

Retinoscopy and Troubleshooting

Prof. Sukumaran, Dept. of Optometry, Aravind Eye Hospital, Madurai

The method of estimating the refractive state of the eye is the technique of retinoscopy. The technique when mastered, can give results as accurate as 0.25 dioptres. It is an art, which requires a lot of practice and cannot be learned in a day. It is essentially practical and cannot be learnt from books. It is only after an optometrist has done many retinoscopies that he can rely on his findings.

The problems usually encountered fall into two categories. The first are those resulting from poor technique. Common mistakes are likely to occur if the refractionist is inexperienced. It is important to keep a definite working distance and to ensure that retinoscopic examination is performed close to both the visual axis in order to refract the macula. Failure to do so may falsely introduce cylindrical element in the result. The retinoscopy should be performed such that while examining the patient's right eye, the examiner's right eye should be used and similarly for the left eye.

The next problem is that of the relaxation of the patient's accommodation. It can usually be recognised that when accommodation is not being in - active that retinoscopic results are changing during the course of examination.

First, fogging retinoscopy can be attempted using plus lenses depending on the highest presumed retinoscopic meridian of either eye. The subject is told to gaze into distance and to make no attempt to see clearly, simply to let everything stay blurred. The other trick is to let the subject close and open the eyes and inspect the reflex when the eye opens again. If these fail, then cycloplegia is used.

The advantages of a cycloplegic are, that accommodation is paralyzed, that the pupil is dilated, and macular refraction can be estimated. But the cycloplegia frequently involves certain disadvantages. During the period of its activity near work is impossible. To some extent this is overcome by replacing a shorter acting cycloplegic. While using

cycloplegics, the angle of anterior chamber and tension if abnormal, glaucoma that can be caused should all be kept in mind. In the child atropine 1% can be given in ointment form. Sometimes a mydriatic is necessary in order to obtain the refraction at the macula, in cases of high myopia and for detail fundus examination.

A number of cases of spasm of accommodation are frequently seen as pseudo myopia. In these cases it is difficult to know the correct refractive status as the values keep fluctuating. In these cases retinoscopy seems difficult. The only solution to this is using cycloplegia.

Special difficulties in retinoscopy

Some difficulties are not related to faults in technique. The initial retinoscopic reflex may be too faint to be recognisable; the causes may be some opacity in the ocular media and high refractive errors. To handle such problems, try doing retinoscopy with high power such as +7D then concave lens of high powers may be tried. If there is still some difficulty even higher powers can be tried.

Sometimes refraction varies in different parts of pupil, the central part being different from periphery, this is observed in cases when pupil is dilated. This is due to spherical aberrations causing increase in brightness. These aberrations may be considered normal. Sometimes in pathological conditions like lenticular sclerosis, the difference between two zones may be as much as 14 dioptres. When a mixed aberration occurs so that one half of the reflex differs in its refractivity, two band reflexes appear which move toward and away from each other like the blades of scissors. The best way to arrive at neutralisation point is to find a lens, which causes two lines of portions to meet in the center of the pupil. Attention is being directed to the central part of the shadow to exclude the periphery. An irregular

astigmatism or tilting of the crystalline lens gives rise to the same condition. In immature cataract very confused reflexes are seen. Neutralisation point is achieved even at one meridian or one at right angles may be a guide to spherical correction. Onto which cylinders, with their axis along this known meridian, may be superimposed in subjective testing.

In conical cornea the shadow is frequently triangular with its apex at the center of the cone, and it appears

to swirl round as a mirror is moved. In irregular astigmatism all sorts of distorted shadows may be apparent, which may move about in a confusing manner. In such case approximate value can be guessed, and in many cases greater reliance should be placed upon subjective tests.

As modern auto refractors failed to achieve the required accuracy and efficiency, retinoscopy method is to be mastered and cannot be given up.

Suggested readings

1. David Abrams . *Tenth Edition Duke-Elder's Practice of Refraction*. 1998

Biological Clock

Most biological clocks operate on a 24-hour, or circadian, cycle that governs function such as sleeping and waking, rest and activity, fluid balance, body temperature, cardiac output, oxygen consumption and endocrine gland secretion. In mammals, the main components of the circadian clock are found in cells in the brain. Inside these cells, the molecular components of the clock are "rewound" daily by the effects of light and other stimuli.

Light causes the brain internal clock to reset its cycle. Sunlight reaching photoreceptors in the retina travels to the brain by the optic nerve. It sets off reactions in a region of the hypothalamus called the suprachiasmatic nucleus (SCN), which serves as the body's clock. Circadian changes in the SCN affect the nervous system and cause daily fluctuations in many body traits. Nerve fibers also carry signals from the SCN to the pineal gland, which affects hormones and other functions.

Ms. Jeyalakshmi, Science Writer, DTP, Aravind Eye Hospital, Madurai