Evaluation of Soft Lens Fit in Relation to Corneal Topography

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Introduction

The traditional approach of selecting soft lens base curves based on keratometry (i.e. central corneal curvature) has largely been discarded. The ocular profile and sagittal height is dependent on a number of additional parameters such as corneal asphericity and corneal diameter. With the widespread use of corneal topographers, the question arises whether the information provided by these instruments can be used to predict the fit of soft contact lenses?

Purpose

To determine which ocular topography variables affect soft contact lens fit.

Methods

- Fifty subjects each wore three soft lenses in random succession: Vistakon ACUVUE2 [A2], Vistakon ACUVUE® ADVANCE™ [AA] Ciba Focus® NIGHT & DAY™ (N&D)
- The steeper base curve (BC) of each type was worn in one eye and the flatter base curve in the other eye.
- Corneal topography data were collected using a Medmont E300 corneal topographer (Camberwell, Australia): Central corneal curvature (CC), K-reading (K), corneal shape factor (SF), corneal height (CH) measured over a 10mm chord and also maximum measurable diameter. These were measured in the horizontal (h), vertical (v), steepest and flattest meridians – see Fig. 1.

Results

BEST FITTING BASE CURVE

- With each lens type, the steeper BC provided the best fit on the greatest proportion of eyes (Fig. 2).
- For each lens type, there was no significant difference in mean K-reading between those eyes best fit with the steeper BC and those eyes best fit with the flatter BC (e.g. see Fig 3).

LENS FIT CORRELATIONS

- All three lens types showed significant positive correlations between lens centration and both vertical and horizontal CH (maximum) - greater decentration was associated with greater CH (Figs. 4a-c).
- With A2, there were also some negative correlations between centration and some of the SF measurements. Greater decentration was associated with lower corneal asphericity.
- No correlations were noted between corneal topography and tightness on push-up or post-blink movement.
- The assessment of overall fit correlated with CH, and SF - better lens fit was associated with greater CHh and lower corneal asphericity, i.e. greater SFv & SFh (e.g. Fig. 5).

Conclusions

The best-fit base curve is not predicted by keratometry. The most consistent correlation between lens fit and corneal topography is that between centration and corneal sagittal height.

References


Acknowledgements & address for correspondence

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