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August 2016

Orthokeratology & Astigmatism

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Introduction

Using orthokeratology to correct astigmatism often results in an insufficient visual outcome due to poor centration of the treatment zone ([Maseedupally et al](#), Optometry & Vision Science, May 2016) or to insufficient correction of the astigmatism. A toric reverse geometry design (developed in 2004 by Falco, Switzerland) provides full correction in astigmatic eyes from 1D up to 7D of astigmatic power (Baertschi et al, GOS Chicago 2005). In this case report, we will discuss orthokeratology as a possible treatment in a case with 3.1D of corneal astigmatism.

Case Report

A 22-year-old female complained of dry eye syndrome and fluctuating visual acuity with her current hydrogel contact lenses. Subjective refraction OD was S-4.25 =C -3.75 axis 8° VAcc 1.25. Corneal topography (Oculus) showed a typical astigmatism rectus pattern with -3.1D of astigmatism (Figure 1).

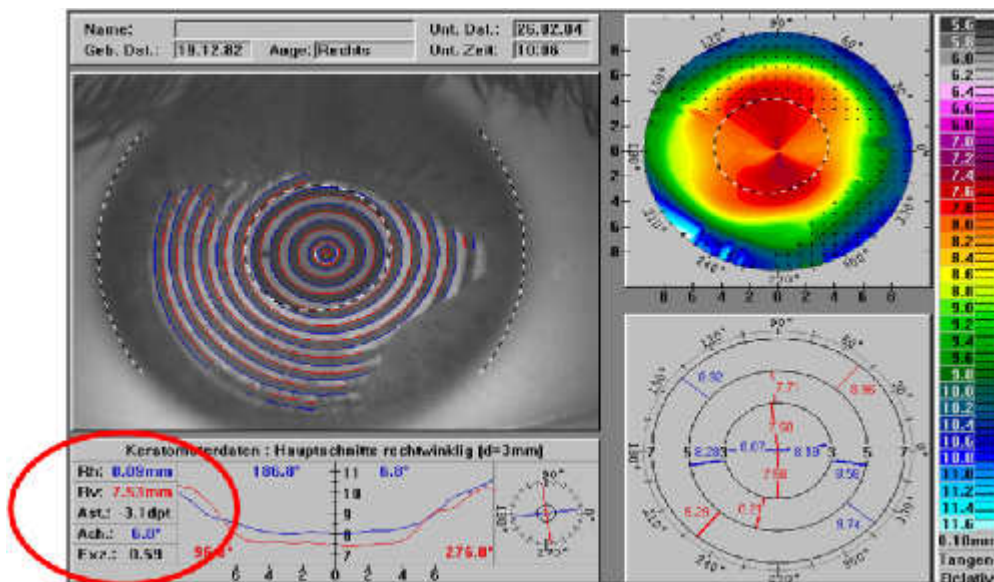


Figure 1: Corneal topography map showing -3.1D of astigmatism

After discussing all of the various treatment options, we decided to attempt overnight orthokeratology. The first orthokeratology trial lens had a standard reverse geometry design, which resulted in an unstable fit and a toric fluorescein pattern with a flat periphery along the vertical meridian. More importantly, the reverse zone was not landing appropriately in the vertical meridian (Figure 2).

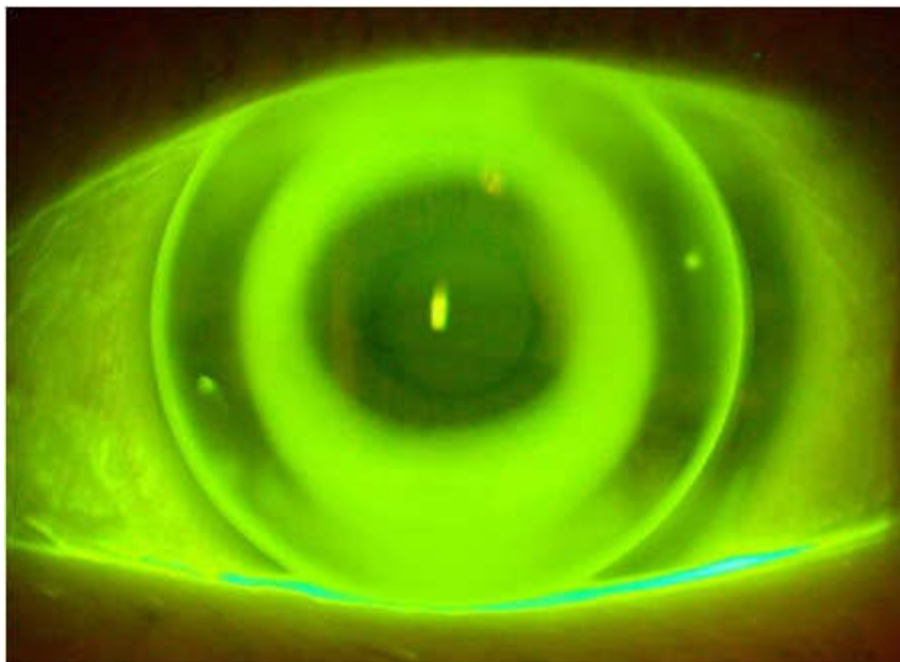


Figure 2: Fluorescein pattern with standard lens design

As a consequence, this contact lens will decenter during the treatment period, and the astigmatism will likely not be corrected fully. To achieve better contact lens centration, the design needs to be toric in the landing zone. Additionally, to achieve full astigmatic correction, the reverse zone needs to be toric as well (Figure 3).

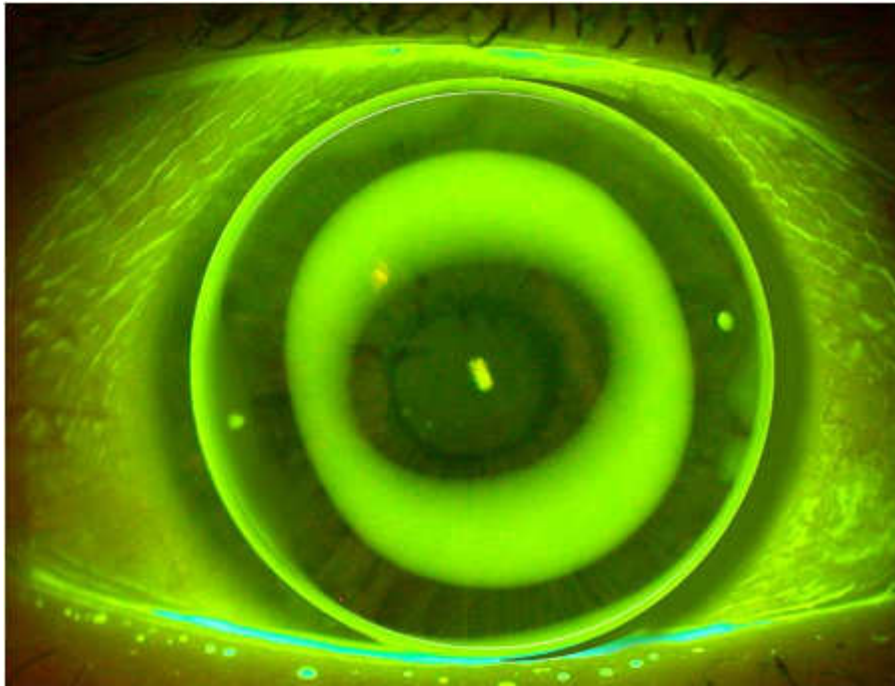


Figure 3: Fluorescein pattern with toric lens design

After 2 months of treatment with this lens, the astigmatism could be corrected with a final VAcc of 1.0 and subjective refraction of S plano =C -0.50 axis 8°. The topography showed a bulls-eye image and a nicely centered treatment zone (Figure 4).

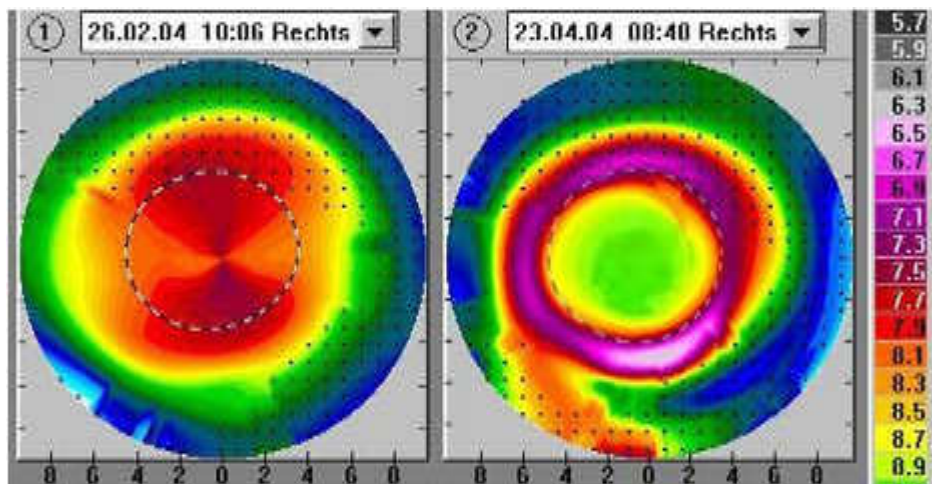


Figure 4: Topography after orthokeratology treatment

Closing Remarks

Overnight orthokeratology with a toric reverse geometry design is an excellent alternative treatment for astigmatic eyes and should be more often considered as a valuable treatment option when fitting overnight corneal reshaping lenses. Additionally, myopia control with full correction of high astigmatism could provide a huge step forward for young patients suffering from both astigmatism and progressing myopia.



Michael Baertschi

Michael Baertschi was the senior optometrist at the University Eyehospital Basel from 2000 to 2007. He is the owner of Kontaktlinsenstudio Baertschi in Bern, Switzerland and the CEO of Eyeness AG in Bern. Michael graduated from Pennsylvania College of Optometry as MSc Optom. and from the University of Bern as Mmed in Education and he did his PhD in Biomedicine at Salus University in the USA. Michael is a fellow of the American Academy of Optometry and president of the Swiss Interlens group.



Michael Wyss

Michael Wyss graduated from Olten SHFA in Switzerland and did his MSc at the Hochschule Aalen Germany (in cooperation with New England College of Optometry and Pacific University, USA). Since 1999 he has worked in a private practice (kontaktlinsenstudio Baertschi in Bern, Switzerland) as Optometrist for specialty contact lens fitting. Additionally, he is an adjunct Faculty Member at the New England College of Optometry USA, Hochschule Aalen Germany, TVCI in Prague (Czech Republic) and FHNW Optometry in Olten Switzerland. Michael is a clinical investigator for several industry partners and has published or lectured on several topics in the contact lens field throughout the world. Michael is a Fellow of the American Academy of Optometry and serves as the vice chairman of the Admittance Committee for new Fellows outside the USA.

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