ModernMedicine NETWORK

Progressive Thinking

January 15, 2004

By Phernell C. Walker II, ABOM

Lens designers and manufacturers are constantly searching for the perfect progressive addition lens. They strive to design the most comfortable lens both optically and cosmetically. This combination of both equals a lens that is thin, light, and versatile for all lifestyle activities, while delivering the sharpest visual acuity possible without noticeable power shifts in every meridian. Ophthalmic professionals don't have to wait for tomorrow for this technologically advanced progressive lens. It's here today.

Cutting-edge lenses at a glanceThe Definity, which was designed by The Spectacle Lens Group of Johnson & Johnson, is a progressive lens based on the concept of a patented dual add design that splits the add power between the base and ocular curve (front and back surface) of the lens. The corridor's width is influenced by the increase in add power on the front surface of the lens.

Figure 1.

With conventional progressive lens designs, as the add power increases, the corridor's width decreases. Using both sides of the lens surface allows for a wide intermediate zone, significantly reducing the unusable soft focus areas that result in a smooth transition between the distance and near portions of the lens (Figure 1).

The Micro and Biospheric progressives by iScience are cutting-edge progressive designs. Both lenses are cast to prescription, which means that each lens is custom manufactured to the exact prescription rather than using traditional surfacing methods. The cast to prescription feature ensures a defect-free surface compared with conventional surfacing, which leaves microscopic imperfections that degrade visual acuity.

The Micro lens is an excellent choice for today's smaller frames (Figure 2). It features a short corridor with a fitting height of just 15 mm. The Biospheric lens uses aspheric and atoric ocular curves in both the tangential and sagittal planes, which virtually eliminates unwanted astigmatism (soft focus areas) in all prescriptions (Figure 3). It has a recommended fitting height of just 18 mm, which works well in almost any frame.

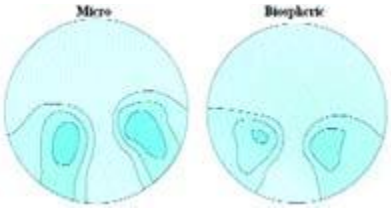

Figure 2 and 3.

Traditional progressive lensesProgressive lenses are designed to allow presbyopic patients the ability to see at various distances without residual image jump (base down prismatic effect), restrictive focal lengths, and demarcation lines. Also known as variable focus lenses, progressive lenses employ aspherical curves across the front surface of the lens (below the major reference point), while at the same time a gradual decrease in the radius of curvature is used from the distance portion to the near area. This results in a lens that has multiple centers of curvature, which allows for multiple focus points. Early variable-focus lenses were designed to accomplish daily tasks such as driving, moderate intermediate focus, and near for reading.

Corridor profileExactly what is the progressive corridor? Simply put, a corridor (umbilical line) or gradual increase in plus varying conic sections (curves) from the distance portion to the near portion of a progressive lens creates additional plus power. As the add power increases, positive radial astigmatic dioptric power (plus cylinder) is introduced in the lens.

The result is skewed aberration toward the periphery of the lens. This residual unwanted plus cylinder creates the boundary or corridor, which is perceived as a "busy" sensation as the angle of gaze rotates towards the periphery of the lens below the major reference point.

The corridor's length is that distance measured from the optical cross (not the major reference point), to the near optical center. Though the definition of the corridor length is quantified differently by each manufacturer, it is important to know that each lens designer will specify a specific corridor length.

This is critical in choosing a lens for your dispensary. The gradual increase in plus power through the corridor will determine the corridor's overall length. The more abrupt changes in curvature create a shorter corridor and decrease the overall length and width in the intermediate area of the corridor.

Tomorrow's progressive lenses are here today. Lens designers can be expected to continue to improve on these cutting-edge designs in hopes of delivering the ultimate in progressive lens technology.