

The Effects of Hydrophilic Contact Lens Wear on the Reduction
of Progressive Myopia in Adolescents

by
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STRACT

The purpose of this retrospective study was to evaluate the effects of hydrophilic contact lens wear versus spectacle lens wear on the reduction of progressive myopia. Fifty hydrophilic contact lens wearers were compared with forty spectacle lens wearers. The data revealed a mean increase in myopia of 0.627 D in the contact lens sample and 0.660 D for the spectacle lens control group.

INTRODUCTION

The prevalence of myopia in this country has been estimated to be as high as 30-35% during early adult years.(1) Although the treatment of myopia with minus lenses is universally accepted, the etiology of myopia has caused considerable debate. Many researchers conclude that myopia is due to environmental factors since myopia is seldom present upon entering school but in most cases is apparent only after several years of schooling.(2,3) Others who conclude that myopia occurs as a result of heredity point out that the trait does not have to be present at birth in order to be inherited.

Finding a method for controlling the progression of myopia has interested researchers since early in the present century. A number of methods have been advocated to reduce progressive myopia including reducing or eliminating the need for accommodation, various surgical procedures, incorporating dietary changes and the use of contact lenses. In this study, the effects of hydrophilic contact lens wear on the reduction of progressive myopia were examined since hydrophilic lenses are the most commonly worn contact lenses for children and adolescents.

PURPOSE

Many reports have been published concerning the use of PMMA contact lenses for the control of myopia.(4) However, few studies addressing the use of rigid gas permeable or hydrophilic lenses have been published. Perrigin et. al. reported a significant reduction in myopic progression with the use of gas permeable lenses and Bier and Lowther showed a statistically significant reduction in myopia by over-correcting the non-dominant eye by 0.50D with hydrophilic or gas permeable lenses.(4,5)

It was the purpose of this study to determine retrospectively whether patients fit with hydrophilic contact lenses showed a significant reduction in myopia versus a population fit with spectacle lenses.

METHODS

All of the patients were selected randomly from a large partnership^{located} located in a small midwest city. The patients chosen also had similar social and cultural backgrounds. A computer generated list provided myopic patients that fell within an

Appropriate age criteria.

The experimental group consisted of 50 hydrophilic contact lens wearers initially between the ages of 9 and 17. These ages were selected in the attempt to avoid the ages where myopia appears to level off on its own. In addition, the subjects had to have best corrected visual acuities of 20/20 or better, normal ocular health and no more than one diopter of astigmatism.

The control group consisted of 40 wearers of single vision spectacle lenses initially between the ages of 9 and 16. The same criteria that existed for the experimental group also existed for the control group.

RESULTS

The data revealed a mean increase in myopia of 0.627D in the contact lens sample, 0.590D OD and 0.675D OS, and 0.660D for the spectacle lens control group, 0.725D OD and 0.594D OS. The amount of myopic increase and the initial age of correction, either by contact lenses or spectacles, can be seen in Tables 1 and 2.

Table (1) Age of initial lens wear and amounts of myopic increase in the contact lens (sample) group.

	OD	OS	Age at Initial Exam
BH	-0.25 *	-0.25	15
MB	0	0	16
KB	0	0	15
JB	0	0	17
VB	0	0	15
MC	0	0	16
NC	0	0	15
DH	0	0.25	14
MC	0	0.25	15
TD	0	0.25	17
PS	0.25	0.25	14
DC	0.25	0.25	17
JB	0.25	0.25	15
AB	0.25	0.25	16
AD	0.25	0.25	9
DD	0.25	0.25	12
BF	0	0.50	15
JC	0.50	0	16
KD	0.50	0.25	14
DF	0.50	0.25	17
SC	0.50	0.25	16
DF	0.25	0.50	17
CC	0.50	0.50	14
LB	0.50	0.50	15
JB	0.75	0	15
RB	0.25	0.75	16
KE	0.25	0.75	17
JC	0.50	0.75	17
AH	0.75	0.50	15
LH	0.75	0.50	16
JJ	0.75	0.75	14
DB	0.75	0.75	17
RC	0.75	0.75	17
ED	0.50	1.00	15
CF	0.50	1.00	15
JH	0.75	1.00	14
TD	1.00	0.75	14
DF	1.00	0.75	13
DC	1.00	1.00	15
DH	1.00	1.00	15
DD	1.00	1.00	17
CG	1.00	1.25	14
TH	0.75	1.50	16
BC	1.00	1.50	15
JF	1.50	1.50	13
ED	1.50	1.75	15
SD	1.75	1.75	16
SH	1.75	2.25	15
CB	1.00	2.50	15
PC	2.50	2.00	15
Total 50	Ave. 0.590	Ave. 0.675	Ave. 15.1

Table (2) Age of initial lens wear and amounts of myopic increase in the spectacle lens (control) group.

	OD	OS	Age at Initial Exam
LR	-0.75	-0.50	15
AN	-0.37	-0.25	15
RR	-0.12	-0.50	16
TK	-0.25	-0.25	16
AF	-0.12	-0.25	10
LG	-0.25	0	14
JP	0	-0.25	12
SB	0	0	14
KD	0	0	11
TE	0	0	13
CE	0	0	14
LK	0	0	13
BW	0	0.25	16
MD	0.25	0.12	14
ME	0.25	0.25	11
DN	0.25	0.25	16
TD	0.50	0.37	15
KT	0.50	0.50	14
GH	0.87	0.25	10
JH	0.75	0.75	15
BA	0.75	0.75	11
KD	0.87	0.62	13
JG	0.87	0.62	14
DE	1.00	0.75	10
SE	1.00	0.87	12
DD	1.00	1.00	12
LJ	1.12	0.87	13
LN	1.12	1.12	13
WW	1.12	1.37	14
JA	1.25	1.50	9
MO	1.37	0.50	13
JL	1.37	1.37	13
RH	1.00	1.62	9
JB	1.50	1.50	9
AP	1.50	1.75	12
TW	1.62	1.37	15
ML	1.75	1.25	11
GG	2.12	0.50	14
MK	2.62	1.62	12
RB	2.50	2.00	9

Total 40 Ave. 0.725 Ave. 0.594 Ave. 12.8

* (-) denotes a reduction in the amount of myopia

Table (3) A comparison of the contact lens experimental group versus the spectacle lens control group.

Experimental Group

Sample Size	50
Age Range	11-29
Initial Age of Contact Lens Wear	9-17
Number of Subjects with an Increase in Myopia	42
Average Amount of Increase in Myopia	0.627 D

Control Group

Sample Size	40
Age Range	11-29
Initial Age of Spectacle Lens Wear	9-16
Number of Subjects with an Increase in Myopia	28
Average Amount of Increase in Myopia	0.660 D

DISCUSSION

As stated earlier, the etiology of myopia has been a topic of continued debate. Those supporting environmental factors theorize that myopia is caused by prolonged accommodation, which brings about an increase in intraocular pressure, leading to an increase in the axial length of the eye due to the stretching of the posterior sclera.(6) Still others insist that myopia is a pre-determined anomaly that does not develop until it is time for the appropriate genes, that cause myopia, to express themselves.

Methods for controlling the amount of myopic progression have been numerous including reducing the need for accommodation, various surgical procedures, incorporating dietary changes and the use of contact lenses. Bier and Lowther found evidence that contact lenses retard the progression of myopia.(5) They showed that regardless of the type of contact lens, whether hard or soft, one factor is common to both; that the equal and natural accommodation-convergence relationship that can be obtained with contacts can never be achieved with spectacles. One significant advantage of soft lenses over hard lenses is that the integrity of the anterior ocular surface can be preserved.

It has been documented that the amount of myopic progression is the greatest between the ages of 6 and 16. Goss and Winkler have reported that the progression of myopia appears to cease at about 15 years of age for females and 16 years for males.(7).

Although the age ranges for both the experimental and control groups were the same for this study, the average age of initial correction for the experimental group was 15.1 versus 12.8 for the control group. If the initial ages of correction would have been equal, then the results may have indicated that the amount of progressive myopia is reduced when corrected with hydrophilic contact lenses.

A comparison of the amount of myopic progression of the contact lens group versus the spectacle lens group showed virtually no statistical significance. One reason for this is that matching an experimental group with a control group in a retrospective study is extremely difficult. However, a study designed with better control of the many variables, especially the initial age of subjects, may provide further evidence that the use of hydrophilic contact lenses provides some reduction in the amount of progressive myopia in children and adolescents.

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