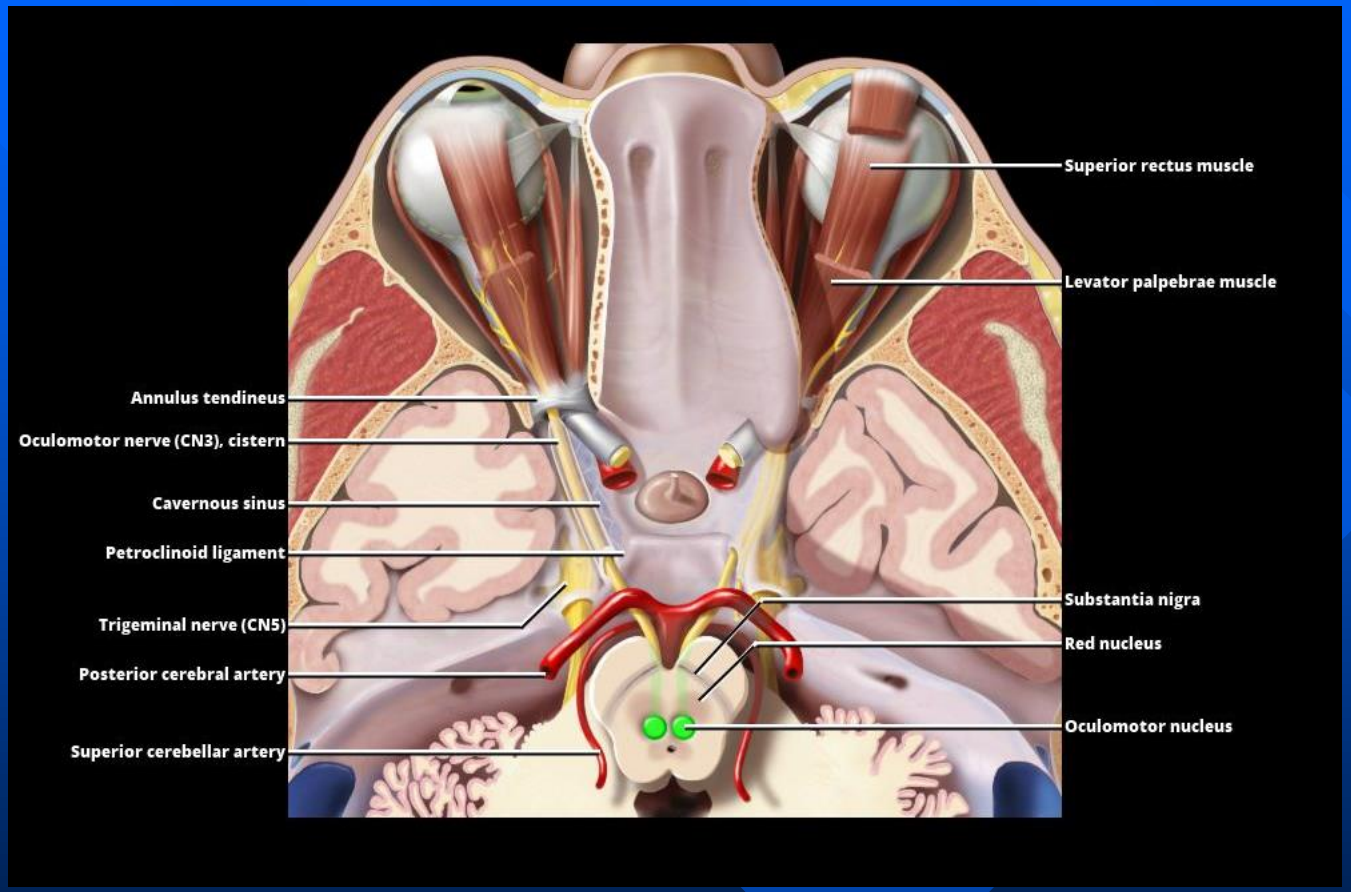
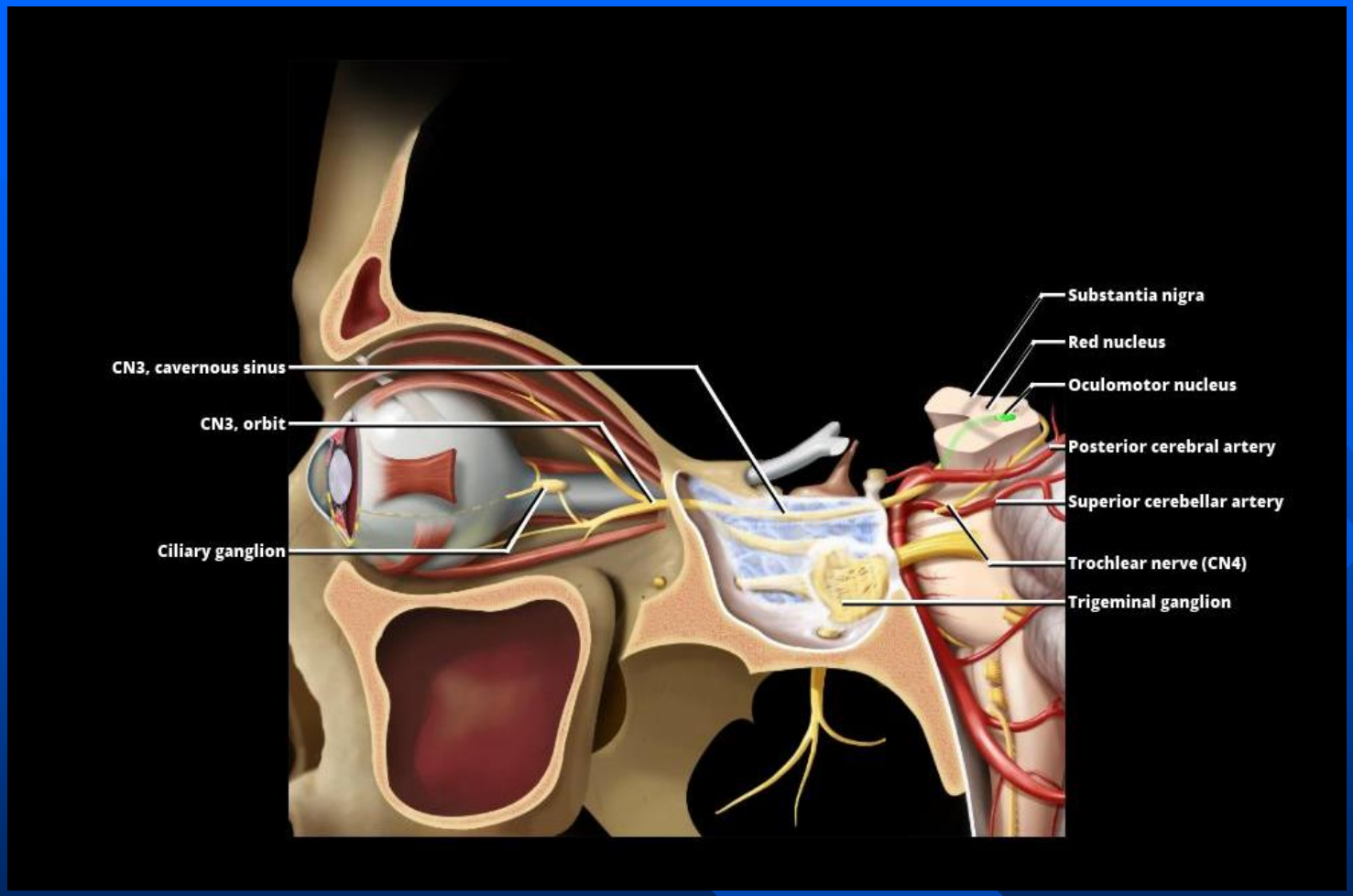
- CN3: Motor nerve to extraocular muscles except lateral rectus (CN6) & superior oblique muscles (CN4); parasympathetic to pupillary sphincter & ciliary muscleFour segments:



Axial graphic clearly depicts CN3 originating from the oculomotor nuclei complex to travel through medial aspect of red nucleus and substantia nigra before exiting into prepontine cistern. After traversing the cavernous sinus, surrounded by the CSF-filled oculomotor cistern, it enters the orbit through the superior orbital fissure through annulus tendineus (annulus of Zinn) to divide into superior and inferior branches.



Sagittal graphic shows occulomotor nerve exiting from anterior brainstem. After passing medially to trochlear nerve (CN4) between superior cerebellar artery and posterior cerebral artery it enters cavernous sinus. CN3 is the most superior nerve coursing through cavernous sinus. Once in orbit it divides into superior and inferior divisions. Preganglionic parasympathetic fibers travel with inferior division to join ciliary ganglion.

Clinical Importance

- Uncal herniation pushes CN3 on petroclinoid ligament
- During trauma downward shift of brainstem upon impact can stretch CN3 over petroclinoid ligament
- CN3 susceptible to compression by PCA aneurysms
- CN3 neuropathy divided into simple if isolated and complex if with other CN involvement (CN4 & CN6)
- Simple CN3 with pupillary involvement
  - Must exclude PCA aneurysm as cause
  - Explanation: Parasympathetic fibers are peripherally distributed
- Simple CN3 with pupillary sparing
  - Presumed microvascular infarction involves vessels supplying core of nerve with relative sparing of peripheral pupillary fibers