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Orthokeratology & the Importance of Topographic Difference Maps

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Introduction

Orthokeratology plays an increasingly greater role in the specialty contact lens practice. Topography is essential while fitting orthokeratology. However, the function of the different mapping opportunities is often unknown and underused. In this case report, we will highlight the importance of using difference mapping tools to ensure patients' optimal vision and to avoid pitfalls during the orthokeratology fitting procedure.

Case Report

A 32-year-old female Caucasian started wearing orthokeratology lenses 6 months ago. The patient complained of increasing vision problems OD, for distance and near, with her current orthokeratology lens. BCVA dropped from an initial 1.25 down to 0.80. No correctable residual astigmatism was found during subjective refraction. The fluorescein pattern showed

an adequate fit, without any abnormalities. Sagittal topography showed no abnormalities except for some toricity that corresponds with the initial 0.7D corneal astigmatism before treatment (Figure 1)

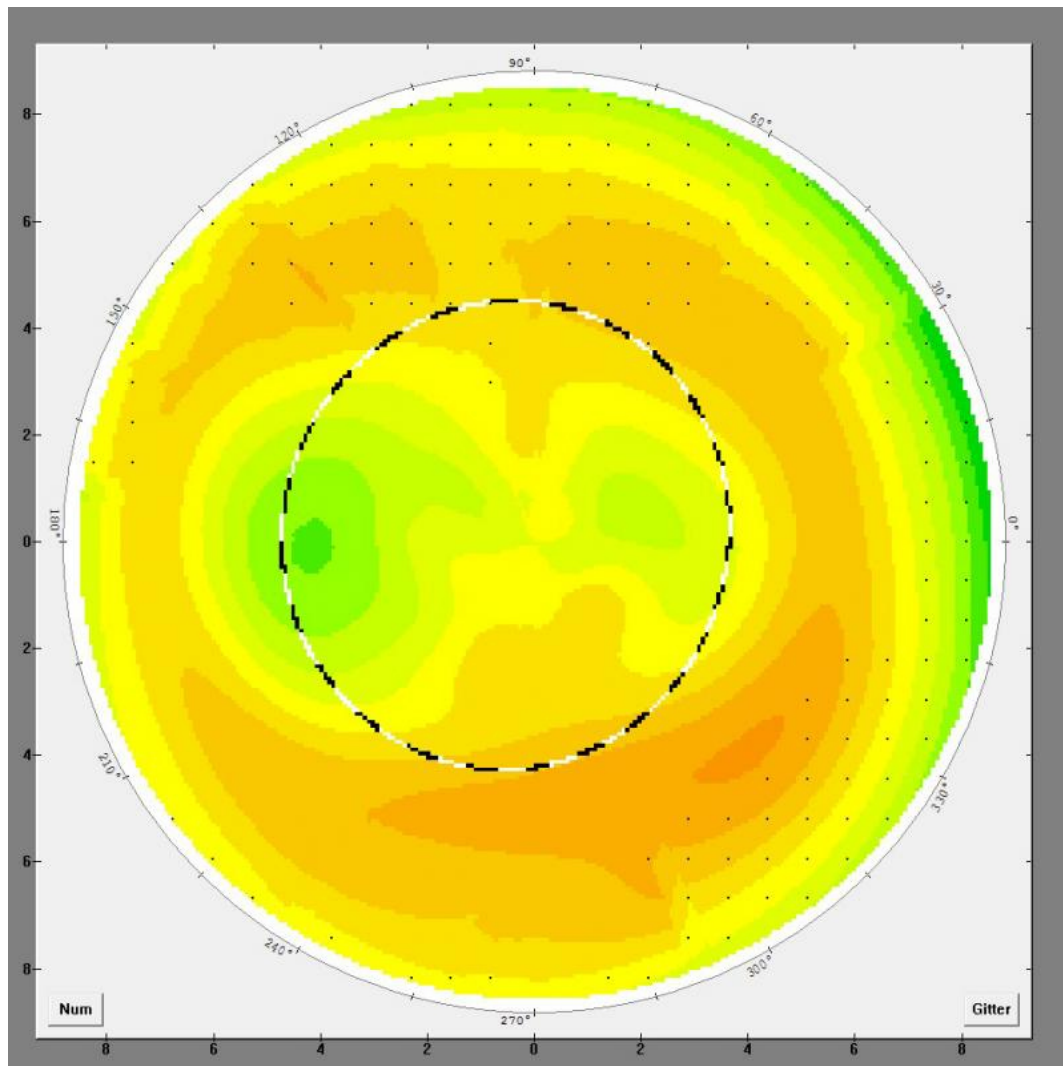


Figure 1: sagittal mapping

The toricity (0.8D) is more apparent in the tangential map, but these regular findings did not represent the cause of the drop in visual acuity. (Figure 2)

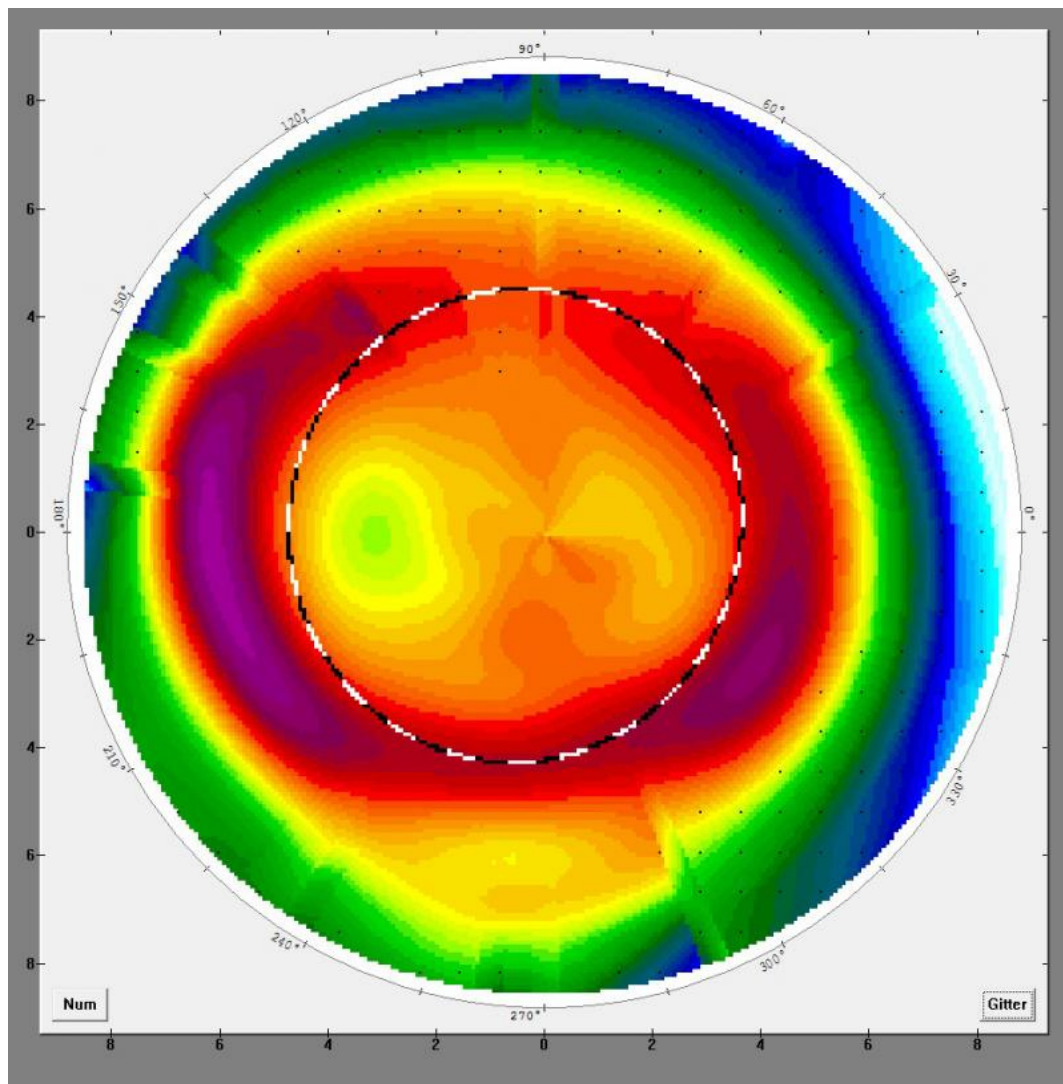


Figure 2: tangential mapping and toric treatment zone

If residual astigmatism had caused the visual problems, a toric over-refraction should have restored the visual acuity. Difference mapping offers the ability to compare the initial with the current topography measurement in a subtractive picture. When evaluating the difference map, the reason for the visual problems became obvious. A central island (red circle) was present, with a 0.91D power difference. This classic orthokeratology problem would have been overlooked by the above prescribed topography presenting methods. (Picture 3)

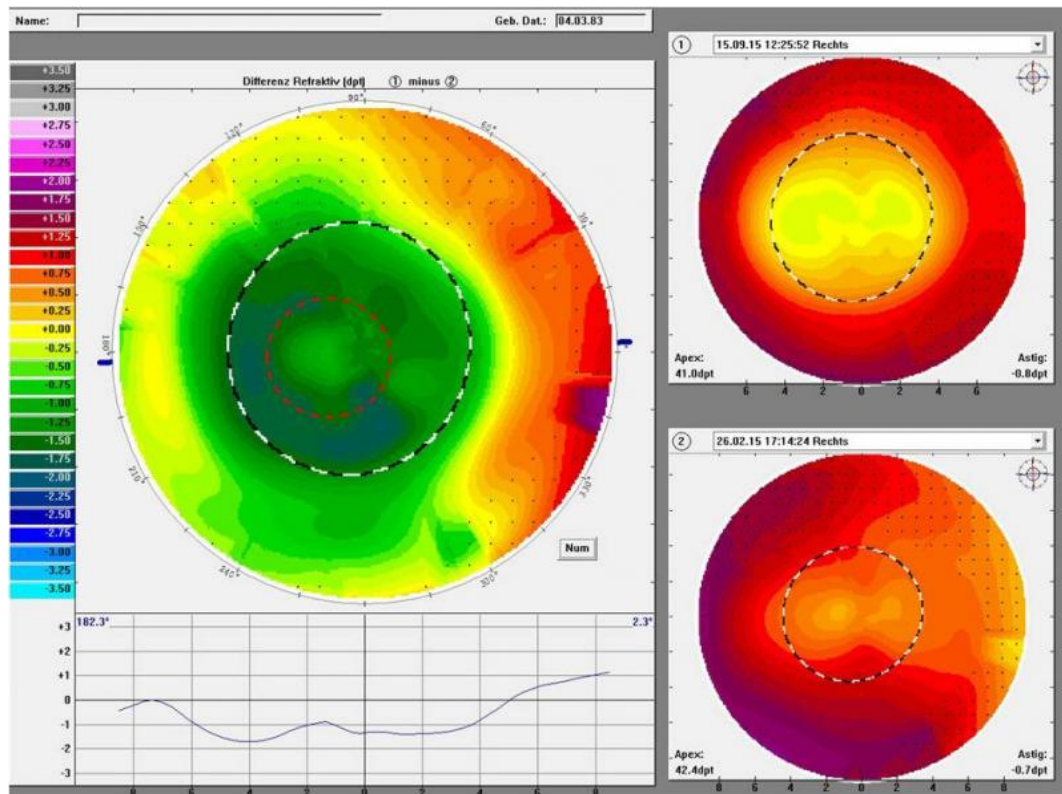


Figure 3: difference map presenting central island (red circle)

Knowing this, troubleshooting was easy: the landing zone was flattened, and the central island disappeared. As a result, visual acuity returned to the initial level.

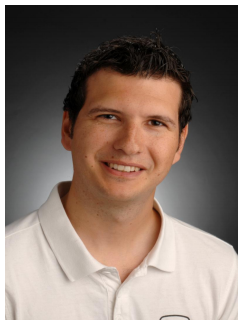
Discussion

Difference mapping should be performed as a standard evaluation during an orthokeratology fitting procedure to ensure patients' visual outcome and to avoid fitting pitfalls. Due to its subtractive calculation of baseline and current measurements, this represents a more adequate evaluation of the orthokeratology fitting compared to sagittal or tangential mapping alone. Additionally, because the software also provides the topography change in dioptric values, the residual ametropia can be estimated exactly and represents additional objective information for the subjective refraction.



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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