Prerequisite to Basic Retinoscopy

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Retinoscopy

Streak retinoscopy is an objective method of measuring the refractive error of the eye. Using the light from the retinoscope to illuminate the retina, light reflexes and shadows are created. The various characteristics of the movement of the reflex are identified by the examiner and neutralized using lenses.

- Accommodation must be controlled
- The light may cause a brief “dazzle” effect in some patients.
- It is useful in identifying the clarity of the ocular media.
- Skill develops with use.

The Far-Point in Myopia, Hyperopia and Emmetropia

The far point is the furthest point at which the unaccommodated eye can see clearly. In emmetropia it is at infinity. In hyperopia it is beyond infinity (and therefore is a virtual far point behind the eye). In myopia it is in front of the eye (and therefore real). The higher the myopia the closer the far point is to the eye. In retinoscopy plus or minus lenses are used to move the far point in a controlled fashion to infinity thus, moving the focal point to the retina.

Myopia

- Parallel rays of light come to a focus in front of the retina.
- Past the point of focus (focal point) the light rays cross and become divergent.
- The diffused retinal image is formed by the diverging rays.
- Emergent rays from the retina will leave the eye convergent.
- They will converge to a point somewhere in front of the eye, and that point of focus is the eye’s far point.

Hyperopia

- Parallel rays of light come to a focus behind the retina.
- Emergent rays from the retina will leave the eye divergent.
- They will meet at a virtual place behind the eye.
Emmetropia

- Parallel rays of light come to a focus on the retina.
- Emergent rays will meet at infinity.

When the retina is illuminated by the light of the retinoscope, it becomes an object whose image is formed at its far point.

The Working Distance

Since it is not practical to retinoscope a patient’s eye from infinity, a convenient working distance of 2/3m (66c) is used. This is generally about arm’s length from the patient. At this distance a +1.50D lens is needed to move the emmetropic far point from infinity up to 2/3m in front of the eye. The +1.50D lens would affect all far points. This is called the working lens and must be removed at the end of retinoscopy to achieve final results. Many examiners do not use the working lens as it creates additional reflexes. If a working lens is not used, -1.50 is added at the end of retinoscopy to place the patient’s far point at infinity and achieve the final result.

Example: neutral with a -3.00D lens, final result is -4.50D. neutral with a +2.50D lens, final result is +1.00D. neutral with plano, final result is -1.50D. neutral with +1.50D, final result is plano.

- Without the working lens in place at 66c, the emmetrope, hyperope, and myope less than -1.50D would exhibit with movement.
- The myope of greater than -1.50D would exhibit against movement.
- The myope of -1.50D would be neutral.
- Working distances shorter than 2/3m will require -1.75D (or more depending on the distance) to be added to achieve the final results.

Motions/Movement

The intercept is the band of light that is on the patient’s face and eye (except for the pupil) which indicates the direction the retinoscope is moving. The streak is the reddish-orange reflex moving in the pupil. If both movements are going in the same direction with movement is indicated. If the movements of the intercept and streak are going in opposite directions against movement is indicated.
Without the working lens at 66c:

- In myopic eyes greater than -1.50D the far point lies between the examiner and the patient.
- Against movement will be seen.
- Add minus lenses until neutral.

- In hyperopic, emmetropic and weak myopic eyes, the far point lies behind the examiner.
- With movement will be seen.
- Add plus lenses until neutral.

When the patient’s far point is at the peephole of the retinoscope the examiner’s pupil fills with light. Neutrality is seen as no movement. To confirm neutrality the examiner moves forward to see with movement and moves backward to see against movement. Neutrality at working distance, examiner remembers to algebraically add -1.50D to place the far point at infinity.

Suggested Reading Material
