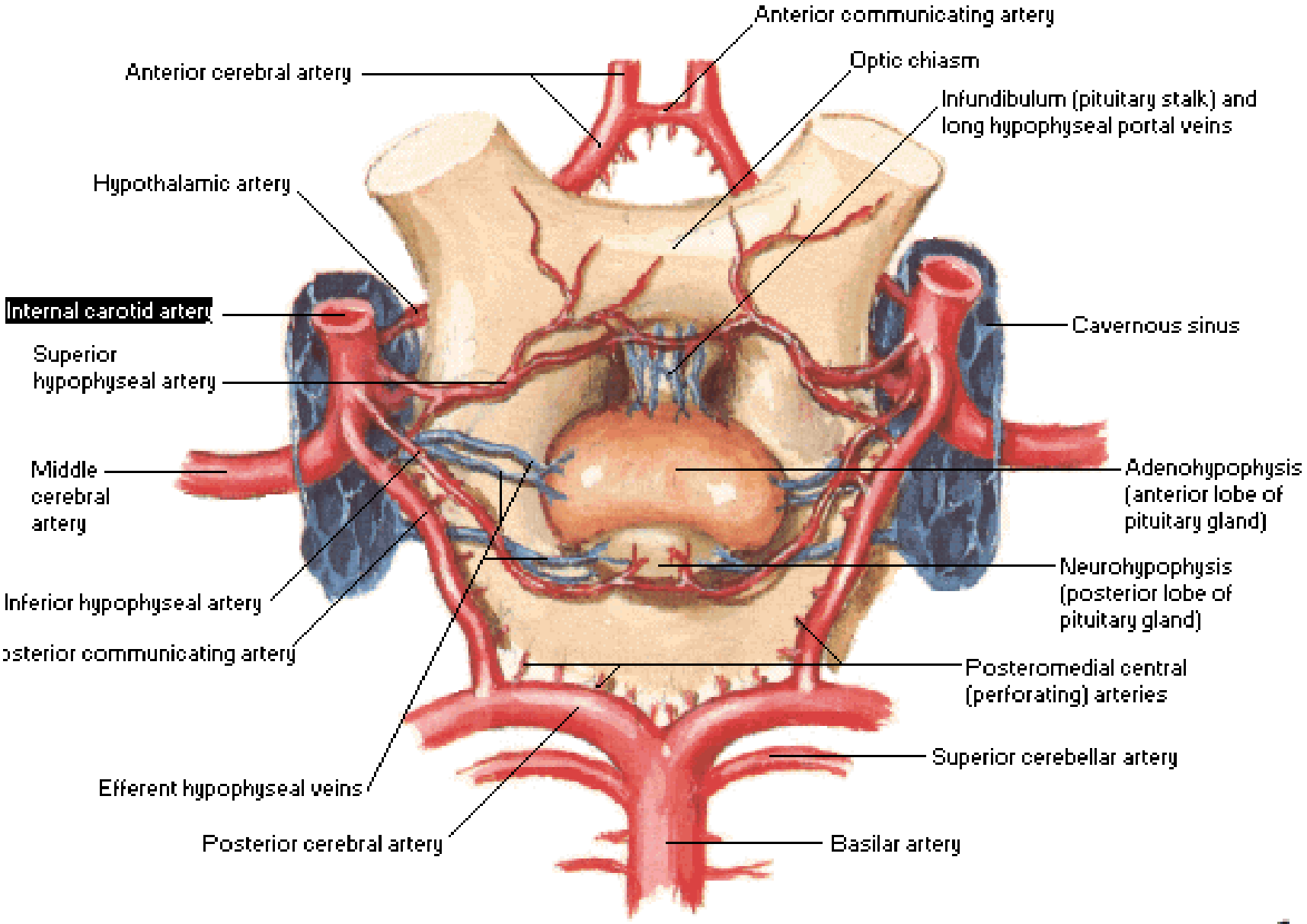
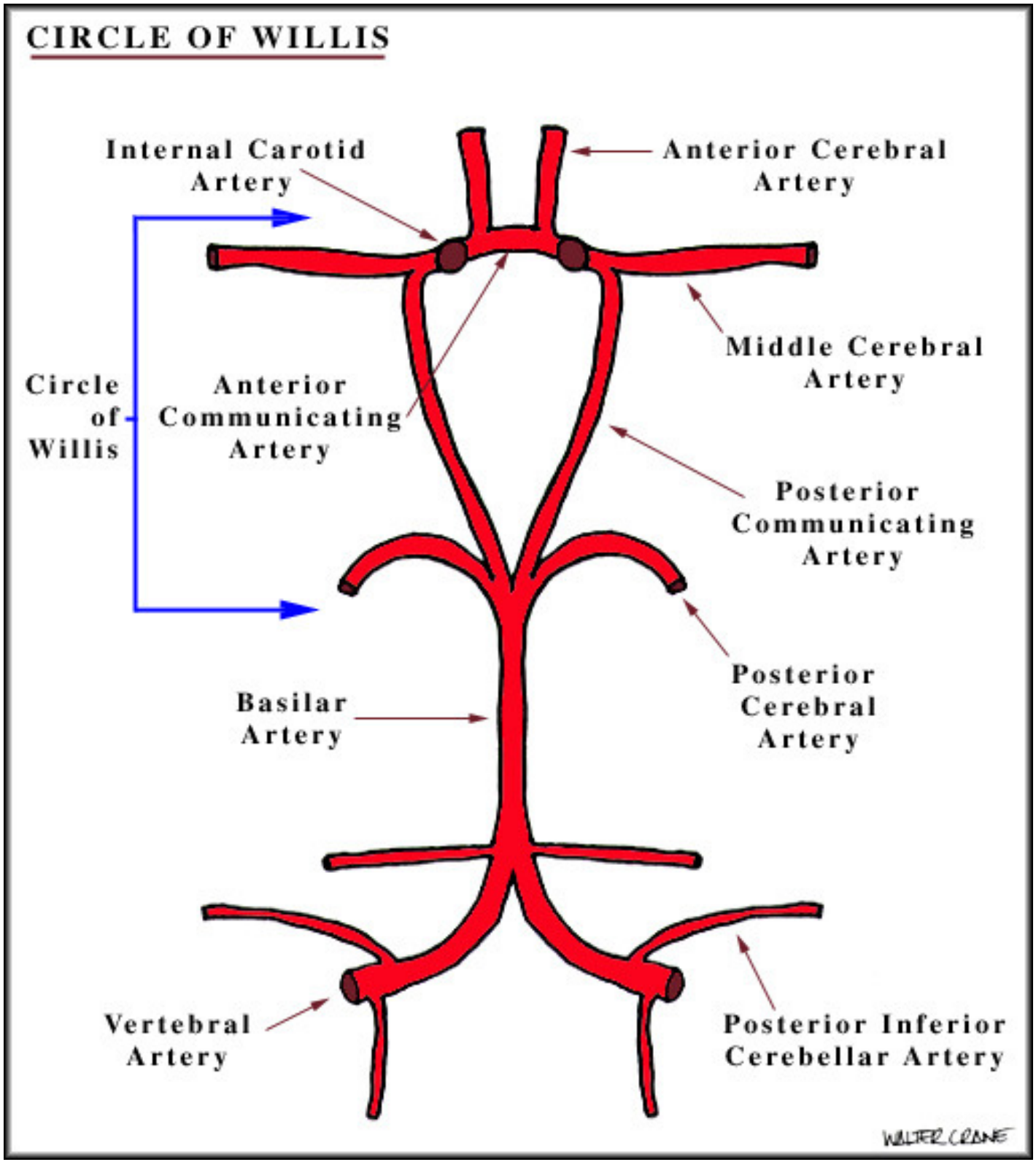
Basilar artery

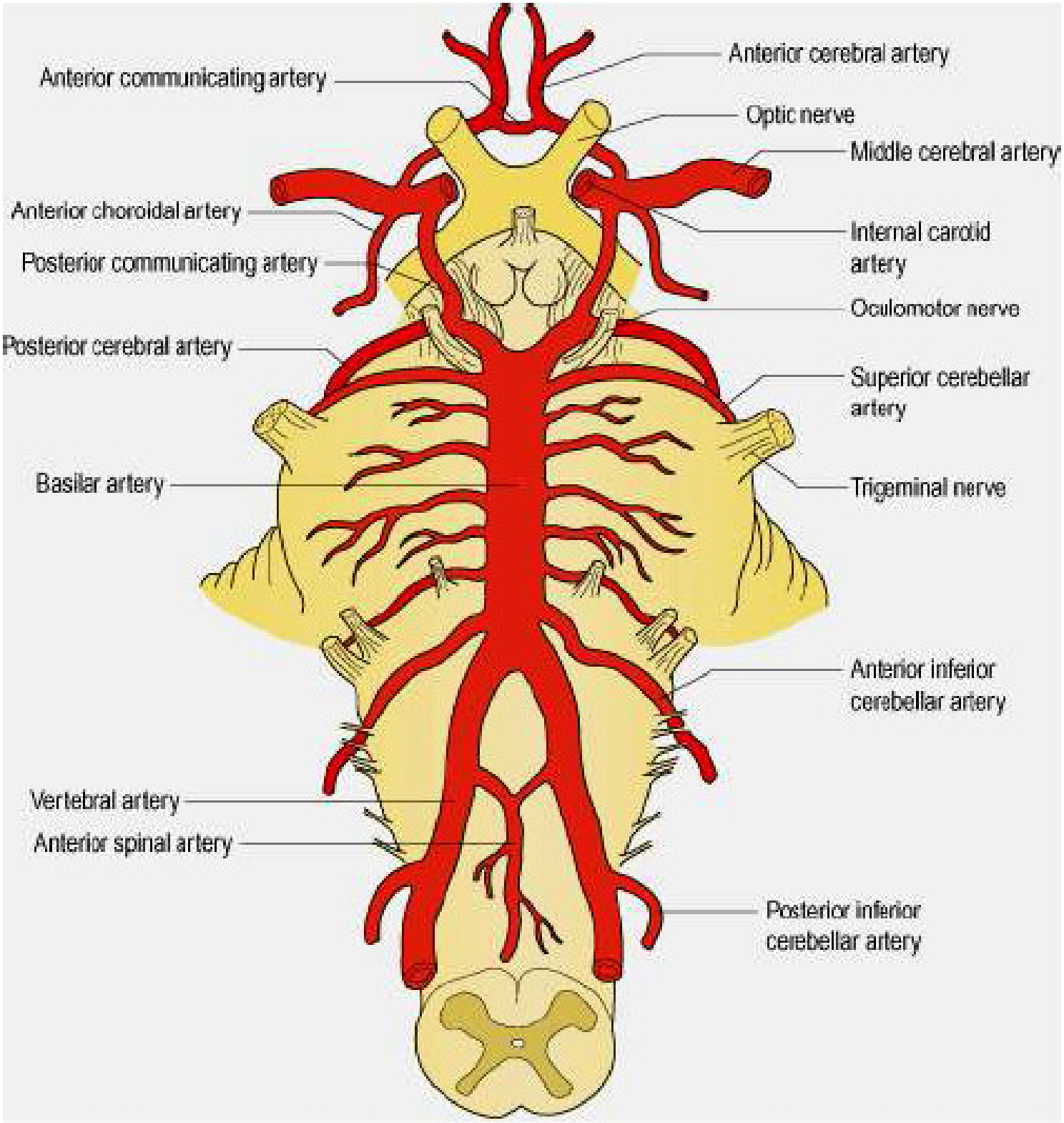
- Formed by the **union** of the two vertebral arteries at the **lower border** of the **pons**
- Ascends on the front of the pons lodged in the **basilar groove**
- Ends at the **upper border** of the pons by dividing into 2 **Posterior cerebral arteries (PCA)**

Cerebral Arterial Circle [Willis] - Vessels in Situ

Inferior View

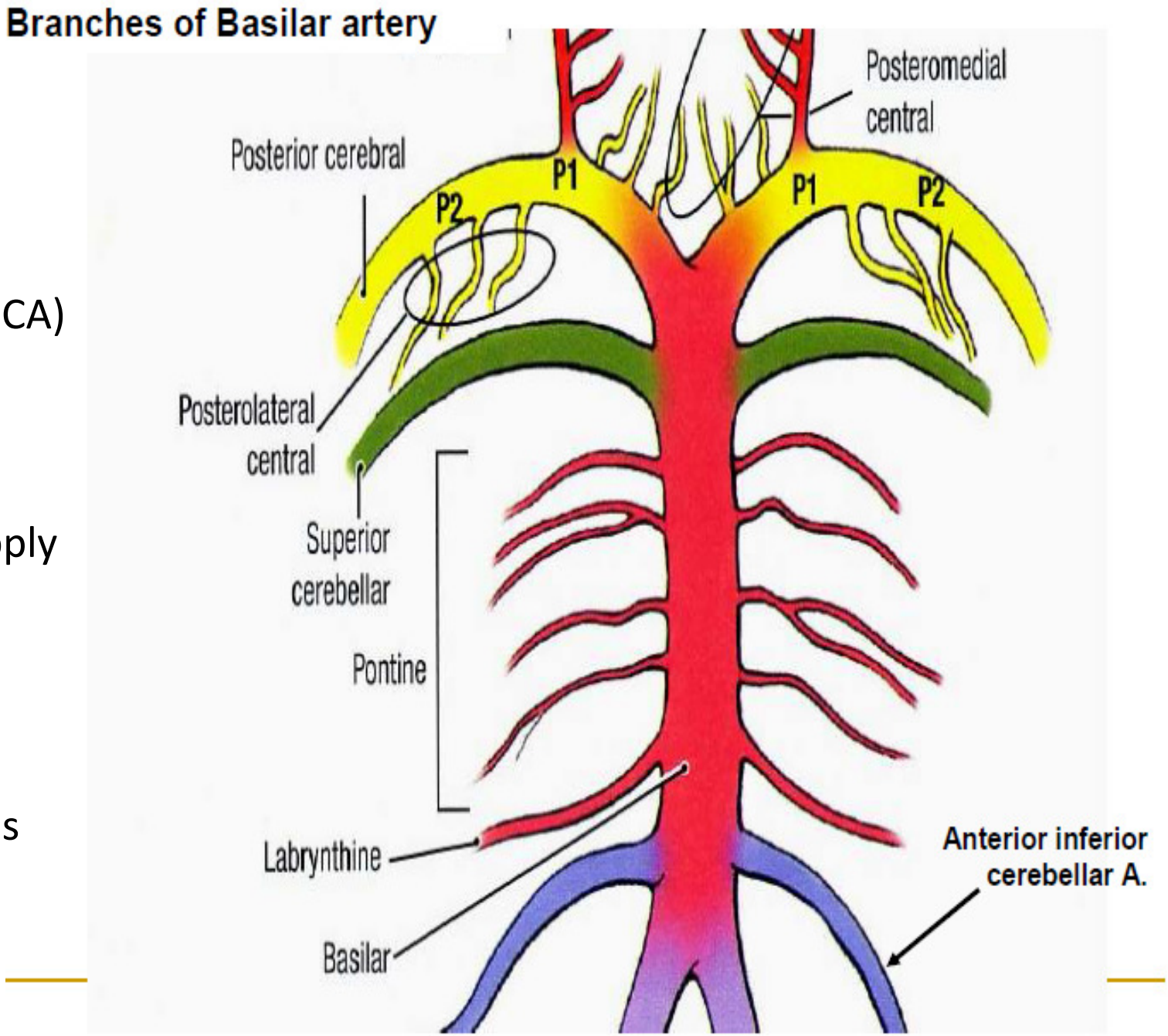



CIRCLE OF WILLIS
Internal Carotid Artery
Anterior Cerebral Artery
Middle Cerebral Artery
Circle of Willis
Anterior Communicating Artery
Posterior Communicating Artery
Posterior Cerebral Artery
Basilar Artery
Vertebral Artery
Posterior Inferior Cerebellar Artery
WALTER CRANE

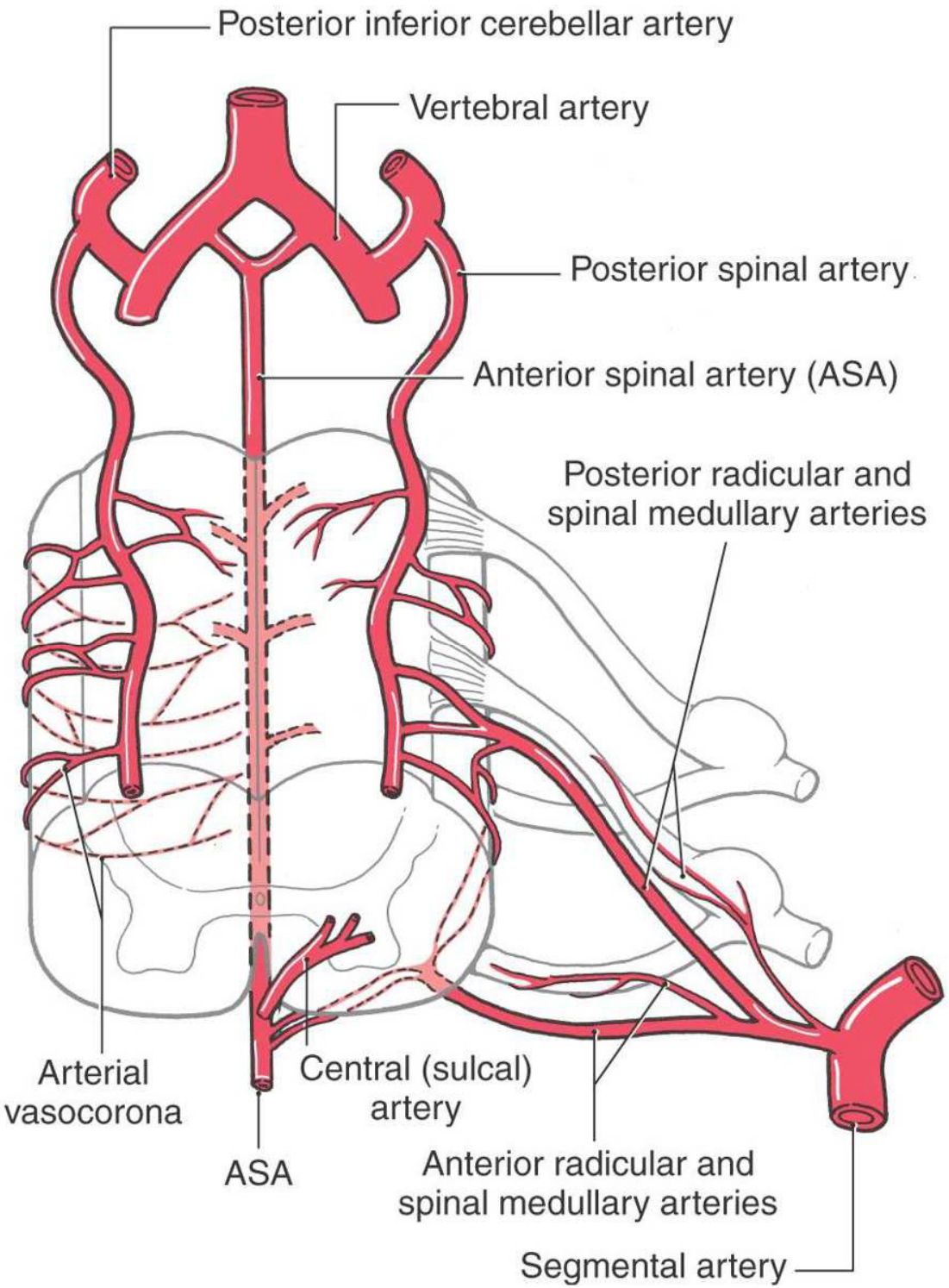

Anterior communicating artery
Anterior cerebral artery
Optic nerve
Middle cerebral artery
Anterior choroidal artery
Internal carotid artery
Posterior communicating artery
Oculomotor nerve
Posterior cerebral artery
Superior cerebellar artery
Basilar artery
Trigeminal nerve
Anterior inferior cerebellar artery
Vertebral artery
Anterior spinal artery
Posterior inferior cerebellar artery

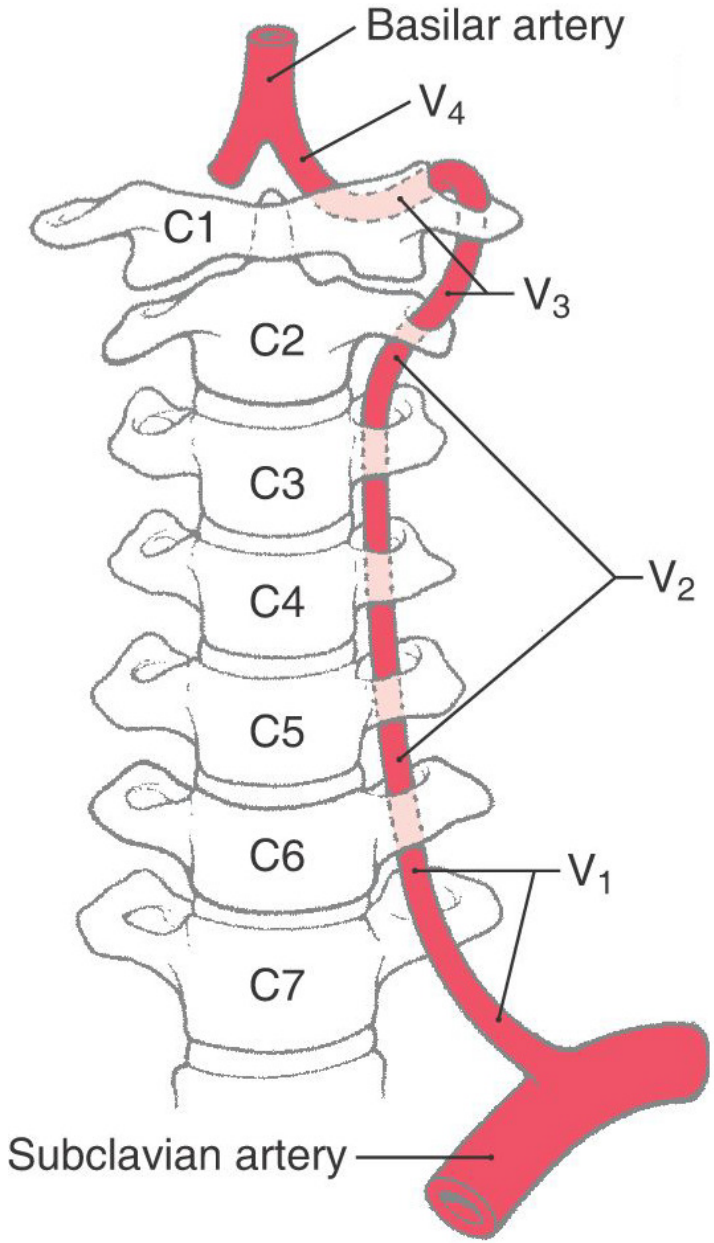
Basilar artery

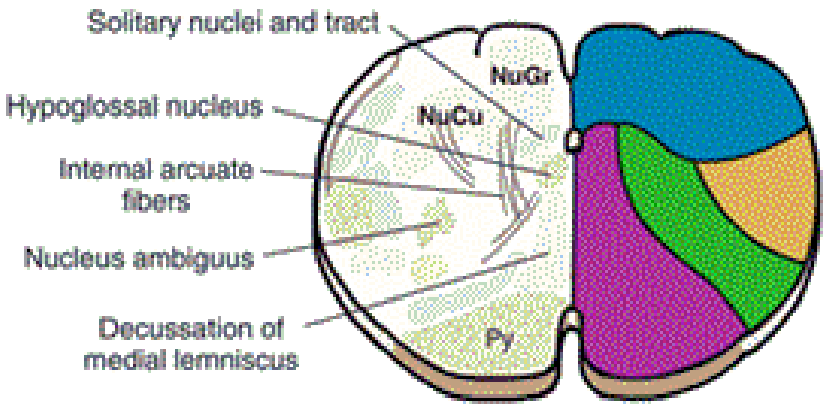
- Branches of basilar artery
- ➢ anterior inferior cerebellar artery (AICA) supplies inferior surface of the cerebellum
- ➢ Pontine arteries supply pons
- ➢ superior cerebellar artery supplies superior surface of cerebellum and pons



Blood supply of spinal cord





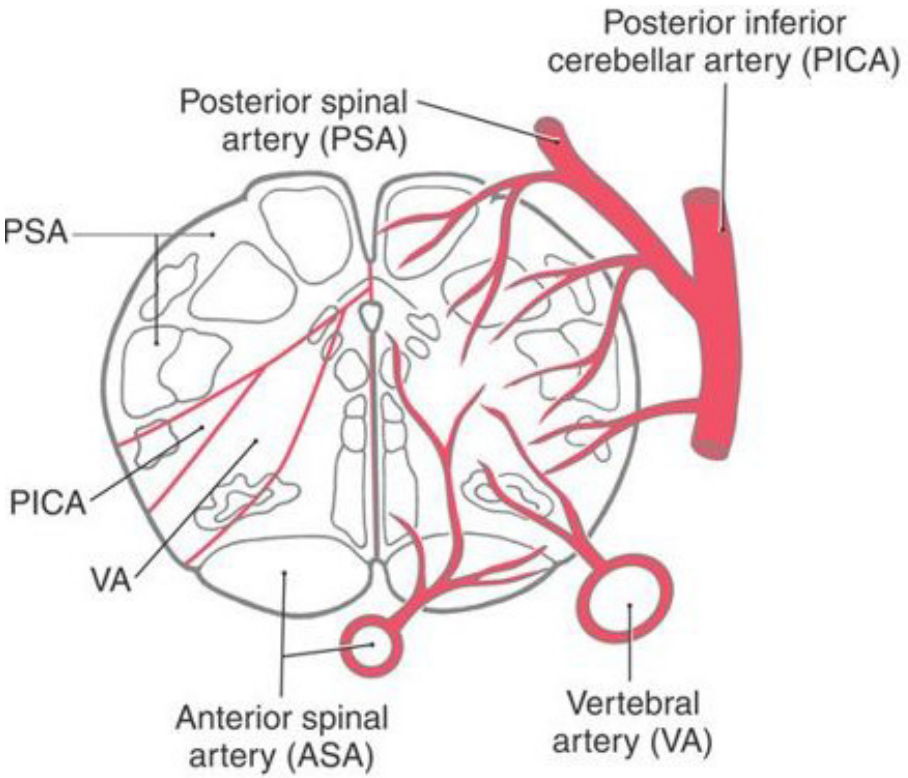


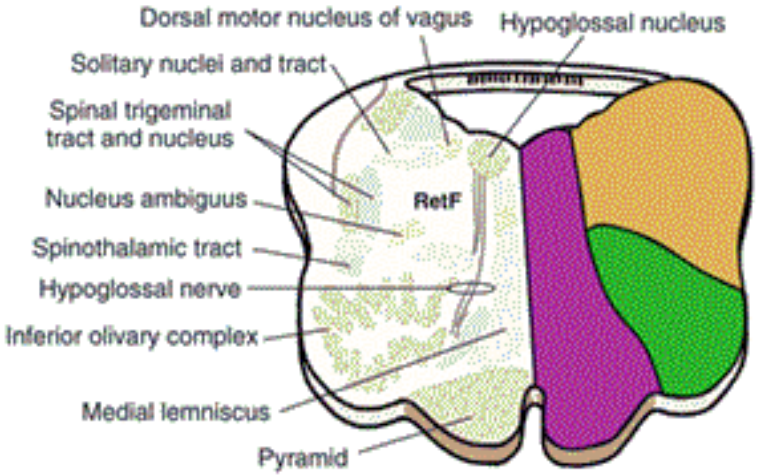
Anterior spinal artery

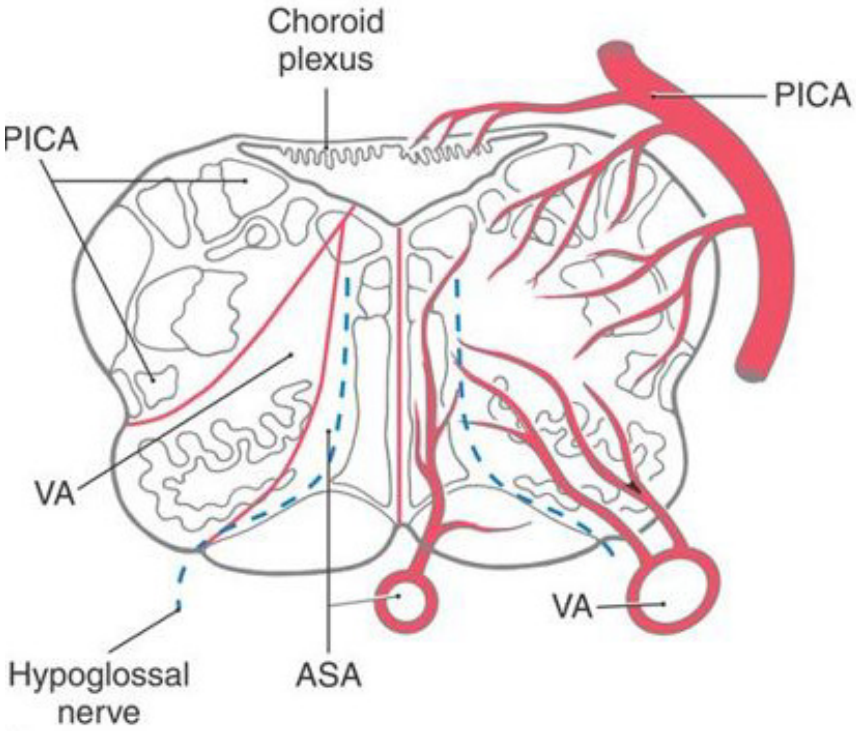
Posterior spinal artery

Vertebral artery

Posterior inferior cerebellar artery







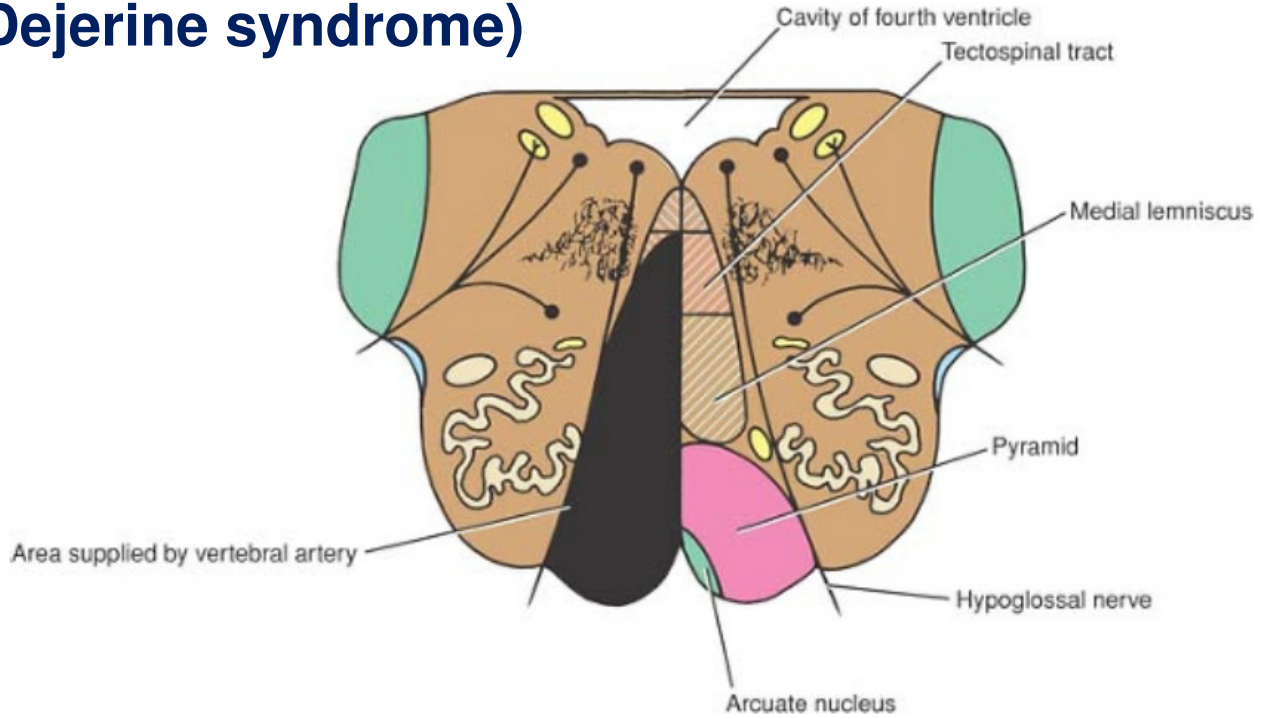
Medial medullary syndrome (Dejerine syndrome)

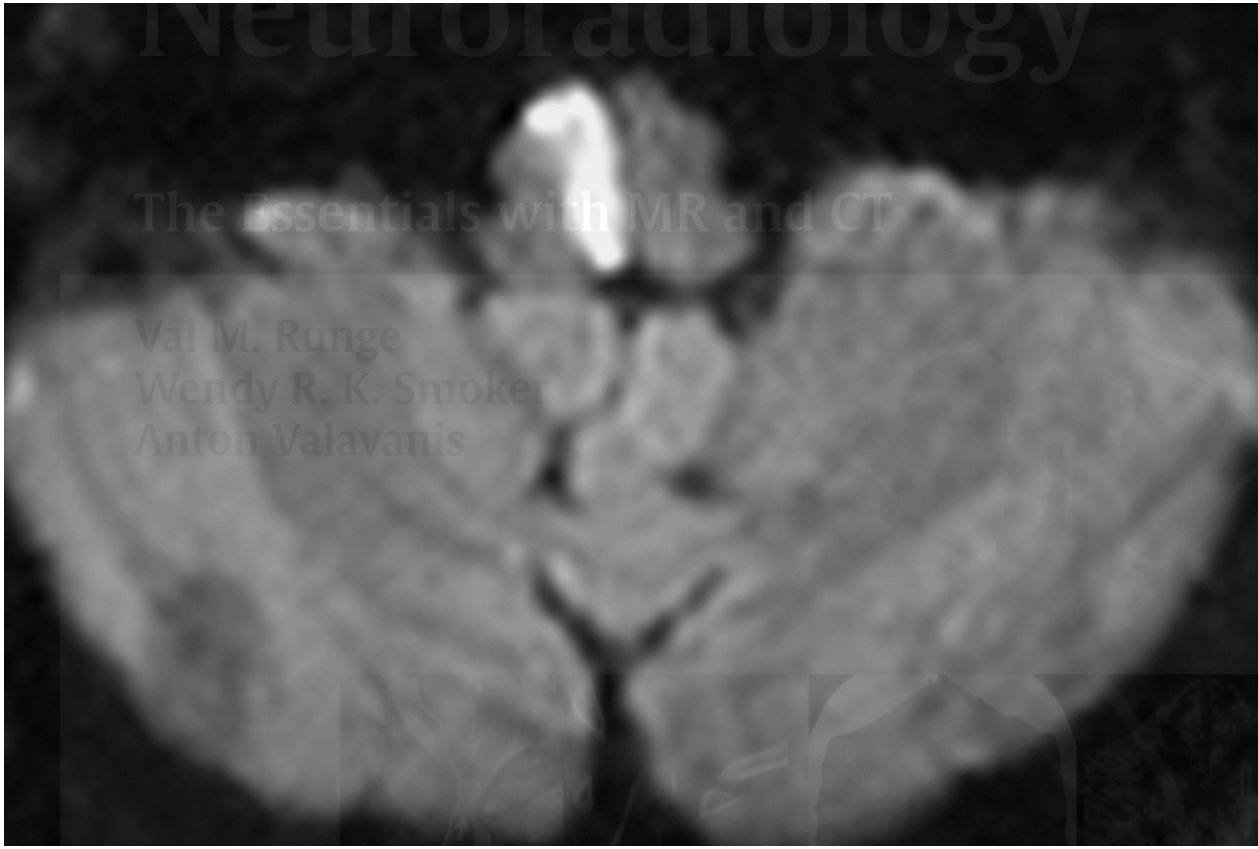
- Symptoms

➢ Contralateral hemiparesis(pyramidal and corticospinal damage)

➢ Contralateral loss of proprioception and vibratory sense (medial lemniscus)

➢ Deviation of the tongue to the ipsilateral side when it is protruded (hypoglossal root or nucleus injury)

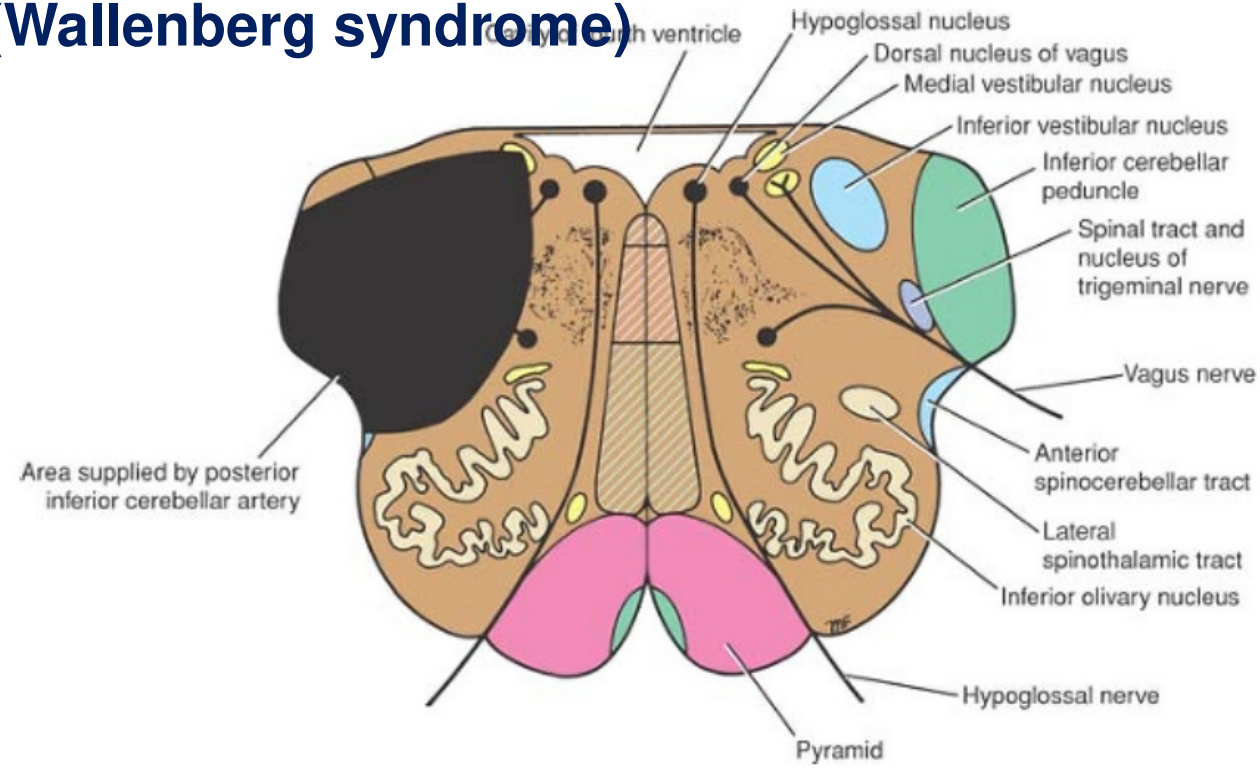


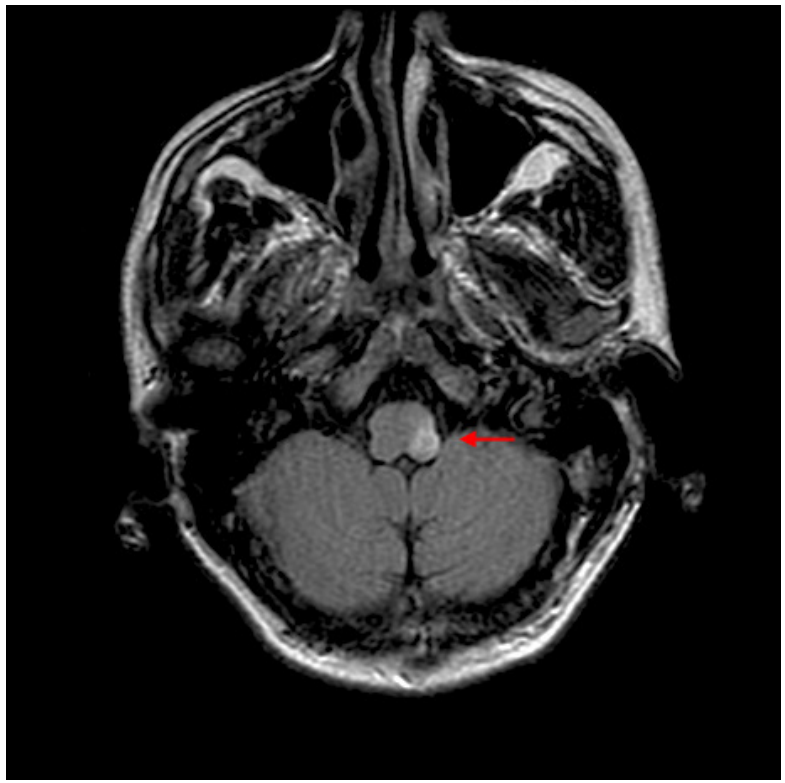


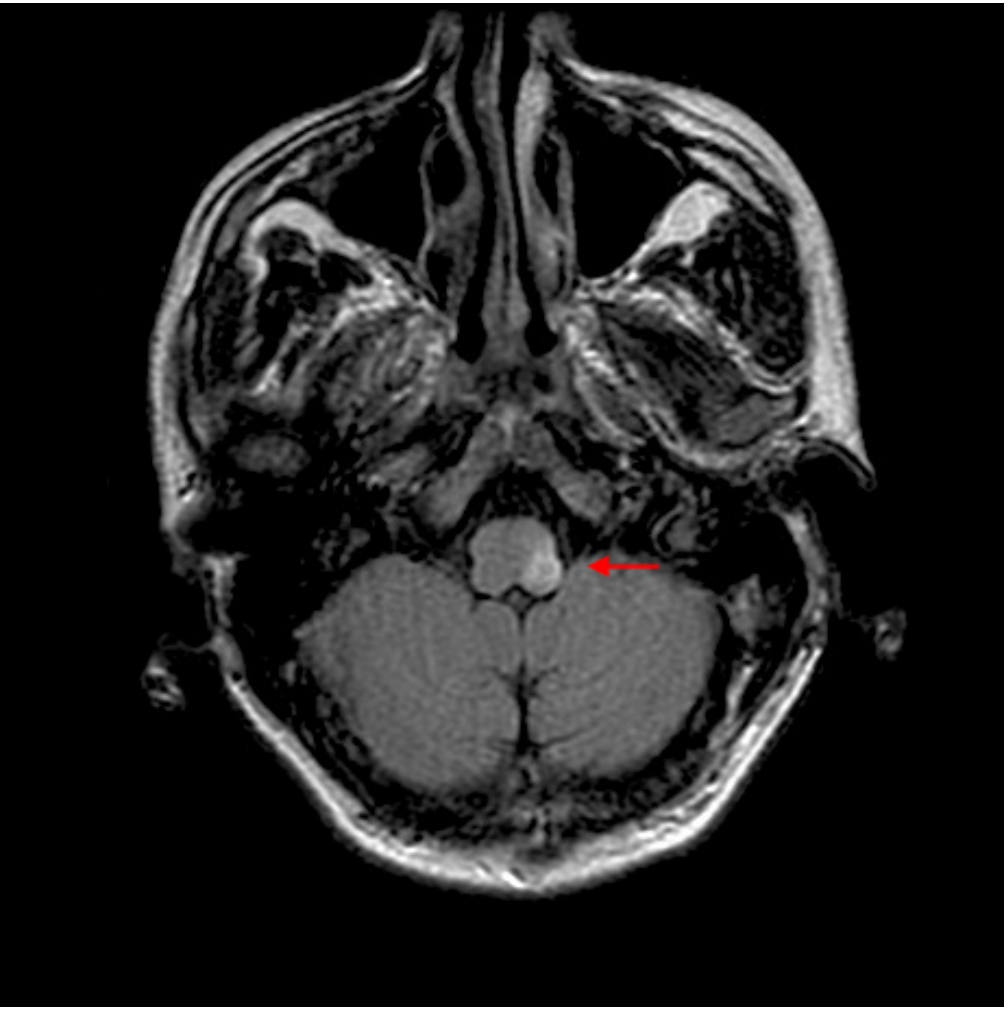
Lateral medullary syndrome (Wallenberg syndrome)

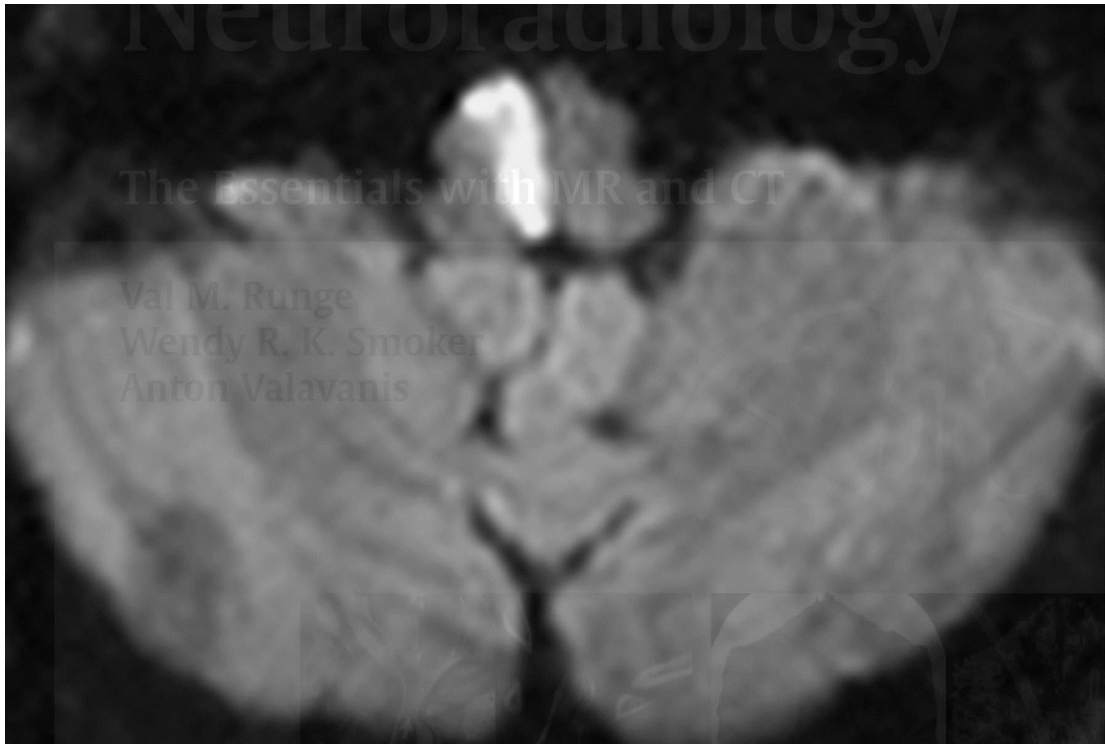
- Symtoms

- contralateral loss of pain and temperature sensation from the body (anterolateral system)
- ipsilateral loss of pain and temperature sensation from the face (spinal trigeminal tract and nucleus),
- vertigo and nystagmus (vestibular nuclei),
- loss of taste from the ipsilateral half of the tongue (solitary tract and nucleus),
- hoarseness and dysphagia (nucleus ambiguus or roots of cranial nerves IX and X)
- **Ipsilateral Horner syndrome:** hypothalamospinal fibers



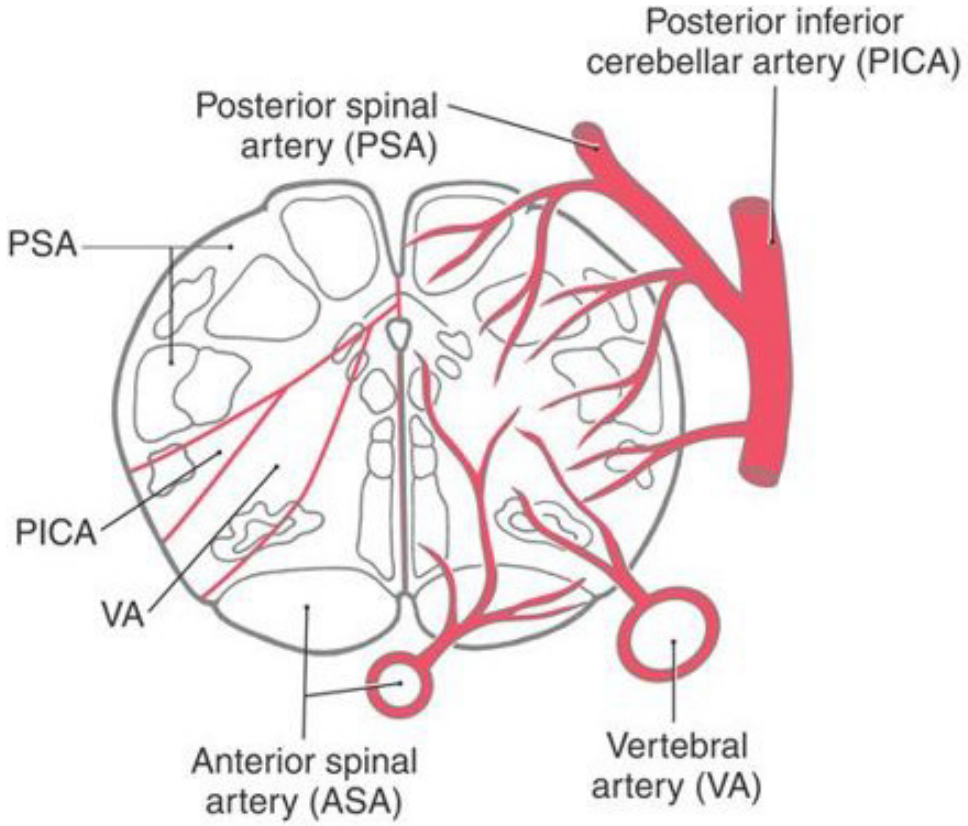


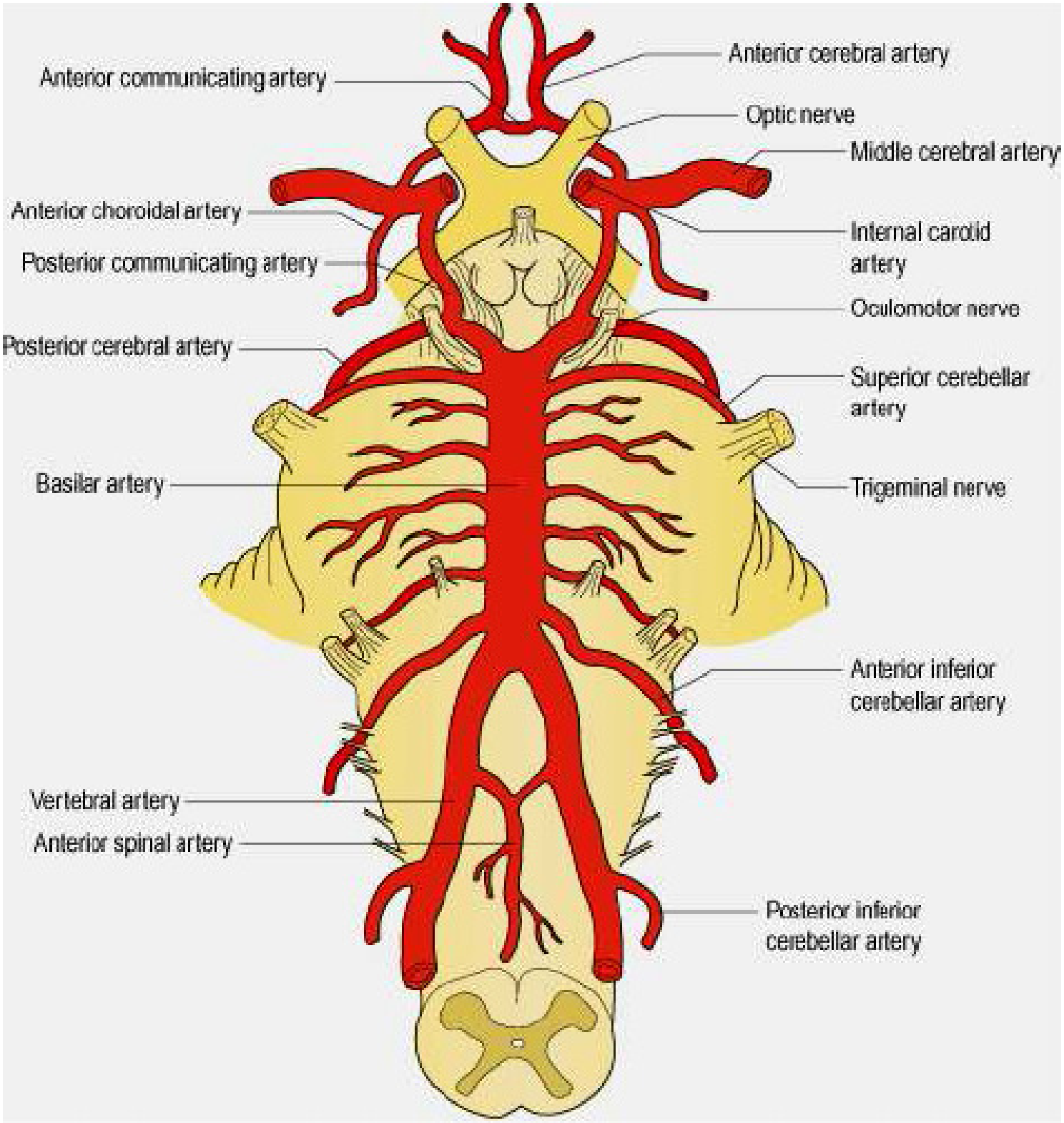



Neuroradiology
The Essentials with MR and CT
Val M. Runge
Wendy R. K. Smoker
Anton Valavanis

Vascular lesions of the posterior spinal artery

- Symptoms
- ➢ ipsilateral loss of proprioception and vibratory sense
- ➢ ipsilateral loss of pain and temperature sensation from the face




Anterior communicating artery
Anterior cerebral artery
Optic nerve
Middle cerebral artery
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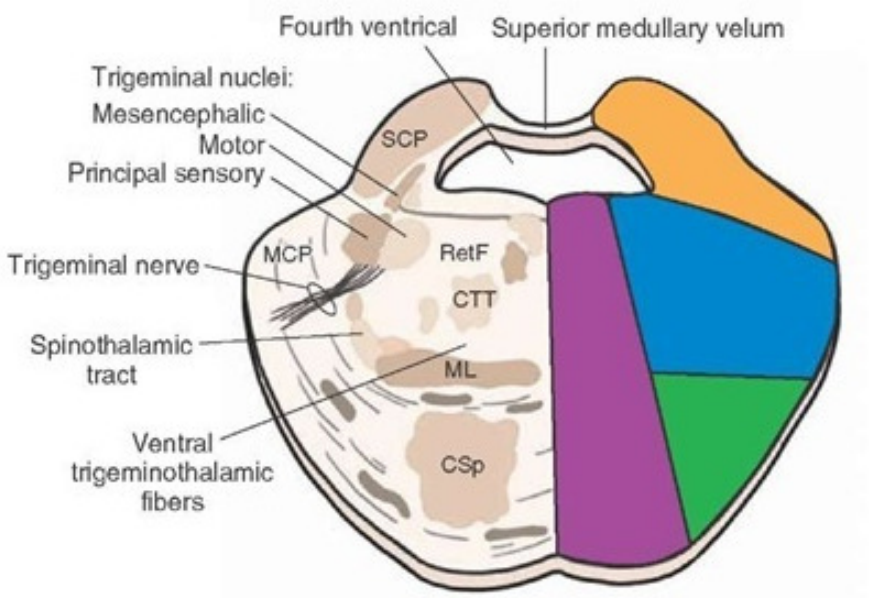
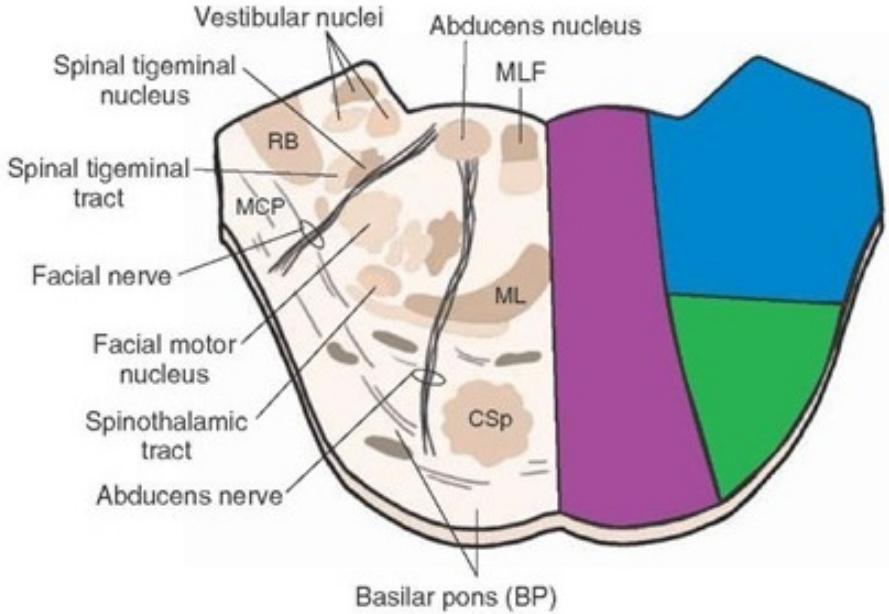
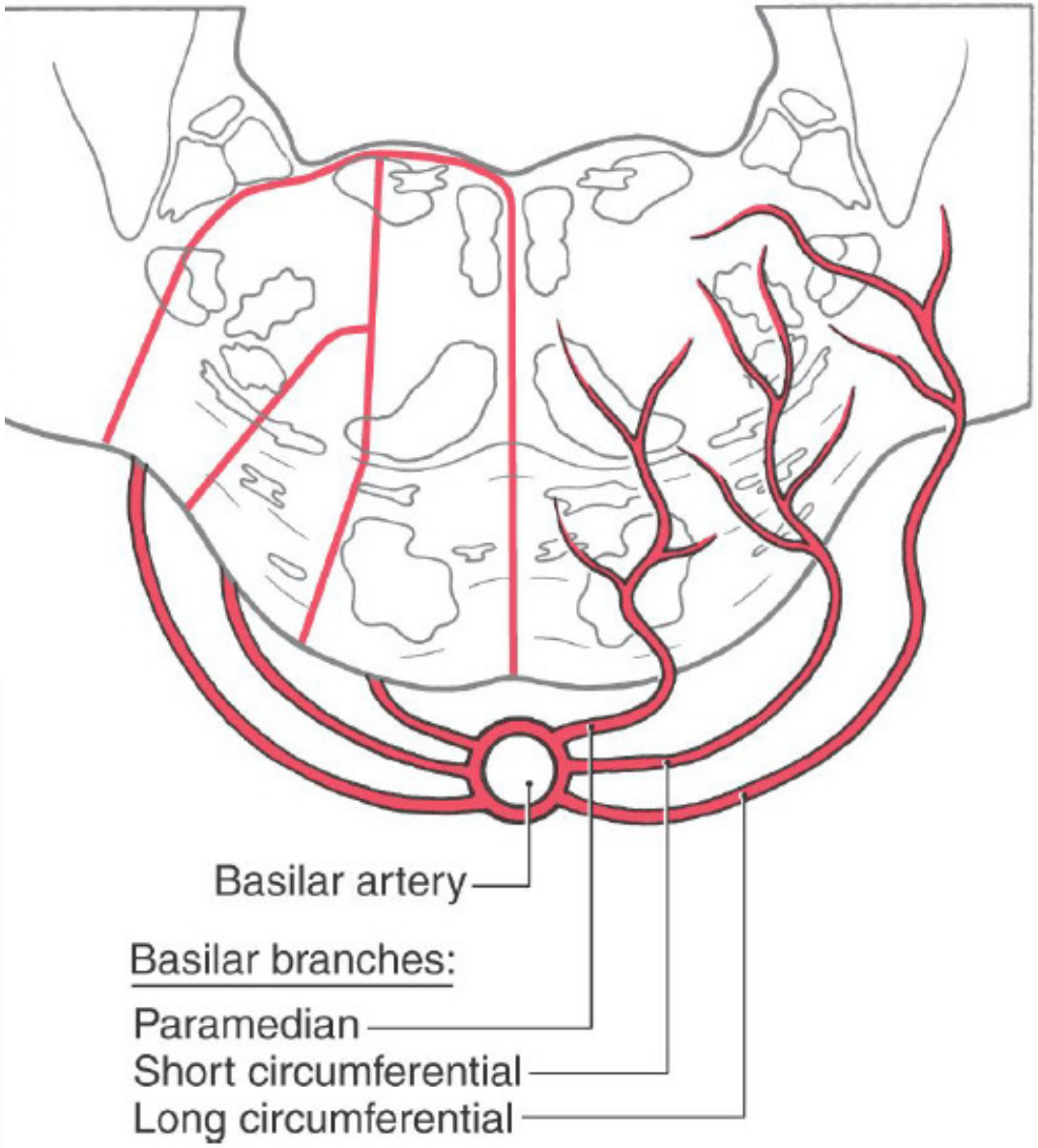
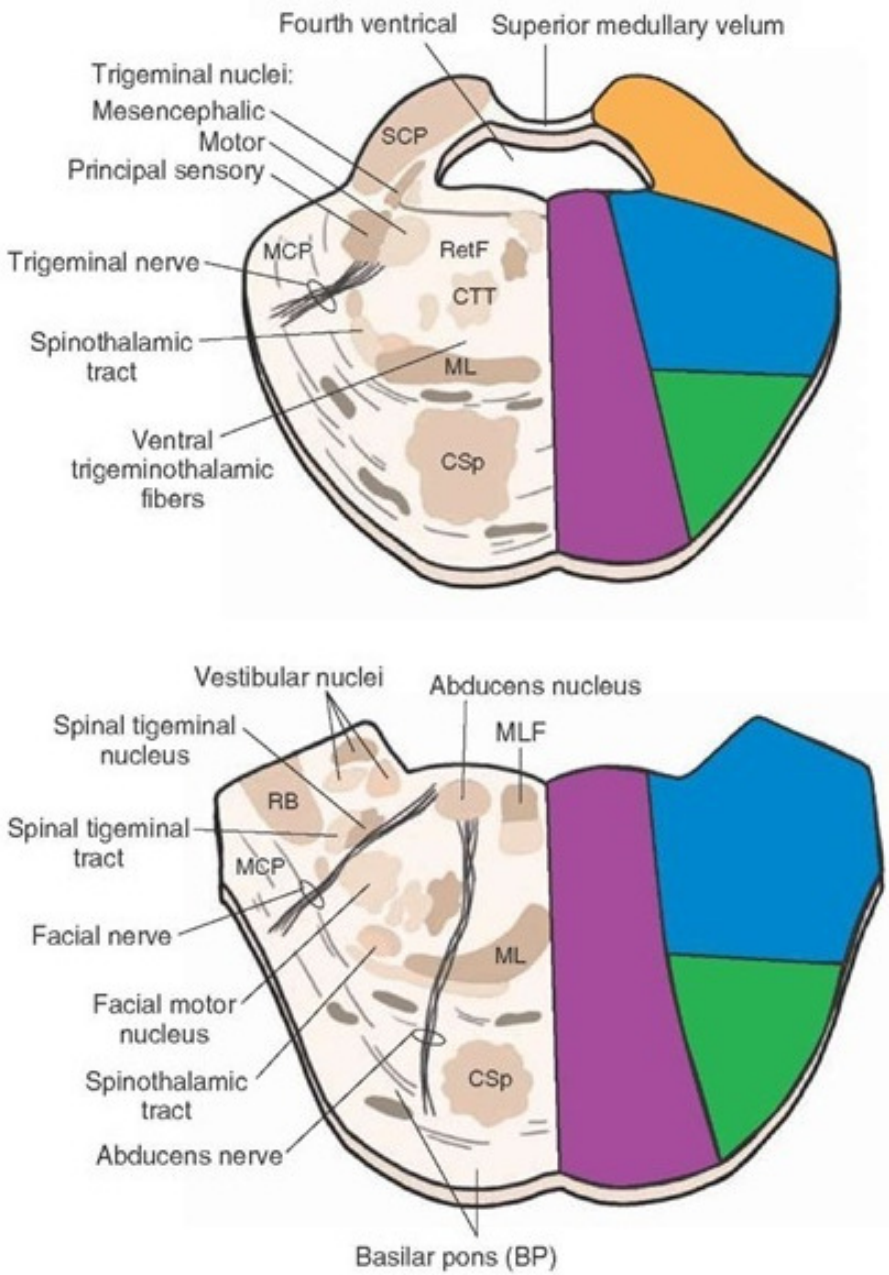
Internal carotid artery
Posterior communicating artery
Oculomotor nerve
Posterior cerebral artery
Superior cerebellar artery
Basilar artery
Trigeminal nerve
Anterior inferior cerebellar artery
Vertebral artery
Anterior spinal artery
Posterior inferior cerebellar artery


Fourth ventrical
Superior medullary velum
Trigeminal nuclei:
Mesencephalic
Motor
Principal sensory
SCP
Trigeminal nerve
MCP
RetF
CTT
Spinothalamic tract
ML
Ventral trigeminothalamic fibers
CSp


Vestibular nuclei
Abducens nucleus
Spinal tigeminal nucleus
MLF
RB
Spinal tigeminal tract
MCP
Facial nerve
ML
Facial motor nucleus
Spinothalamic tract
CSp
Abducens nerve
Basilar pons (BP)


Basilar artery
Basilar branches:
Paramedian
Short circumferential
Long circumferential



Paramedian branches of basilar artery

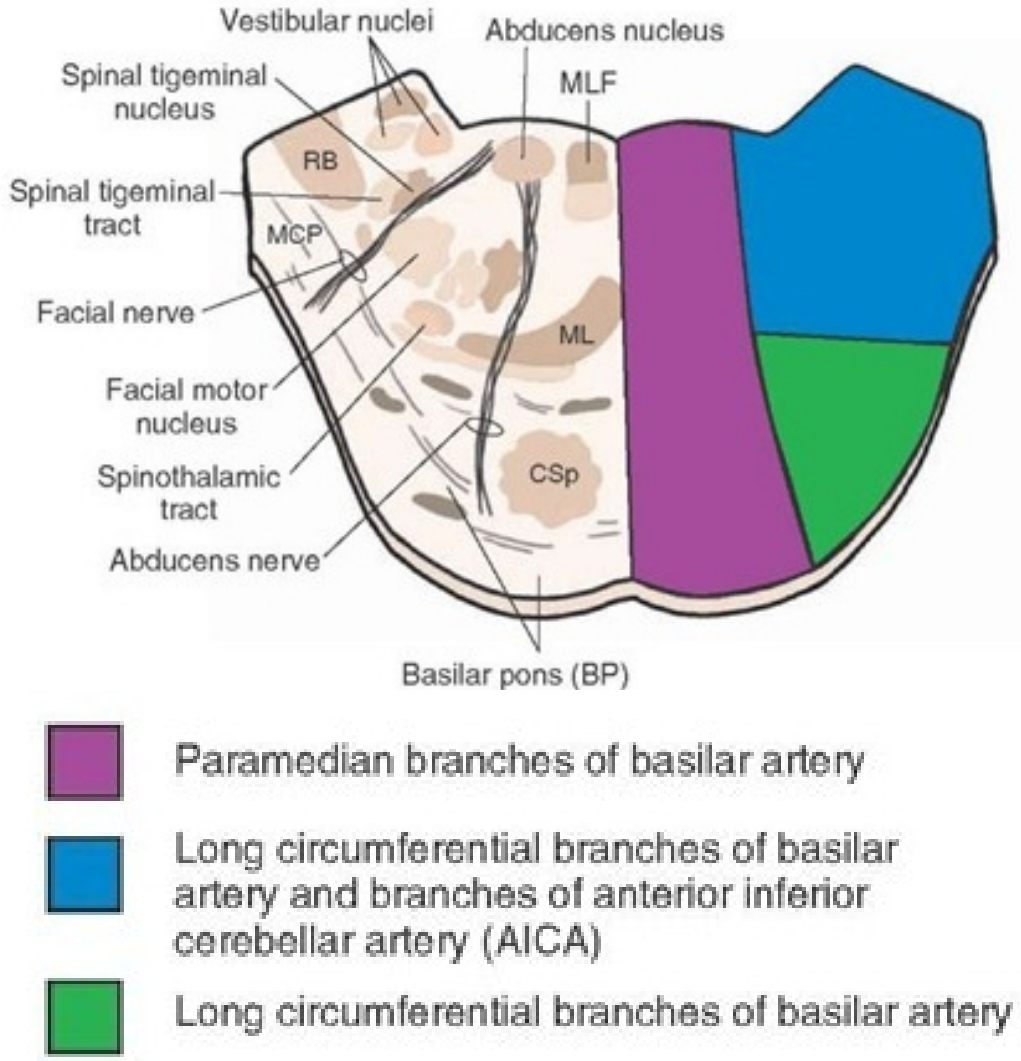
Long circumferential branches of basilar artery and branches of anterior inferior cerebellar artery (AICA)

Long circumferential branches of basilar artery

Long circumferential branches of basilar artery and branches of superior cerebellar artery (SCA)

Foville syndrome

- Due to: Occlusion of the paramedial branches
- ipsilateral abducens nerve paralysis
- contralateral hemiparesis
- variable contralateral sensory loss reflecting various degrees of damage to the medial lemniscus

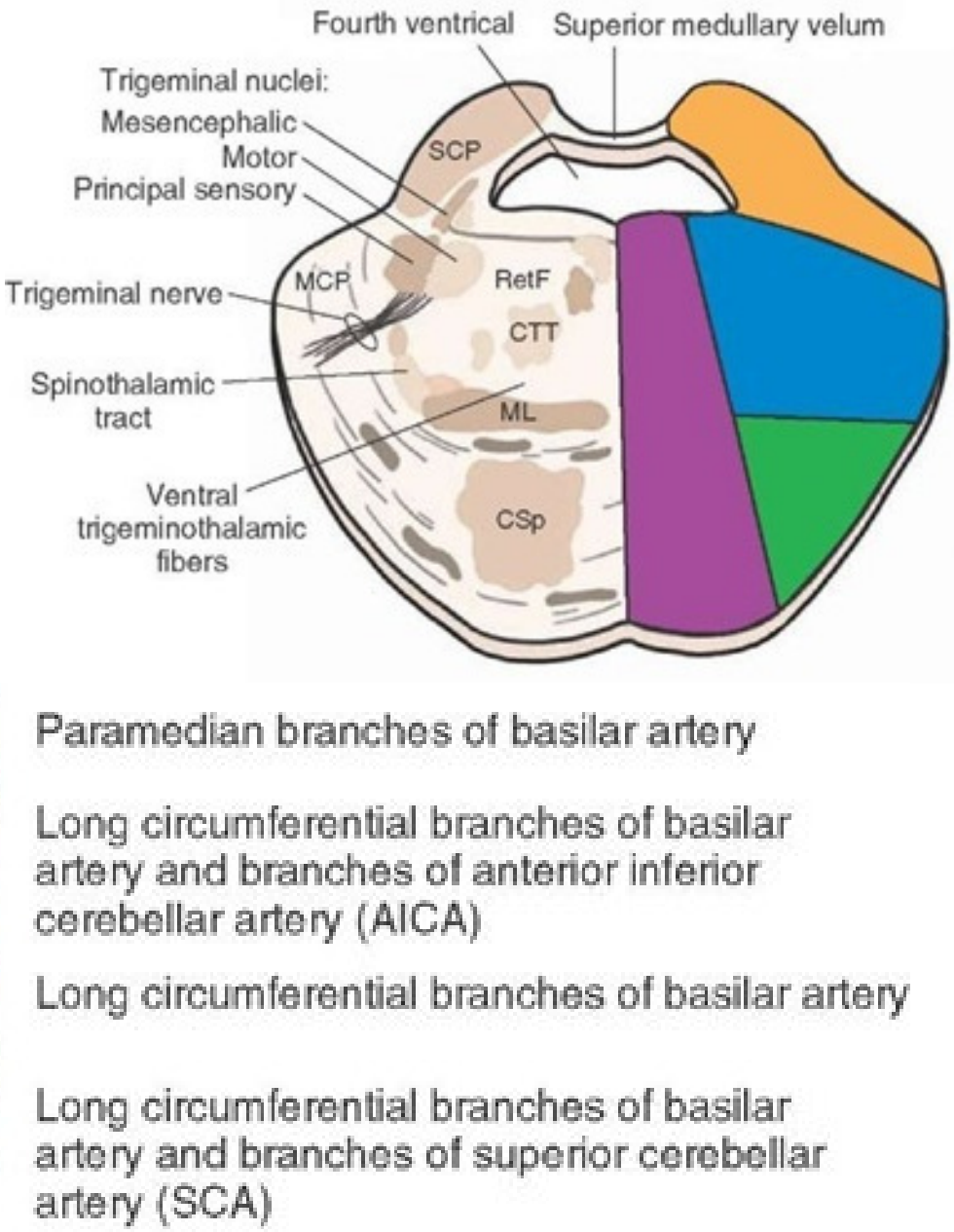


Millard-Gubler syndrome

- If the area of damage is shifted somewhat laterally to include the root of the **facial nerve along with corticospinal fibers, the patient has a contralateral** hemiparesis and an ipsilateral paralysis of the facial muscles

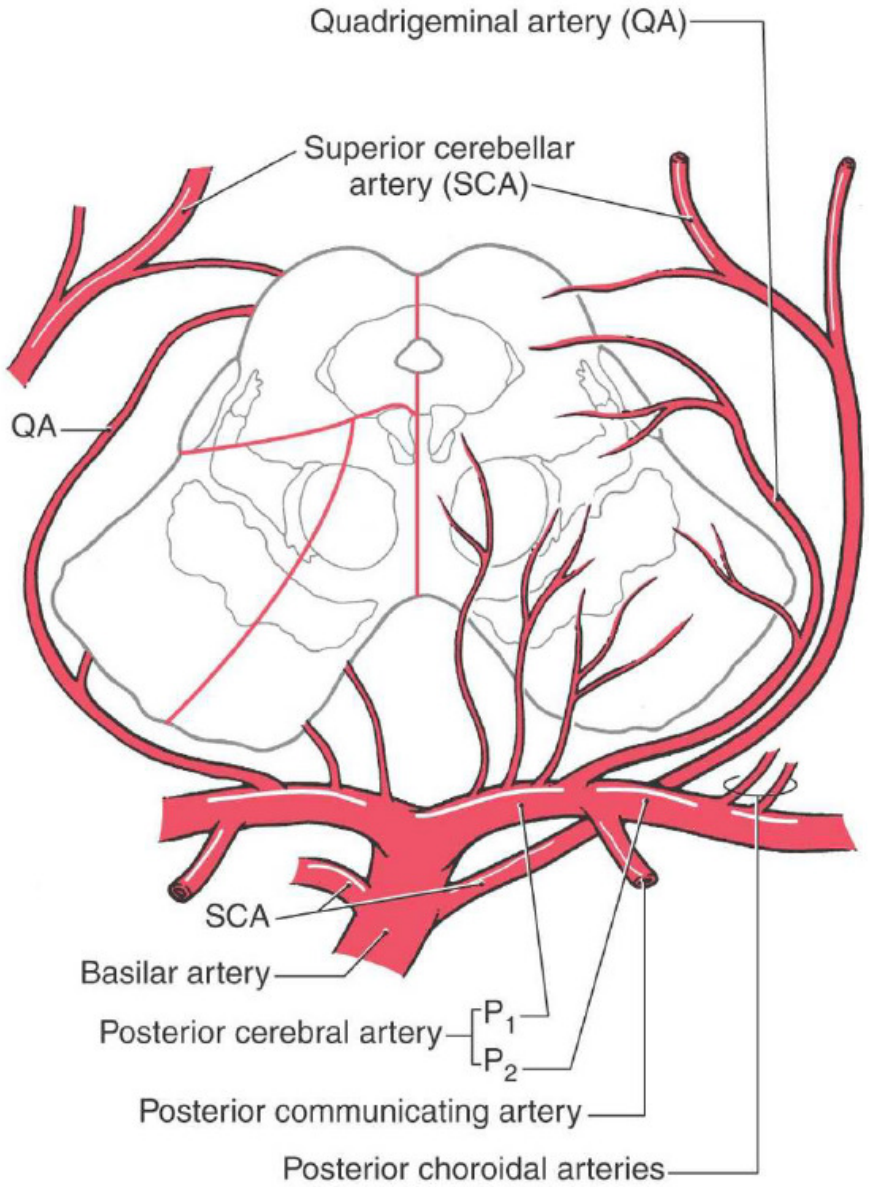
Syndrome of the midpontine base

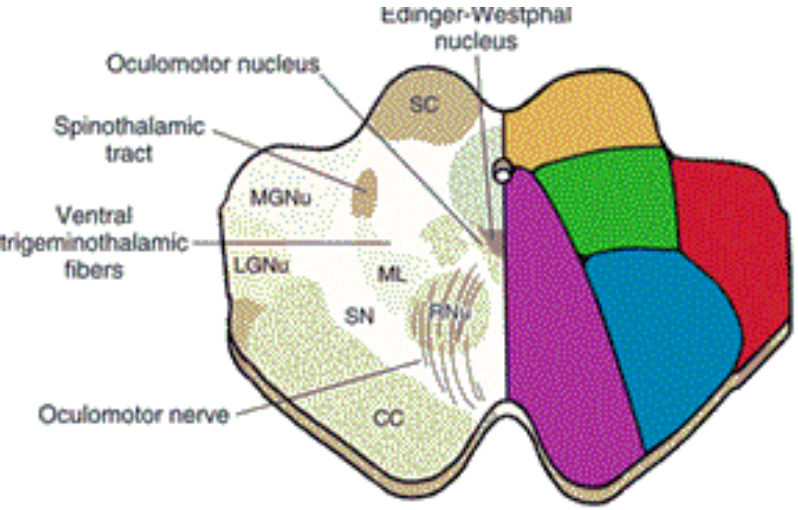
- Due to: Occlusion of the paramedial branches and short circumferential branches
- Corticospinal fibers (contralateral hemiparesis)
- Sensory and motor trigeminal roots (ipsilateral loss of pain and thermal sense and paralysis of the masticatory muscles),
- Fibers of the middle cerebellar peduncle (ataxia).

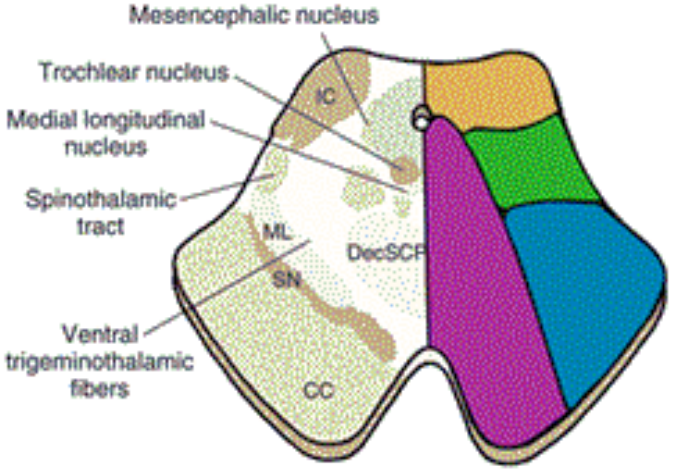


hallmark of brainstem vascular lesions, **ipsilateral cranial nerve sign coupled with a contralateral long tract sign**

- **Basilar artery**
  - **quadrigeminal**
  - **superior cerebellar arteries**
- **Internal carotid: anterior choroidal artery**
- **Posterior cerebral artery: medial posterior choroidal artery**







Anteromedial (paramedian) branches of basilar bifurcation and posterior cerebellar artery (paramedian branches)

Anterolateral (short circumferential) branches of the quadrigeminal and medial posterior choroidal arteries

Lateral branches of quadrigeminal (level of inferior colliculus) and posterior medial choroidal arteries (level of superior colliculus)

Quadrigeminal and superior cerebellar arteries (level of inferior colliculus), quadrigeminal and posterior medial choroidal arteries (level of superior colliculus)

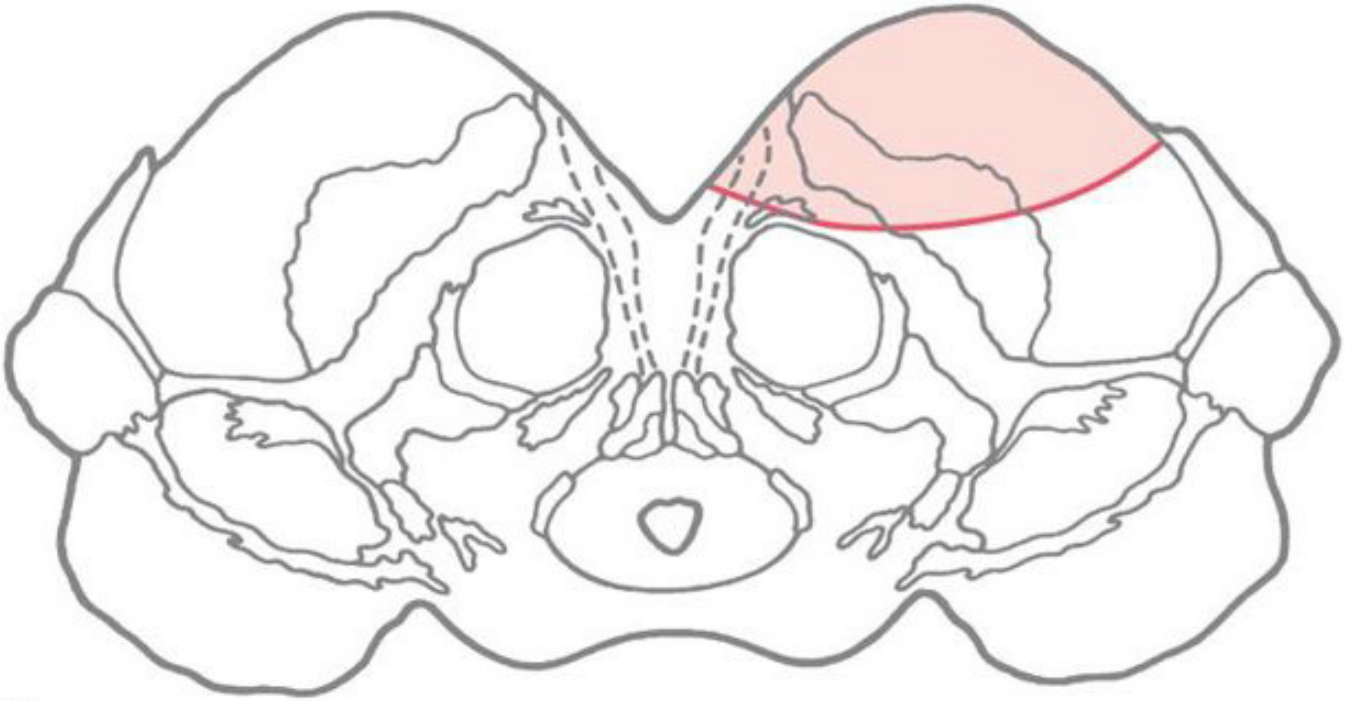
Thalamogeniculate artery posterior cerebral artery

paramedian branches
are the oculomotor, trochlear, and Edinger-Westphal nuclei; the exiting oculomotor fibers; the red nucleus; and medial aspects of the substantia nigra and crus cerebri
Medial regions of the midbrain receive numerous small branches from posterior cerebral artery and from the posterior communicating artery

Ventrolateral regions of the midbrain are served by penetrating branches of the **quadrigeminal artery the anterior choroidal artery, and the medial posterior choroidal artery.** The region served by these branches includes the lateral parts of the crus and substantia nigra and the medial lemniscus

The posterior midbrain is served primarily by the **quadrigeminal artery** which typically arises from posterior cerebral artery Much of the periaqueductal gray, the nuclei of the superior and inferior colliculi, the anterolateral system, and the brachium of the inferior colliculus are served by quadrigeminal branches. Additional blood supply medial branches of the superior cerebellar artery

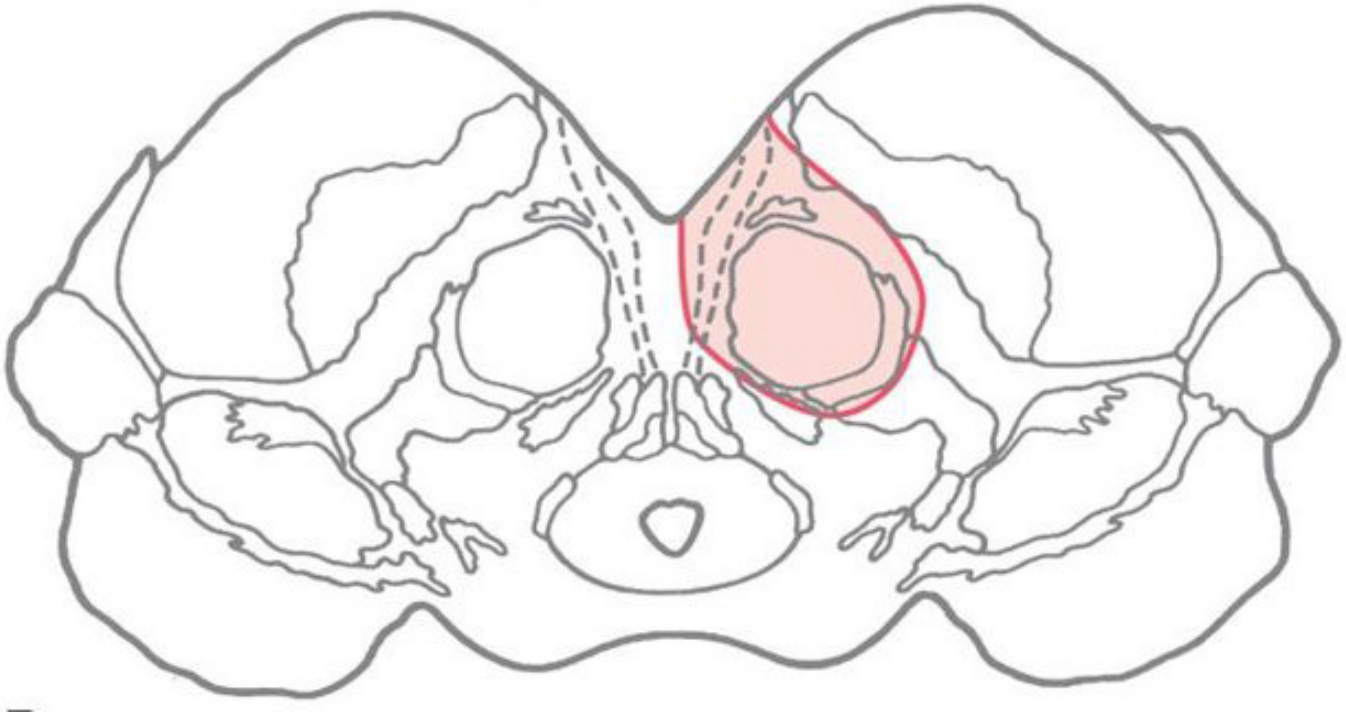
Weber syndrome



- Due to: Occlusion of vessels serving the medial portions of the midbrain involving the oculomotor nerve and the crus cerebri.
- Ipsilateral paralysis of all extraocular muscles except the lateral rectus and superior oblique
- Paralysis of the contralateral extremities
- Ipsilateral dilatation of pupil
- Contralateral weakness of the facial muscles of the lower half of the face
- Contralateral deviation of the tongue when it is protruded

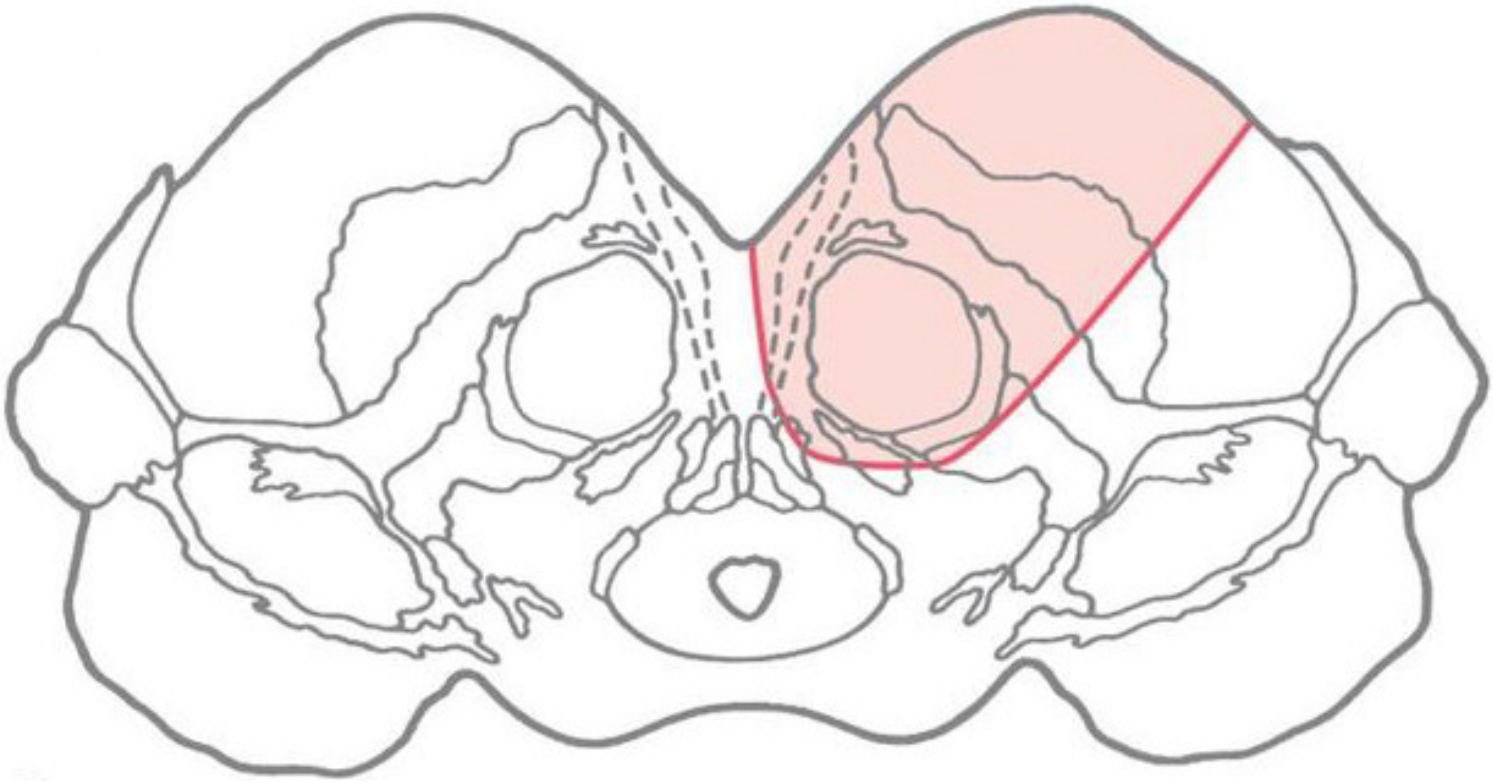
hallmark of brainstem vascular lesions, **ipsilateral cranial nerve sign coupled with a contralateral long tract sign**

Claude syndrome



- Due to: Occlusion of vessels serving the central area of the midbrain
- ipsilateral paralysis of most eye movements; the eye is directed down and out
- Ipsilateral dilatation of pupil
- contralateral ataxia, tremor, and incoordination

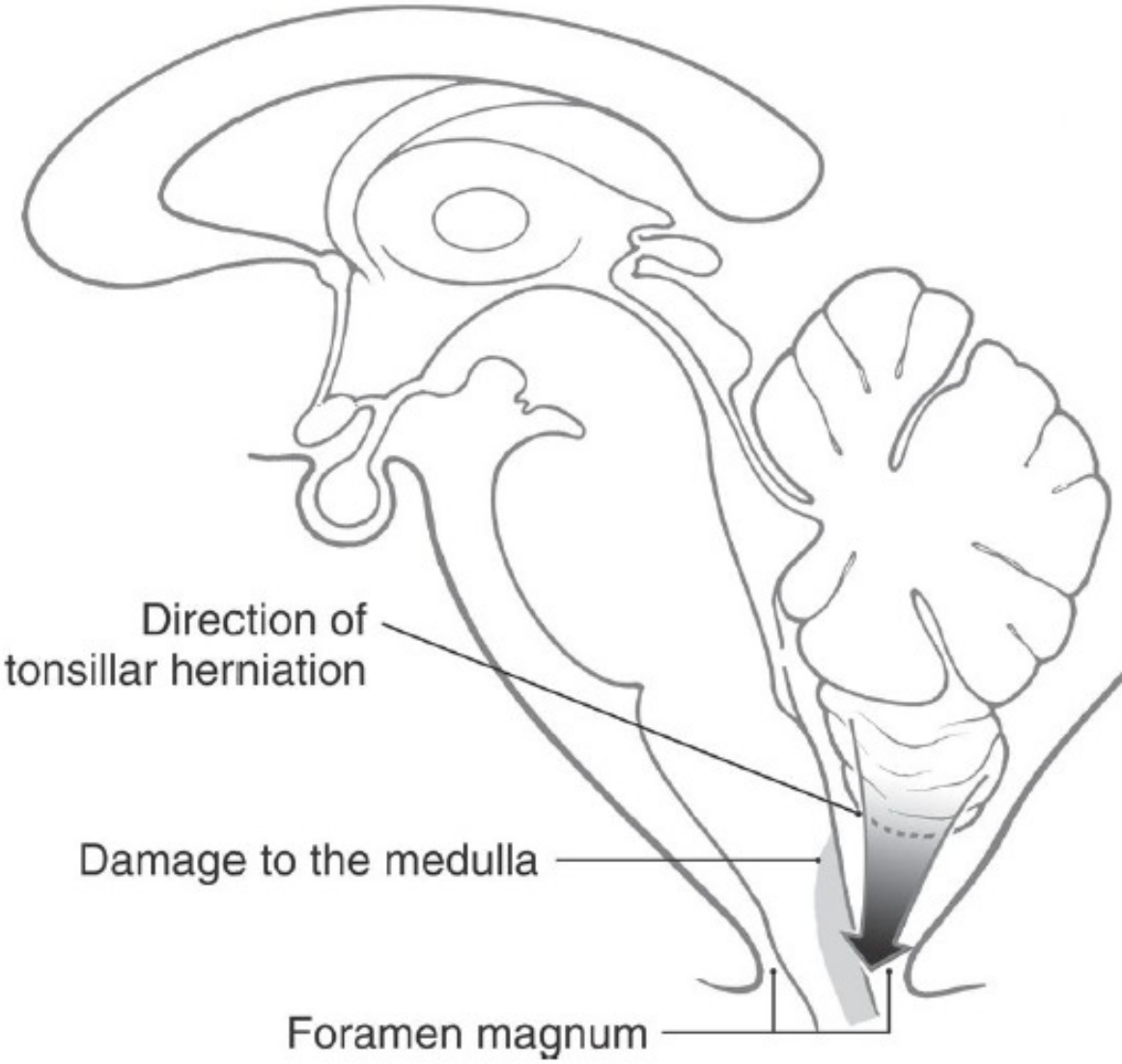
Benedikt syndrome



- Large lesion that includes the territories of both the Weber and Claude syndromes

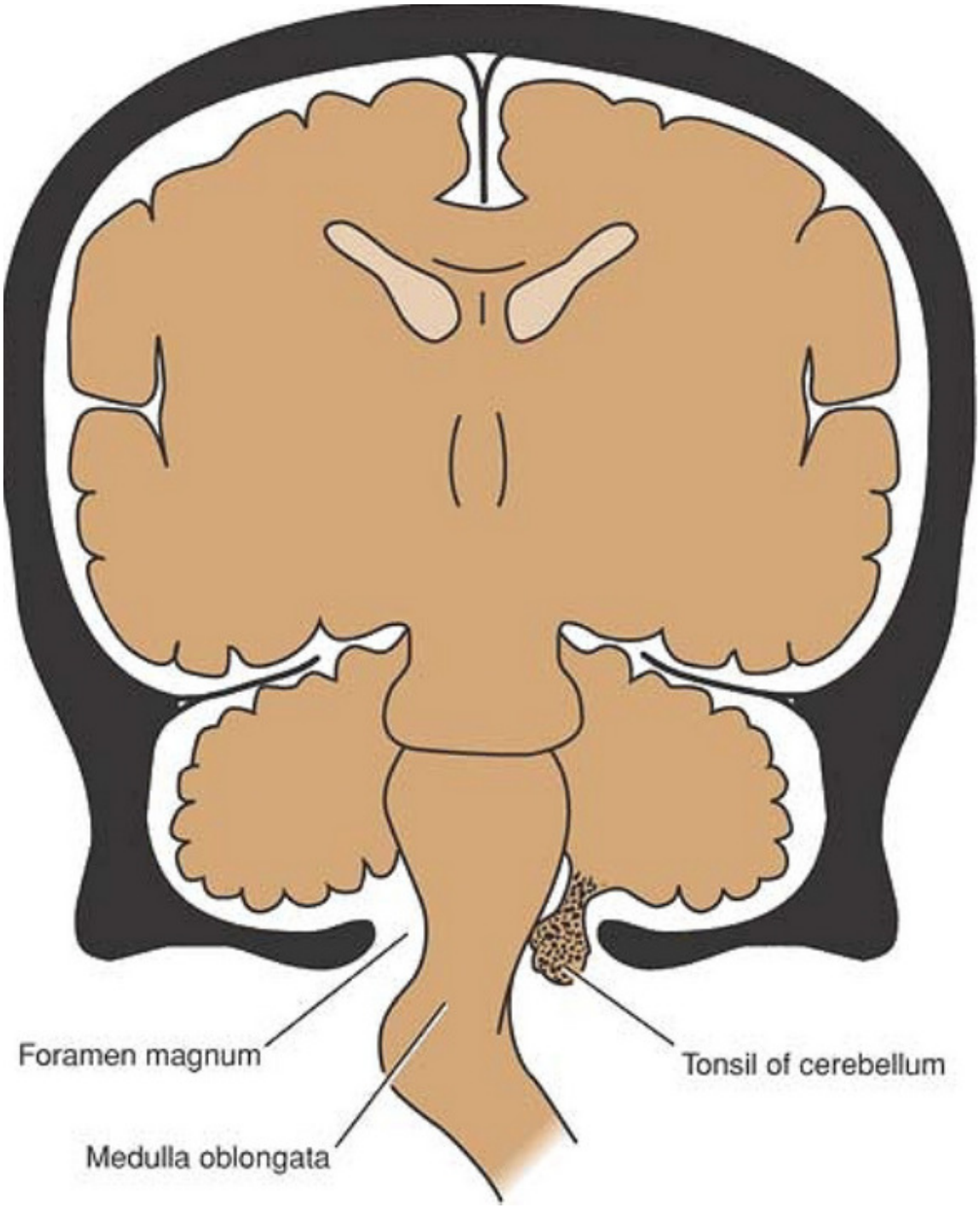
TONSILLAR HERNIATION

- ❑ Causes:
- ➢ mass in the posterior fossa (tumor, hemorrhage)
- ➢ **increase in intracranial pressure**
- ➢ The major concern in acute herniation is damage to the **ventrolateral reticular area (**heart rate and respiration)
- ❑ Symtoms
- ➢ sudden change in heart rate and respiration
- ➢ **hypertension**
- ➢ **hyperventilation**
- ➢ rapidly decreasing levels of consciousness
- ➢ If sever death



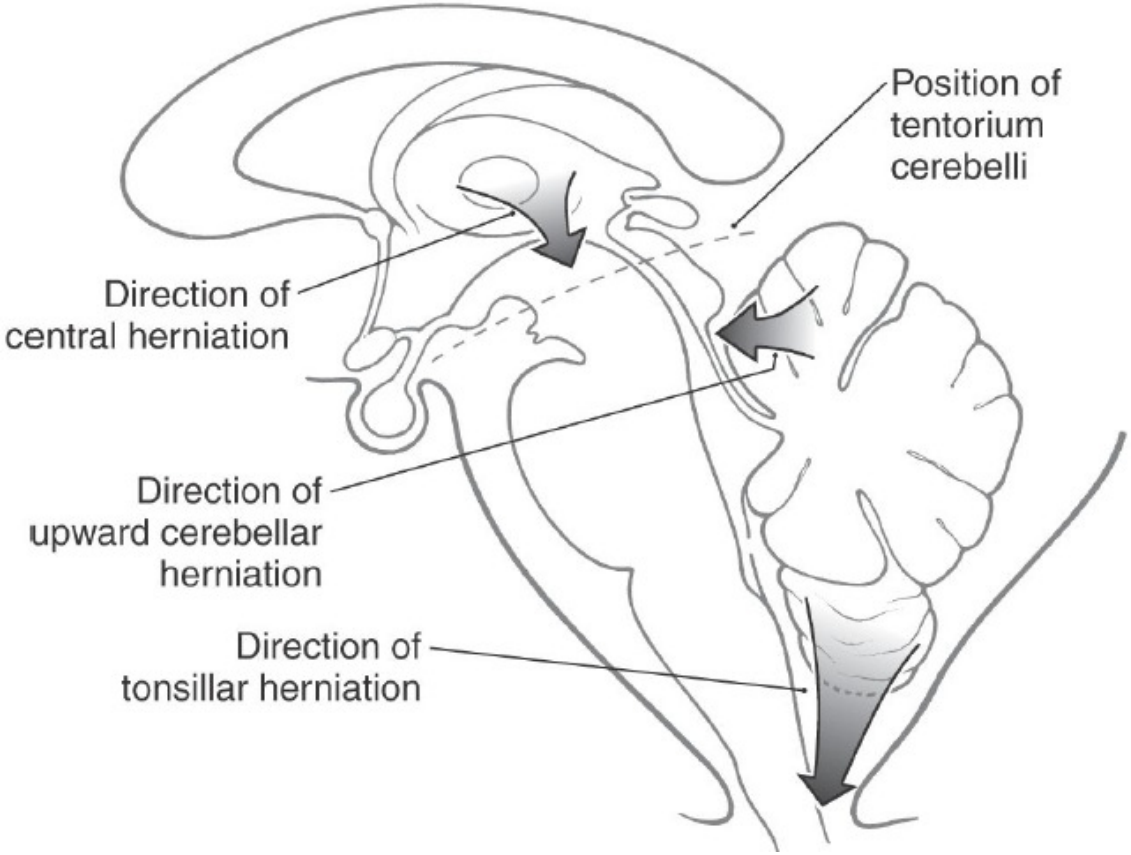
Arnold-Chiari Phenomenon

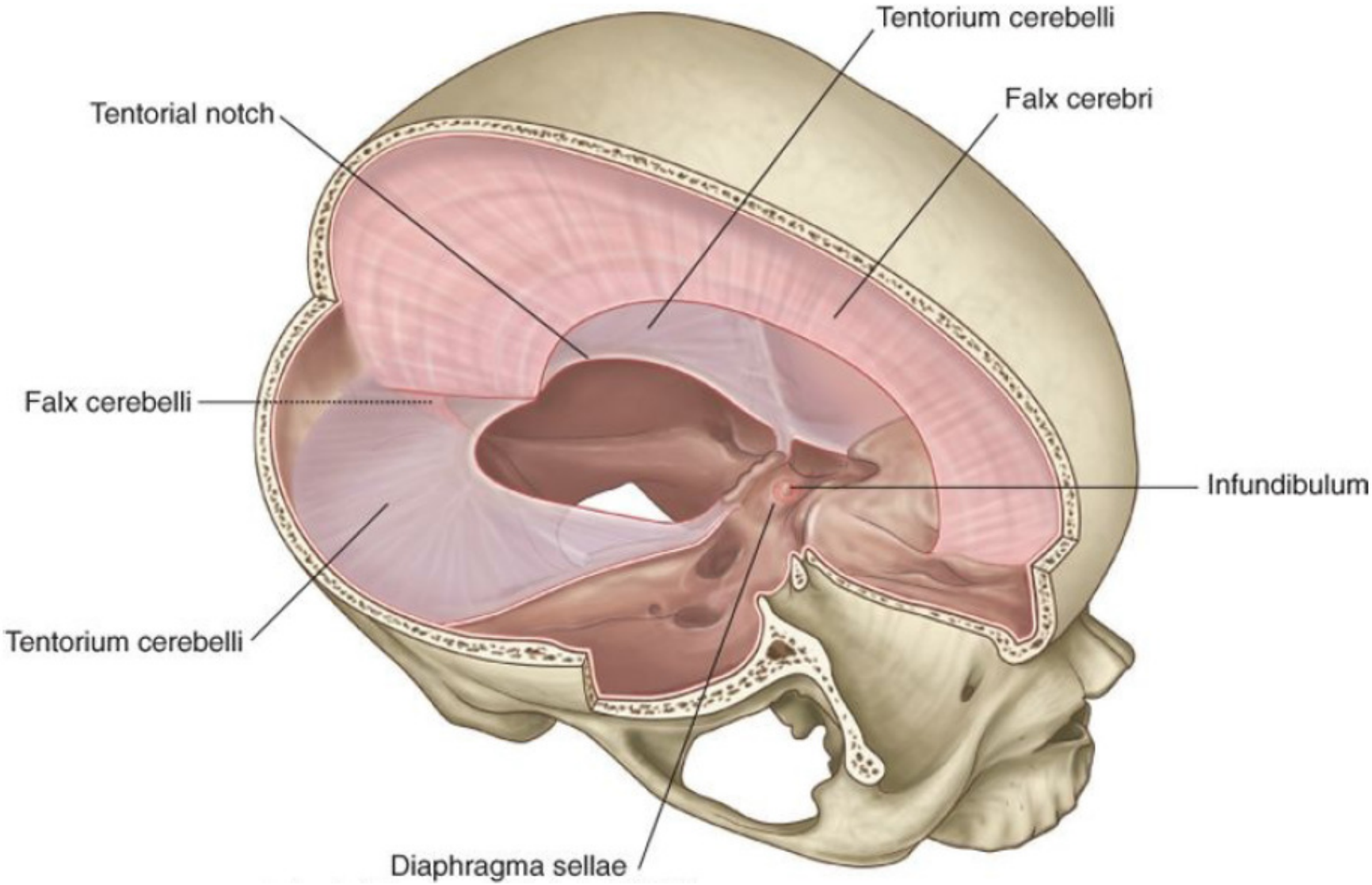
- Congenital anomaly in which there is a herniation of the tonsils of the cerebellum and the medulla oblongata through the foramen magnum into the vertebral canal



Central herniation

- space occupying lesion in the hemisphere (supratentorial compartment) elevates intracranial pressure and forces the diencephalon downward through the tentorial notch and into the brainstem
- Symptoms: change in respiration, eye movements are irregular,
- As the damage progresses downward into the brainstem, there is significant change in respiration
- Tachypnea and apnea
- profound loss of motor and sensory functions,
- probable loss of consciousness.

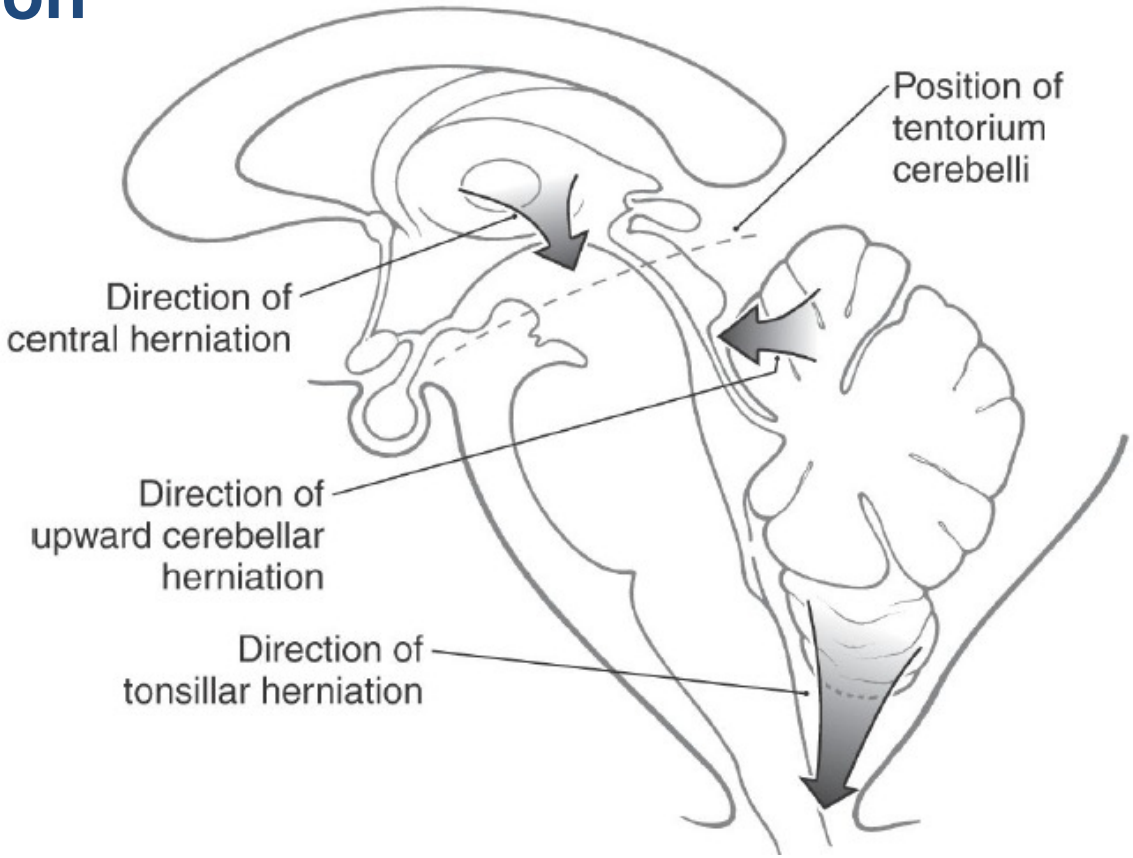




- Falx cerebri: crescent-shaped, Attachments:
  - Anterior: crista galli, Posterior: tentorium cerebelli
- Tentorium cerebelli: horizontal, Attachments:
  - Anteriolateral: superior border of the petrous. Posterior: occipital bone, Anteriolmedial: free, tentorial notch

Upward Cerebellar Herniation

- A mass in the posterior fossa may force portions of the cerebellum upward through the tentorial notch (upward cerebellar herniation) and compress the midbrain
- The result may be occlusion of branches of the superior cerebellar artery with resultant infarction of cerebellar structures or obstruction of the cerebral aqueduct and hydrocephalus.
- The latter is seen as signs characteristic of an increase in intracranial pressure
- vomiting, headache, lethargy, decreased levels of consciousness).



Uncal Herniation

- movement the uncus) downward over the edge of the tentorium cerebelli
- **Early signs:**
  - dilated pupil ipsilateral to the herniation
  - abnormal eye movements ipsilateral to the herniation
  - double vision
  - Weakness of the extremities (corticospinal fiber involvement) opposite to the dilated pupil.
- **Later:**
  - respiration is affected