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(R)GP designs

Rotationally Symmetric vs. Peripheral Toric Lens Designs

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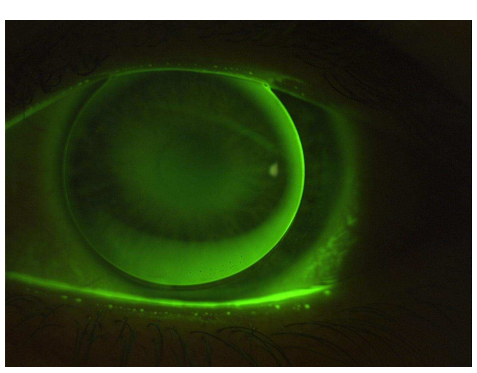
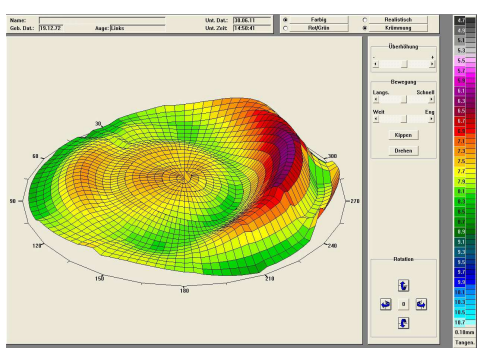
Introduction

Classical (R)GP fitting methods concentrate on central K readings only, but most corneas show a marked difference between the central and peripheral radii. This article demonstrates the aim and principles of fitting an (R)GP peripheral toric lens on an astigmatic eye. This fitting philosophy is also the key for successful usage of quadrant specific designs, which will be discussed in a future I-Site newsletter article.

Case report

Our patient, age 38, was wearing rotationally symmetric (R)GP lenses and complaining about discomfort. The classic fitting of her previous lenses resulted in a high-riding lens. The base curve of the lens had been chosen slightly steep to compensate for the toric edge lift in the vertical meridian (Picture 1, below left). Topography performed with the Oculus Topographer clearly confirmed that the high-riding lens evoked inferior steepening on the cornea (Picture 2, below right).





To achieve better comfort and centration, the lens needs to stabilize in the vertical meridian. Back toric lens designs have the disadvantage of inducing astigmatism in the opposite direction from the original corneal astigmatism, often leading to more complicated and expensive bitoric lenses. Peripheral toric lens designs consist of a spherical optic zone and a toric periphery, providing outstanding centration and crisp, clear vision.

In our case, the peripheral vertical meridian showed a K reading of about 7.50mm (Picture 3, to right). The lens needs to 'click' in that direction, and that is achieved using a base curve of 7.50mm with no flattening (e-value is zero) toward the periphery in this meridian. As a result of the 0.15mm steeper central K reading in the horizontal meridian, we have to compensate with a higher e-value. Measurements showed an e-value of about 0.50 (Picture 4, below) in the horizontal meridian. To achieve alignment in the horizontal meridian, the e-value needs to be about 0.60.

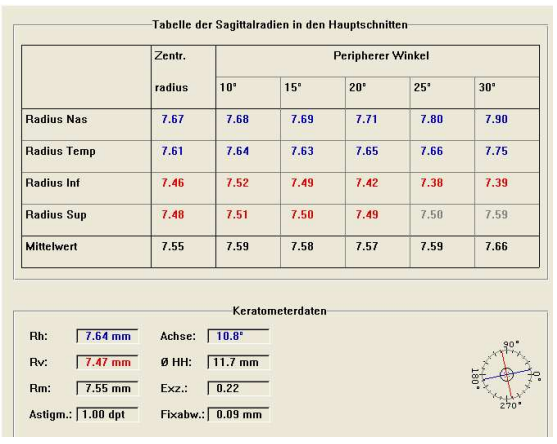


Tabelle der Sagittalradien in den Hauptschnitten

	Zentr.	Peripherer Winkel				
	radius	10°	15°	20°	25°	30°
Radius Nas	7.67	7.68	7.69	7.71	7.80	7.90
Radius Temp	7.61	7.64	7.63	7.65	7.66	7.75
Radius Inf	7.46	7.52	7.49	7.42	7.38	7.39
Radius Sup	7.48	7.51	7.50	7.49	7.50	7.59
Mittelwert	7.55	7.59	7.58	7.57	7.59	7.66

Keratometerdaten

Rh:	7.64 mm	Achse:	10.8°
Rv:	7.47 mm	Ø HH:	11.7 mm
Rm:	7.55 mm	Exz.:	0.22
Astigm.:	1.00 dpt	Fixabw.:	0.09 mm

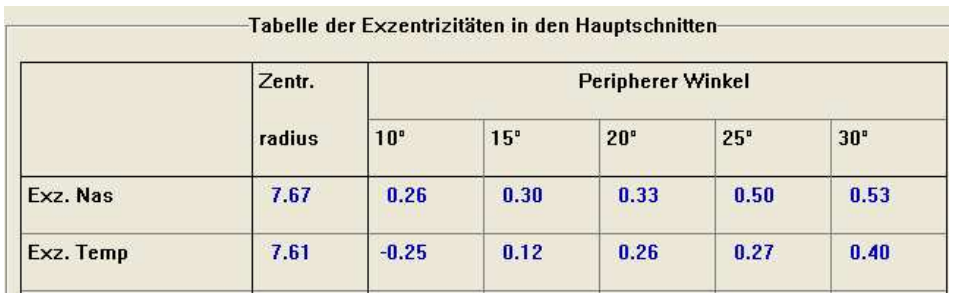
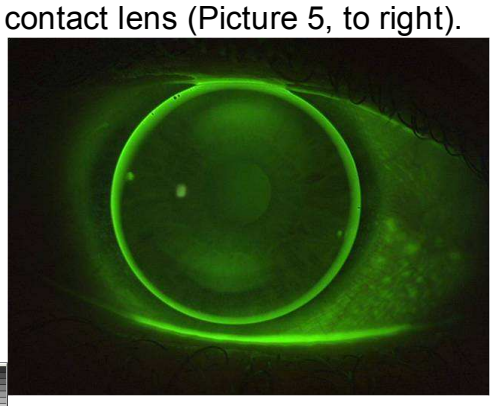


Tabelle der Exzentrizitäten in den Hauptschnitten

	Zentr.	Peripherer Winkel				
	radius	10°	15°	20°	25°	30°
Exz. Nas	7.67	0.26	0.30	0.33	0.50	0.53
Exz. Temp	7.61	-0.25	0.12	0.26	0.27	0.40

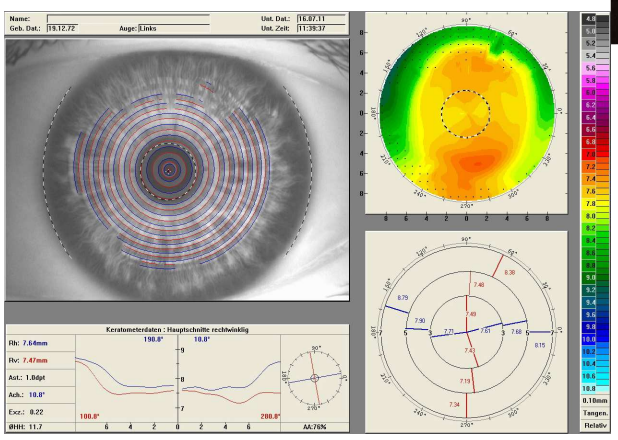
These calculations resulted in the following contact lens ordered through Falco Kontaktlinsen (Switzerland): FSA 06/00 (indicating the

e-value in both meridians), base curve 7.50mm with a diameter of 9.80mm, resulting in a perfectly centered contact lens (Picture 5, to right). The patient reports that this lens is much more comfortable to wear and actually provides better vision as well. The fluorescein pattern was typical with some pooling zones in the midperiphery of the steep meridian. The two ‘dots’ near the lens edge illustrate the flattest meridian. Important here is that the periphery shows perfect alignment, otherwise the lens has the freedom to rotate, which can cause spectacle blur. After removal of the lens in this case report, the cornea now demonstrates only minimal distortion due to contact lens wear (Picture 6).



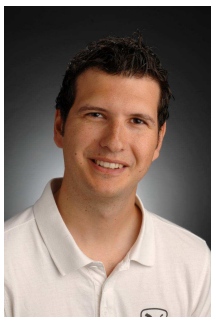
Discussion

Instead of a decentered and high-riding rotationally symmetric contact lens, causing discomfort and sometimes even 3- and 9-o'clock staining, peripheral toric (R)GP lenses can offer a better and more comfortable lens fit with longer wearing time for your patients. The most important fitting pearl is to concentrate first on the steep peripheral meridian rather than on the central K readings. This sounds almost like a violation of what we have learned about fitting (R)GPs, but this is the key for going further with quadrant specific or all larger diameter corneal lenses.



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 M.Sc. Optom. and from the University of Bern as M.med. Educ. Michael Baertschi is a fellow of the American Academy of Optometry and president of the Swiss Interlens group.



Michael Wyss

Michael 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 a Member of the Admittance Committee for new Fellows outside the USA.

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