APPLIANCES

NEW USES FOR OLD MIRRORS*

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THE use of a small plane mirror on a handle (Fig. 1), similar to a dental mirror, can be a most useful aid in direct ophthalmoscopy especially for examining the periphery of the fundus and, in particular, when light-coagulation of the periphery is to be done.

FIG. 1.—Dental mirror and handle. The rectangular lens is for attachment to the light-coagulator mirror, whilst the circular lenses are for attachment to the dental mirror. The face of the mirror should be parallel to the handle.

The extreme simplicity of this technique suggests that it might well have been used before, but I have been unable to find any reference to it, other than Goldmann's ingenious use of mirrors set in contact lenses for slit-lamp gonioscopy and funduscopy.

Fig. 2 (opposite) shows the mirror held on the nasal side of the eye and the ophthalmoscope on the temporal side, so that the extreme temporal periphery is seen in the mirror. For small excursions, the ophthalmoscope is held still, and movements of the mirror will bring adjoining areas of the retina into view. The pupil must, of course, be dilated if the peripheral retina is to be examined. Fig. 3 (opposite) shows the view obtained by looking through the ophthalmoscope.

Normally, examination of the peripheral fundus with indirect and direct ophthalmoscopy reveals as much of the peripheral retina as the examiner wishes to see, but, if the patient cannot rotate his eyes freely, this examination becomes more difficult. In light-coagulation the eye can be rotated forcibly

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FIG. 2.—Approximate positions of ophthalmoscope and mirror in examining the temporal periphery. The position of the mirror has been changed for the photograph.

FIG. 3.—Appearance of patient's eye and mirror as seen through the ophthalmoscope. The parallel lines on the cornea are light reflexes.

with a squint hook or forceps, but this often proves uncomfortable, and I have found that, in spite of the retrobulbar injection, forcible rotation of the eye causes much discomfort. If an eye needing coagulation also needs a contact lens to overcome ametropia during coagulation, I have found that forcible rotation usually tilts the lens and permits the entry of an air-bubble.

Even when an eye cannot be rotated, the nasal periphery is not too difficult to examine, but the upper and lower peripheries are more difficult, and the temporal periphery is well-nigh impossible to examine, particularly when the patient is immobilized in bed.

The mirror-image produced by the method here described does not cause any difficulty. It must be remembered that this image is not totally inverted as in indirect ophthalmoscopy, but laterally inverted.

When the upper or lower fundus is to be examined by this method, the lid is pulled out of the way either with the back of the mirror, or with one of the fingers of the hand holding the mirror (Fig. 4).

FIG. 4.—Method of pulling down the lower lid with the edge of the mirror whilst looking at the upper periphery.

The use of the mirror in light-coagulation of the peripheral retina is shown in Fig. 5. Without forcible rotation of the immobile eye, and merely by rotating the mirror and holding the ophthalmoscope of the light-coagulator still, one can coagulate about one-quarter of the periphery. Merely by changing the position of the ophthalmoscope and the mirror, and without moving either the patient or the light-coagulator, one can coagulate three-quarters of the periphery.

FIG. 5.—Use of the mirror with the light coagulator.

If one cannot coagulate far enough towards the periphery, indentation of the sclera by an assistant is particularly easy, because the light from the ophthalmoscope shines through the sclera.

To avoid the use of contact lenses in ametropic eyes needing peripheral coagulation, I have had +6 and +12 dioptre plano-convex lenses, and a -10 dioptre plano-concave lens made to attach to the front of the mirror (Fig. 1). I do not anticipate any difficulty with the convex lenses in cases of hypermetropia, but expect that the concave lens will cause some of the divergent rays to cause light loss unless the mirror is held near enough to the cornea.

It is well known that in light-coagulating the periphery in emmetropes, a higher intensity of light is required to produce a burn: the fact that the periphery is relatively hypermetropic seems to account for this in part. My experience in coagulating the periphery in emmetropic eyes with and without the +6 dioptre lens in front of the mirror, suggests that a lower intensity of light is needed when one uses the convex lens. The ease with which myopes of about 5 to 10 dioptres are coagulated in the periphery with a low intensity of light and without a contact lens is added confirmation of this theory.

A plano-convex lens of 3 dioptres on a mirror acts like a 6-dioptre convex lens, because the rays of light are refracted twice by the convex surface.

Silvering the plano side of the lens would seem to be a method of overcoming some of the surface reflections that occur if the lens is attached to the surface of the mirror.

This method of attaching a lens to the surface of the mirror has a further use in light-coagulation.

If the required strength of lens is attached to the front surface of the plane mirror which acts as the ophthalmoscope of the light-coagulator, it should be possible to coagulate any ametropic area directly, without using a contact lens. Suitable lenses made for this purpose are shown in Fig. 1.

Slit-lamp biomicroscopy of the peripheral fundus is exceedingly difficult without the help of a Goldmann contact lens with mirrors.

However, by using the mirror and the slit-lamp microscope with a Hruby lens, one can see the peripheral fundus without difficulty. Here again it must be remembered that there will be lateral inversion of the image (Fig. 6).

FIG. 6.—Use of the mirror with the slit-lamp microscope.

Using a self-luminous indirect ophthalmoscope and standing somewhat behind the patient, I can see the fundus without difficulty if I use a concave mirror instead of a condensing lens. However, as the only concave mirror I have is a small one with a hole which is normally used for indirect ophthalmoscopy, I cannot carry this much further at present. But indirect binocular ophthalmoscopy of the periphery may prove easier with a suitable concave mirror instead of a condensing lens, particularly when the eye to be examined cannot be rotated.

Binocular indirect ophthalmoscopy of the peripheral fundus is very simple if a condensing lens and a plane mirror are used, because the examiner has one hand free to hold the condensing lens and the other to hold the mirror. The use of mirror-lens combinations for binocular indirect ophthalmoscopy is being further investigated.

Lastly, the ingenious direct vision gonioscopy lens made by the Medical Workshop of Groningen, Holland, has one defect, that the patient has to turn the eye with the lens—which is attached by suction—in the direction required by the examiner.

I find most elderly people are unable to look sufficiently upwards with the lens attached, so that one cannot examine the 12 o'clock position of the angle properly. As this is the situation of most glaucoma operations, the importance of examining this area needs no elaboration.

If the mirror is used, however, all the patient needs to do is to look straight ahead, and the mirror, held at 6 o'clock, enables one to examine the upper angle very easily.

Summary

A method of using a small mirror on a handle, which under certain circumstances greatly facilitates direct ophthalmoscopy, is described. This is of particular advantage in light-coagulation, and it is also useful in binocular indirect ophthalmoscopy, and slit-lamp biomicroscopy of the fundus.

The advantages of attaching suitable lenses to mirrors in light-coagulation are also described.

The mirror illustrated in this paper was made by Gowllands, England.