THERAPEUTIC CONTACT-LENSES FROM PLASTIC *†

BY

ISTVAN DE GYÖRFFY

Budapest

THERE has been a great improvement in ophthalmologic prostheses during the last twenty years. Artificial eyes, contact-lenses, and recently ocular implants have become so numerous that they have begun to represent a special branch of ophthalmology. In this publication I wish to speak about prostheses in the form of contact-lenses which are made from plastic and are used successfully for therapeutic purposes in modern ophthalmology.

The first to write about the therapeutic use of contact-lenses were Galezowski (1882) and Mules (1894) who applied gelatine shells impregnated with drugs to the eye in order to protect it from infection, or to cure corneal abscess.

The ordinary contact-lens was first used therapeutically by Weihmann (1923) for the treatment without bandage of corneal ulcer and for diseases of the corneal epithelium. No drugs were used and the essential form of treatment was protection. Huber (1934) used a contact-lens containing ointment in the treatment of various conditions. The advantage of this method was obvious, and others made use of it in the application of different drugs. The therapeutic use of contact-lenses has become especially important since the introduction of sulphonamides and penicillin, as no other method can bring the diseased cornea into such prolonged and close a contact with the drug. It is especially valuable to try this method when the disease is so deep-set or so severe that treatment consisting of the instillation of solutions or application of ointment does not prove efficacious. In order to obtain prolonged local effect of vitamins and anti-histamin drugs this method can also be recommended.

Contact-lenses also prove effective in preventing desiccation or erosion of the cornea. Entropion and trichiasis may be treated in this way until surgical treatment is undertaken, or in cases when an operation is contra-indicated. Contact-lenses are also useful in cases of keratitis *e lagophthalamo*, and the necessary correction may be ground on to the lens. Contact-lenses can be used in combination with surgical treatment. In the literature Rosengren (1930) reports that he used them with good effect to fix the disc after keratoplasty and Wright (1932) mentions a similar case. They also used contact-lenses after operations for detachment of

* Received for publication June 27, 1949.

† From the Second University Eye Clinic, Budapest, Hungary.

the retina. Klein (1935) has used them in order to ensure transparency of the cornea in ophthalmoscopy. Aust (1929) uses them in cases of high astigmatism in order to clarify the view of the fundus. Contact-lenses may prove useful after Blaskovic's operation for ptosis instead of the protective glass-cup dressing, and assist in preventing erosions caused by sutures placed in the upper lid. Muller-Welt (1926) devised a special contact-lens for the treatment of ptosis. This shell has a horizontal strip in its upper part to support the upper eyelid.

Knapp (1925) recommends contact-lenses filled with ointment for cases in which the cornea is tattooed with chloride of gold, in order to avoid the corresponding portion of the palpebral conjunctiva being tinted, and Mayerbach (1926) reports a case in which he used Muller's contact-lens for the protection of pulsating descemetocoele. With all these methods ordinary or slightly modified lenses were used which prevented access of air to the cornea.

Another group of therapeutic lenses are the ocular shells. These are contact-lenses which have openings in front of the cornea, so that it is possible to have access to the eyeball, the shells having to remain in the eye sometimes for weeks without being removed. Hanke (1916) and Majewski (1916) as well as Illig (1917) and Carsten (1917) were the first to advocate their use to prevent the development of symblepharon, after burns or other injuries. They are useful after recent burns, as the part behind the shell can be well flushed through the opening in front of the cornea, and the instilled drug can reach the whole surface of the bulbar and tarsal conjunctiva. When cicatrization has set in, the shell regulates the shape of the conjunctival sac and prevents the development of adhesions. The perforated shells are very useful for stopping recurrence of smaller symblepharons and ankyloblepharons after severing scars or strands. A shell of the appropriate size and shape is inserted and new adhesions can be prevented. We used this method very successfully when scars had to be removed which prevented the wearing of artificial eyes and tinted lenses, and the complicated operation of transplanting mucous membranes was not necessary in less severe cases. In all these cases plastic shells were used in preference only to glass, porcelain or metal. In cases requiring ordinary contact-lenses the shell can be made from sheet plastic 0.2-0.3 mm. thin, so as to be no more than a membrane between the eyeball and the lid. Thus it is extremely elastic and pliable, and even when the eyeball is not spherical the shell tends to take its shape and is comfortable to wear. If necessary the corneal part can have a correction ground on to it. The material itself is indifferent to the lacrimal fluid, and it can be perfectly cleaned and sterilized in a solution of 1 per cent.

mercuric oxycyanate. The perforated shells (Fig. 1) are made from thicker (1.0-1.5 mm.) material. This is better for prevention of symblepharon. We generally make a corneal opening of 10-12 mm. Through this opening the bulbar conjunctiva can be well irrigated and the absorption of instilled drops is more complete. By reason of the extremely easy moulding properties of acrylics the shells can be rapidly adjusted.

In connection with plastic lenses I should like to mention a new moulding-shell (Fig. 2) which I have found useful. Many authors

FIG. 1.—Ocular shells.

FIG. 2.—Moulding shell.

have recommended moulding-shells—Csapody (1929), Prister (1933), Obrig (1938), Maisler (1939), etc. All these shells are good, but some prefer one type and others another. The characteristic of my shell is that it is a larger contact-lens made from plastic, having a small handle attached to the centre of its corneal part. This handle has a central hole to which a record syringe can be fixed. The inner side of the plastic shell is roughened to ensure better adhesion of the moulding material. The moulding process is carried out by inserting the shell into the anaesthetized eye of the recumbent patient, and injecting moulding material from the syringe under the shell through the opening in the handle. It is an advantage that the psychic irritation which the patient feels when the lens is inserted is avoided, as well as the resulting blepharospasm. The patient lies on his back, and is told to fix a sign on the ceiling, and, as the shell is in his eye, he does not notice when it is being filled with moulding material. The syringe is placed upon the handle, the shell is slightly raised from the eyeball, 2-4 cc. of liquid moulding material are instilled, the shell is slightly pressed back upon the eye, and the syringe is immediately removed. As the moulding material stiffens very quickly, it cannot flow back through the opening in the handle, and if the patient were to move his eye the whole shell would move with it, so that the mould could not get out of shape. Removal is carried out in the usual way. This method requires a certain amount of practice, as no air should remain under the shell, but after a few trials no difficulty is found.

Finally, I should like to mention, as advantages of the lenses made from plastic, that being unbreakable they do not require frequent replacement, and that being simpler to make than the glass variety, they are cheaper.

REFERENCES

- AUST (1929). *Klin. Mbl. Augenheilk.*, **82**, 535.
 CARSTEN, P. (1917). *Arch. Augenheilk.*, **82**, 198.
 CSAPODY, J. VON. (1929).—*Klin. Mbl. Augenheilk.*, **82**, 818.
 GALEZOWSKI (1882). *Bull. Mém. Soc. franç. Ophtal.*, **5**, 106.
 HANKE (1916). *Z. Augenheilk.*, **36**, 101.
 HUBER, E. (1934). *Arch. Ophthalm. B. Aires*, **9**, 316.
 ILLIG, H. (1917). *Arch. Augenheilk.*, **82**, 94.
 KLEIN, M. (1935). *Arch. Ophthalm.*, **13**, 250.
 KNAPP (1925). *Klin. Mbl. Augenheilk.*, **75**, 693.
 MAISLER (1939). *Arch. Ophthalm.*, **21**, 359.
 MAJEWSKI (1916). *Zeitschr. Augenheilk.*, **35**, 364.
 MAYERBACH, F. (1926). *Klin. Mbl. Augenheilk.*, **77**, 507.
 MULES (1894). *Trans. 8th. int. Ophthalm. Congress*, p. 60.
 MULLER-WEIT (1926). *Opt. Rundschau*, 230.
 OBRIG, T. E. (1938). *Arch. Ophthalm.*, **19**, 735.
 PRISTER (1933). *Boll. Oculist*, **12**, 149.
 ROSENGREN, B. (1930). *Acta Ophthalm. Kbh.*, **8**, 321.
 WEIHMANN, M. (1923). *Klin. Mbl. Augenheilk.*, **70**, 236.
 WRIGHT, R. E. (1932). *Brit. J. Ophthalm.*, **16**, 473.