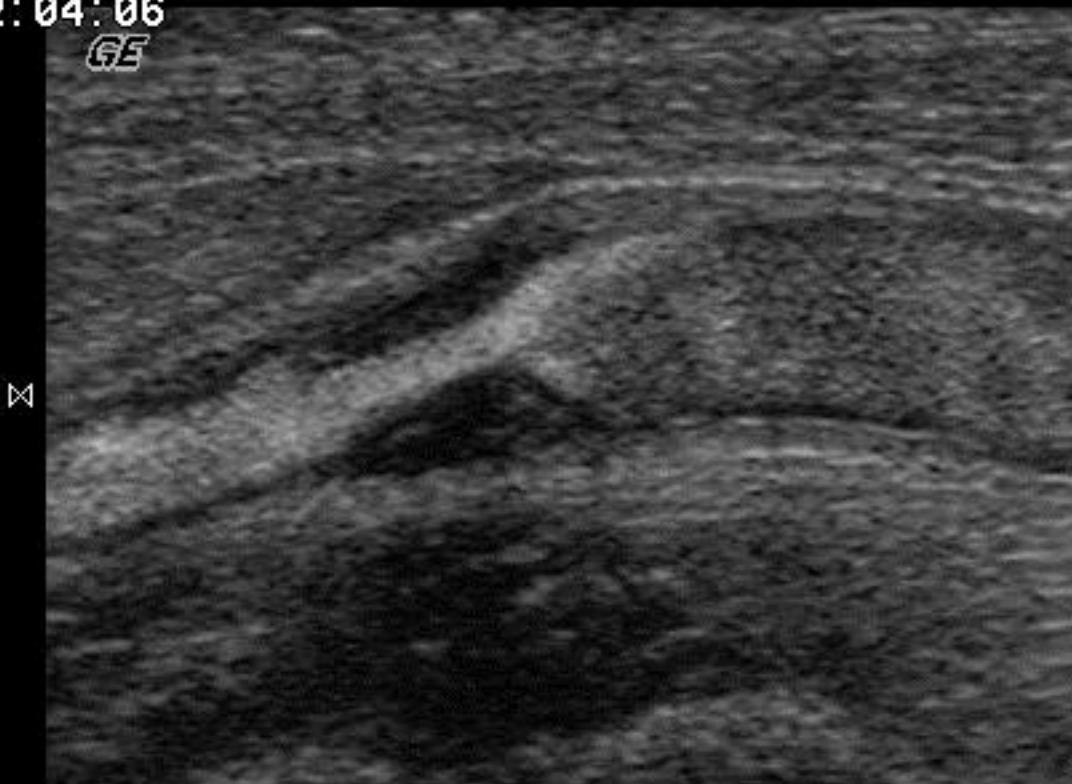
# Thrombosis → infarction \*



BAPTIST MED CTR  
IM#1 +2:04:06

GE

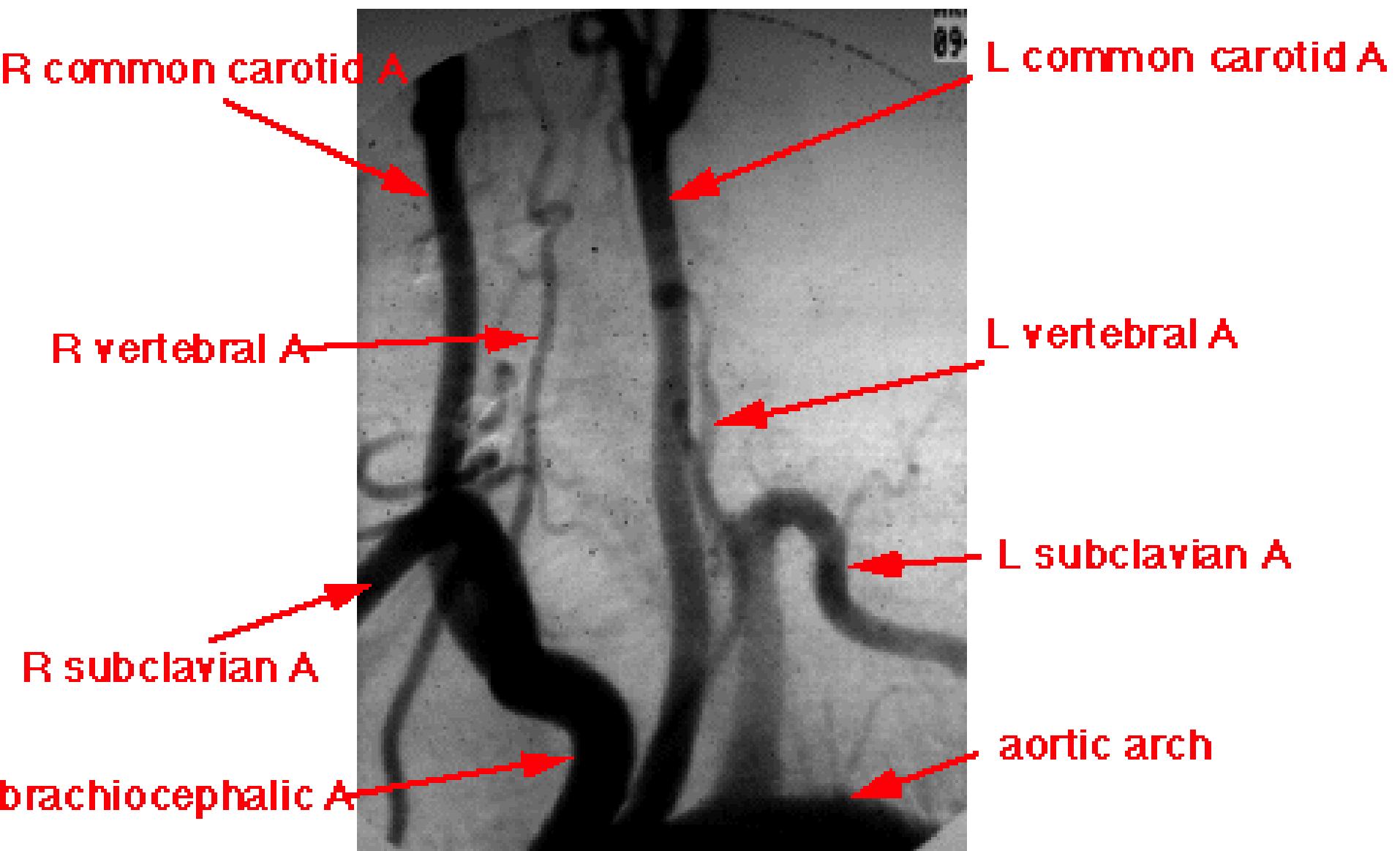
D0. 3cm 5739L  
RENAL  
CINE 0439  
29G  
60DR  
E3 ME A2



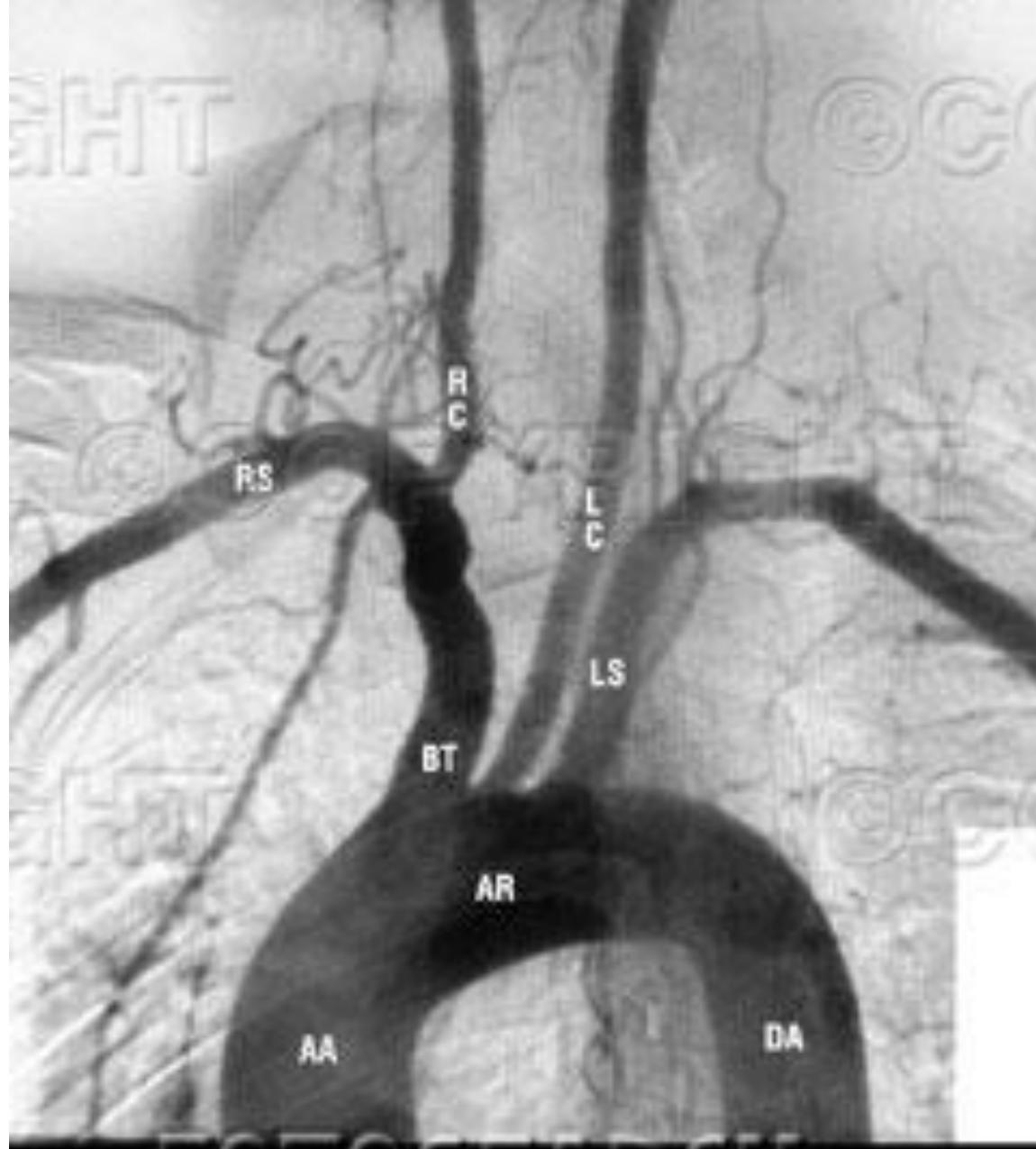
B - FLOW  
INTERNAL CAROTID STENOSIS

MI=0.7 AO=100%

**CT and MR**



angiogram of the aortic arch



Courtesy D. E. I. Lansdown  
University of Toronto,  
Toronto, Ontario, Canada

05108098

3/11/55

M: 4/1

I: 12/1

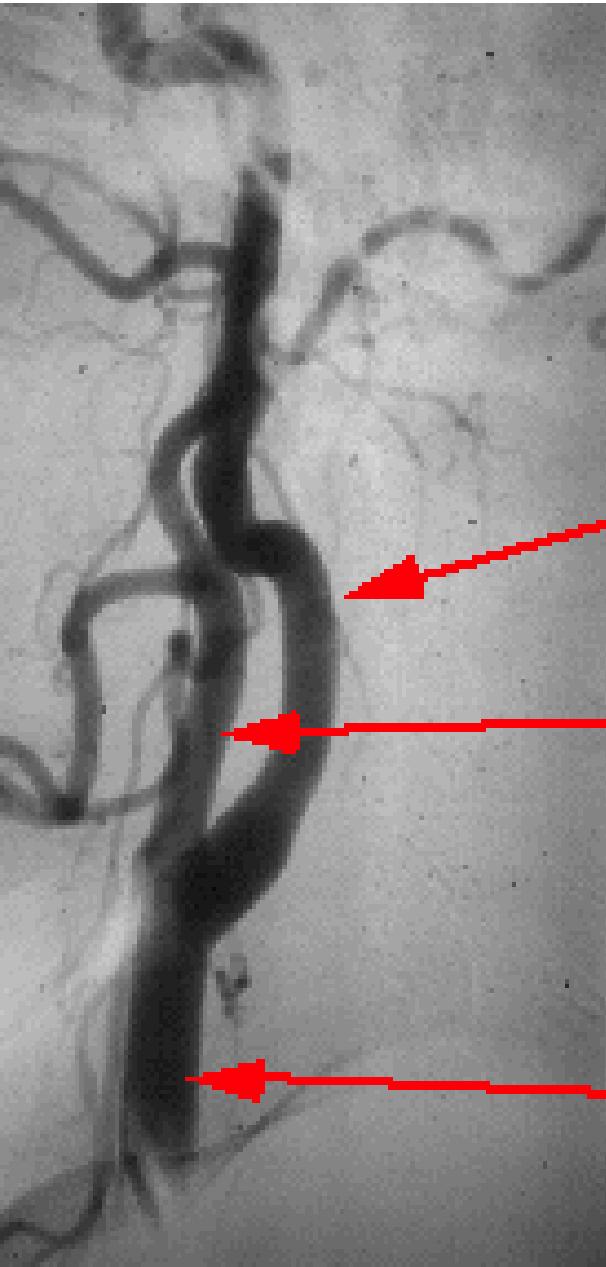
THOR - MURK 311  
3-SEP-99  
3:01:07  
Phys: MMF  
W-B: 102  
W-C: 81



This image is an axial MRI scan of the human heart. The central structure is the aorta, which appears as a bright, circular region. The surrounding tissue has varying shades of gray, representing different types of tissue density.

Aorta



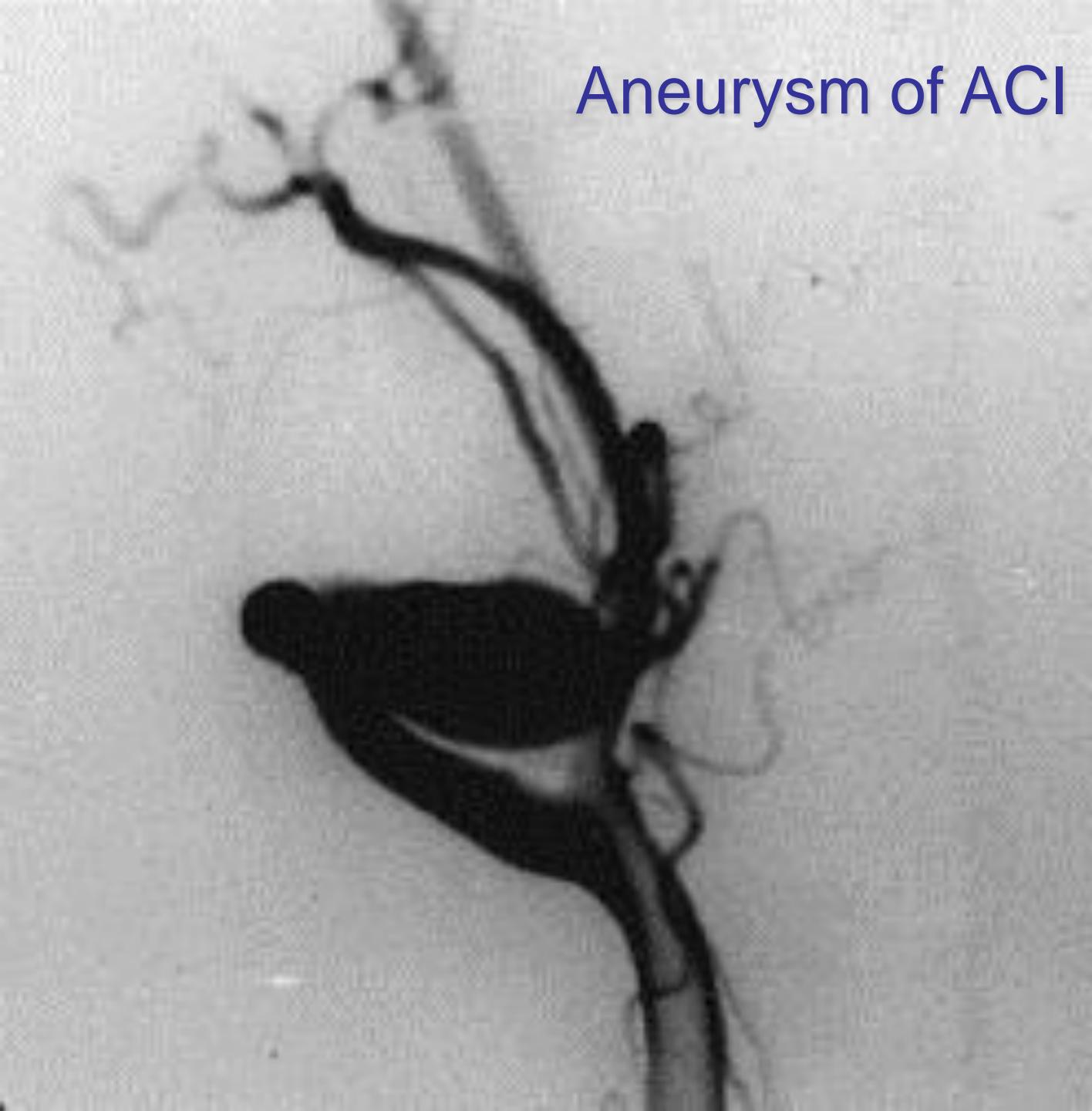


internal carotid artery: no branches

external carotid artery: branches in neck

common carotid artery

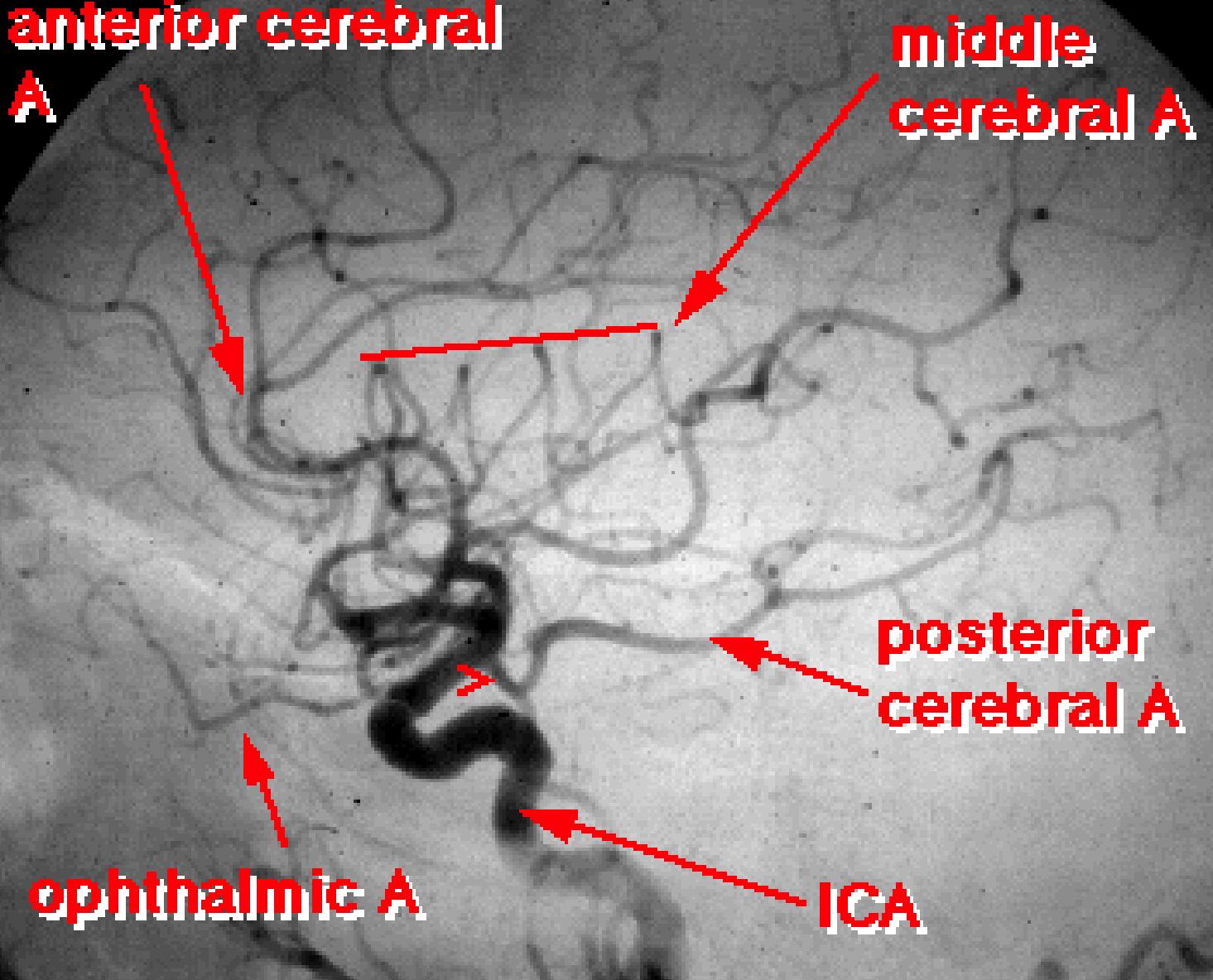
# Aneurysm of ACI



**anterior cerebral**

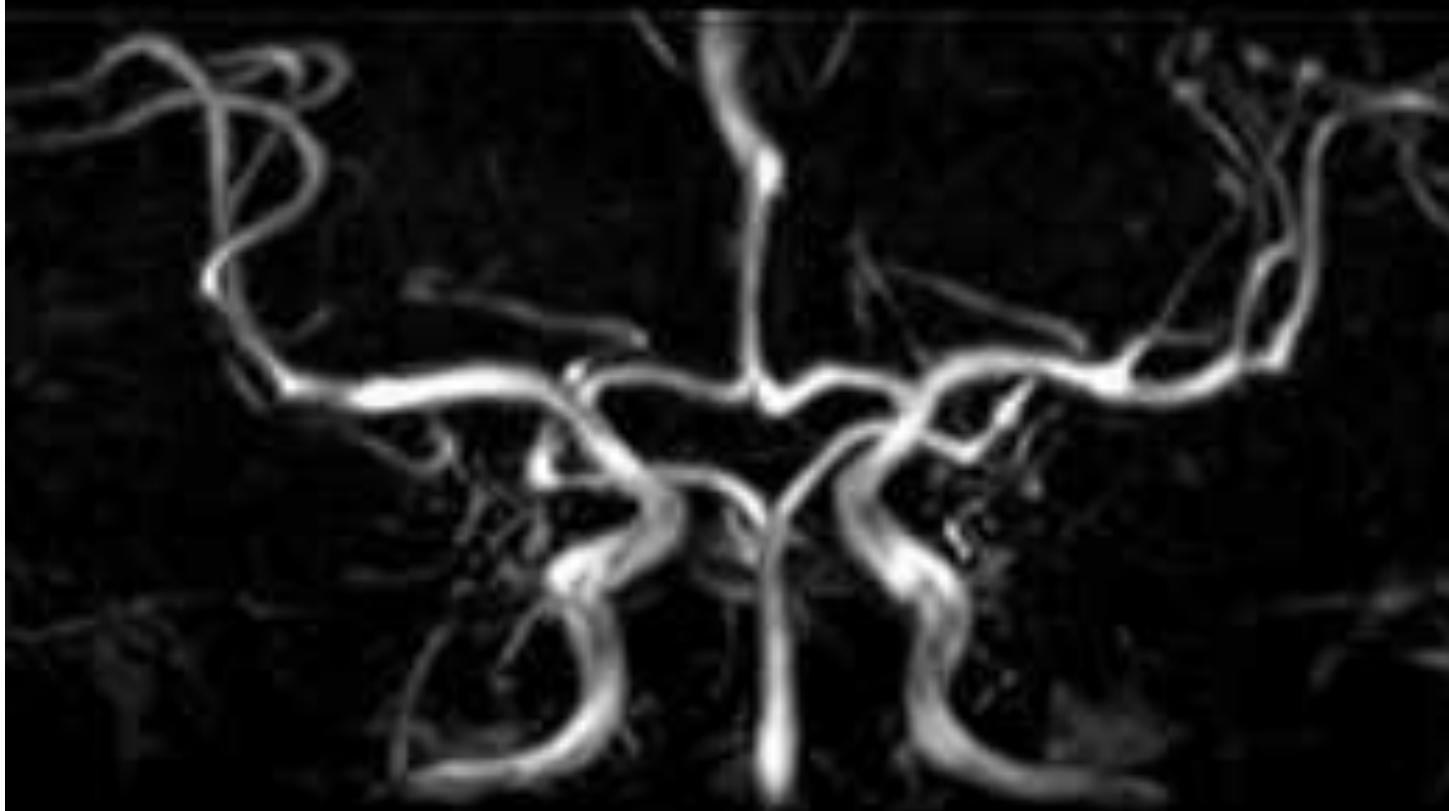
**A**

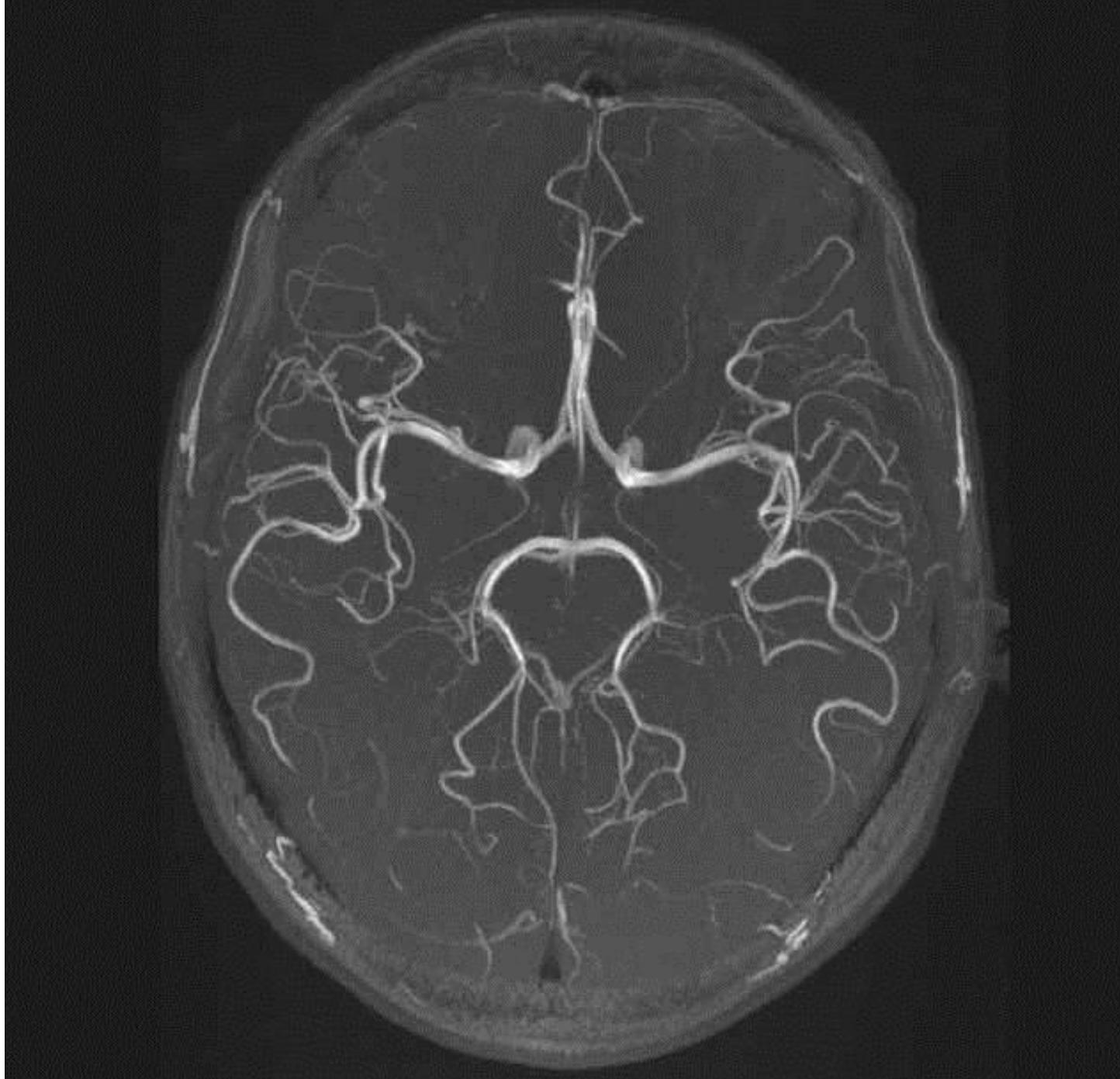
**middle  
cerebral A**

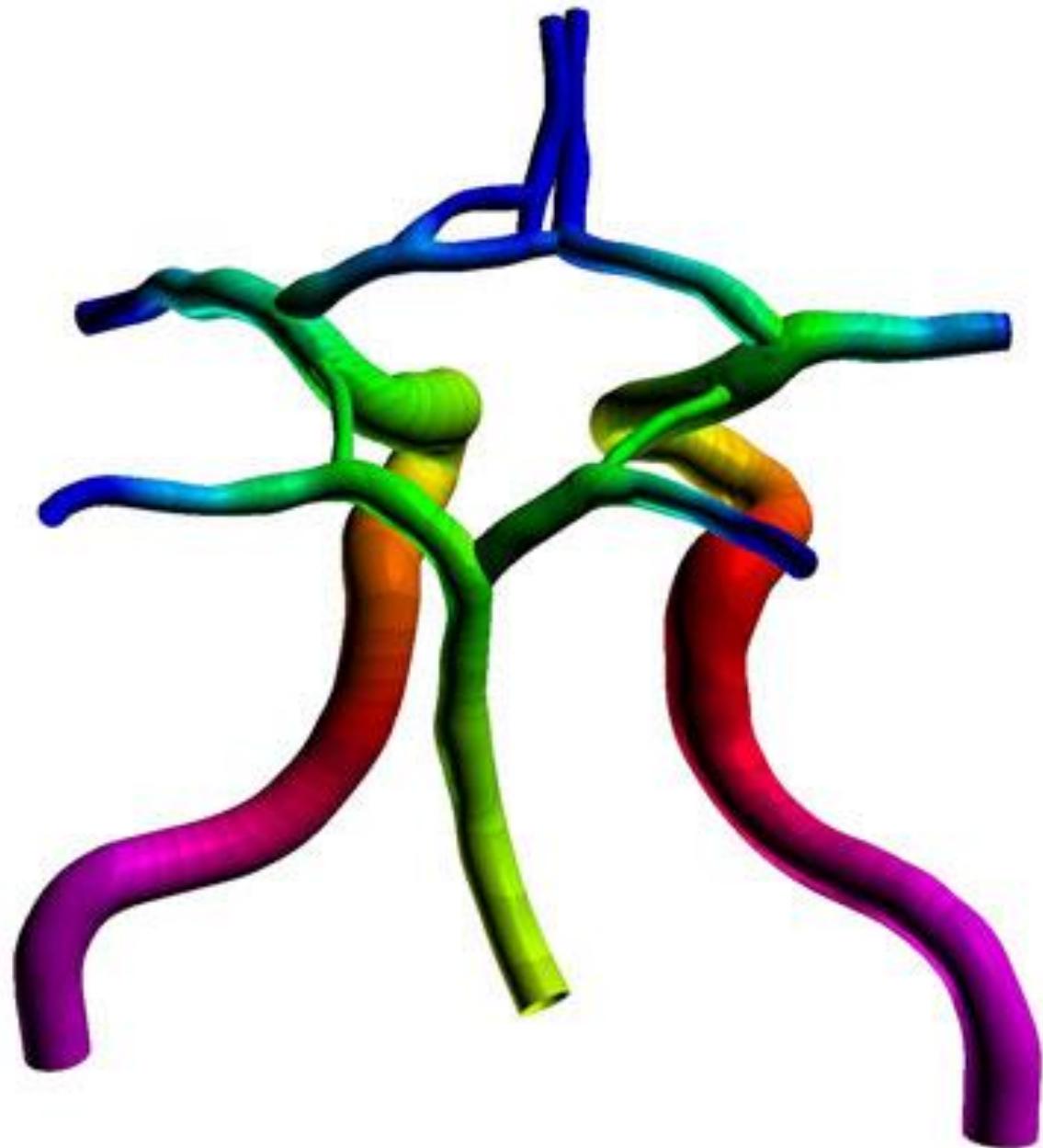


**> = posterior  
communicating A**

OPART



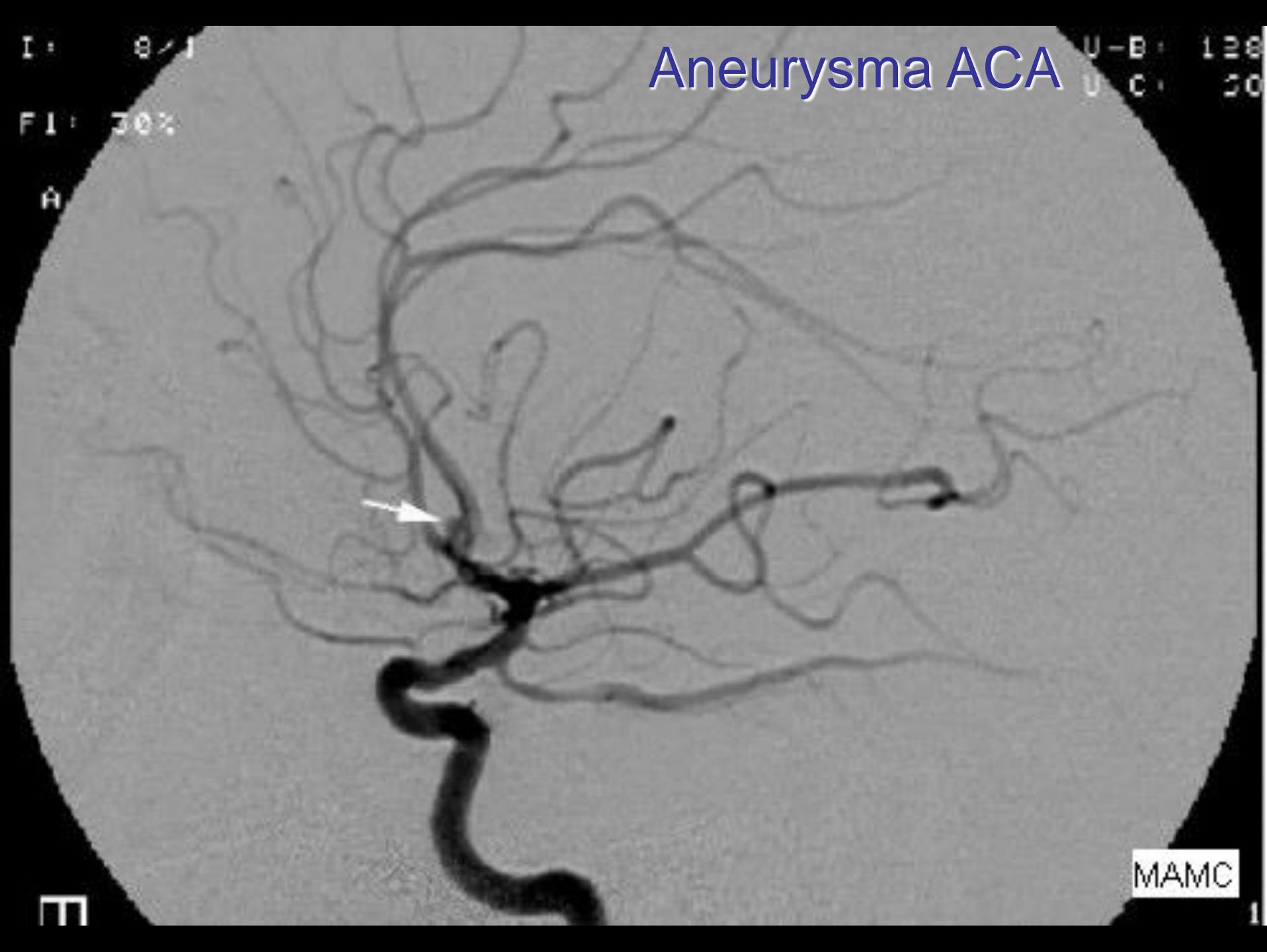




21-7  
21.72

TR 20  
\*  
1 SAT SET  
TE 37.0  
TL 6.5/1  
TR 15.0

SP 5.  
SL 124.  
Pov 145\*22  
192 \*5120  
Trs-Cor -3



# Aneurysma ACA

U-B: 128  
U-C: 50

I: 8/1

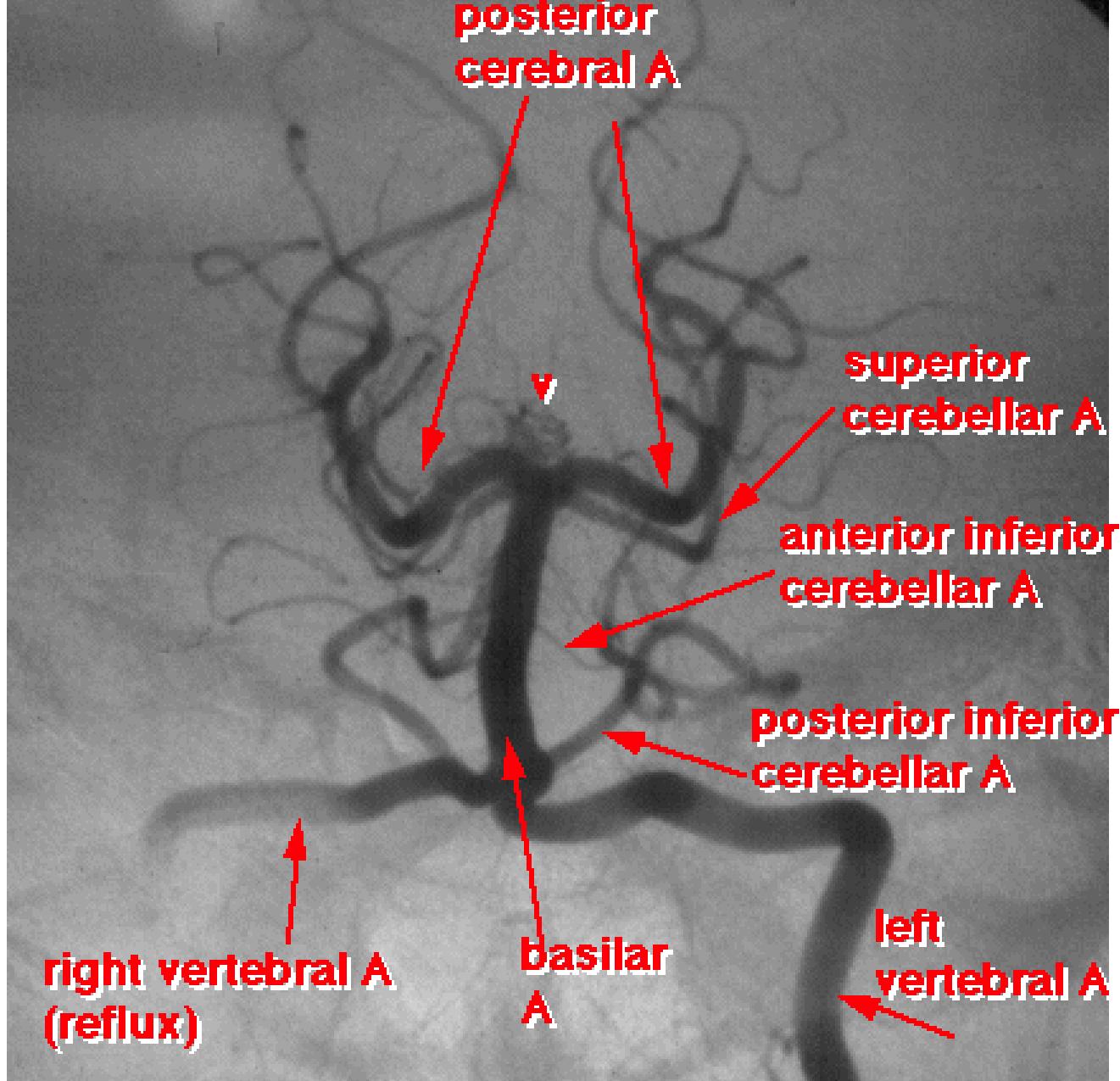
FI: 30%

A

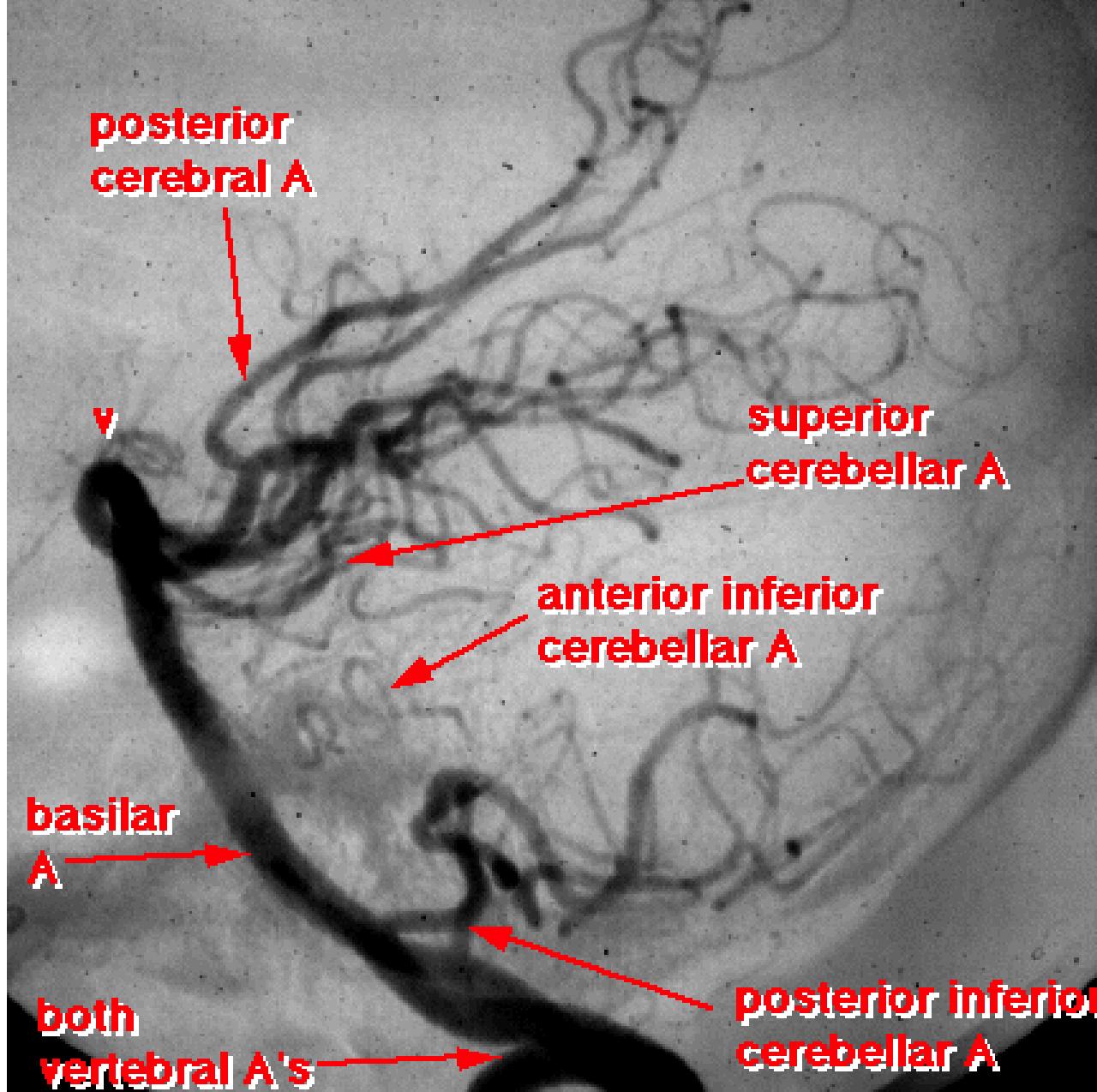
M

MAMC

1



v =perforators off the top  
of the basilar



\* =perforators off the top  
of the basilar

