Selecting the best fitting MicroVault based on Profilometry

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Introduction

Scleral lesions can cause complications when fitting scleral lenses, such as impingement, or decentration of the lens. For most practitioners a scleral abnormality such as a pinguecula or a pterygium can be a contraindication for fitting scleral lenses. A solution to by-pass these obstacles is creating a notch or vault into the scleral lens surface. It can be difficult to determine the right location, height and size of the vault that needs to be created for the lens to fit comfortably. This can lead to many refits and an increase in chair time.

To define the right MicroVault prescription we need information on 4 parameters:

- **Axis**: The Optical axis location of the center of the MicroVault relative to the center of Zenlens, presumably close to 0 or 180 depending on which eye is being fit and whether the MicroVault is to be nasal or temporal. May depend on the axis and orientation of the toric scleral lenses
- **Decentration**: Distance from the center of Zenlens to the center of the MicroVault. If you want the maximum clearance point of MicroVault to be right at the lens edge, this will be half the lens diameter, i.e., decentration of 8 mm on a 15 mm Zenlens or 8.5 on a 17 mm lens.
- **Width**: Equal to the width of the MicroVault.
- **Depth**: The Sagittal Depth of the MicroVault how high the apex of the vault is above the ocular surface (up to 500 micron).

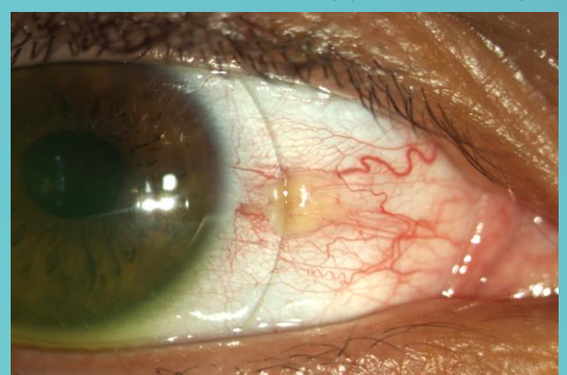

Image 1: MicroVault bypassing a pinguecula

Corneo-scleral sagittal height profiling can help estimating the location, height and size of the vault. With the help of Profilometry as done by the Eye Surface Profiler (ESP), Eaglet-Eye, The Netherlands (Image 2). We can accurately determine the parameters needed to order a Vault and reduce the number of adjustments it takes to order the best fitting lens. This study aims investigate the number of refits necessary when ordering MicroVaults based on sagittal height data.

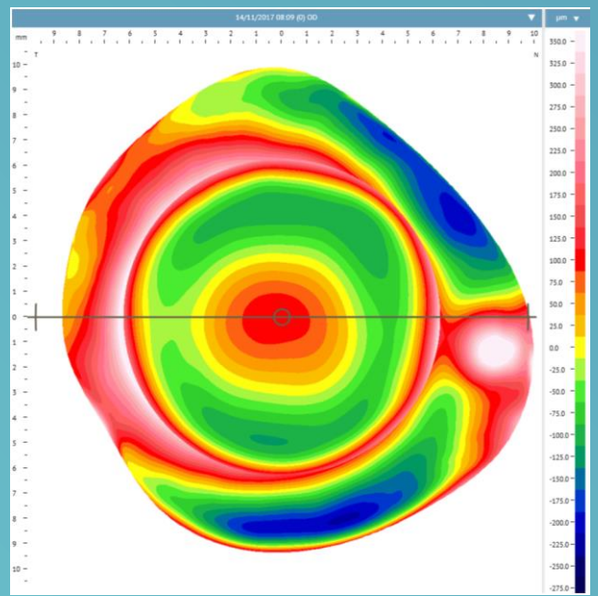

Image 2: Bisphere elevation map

Methods

6 measured eyes indicated with scleral abnormalities were fitted with a Zenlens, Bausch & Lomb, USA including a MicroVault to bypass these scleral irregularities.

Measurements were taken by the practitioner and lenses were ordered, after ordering the final lens it was analysed how many re-orders there were necessary and which parameter was most difficult to decided. The Axis was excluded due to the difficult ability of predicting of the rotation off the lens without being able to see it on eye.

Results

6 measurements were included in the research. The orders were analysed and the number of re-fittings that needed to be made before having the best fitting lens were noted. Differences of > 50 microns were qualified as a significant difference and reason to re-order. Moreover, deviations of more than 0.5mm were marked as a significant difference.

Table 1: Number of refits

Parameter / Patient	I	II	III	IV	V	VI
Width	1	0	1	1	0	0
Location	0	0	0	0	0	0
Depth	0	0	1	0	0	0

As table 1 describes most re-orders were made based on width of the pinguecula, this can be due to misreading the maps or misalignment when taking a measurement. 1 adjustment has been made on the depth of the MicroVault this could be due to under/over-estimating the softness of the tissue and therefore the lens settling.

Of the 5 patients (6 eyes) 3 needed a re-order and 3 were fitted with the best fitting lens on the first order. Please keep in mind that there are a variety of reasons for a practitioner to change the location, width, depth or axis of the MicroVault to ensure the best fitting lens.

Conclusion

Ordering a MicroVault based on height information can assist the practitioner in ordering the best fitting MicroVault. This will likely reduce the number of refits and consequently the total time spent per patient.

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