6

FUNDUS EXAMINATION AND PREOPERATIVE MANAGEMENT

INDIRECT OPHTHALMOSCOPY

PRINCIPLES AND ADVANTAGES

The first precept of retinal detachment surgery is that all the breaks must be found. The indirect ophthalmoscope is the best instrument for this purpose.[5,7,9,10] In indirect ophthalmoscopy, a light source illuminates the patient's fundus; light rays diverging from this fundus are focused by a convex lens into an intermediate image, which is focused onto the examiner's fundus (Fig. 6-1). The image perceived by the latter is inverted and backward (Fig. 6-2).

The Schepens binocular indirect ophthalmoscope utilizes this basic system with certain additions which make it the best available indirect ophthalmoscope. The headpiece is constructed so that the light of a high-intensity electric lamp is focused onto a mirror which reflects the light onto the patient's fundus. Because the mirror is mounted above the view box, the beam of light entering the patient's eye (illumination beam) is separated from the light rays which are viewed by the examiner (observation beams). This arrangement prevents the corneal light reflex of the illumination beam from interfering with viewing (Fig. 6-3). The view box contains prisms which provide stereoscopic vision. They optically "narrow" the examiner's pupillary distance; otherwise, the light rays exiting from the patient's pupil could not reach both of the examiner's pupils (Fig. 6-4).

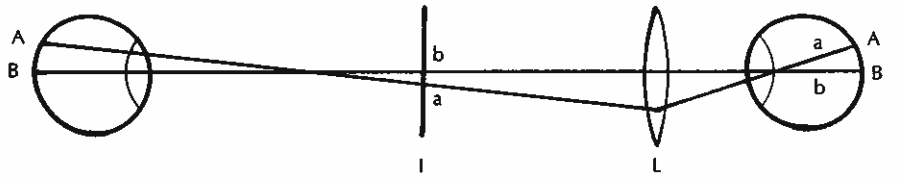
The indirect ophthalmoscope offers several advantages over the direct ophthalmoscope. First, the strong illumination provided by the head lamp plus the light gathering capability of the hand lens enable the examiner to see through hazy media. Second, it provides stereopsis. Third, indirect ophthalmoscopy, combined with scleral depression, provides the best view of the peripheral retina. Fourth, it makes a wide area of the retina visible at one time, thereby helping to insure that no abnormalities will be missed (Fig. 6-5).

TECHNIQUE

The large, aspheric lenses provide a sharper image and wider field of view than do the smaller, spheric lenses. As for power, the 14 diopter lens has the highest magnification (3.6 ×) of the commonly used lenses, but is difficult to use because of its long focal length (7 cm.). Examiners with small hands cannot steady the lens by resting their fingers on the patient's face. The 30 diopter lens (f = 3.3 cm.) is easy to use, but it gives inadequate magnification (1.5 ×)

FIG. 6-1. Indirect ophthalmoscopy. (*A*) Rays from a point in the patient's fundus (P) are focused by a lens (L) into an intermediate image (I) which is viewed by the examiner (E).

FIG. 6-2. The relative position of rays of light a and b from points A and B in the patient's fundus is reversed at the intermediate image (I), so that a strikes the examiner's superior retina at A'. Since the examiner's inferior visual field is "seen" by his superior retina, A appears to be inferior to B.



for finding small breaks. I prefer the 20 diopter lens (f=5 cm.), which is easy to use and provides a magnification of 2.3 ×.[10] Any lens should be held with the more convex surface toward the examiner (Fig. 6-1). It is slightly tilted to move the two light reflexes (one from each surface of the lens) away from the examiner's viewing axis (Fig. 6-6).

The patient should be reclining comfortably for the examination. The widest possible dilation of the pupil is desirable. Bilateral cycloplegia combined with topical anesthesia reduces photophobia and enhances cooperation. Bell's phenomenon is avoided if the patient keeps both eyes open. A fixation target such as the patient's thumb or a mark on the ceiling is helpful.

In order to minimize the corneal light reflex, the mirror must be adjusted so that the illumination beam is in the top of the field of view of the eye pieces. For small pupils, the light must be directed still higher (Fig. 6-7).

The superior periphery should be examined first because photophobia is minimized in upgaze and because the periphery is less sensitive to light than is the posterior pole. Initially, the transformer rheostat should be set at a low voltage. Higher light intensities can be used later, as the patient becomes less light-sensitive. Sensitivity to light is inversely proportional to the area of detached retina. A patient with a total retinal detachment will usually tolerate the full voltage.

Beginners frequently make the error of standing too close to the patient (Figs. 6-8, 6-9). It is much easier for the examiner to obtain a clear fundus image if his arm is extended. This is especially important if the pupil is small.

The examiner should hold his head so that he looks directly into the quadrant being examined. To examine the nasal periphery, he should stand on the same side as the eye being examined (Figs. 6-10, 6-11); for the temporal periphery, on the opposite side (Figs. 6-12, 6-13). The hand lens is shifted from

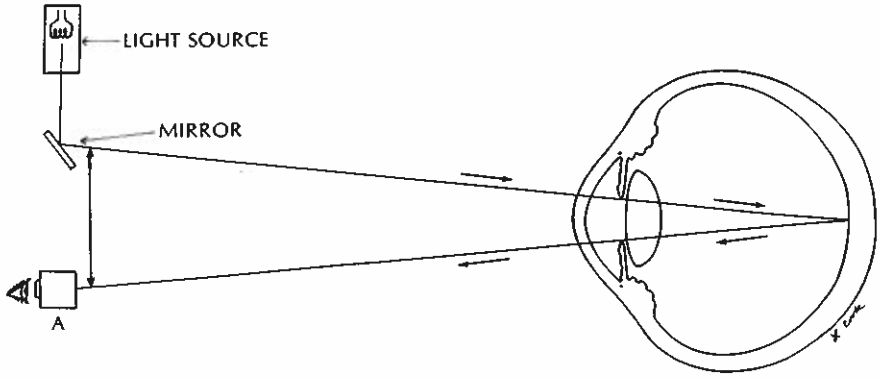
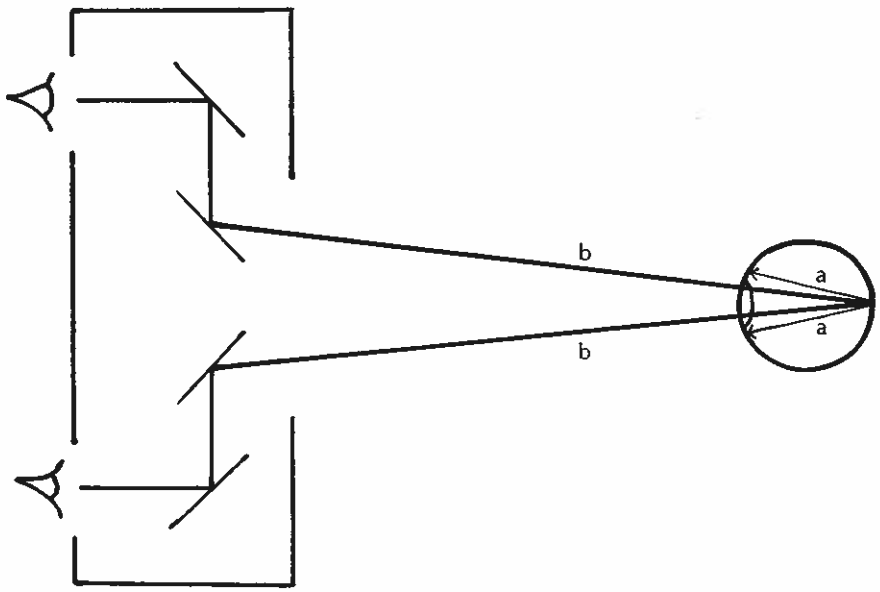
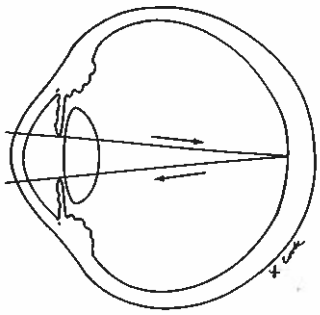


FIG. 6-3. The path of light rays entering the eye (illumination beam) is separated from those leaving it (observation beam), minimizing corneal light reflexes.

FIG. 6-4. Prisms in the view box of the binocular indirect ophthalmoscope "narrow" the examiner's pupillary distance. Therefore, from points in the patient's fundus, an observation beam (b) can reach each of the examiner's eyes. Without the viewbox, binocular vision would be impossible because light rays (a), aimed at each of the examiner's eyes, could not exit through the pupil.





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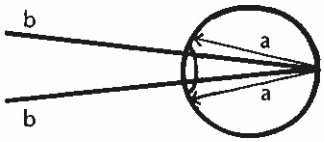


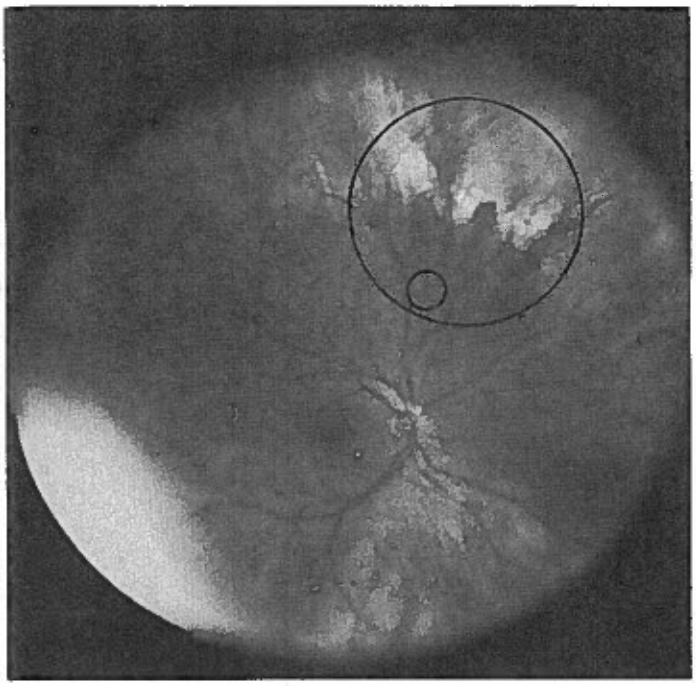


FIG. 6-5. The large circle indicates the area of the fundus which can be seen at one time with the indirect ophthalmoscope and the large 20 diopter lens. The small circle indicates the area which can be seen with the direct ophthalmoscope. Clearly, detection of the long-standing retinal detachment with demarcation line is easier with the indirect.

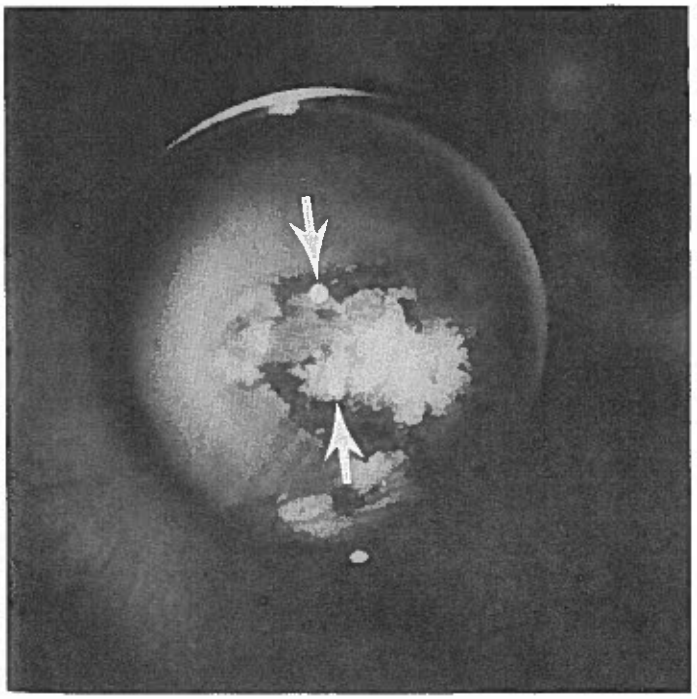


FIG. 6-6. Proper use of the hand lens. The lens is tilted to separate the light reflexes (*arrows*) on its surfaces.

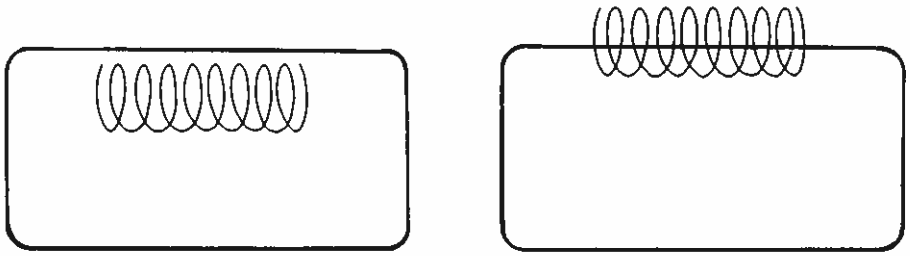
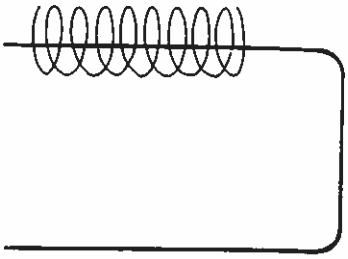


FIG. 6-7. For viewing through adequately dilated pupils (left), the reflected light (filament) should be at the top of the examiner's field of vision (*the enclosed area*). For viewing through small pupils (*right*), the mirror is positioned so that only a small strip of light is seen at the top of the field of vision.

FIG. 6-8. Examiner standing too close to patient.



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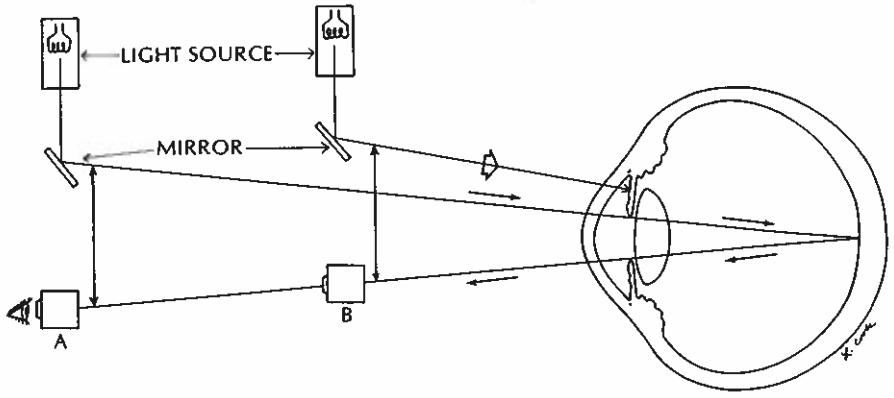

FIG. 6-9. The distance between the illumination beam and the observation beam(s) is fixed (*double-headed arrows*). When the examiner stands at position A, the illumination beam can enter the patient's pupil and the observation beam(s) can exit. At position B, the illumination beam (*open arrow*) cannot enter the eye. If the examiner lowered his head, the eye would be illuminated, but the observation beam(s) could not exit.

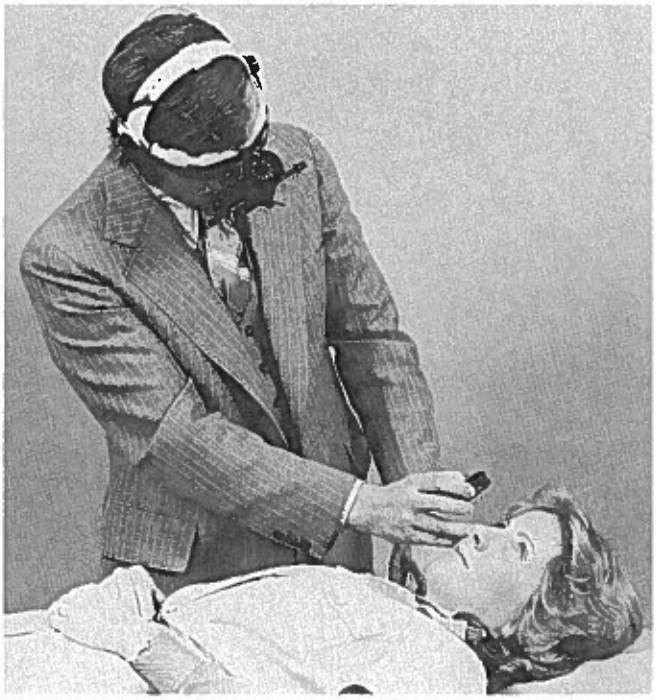

FIG. 6-10. Examination of the superonasal periphery, right eye. The patient keeps both eyes open and looks up and to the left. The examiner's arm is extended. He stands on the patient's right. He holds the lens in his right hand, steadying it by resting his finger on the patient's face.

FIG. 6-11. Examination of inferonasal periphery, right eye. Patient looks down and left. The examiner remains on the patient's right but holds the lens in left hand.

FIG. 6-12. Examination of superotemporal periphery, right eye. The examiner has moved to patient's left side. The lens is held in his left hand. The patient looks up and right. Her face is rolled to the left so that the nose is not an obstacle.

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FIG. 6-13. Examination of the inferotemporal periphery, right eye. The examiner remains on the patient's left but has shifted the lens to his right hand.

6-12. Examination of su-
temporal periphery, right
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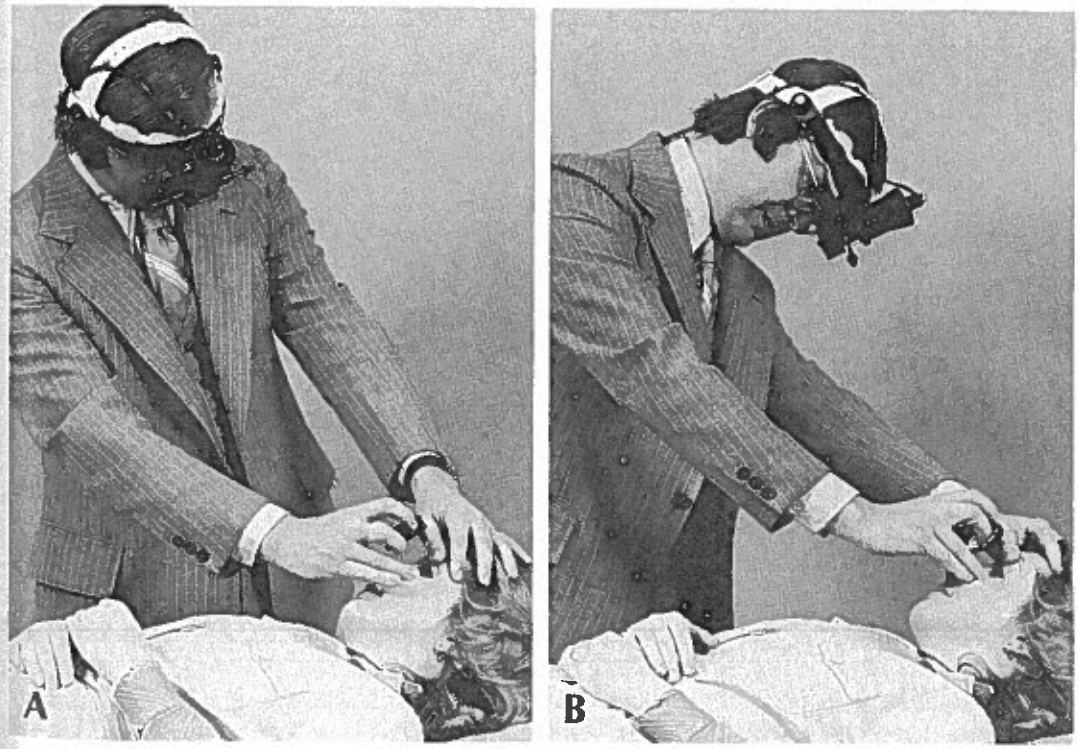


FIG. 6-14. (*A*) Examiner's head is incorrectly positioned for examination of the temporal periphery. (*B*) Examiner's head is properly tilted so that the eye is well illuminated and a monocular image can be seen.

his right to left hand as necessary to avoid awkward maneuvering, especially during scleral depression. The nose becomes less of an obstacle to viewing the temporal periphery when the patient rolls his head toward the examiner while looking temporally.

The pupillary aperture appears elliptical to the examiner when he looks at the peripheral retina. This makes stereoscopic viewing more difficult and decreases the amount of light which can enter the eye. The examiner must increase the voltage of his light source and tilt his head slightly so that part of the illumination beam can enter the eye and one of the observation beams can exit (Figs, 6-14, 6-15). This achieves only a monocular view.

THE FUNDUS DRAWING

A detailed drawing of the fundus should be made prior to surgery. The drawing may help locate the tears during surgery if the media become opaque or if the pupil constricts. Retinal hemorrhages, pigment, blood vessels, and folds should be represented. On the standard diagrams commonly used, the outermost circle represents the pars plicata of the ciliary body; the second, the ora serrata; and the innermost, the equator, which is located two disc diameters anterior to the ampullae of the vortex veins (Fig. 6-16).

There are two ways to correct for the inverted image of the indirect ophthalmoscope. The first is to observe the retina, then mentally correct for the inverted image, drawing the findings as they are, not as they are seen. The second method is to invert the drawing pad and then to draw the findings as they are seen. When the drawing is finished, the findings will be correctly positioned.

After the limits of the detachment have been sketched, all retinal breaks must be found. To this end, one may start at the optic nerve and follow each of the retinal vessels to the periphery. A scanning technique should also be used. Keeping his eyes and the hand lens aligned, the examiner swings his gaze along the periphery (Fig. 6-17). This serves two purposes. First, the entire retina is examined. Second, holes can be recognized when a sudden change in the brightness of the subretinal layers is noted. A hole is perceived as a discontinuity in the nearly uniform translucency of the detached retina (Fig. 6-18); when the observer's gaze is moving, the discontinuity becomes easier to see because of the contrast between the detached retina and the now visible layers underneath (Fig. 6-19). Slightly wiggling the lens from side to side produces a prism effect which also helps to reveal discontinuities in the retina (Fig. 6-20).

SCLERAL DEPRESSION

After the retina has been thoroughly scanned, the peripheral retina should be examined with scleral depression to detect small holes, especially those near the ora serrata. In some patients, this region cannot be seen at all without indentation. Beginners should not attempt scleral depression until they are adept at viewing the retina anterior to the equator with the indirect ophthalmoscope. Otherwise, the scleral depression will afford little or no information and the patient will have suffered needlessly.

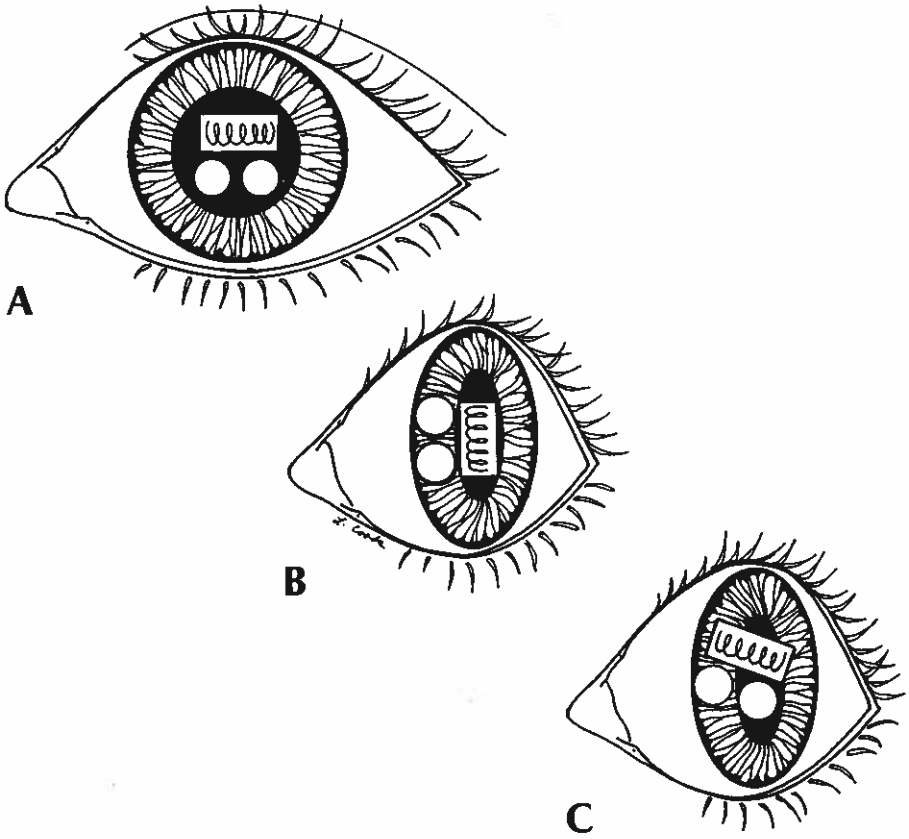


FIG. 6-15. (*A*) Viewing the posterior pole through a large pupil. The illumination beam (filament) enters through the top leaving ample room for the observation beams (*white circles*) below. Binocular vision is provided. (*B*) The pupillary aperture becomes elliptical when the examiner tries to see the far periphery. If he does not tilt his head, the illumination beam can enter the eye, but the observation beams cannot emerge. (*C*) The examiner must tilt his head so that part of the illumination beam can enter the eye. Often only a monocular view of the fundus is possible, as only one of the observation beams can emerge from the eye.

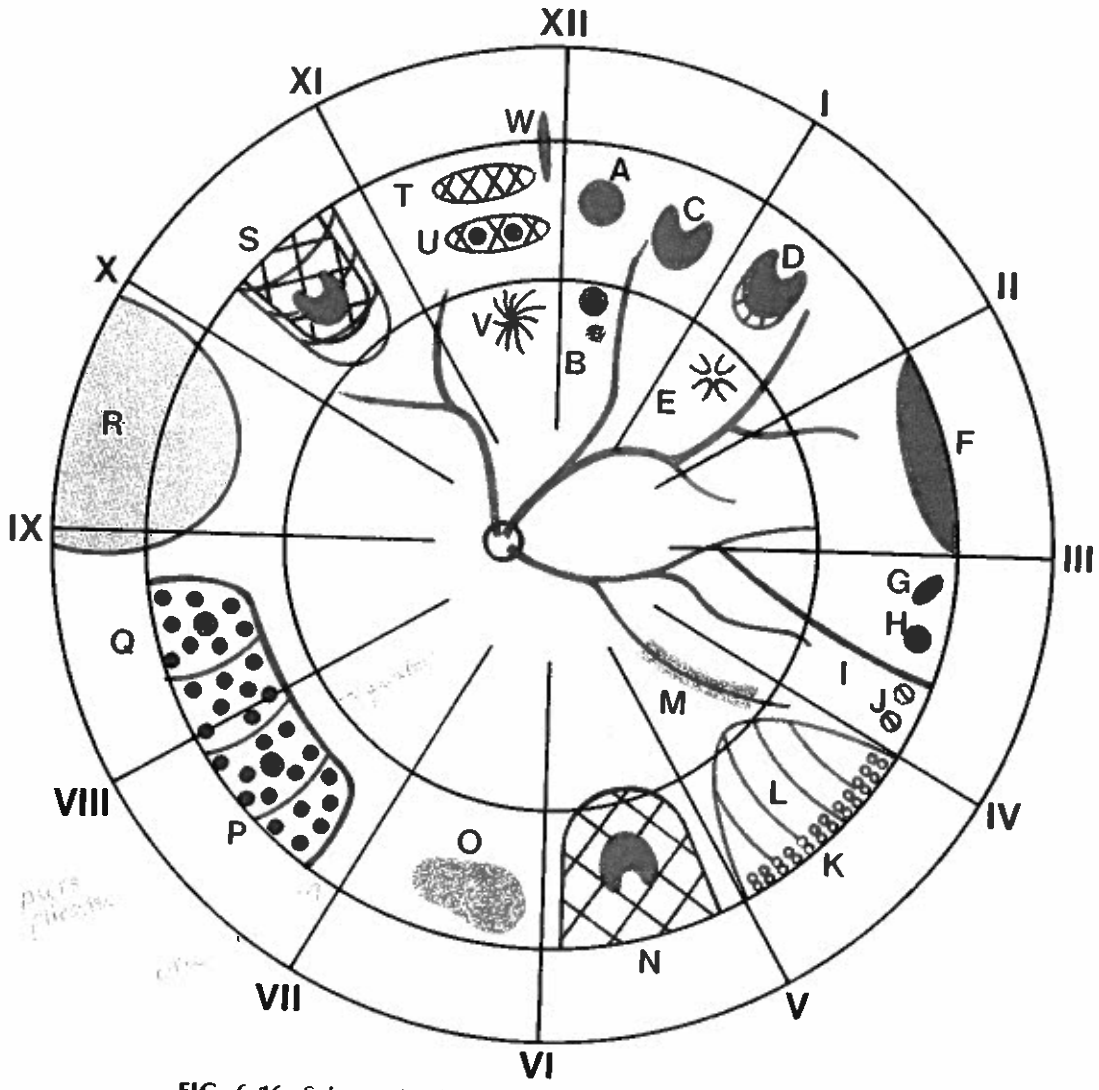
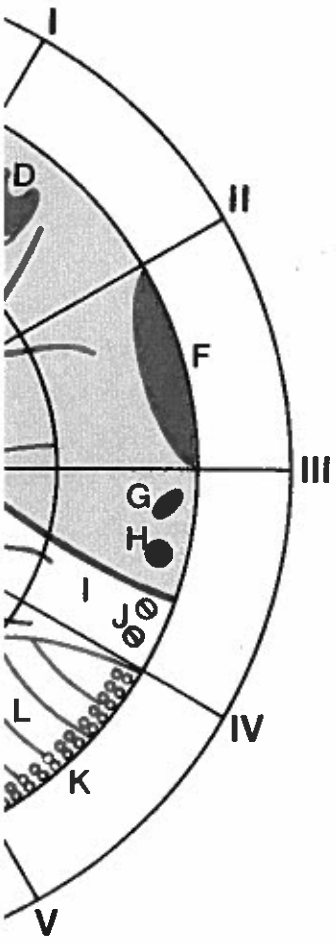


FIG. 6-16. Schematic drawing of retinal findings. Arteries and intraretinal or subretinal hemorrhages are red. Veins are blue. Red outlined by blue indicates retinal breaks. Attached retina is white. Detached retina is blue. Intraretinal and subretinal exudates are yellow. Chorioretinal scarring (pigment epithelial proliferation) is black. Any choroidal mass or indentation is brown. (Clearly, a label is required to distinguish a choroidal detachment from a malignant melanoma.) Anything in the vitreous (hemorrhage, foreign body, etc.) is green. Here, too, a label is often required. (*A*) round hole; (*B*) operculated tear; (*C*) flap tear; (*D*) flap tear with posteriorly rolled edge; (*E*) fixed fold; (*F*) retinal dialysis (disinsertion); (*G*) retinal hemorrhage; (*H*) intraretinal pigmentation; (*I*) demarcation line; (*J*) cobblestones; (*K*) peripheral cystoid degeneration; (*L*) senile retinoschisis; (*M*) exudate along a retinal artery; (*N*) flap tear surrounded by cryotherapy scarring; (*O*) vitreous opacity (needs label); (*P*) two round holes on a circumferential scleral buckle surrounded by diathermy scars. Superiorly, the retina has redetached; (*Q*) detachment of non-pigmented epithelium of the pars plana; (*R*) choroidal mass (needs label); (*S*) flap tear surrounded by cryotherapy scarring on a radial scleral buckle; (*T*) lattice degeneration; (*U*) lattice degeneration with atrophic round holes; (*V*) vortex vein ampulla; (*W*) meridional fold. (See color plate.)



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I prefer the original thimble-type depressor designed by Schepens, although a simple cotton-tipped applicator can also be used.

Scleral depression helps in three ways to detect small breaks. First, it increases the contrast between the intact retina and the break. The indented choroid/retinal pigment epithelium is darker than the unindented choiroid/retinal pigment epithelium and darker still than the intact retina, enabling the examiner to locate the break, which appears as a dark spot (Figs. 6-21, 6-22). Second, the decreased retinal translucency which results from scleral depression may increase the contrast between the hole and the retina, allowing the hole to be seen. The retina appears less translucent because it is seen at a more acute angle (Fig. 6-23). Moreover, the increased angle may aid the examiner to see the posterior edge of a break. Third, the flaps of tiny breaks at the posterior vitreous base can sometimes be seen as the sclera is indented (Fig. 6-24). In all cases, constant movement of the scleral depressor maximizes the chances of finding a small break.

Scleral depression does not enlarge retinal holes and there are very few contraindications to its use. It should be avoided only in patients who have had recent intraocular surgery. Scleral depression may cause pain. It raises the intraocular pressure and is therefore especially painful in eyes with a high initial pressure. Glaucoma patients must be examined very gently. Also, the examination stretches and compresses the eyelids and may thereby cause discomfort. To minimize this, scleral depression should be started superiorly because the upper lid is looser and more flexible than the lower.

The patient looks down and the examiner places the depressor near the lid margin, following the eyelid up as the patient looks up. Beginners should hold the depressor vertically so that the indentation can be found easily with the indirect ophthalmoscope. The examiner merely follows the shaft of the depressor down into the eye. If he does not see the indentation, he should scan the fundus, moving his head from side to side. Vertical depression also simplifies the problem of orienting one's movements in the inverted upside-down field of the indirect ophthalmoscope (Fig. 6-25). Anterior-posterior movements are easily made. If the observer wants to examine further posteriorly, he simply moves the depressor toward the optic nerve. Circumferential movements are more difficult, but they become automatic with practice. The beginner simply has to remember that the depressor should be moved opposite to the direction suggested by his view of the retina.

If the ora serrata is to be viewed, the patient should look as far superiorly as possible (Fig. 6-26). Beginners will see the ora serrata most easily in highly myopic eyes and in aphakic eyes which have had a sector iridectomy. If areas of the superior retina posterior to the equator are to be examined, the patient must look slightly inferiorly (Fig. 6-27).

Scleral depression is most difficult at the 9:00 and 3:00 positions because the eyelid is shorter here and because the canthal ligaments resist the posterior movement of the depressor. Direct scleral depression at the canthus is painful. Moreover, the depressor may slip off the eyelid and strike the patient's eye. The following techniques help to avoid these problems. First, the depressor is placed on the superior eyelid, above the horizontal axis. It is then rotated downward toward the canthus, carrying the eyelid down with it. The lid be-

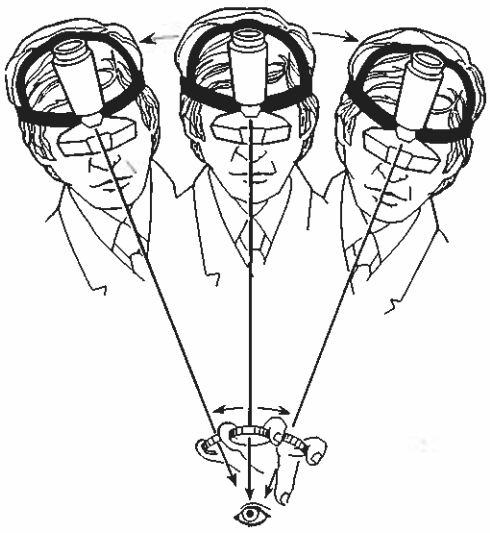


FIG. 6-17. Scanning technique for examining the retina. The examiner keeps his eyes and lens aligned while viewing the retina.

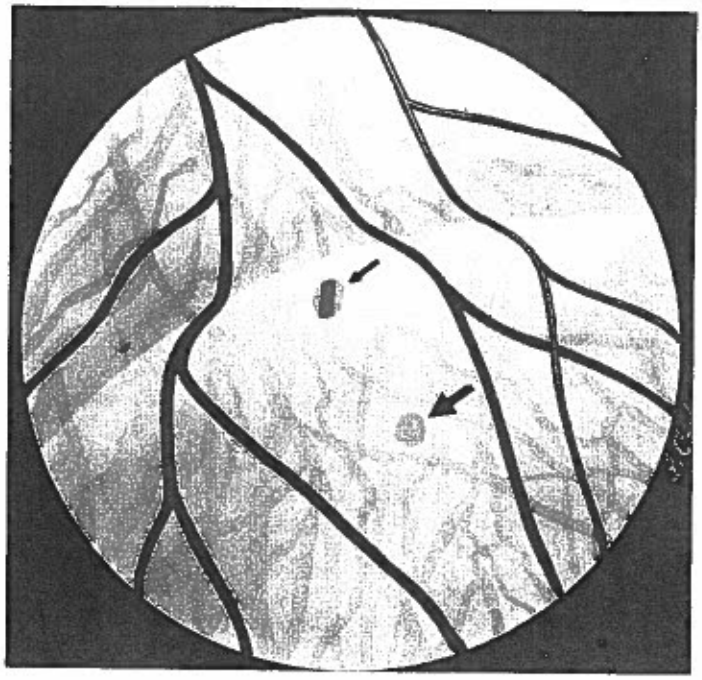


FIG. 6-18. Retinal breaks are perceived as discontinuities in the detached retina. One hole (*small arrow*) appears as a dark spot because a choroidal vessel underlies it. The other (*large arrow*) is more difficult to see because of lack of contrast between the retina and the subretinal layers.

G. 6-17. Scanning technique r examining the retina. The aminer keeps his eyes and ıs aligned while viewing the ina.

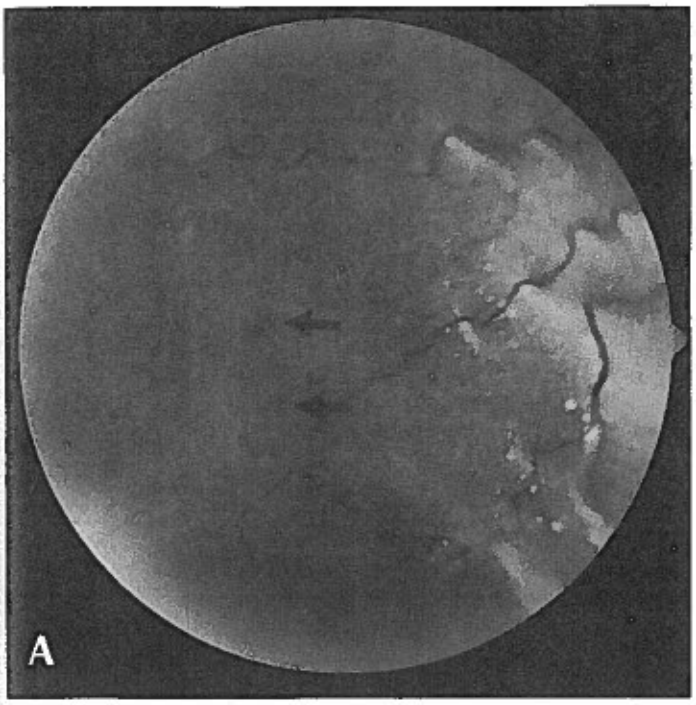
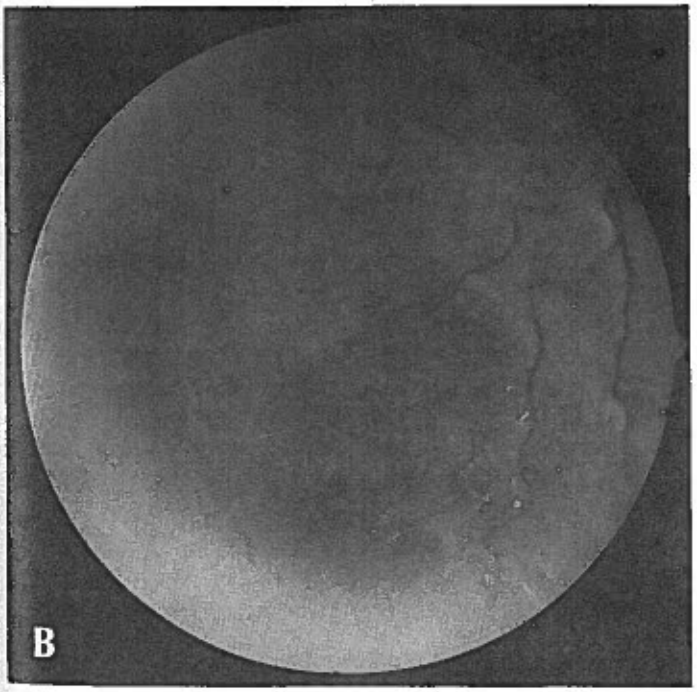


FIG. 6-19. Retinal detachment with two small holes (*arrows*) in a patch of lattice degeneration. Under the detachment is an area of nonpigmented choroid. (*A*) The superior hole appears to be a dark spot. The inferior hole appears as a light spot.

G. 6-18. Retinal breaks are rceived as discontinuities in e detached retina. One hole *nall arrow*) appears as a dark ɔt because a choroidal vessel derlies it. The other (*large ow*) is more difficult to see cause of lack of contrast beeen the retina and the subinal layers.



(*B*) Viewed from a different angle, the superior hole appears to be a light spot. The inferior hole appears to be a dark spot.

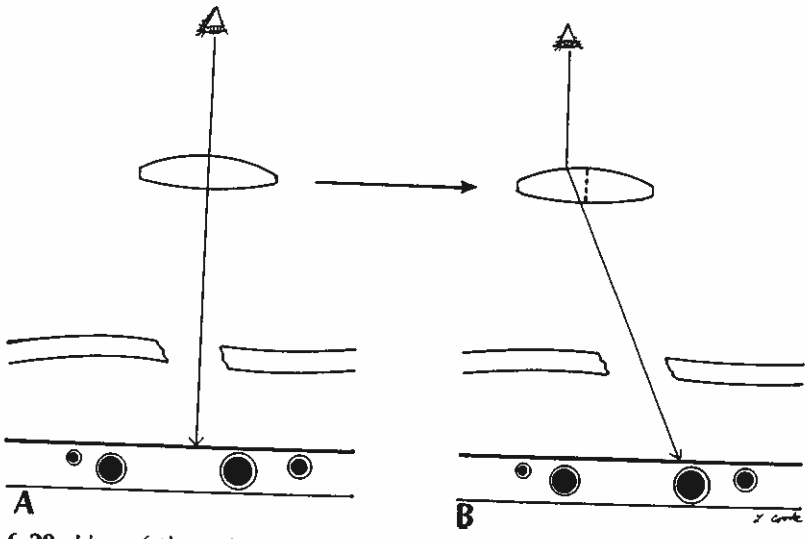
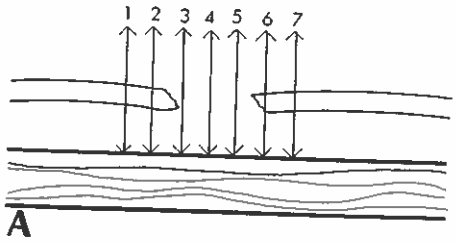
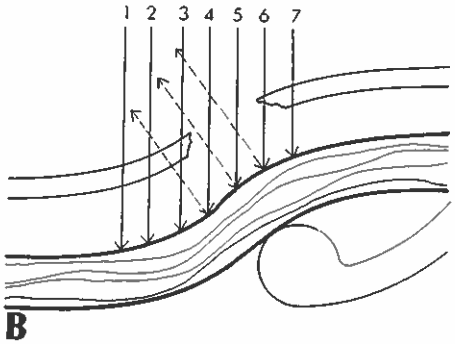
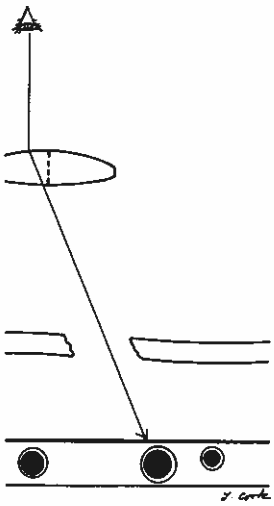


FIG. 6-20. Use of the prism effect of the lens to find retinal breaks. (*A*) Break initially difficult to find because of little contrast between the detached retina and the background. (*B*) As lens moves, the retina appears to move with it. A choroidal vessel is suddenly seen more clearly, identifying the break.

FIG. 6-21. Scleral depression changes the brightness of the subretinal layers. (*A*) Without indentation light rays 3, 4, and 5 are reflected directly back to the examiner. (*B*) With indentation, some light rays are reflected away from the examiner, so that the indented area appears darker.







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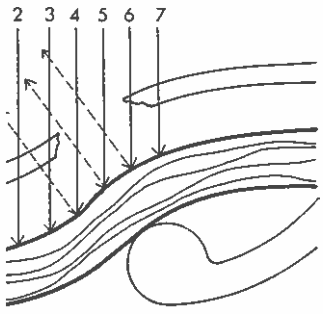


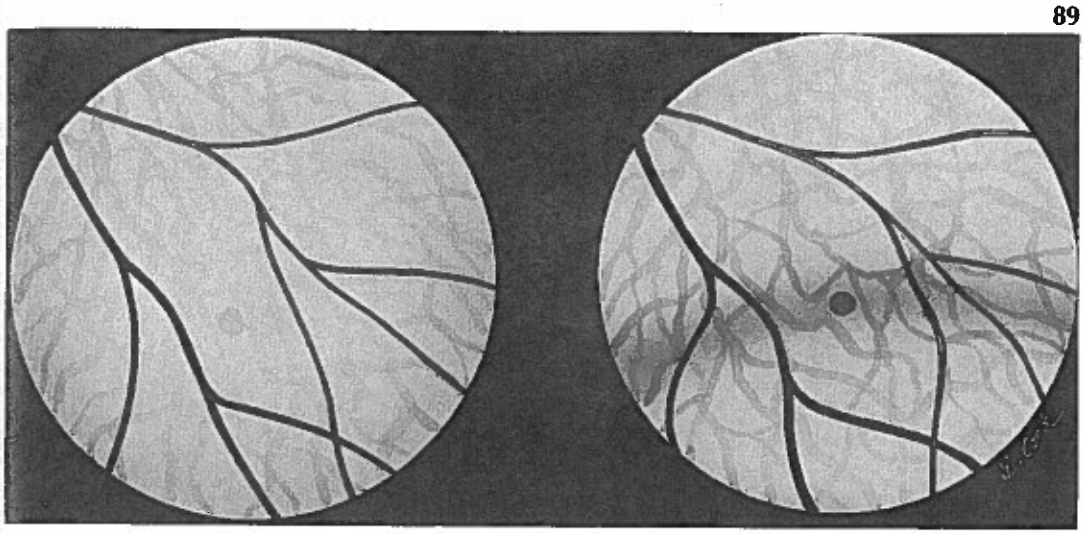
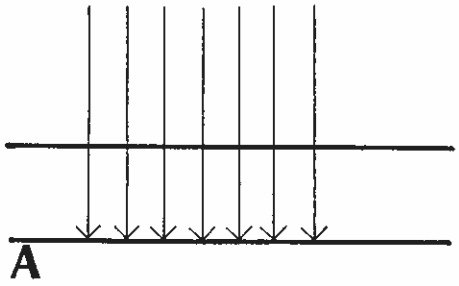
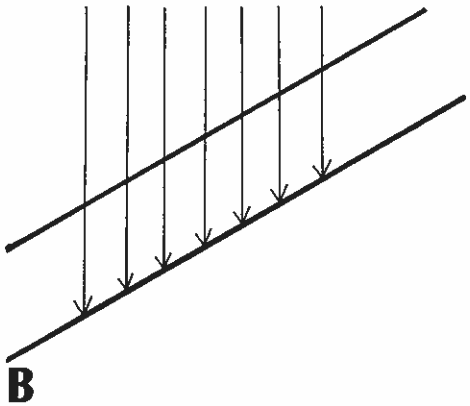


FIG. 6-22. The use of scleral depression to find retinal breaks. Left, the retinal hole can barely be seen because of little contrast between the retina and the underlying choroid. Right, scleral depression darkens the underlying choroid. The hole is seen as a dark spot.

FIG. 6-23. (*A*) Without scleral depression, light rays have a short path through the retina. (*B*) Retina tilted by scleral depression. The light rays must travel a longer path through the retina, which therefore appears less translucent.





comes more slack when the patient, his head rolled away from the examiner, is not looking into an extreme position of gaze (Fig. 6-28).[3] Second, a cotton-tipped applicator, being blunter and softer than a metal depressor, may be better tolerated. Finally, if the above techniques have been unsuccessful, one can easily depress directly on the conjunctiva after topical anesthesia has been administered (Fig. 6-29).

After thoroughly examining the retina with indirect ophthalmoscopy and scleral depression, one should use the slit lamp and the Goldmann three-mirror lens to search for small breaks and to evaluate vitreous traction. It is essential that the fellow eye be carefully examined for retinal breaks or other abnormalities which might require prophylactic treatment.[2]

FINDING THE RETINAL BREAKS

The configuration of the retinal detachment suggests the location of at least one retinal break.[8] The basic principle is that gravity helps subretinal fluid to dissect inferiorly and retards superior dissection. The following hints may be helpful:

1. For superior retinal detachments crossing the 12:00 meridian, a break will be within 1½ hours of 12:00 on the side with the greatest inferior extent of detachment (Fig. 6-30).
2. For retinal detachments involving the superior retina but not crossing the 12:00 meridian, a break will be within 1½ hours of the most superior edge of the detachment (Fig. 6-31).
3. A focal spot of pigment may help to locate a break because such a spot sometimes appears in the flap of a tiny horseshoe tear (Fig. 6-31).
4. For inferior detachments higher on one side, a break will be located on that side (Fig. 6-32).
5. For inferior detachments with equal upward extent on both sides, a break will usually be found near 6:00 (Fig. 6-33).
6. Inferior breaks usually do not cause highly bullous retinal detachments. Therefore, when large bullae are seen inferiorly, the surgeon must look carefully for a superior retinal break.
7. When no breaks are found in an inferior retinal detachment, a superior break may be leaking fluid down a shallow peripheral trough (Fig. 6-34). Locating these breaks is sometimes facilitated by having the patient's head tilted far backwards, allowing the fluid to shift up toward the break (Fig. 6-35).
8. If a demarcation line is present, there must be a hole between the line and the ora serrata (Fig. 6-36).
9. Until proven otherwise, one should suspect that a break is present at the end of meridional folds, especially in aphakic retinal detachments.
10. In aphakic retinal detachments, the surgeon should carefully examine the posterior border of the vitreous base for tiny flap tears (Fig. 6-24).[1]
11. In high myopes with a posterior staphyloma, a break may be found anywhere in the posterior pole, not necessarily in the fovea.
12. In redetachments, the surgeon should first see if the original break or breaks have reopened (Fig. 6-37). If not, a break may be found in the most superior area where subretinal fluid crosses over the scleral buckle (Fig. 6-38).

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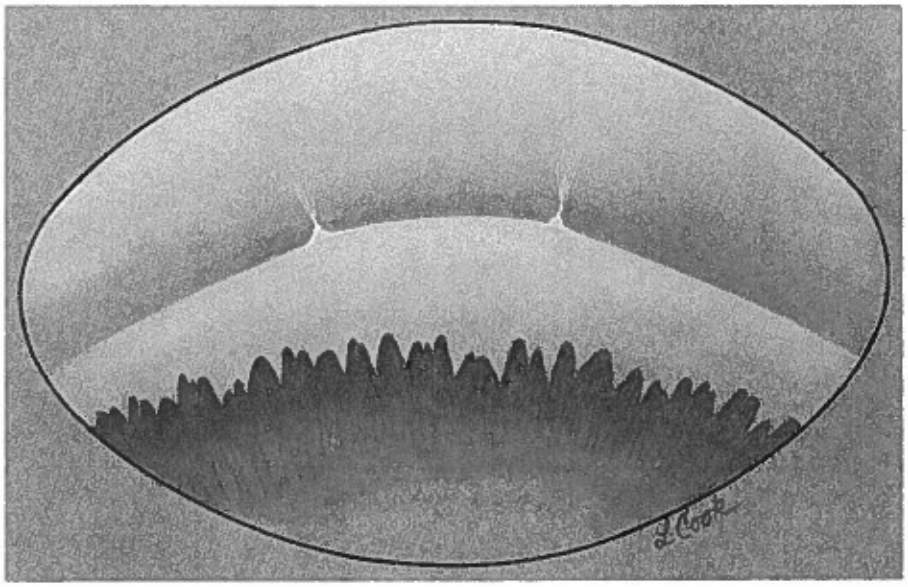
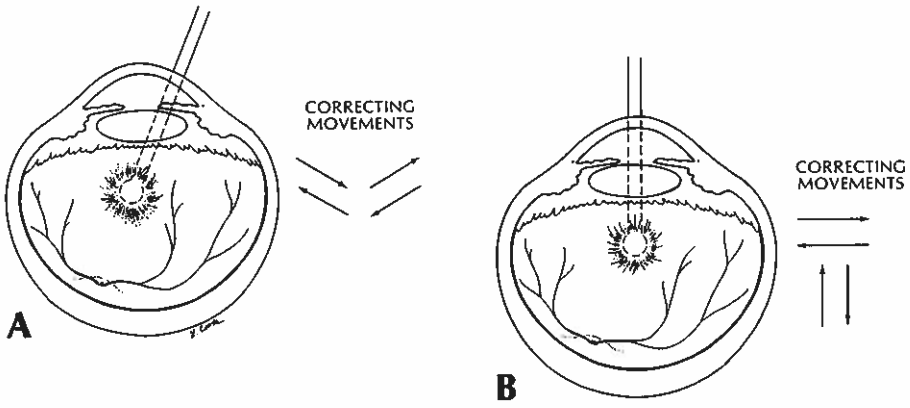


FIG. 6-24. Indirect ophthalmoscopic view of tiny flap tears with vitreous traction, demonstrated by scleral depression at the posterior vitreous base.

FIG. 6-25. (*A*) Incorrect technique for scleral depression. It is difficult to make diagonal correcting movements because of the upside down and backward image of the indirect ophthalmoscope. (*B*) Correct technique for scleral depression. The depressor is held vertically so that horizontal and vertical correcting movements can be easily made.



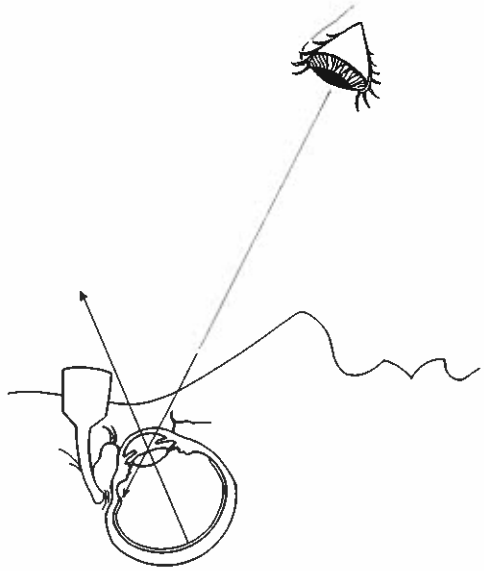


FIG. 6-26. The ora serrata can be seen best when the patient looks as far superiorly as possible.

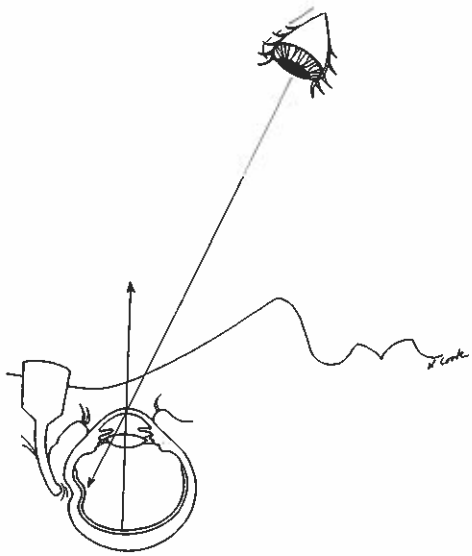


FIG. 6-27. In order to view the midperiphery, the examiner should have the patient look slightly inferiorly.

FIG. 6-29. Examination of the temporal periphery. If the eyelid is not slack ▶ enough to allow depression, the scleral depressor can be placed on the anesthetized conjunctiva.

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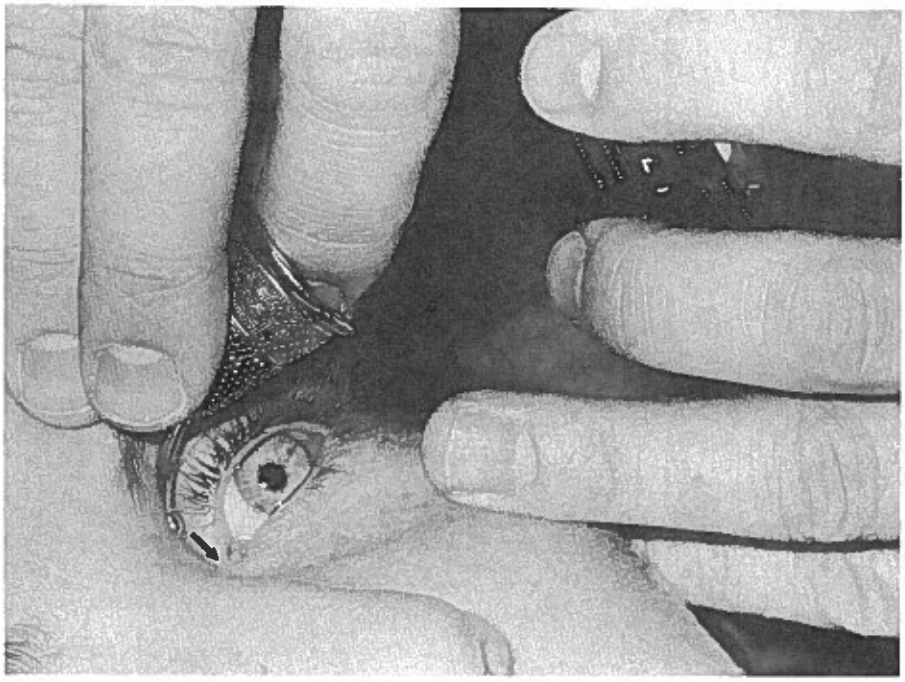
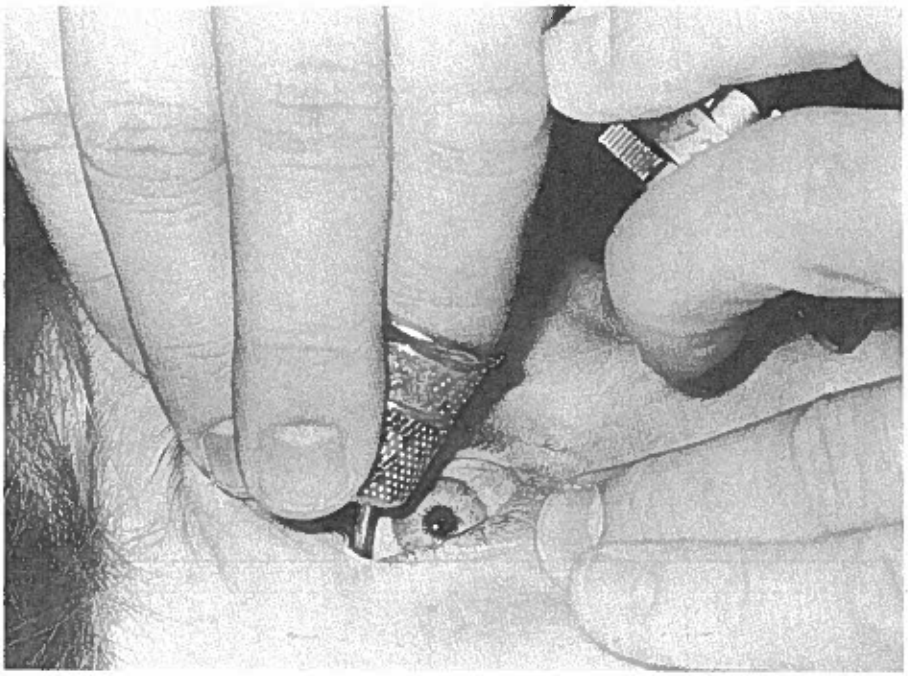


FIG. 6-28. Scleral depression of the nasal periphery. The patient's head is rolled away from the examiner. She looks straight ahead, keeping the lid slack. The scleral depressor is placed on the superior eyelid above the horizontal axis. It is then rotated downward toward the canthus (*arrow*), carrying the eyelid with it.



. If the eyelid is not slack ▶
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If no subretinal fluid crosses over the buckle, the break is probably posterior to it (Fig. 6-39).

13. When a break is not easily located, the patient should be examined in a sitting position. The slight shift of the fluid may facilitate the detection of breaks.

14. In 3 to 10 per cent of patients with retinal detachment, no definite break is ever found.[4]

15. When a bullous retinal detachment is present, a break previously hidden by retinal folds sometimes appears after the subretinal fluid has been drained at surgery.

The above discussion in no way implies that the remainder of the retina need not be examined after a break has been found in the expected location. Fifty per cent of retinal detachments have more than one break.[9] If any retinal break is not closed, the surgery will fail.

PREOPERATIVE MANAGEMENT

MEDICAL EVALUATION

A careful medical evaluation is important, especially if the retinal detachment procedure, which often lasts 2 or more hours, is to be done under general anesthesia. Allergies must be identified. The anesthesiologist must be alerted if the patient has glaucoma and is being treated with anticholinesterase drugs, such as phospholine iodine. Because these drugs lower blood pseudocholinesterase, succinylcholine should not be used in conjunction with general anesthesia, or the patient will have prolonged respiratory paralysis.

PREVENTION OF INFECTION

Blepharoconjunctivitis, when present, should be treated before retinal surgery. Even in the absence of clinical infection, some surgeons routinely treat patients preoperatively with prophylactic antibiotics. The eyelashes are trimmed so that they do not contaminate the operative field and so that postoperative secretions can be more readily wiped away.

BINOCULAR PATCHING

Binocular patching and bed rest will, in almost all cases, prevent the spread of the retinal detachment. Moreover, significant quantities of subretinal fluid may be absorbed, especially in recent retinal detachments with small retinal breaks. The fluid is not as readily absorbed in aphakic and inferior retinal detachments.[7] The decreased elevation of the detachment facilitates the localization of breaks and sometimes allows a non-drainage procedure to be performed.

PUPILLARY DILATATION

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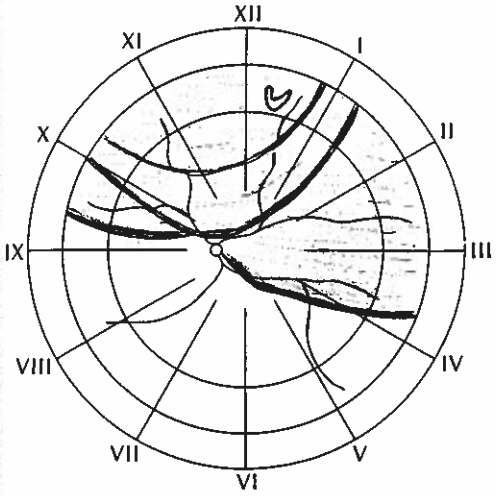


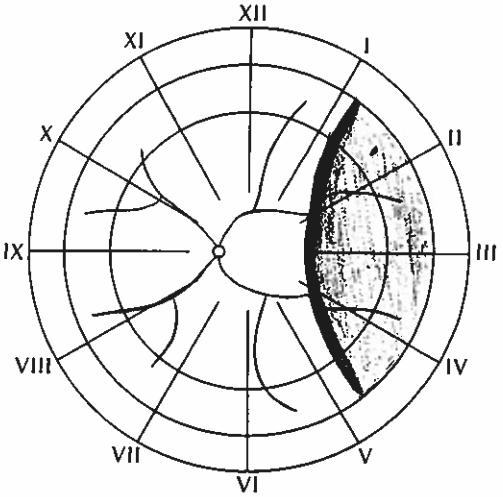
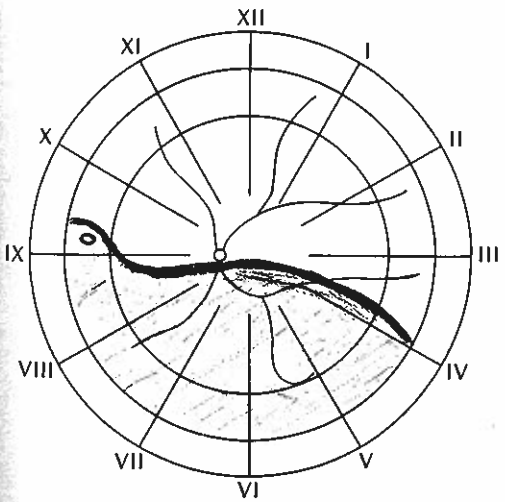


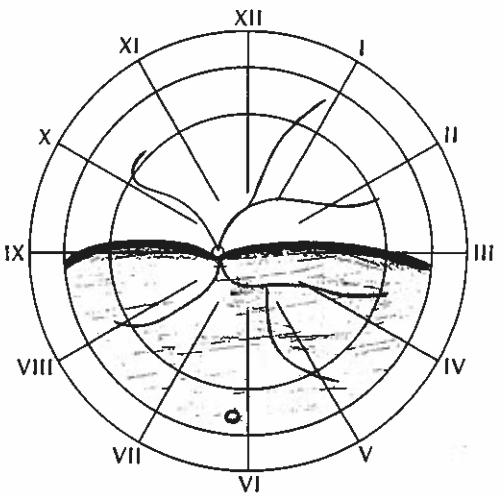
FIG. 6-30. Top, left. A superior retinal detachment which crosses the 12:00 meridian. A break is found near 12:00 on the side with the greatest inferior extent of detachment, in this case the temporal side.

FIG. 6-31. Top, right. A superior retinal detachment which does not cross the 12:00 meridian. A break is found within 1½ hours of its most superior margin. A focal pigmented spot alerts the examiner to the location of the break, which can only be seen with scleral depression.

FIG. 6-32. Bottom, left. An inferior detachment which is higher on the nasal side. A break is located on that side (at 8:45).

FIG. 6-33. Bottom, right. An inferior detachment with equal superior extent on both sides. A break is found near 6:00.





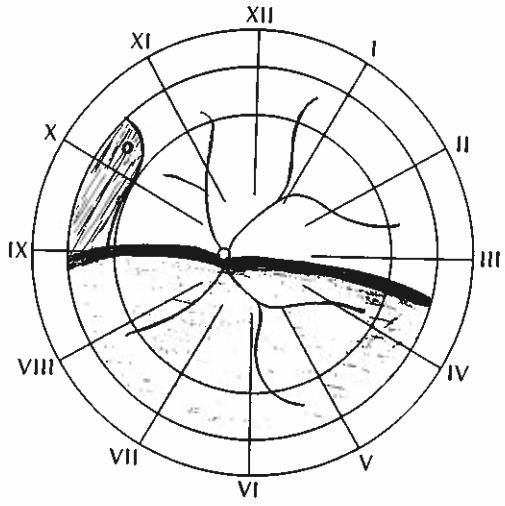


FIG. 6-34. When no inferior break is found in an inferior retinal detachment, the examiner should look for a superior break which is leaking fluid along a shallow peripheral trough.

FIG. 6-35. Patient's neck is hyperextended to allow fluid to shift superiorly.

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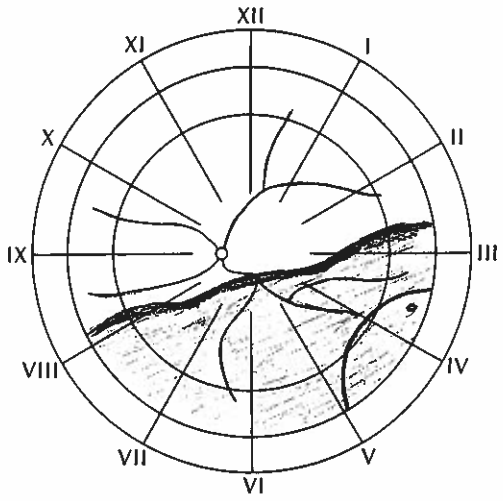
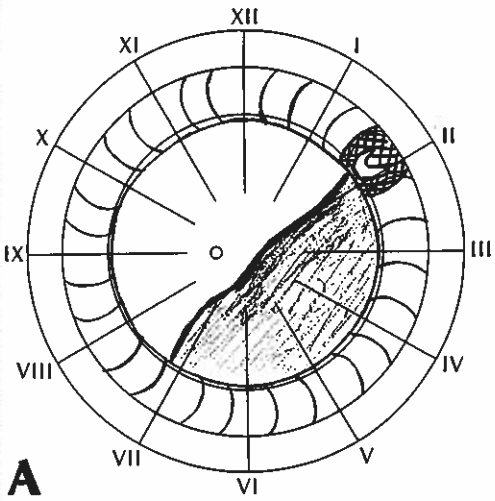
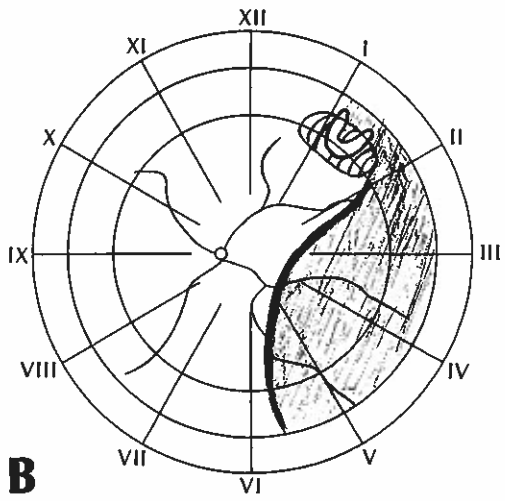


FIG. 6-36. A demarcation line (from 3:30 to 5:00) has failed to contain a retinal detachment. A break must be present between the demarcation line and the ora serrata.

G. 6-35. Patient's neck is hy- rextended to allow fluid to ift superiorly.

FIG. 6-37. Redetached retina. (*A*) The encircling scleral buckle (*parallel curved lines*) was not placed far enough posteriorly to seal the horseshoe tear. (*B*) The segmental circumferential buckle was not placed far enough anteriorly.





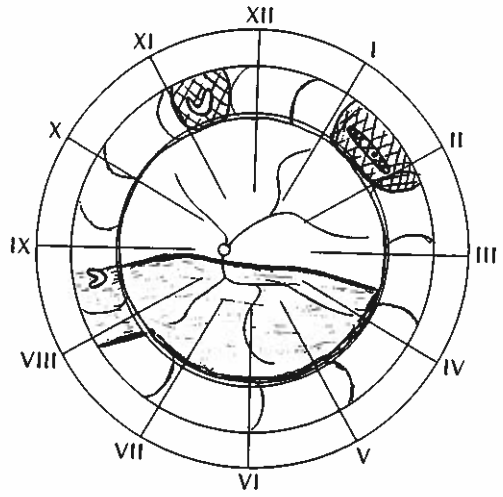


FIG. 6-38. Redetached retina. A break is often found where the subretinal fluid crosses over the scleral buckle (8:00 to 9:00).

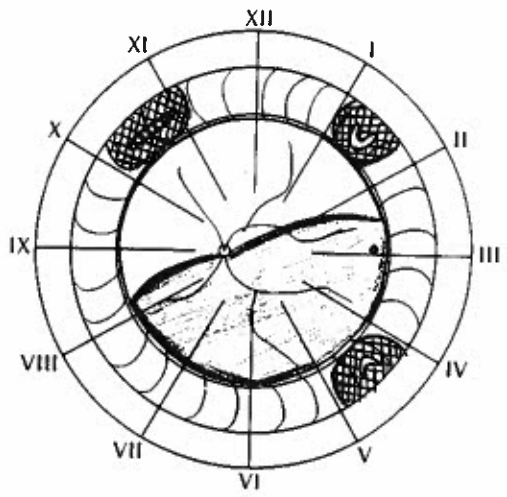


FIG. 6-39. Redetached retina. No fluid crosses over the scleral buckle. A break is found posterior to the buckle (3:00).

cent in both eyes twice per day. This avoids the need for repeated dilatation each time another member of the operating team examines the patient. Maximal cycloplegia and mydriasis are obtained if, beginning 1 hour before surgery, three applications of cyclopentolate 1 per cent and phenylephrine 10 per cent are given at 15-minute intervals. If the pupil will not dilate enough to allow peripheral retinal examination, it must be enlarged either by photocoagulation of the iris or by iridectomy. Iridectomy is also indicated in patients with angle closure glaucoma. If a dense cataract prevents satisfactory examination, it must be removed. Current techniques of cataract wound closure allow the cataract extraction and retinal surgery to be performed at one sitting.

G. 6-38. Redetached retina. A eak is often found where the bretinal fluid crosses over the leral buckle (8:00 to 9:00).

G. 6-39. Redetached retina. › fluid crosses over the scleral ckle. A break is found poste- r to the buckle (3:00).

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