THE THERAPEUTIC USE OF SOFT CONTACT LENSES

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SUMMARY: Many therapeutic problems arising from a wide range of corneal, conjunctival and eyelid disorders may be solved or greatly eased by the use of high water-content hydrophilic contact lenses. A general introduction to the subject of bandage contact lenses is followed by a brief account of seven illustrative cases.

Introduction

Hydroxyethylmethacrylate (HEMA) is a hydrophylic absorptive hydrogel of good mechanical strength which can, in the dehydrated state, be lathe cut to accurate dimensions and then rehydrated to form a soft contact lens of excellent optical properties. Lenses intended for correction of ametropia (usually myopia) have a water content of 30 per cent to 40 per cent but the material can be made with a water content of up to 85 per cent. The author's experience has been limited to HEMA lenses of 72 per cent water content (Hydroflex 72—WOHLK).

The lenses, which must be stored in saline solution, are floppy, bowl-shaped structures, perfectly transparent and difficult to see when in liquid or on the cornea. Fitting is far from critical, the radius of curvature of the lens being selected at about 1.3 mm greater than that of the cornea, so that the lens is significantly flatter than the corneal curve. A satisfactorily fitted lens will move slightly on blinking. Lenses can easily be removed by pinching them off the cornea with finger and thumb, but may, with advantage, be worn continuously, day and night, for very long periods. In asymptomatic cases, the very minor initial discomfort is soon forgotten. In patients with severe symptoms these lens afford so much immediate and dramatic relief that their use would be justified on this ground alone. Although not intended to be optical aids, bandage lenses often provide a significant visual improvement especially in cases where pathology, such as corneal ulceration, has caused irregularity of the corneal surface.

Case reports

The following cases demonstrate the therapeutic value of HEMA lenses.

Case 1

Cpl FKC, suffered an accidental incised wound of his cornea from the tip of a bayonet while he was on a military exercise. The tissue was severed cleanly in a vertical manner, just 3 mm to the temporal side of centre and the wound extended, full-thickness, from the corneal margin at 11 o'clock to the margin at 7 o'clock. By good fortune the crystalline lens was undamaged. At operation, under microscopy, the anterior chamber was washed out, the iris repositioned, and the wound closed with a continuous suture of 10-0 ethilon on a 6 mm, micropoint spatula needle. The immediate postoperative course was uneventful, but the usual discomfort from the suture was experienced. Two days postoperatively, keratometry

was performed on the sound eye (corneal topology is usually remarkably similar between the two eyes) and a Hydroflex 72 lens, plano, of 8.2 mm back radius and 14.5 mm diameter was placed on the injured cornea. A lens of this diameter will overlap the corneal margin all round by about 1.5 mm. Little or no discomfort was experienced and the protected eye settled down so quickly that Cpl F was allowed to leave hospital only 10 days after the injury. Two weeks postoperatively the visual acuity, in the atropinized eye, was 6/18, correcting with a pinhole 6/9. There were no signs of infection or uveitis. After wearing the lens continuously for four weeks the eye was so quiet and comfortable and the corneal surface so smooth that the lens was considered no longer necessary and was removed.

Subsequent keratometric examination of the injured cornea showed that the regularity of the corneal curvature was considerably better than is usual after such injuries.

Case 2

Miss CLK, had had bilateral penetrating keratoplasty for corneal dystrophy a year before she was first seen and was suffering from a severe and extremely painful bullous and filamentary keratopathy on the left side with constant lacrimation. The graft and the surrounding host cornea were so opaque that no details of the anterior chamber were visible. There was a great deal of both superficial and deep vascularisation of the cornea and graft. The eye had bare perception of light but her chief concern was the pain from the keratopathy.

Bullous keratopathy is probably the chief indication for the use of a bandage lens and she was fitted, at once, with a HEMA 72 lens of 9.4 mm radius and 14.50 mm diameter.

Symptoms were dramatically relieved as soon as the lens was inserted and within a short time she was entirely symptom-free. The lacrimation stopped almost at once. She was advised to wear the lens continuously, day and night and was followed up for complications. None occurred and it soon became apparent that, under the influence of the bandage lens the transparency of the cornea was improving. This improvement was first noted about two weeks after insertion of the lens and continued progressively until, after two months of continuous wear it was easy to make out the details of the iris and the lens and it could be seen that she had a dense cataract. Because of this the improvement in the corneal transparency did not help her vision and because the original condition was believed to have produced a severe stimulus-deprivation amblyopia it was decided not to proceed with lens extraction.

Miss C wore her soft lens continuously for over 18 months and derived considerable benefit. The lens remained in pristine condition and showed no deposits or any other indication of spoilage. After about 19 months of wear she appeared in the clinic minus her lens and was quite unaware that it had been accidentally dislodged and lost. She was convinced that she was still wearing it.

Case 3

Mr LKT, presented with a deep corneal ulcer (L), situated just to the temporal side of centre and causing pain, foreign body sensation and a reduction of visual

acuity to less than 6/60. Keratometry was performed on the (R) eye and on the basis of these measurements he was fitted with a HEMA 72 Hydroflex bandage lens of plano power. Symptoms were immediately abolished and, to the surprise of the writer, the patient announced that his vision had been restored. On testing, he read the 6/9 line correctly, without glasses and with a wide open eye. This unexpected bonus was the result of replacing his own irregular corneal surface with an optically perfect air/lens interface. This patient's ulcer healed under the lens within a few days.

Case 4

Mrs TSB, aged 26 years, a Government Servant, suffering from naso-pharyngeal carcinoma with erosion of the base of the skull and progressive palsies of the (R) 5th, 6th, 7th, 8th and 9th cranial nerves, had a sudden rush of "tears" from her (R) eye and lost vision totally. Examination showed that she had a large central corneal perforation with loss of the anterior chamber and central prolapse of the iris. The 'tears' were, of course, aqueous humour and the aetiology was a combination of corneal denervation (V), exposure (VII) and the devitalizing effect of the cytotoxic treatment she was receiving. Because of her poor general condition conventional definitive treatment was precluded and so a HEMA 72 soft bandage lens was applied and Gentamycin eye drops ordered 6 hourly as prophylaxis against infection.

Mrs T was unaware of the pressure of the lens and no adverse local reaction was excited. The lens was worn continuously for two months during the early part of which time the central perforation healed to form an 'adherent leucoma'. On a regime of Gentamycin drops only, the eye remained quiet and infection was avoided. Although the patient's condition precluded microscopic examination of the eye, examination with a binocular loupe showed that the central healed area was smooth and even. She was still wearing the lens when she died.

Case 5

Nurse CSW, aged 20 years, when first seen, gave a four month history of (L) ocular pain, redness, lacrimation and blurred vision. She presented with an extremely injected (L) eye with a central ulcer and peripheral vascularisation. She had irregular astigmatism and a worrying linear stromal opacity running horizontally across the centre of the cornea. The visual acuity was reduced to 6/24. There was extensive superficial punctate keratopathy. The nurse had been attending a Government clinic and had had a variety of antibiotic and steroid eye drops. The aetiology was unknown.

Empirical treatment with Gentamycin and Betnesol eye drops and padding produced no real improvement and after one week she was fitted with a HEMA 72 bandage lens. After three days of continuous wear, with the same medication, the ulcer had healed, the epithelium no longer stained with fluorescein and the visual acuity, with the lens in place, was improved to 6/6, less one letter. The eye was comfortable for the first time for weeks and she was almost unaware of the presence of the lens, which she continues to wear.

Case 6

Mr PLK was experimenting with a home-made explosive when a blast occurred which removed his left hand above the wrist and caused various other injuries including severe damage to his left eye. The cornea sustained a comminuted laceration, some portions of the corneal stroma being almost detached and some reversed. The iris suffered ragged tears and the lens was rendered opaque. At operation, lens matter was washed out and prolapsed portions of iris were abscised. Under microscopy, the cornea was unscrambled and put together with multiple interrupted fine suture. Subconjunctival Ceforin 200 mg and Depo-Medrone 10 mg were given.

The eye remained extremely painful, irritable and inflamed and enucleation was seriously considered. The multiple sutures caused a great deal of discomfort and after four weeks were removed although comparatively little healing had occurred and the cornea looked like 'crazy pavement'. The author was in grave doubt as the propriety of further attempts to preserve this eye but decided to fit a HEMA 72 bandage contact lens as a last resource. Almost at once the eye was noticeably quieter and the transparency of the cornea rapidly improved to the point where the details of the anterior chamber became readily visible.

Mr P has now been wearing the lens for four weeks and there is now no question of the eye having to be removed. The cornea shows a large mesh reticulation but the surface is extremely smooth and the lens has obviously acted as a mould for the optical surface. The patient is unaware of the presence of the lens. The prognosis for vision remains uncertain, but the improvement in comfort effected by this lens has greatly contributed to this young man's morale in his very distressing situation.

Case 7

Mr GT had a history of recurrent dendritic ulcer of the (L) cornea dating back about 20 years. Nineteen months prior to his being seen he had had a penetrating corneal graft which, after considerable initial complications, had settled down and he had enjoyed an improvement in visual acuity to 6/12. On presentation, he was found to have two small dendritic figures actually in the epithelium of the graft itself. Symptoms had started 10 days before. In view of the history, the decision as to the best treatment was not easy but it was decided to rely on mechanical debridement of the epithelium and frequent instillations of IDU drops with atropine and padding. This, unfortunately, was followed by a quite severe corneal oedema, with multiple blebs on the graft surface and it was feared that a bullous keratopathy was developing. Twenty-six attendances later, over a two month period during which almost every manifestation of metaherpetic keratopathy had been observed, it was decided to fit him with a HEMA 72 bandage lens and this was accomplished on the basis of the corneal measurement of the (R) eye.

It was found that the presence of the lens in no way interfered with the continuation of the medication and a rapid improvement in the condition of the cornea followed, the clouding being reduced and the regularity of the surface restored, with a consequent improvement in visual acuity. Because fluorescein will stain a

soft lens permanently it was necessary briefly to remove the lens at each attendance for examination of the corneal staining pattern, but, apart from this, the lens was worn day and night with complete comfort. Mr T has now been wearing the lens for over three months and tends to forget all about it. The condition is gradually coming under control.

Discussion

These cases cover only a portion of the spectrum of pathology which may be successfully treated or ameliorated by bandage contact lenses. In addition to the conditions mentioned these lenses have been found by others to be of considerable value in the management of chronic corneal oedema from any cause; recurrent corneal erosion (formerly a notoriously difficult condition to treat successfully); chemical keratopathies, including alkali burns; dry eye syndromes (keratitis sicca, Stevens-Johnson syndrome, pemphigoid disease; conical cornea; entropion with lash abrasion; corneal injuries of almost any kind including thermal injuries; and exposure keratopathy from exophthalmos, Bell's palsy or lid burns or injuries.

Considerable clinical experience has now been documented on the therapeutic use of bandage lenses, and many important contributions have been made to the literature¹⁻⁹. It appears to be well established that in the great majority of cases the oxygen requirements of the cornea can be met in the presence of a continuously-worn modern high water content hydrophilic lens. Bacterial contamination does not appear to be a problem and infective conjunctivitis may be treated conventionally without removing the lens.

Although bandage lenses are being increasingly employed by ophthalmologists, their use and value is little appreciated outside ophthalmic circles — hence this paper.

REFERENCES

1. AQUAVELLA, J V (1972). *Eye, Ear, Nose and Throat Monthly* **51**, 374.
2. BAUM, J L (1973). *Hospital Practice* **8**, 8.
3. BUXTON, J N and LOCKE, C R (1971). *American Journal of Ophthalmology* **72**, 532.
4. GASSET, A R and KAUFMAN, H E (1971). *American Journal of Ophthalmology* **72**, 376.
5. KAUFMAN, H E (1970). *Transactions of the American Academy of Ophthalmology and Otolaryngology* **74**, 902.
6. LOWE, R F (1970). *British Journal of Ophthalmology* **54**, 805.
7. RUBEN, M (1975). *Transactions of the Ophthalmological Society of the United Kingdom* **95**, 75.
8. STEIN, H A (1976). *Contact Lenses Journal* **10**, 25.
9. STEIN, H A (1977). Bandage Lenses — 2 chapters in "Fitting Guide for Hard and Soft Contact Lenses" C V Mosby Company.