

# Brainstem Clinical Neuroanatomy Made Flabbergastingly Simple

Dr. Susmit

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## Midbrain

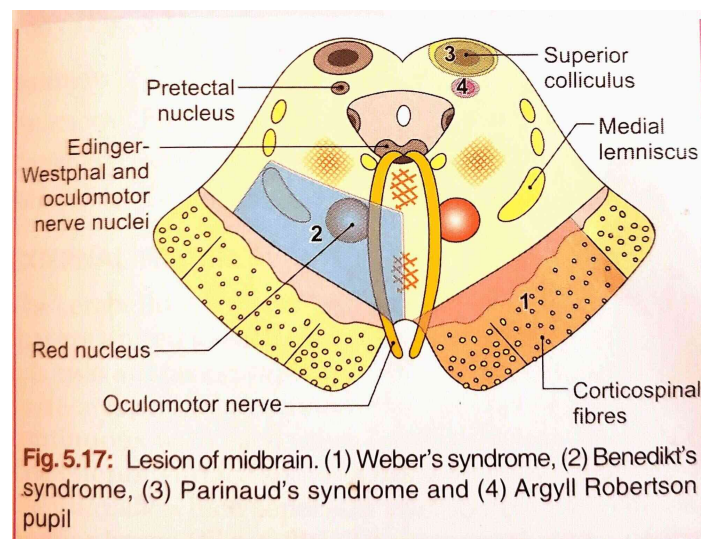


Figure 1: Midbrain

### Region 1: Crus cerebri (Weber's Syndrome)

(cerebral peduncle = crus anteriorly and tegmentum posteriorly)

- *Artery:* Ventral paramedian branches of PCA
- *Lesion:* **Weber's**
- Clinically relevant *structures*:
  - Corticospinal and corticobulbar fibres in the cerebral peduncles
  - Oculomotor nerve fibres exiting from interpeduncular fossa
- Clinical *syndrome*: **i3 + c7u + CHP**
  - Ipsilateral: Oculomotor palsy ("down and out")
  - Contralateral: UMN facial, hemiplegia

### Region 2: Tegmentum (Claude's Syndrome)

- *Artery:* Dorsal paramedian branches of PCA
- *Lesion:* **Claude's**
- Clinically relevant *structures*:
  - Red nucleus containing fibres from contralateral dentate nucleus of cerebellum (part of dentato-rubro-thalamic pathway)

- Oculomotor nerve fibres in the central tegmental region
- Clinical *syndrome*: **i3 + CCA<sub>t</sub>**
  - Ipsilateral: Oculomotor palsy (CN3)
  - Contralateral: Cerebellar ataxia

### Region 3: Tectum (Parinaud's Syndrome)

- *Artery*: Posterior choroidal artery (br. of PCA) at sup. colliculus, superior cerebellar artery (SCA) at inf. colliculus
- *Lesion*: **Parinaud's**
- Clinically relevant *structures*:
  - Interstitial nucleus of Cajal at superior colliculus aka rostral interstitial nucleus of the MLF (riMLF) which is the vertical gaze centre
  - Pretectal nucleus: relays light reflex input arm signals to Edinger-Westphal nucleus, which then relays it to oculomotor nucleus
- Clinical *syndrome*:
  - Vertical gaze palsy (due to riMLF lesion)
  - Pupillary disorders (e.g. light-near dissociation) (due to pretectal nucleus lesion)

## Pons

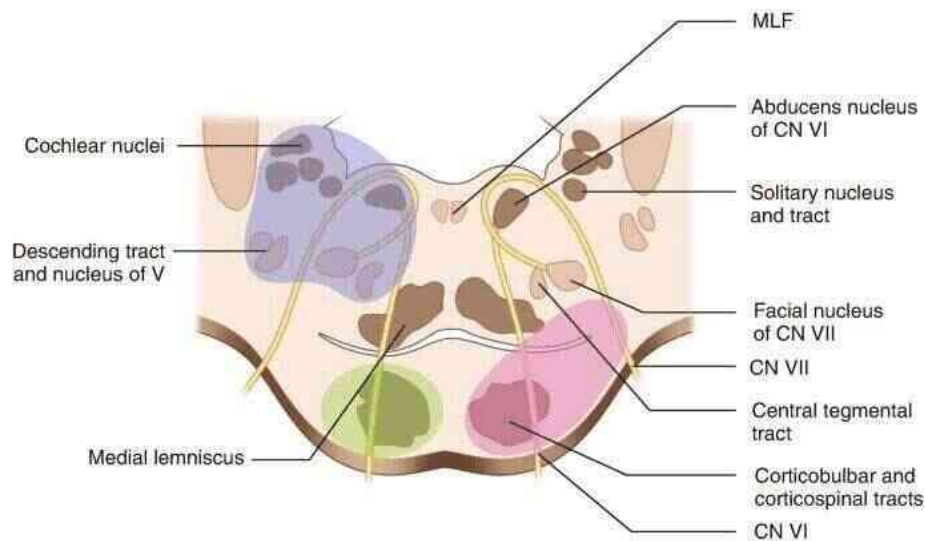


Figure 2: Pons

### Ventral (Basilar) Pons (Millard-Gubler Syndrome)

- *Artery*: Basilar artery (lodges in the median sulcus between the two sides of pons)
- *Lesion*: **Millard-Gubler's**
- Clinically relevant *structures*:
  - Corticospinal tract in the paramedian area
  - Axons of CN6 and CN7
- Clinical *syndrome*: **i6, i7 + CHP**
  - Ipsilateral lateral rectus (CN6) and LMN facial palsy (CN7)
  - Contralateral hemiplegia

# Medulla

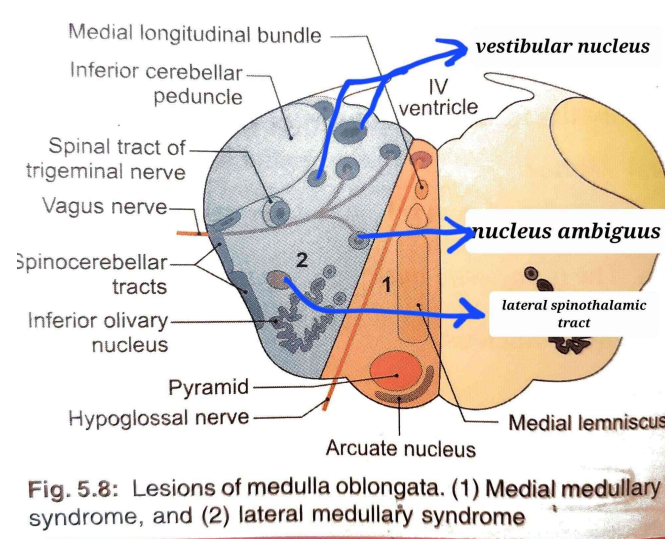


Figure 3: Medulla

## Posterolateral Medulla (Wallenberg / lateral medullary syndrome)

- **Artery:** PICA (posteroinferior cerebellar artery, br. of vertebral)
- **Lesion:** **Wallenberg / lateral medullary syndrome**
- Clinically relevant *structures*:
  - Nucleus ambiguus: motor nucleus of CN 9, 10, 11 - ipsilateral soft palate, pharynx, larynx muscles
  - Spinal trigeminal nucleus and tract: ipsilateral face - pain and temperature senses
  - Lateral spinothalamic tract: contralateral body - pain and temperature senses
  - Vestibular nucleus
  - Spinocerebellar tracts - coordinate ipsilateral limb movements
  - Descending sympathetic fibres from hypothalamus - ipsilateral Horner
- Clinical syndrome: **i5, 9-11 + CPT**
  - Ipsilateral - 5 (pain and temperature lost at ipsilateral face), [9, 10, 11] (bulbar palsy) lesion; dysequilibrium (vestibular nucleus); ataxia (spinocerebellar tract); Horner's (ptosis, miosis, anhidrosis, enophthalmos)
  - Contralateral - pain and temperature lost (lateral spinothalamic) at contralateral body

## Anteromedial Medulla (Dejerine syndrome)

- **Artery:** Anterior spinal artery
- **Lesion:** **Dejerine syndrome**
- Clinically relevant *structures*:
  - Pyramidal tract
  - Medial lemniscus
  - Hypoglossal nucleus and nerve
- Clinical syndrome: **i12, dc + CHP**
  - Ipsilateral: fine touch, vibration (DCMLS); tongue paralysis (CN12)
  - Contralateral: hemiplegia (pyramidal)

## High-Yield Summary

Region	Artery	Syndrome	Key Features
Midbrain (crus)	PCA (ventral paramedian)	Weber's	i3 + contralateral hemiplegia + c7 UMN
Midbrain (tegmentum)	PCA (dorsal paramedian)	Claude's	i3 + contralateral ataxia
Midbrain (tectum)	Post. choroidal, SCA	Parinaud's	Vertical gaze palsy + pupillary light-near dissociation
Pons (ventral)	Basilar	Millard-Gubler	i6, i7 + contralateral hemiplegia
Medulla (anteromedial)	Anterior spinal	Dejerine's	i12 + contralateral hemiplegia + DCMLS loss
Medulla (posterolateral)	PICA	Wallenberg	i5, i9-11, Horner + contralateral pain/temp loss