


kontaktlinsenstudio
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Peripheral fitting Concept for (R)GP's

A Paradigma shift

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Financial Disclosure

- Clinical Investigator
 - Abbott
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 - Cooper
 - Falco Kontaktlinsen
 - Vistakon (Johnson&Johnson)
- Payed Consultant
 - Falco Kontaktlinsen Switzerland
 - Vistakon (Johnson&Johnson)

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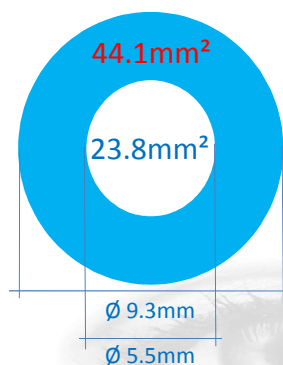
Current GP fitting Concepts

- Central K reading as starting point of classic GP design calculation
- Peripher alignment fit will achieved with multicurve or aspheric designs
 - e- value: flattening depending on difference between central K and K measurements in 30°

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New fitting Concept

- Centration / stabilisation of GP is provided by the biggest part of alignment surface between Cornea and GP
 - Periphery of GP provides much greater surface than the central part!!



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New fitting Concept

- Mean Goal is to achieve alignment fit in the corneal periphery
 - Improve initial comfort
 - Reduce 3-9 o' clock staining, due to reduced mechanical pressure
 - Improve centration (reduce high / low riding)
 - Improve Visual outcome

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New fitting Concept

- Peripheral fitting Strategies need new GP designs
 - Peripheral curves need to be manipulated independently from BC, in all four quadrants
 - Lead into bigger overall diameter
 - Need higher DK Materials
 - Frequent or planned replacement schedule

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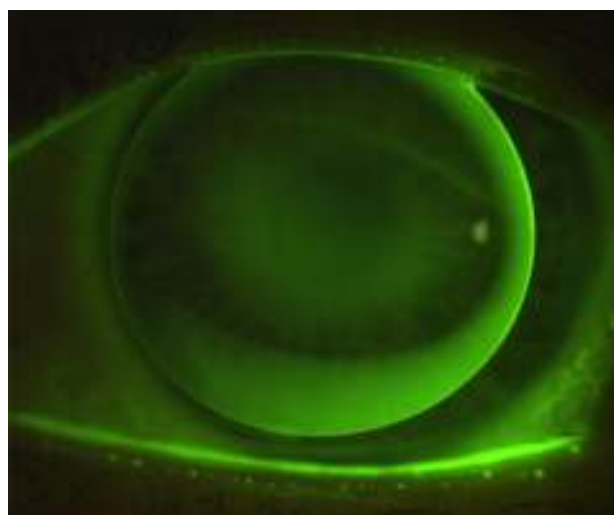
Regular Corneas

- Case Report, BT, age 38, caucasian female
 - aspheric rotation symmetric GP design
 - Diameter 9.30
- Subjective Feedback
 - comfort problems
 - often foreign body under lens
 - visual fluctuation

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Regular Corneas

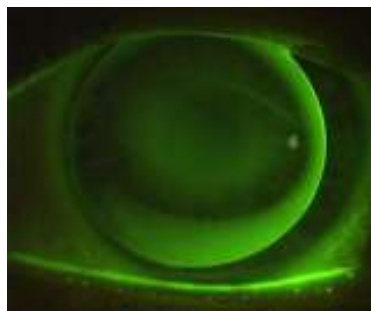


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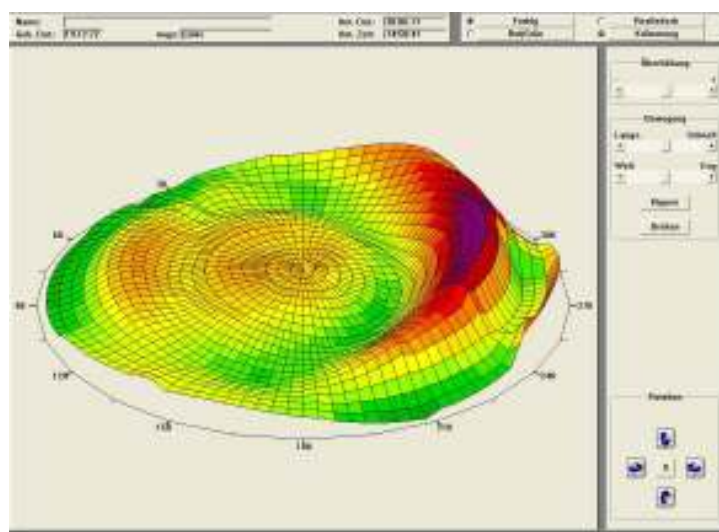
Regular Cornea

- Objective Results
 - Highride position and BC slight steep to camouflage the toric cornea
 - Inferior edge lift, lens rocks around the horizontal meridian



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Regular Cornea



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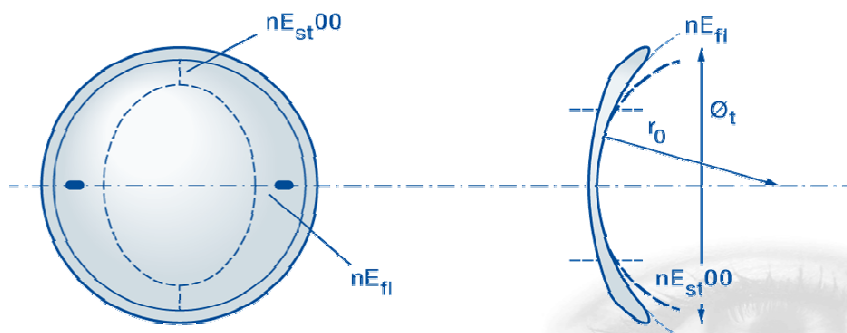
Regular Cornea

- Current contact lens options:
 - Back Toric Design
 - Smaller Diameter
- Drawback:
 - Back Toric Design will induce inverse astigmatism and often leads into more expensive BiToric design
 - Smaller Diameter can lead into comfort or loosening lens problems

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Peripher Toric Design

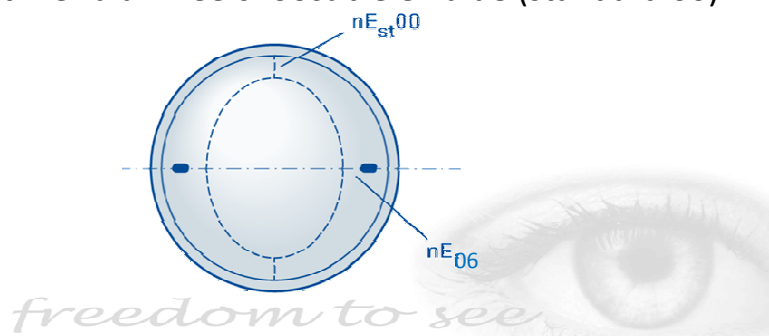
- Schema of a peripher toric design
 - Spherical optic zone vs toric periphery



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Peripher Toric Design

- Peripheral Toricity is achieved by different flattening (e-Value) in steep and flat meridian
 - Steep meridian with zero e-value (no flattening)
 - Flat meridian free choosable e-value (standard 06)



Fitting concept

- Starting point of fitting is the **steep peripheral meridian**
 - Goal is to allow the peripheral curve to click into the corneal curvature
 - If the fitting fails to reach alignment here, the lens will rotate and rock around flat meridian



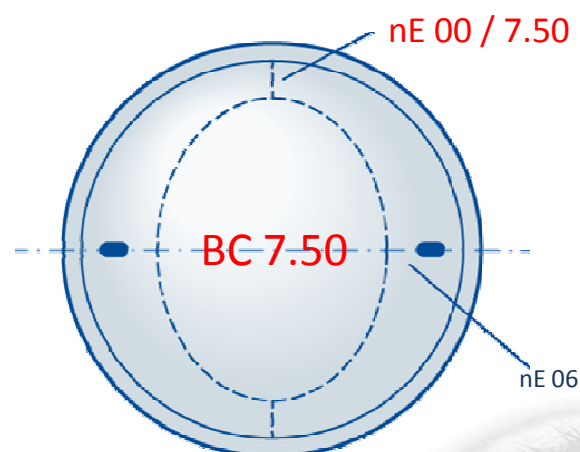
Fitting concept

- Steep peripheral meridian K: 7.50mm

	Zentr. radius	Peripherer Winkel				
		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

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Fitting concept



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Fitting concept

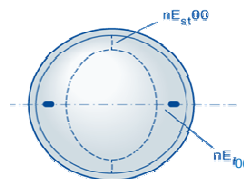
- Flat peripheral meridian K: 7.85mm

	Zentr. radius	Peripherer Winkel				
		10°	15°	20°	25°	30°
Radius Nas	7.67	7.68	7.69	7.71	7.80	7.90
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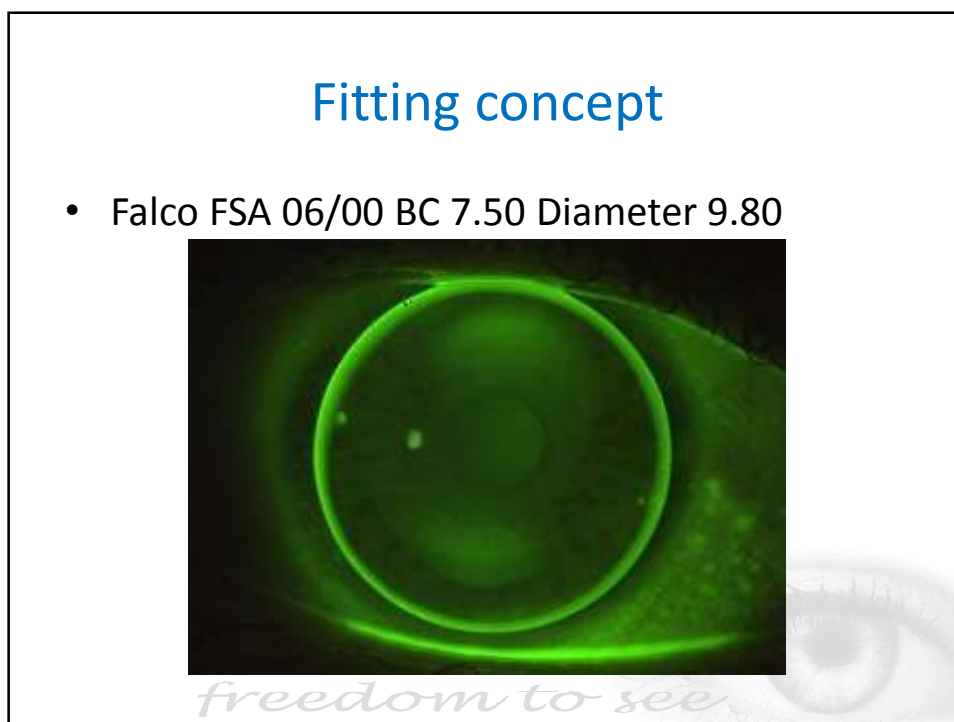
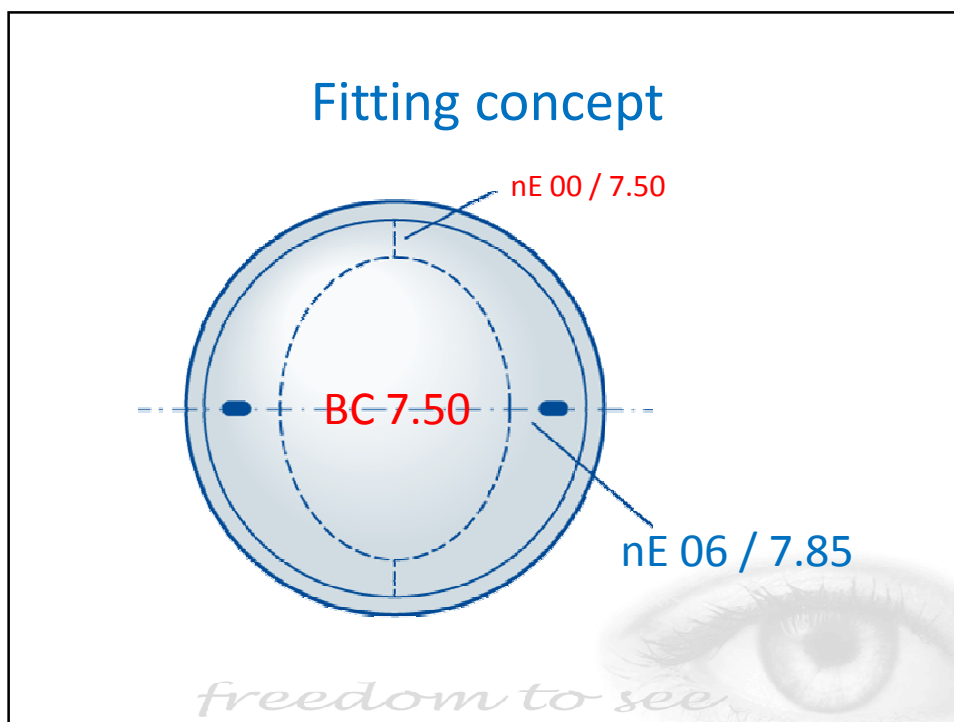
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Fitting concept

- Rule of thumb for nE calculation
 - BC of lens = 7.50mm
 - K reading peripheral meridian = 7.85mm
 - Radius difference between BC and periphery = 0.35mm
 - Square root of 0.35mm difference = nE 0.60

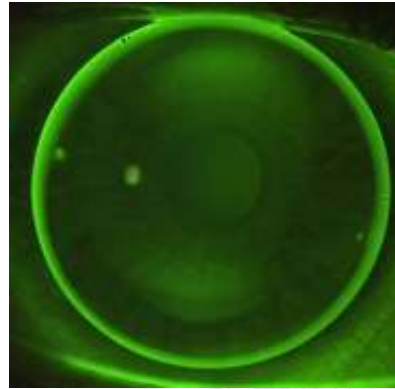


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Fitting concept

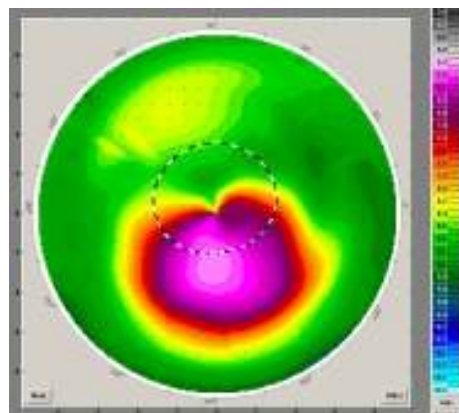
- Perfect centration
- Outstanding comfort
- Fluorescein pattern:
typical pooling in steep
mid-periphery and align-
ment fit in periphery
- Markings of flat meridian



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Irregular Cornea

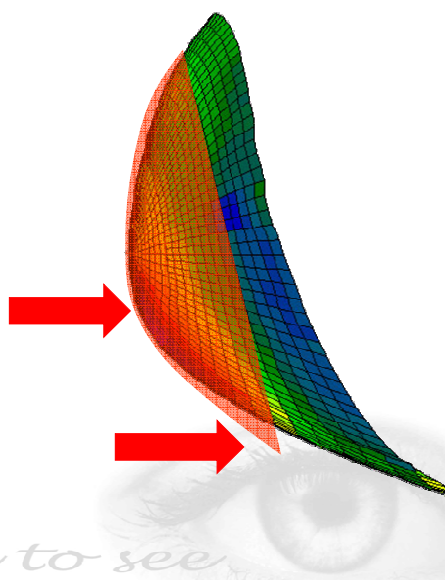
- Ectasia displaced (mostly inferior), but
periphery still
possible to fit
- Prevalence
 - All stages of
Keratoconus
 - mild or early PMD



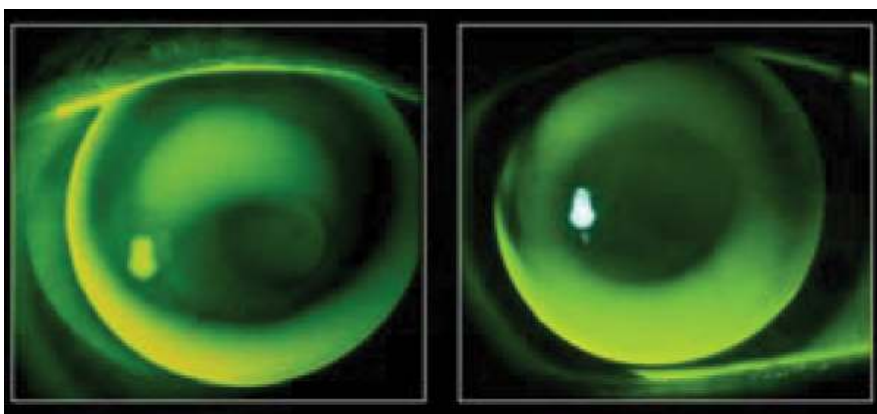
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Irregular Cornea: Classic GP Design

- Rotation symmetric Design
- Pay attention to apex touch and the edge lift in 270°



Irregular Cornea: Classic GP Design



courtesy of Pat Caroline

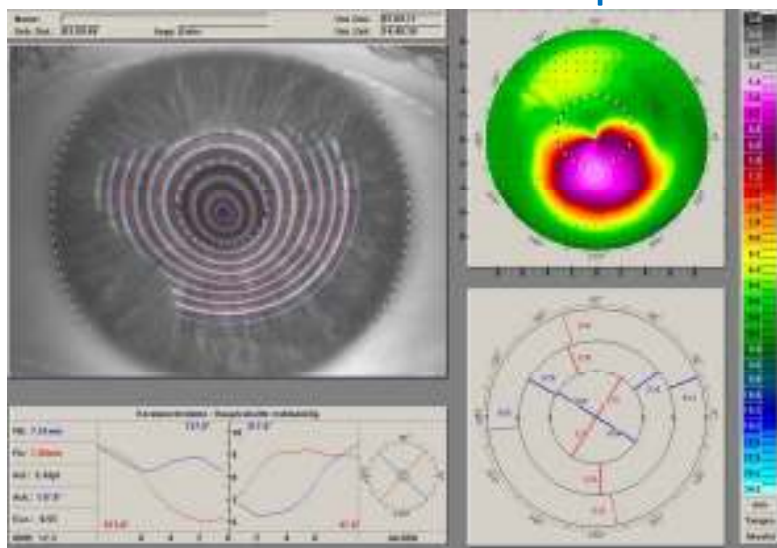
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Classic GP Design (Scarring)

- CLEK Study 1994 - 2002 (1'209 Px)
 - 32% of flat fitted Px by eight years vs. 14% steep fitted
- Korb et al, 1982 (7 Px)
 - 57% flat vs. 0% steep after 12 month
- Maguen et al, 1983
 - 25% flat by 3 years had “significant staining”

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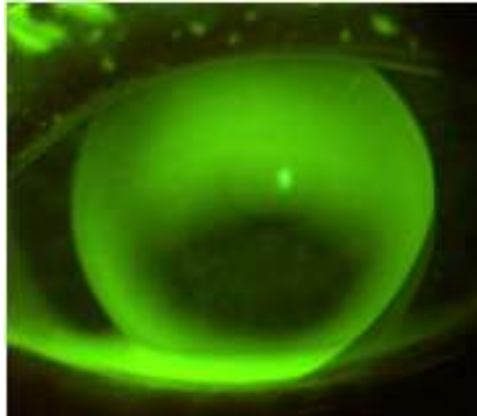
Keratoconus Case Report



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Keratoconus Case Report

- Case Report, CB, age 43, caucasian female
 - aspheric rotation symmetric GP design
 - Diameter 9.30

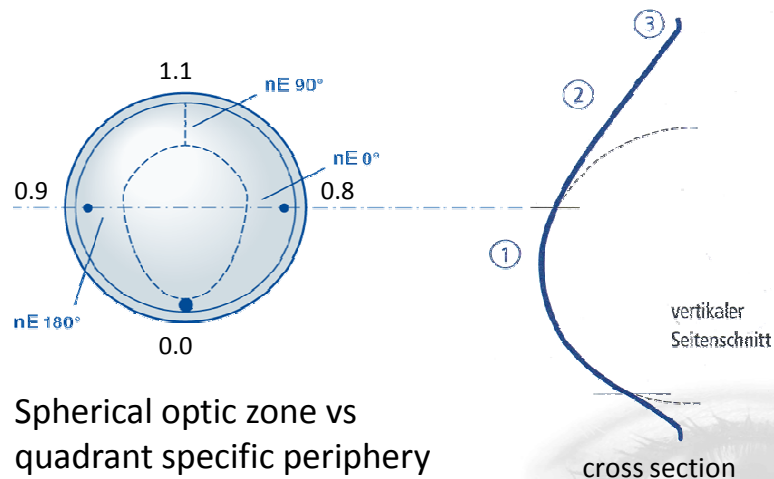


Quadrant-specific Design

- The idea is to fit the lens in every quadrant as good as possible to the origin cornea curvature
 - Reducing pressure on the Apex of the Ectasia
 - Fitting the periphery is more important, than central K readings
 - The contact lens will click-in the peripheral cornea curvature

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Quadrant-specific Design



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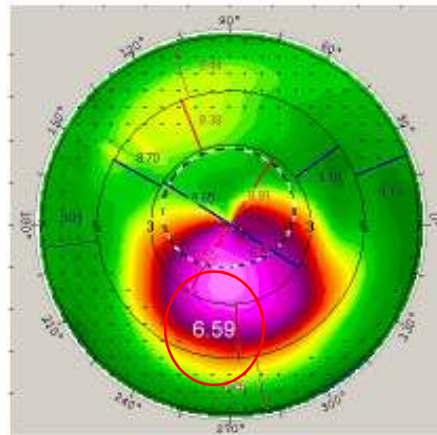
Fitting concept

- Starting point of fitting is the **steepest peripheral** meridian
 - Goal is to allow the peripheral curve to click into the corneal curvature
 - If the fitting fails to reach alignment here, the lens will rotate and rock around flat meridian
- Identical concept like the peripher toric design

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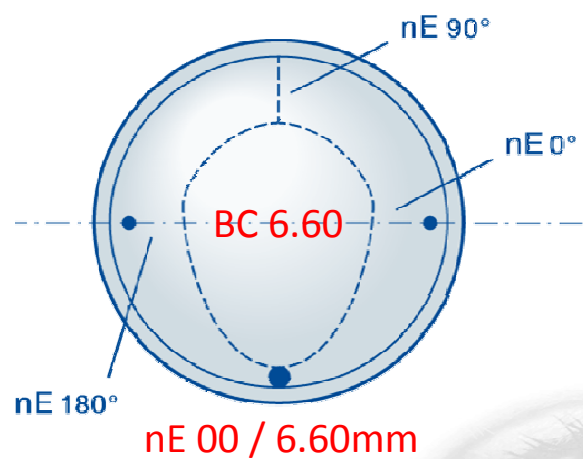
Fitting concept

- Steepest peripheral meridian K: 6.60mm



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Fitting concept

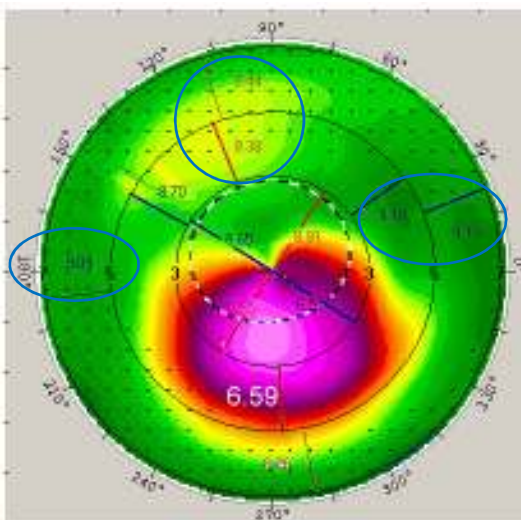


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Fitting concept

- K in each quadrant:

- 0° 9.10mm
- 180° 9.10mm
- 90° 8.40mm

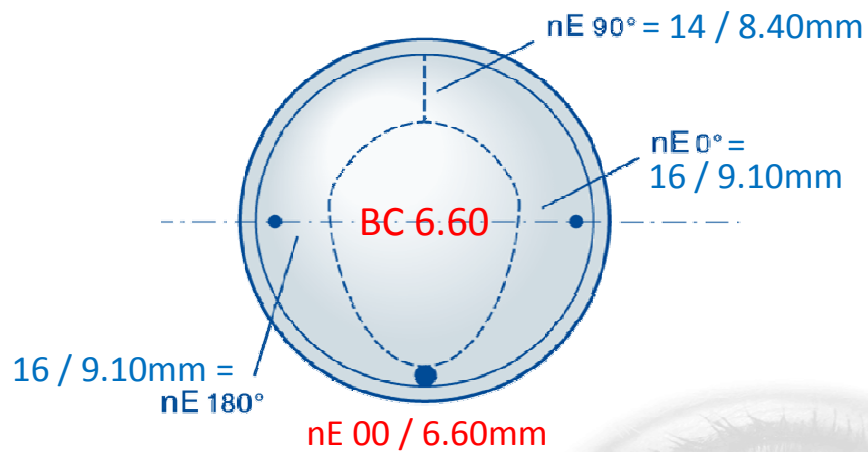


Fitting concept

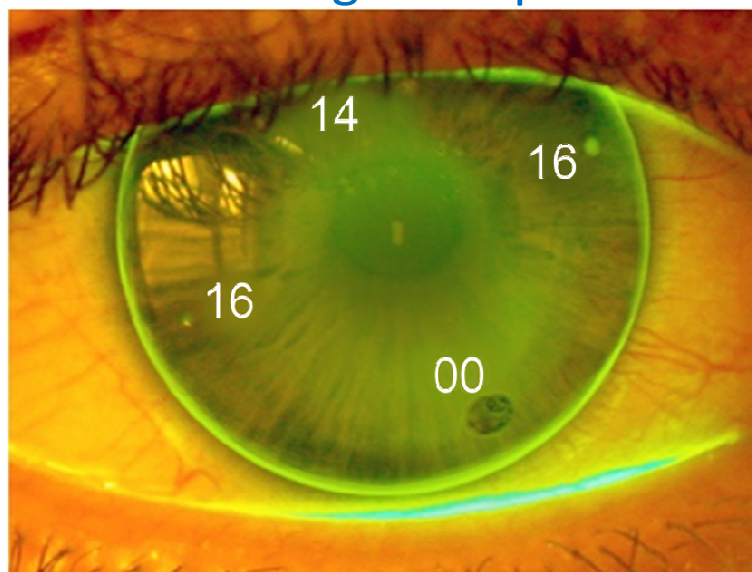
- Rule of thumb for nE calculation
 - 0° and 180° = Square root of 2.50mm difference = nE 1.60 (6.60mm vs 9.10mm)
 - 90° = Square root of 2.50mm difference = nE 1.40 (6.60mm vs 8.40mm)
- Falco FKQ 16/16/14/00 BC 6.60 Diameter 10.80

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Fitting concept

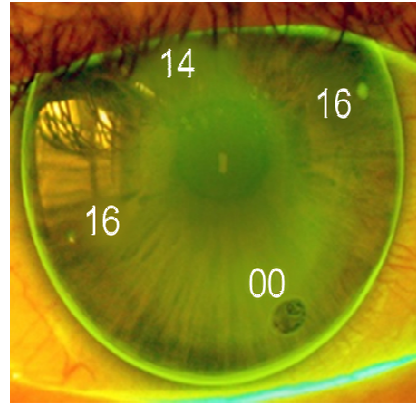


Fitting concept



Fitting concept

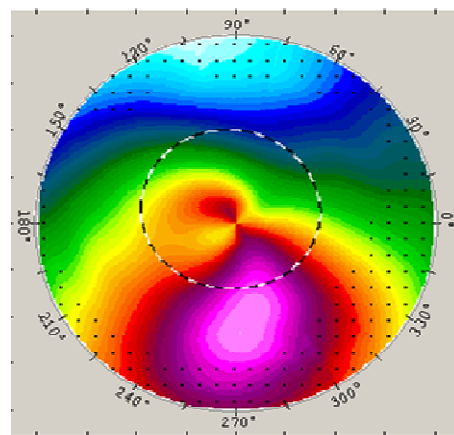
- Perfect centration
- Outstanding comfort
- Fluorescein pattern:
typical pooling in steep mid-periphery and alignment fit in periphery
- Markings of flat meridian and black coloured engraving in 270° leads Px during insertion



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Advanced Ectasia

- Ectasia extremely displaced, including the periphery
- Prevalence
 - Advanced stages Keratoconus
 - PMD



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Scleral Lenses

- Perfect centration
 - Vaulting entire Cornea and Limbus
 - The lens rests only at the Scleral Zone
- Simplified Fitting
 - Sclerals are fitted by Sagittal Depth rather than BC or K readings
- Outstanding Optic Results
 - Flatter BC and bigger Optical Zone Diameter

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Sclerals: Fitting Concept

- Topographie BC does not matter at all!!
- Sagittal Depth established by Trial lenses
 - Pentacam or OCT gives an idea which Sag will be useful
 - Anterior chamber evaluation gives an idea for Sag as well
- Cornea-Scleral profile works as an indicator for scleral zone

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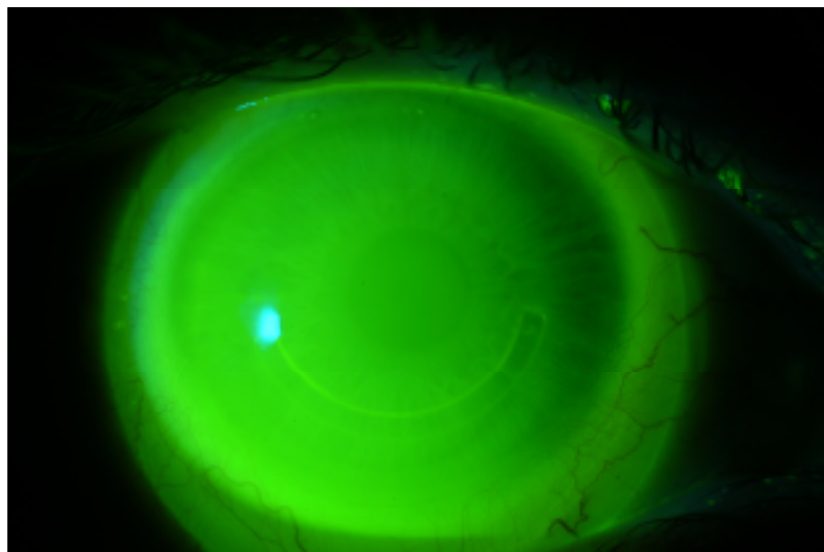
Sclerals: Fitting Concept

- Diameter (\emptyset_t)
 - maximal 17.00mm / Trials are 16.00mm
 - Till \emptyset 16.50 Sclera is more or less regular for fitting, if going bigger, the sclera shows different curves in each quadrant
- Limbal Region
 - Avoiding any Edema, by changing the Transition Zone between Optic - and Scleral Zone

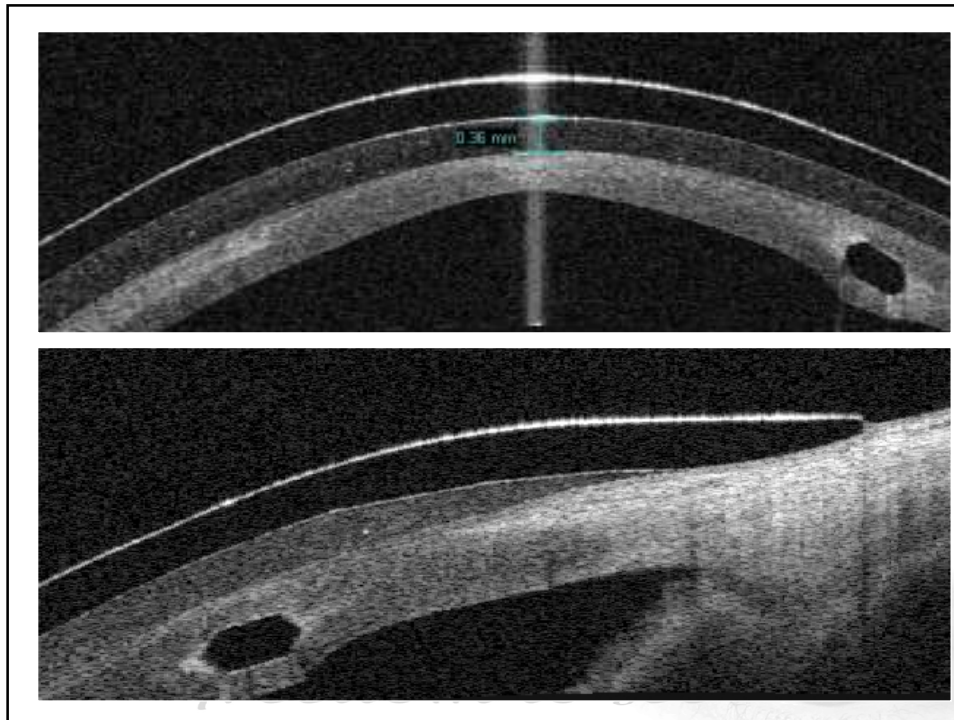
Study Pat Caroline, M.Sc. Kurs, Freiburg July 2010

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Sclerals: Fitting Concept

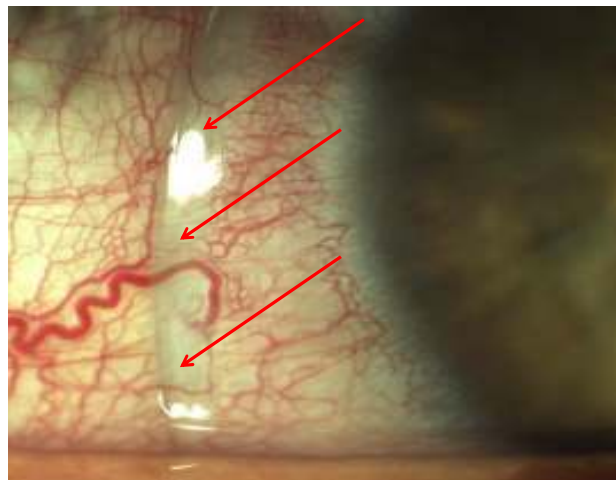


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Sclerals: Fitting Concept

- Blanching of conjunctival vessels



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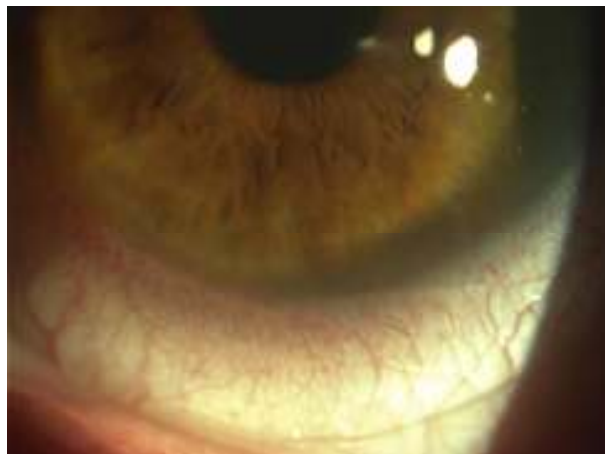
Sclerals: Fitting Concept



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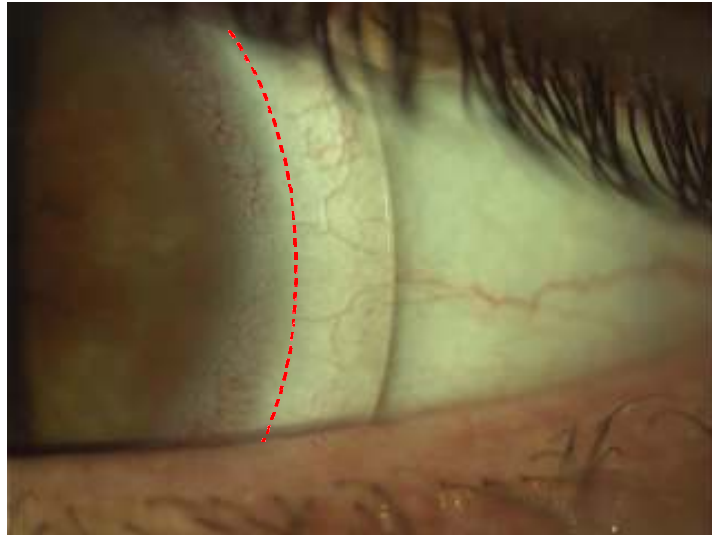
Sclerals: Fitting Concept

- Limbal Edema



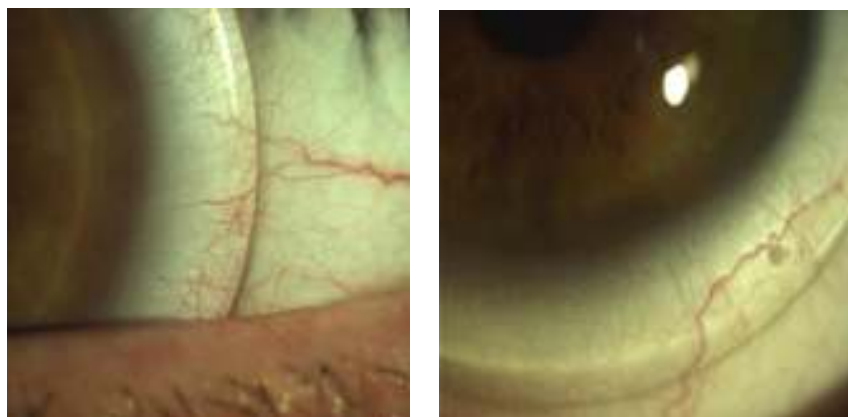
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Sclerals: Fitting Concept



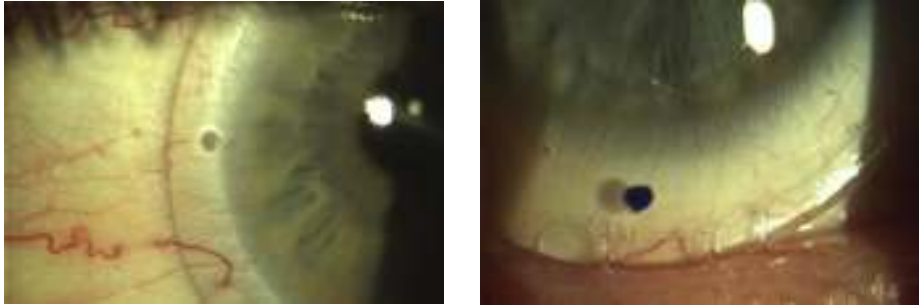
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Sclerals: Fitting Concept



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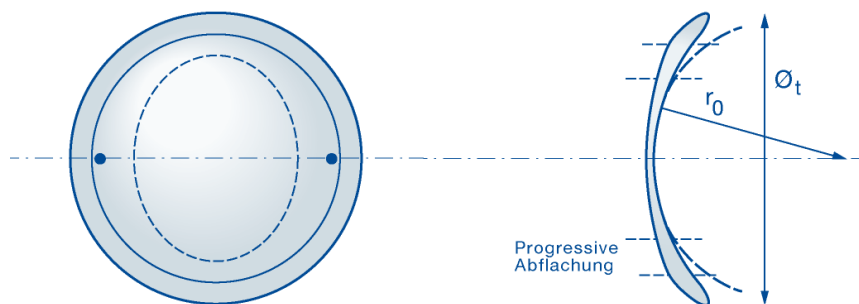
Sclerals: Peripher Toric



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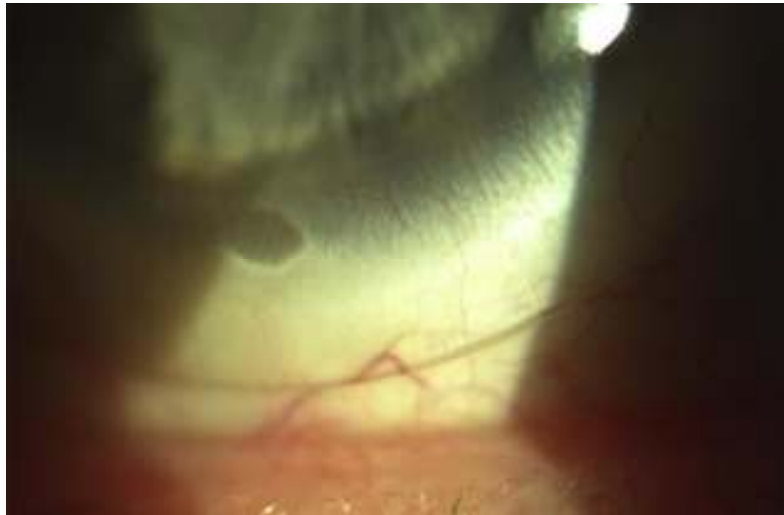
Sclerals: Peripher Toric

SKT, Falco Switzerland



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Sclerals: Peripher Toric



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Paradigma Shift

- Mean Goal is to achieve alignment fit in the corneal periphery
 - Improve initial comfort
 - Reduce 3-9 o' clock staining, due to reduced mechanical pressure
 - Improve centration (reduce high / low riding)
 - Improve Visual outcome

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