

# Trochlear nerve

***Nervus trochlearis*** (*IV cranial nerve, pulley nerve*) is the thinnest of the cranial nerves.

It is the only one that emerges *dorsally* from the head trunk.

It is a purely **somatomotor nerve**. It innervates only **m. obliquus bulbi superior** (oculomotor muscle).

## Anatomy

### Cores

The motor nucleus – ***nucleus nervi trochlearis*** is located in the tegmentum *mesencephalon*, caudal to the nucleus *nervus oculomotorius* ventral to the aqueductus mesencephali Sylvii.

After exiting the nucleus, axons wrap around the *aqueductus mesencephali* and cross dorsally - *decussatio nervorum trochlearium*

### Progress

#### Extracerebral course:

- in the subarachnoid space, the beginning of the nerve is located **above the tectum**, then it enters the cisterna ambiens
- wraps around the *crura cerebri* and reaches the space **between the a. superior cerebelli and the a. cerebri posterior**
- The *fossa cranii posterior* leaves at the *margin of the tentorium* and goes to the base of the skull
- at the tip of the pyramid, it emerges from under the *dura mater* and goes to the front wall of the *sinus cavernosus*
- runs in the lateral wall of the sinus below the *n. oculomotorius* and above the *n. ophthalmicus*

#### Extracranial course:

- enters the orbit outside **anulus tendineus communis**
- from there it continues **to m. obliquus bulbi superior** and innervates it

#### SUMMARY:

It originates from the tectum mesencephali (**the dorsal side of the brainstem**), emerges below the colliculi inferiores. Axons emerging from the nucleus go **dorsally** and in the brainstem they **cross** (*decussatio nervorum trochlearium*). It wraps around the side of the mesencephalon (through the pedunculi cerebellares superiores) at the base of the skull and **runs parallel to the n. oculomotorius. At the tip of the pyramid, it pierces the dura mater and enters dorsally from III. of the cranial nerve** to the lateral wall of the sinus cavernosus. It continues through the *fissura orbitalis superior* (outside the anulus tendineus communis) into the orbit. In the eye socket, it runs above the levator palpebrae superioris muscle to the edge of the belly of the obliquus superior muscle, **which innervates the motor.**

## Neurology

### Features

*M. obliquus bulbi superior* bends the bulbus **caudally and laterally**.

### Nerve Disorders

- **Central palsy** - contralateral impairment of the function of the superior obliquus muscle (crossing of the nerve);
- **peripheral palsy** - impairment of the superior obliquus muscle, the disorder appears on the side of the lesion (ipsilaterally);
- **elevation of the affected eye** - when looking directly, most during adduction (especially if the head is tilted to the side of the affected eye), disappears when tilted to the opposite side - *Bieschowski test*;
- **diplopia** - when looking down (double vision);
- **convergent strabismus** - inward squinting

# Links

## Related Articles

- Cranial Nerve Exits
- Ocular muscles
- Orbit
- Disorders of selected cranial nerves/PGS

## References

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