

Higher vaulting means worse? UNIVERSIDAD DE Diego López-Alcón BSc MSc^{1,2,3} Carmen Fernández BSc¹ Norberto López-Gil PHd^{1,2} 1.) Faculty of Optics and Optometry. University of Murcia, Spain 2.) CiViUM (Vision Science Group, University of Murcia) 3.) www.lentesesclerales.com

The beginning...

Scleral lenses are used in most cases to compensate optical aberrations caused by corneal irregularities¹. Although its use in regular corneas is becoming more and more widespread¹. Especially for dry eye treatment² and in cases of elevated astigmatism. A scleral lens corrects optical aberrations³ but also induces other aberrations⁴.

There are currently criteria for establishing the minimum separation (vault) between the posterior surface of the scleral lens and the corneal epithelium⁵. But the final vault can be variable according to the specialist's criteria.

The question is...

How does the vault and scleral lens induced optical aberrations influence the optical quality of our patients?

The purpose of this study is to assess the variation in optical quality in healthy eyes by increasing the sagitta of a scleral lens.

What we did...

Eleven spherical scleral lenses of diameter 16.50 were adapted with sagittas between 3900 um and 4900 um in 10 healthy eyes of 10 young patients (23.5 y. ±2.5) Aberrometry was performed (Visionix vx120) for a pupil of 5 mm on each of the lenses after thirty minutes of use. Finally, a regression analysis was performed between the sagitta of the lens and the third and fourth order optical aberrations as well as the second order spherical aberration.



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As we can see in all figures (except in figure 9) there is no relationship between the increase of sagitta of the scleral lens and the change in the optical aberrations studied. However, figure 9 shows an increase in primary spherical aberration with increased sagitta. That change could affect the vision^{6.} This can be explained by the change in spherical aberration caused by the increase in curvature. The main parameter for controlling the vaulting of the scleral lens over the cornea is the base radius of the optical zone. To increase the sagitta of the lens, the curvature of the optical zone is increased. It is therefore advisable to keep the vault at the lowest possible value for purely optical reasons.

By increasing the sagitta of the scleral lens used in this study the spherical aberration increases significantly (p 0.05), the other aberrations do not change significantly. So, in general, we advice not to fit scleral lenses with too much vaulting.

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Discussing the result...

Finally...

The references...