DIAGNOSIS OF PUPILLARY ANOMALIES FOR SYNTONICS

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This is a summary of the following articles:

1. Diagnosis of Pupillary Anomalies
   John Carter, O.D., Ph.D., JAOA 1979 June;50(6):671-680
2. The Preliminary Examination (Part 6 - Tests of Pupillary Function)
   Theodore Grosvenor, O.D., Ph.D., Opt. Weekly 1977 Dec 22:25-27
3. Pupillary Examination
   Jeffrey Nyman, O.D., F.A.A.O. & Neal Nyman, O.D., F.A.A.O.
   JAOA 1977 Nov;48(11):1375-1380
4. Syntonic basic and advanced lecture notes
   College of Syntonic Optometry

A pupil examination is an important part of the evaluation of a patient who is to be considered for syntonics. One of the most useful tests is for an *Alpha Omega* (αω) pupil. This test gives you a good indication how the *autonomic nervous system* is functioning at that particular time. It indicates whether the sympathetic or parasympathetic is dominating the individual; specifically, it is indicative of inadequate adrenal function. The name was suggested by Dr. Paul Johnson after hearing Dr. Dutton Brewer's paper on pupillary asthenia in 1934.

To administer a penlight is pointed directly at the pupil of the right eye while the patient fixates a distant non-accommodative target. Normally when the sympathetic and parasympathetic systems are in balance, the pupil will constrict down and stay that initial constricted size for about 60 seconds if the light is not varied. With an Alpha Omega pupil the pupil will constrict and then start to dilate back again. The quickness and amount of dilation will depend on how dominant the sympathetic system is over the parasympathetic. I usually record the size of the pupil before the light is directed at the eye, the size to which the pupil constricts, the number of seconds before the pupil starts to dilate and the size dilated back.

A pupillary exam should include the determination of size, shape and position of the pupils under standardized light and dark room conditions for your office. Check the light response, dark response and near response under both standardized illuminations for your office.

Direct and Consensual Reflex

1. Fixate a distant muscle light.
2. Shine the light in the right eye and note the direct response of the right eye and observe the left eye to note the consensual response.
3. Switch the light to the left eye and note its direct response while observing the consensual response of the right eye.
4. Record the presence and quality after repeating three times.
   Brisk reflex = 4+ No reflex = 0

Near Reflex

1. Have the patient look at their own finger lines. Note and record presence and quality of the near reflex as above.

Swinging Flashlight Test

1. To detect a Marcus Gunn pupil.
2. Fixate distant muscle light and swing light from right to left several times.
3. If the consensual response is greater than the direct response in a sighted eye, you have a Marcus Gunn pupil.
4. If so, the patient probably has an ipsilateral (same side) old or active afferent tract lesion, e.g., optic neuritis, optic atrophy or vascular, neoplastic or traumatic optic nerve disease.
5. Decreased visual acuity with best Rx; defective color vision.

Anisocoria

Any difference in pupil sizes should be considered as a possible pathology sign of the pupillary pathways. Can be caused by:

1. Physiological.
   a) Usually congenital.
   b) Pupil reactions *all normal*.
   c) Examine baby pictures.
2. Medication handling.
   a) Re-examine in 72 hours.
3. Acquired (if nos. one & two are ruled out)
   a) Determine which is abnormal pupil. Light reaction should be checked and repeated; if diminished in one eye this is possibly the abnormal one.
   b) If anisocoria increases in increased light then suspect a parasympathetic lesion.
   c) If anisocoria decreases in increased light then suspect a sympathetic lesion.

Argyll Robertson Pupil

1. Does not react to light (direct or consensual).
2. Does react to near reflex.
3. Diagnosis is nearly always neuro-syphilis, but may be "tabes" pituitaria or "tabes" diabetica.
4. Pupil is usually small, irregular and difficult to dilate.

Amaurotic Pupil

1. No light perception.
2. No direct reflex but will contract consensually when the fellow eye (if normal) is stimulated by light.
3. The normal eye will react to the direct reflex but has no consensual reflex when the amaurotic eye is stimulated by light.

Adie's Tonic Pupil

1. Very slow pupil reaction to light and near.
2. Usually unilateral.
3. Affected pupil is larger than fellow pupil.
4. Tonic redilation as one shifts gaze from near to far.
5. Application of dilute metacholine (Mecholyl) will result in the constriction of the tonic pupil but no reaction in the normal or Argyll Robertson pupil.

Horner's Syndrome

1. Test in dim illumination.
2. Pupillary reactions are present to both light and near but may be difficult to see due to *miosis*.
3. In any patient with ptosis rule out ipsilateral miosis.
4. Use 10% cocaine on virgin cornea to determine presence or absence of Horner's pupil. Affected eye does not dilate.
5. The diagnosis of Horner's Syndrome can save a patient's life. Pancoast tumor, artery disease, thyroid tumor and metastatic tumor to cervical neck nodes are among the differential diagnoses.

Near light dissociation = a decreased but present response to light.

Hippus = abnormal, rhythmic, irregular contractions and dilations of the pupil.

For a more definitive pupil analysis refer to Carter's paper Diagnosis of Pupillary Anomalies which will help you to locate the lesion by various tests.

If all findings are normal, they may be recorded as "PERRLA" meaning pupils equal, round, reactive to light and accommodation.

A sample of an easy-to-read pupillary exam record:

PERRLA pupil size R/L _____mm in normal illumination
R/L _____mm in dim illumination
Hippus
No αω pupil _____mm pupil to _____mm in _____seconds
D and C present _____ Near reflex _____ Score 4+ to 0