

# New Progressive Addition Lens Design: Utilizing the Varilux Ipseo Lens for Non-Adapt PAL Wearers

Jennifer Wong

National Award Winner of the 2006 Varilux Student Award Program

© 2006

## *Abstract*

*A progressive addition lens (PAL) is a seamless multifocal lens with the distance power in the top half of the lens that gradually increases in power as the wearer looks down into the bottom portion of the lens. This design allows for clear distance, intermediate and near vision. In order to achieve this lens design, unwanted astigmatism is created in the lower quadrants of the lens. The inability to adapt to this peripheral distortion prevents some presbyopes from wearing PALs.*

*Numerous factors must be considered when designing a successful PAL. This paper explores different PAL designs and discusses which lens may benefit different individuals. Most progressive lenses do not account for eye movement and force the wearer to adapt by increasing the amount of head movement. Specialized lenses have been designed in an attempt to accommodate those having a hard time adapting. For instance, the Varilux Liberty is a lens specifically designed for those transitioning from lined bifocals to PALs by providing a shorter corridor from distance to near. The Varilux Panamic is one of the leading PALs used in the optometric field and it provides the wearer with a wider field of clear vision that is easier to adapt to. The Varilux Ipseo lens is the first customized lens that takes into account head/eye movement and incorporates individualized characteristics of each wearer to produce a unique lens. This gives patients having a hard time adapting to other PAL designs the opportunity to wear a PAL successfully.*

*In the two cases presented here, one patient was fit with the Varilux Liberty lens and had problems with intermediate and near tasks. Another patient was fit with Varilux Panamic and complained of the inability to read. Both patients were successfully fit with Varilux Ipseo lenses and were extremely pleased with their vision at all distances.*

## Introduction:

The spectacle lens design of choice for most presbyopic patients today is a progressive lens design. The benefits of this design include multiple working distances and no image jump, allowing for more visual freedom. The Varilux 1 lens was the first PAL, and it was introduced in 1959. The first PALs were designed with a short corridor and a “hard” design (caused increased spherical and astigmatic power changes in the periphery) which created significant distortion in the periphery. As technology and knowledge of the optical system has advanced, so has the progressive lens design. Manufacturers began moving towards a softer design with a longer corridor to decrease the amounts of aberrations. A downside with using a softer lens design is the decreased reading area. In order to meet the needs of different patients, many different designs are available, including the Varilux Liberty lens, the Varilux Panamic, and the newest lens design concept, the Ipseo lens. The Ipseo lens incorporates whether a patient uses eye movements or head movements when reading. This lens uses a balance between long and short corridors depending on the type of head/eye movement of the wearer.<sup>1</sup> Two patients who were helped with the new Ipseo design will be discussed here.

## Case History #1:

Patient J.W., a 55 YOM chancellor at a small junior college in Indiana, presented with a chief complaint of difficulty reading on December 15, 2004. The patient’s habitual prescription, from June 10, 2003, was -1.25 OD, -1.00 OS for distance, and OTC +1.25 readers for near work. This

required the patient to carry two pairs of glasses with him at all times. Visual acuities taken with the habitual Rx were 20/25 OD, 20/25<sup>+</sup> OS at distance and 20/20<sup>-</sup> at near. Best corrected visual acuity, taken December 15, 2004, was 20/20 OU at distance and near, with -0.75 OU / +2.50D add. Binocular vision was WNL. Ocular health was normal and showed no apparent pathology.

J.W. was fit initially with Varilux Panamic lenses. This advanced lens design provides patients with enlarged fields of vision for fast and easy adaptation. By balancing central, peripheral, and binocular vision, this lens gives the wearer a panoramic field of view at all distances, which allows for increased eye movements. Varilux Panamic also reduces distortion in the distance, especially in the periphery. Even though this lens design is considered a premium PAL with a high success rate, success is dependant on correct fit and adjustment of the lens. Specifically, distance monocular PDs and monocular segment heights should be carefully measured.<sup>ii</sup>

J.W. returned complaining of not being able to read and it was evident that he was unable to find the reading area in his glasses. J.W. was extremely frustrated and was going to purchase separate distance and reading glasses since his field of work required an extensive amount of reading and computer work. The patient was educated on the different types of PALs and we suggested trying the Varilux Ipseo lenses and the patient agreed. After running the VisionPrint System (VPS), Varilux's patented instrument required for ordering the Ipseo lens, J.W.'s head/eye movements were calculated. He had a 0.1 head/eye ratio, which indicates preferred eye movement over head movement. VPS also calculates a stability ratio which is incorporated into the design of the transition needed between the central and peripheral zones. Every lens is custom made with Crizal Alizé A/R. The wearer also has the option of engraving an identifier in the superior temporal edge of each lens to add further individualization to his/her own lens. J.W. returned very satisfied with his new glasses and noted how excellent his vision was out of his new glasses.

#### Case History #2:

Patient T.T., a 58 YOF school teacher, presented to our clinic on August 11, 2005 with difficulties with near and intermediate vision. She had an outside prescription of -0.50 -0.50 x 085 OD, -0.75 -0.75 x 080 OS with an add of +2.75D filled August 4, 2005. T.T.'s current glasses had Varilux Liberty lenses, a specialized PAL. This lens features Instant Reading Power by combining a balance between near vision width, balanced binocular vision, and near vision peripheral softness. This lens is especially helpful with transitioning previous lined bifocal wearers into progressives. Another benefit of this design is that some leeway is allowed when taking measurements, compared to other traditional PALs. Unfortunately, T.T. was not seeing well out of these lenses, so we refit her with Varilux Panamic.

T.T. returned October 5, 2005 with complaints of reduced vision at intermediate and near distances. She reported having the most difficulty while working at her desk. After working with the patient for an extensive amount of time trying different working distances and frame adjustments, she insisted on re-ordering her original Varilux Liberty lenses.

Five days later, T.T. returns with the same chief complaint. She was educated on the pros and cons of the Varilux Ipseo lens design and ended up fitting her for in these lenses. The VisionPrint System estimated a 0.18 head/eye ratio for T.T. which makes her more of an eye mover than head mover. Her stability coefficient was 0.05. T.T. chose to engrave her initials on her lenses. Upon follow up, T.T. noted excellent near, distance, and intermediate vision with her new glasses and all her visual needs were met.<sup>iii</sup>

#### Discussion

Fitting Varilux Ipseo lenses requires using the patented VisionPrint System (VPS), which tests and records natural head/eye movement and determines the optimal design of the lens for each

patient. It utilizes a Polhemus FASTRAK system which tracks motion. The patient is situated in front of the instrument, wearing the special headset that helps measure the proportion of head and eye rotation, and instructed to follow the random blinking lights naturally (head movement is allowed). A set of three lights positioned horizontally 40° apart is viewed. The VPS calculates the Gain ( $\text{Gain} = \text{Head Angle} / \text{Target Angle}$ ) separately for the right and left side. Results can vary from 0 (no head movement) to 0.98 (40° head movement). Various studies<sup>iv</sup> (Fuller 1992) have shown that the number of eye movers outweighs the number of head movers.<sup>v</sup>



VisionPrint System<sup>v</sup>

Patients must have the following three requirements before being fit with the Varilux Ipeo lens: good foveal vision, low levels of perceived distortion, and binocular symmetry. This lens is designed using a “Dioptic Loop” approach that individualizes each lens. The Varilux Ipeo is the first customized progressive addition lens ever made and is made possible by using a new direct digital surfacing technique. Distance powers range from +6.00D to -10.00D sphere and up to 4.00D cylinder and adds range from +0.75D to +3.50D per 0.25 increments. The minimum fitting height is 14 mm.

#### Conclusion:

With the increasing trend of PALs becoming the lens of choice for many multifocal wearers, we must learn how to accommodate a wider range of patient needs. The Varilux Ipeo lens design allows us to do this by creating a custom made lens for every wearer. Two different cases dealing with difficulties adapting to progressive addition lenses were discussed. J.W. had a hard a time finding the add portion for reading, while T.T. had troubles with intermediate and near tasks. Both cases were successfully fit with Varilux Ipeo lenses, which solved all their chief complaints. These cases have demonstrated the importance of having custom designed PALs. There are a wide variety of PALs available and it is important for clinicians to be well-educated on the options available to their patients, thus avoiding potential complications. The Varilux Ipeo technology may help previously non-adapt PAL wearers to successfully wear PAL lenses and also accommodates many different lifestyle activities.

<sup>i</sup> Benjamin WJ, Borish IM. Borish’s Clinical Refraction. Philadelphia, PA. WB Saunders, 1998.

<sup>ii</sup> Sheedy JE. Progressive addition lenses-matching the specific lens to patient needs. *Optometry* 2204;75:83-102

<sup>iii</sup> Bacotti JL. The first and only PAL designed specifically for bifocal conversion introducing Varilux Liberty, a new solution for bifocal wearers. 01/20/06. [www.visioncareproducts.com/varilux/apr\\_pal.html](http://www.visioncareproducts.com/varilux/apr_pal.html).

<sup>iv</sup> Fuller H. (1992). Head movement propensity. *Experimental brain research*. 92: 152-164.

<sup>v</sup> Essilor of America. Varilux Knowledge Series VisionPrint System. 2005.

Faculty Advisor:

Susan Kovacich, OD, Clinical Assistant Professor  
Indiana University School of Optometry, Bloomington, IN 47405  
[skovach@indiana.edu](mailto:skovach@indiana.edu)