

The USE of LOW POWERED PROGRESSIVE ADDITION LENSES

For NON-PRESBYOPIC PATIENTS

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Abstract

Many non-presbyopic optometric patients present with symptoms related to near work or computer use. Practitioners may be reluctant to prescribe low-powered progressive addition lenses for these patients because of concerns about adaptation or effectiveness. This study investigated the benefits of using low-powered progressive addition lenses (PALs) in a symptomatic non-presbyopic population. Fifteen computer users, and 21 non-computer users compared single vision distance spectacle prescriptions to PALs. Although the subjects seemed to take a little longer to adapt to the PALs, the PALs were preferred by a majority of subjects for reading and computer use. The low-powered PAL may be the lens of choice for non-presbyopic patients experiencing nearpoint symptoms.

Key Words

multifocals, progressive addition lenses, asthenopia, computer users

Symptoms such as asthenopia and eyestrain related to near work are common in optometric practice, especially among computer users.¹⁻³ These symptoms can be related to accommodative problems such as insufficiency or infacility, vergence anomalies such as nearpoint eso- or exophoria, or even uncorrected refractive errors as low as 0.50 D.⁴ Management of such problems can be a challenge. One treatment option is prescribing low-plus additions for use at near, a common technique in the behavioral optometry approach.^{5,6}

In general, when near additions are prescribed, low-powered additions are seldom used in typical optometric practice. Perhaps patients who would benefit from a low add power would rather endure the discomfort of tired eyes than subject themselves to the annoyance and stigma of a bifocal segment. Many patients delay the inevitable by postponing the "40-something" eye exam for as long as possible, usually until the nearpoint symptoms become intolerable. Consequently, low add powers (i.e. +0.50 D and +0.75 D) are used primarily for myopia management and control in children,⁶⁻⁸ or for the occasional early presbyopic patient with very intense nearpoint demands.⁶

Most progressive addition lenses are available in powers starting at +0.75 D.⁹ Some start at an add power of +1.00 D. And, as with straight-top bifocals, the number of progressive addition lenses

having add powers below +0.75 D is limited. Judging from the availability of add powers in progressive lenses, it is likely that practitioners prescribe progressive addition lenses more frequently than traditional straight-top bifocals in these low powers.

If a patient is currently wearing glasses, most practitioners would consider prescribing new lenses for a refractive change of 0.50 to 0.75 D or more.¹⁰ Therefore, it would seem that if multifocal adaptation and acceptance were good, then low-powered lens additions would be used much more often. This would be true for non-presbyopic patients as well as presbyopic patients. It has been reported that non-presbyopic patients do function well and experience relief of nearpoint symptoms with the use of progressive lenses.¹¹ In an effort to further investigate this, a study of non-presbyopic patient acceptance of low-powered near additions was undertaken.

Subjects

This study was limited to non-presbyopic subjects between the ages of 18 and 39 who were experiencing symptoms at reading distance. In addition, they had to be wearing single vision spectacles with a distance refractive correction at the time of the initial examination, and this prescription must have changed by at least 0.50 D in sphere or cylinder power at the initial examination. Thus, a comparison between a distance refractive change

alone and a distance refractive change combined with a low-powered add could be made. The subjects were given a pre-study questionnaire to determine the extent of their nearpoint symptoms.

Because of the increasing number of symptomatic computer users appearing in optometric practices,¹⁻³ approximately one-half of the subjects chosen for this study were individuals who spent at least 20 hours per week at a computer. Patients with corrected visual acuity of worse than 20/20, amblyopia, strabismus, or significant ocular pathology were excluded. The subjects who met these criteria were recruited from consecutive comprehensive examinations in the Indiana University School of Optometry Primary Care Service over a one-month period. Subjects were completely instructed regarding their participation in this study, and they all read and signed an Informed Consent Statement approved by the Indiana University Institutional Review Board.

Thirty-six subjects, with a mean age of 31.8 years, completed the study. Table 1 shows the composition of the subjects. Table 2 lists the ages and occupations of the subjects in the two groups (computer users and non-computer users).

Methods

Following the comprehensive Primary Care examination, the final distance refractive correction was determined, along with an add power of +0.50 D or +0.75 D. Each of these two add powers was given to approximately one-half of the subjects. The near add power prescribed was based on severity of symptoms, amplitude of accommodation, negative and positive relative accommodation, binocular crossed-cylinder, and subjective appreciation of the near addition. Those subjects with more severe symptoms, or significant problems with nearpoint testing, were given the +0.75 D add power.

Before new lenses were provided, each subject completed a survey to determine satisfaction with their current spectacle prescription. Next, a frame was selected and measurements were taken for one pair of single vision (SV) lenses and one pair of low-powered, American Optical TruVision Omni (AOMNI) progressive addition lenses. The progressive addition lenses were fit in accordance with manufacturer's instructions.

The subject was then given one of the two pairs of glasses to wear for two weeks. The glasses dispensed first were selected at random. SV lenses were dispensed first to 16 subjects and low plus AO OMNI lenses were dispensed first to 20 subjects. Subjects were not informed as to which lenses were being dispensed. In order to maintain subject masking, yet ensure that the progressive addition lenses were being properly used, subjects were given identical wearing instructions at each dispensing visit. These instructions were similar to those given when dispensing progressive addition lenses to typical clinic patients: that is, point the nose towards the reading material and move the head up and down until the material is clear.

After a two-week period, the subject returned to the clinic and completed a second satisfaction survey. Survey questions addressed issues of adaptation, clarity of distance and near vision, vision at the computer screen, and any discomfort the subject may have experienced with the glasses. After responding to the survey, the first pair of glasses was taken from the subject, and the second pair was dispensed.

Following another two-week wearing period, the subject returned and completed another survey. At this point, the initial lenses

Table 1
Subject composition

	Computer users (≥4 hrs/day)	Non-computer users (<4 hrs/day)	Total
Number of subjects	15	21	36
Number of males	5	9	14
Number of females	10	12	22
Average age	32.6	31.2	31.8

Table 2
Subject composition and ages

Category	Occupation	Age
Computer users (n=15)	computer consultant	27
	student	26
	secretary	38
	librarian	33
	secretary	35
	freelance writer	32
	data entry clerk	32
	media researcher	37
	realtor	36
	secretary	37
	VDT operator	26
	library assistant	37
	records clerk	35
	VDT operator	38
	student	20
Non-computer users (n=21)	professor	38
	editor/translator	30
	student	24
	social worker	30
	janitor	32
	student	27
	proofreader	37
	student	18
	professor	31
	professor	38
	bank teller	37
	student	28
	packaging inspector	36
	student	25
	probation officer	34
electronic technician	39	
student	24	
janitor	33	
student	23	
building inspector	38	
secretary	32	

were returned to the subject, with instructions to wear both pairs for direct comparison purposes over a two-week period. At the return visit following this final two-week period, the subject completed one last survey which asked comparative questions, such as relative ease of adaptation and use, distance and near vision quality, and symptom relief. The subject was then told to choose one pair of glasses based upon overall preference.

Results

Figures 1 through 5 show the ratings of the SV and progressive addition lenses (PALs). From these figures, the following comments can be made:

1. Adaptation time (Figure 1) - Clearly, more subjects were able to adapt to the SV lenses during the first three days of wear than to the PALs. However, it is important to note that only one subject was unable to eventually adapt to the PALs, whereas three subjects could not adapt to the SV lenses.
2. Reading performance (Figure 2) - Thirty subjects rated the SV lenses as "satisfactory" or better, and 34 rated the PALs as "satisfactory" or better. Six subjects rated the SV lenses as "poor" or "can't use," whereas only two rated the PALs this way.
3. Computer performance (Figure 3) - Although only 15 subjects were in the "computer users" group, all subjects were able to rate the lenses on computer performance. Ratings of "satisfactory" or better, similar to those given in reading performance, were recorded here (SV - 32; PALs - 36). Four subjects rated the SV lenses as "poor" or "can't use," and none rated the PALs this way.
4. Distance vision (Figure 4) - Ratings in this category were very similar for the SV and PALs prescriptions.
5. Comfort at work (Figure 5) - Again, ratings in this category were similar for both prescriptions; however, four subjects rated the SV lenses in the "can't use" category, compared to only one for the PALs.

Lens preferences were also given for each of these five categories (Figure 6). Each subject chose the preferred lens in each category, or chose "no preference" if neither lens was preferred. The SV lenses were preferred by more subjects in the adaptation time and distance vision cate-

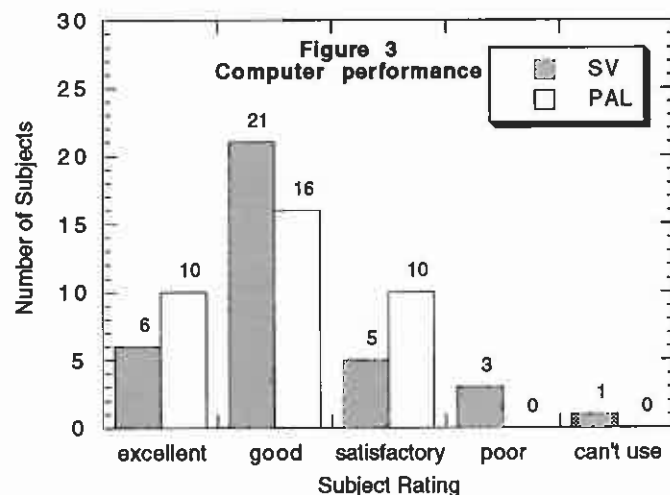
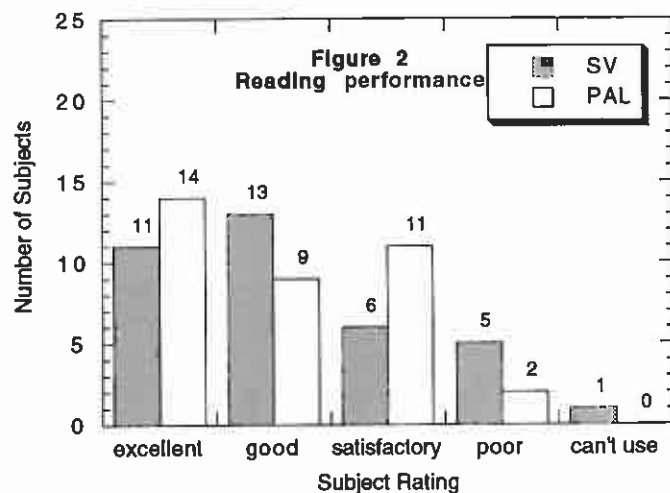
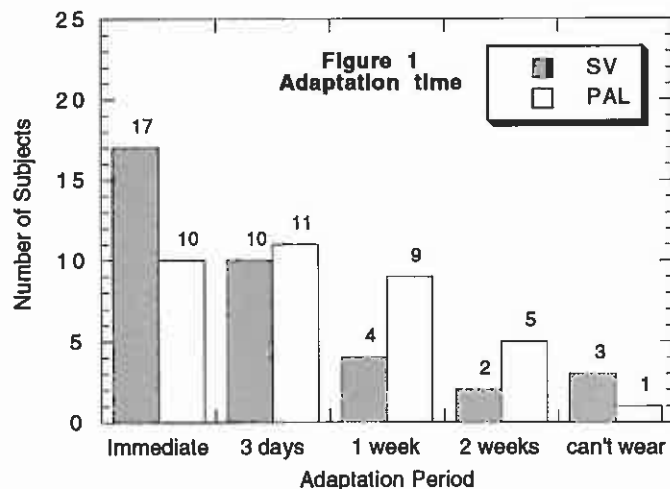
gories. The PALs were preferred by more subjects in the reading performance, computer vision, and comfort at work categories.

When asked to select the preferred lens overall, more subjects chose the PALs (20) than the SV lenses (14). This overall preference can also be seen in both groups of subjects when comparing computer users to non-computer users (Figures 7 and 8).

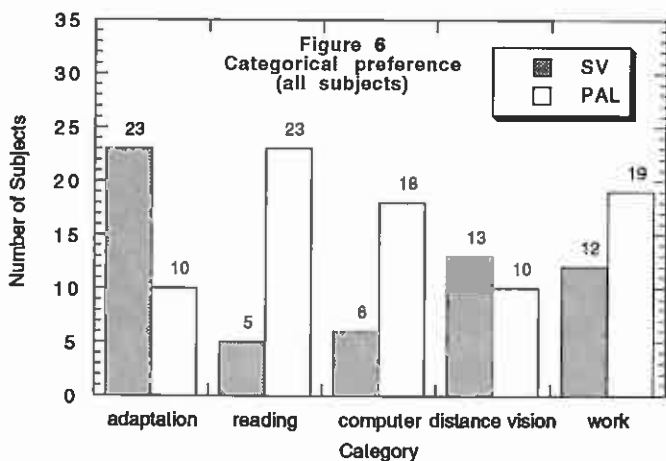
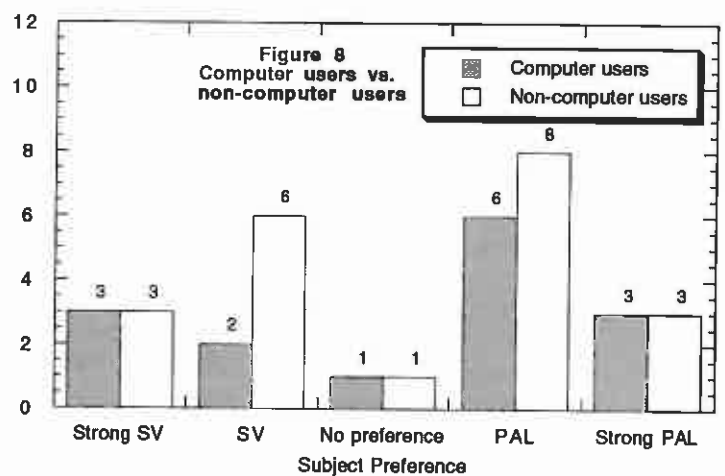
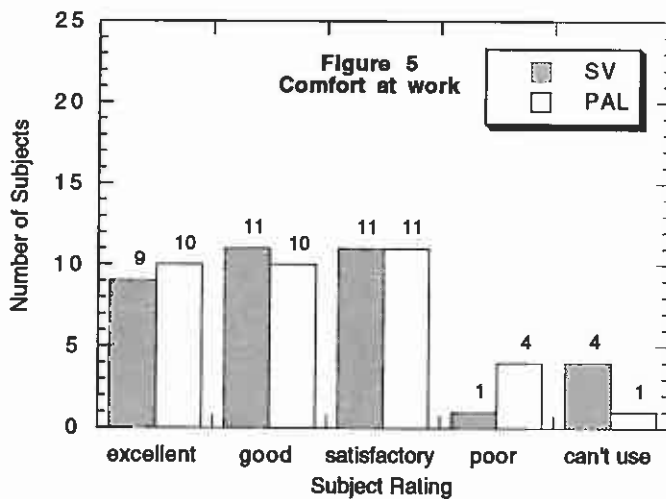
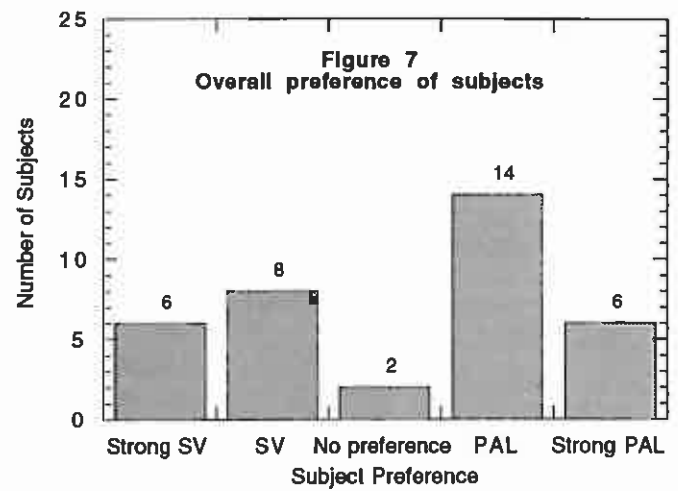
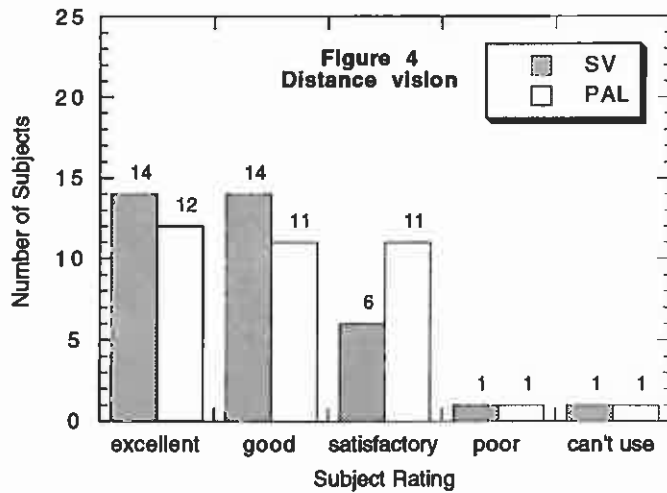
Discussion

Despite being masked to the lenses, most subjects recognized the task-difference effect of the two lens types. Although 39% of the subjects chose the single vision lens at the end of the study, many of the individuals said they liked the AO OMNI progressive addition lenses best for certain near tasks. If there had been an option for obtaining a second pair of glasses, many subjects likely would have utilized both types of lenses.

Although not specifically addressed by survey, several subjects complained of minor lens reflection problems with the AO OMNI lenses. These problems could have been resolved with the use of an anti-reflection lens coating; however, this study used only untinted, uncoated lenses in order to isolate preference factors.



The adaptation process seemed to take longer, as one might expect, with the progressive addition lenses. However, all but one subject eventually adapted, and most subjects adapted within a one-week period



of time. Therefore, patients should be advised about the adaptation process; but this should not be a reason to avoid low-powered progressive addition lenses.

sion. This does not seem to be a problem with low-powered progressive addition lenses. The combination of non-presbyopia and low add powers permits view-

Also of interest is the fact that most of the subjects in the "computer users" group had an overall preference for the AO OMNI lenses. Practitioners are often reluctant to prescribe progressive addition lenses for computer use because of the peripheral lens distortions, which are typically assumed to limit intermediate range viewing to a narrow channel of clear vision.

ing of intermediate range objects through either the distance or near lens areas without blur. Thus, practitioners should not avoid low add progressives even in the case of prolonged computer use.

Conclusion

For non-presbyopic individuals with nearpoint symptoms and appropriate clinical findings, the lens of choice for reading and close work is the low-powered progressive addition lens. This is true even in the case of patients who use a computer extensively. The results of this study indicate that the majority of non-presbyopic patients with nearpoint symptoms will choose a low add progressive lens over a single vision lens that is prescribed with the distance correction only.

Acknowledgments

The authors wish to thank Joanne DeLone for help in study administration and organization, and Edward Uyesugi, O.D.,

for his assistance in clinical management of subjects. We gratefully acknowledge the help of American Optical, Southbridge, MA, for their encouragement and generosity in underwriting the expenses of this project.

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Date accepted for publication:

February 14, 1997



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