Abducens nerve

The abducens nerve or abducent nerve (the sixth cranial nerve, also called the sixth nerve or simply CNVI) is a somatic efferent nerve that, in humans, controls the movement of a single muscle, the lateral rectus muscle of the eye.

The only nerve not attached to the dural wall, the only nerve inside the cavernous sinus.

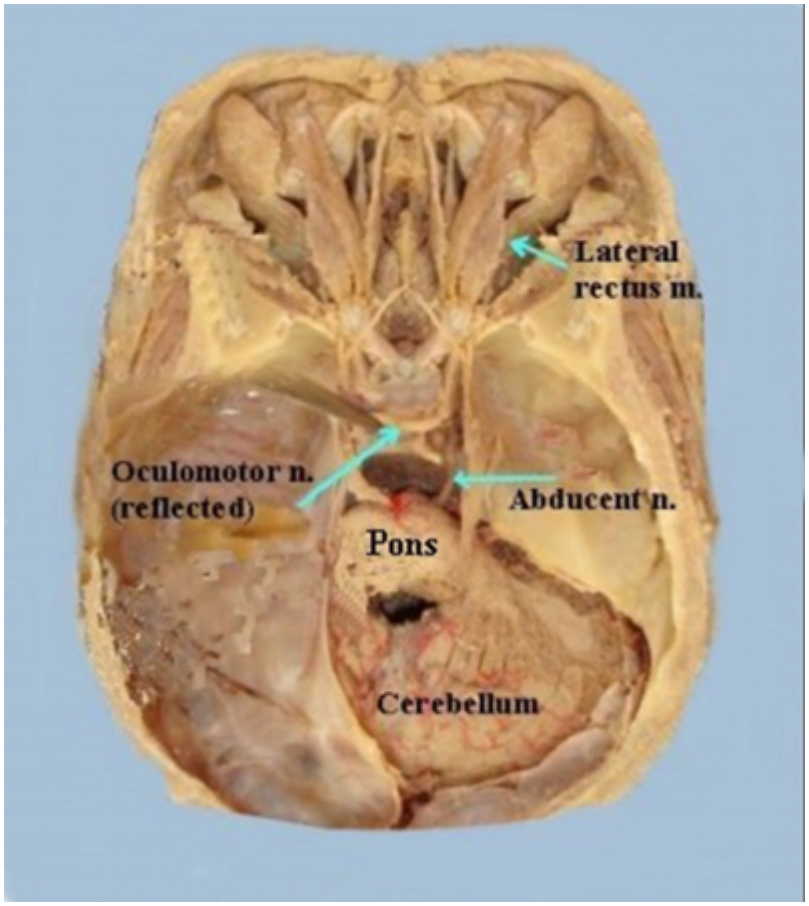
At risk of damage during skull base surgery.

Trajectory

The abducens nerve leaves the brainstem at the junction of the pons and the medulla, medial to the facial nerve. In order to reach the eye, it runs upward (superiorly) and then bends forward (anteriorly).

From:http://www.scielo.br/img/revistas/anp/v67n1/a22fig03.jpg

The nerve enters the subarachnoid space when it emerges from the brainstem. It runs upward between the pons and the clivus



, and then pierces the dura mater to run between the dura and the skull through Dorello's canal.

At the tip of the petrous bone it makes a sharp turn forward to enter the cavernous sinus.

Nathan et al described three patterns of the course of the abducens nerve before it enters the cavernous sinus. In a majority of cases (86.5%), the nerve originates as a single trunk and runs all its way as a single trunk. In about equal number of the rest of the cases, the nerve either originates as a single trunk and splits into two branches in the subarachnoid space, or it originates as two separate trunks. In both of these situations, Nathan observed that the nerve trunks perforate the dura independently and enter the cavernous sinus by passing one above and other below the petrosphenoidal ligament [1)].

In the cavernous sinus it runs alongside the internal carotid artery. It then enters the orbit through the superior orbital fissure and innervates the lateral rectus muscle of the eye.

The long course of the abducens nerve between the brainstem and the eye makes it vulnerable to injury at many levels. For example, fractures of the petrous temporal bone can selectively damage the nerve, as can aneurysms of the intracavernous carotid artery. Mass lesions that push the brainstem downward can damage the nerve by stretching it between the point where it emerges from the pons and the point where it hooks over the petrous temporal bone.

Monitoring

Neurophysiological monitoring of nerve VI enables their intraoperative identification during resections in the case of intracavernous tumors [2)].

Pathology

see Abducens nerve palsy.

see Abducens nerve schwannoma

1)
Nathan H, Ouaknine G, Kosary I Z. The abducens nerve. Anatomical variations in its course. J Neurosurg. 1974;41(5):561–566.
2)
Kaspera W, Adamczyk P, Slaska-Kaspera A, Ladziński P. Usefulness of intraoperative monitoring of oculomotor and abducens nerves during surgical treatment of the cavernous sinus meningiomas. Adv Med Sci. 2014 Sep 6;60(1):25-30. doi: 10.1016/j.advms.2014.08.009. [Epub ahead of print] PubMed PMID: 25262200.