Selecting the best fitting hybrid lens based on Profilometry and an automated fitting algorithm

Ilse Flux, MSc Clinical Ophthalmology and Vision Research; Kyriakos Telamitsi, BSc (Optometry); Cian Gildea, BSc (Hons) Optom, FAOI

Introduction

Hybrid lenses are commonly used in specialty lens practices around the globe. They consist of a RGP centre (130 Dk) and Silicone Hydrogel skirt (80 Dk). Hybrid lenses have been proven as a combination of rigid lens vision and flexible lens comfort. It has been researched that they achieve better best corrected visual acuity (BCVA) when compared to spectacles (Moschos *et al.*, 2017).

Finding the final good fit for hybrid lens can take some time and can be quite frustrating even for the more experienced fitters.

Several factors should be taken in account for successful hybrid lens fitting.

- Provide good visual acuity
- Adequate lens movement
- Lens should be centred on the eye
- Adequate lens comfort and wearing time
- No increase in corneal staining

Profilometry can help to select the best fitting lens. An automated fitting algorithm was developed together with the Eye Surface Profiler (ESP) of Eaglet-Eye, The Netherlands. This algorithm was based on selecting the correct vault or BCR of the RGP zone of the lens and was created to help assist in selecting the optimal lens.

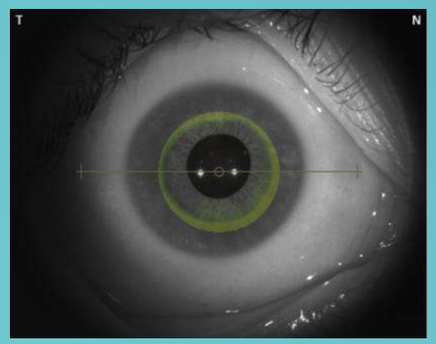


Image 1: Fluo-simulation of RGP centre on eye

Since manufacturers were unable to give us information on the soft skirt part of the hybrid lenses the algorithm only takes the RGP centre of the lens in account. The main advantages of using the ESP is gathering data of the ocular surface up to 20mm, and gather sagittal height information

Methods

11 measured eyes were retrospectively fitted with the automated fitting algorithm and compared with the final lens. 3 types of hybrid lenses were used in this research: UltraHealth (UH), UltraHealth FC (UH FC) and the Duette. All manufactured by Synergeyes, Carlsbad CA, USA.

The algorithm uses the ocular sagittal height (SAG) and matches the (SAG) of the RGP lens in steps of 50 micron. The guidelines advised by the manufacturer were used to calculate the SAG of the lens and suggest the best fitting lens.

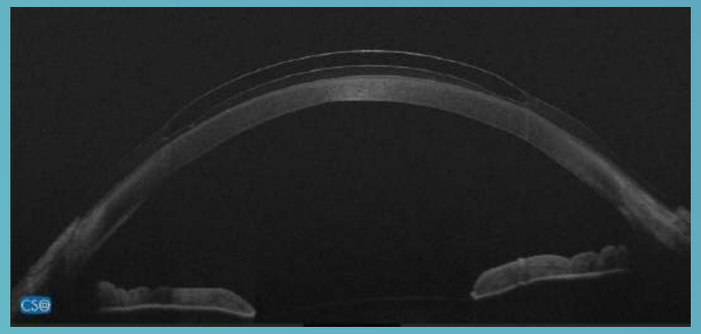


Image 2: OCT image of best fitting hybrid lens on eye.

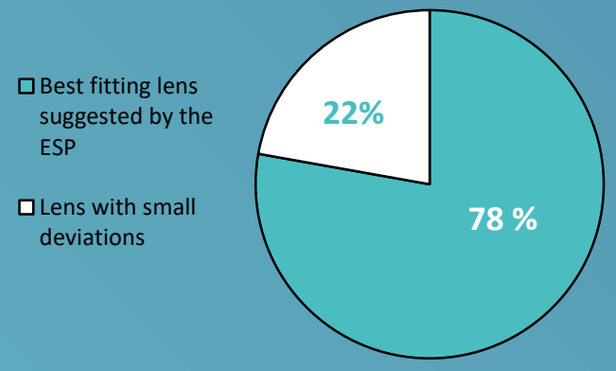
Results

Out of the 11 lens orders, 9 orders were included into the research. 2 measurements were excluded from research due to incomplete data.

From the 9 measurements 7 suggestions were the best fitting lens, 1 suggestion was 50 microns apart, and 1 lens had a deviation off 0.10 BCR. Which would indicate that in 77.8% percent of the time the best fitting lens is suggested by the ESP algorithm (Graphic 1).

It was noticed that a better quality of the measurement resulted in a better prediction off the algorithm. In addition, it is important to mention that there are a variety of reasons for a practitioner to fit a higher or lower clearance. For example, disease, irregularity, wearing time or dry eyes.

Graphic 1: Percentage of best fitting lens suggested by the ESP



Conclusion

Predicting the perfect fit based on sagittal height information provided with the ESP can assist the practitioner in the fitting process of fitting hybrid lenses. In combination with an automated algorithm we can reduce the number of refits and speed up the fitting process.

References:

Moschos, M. M. *et al.* (2017) 'Contact Lenses for Keratoconus-Current Practice', *The Open Ophthalmology Journal*, 11(Suppl-1, M8), pp. 241–251. doi: 10.2174/1874364101711010241.

Contact and disclosure
Eaglet-Eye, The Netherlands
Email: ilse.Flux@eaglet-eye.com

Ilse Flux employee of Eaglet-Eye, The Netherlands
Kyriakos Telamitsi Head Officer and optometrist at Kyranto, Optical Centre ltd, Cyprus
Cian Gildea Optometrist at Wellington Eye Clinic, Ireland