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By a careful process of preselection, the percentage of successful extended wear patients was increased over the studies of the previous two years which utilized similar lenses. Choosing previous successful daily soft lens wearers with good hygiene and compliance may help avoid previously described problems.

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Clinical Success in Fitting Extended Wear Hydrocurve II and Permaflex Soft Contact Lenses

By

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Ricky D. Toyama

In Partial Fulfillment of the Requirements for the Doctor of Optometry Degree
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Dr. James E. Peterson, Advisor

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Abstract:

Nine myopic subjects (eighteen eyes) were fit with Hydrocurve II soft lenses for three months, then fit with Permaflex soft lenses for three months, both on an extended wear basis. During this time one patient developed corneal microcysts, one developed early signs of neovascularization, two could be fit with only one pair of lenses and another could not adapt to either set of lenses.

By a careful process of preselection, the percentage of successful extended wear patients was increased over the studies of the previous two years which utilized similar lenses. Choosing previous successful daily soft lens wearers with good hygiene and compliance may help avoid previously described problems.
Clinical Success in Fitting Extended Wear Hydrocurve II and Permaflex Soft Contact Lenses

Introduction

The purpose of this study was to determine the success rate of extended wear patients utilizing lenses previously studied in our clinic. Prior research here, with continuous wear lenses, showed that patients experienced limited success and the question arose as to what could be gained by careful selection of prospective patients.

With the current advertising blitz, contact lens market trends seem to indicate a large patient population desiring extended wear schedules. Radial keratotomy also presents the practitioner with a challenge to design a non-surgical but somewhat permanent correction for myopia. It seems that extended wear lenses are here to stay, so we must confront the adversities encountered with them.

The goal of extended wear lenses is clear, comfortable vision without harmful effects to the cornea and adjacent ocular adenexia.

For this study two lens materials were used. The Hydrocurve II is constructed from bufilcon A, and the Permaflex is composed of surfilcon A. The major difference between these two lenses is that the former is 55% water and the latter is 74% water by weight.
Methods

In this study there were eight females and one male ranging in age from 19 to 37 years. All subjects were currently wearing soft lenses on a daily basis or had worn them no less than six months prior to the study. Successful daily wear was defined as a contact lens user who wore his/her lenses all waking hours with no subjective complaints or previous evidence of complication.

Patients had low refractive cylinder which allowed them to be corrected with spheres to at least 20/20 monocular acuity. There was no clinical appearance or history of pathology. Complete analytical exams were performed at the onset of the project. Tests also included ophthalmoscopy, keratometry, tonometry, and slit lamp biomicroscopy. Special considerations were made to examine corneal integrity to establish baseline status.

The fitting method was simplified due to the limited parameters available in the lens types. With three base curves available, more desirable movement and centration could be achieved with the Hydrocurve II lenses. Permaflex currently is available in only one parameter. The following criteria were used initially to determine a proper fit:

1. Limbal coverage during all cardinal positions of gaze of at least one millimeter.
2. Good movement of at least two millimeters was expected; with the higher water content lenses it was probable that the lenses would tighten slightly as the lens/air interface equilibrium was reached.
3. When more than one lens seemed to provide good results, the loosest fit that still allowed proper centration was chosen with the Hydrocurve II.

Each time the lenses were placed on the eye at least one-half hour was allowed to give the lenses a chance to settle, and then the overrefraction was performed.

The lenses were dispensed upon arrival at the clinic. Fits were checked to assure lens quality, and another complete overrefraction was done. At this point, the patients were instructed to wear the lenses on a daily basis for one week, then if there was no evidence of irritation or acuity decrease, to wear the lenses overnight and return the following morning to be examined. It was desired to perform all follow-up exams as early in the day as possible to hopefully locate and identify any corneal insult. Other visits were scheduled for one week of extended wear, three weeks, two months, and three months. This was done for both sets of lenses.

Each patient kept a personal record of their cleaning routine. They were allowed to remove and clean the lenses at their convenience.

Pliegel daily cleaner, Allergan disinfection solution, and Allergan rinsing solution were dispensed for lens care. Clerz II drops were recommended to rewet the lenses any time they felt dry. Enzyme tablets should also be used, but the patients were instructed to only allow the lenses to soak for fifteen minutes, to prevent any possible damage to the lenses or chemical absorption, due to their high water content.
At the end of six months, each patient was mailed a questionnaire (Appendix 1) and asked their opinion on several items including:

1. Ease of handling
2. Cleaning effectiveness
3. Ease of application and removal
4. Vision clarity
5. Comfort
6. Length of time spent before removal

Results and Discussion

Six patients were successful with extended wear schedules wearing both sets of lenses. One patient experienced decentration with the Hydrocurve lenses, but minimal limbal coverage was attained with the Permaflex lenses. Another patient had no movement with the HCII lenses but had a good fit with the Permaflex. One patient could be not satisfactorily fit with either set.

Patient response to each set of lenses was consistently favorable. However, when the questionnaires were reviewed some patient judgements were unexpected. The patients used a five point rating scale with the following levels to describe their qualitative impressions of the lenses:

1. Very poor
2. Poor
3. Adequate
4. Good
5. Very good

In terms of ease of handling all patients described the Permaflex lenses as very good. The responses for the Hydrocurve II were mixed, but never received a rating below
adequate. This result was initially surprising considering the higher water content of the Permaflex. Since the Hydrocurve lenses had a larger over all diameter, it could be more prone to inverting. See Figure 1.

Cleaning effectiveness generally received good remarks. Each lens set had one patient response of poor. The patient who rated Hydrocurve as difficult to clean reported that her eyes became irritated sooner. Her lenses required cleaning at this time mainly because of fogging, which indicates the possibility of a dry eye problem. The patient that reported problems with Permaflex actually developed a "jelly bump" or crystalline deposit, and the lenses had to be replaced. See Figure 2.

The lens types generally received equal ratings for ease of application and removal. Only two patients ranked them differently, both giving the Permaflex a slight edge. This probably related to lens size, and the lenses should be judged as equal. See Figure 3.

Vision clarity was consistently rated as either good or very good. Only one patient stated that one lens pair was adequate. Everyone seemed pleasantly surprised with the consistent, quality acuity which didn’t fluctuate with time of day or change in environment. See Figure 4.

Comfort was always rated as either good or very good. One patient gave the Hydrocurve set slightly better ratings as did another patient with the Permaflex. Almost every patient reported that lens build-up was a cause of
discomfort. See Figure 5.

The patients were allowed to choose their own wearing time and no schedule was forced upon them. With the Hydrocurve lenses, four patients restricted their wearing schedules to under ten days, and two wore the lenses up to twenty days. With Permaflex, three wore the lenses less than ten days, two up to fifteen days, one up to twenty, and only one wore the lenses for thirty days before removal and cleaning. See Figure 6.

Centration and movement of the lenses did not seem to be a problem. Of the fittings that were unacceptable (eight lenses), six were too tight (four HCII and two Permaflex) and two rode superiorly failing to provide minimal limbal coverage.

Edema was noted in three eyes on the first morning after starting extended wear. Of the three, two showed vertical striae and the other had central corneal clouding. None elicited any problems thereafter, and all were with the HCII. Vessel engorgement was noted on some of the patients, but no neovascularization was observed.

One patient developed epithelial microcysts with the Permaflex lenses. The patient was told to decrease wearing time from eighteen days to one week and the problem resolved. It was initially hypothesized that the microcysts developed because of deposits; however, two other patients had lenses that had protein and calcium deposits without the microcysts developing. The build-up/microcyst relationship seems unlikely. These deposits were only seen with the Permaflex
lenses (which were replaced). The only other lens replacements were due to lost lenses.

Overall, in comparing the two lenses, both seemed to have advantages and disadvantages. There appeared to be no significant difference in clarity and handling. Permaflex was initially found to be the more comfortable of the two and, therefore, had a slightly longer wearing time. Once the patients adjusted to the HCII there was no subjective difference reported. Permaflex seemed to have been more susceptible to lens deposits, especially "jelly bumps".

The authors believed in the beginning that occupation might have a controlling factor in the wearing of these lenses. However, the one who worked outdoors in somewhat adverse environmental conditions seemed to have the least problems. Tear film composition appeared to be a factor on wearing time and lens life. Patients with more debris had shorter wear time between cleanings and shorter lens life due to deposits.

Conclusion

This study demonstrated that extended wear lenses are a viable option in the attempt to provide a non-surgical approach to permanent myopia correction. It must be emphasized that patients respond quite differently to extended wear schedules and attempts should be made to carefully control all variables possible. Deposits seemed to be the biggest factor in comfort and lens life, and tear composition may be the best way to predict how a patient will perform. The "thirty-day lens"
Success.

Frequent lens replacement are needed for future long-term better patient compliance with cleaning schedules, and more more parameters are available. Careful patient control should be able to wear these lenses for extended periods when transition easy for doctors and patients both. More patients problems evident with novice lens wearers. This makes the wear for a suitable time first eliminates many of the experiences with continuous wear lenses. Choosing candidates will increase the percentage of success a practitioner whenever they are irritating. Preselction of patients lenses for this length of time is also to remove and clean appears to be a misnomer, since few people will wear these
QUESTION 1: Rate lens in terms of ease of handling:

- 1 = very poor
- 2 = poor
- 3 = adequate
- 4 = good
- 5 = very good

FIGURE I

HYDROCURVE II

PERMAFLEX
QUESTION 2: Rate lens in terms of cleaning effectiveness?
(1-very poor; 2-poor; 3-adequate; 4-good; 5-very good)
QUESTION 3: Rate lens in terms of ease when applying and removing?
(1-very poor; 2-poor; 3-adequate; 4-good; 5-very good)
QUESTION 4: Rate lens in terms of clarity of vision. (1 = very poor; 2 = poor; 3 = adequate; 4 = good; 5 = very good)
HYDROCURVE II PERMAFLEX

QUESTION 5: Rate lens in terms of comfort.

FiguRE 5
Figure 6

QUESTION 6: What was the average length of time you wore your...

Hydropic Line II

Patients

Days

10

15

20

25

30
Bibliography


APPENDIX

Research Questionnaire
Extended Wear Contact Lens Project

Dear __________________,

During the last few months you have worn two pairs of contact lenses and have probably developed some qualitative judgements about the use of them. Please take a few minutes and complete the following questionnaire and inform us as to how you would rate their use.

(1) How do you rate each lens set in terms of ease of handling? (Please circle your response)

   Lens Set 1
   Very Poor  Poor  Adequate  Good  Very Good

   Lens Set 2
   Very Poor  Poor  Adequate  Good  Very Good

   Remarks?

(2) How do you rate each lens set in terms of cleaning effectiveness?

   Lens Set 1
   Very Poor  Poor  Adequate  Good  Very Good

   Lens Set 2
   Very Poor  Poor  Adequate  Good  Very Good

   Remarks?

(3) How would you rate each lens set in terms of ease when applying and removing?

   Lens Set 1
   Very Poor  Poor  Adequate  Good  Very Good

   Lens Set 2
   Very Poor  Poor  Adequate  Good  Very Good

   Remarks?
(4) How would you rate the clarity of the vision that you experienced with these lenses?

Lens Set 1
Very Poor    Poor    Adequate   Good    Very Good

Lens Set 2
Very Poor    Poor    Adequate   Good    Very Good

Remarks?

(5) How would you rate the comfort of each lens pair?

Lens Set 1
Very Poor    Poor    Adequate   Good    Very Good

Lens Set 2
Very Poor    Poor    Adequate   Good    Very Good

Remarks?

(6) What was the average length of time that you would wear the lenses before removing and cleaning them?

Lens Set 1
1-10 days    10-15 days    15-20 days    20-25 days    25-30 days

Lens Set 2
1-10 days    10-15 days    15-20 days    20-25 days    25-30 days

Remarks?

(7) Have you ever experienced any minor eye infections, styes, or other related problems that we don’t know about?

No    Yes

If yes, what was the nature of the problem?

Please be sure to return for a check-up no later than 6 months from your last appointment with us.
Thank you for your cooperation, it was greatly appreciated. If you have any problems, please contact me at:

Dr. William C. Rogers  
University Center Box 433  
Forest Grove, OR 97116

or leave a note with the clinic office at the university.

Regards,

William C. Rogers