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Abstract

The general acceptance of progressive addition multifocal lenses has prompted investigation of their use in the treatment of presbyopic contact lens wearers. Twenty-two candidates were selected from the current Pacific University College of Optometry Clinic's records to compare a new Varilux progressive addition lens to standard near corrections (i.e. · conventional bifocals or half- eyes) .

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A Clinical Trial of Varilux "Alpha S" Progressive Lenses

Submitted in
fulfillment of the
requirements for
Opt. 692

Research Advisor
Dr. J.R. Roggenkamp

Submitted by
Luther O. Ness
Kevin W. McBride

ABSTRACT - The general acceptance of progressive addition multifocal lenses has prompted investigation of their use in the treatment of presbyopic contact lens wearers. Twenty-two candidates were selected from the current Pacific University College of Optometry Clinic's records to compare a new Varilux progressive addition lens to standard near corrections (i.e. conventional bifocals or half-eyes).

KEY WORDS - progressive addition lenses, contact lenses, multifocals, Varilux "Alpha S".

With continued expansion and improvements in the contact lens industry, greater numbers of patients are wearing contact lenses. As these individuals become presbyopic, the practitioner must be prepared to provide a practical and effective solution to their near vision needs. The increased use of progressive addition multifocals(1) has led some manufacturers to consider the use of this design in developing a reading lens specifically suited to the presbyopic contact lens wearer. This study involved a clinical comparison of the newly developed Varilux "Alpha S"

lens with conventional bifocals and half-eye spectacles.

Progressive addition lenses were first developed in the 1950's. These lenses had a true variable focus with a continuous power change in the transition corridor between the near and the distance prescriptions. Weinstein and Volk were the first to introduce such a variable focus lens into the United States. This lens was introduced in 1962 and was termed the Omnifocal. The Varilux lens was developed in France by Maitenaz and was introduced in the United States soon after the Omnifocal(2).

Essilor International, the parent company for the Varilux lens, has devoted much research towards developing a successful progressive lens. The first lens which they introduced was called the Varilux I. It met with limited success due to optical aberrations, a narrow corridor, and a significant amount of peripheral distortion. The Varilux II lens represented a significant improvement over the previous lenses. In addition to a wider corridor, the peripheral lens distortions were decreased. Of all the progressive addition lenses available in the market today, only the Varilux II is designed with aspheric curves on the front surface resulting from manufacture with a series of conic sections(3). This aspheric design gives the Varilux II lens the benefit of less peripheral distortion, but also results in a reduction of the usable width of the reading area(4). The effective width of

the near zone varies with the power of the add, decreasing as the power increases.

In order to meet the needs of the presbyopic contact lens wearer, Essilor has modified the design of the Varilux II lens. This new lens, the "Alpha S", is currently supplied only in plano distance corrections and is intended for use by fully corrected contact lens wearers. The near zone of the lens is wider than the Varilux II, and the add power increases faster in the corridor to give transition zones from six to twelve millimeters in length dependent on add power. The transition zone for the +1.00 D add is 6 mm long and increases 1.5 mm for each .25 D increase in add power resulting in a 12 mm transition zone for the +2.00 D add.

PURPOSE - The intent of this study was to ascertain whether the "Alpha S" progressive add would compare favorably to standard bifocals when measured by subjective response. Since design characteristics of the lens are improved compared to previous designs, it was hypothesized that patients would find this newest progressive add to be both visually and cosmetically acceptable.

PROCEDURES - Current presbyopic contact lens patients of the Pacific University College of Optometry Clinics were used as subjects. The subjects were either wearing a reading lens or findings indicated the need for a first time near lens. The

age range of the subject pool was 36-64 years of age.

At their first visit, subjects selected two frames, one for a traditional correction and another for the experimental lenses. Measurements for the half-eye or standard bifocal and "Alpha S" were carefully taken at this visit. The measurements for the "Alpha S" included monocular PD's using the corneal reflection pupilometer and optical center heights. The marked optical center of the "Alpha S" lens was placed, per the manufacturer's instruction, coincident with the center of the subject's pupil.

Lens powers for reading prescriptions usually matched those the subject was currently using at near. If the subject's findings indicated a change or the subject needed reading lenses for the first time, a near lens power was determined using standard clinical techniques.

Half the subjects were randomly selected to wear the "Alpha S" lens first with the remaining subjects wearing either a half-eye or a flat top bifocal. Each subject was then released for a period of two weeks with instructions to wear the selected lenses for all near use. Special emphasis was placed on not substituting other spectacles during this period.

A questionnaire was administered at the end of the trial

period which assessed the subjective performance of the first pair of lenses. These first lenses were returned and the second pair was dispensed with similar instructions. After an additional two weeks, each subject completed another questionnaire. Both pair were then returned to the patient with instructions to experiment with each for one week and determine which was best suited to specific home and work related tasks. The final visit involved another questionnaire which essentially asked the subject to compare and choose a preferred reading lens.

RESULTS and DISCUSSION - Of the twenty-two subjects entering, twenty completed the study. One subject dropped out due to contact lens intolerance and the second was dropped due to delays in frame supply.

Patient preference was determined for various task applications. In the final questionnaire, subjects were asked to choose the near lenses which best suited their work environment. Ten subjects determined the Varilux "Alpha S" to be the lens of choice and an equal number chose the half-eye or bifocal correction. Table 1 shows a breakdown of the preferred lens by add power. The subjects preferring the "Alpha S" lens at work cited the advantage of variable focus and the comfort of the full frame compared to the half-eye frame. In addition, some subjects admitted vanity affected their preference for the "Alpha S" lens at work. Others were

bothered by the top bar of the half-eye as they alternated between distance and near tasks.

In a home environment, the lens preference moved toward the half-eye correction with 65% of subjects choosing it and 35% choosing the Varilux "Alpha S". Table 2 illustrates subject response for each add power. The explanation many subjects gave for their choice involved enhanced visual comfort due to increased field of view and decreased distortion compared to the "Alpha S" lens. A majority of subjects complained that distance vision through the "Alpha S" lenses appeared fuzzy and they tended to remove the lenses when looking up.

In determining overall preference subjects were asked, if forced to choose one pair of lenses, which would they prefer to keep. Eleven subjects selected the half-eye and nine selected the "Alpha S" lens. Table 3 summarizes patient response to this question. Choosing between the two pair was difficult for some subjects because they had developed specific uses for each over the five week period.

The adaptation period was longer overall for the "Alpha S" lens. While 75% of subjects adapted to the half-eye within one day, only 35% were able to adapt to the "Alpha S" in one day. Additionally, 30% were unable to adapt to the "Alpha S" even after the two week period. Table 4 illustrates differences in length of the adaptation period between the

two lens types.

Many of the subjects who had trouble adapting to the "Alpha S" lens complained of distortion as the major negative element. Although the lens worked quite well when seated and attending to a near task, distortion caused visual discomfort with any excessive head movement. The distortion became especially evident when walking and during other tasks dependent on distant visual clues.

Subject background and a summary of experimental data for each is outlined in Table 5. The population size in this study does not lend itself to generalizations, and it is our opinion that each subject was unique and generalizations would be useless even if statistically significant.

CONCLUSIONS - If success with this progressive power lens is to be achieved, certain factors must be carefully addressed. The frame fit and measurements are extremely critical as in all progressive lens fits. The adaptation period must be discussed in depth so the patient will understand and expect the increased adjustment time. Many potentially successful progressive add patients are lost because the adaptation period is not fully explained. Finally, communication between the practitioner and his/her patient is critical in assessing motivation. Unlike our randomly chosen subjects, the practitioner should recognize those patients that are

sincerely motivated and he/she will have a higher probability of success.

The Varilux "Alpha S" lens does seem to have a place in today's market. Of the subjects utilized in this clinical trial, 45% chose the "Alpha S" over conventional near prescriptions. The practitioner is providing a valuable service in educating his/her patients concerning the availability of progressive lenses and by demonstrating how many of their needs could be best met using the "Alpha S" lens.

PREFERRED LENS FOR WORK

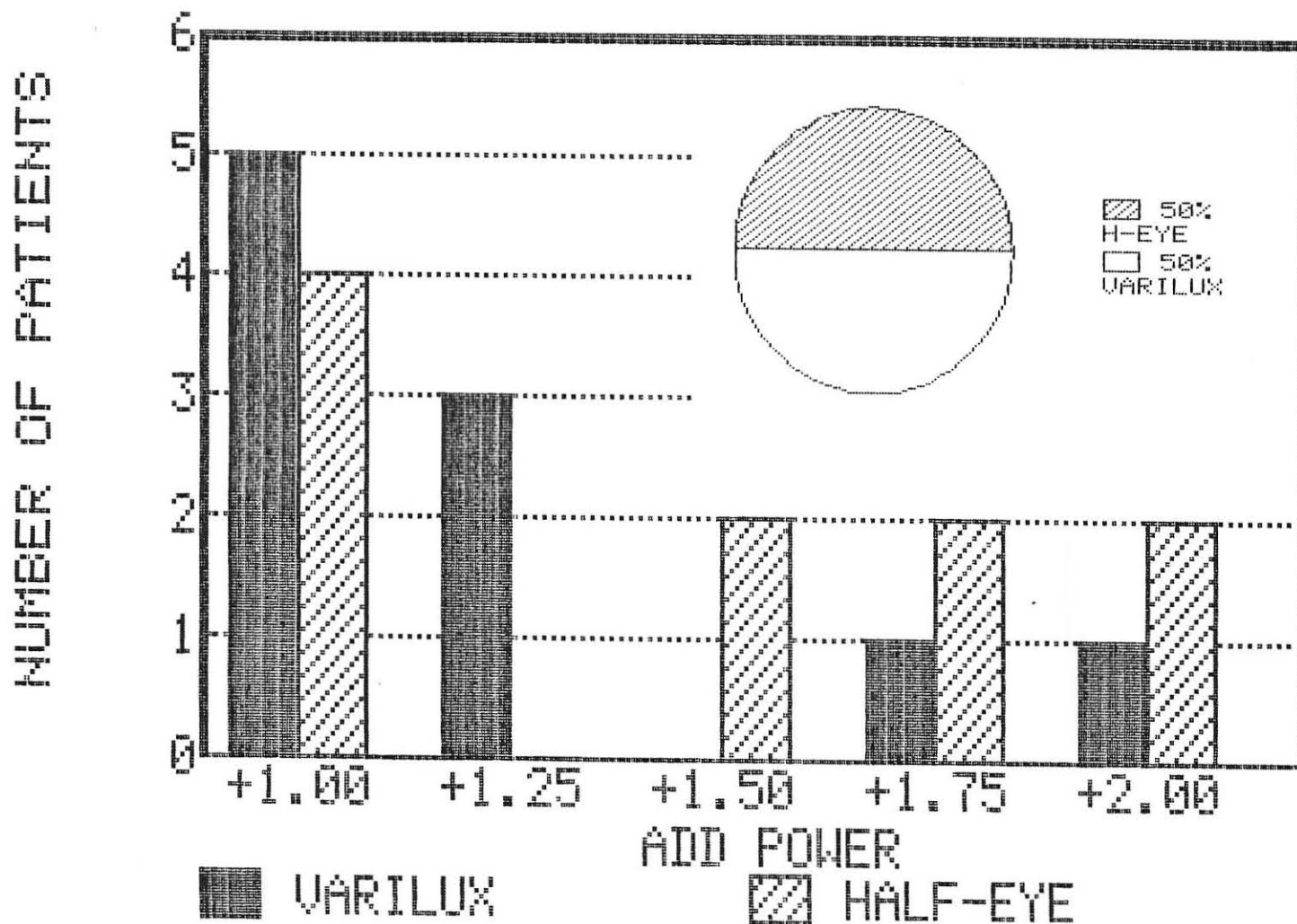


TABLE 1

PREFERRED LENS FOR HOME

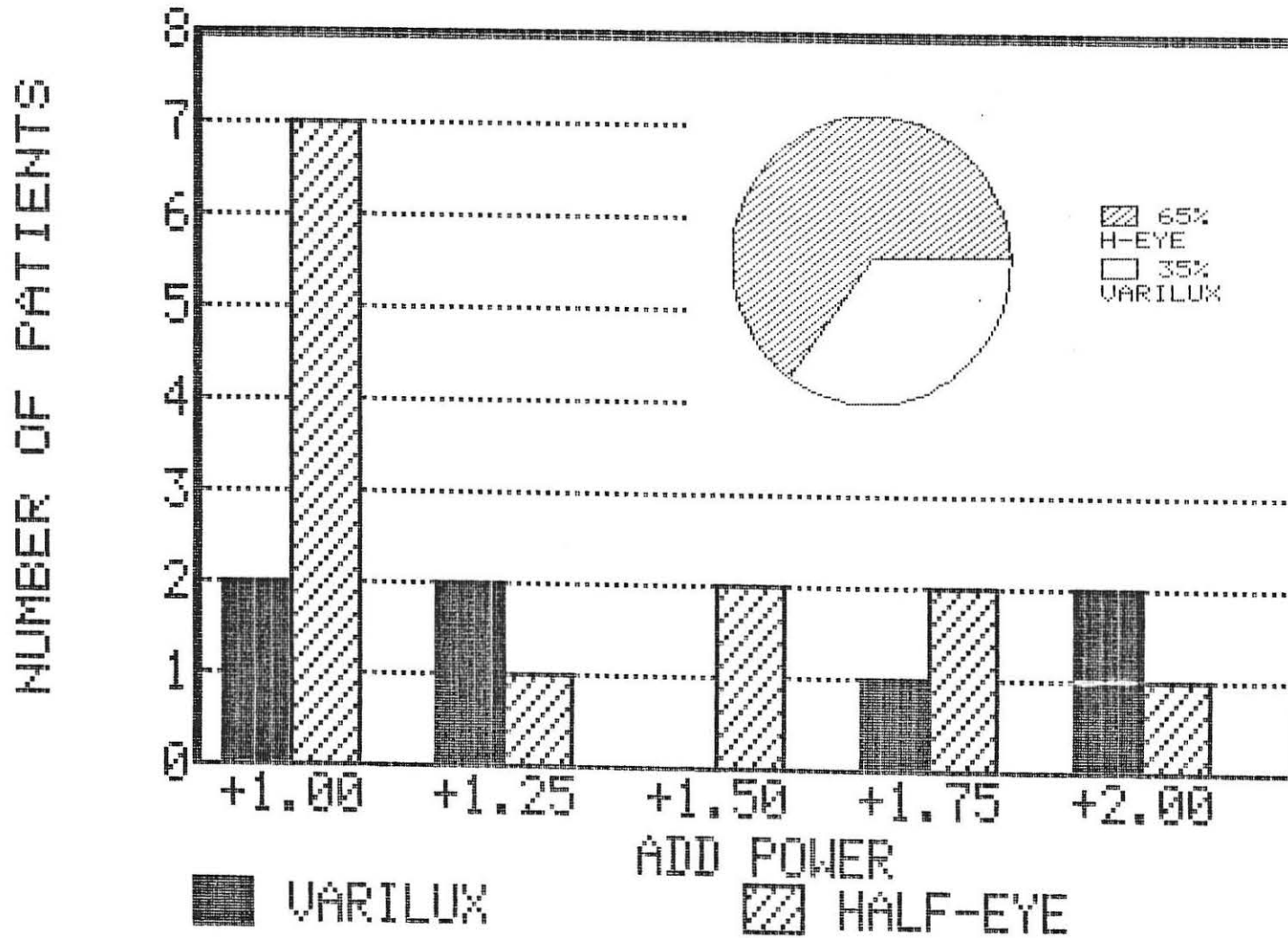


TABLE 2

OVERALL PATIENT PREFERENCE

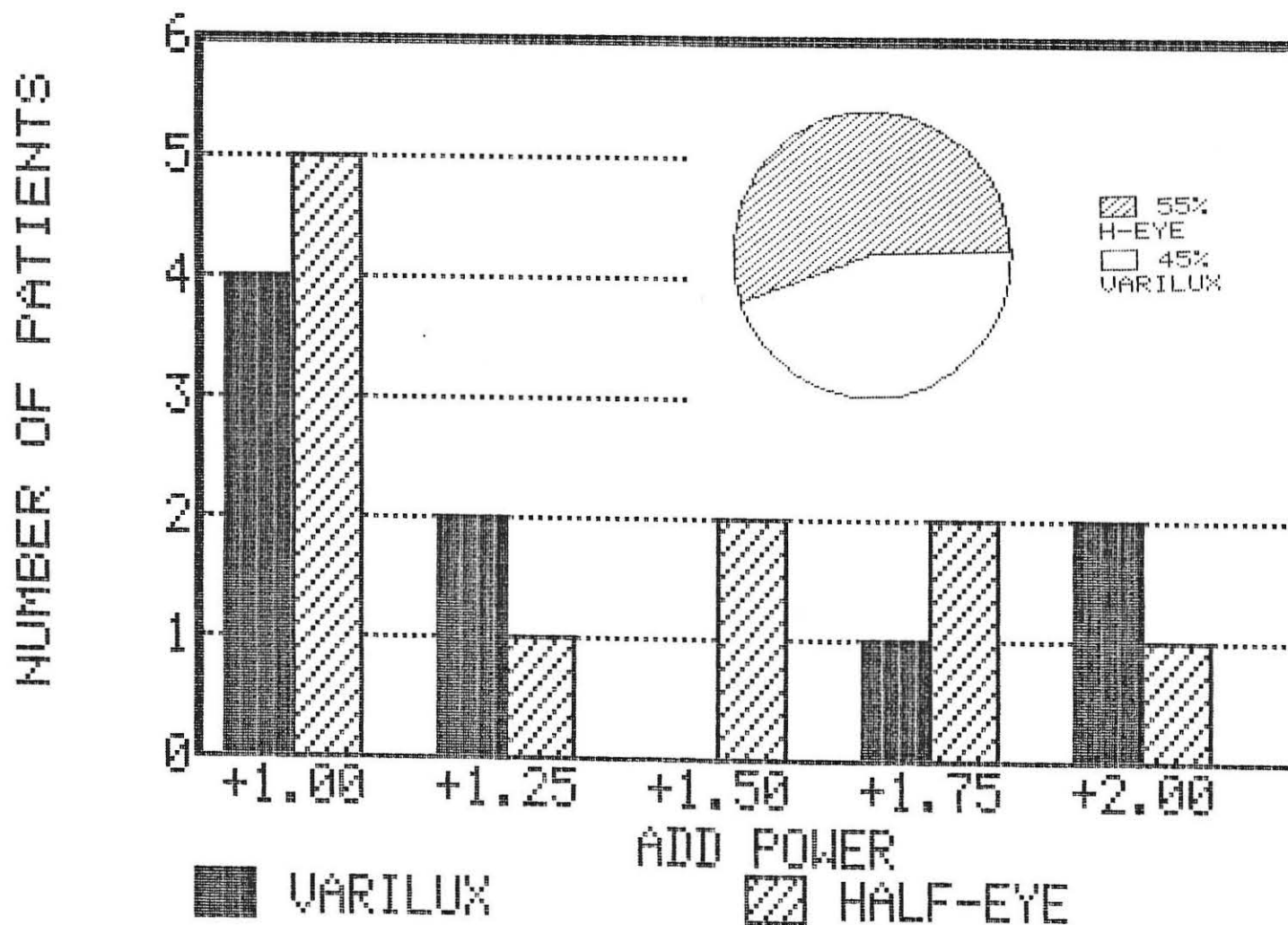


TABLE 3

ADAPTATION PERIOD

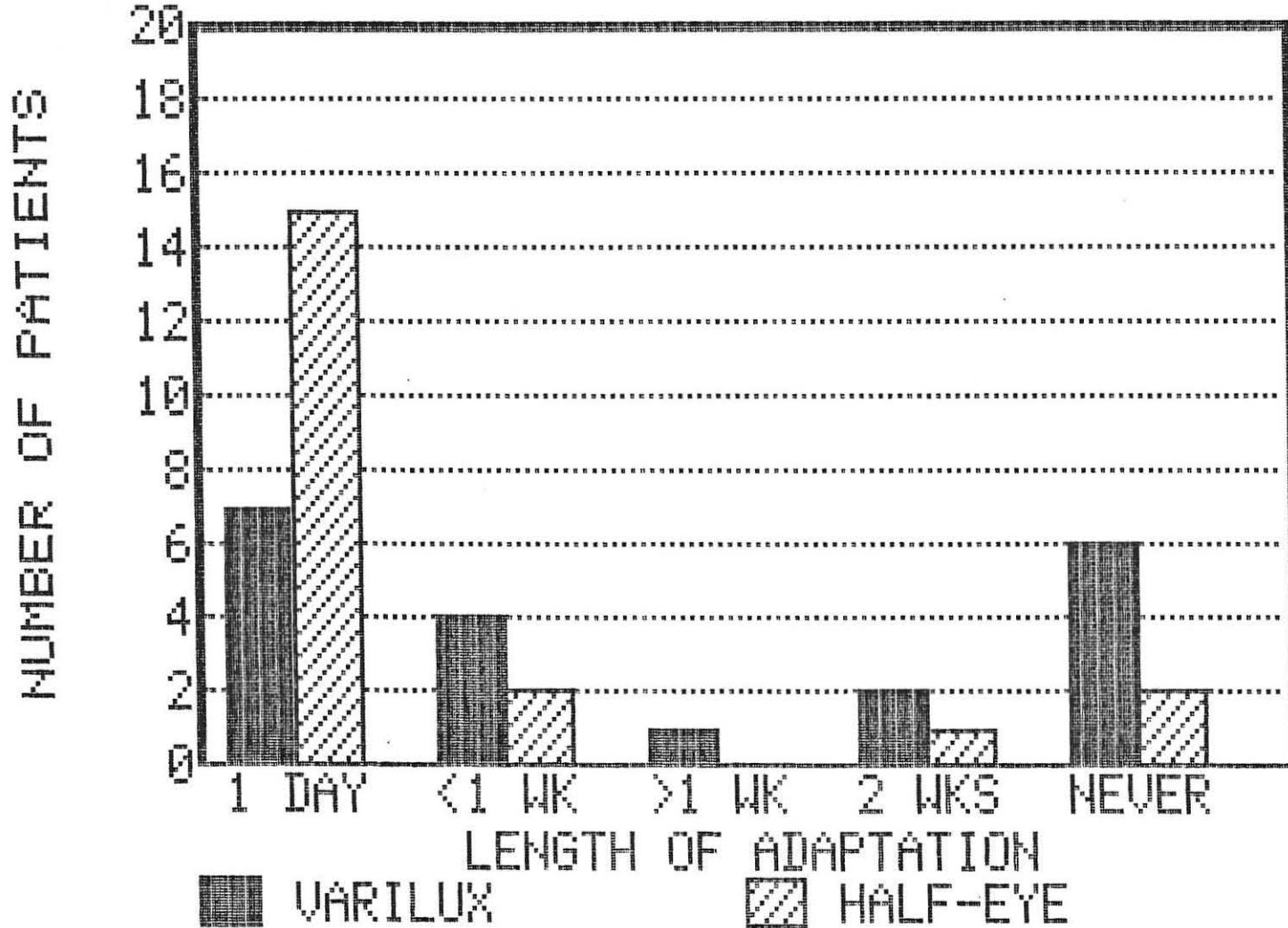


TABLE 4

TABLE 5

Pt.	Age	Sex	Add	Occupation	Sequence		Choice	Previous Bifocal
					1st	2nd		
G.A.	44	M	+1.00	Med. Tech	HE	@S	@S	none
J.A.	41	M	+1.00	Professor	@S	HE	@S	none
R.B.	44	M	+1.00	Insurance	@S	HE	HE	D-25
D.C.	49	F	+1.75	Banking	@S	HE	HE	none
K.D.	39	F	+1.00	Clerical	@S	HE	HE	none
F.D.	49	M	+2.00	Nurse	HE	@S	@S	HE
P.D.	64	M	+2.00	Psychology	HE	@S	HE	HE
D.E.	50	F	+1.75	Homemaker	HE	@S	@S	D-25
E.E.	44	M	+1.00	Engineer	@S	HE	@S	none
E.G.	36	F	+1.00	Counselor	@S	HE	@S	Exec.
L.K.	42	M	+1.00	Ranger	@S	HE	HE	none
W.L.	44	F	+1.25	Clerical	@S	HE	@S	none
A.M.	49	F	+1.50	Sales	@S	HE	HE	none
L.O.	45	F	+1.25	Clerical	HE	@S	@S	none
R.O.	49	M	+1.75	Janitorial	HE	@S	HE	D-25
G.P.	63	F	+1.50	Retired	HE	@S	HE	none
B.P.	36	M	+1.25	Student	HE	@S	HE	HE
A.R.	53	M	+2.00	Professor	@S	HE	@S	HE
M.R.	46	F	+1.00	Clerical	HE	@S	HE	none
D.V.	42	M	+1.00	R. Estate	HE	@S	HE	none

APPENDIX 1

This questionnaire was used to assess the subject acceptance of the two pair of spectacles.

PATIENT QUESTIONNAIRE

The purpose of this questionnaire is to assess the comfort and effectiveness of the pair of glasses which you have been wearing for the last two weeks. Please relate your responses only to the reading glasses you have most recently worn.

- 1) Was this your 1st or 2nd pair of research reading glasses? 1 2
- 2) Were the specifically designed reading glasses comfortable initially (first few hours of wear):
 - a) Frame comfort? Y N _____
 - b) Visual comfort? Y N _____
- 3) How long was your adaptation period? Check one.
 - _____ (a) one day
 - _____ (b) less than one week
 - _____ (c) more than one week
 - _____ (d) two weeks
 - _____ (e) did not adapt
- 4) Do you feel you are reasonably well adapted to the reading glasses? Y N _____
- 5) Symptoms you have experienced:
(check your choice)

	none	little	moderate	considerable
a) Discomfort:	_____	_____	_____	_____
b) Eye strain:	_____	_____	_____	_____
c) Headache:	_____	_____	_____	_____
d) Difficulty walking:	_____	_____	_____	_____
e) Distortion: (swim effect)	_____	_____	_____	_____
f) Difficulty with sustained reading:	_____	_____	_____	_____
g) Difficulty with desk work:	_____	_____	_____	_____
h) Habit changed due to glasses:	_____	_____	_____	_____

Describe changes: _____

- 6) Choose one of the following statements.
- a) I have no trouble with the glasses, and they nicely fill my needs.
 - b) The lenses fill most of my needs, but there is some slight inconvenience.
 - c) I have some problems with the lenses, but I need them for certain things so I use them when necessary.
 - d) I don't think they do a very good job, and I use them very rarely.
 - e) I could not use them and had to give them up.

7) What percentage of waking hours did you wear the glasses?

_____ 0-25% _____ 50% _____ 75% _____ 90-100%

8) Please rate visual acuity for the following working distances by checking appropriate response category:

	Excellent	Acceptable	Poor
a) Reading material	_____	_____	_____
b) Desk work	_____	_____	_____
c) Long-distance viewing	_____	_____	_____
d) Instrument panel (computer terminal)	_____	_____	_____

9) Please rate visual comfort for the following working distances by checking appropriate response category:

	Excellent	Acceptable	Poor
a) Reading material	_____	_____	_____
b) Desk work	_____	_____	_____
c) Long-distance viewing	_____	_____	_____
d) Instrument panel (computer terminal)	_____	_____	_____

APPENDIX 2

RESEARCH STUDY

(McBride/Ness)

NAME: _____ DATE: _____

The purpose of this questionnaire is to compare the comfort and effectiveness of the two pair of glasses that you have worn throughout this study.

1) Which pair of glasses did you like best?

half-eye/bifocal invisible bifocal

Comments: _____

2) Which pair of glasses were best suited to your work environment?

half-eye/bifocal invisible bifocal

Comments: _____

3) Which pair of glasses were best suited to your hobbies or general home activities?

half-eye/bifocal invisible bifocal

Comments: _____

4) If forced to choose one pair of these glasses which one would you prefer to keep?

half-eye/bifocal invisible bifocal

Why?: _____

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