

- *Break.* This is a visible discontinuity of the streak as it crosses the pupillary border. This discontinuity is apparent only when the streak is *not* aligned with one of the principal meridians (Fig Q-36).
- *Skew.* This is a dynamic version of the misalignment between the streak image within the pupil and the projected streak on the eye, appreciated as a disparity in the *direction of motion* between the streak image and the projected streak. As with break, skew is apparent only when the streak is *not* aligned with a principal meridian of the eye. The skew phenomenon may be more readily apparent than break in eyes with a modest degree of astigmatism (Fig Q-37).

Figure Q-36 “Break.” The retinal reflex is not aligned with the retinoscopy streak when the streak is not aligned with 1 of the 2 major axes. (Illustration by C. H. Wooley.)

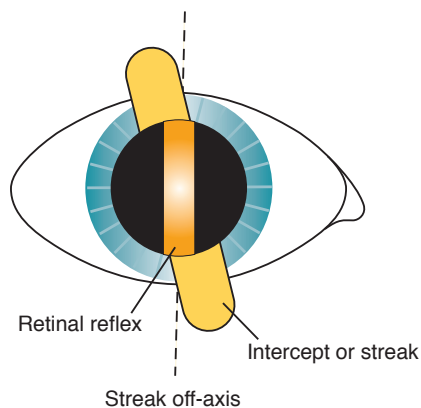
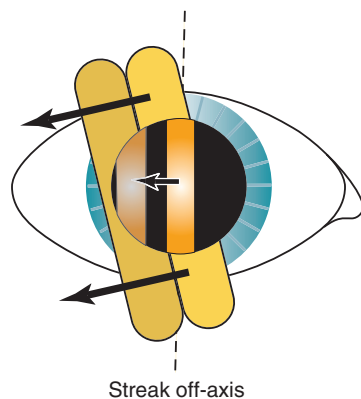


Figure Q-37 “Skew.” Disparity in the direction of movement between the streak and the reflex when the streak is not aligned with a major axis. (Illustration by C. H. Wooley.)



Try It Yourself! Q-7

Detection of Astigmatism

- Set up a practice model eye as in Try It Yourself! Q-6. Adjust the sphere power to obtain a neutral reflex, and then dial in an additional -1.50 D of sphere power to make your model eye mildly hyperopic. Observe the resulting *with* reflex in all meridians by rotating the sleeve of the

retinoscope as you move the streak, always perpendicular to its current orientation. The reflexes should appear the same in all meridians.

- Use the cylinder adjustment of the phoropter to dial in $+1.00$ or -1.00 D of cylinder power, whichever kind of cylinders are provided in your phoropter, with cylinder axis horizontal. Examine the various meridians by rotating the streak as above. Note that the clearest, brightest streak image is seen in either the horizontal or the vertical meridian, with the broadest, least clear streak image 90° away from the clearest meridian. These are the principal meridians of the astigmatic error you have just introduced. This disparity in streak image quality is the blur phenomenon, indicating the presence of the astigmatism.
- Next, turn the streak about 20° away from the meridian with the clearest, brightest streak. Note the break and skew phenomena as you move the streak, perpendicular to its own length, in this orientation.
- When you can readily perceive the blur, break, and skew induced by the 1.00 D cylinder, reduce the cylinder strength to 0.50 D. Examine the reflexes in all meridians as above. With care, you should be able to appreciate the subtler indications of blur, break, and skew for this degree of astigmatism as well.
- Try it again with a 0.25 D cylinder. Don't be discouraged if you are unable to detect this very minor degree of astigmatism. (A disparity of 0.25 D in a cylindrical correction is rarely of clinical significance.)

Activity Q-1 makes use of an online retinoscopy simulator.



ACTIVITY Q-1 Retinoscopy simulator.

Courtesy of Faruk H. Örgе, MD, and K. David Epley, MD.



Putting It All Together

1. Dim the lights in the refracting lane, and direct the patient's attention to a distant fixation target.
2. If desired, place a working lens in front of the right eye. If convenient, use the $+1.50$ D "R" lens in the phoropter accessory wheel. You may wish to fog the fellow eye with the $+1.50$ D "R" lens as well.
3. If using handheld trial lenses (as with infants and small children), it may be preferable to omit the working lens and correct for the working distance algebraically. This reduces the number of lenses that must be held simultaneously in front of the patient's eye, as well as the number of distracting reflections.
4. With the retinoscope sleeve down (for Welch-Allyn type scopes) or up (for Copeland scopes), examine the retinoscopic reflexes in all meridians by rotating the sleeve.