BIFOCAL CONTACT LENS

DESCRIPTION OF THE PRIOR ART

As a person grows older, the natural lens of the eye begins to crystalize and lose its elasticity. As this condition progresses the eye loses its ability to accommodate for objects which are near. The objects, consequently, remain blurry and out of focus. This condition is referred to as presbyopia. In order to correct this condition it is necessary to provide a corrective lens which accommodates for the eye's weakness and properly focuses the light rays upon the retina.

There are several ways to accomplish this correction. A simple solution for people who require correction only for near work is the use of reading glasses which are put on and taken off when close work is required. For people who require correction for both near vision and far vision, dual vision, or bifocal, corrective eye glasses have been prescribed for quite some time. Bifocal eye glasses provide proper correction for distant vision through one segment of the lens, while correction for near vision is achieved through a second segment.

For various and sundry reasons many people do not care to wear ophthalmic frames to correct their vision and have taken to wearing contact lenses. Presently, all bifocal contact lenses function either under the principle of simultaneous vision or of alternating vision. Bifocal contact lenses which feature simultaneous vision provide a distance zone correction on the lens which is smaller than the pupil diameter of the eye. The distance zone is generally surrounded by an area for near correction. The wearer of this type of lens is simultaneously viewing objects through both the near correction and the distant correction portions of the contact lens. The brain receives the visual messages from the eye and then selects the proper image on which to focus while suppressing the other image. However, although the image upon which the eye is focused is clear, some blurring is always present. This is caused by the light passing through the out-of-focus zone. A great many presbyopic people cannot accept this type of corrective contact lens. Other contact lenses function according to the alternating vision principle. The annular type of alternating vision lens usually has a band of near vision power surrounding a center of distance vision power correction. Crescent segmented alternating vision lenses have a distance portion above and a crescent-shaped near power segment immediately below. In either case, the lens must move on the eye with respect to the horizontal meridian in order to achieve proper focussing through the near zone and then to resume its initial position for distance vision. To accomplish this, the lens is generally provided with some sort of ballasting, such as the lens being heavier at its lower portion. One common method to produce such a lens is by manufacturing it with a wedge or prism shape which produces the desired thicker, and thus, heavier, portion at the bottom of the lens. In many instances, and especially with bifocal lenses, both truncation and ballasting may be used simultaneously. In other instances, contact lenses may be ballasted through the incorporation of a heavier material into the lower portion of the lens.

The ballasted lenses, briefly described above, generally help to maintain the contact lens in a proper inferior orientation on the eye when the wearer is looking straight ahead through the distance portion. As the wearer shifts gaze from distance to near, the eye moves downwardly. The enlarged portion of the lens whether from ballasting, truncation, or both, encounters the lower eyelid and is forced upwardly a predetermined amount so that the near vision portion is properly positioned before the pupil. Near vision lens orientation is thereby provided. When the wearer shifts the field of view back to distance gaze, the lens, because of the ballasting, migrates vertically on the eye and resumes its distance position.

The ballasted and truncated lenses described above, while satisfactory for some wearers, generally have several inherent drawbacks which make them less than desirable for a substantial portion of the number of people who are potential bifocal candidates. Some wearers absolutely cannot wear the conventionally ballasted lens as it irritates their lower (inferior) lid and becomes quite uncomfortable and painful. Others cannot wear the conventionally ballasted lens as the ballasted region frequently will be caught and briefly held by the upper (superior) lid upon blinking. As the upper eyelid opens from the blink sequence the lens may be caused to rotate off axis. The rotation may be either in the temporal or nasal direction. The rotational displacement results in diplopia and visual acuity suffers substantially. The patient, of course, cannot accept a contact lens which would give such poor results.

Conventionally truncated lenses, depend upon the blunt lower edge of the lens to rest against the sensitive lower lid margin to move the lens as the gaze is lowered from distance to near vision. It will be appreciated, therefore, that the height of the near segment with respect to the pupil is most critical as it depends solely on the movement induced by the engagement with the lower lid for proper positioning. It is well known that the position of the lower lid varies from patient to patient with respect to the lower limbus of the cornea. Some may have high inferior lids while others have low inferior lids. In instances such as these, many patients cannot be properly fitted as the lens will either move too much or too little to properly position the add portion on the eye. To compensate for this serious problem, it becomes necessary to maintain a substantial inventory of lenses in order to have on hand the lens with the correct segment height to lens center line relationship.

Translating type bifocal lenses which were fitted to patients in the past were generally prism ballasted and/or truncated flat. Dr. Robert B. Mandell, a noted scholar and Professor of Physiological Optics and Optometry at The School of Optometry, University of California at Berkeley writes on p. 721 of "Contact Lens Practice", (3rd Edition) ". . . the shape of the truncation is important. The truncation should be nearly flat at the bottom with rounded corners. It should be rounded evenly on the front and back sides. If the truncation tapers toward the front surface, it will rub against the lower lid and cause severe discomfort. If the truncation tapers toward the rear surface, the lens will slip beneath the lower lid and not be supported in its proper position".

It will be apparent that practitioners and scholars, such as Dr. Mandell, have accepted, as fact, that truncated lenses, as they are known today, must be truncated flat and not be tapered toward or away from the eye. The invention set forth herein illustrates innovative variations on this theme to provide for a multifocal lens of superior performance.