Anisocoria

One pupil smaller/larger than the other—which is affected?

**Affected pupil smaller (miosis)**

- Scleral injection, corneal edema, aqueous flare, hypopyon, hyphema, hypotony
- Corneal ulceration/trauma/defect

**Affected pupil larger (mydriasis)**

- Scleral injection or corneal edema?
  - Yes
    - Anti-inflammatory agents
  - No
    - IOP elevated?
      - Yes
        - Glaucoma
        - No
          - Exposure to mydriatics (e.g., atropine, tropicamide, epinephrine, phenylephrine, anticholinergic agents, certain plant toxins)?
            - Yes
              - Investigate for history of head trauma, signs of CNS disease
              - No
                - Investigate for exposure to mydriatics
                  - Yes
                    - Treat as necessary
                  - No
                    - No

- Elevated nictitans? Enophthalmos? Ptosis?
  - Yes
    - Horner syndrome
    - No
      - Apply fluorescein stain
        - Tick/fungal titer, chemistry panel, CBC, radiography
        - Thorough ocular diagnostics + IOP measurement
        - Confirm with topical 10% phenylephrine (postganglionic lesions will show sign resolution in <10 min)
  - No
    - Investigate for history of head trauma, signs of CNS disease

**CN III = third cranial nerve (also called oculomotor nerve); IOP = intraocular pressure**
Is the eye visual?

Yes

- Efferent lesion or mechanical inhibition

No

- Acquired?

Yes

Treat as necessary

No

- Congenital?

Yes

- Iris atrophy (ie, scalloped pupil margin, holes in stroma)

No

- Ventrolateral strabismus?

Yes

- Posterior synechiae (adhesions of iris to anterior lens capsule; usually following anterior uveitis)

No

- Oculomotor nerve (CN III) palsy

- Retinal dysplasia (severe)
- Retinal detachment
- Optic nerve hypoplasia
- Optic nerve coloboma

- Iris hypoplasia
- Iris coloboma

- Acquired?

No

- Acquired?

- Iris atrophy (ie, scalloped pupil margin, holes in stroma)

- Ventrolateral strabismus?

- Posterior synechiae (adhesions of iris to anterior lens capsule; usually following anterior uveitis)

- Oculomotor nerve (CN III) palsy

- Retinal detachment/
degeneration
- Chorioretinitis
- Optic neuritis
- Optic nerve atrophy
- Glaucoma
- Retrobulbar lesion
- Optic tract lesion

- Exposure to mydriatics?

Yes

- Treat as necessary

No

- Afferent lesion

- Congenital?

- Acquired?

- Iris atrophy (ie, scalloped pupil margin, holes in stroma)

- Ventrolateral strabismus?

- Posterior synechiae (adhesions of iris to anterior lens capsule; usually following anterior uveitis)

- Oculomotor nerve (CN III) palsy

Pupillary Testing: Determining Which Pupil Is Affected

Anisocoria (ie, asymmetric pupils at rest, potentially caused by ocular/neurologic disorders or pharmacologic intervention) may not be apparent at outset. Pupil response to light and dark stimulation should be checked:

- In ambient lighting, use a dim light source held at least arm’s distance from the patient to visualize the tapetal reflection, which will delineate pupil size.
- Darken the room and using the light source to visualize the tapetal reflection, evaluate the degree of dilation in each pupil: both pupils should dilate in darkened conditions; one pupil failing to dilate indicates the affected eye.
- Stimulate each eye separately with a bright light: both pupils should constrict in response to bright light; one pupil failing to constrict fully indicates the affected eye.

See Aids & Resources, back page, for references & suggested reading.