Chapter 6

Skills 48-53

- Pupil
- Iris

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TS 48 : Pupillary reactions

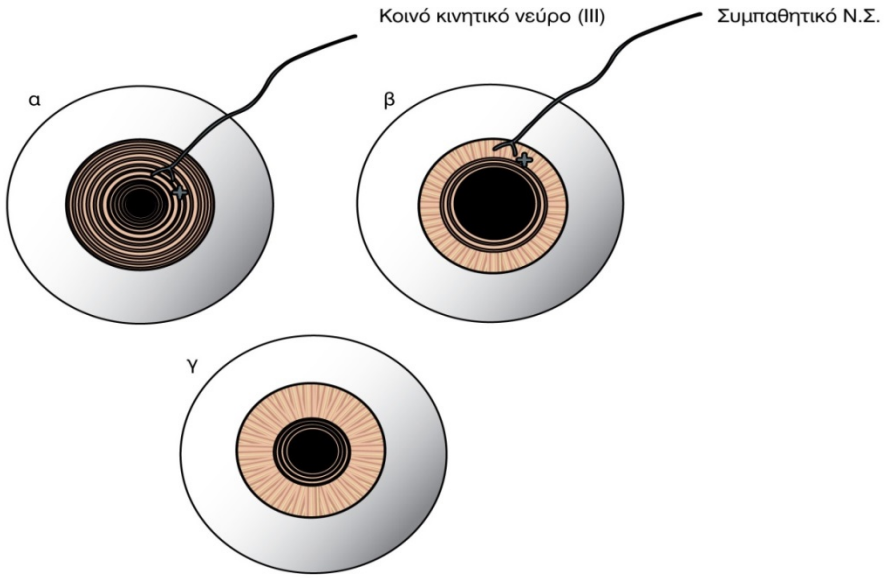
- Balance between

  Sphincter m. – Dilator m.

- Light-Accommodation → Stimulation of Sphincter m.
- Stress → Stimulation of Dilator m.

Innervation

- Sphincter → III CN (Parasympathetic)

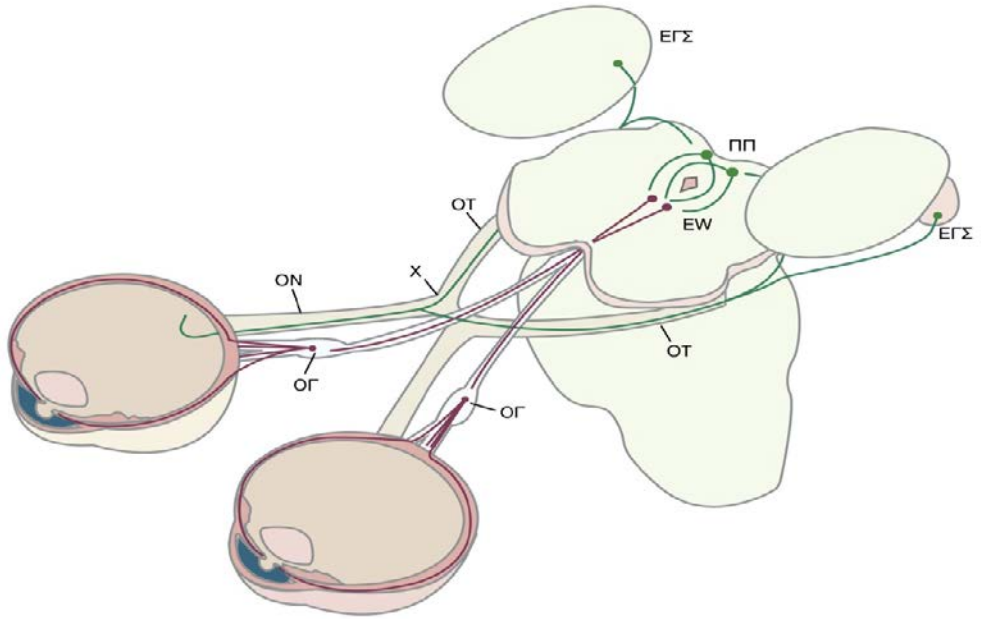


- Dilator → Sympathetic (Superior Cervical Ganglion)

Pupillary light reflex

- Afferent pathway → Optic Nerve (II CN)

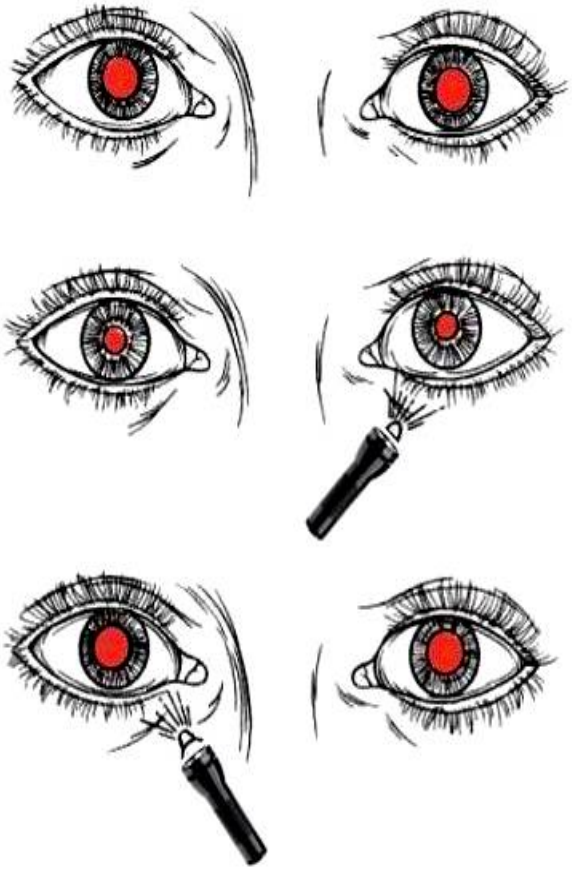
- Efferent pathway → Oculomotor Nerve (III CN)



TS 49 : Pupillary light reflex

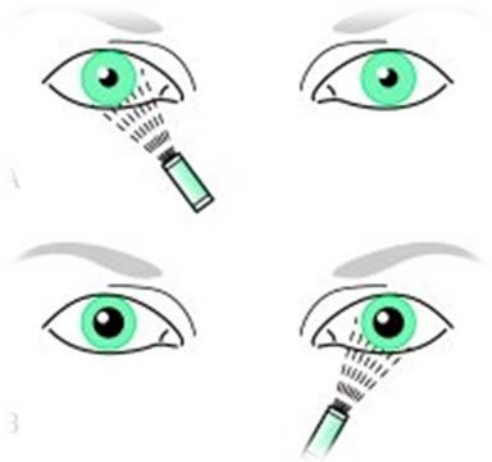
- Efferent pathway **is crossed** in Edinger-Westphal subn.
- Thus, **the pupils are normally equal in size**
- **Afferent pathway defects** (optic nerve disorders) **do not result in anisocoria**

But, they may cause **Marcus - Gunn pupil**

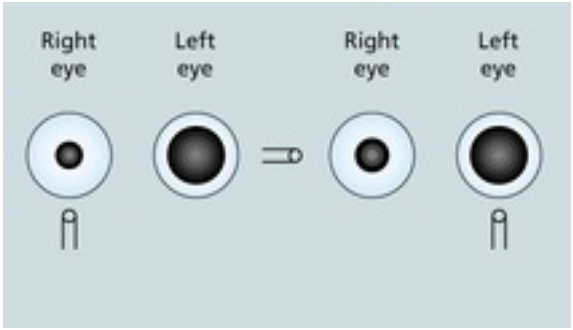


TS 49: Abnormal pupillary reactions

- Poor or absent reaction in both eyes when **Afferent Pupillary defect** is noted (Marcus-Gunn pupil, severe retinal damage, optic nerve damage)



- Direct reaction in an eye is normal while indirect reaction (fellow eye) is poor➔ **Peripheral Efferent pupillary defect of fellow eye** (oculomotor nerve)

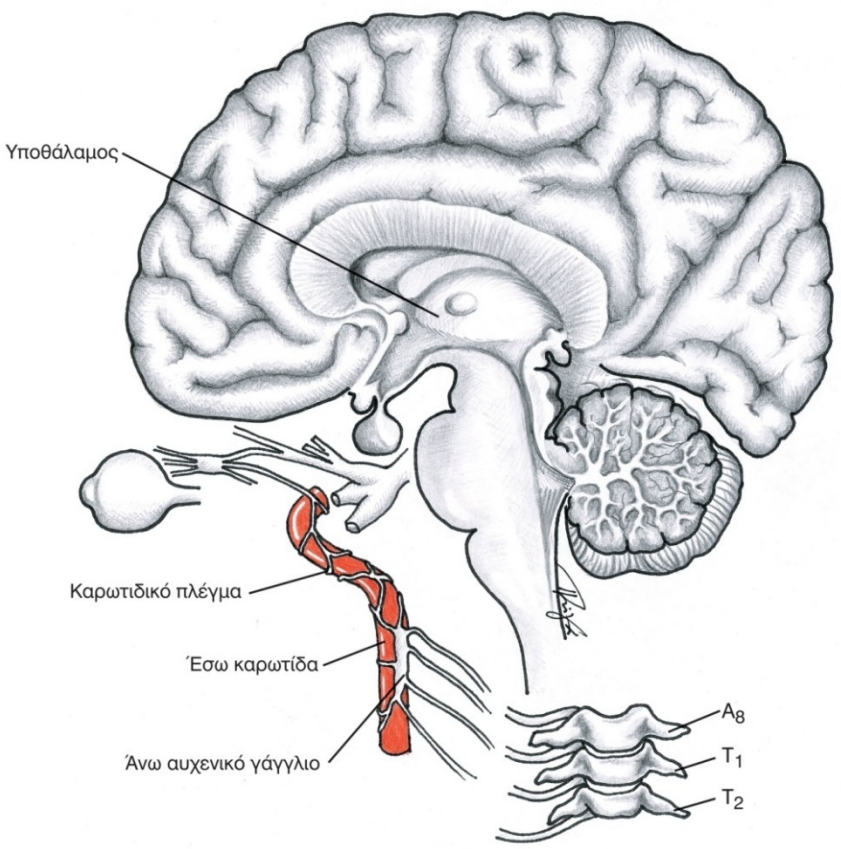


TS 50 : Anisocoria

- Normal (<1 mm) in 10-25% of the population
- Abnormal may be due to:
  - Constrictor defects (III CN-Parasympathetic)
    - Anisocoria worsens in bright light conditions
  - Dilator defects (Sympathetic)
    - Anisocoria worsens in dim light conditions

TS 51 : Claude-Bernard-Horner s.

- Loss of hemi-facial sympathetic innervation as a result of sympathetic outflow defects (Brain stem, second order or third order neurons)



TS 51 : Claude-Bernard-Horner s.

- Characteristic triad of findings :
  - Miosis

    Dilator m.

  - Ptosis-enophthalmos

    Müller m.

  - Anhidrosis

TS 51 : Congenital Horner‘s s.

- + Iris heterochromia

TS 51 : Claude-Bernard-Horner s.

- Lesion localization is very important!
  - 1st order neuron (trauma, tumors)
  - 2nd order neuron (Pancoast tumor)
  - 3rd neuron (Cavernous sinus thrombosis)

TS 52 : Pharmacologic mydriasis

Parasympatholytic

- Prohibit sphincter action
  - Tropicamide
  - Cyclopentolate
  - Atropine

Sympathomimetic

- Stimulate dilator
  - Phenylephrine
  - Adrenaline

TS 52 : Miotics

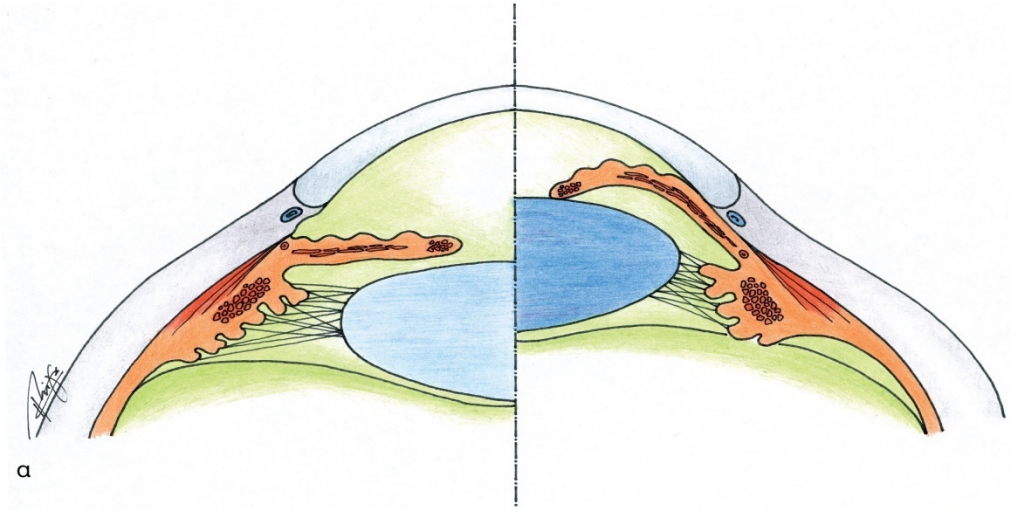
- Parasympathomimetic (stimulate sphincter m.)
    - Pilocarpine

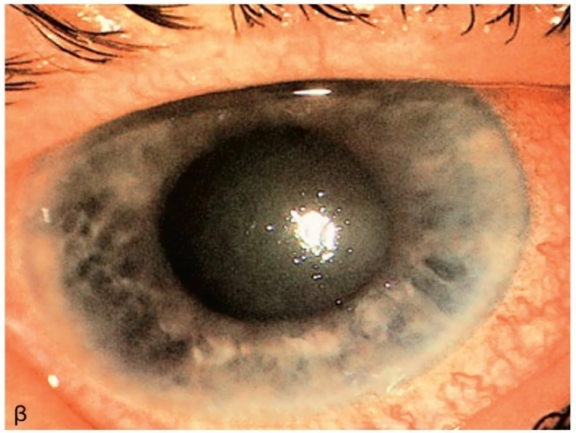
TS 52 : Mydriasis-risks

- **CAUTION!!!**

- In eyes with narrow anterior chamber pharmacologic mydriasis may result in temporary angle closure/pupillary block and thus in:

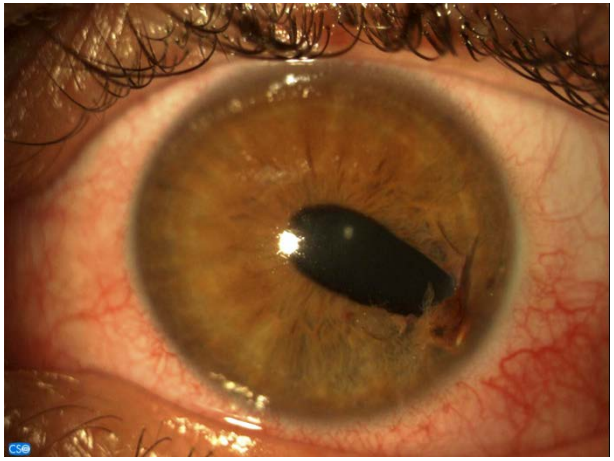
  → Acute angle closure glaucoma



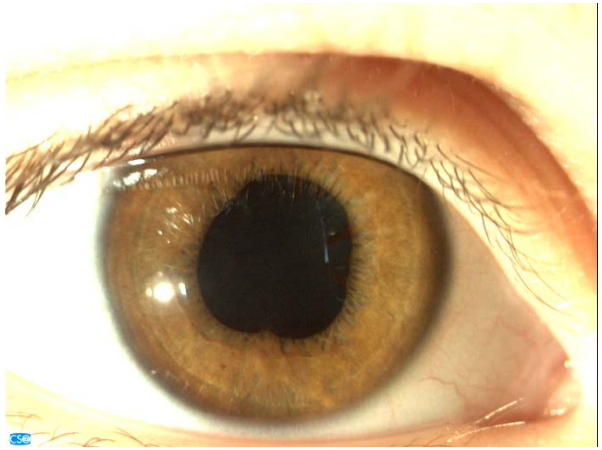


TS 53 : Irregular pupillary shape

- Normal → Round
- Irregular-Causes :
  - Trauma



  - Adhesions (synechiae)
    - anterior
    - posterior



Electronic Referrals – 6th Chapter

1. https://www.inkling.com/read/adlers-physiology-eye-levin-11th/chapter-25/the-neuronal-pathway-of-the
2. http://www.youtube.com/playlist?list=PLflSGwjzBoglNKgNIrsE2e7gUHxCMCrDR
3. http://www.youtube.com/watch?v=E2XzBa0OX8g
4. http://cim.ucdavis.edu/EyeRelease/Interface/TopFrame.htm
5. http://emedicine.medscape.com/article/1158571-overview
6. http://telemedicine.orbis.org/bins/content_page.asp?cid=1-600-265-14471
7. http://emedicine.medscape.com/article/1220091-overview
8. http://www.nps.org.au/medicines/eye/eye-medicines-used-in-examinations-and procedures
9. http://www.optometrists.asn.au/media/274917/clinical_guideline_pupil_dilation.pdf
10. http://grove.grovecan.org/uploads/Signs_of_drug_or_alcohol_abuse.pdf