Hydrophilic lenses for 'continuous' wear in aphakia: Fitting at operation

DERMOT PIERSE AND H. JONATHAN KERSLEY

Croydon Eye Unit

SUMMARY This system of soft lens fitting in conjunction with the backward sloping corneal incision proved satisfactory in 84% of cases and provided good fill-in vision during the postoperative period—that is, until a decision about the type of long-term optical correction was made in each case.

The visual problems of aphakia are mainly due to the optical distortion produced by spectacle correction. Even with new aspheric forms difficulties arise from prismatic effects—ring scotoma, 'jack-in-the-box' phenomenon, and reduced field. For the monocular aphake there is also the absence of binocularity due to aniseikonia. Contact lenses of polymethylmethacrylate have done much to solve these problems, but they also introduce difficulties of visual instability, discomfort, and, more important in the older age group, difficulties in handling. Stability and comfort could be overcome by soft contact lenses for daily wear, but the handling problems are much worse. The cleaning process involved and the breakage rate are enough to discourage the most strongly motivated. A continuously worn lens would overcome all these problems.

All the usual arrangements for optical management leave the patient poorly corrected during the postoperative period, which is normally about six weeks. In order to fill this gap, aid early mobilisation, prevent postoperative confusion, and provide an alternative to the intraocular implant, it was decided to divide this trial into two parts—the first where a 'continuous' wear lens was fitted at operation, and the second, the more conventional, the fitting of these lenses definitively at six weeks.

The placing of a lens on the eye at operation was introduced because of the observed absence of inflammation in the early postoperative period, when a backward sloping corneal incision was used. It has often been suggested that this type of section would produce high degrees of corneal astigmatism. This has not been our experience (on average a spectacle astigmatism of 1.58 was found by analysis of 100

consecutive cases performed by both consultant and resident staff when this incision had been used). Increased astigmatism would seem to relate to those incisions that slope from the limbus towards the pupil. The other advantages of the backward shelving incision, such as good visualisation of the surgical field, minimal bleeding, and early reformation of the anterior chamber, are considerable. Details of this incision have been described (Pierse, 1975), but its main features (Fig. 1, colour plate) are: (1) Positioned superficially at the tips of the final loops of the precorneal vessels; (2) shelving back towards the angle of the anterior chamber; (3) 140° of arc; (4) closed by a 10/0 Perlon continuous suture with buried knots (Fig. 2).

The lens material used in both these trials was

Fig. 2 To show the two continuous sutures and the position of the three buried knots used in wound closure.

Sauflon 85, as this is the only material available that has an oxygen permeability that at optical lens thickness allows a near physiological volume of oxygen to reach the cornea (Larke, 1976). Lenses of two back curves were used, 7.8 mm and 8.1 mm, and the decision regarding which was indicated for a particular patient was taken from the results of a

Fig. 1 (Pierse and Kersley)
To show position of backward
sloping corneal incision.

Fig. 3 (Pierse and Kersley) Aphakic 'soft' contact lens
inserted at operation and worn continuously; seen two
days after operation.

Fig. 4 (Pierse and Kersley) Aphakic 'soft' contact lens
inserted at operation and worn continuously; seen six
weeks after operation.

keratometric follow-up, carried out in this department, of patients before and after cataract extraction. This showed in the averaged graph a 0.4 mm flattening of the flattest K reading after the first postoperative day. This figure was therefore added to the flattest preoperative keratometry reading (the flattest reading being the one most commonly used in soft lens fitting), and the nearest of the two lenses available was then taken. The graph used was consistent with that shown for the majority of patients using conventional incisions (Floyd, 1951). The other parameters of the lenses used were: power +16.0 DS, diameter 13.50 mm, and front optic reduction to 8.0 mm. The power was chosen

from the results of two previous trials (Bausch and Lomb and Sauflon 70) so that on average patients would be slightly overcorrected. The diameter was large enough to bridge the incision line and the front optic reduction small enough so that the transition did not rest on the incision.

The lens at the time of insertion looks very steep, having an air bubble between it and the cornea, but within the following few hours, with further reformation of the anterior chamber, the air bubble disappears. Eyes are not padded, so that on waking the patient can see. No antibiotic cover is given and no steroids are instilled unless there is a definite indication (Fig. 3, colour plate). Follow-up

consists of daily slit-lamp examination until discharge and then weekly examination for a month, when refraction is carried out and a decision taken about future optical correction.

Of the 75 consecutive patients in this trial 25 were men and 50 were women, and their ages varied from 48 to 90 with an average of 72.9. They were selected at random from the clinics of the Croydon Eye Unit and the surgery was performed by both consultant and resident staff. All showed rather more corneal oedema than would have been expected without the lens, but this, and the mild striate keratopathy which lasted rather longer than usual, cleared in about seven days. No evidence of raised intraocular tension was found in the immediate postoperative phase. Twelve patients were not wearing their lenses six weeks postoperatively (Table 1). One was rubbed out, three had surgical anterior chamber problems, four had more oedema than was acceptable (of these, three had had unplanned extracapsular cataract extraction), and two had an acute uveitis of unknown aetiology that settled quickly with local steroids. Therefore of the trial group 3 (or 4%) had had problems that may have been soft-lens induced, but all settled on lens removal. 84% were still wearing their lenses at the time of decision about permanent optical correction.

Visual acuity has not been analysed, as it was not the intention of this procedure to aim at a definitive correction. However, all patients were pleasantly surprised at their early visual acuity and a few achieved as good an acuity with their operation lens as they did after refitting (Fig. 4, colour plate).

Keratometric follow-up of these patients is shown in two histograms (Figs. 5 and 6), the flatter meridia above the abscissa and the steeper below. In the first, the preoperative histogram, the ordinate

Table 1 Reasons for lens removal in the immediate post-operation phase (16%)

No. of patients		
4	Oedema	Failed intracapsular extraction
		Failed intracapsular extraction with raised tension
		Aetiology unknown
3	Iris/anterior chamber complications	Incarcerated trauma at home
		Incarcerated in first 24 hours post-operation
		Shallow anterior chamber
2	Excessive uveitis	
1	Old fundus haemorrhage (i.e., no visual improvement)	
1	Lost lens	
1	Previous monocular aphake—happy with her glasses	

Keratometry preoperatively - 49 patients

Fig. 5 Preoperative keratometry.

Keratometry 6 weeks post-operation - 49 patients

Fig. 6 Postoperative keratometry.

has been drawn through 7.6 mm, as this is the average for the series and fits with the normal population curve. In the second histogram, the keratometry at six weeks, as one might have expected the two peaks have moved away from the ordinate in

opposite directions, showing the development of corneal astigmatism. This is the same pattern as that found without soft lenses; therefore it is suggested that the normal postoperative corneal progression is not affected. Five lenses were removed at the end of the six-week period, and this confirmed that the keratometries did not alter.

References

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