



Contact Lenses

Swiss Eye Week 2020

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eyeness AG



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wellness für ihre augen

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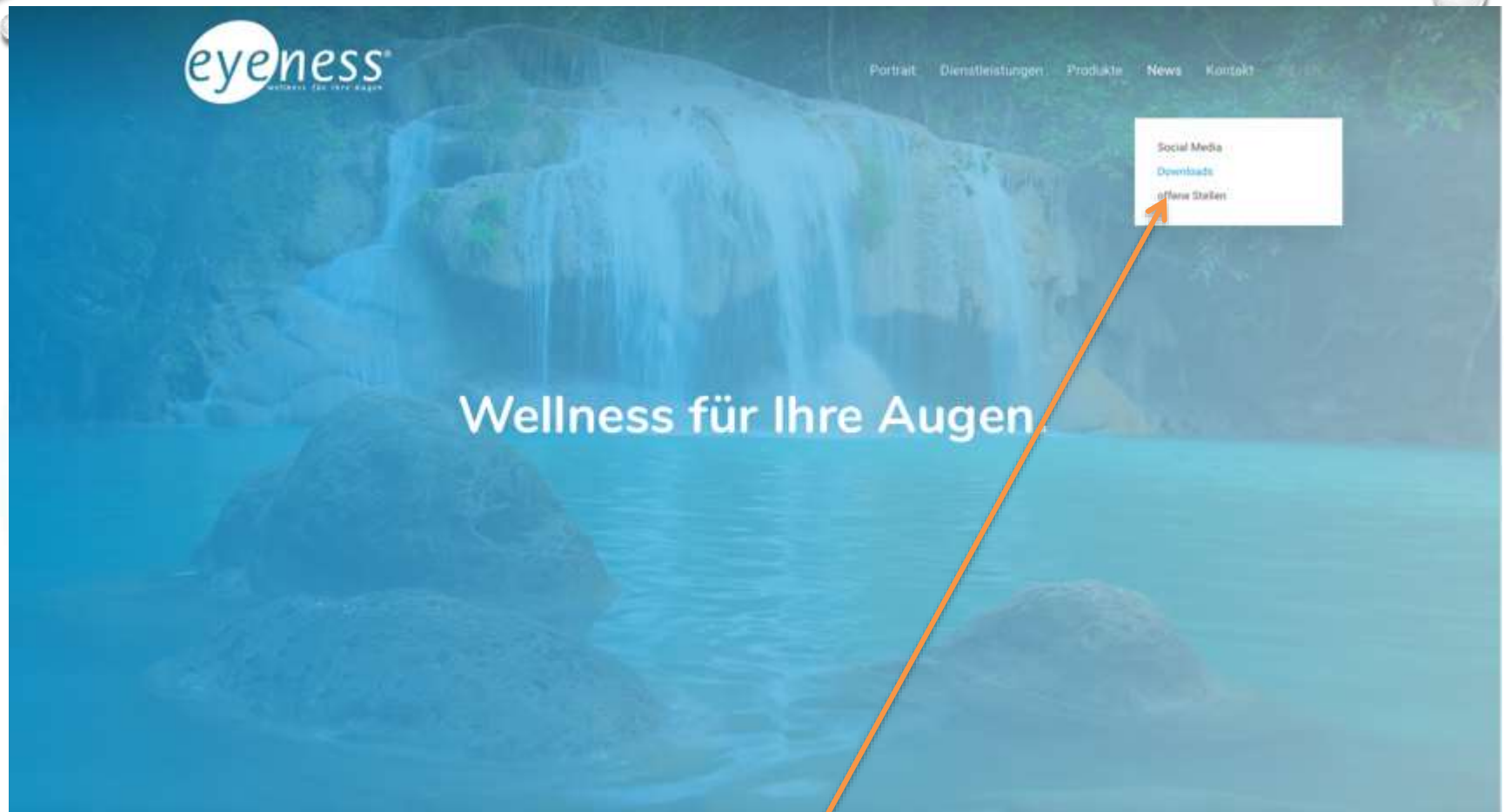


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Aleksandra Krstic

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www.eyeness.ch/downloads



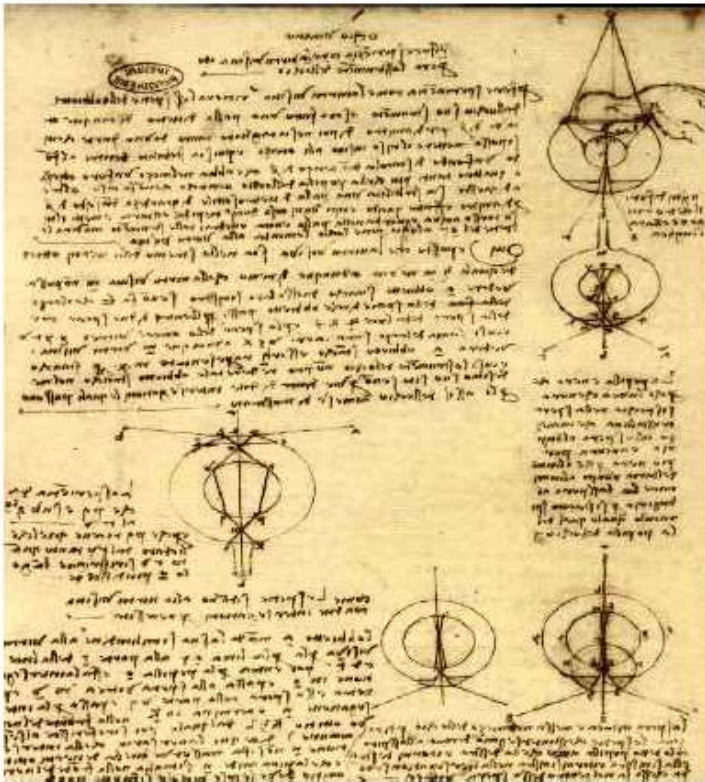
Disclosures

Studien für:	Consulting Mandate:
Abbott	Falco Kontaktlinsen
Alcon Vision Care	Haag Streit Diagnostics
Bausch&Lomb	RaayonNova
Contamac	Vistakon (Johnson&Johnson)
Cooper Vision	
Falco Kontaktlinsen	
Haag Streit Diagnostics	
Sensimed AG (Triggerfish)	
Tissot Medical Research	
Vistakon (Johnson&Johnson)	

Goals

- Understand the basics of contact lenses.
- Know their differentiations and frequency of CL wearers, understand the specific optics and physiology, distinguish wearing modalities, know the fields of applications and the fitting basics, discuss the importance of hygiene and lens care, differentiate complications and how to avoid them and take a look into novelties.
- Have Fun with Contacts !

History and Demography



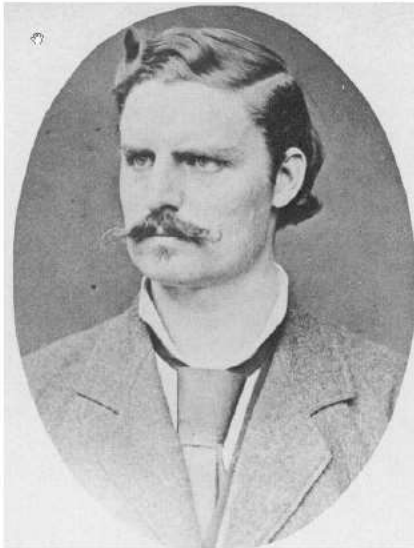
Leonardo da Vinci, 1508 and



Rene Descartes 1637

(Glass) Scleral Lenses / Shells

Adolf Gaston Eugen Fick



A. E. Fick (1852-1937).
Efron N, Pearson RM. Arch Ophthalmol. 1988
Oct;106(10):1370-7.

- First to publish 1888 *Archiv für Augenheilkunde*
- Fit rabbits, then himself, and finally volunteers
- Observations
 - Good for Keratoconus
 - Requires adaptation
 - Ocular signs
 - Lacrimation
 - Hyperemia
- *But....lenses were not powered*



Over All Diameter
OAD 20-24 mm

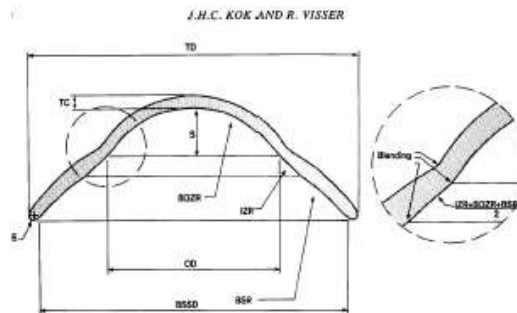
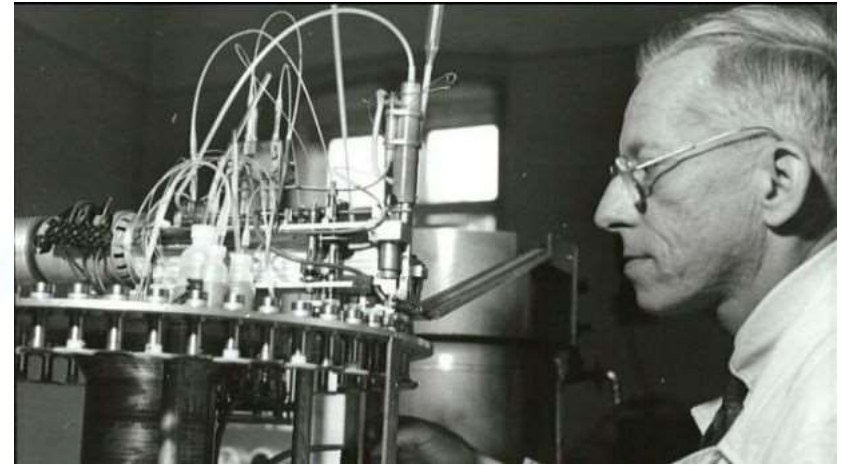
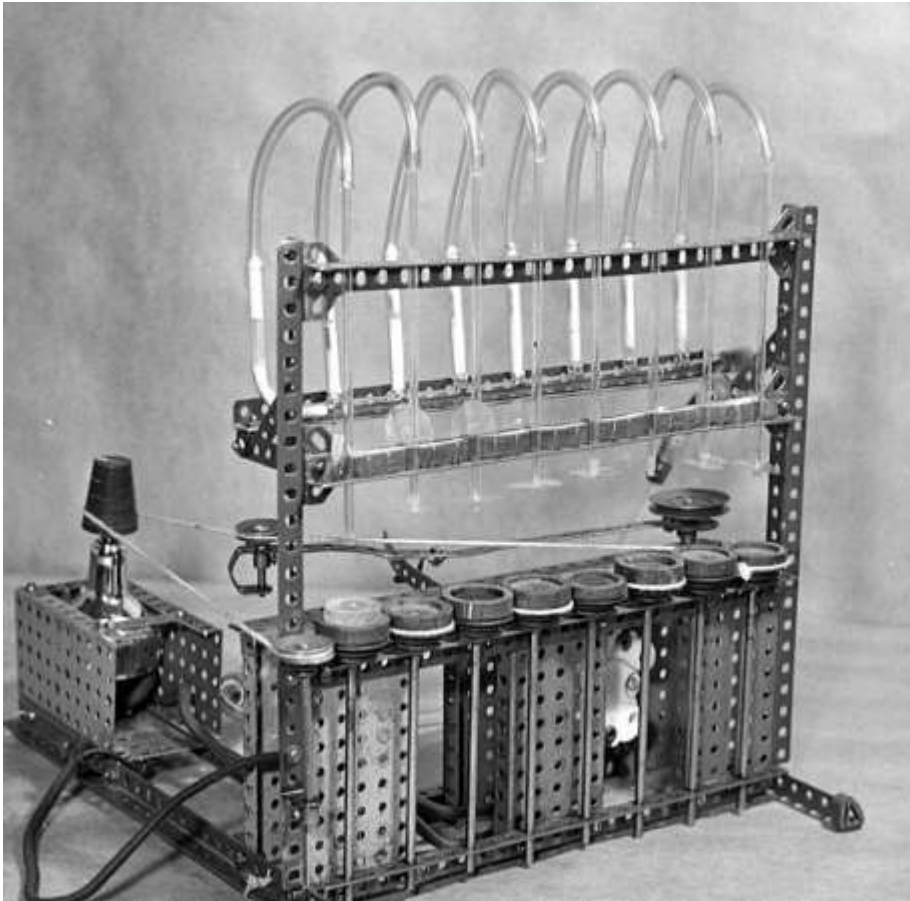


FIG. 1. Scheme of scleral lens. TD, total diameter; BSSD, back scleral size diameter; OAD, optic diameter; TC, center thickness; S, sagitta; BOZR, back optic zone radius; IZR, intermediate zone radius; BSR, back scleral zone radius; TE, edge thickness.

(Soft) Hydrogel Lenses

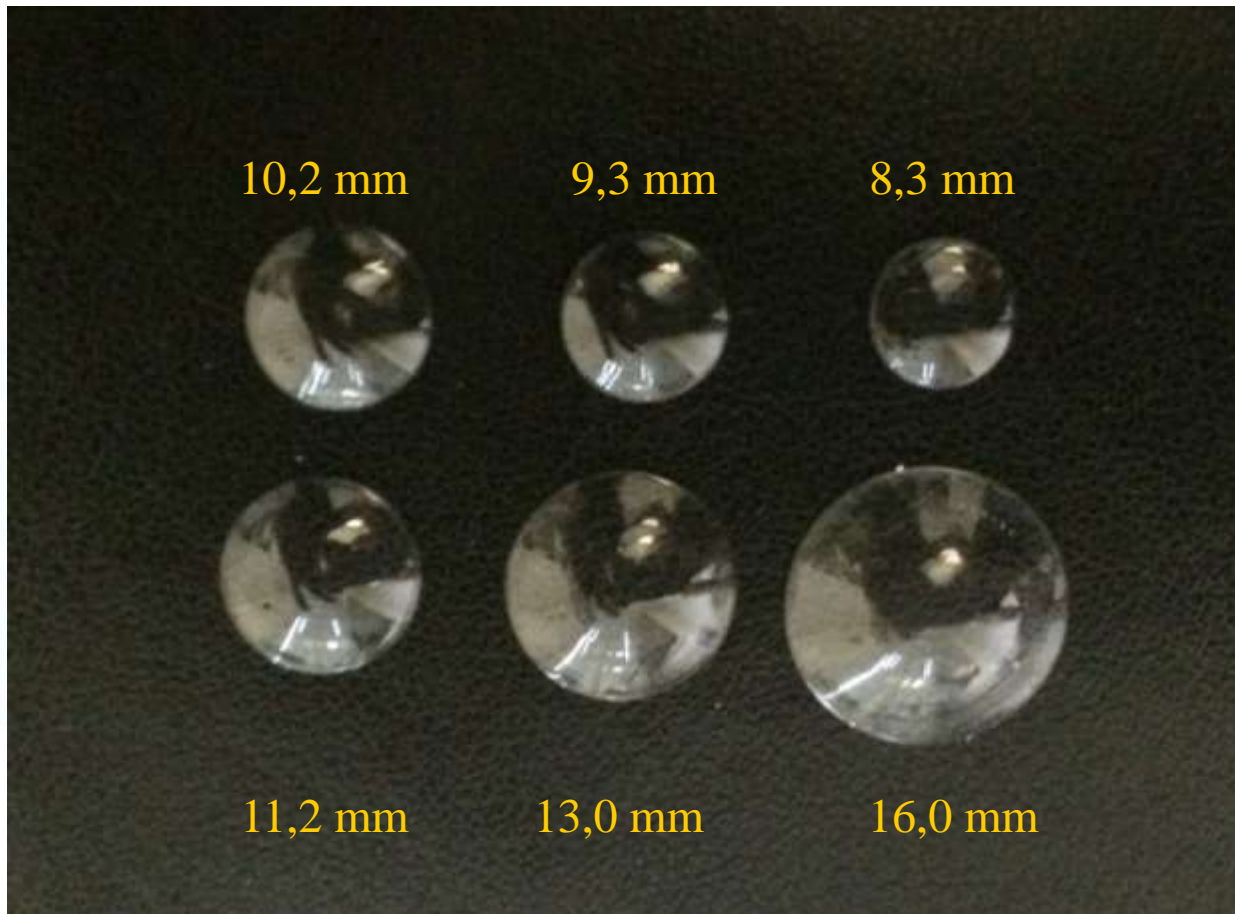


Otto Wichterle, Prague 1961

Patent sold to Bausch&Lomb 1968

Over All Diameter OAD 13-15 mm, Water content 25-85%

(Hard) gas permeable Lenses



Over All Diameters between 8 mm to 18 mm, no water
Invented after WW II (1945), High-tech today

Movement, centration and stabilization



Demography

SCHWEIZ Ständige Wohnbevölkerung der Schweiz Altersaufbau ab dem 15. Altersjahr nach Geschlecht 2013 RAO

Männer 2013 **Frauen 2013**

Contact lenses
1/3 vs 2/3

2013 Alter 48
2013 Alter 34
2013 Alter 20

Anzahl Einwohner in Tausend **Anzahl Einwohnerinnen in Tausend**

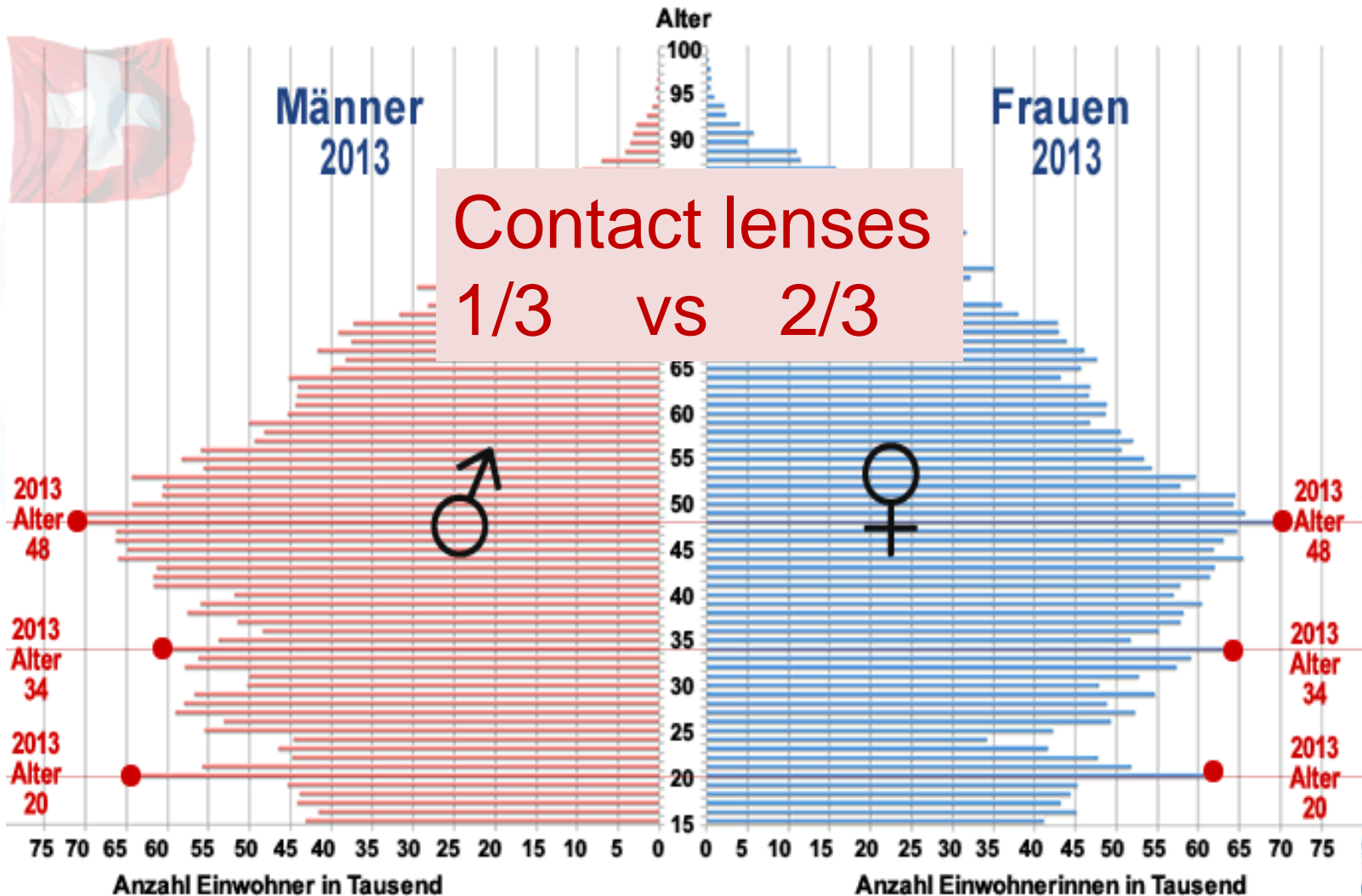
Datenquelle: BFS, Statistisches Lexikon der Schweiz 2015 Diagramm: RAOnline

 SCHWEIZ

Ständige Wohnbevölkerung der Schweiz

RAO

Altersaufbau ab dem 15. Altersjahr nach Geschlecht 2013

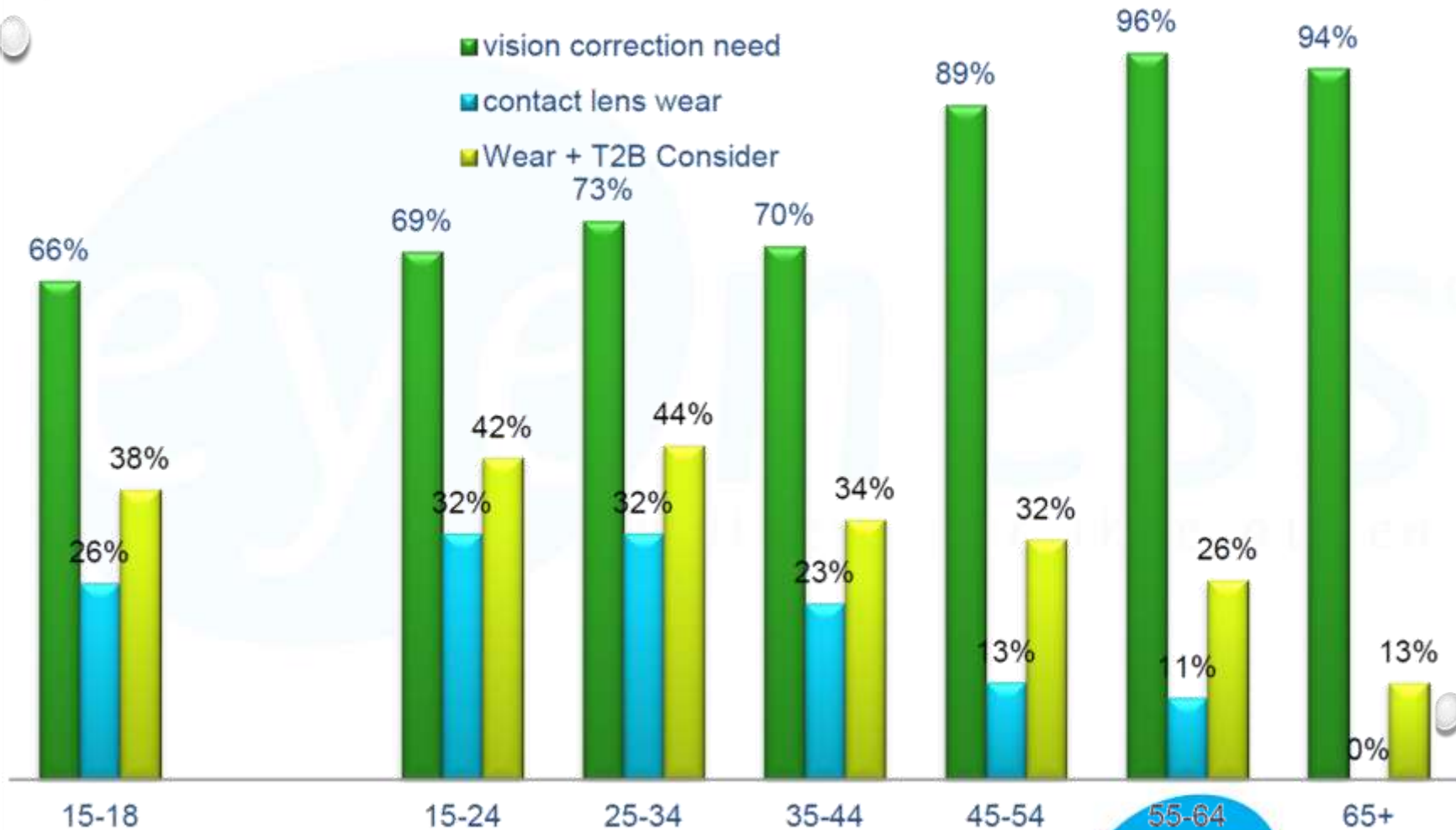


Datenquelle: BFS, Statistisches Lexikon der Schweiz 2015

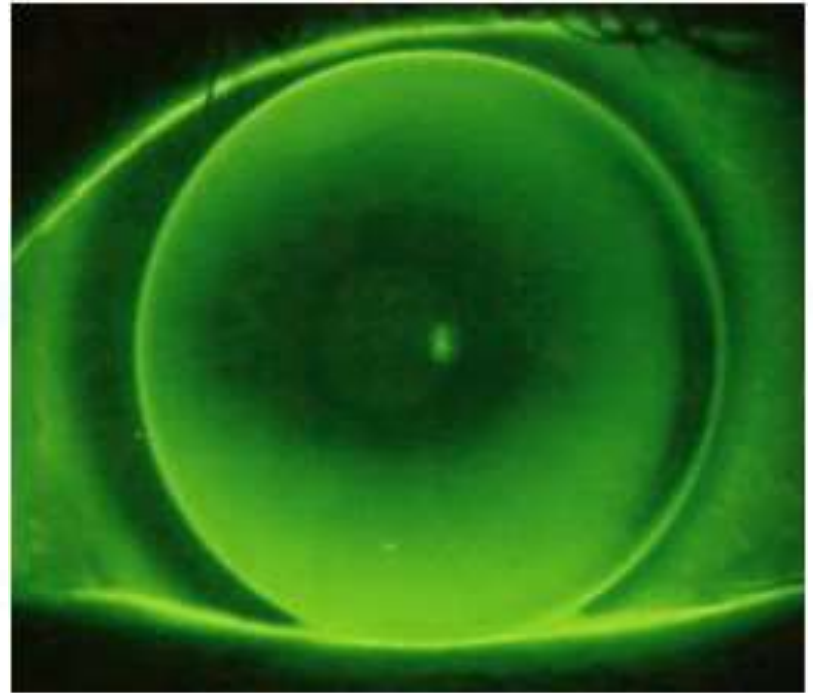
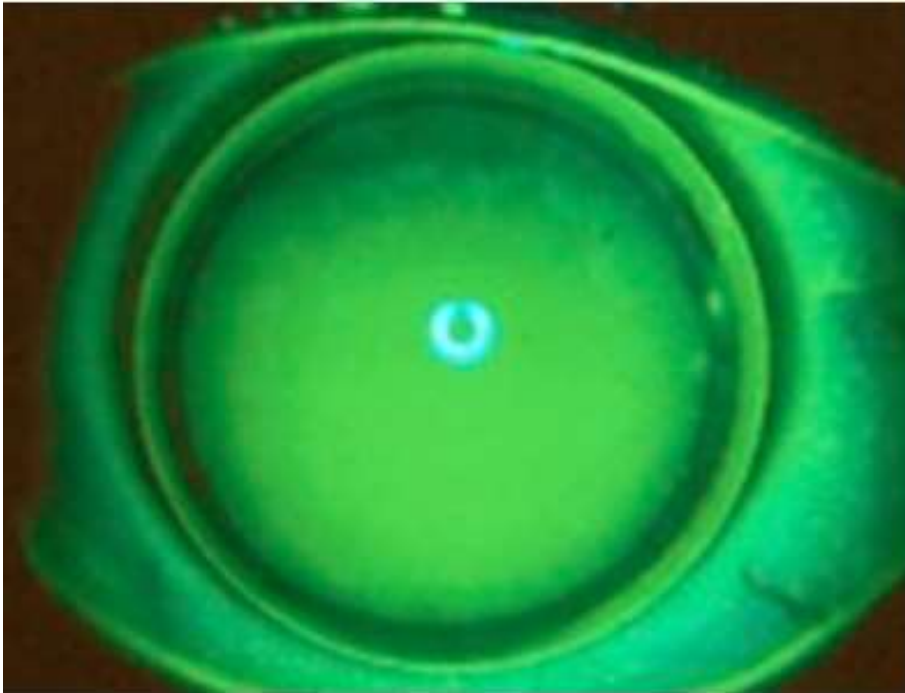
Diagramm: RAOnline



CL Market (Alcon Data, 2015)



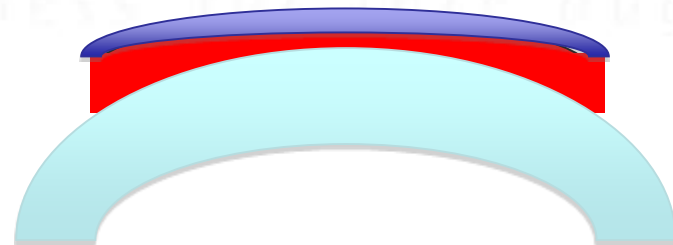
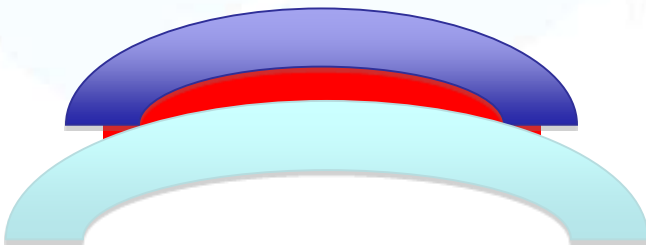
Optics and Physiology



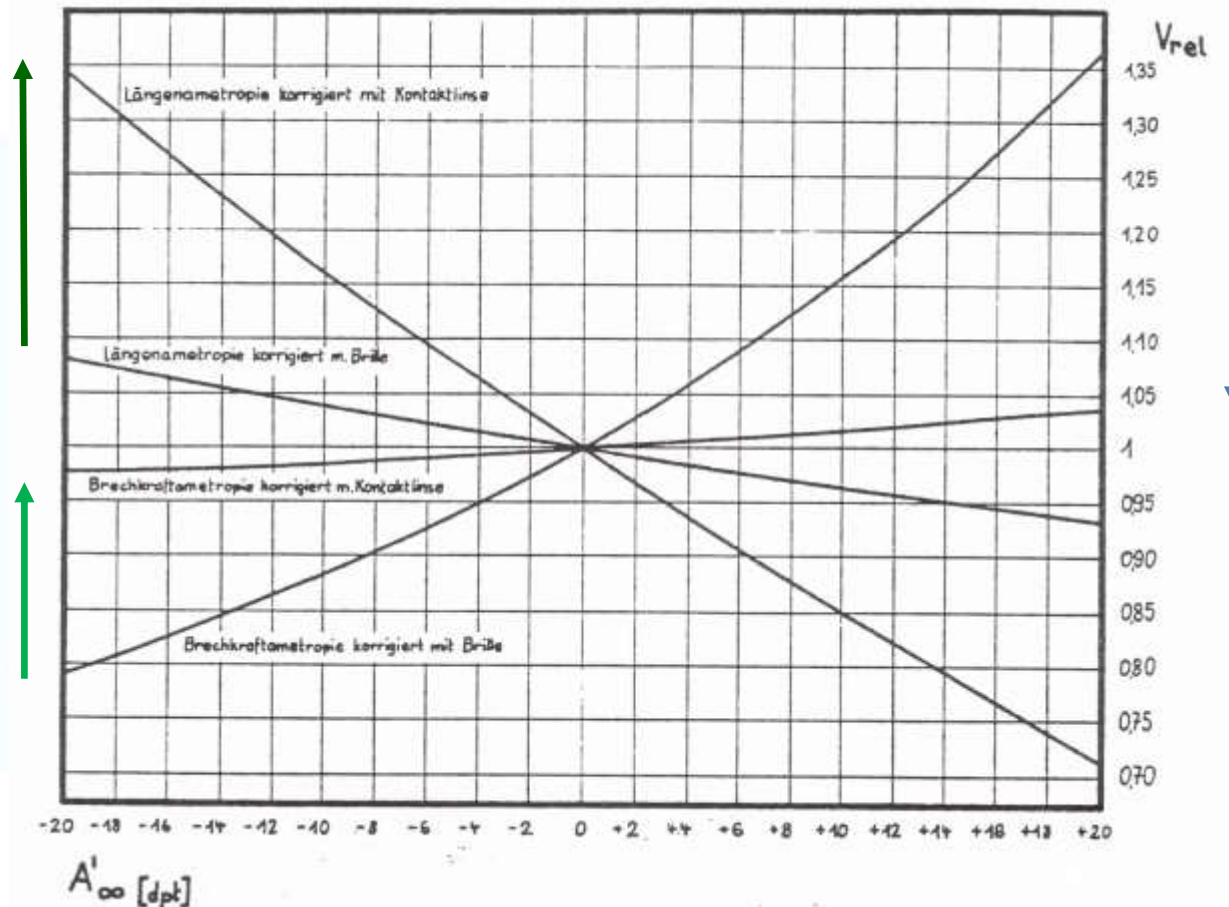
**Whatever contact lens you fit,
always respect the physiology
and the safety of the eye !**

Spheric Calculations

- As a rule of thumb: 0.1mm radius difference results in a power change of 0.5dpt
 - If the lens is chosen 0.1mm steeper than the cornea you have to increase the amount of minus with -0.5dpt
 - If the lens is chosen 0.1mm flatter than the cornea you have to decrease the amount of minus with +0.5dpt



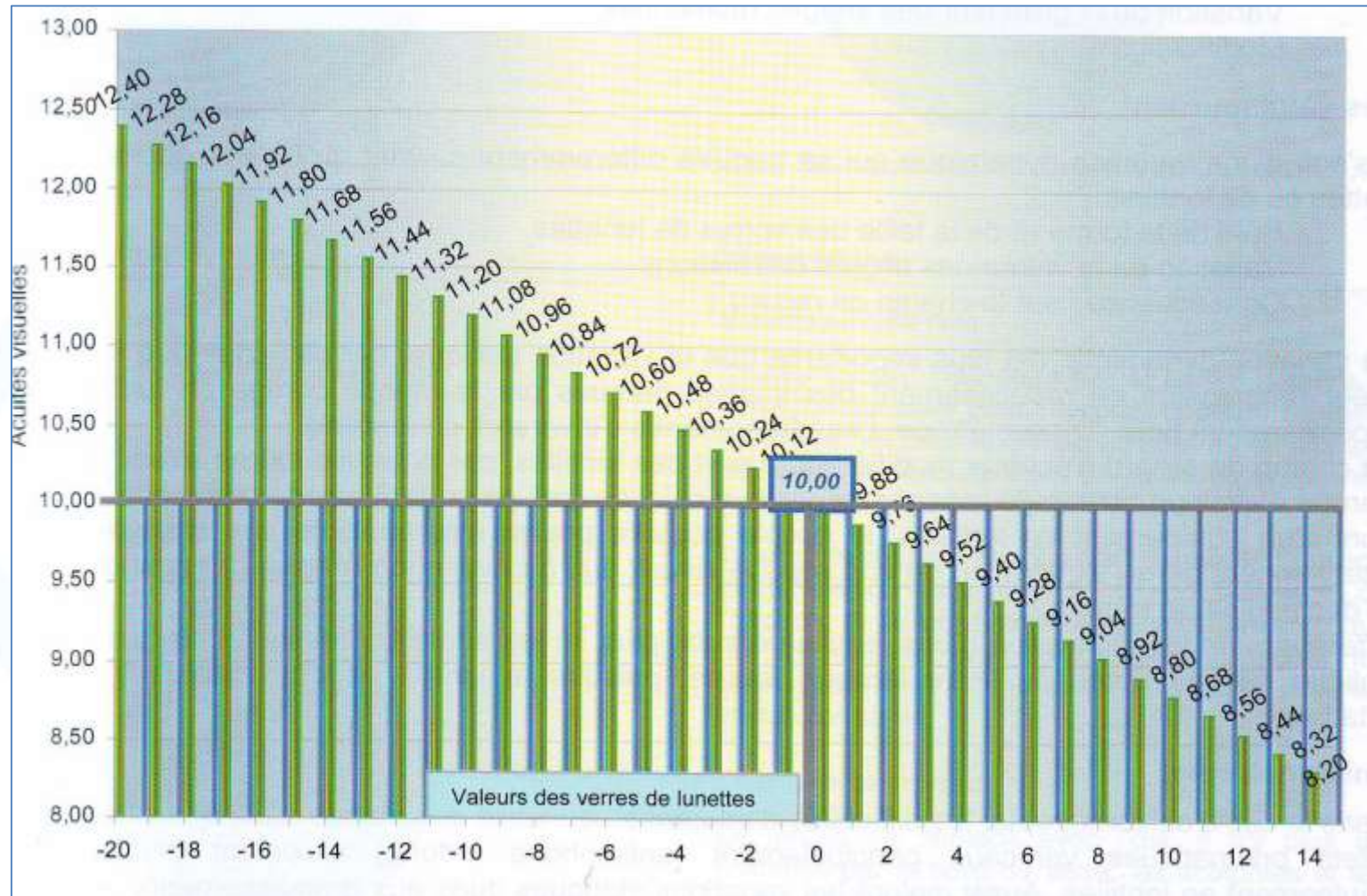
Aniseikonia between CL and glasses



Myopic Px profit the most from CL regarding less retinal **image size reduction**, respectively **image size magnification**.

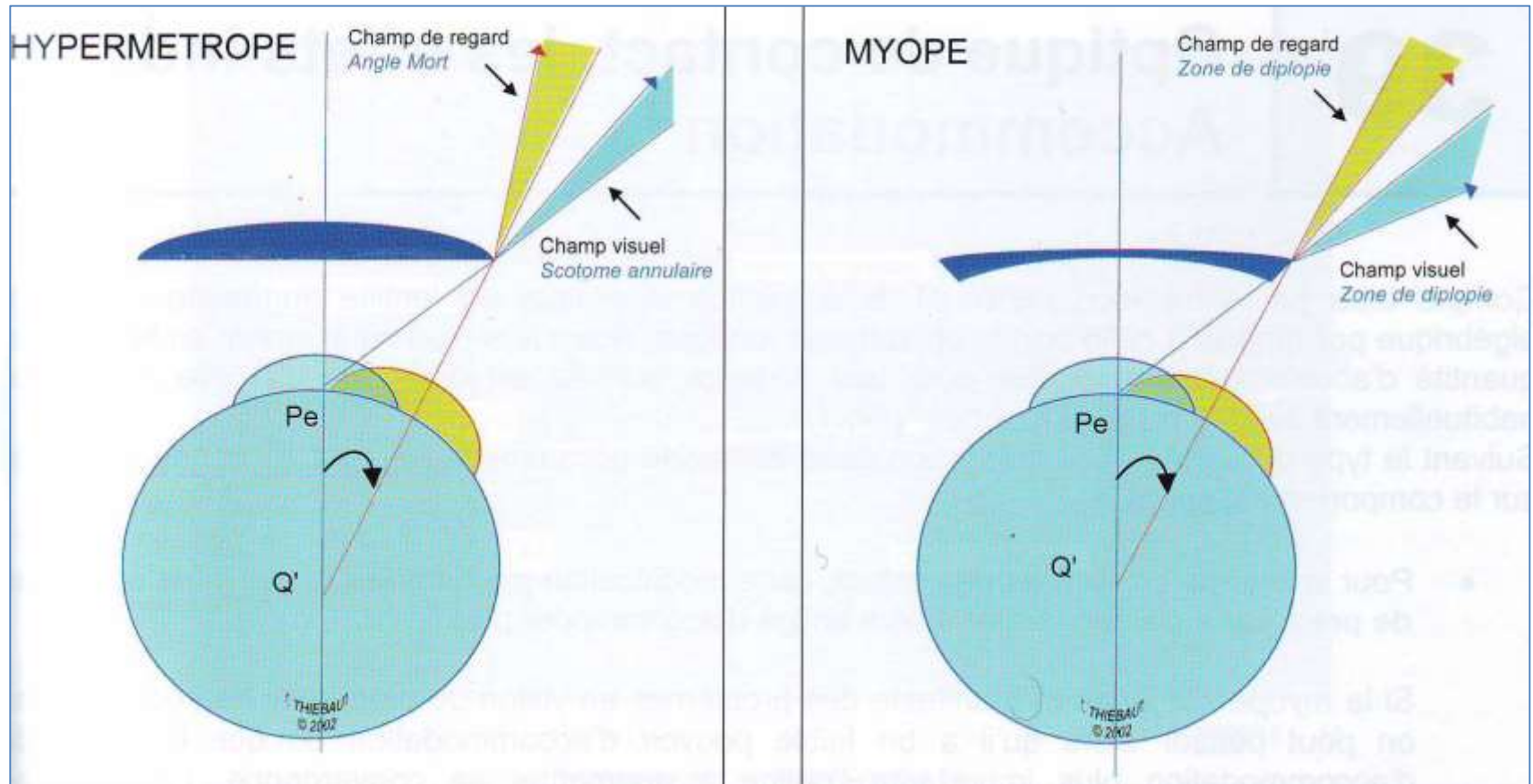
Hyperopic Px profit the most from CL regarding **aesthetics**.

Visual acuity comparison



Myopic Px profit the most of CL regarding VA

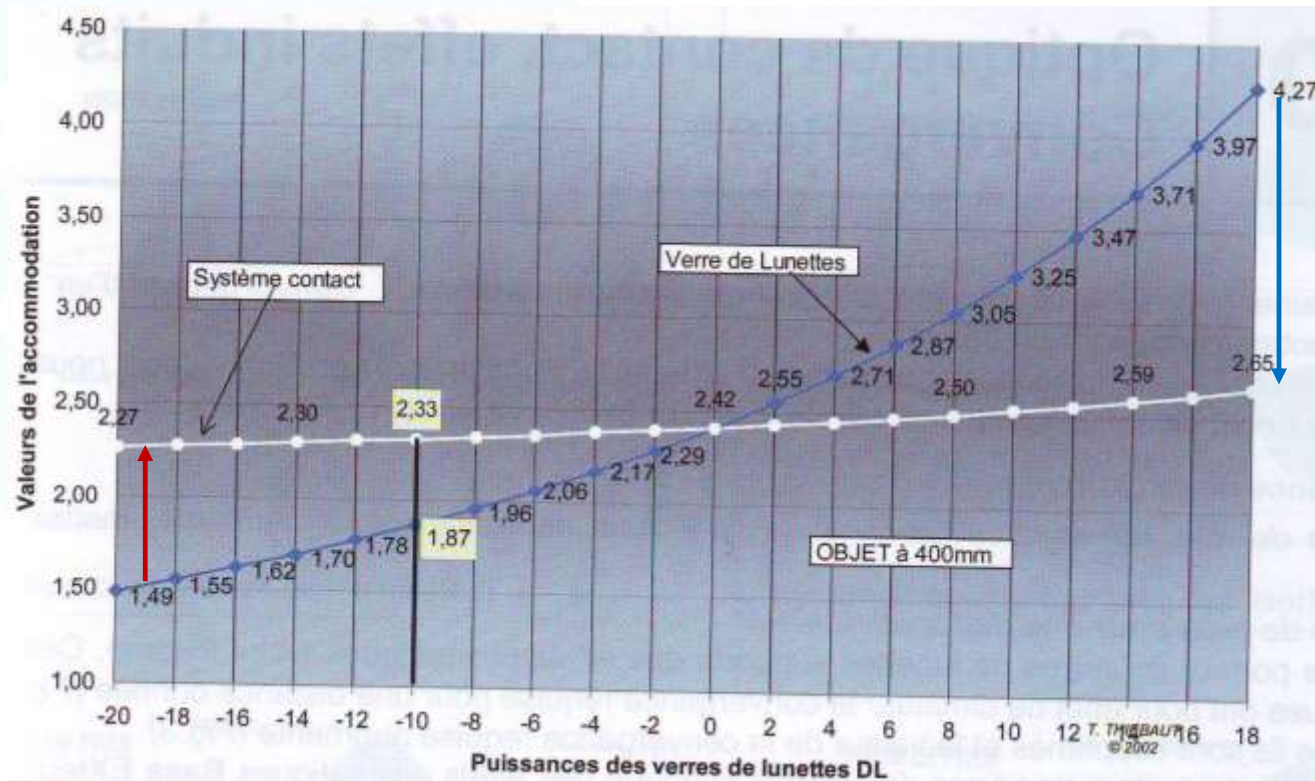
Visual field comparison



Both Px groups profit from CL regarding VF

Accommodation

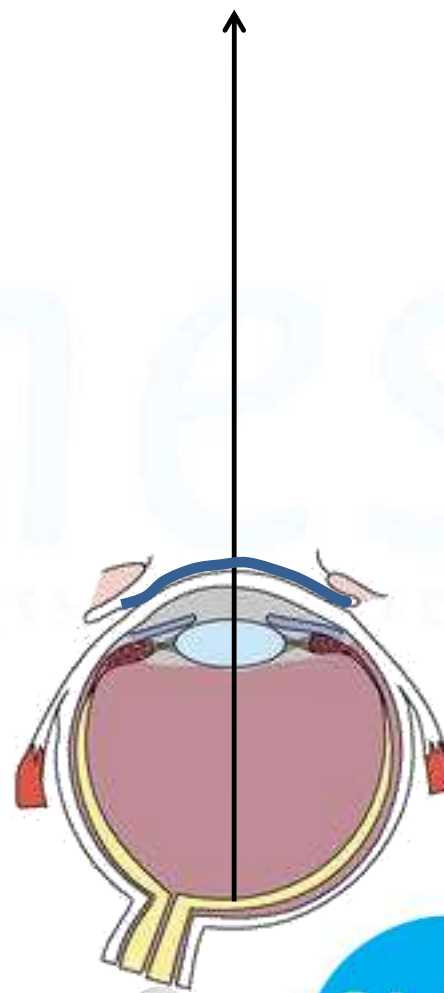
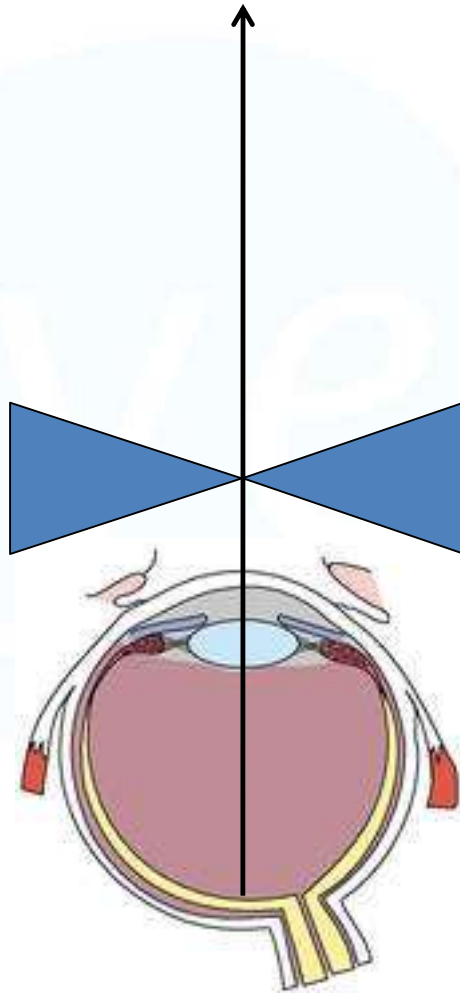
- Hyperopic Px with contact lenses needs to accommodate less (more accommodation success A_0) for a given distance.
- Myopic Px with contact lenses needs to accommodate more.



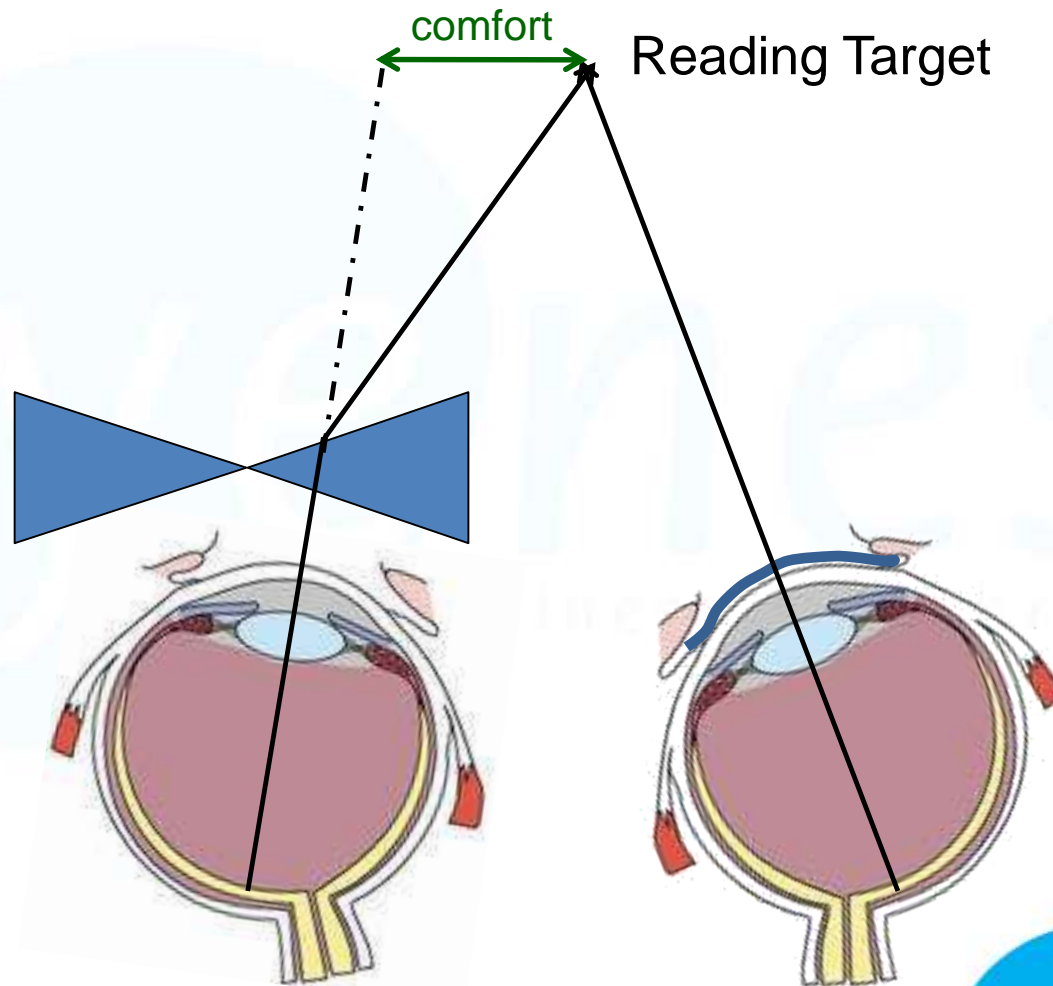
Convergence

- **Myopic Px with contact lenses** needs to **converge more** (less comfortable) compared to a correction with spectacles for a given distance.
- **Hyperopic Px** needs to **converge less** with contact lenses.

Example Distance Myopia



Example Reading Myopia



Regarding Presbyopia and CL

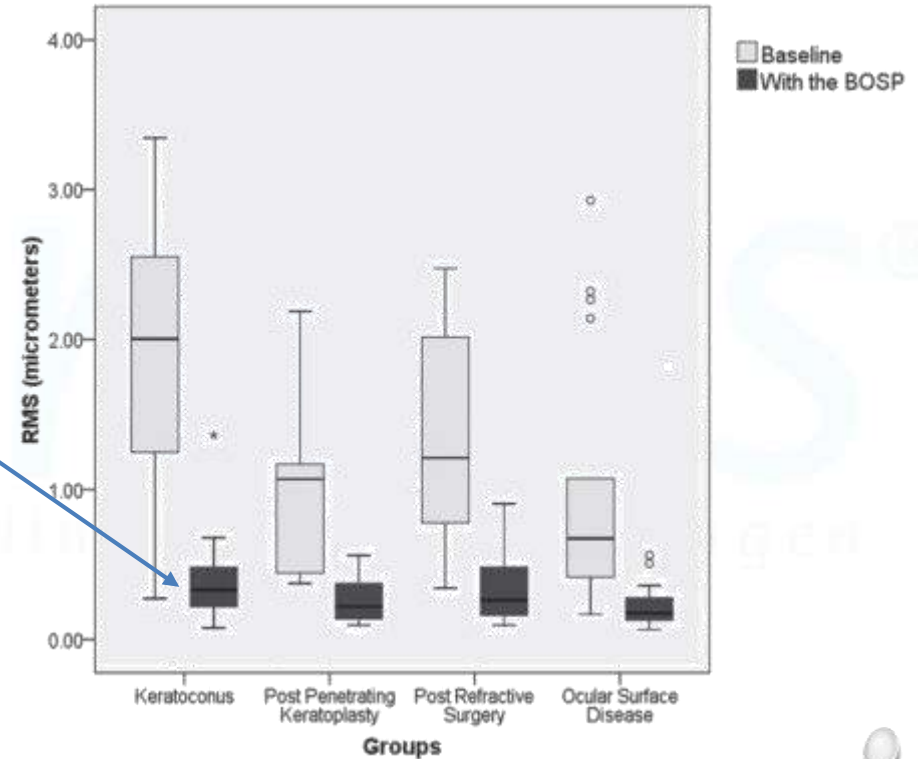
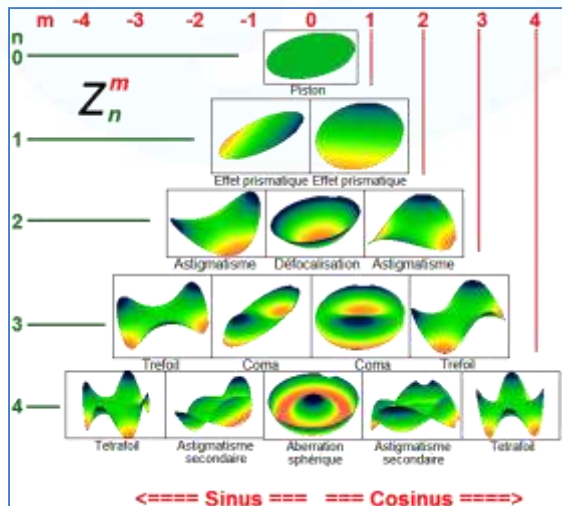
Due to accommodation and convergence disadvantages, myopic

Px are more difficult to correct with CL than with glasses.

But they always profit from better optics (less aberrations).

Higher Order Aberrations

The corrective rates of higher-order aberrations are about 70-90% with (hard) scleral lenses in place !



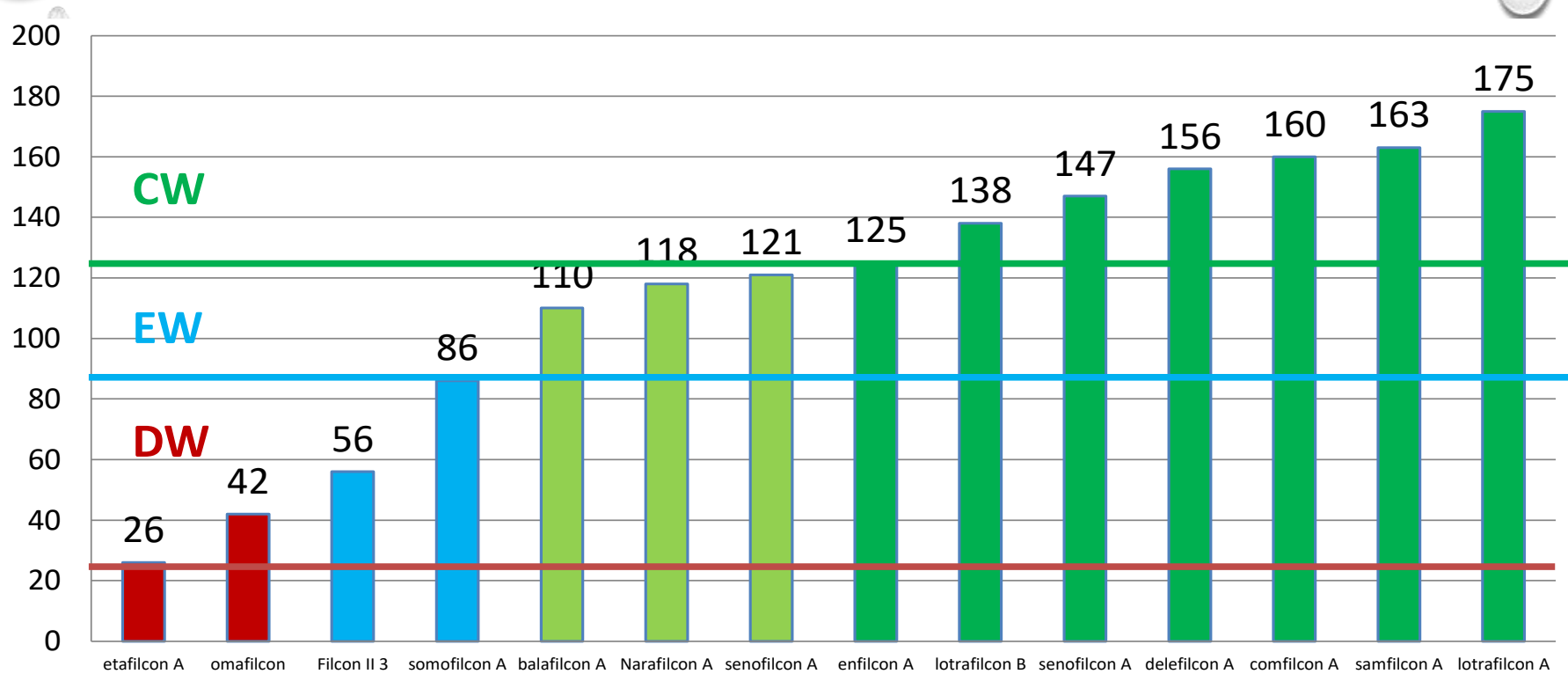
K.Gumus et al The Impact of the Boston Ocular Surface Prosthesis on wavefront Higher-Order Aberrations, Am J Ophthalmol 2011;151:682–690

CL Materials: Physics and Physiology

Differentiate important physical properties :

- *Oxygen Permeability*
- *Hardness (Shore), Resistance*
- *Stiffness (Flex Modulus)*
- *Wettability (Wetting angle)*
- *Silicone, Fluor, Water content*
- *Refractive Index*
- *UV Filter*

Oxygen Permeability Dk

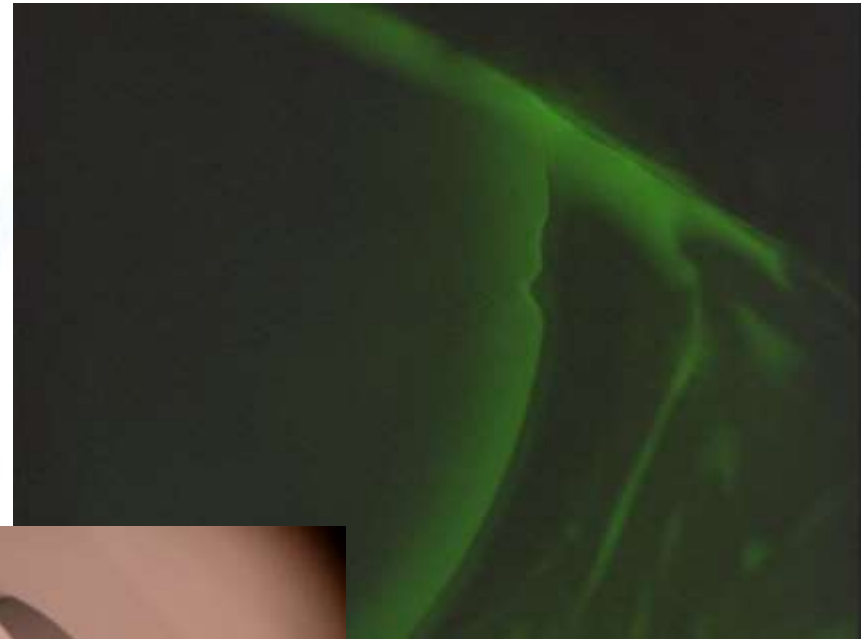
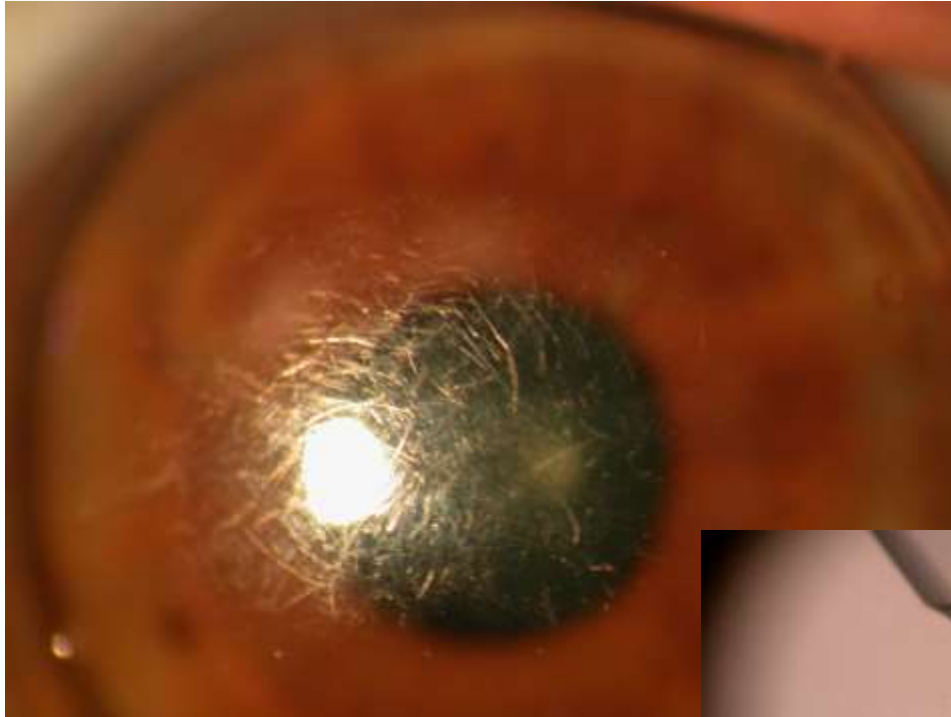


Hardness, Resistance

Scratches

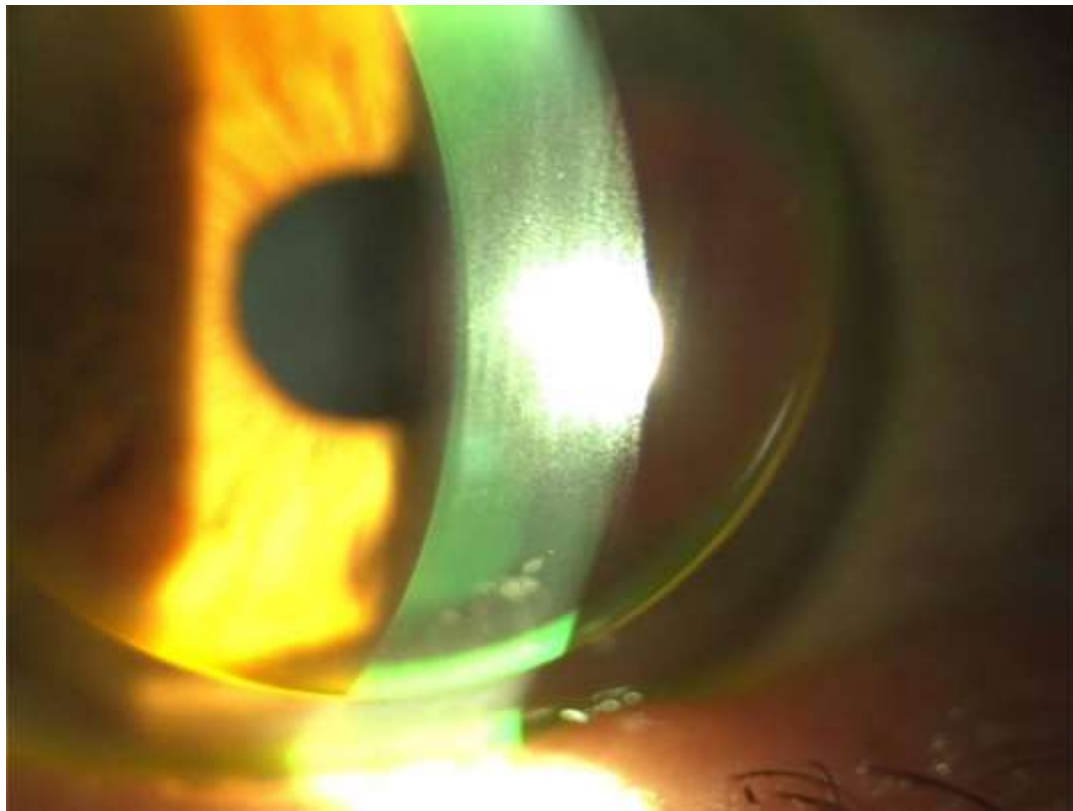
and

Edgedefects



Wettability, Silicone, Water, Fluor

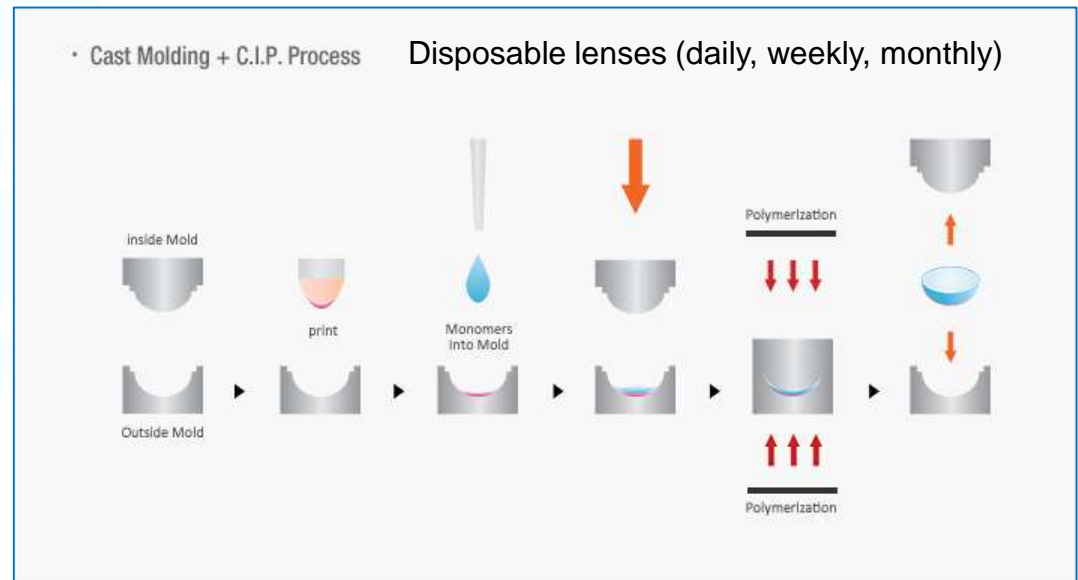
Deposits (Lipids and Proteins)



Contact Lens Manufacturing

Understand manufacturing steps:

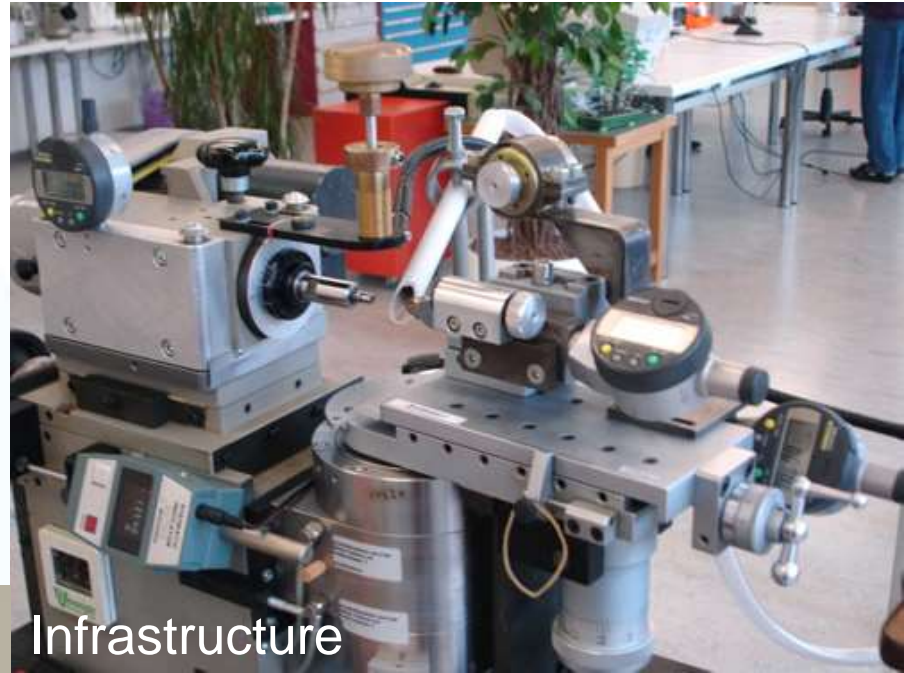
- *Calculation*
- *Preparation*
- *Back Geometry*
- *Over All Diameter*
- *Front Geometry and Power*
- *Finish*
- *Quality Check*



CL Laboratories



Calculation and Preparation



Infrastructure



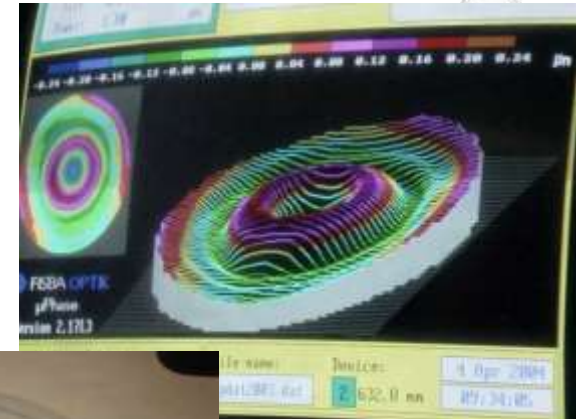
Cutting and lathing



Finish and Quality Check

CL Laboratories

GELFLEX, Perth / Australia

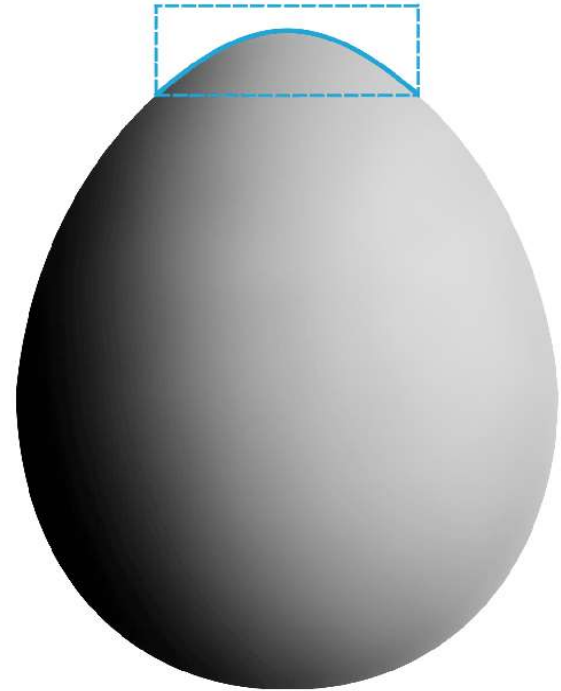


Contact Lens Design

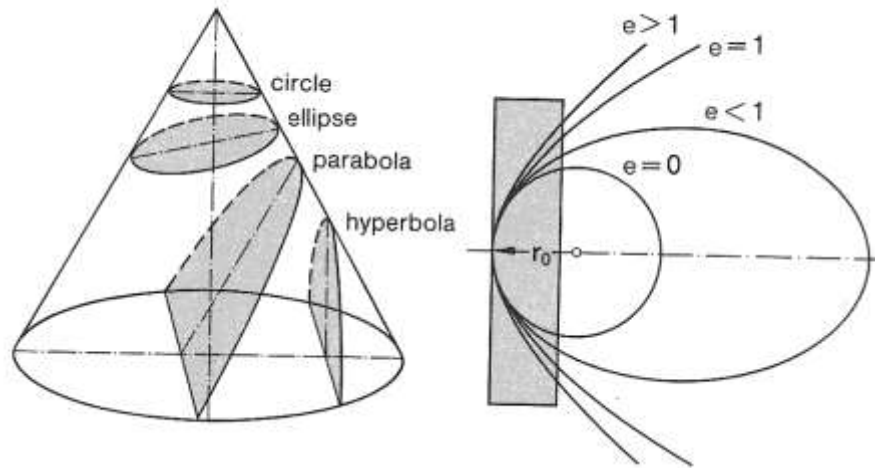
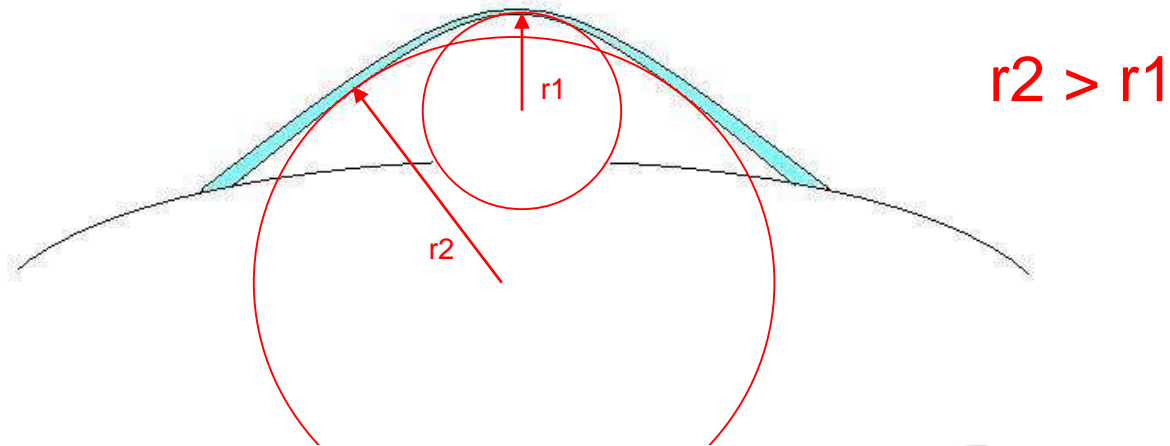
Distinguish different Backcurve Designs

- spherical
- Multi-curve
- aspheric
- toric

Sphere versus Asphere



Numeric Eccentricity nE

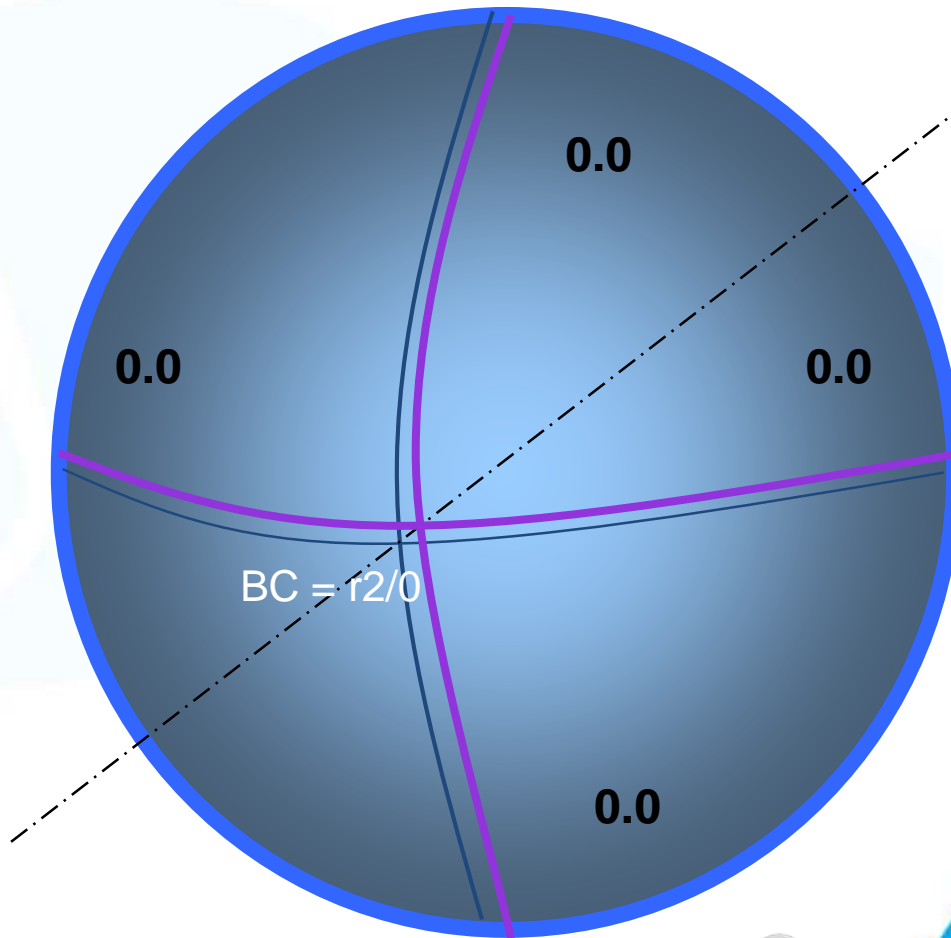


Numeric Eccentricity nE – Rule of Thumb

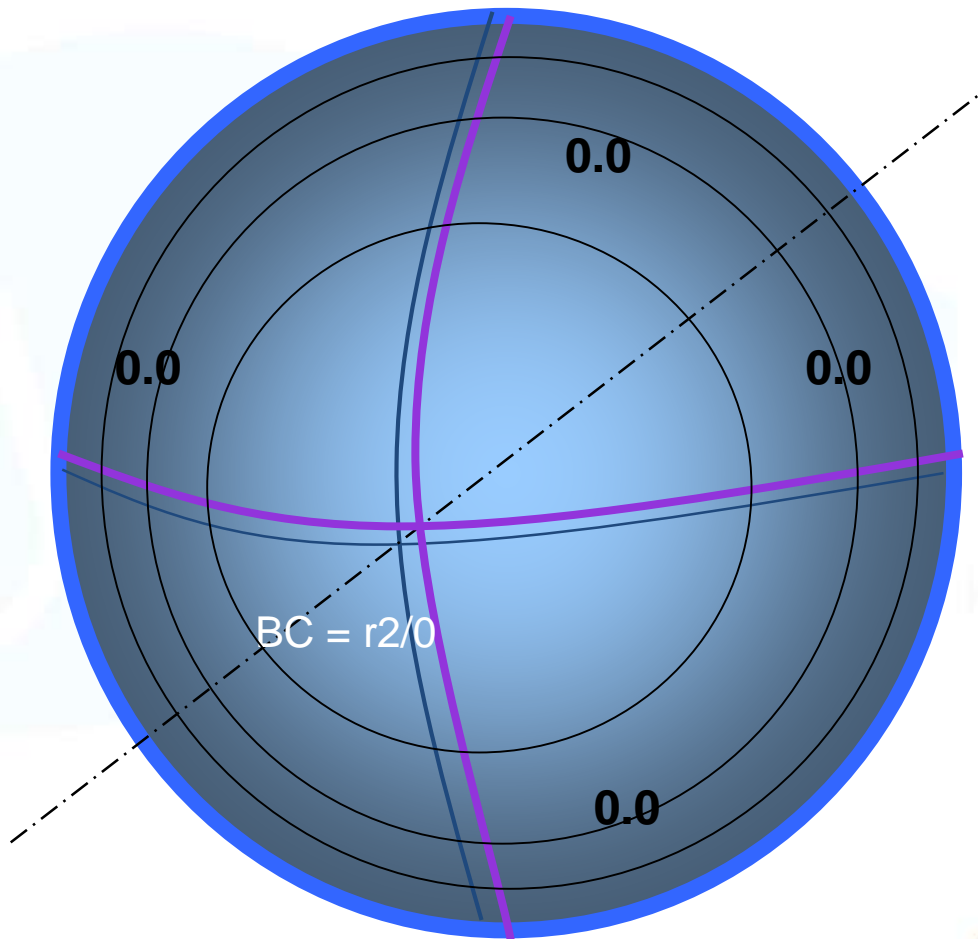
Numerical Eccentricity / peripheral flattening

0.1	=	0.02 mm	->	Elliptic
0.2	=	0.05 mm		
0.3	=	0.10 mm	->	<i>0.1 mm</i>
0.4	=	0.16 mm	->	<i>0.2 mm</i>
0.5	=	0.23 mm		
0.6	=	0.35 mm	->	<i>0.3 mm</i>
0.8	=	0.55 mm		
1.0	=	0.80 mm	->	Parabolic (Keratoconus)
1.2	=	1.20 mm	->	Hyperbolic (Keratoconus)
1.5	=	2.00 mm		

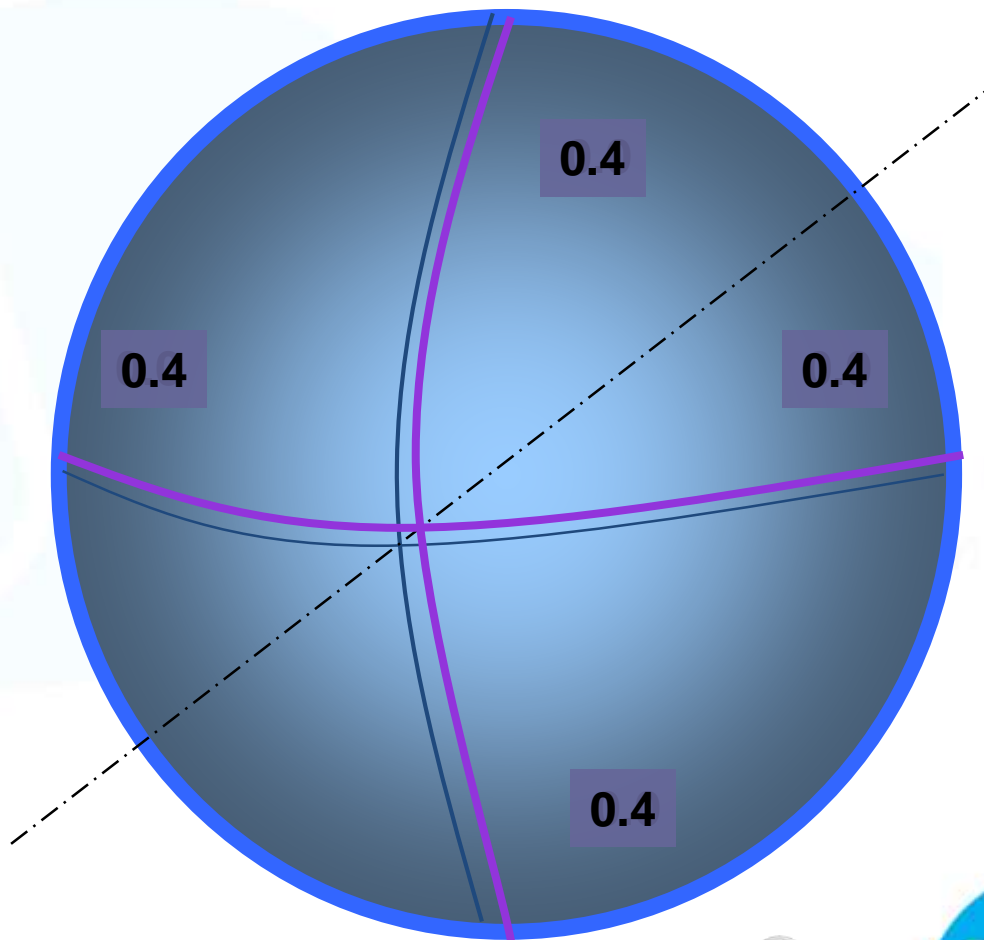
Spherical Design



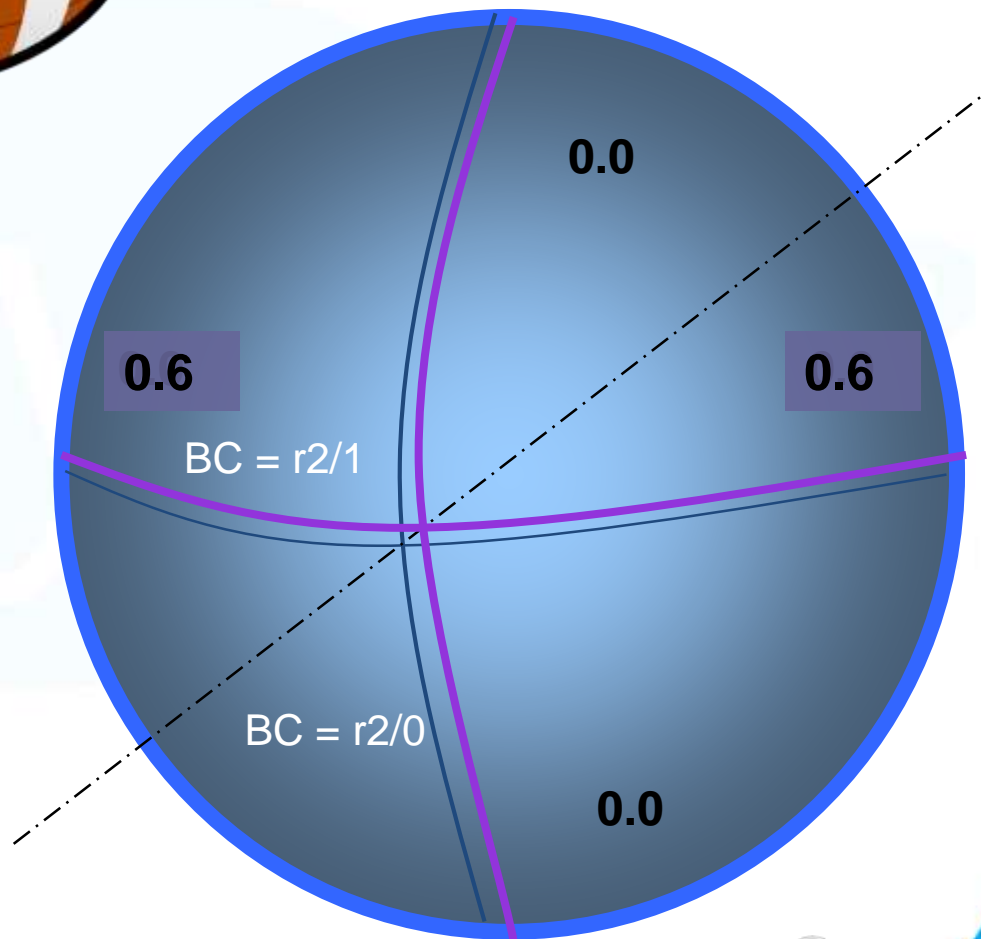
Multi curve Design



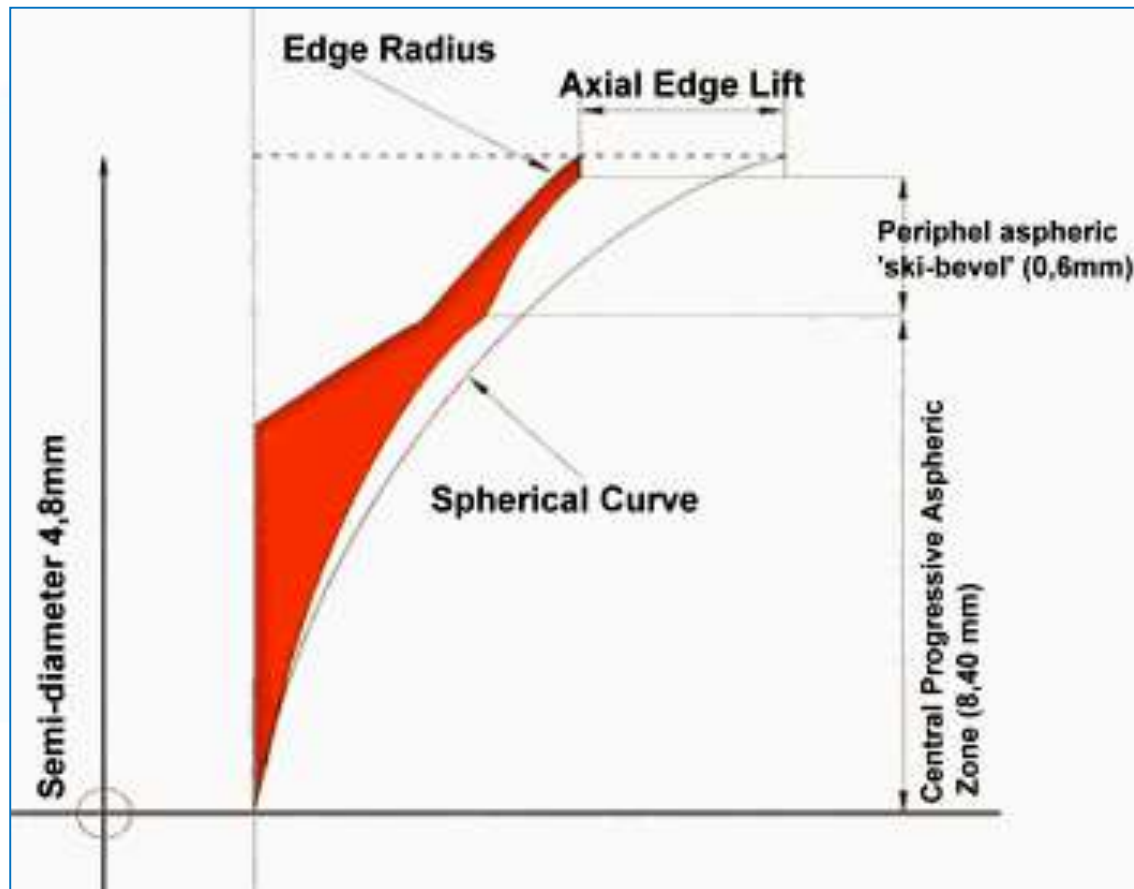
Aspherical Design



Toric Design



Lens Design



Fitting Technics, Ocular Topography and Fluorescein

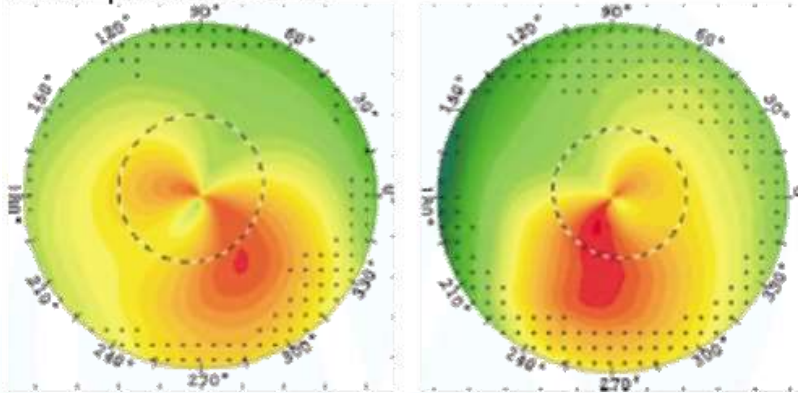
Technique Oculus

- 22'000 measuring points
 - Nose and forehead make shadows and reduce the amount of measure points
 - Only about the central 8mm diameter are really measured
 - Accuracy +/-0.1D

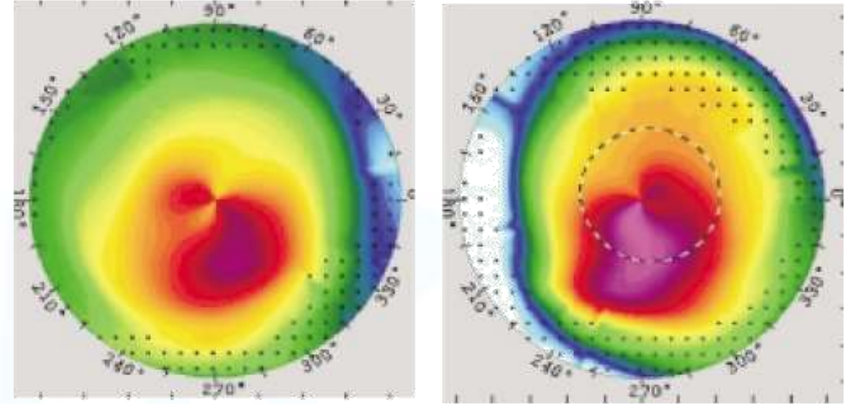


Diagnostic Software (Mapping)

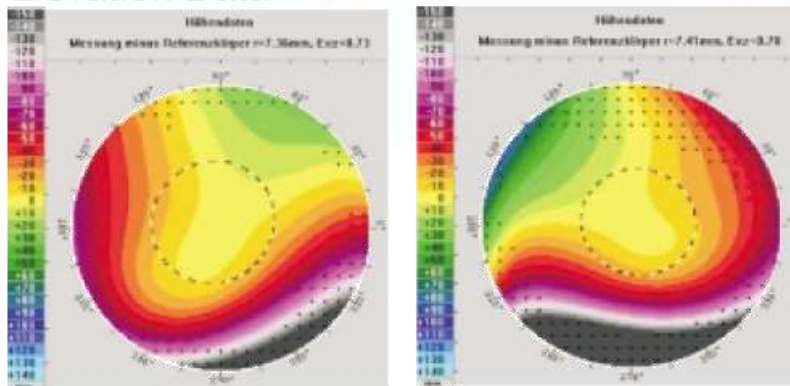
Axial presentation



Tangential presentation



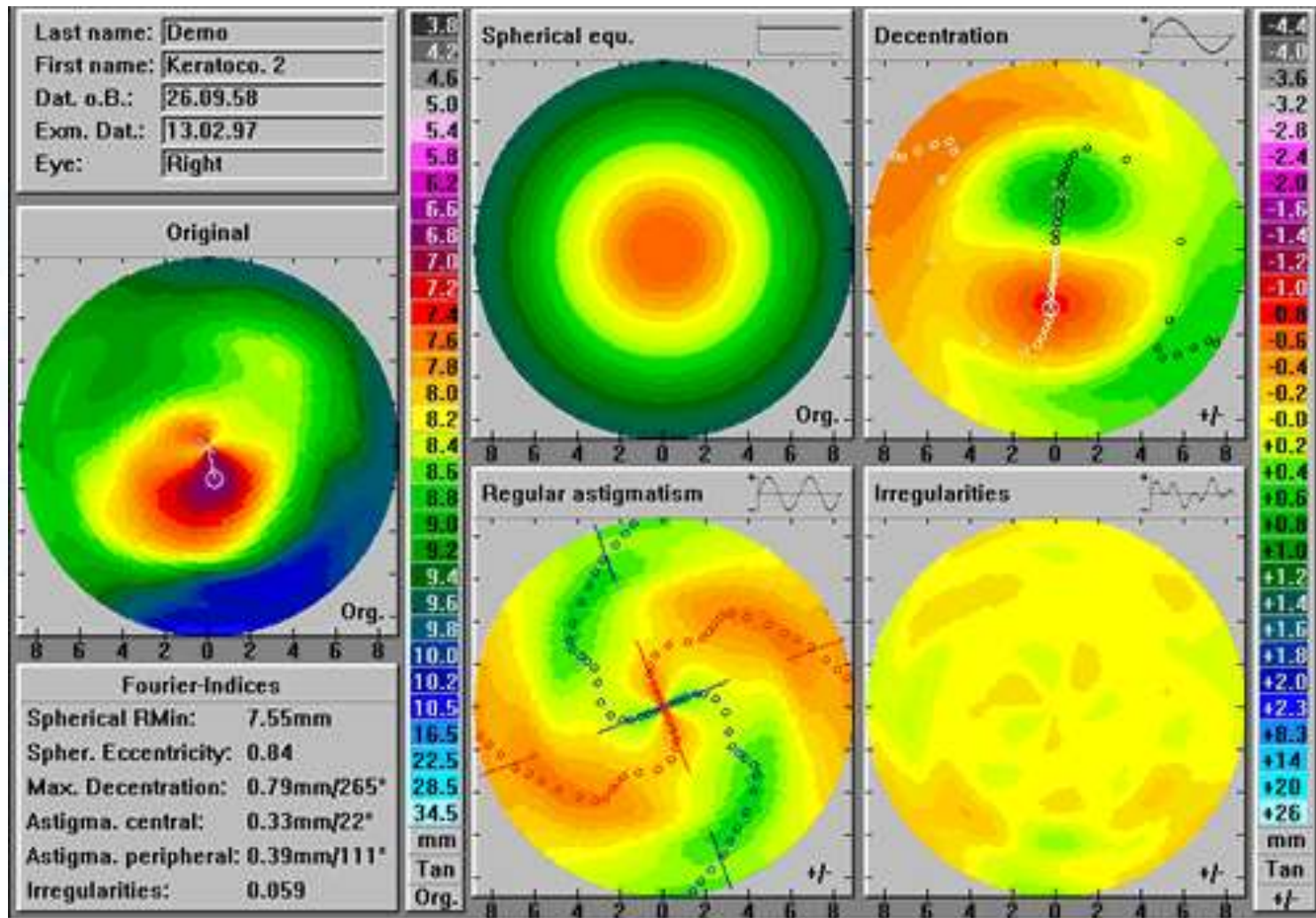
Elevation Data



Diagnostic Software (Fourier)

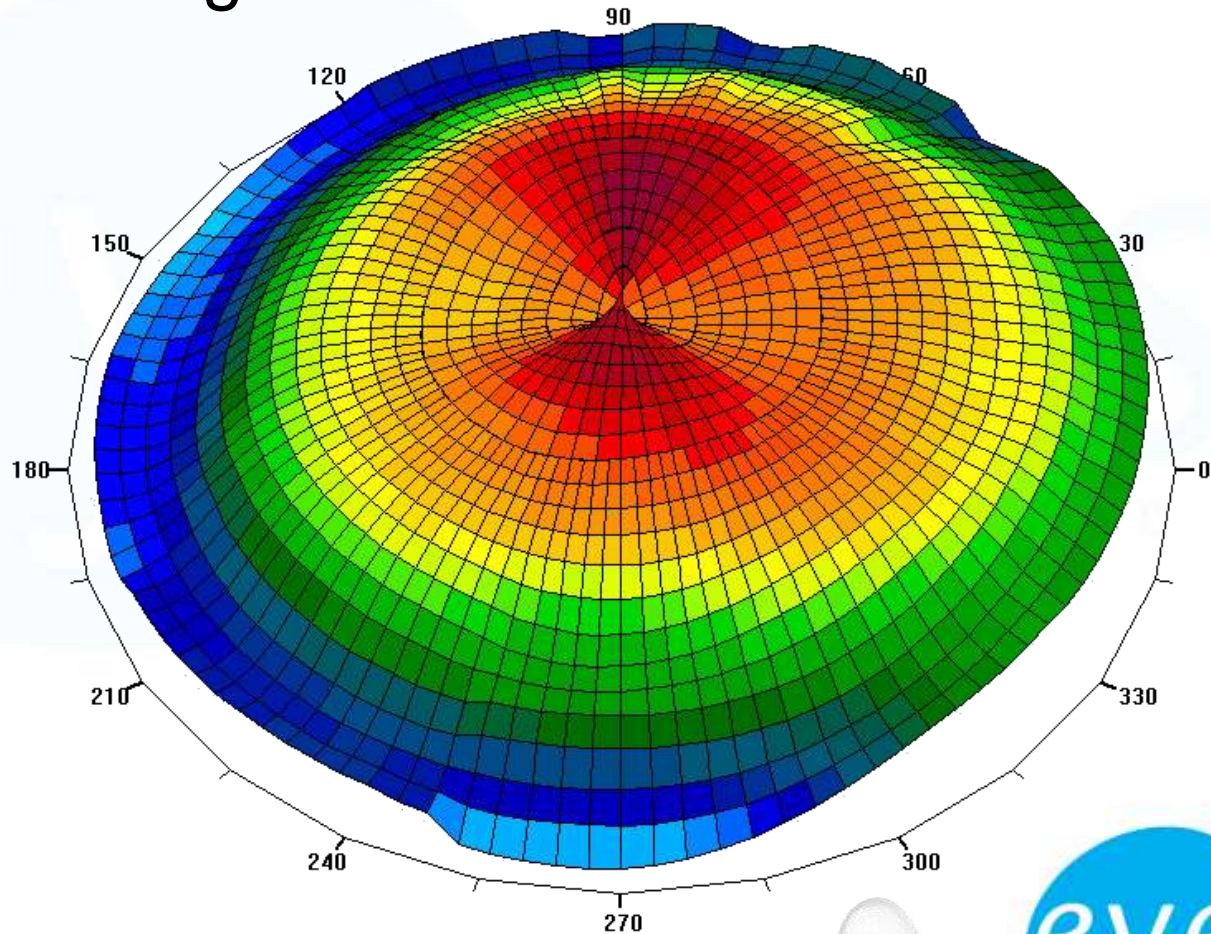
- Fourier Analysis
 - Mathematical separation of the topographic map into individual components
 - Optical aberration (spherical component, decentration or decentration with spherical component, regular astigmatism, irregularities or irregularities with spherical component)

Diagnostic Software (Fourier)



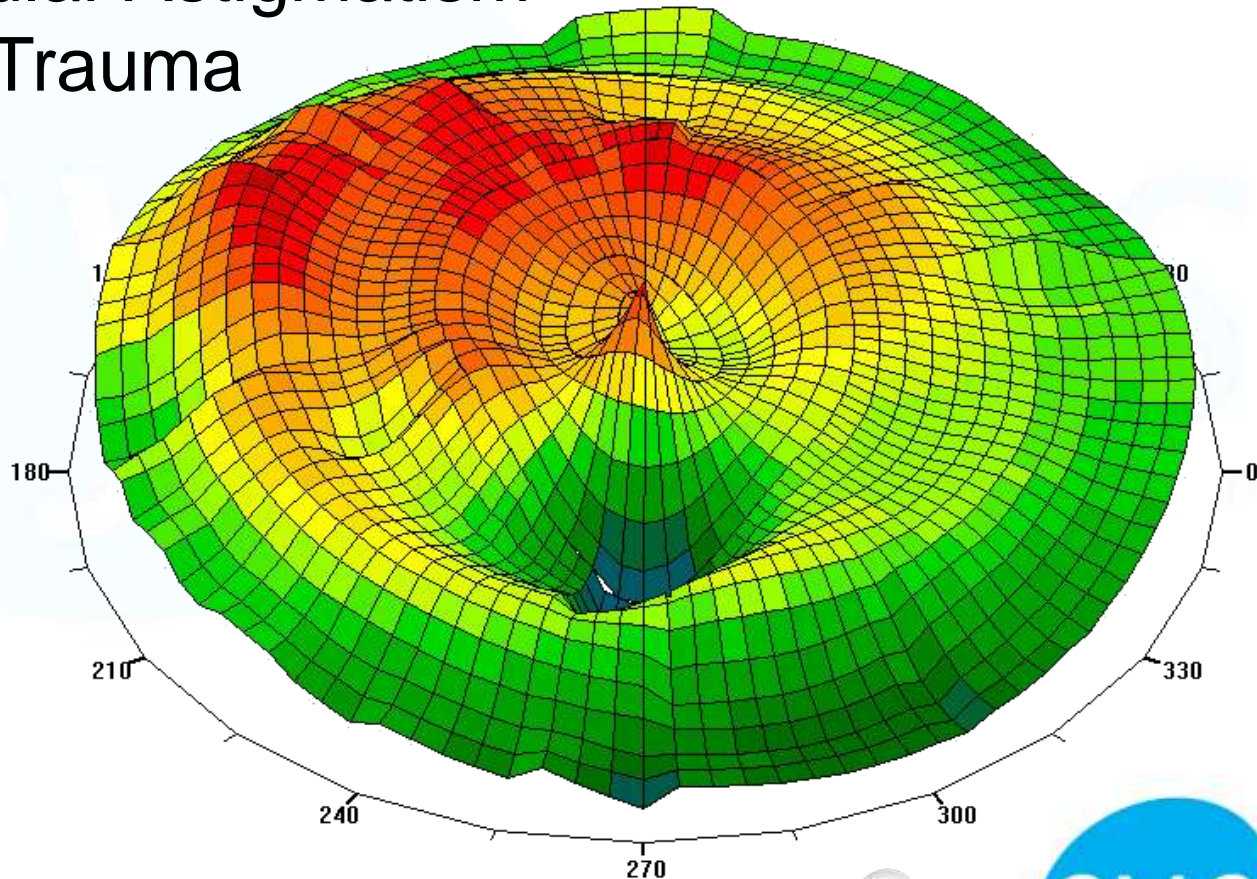
3D Images

Regular Astigmatism



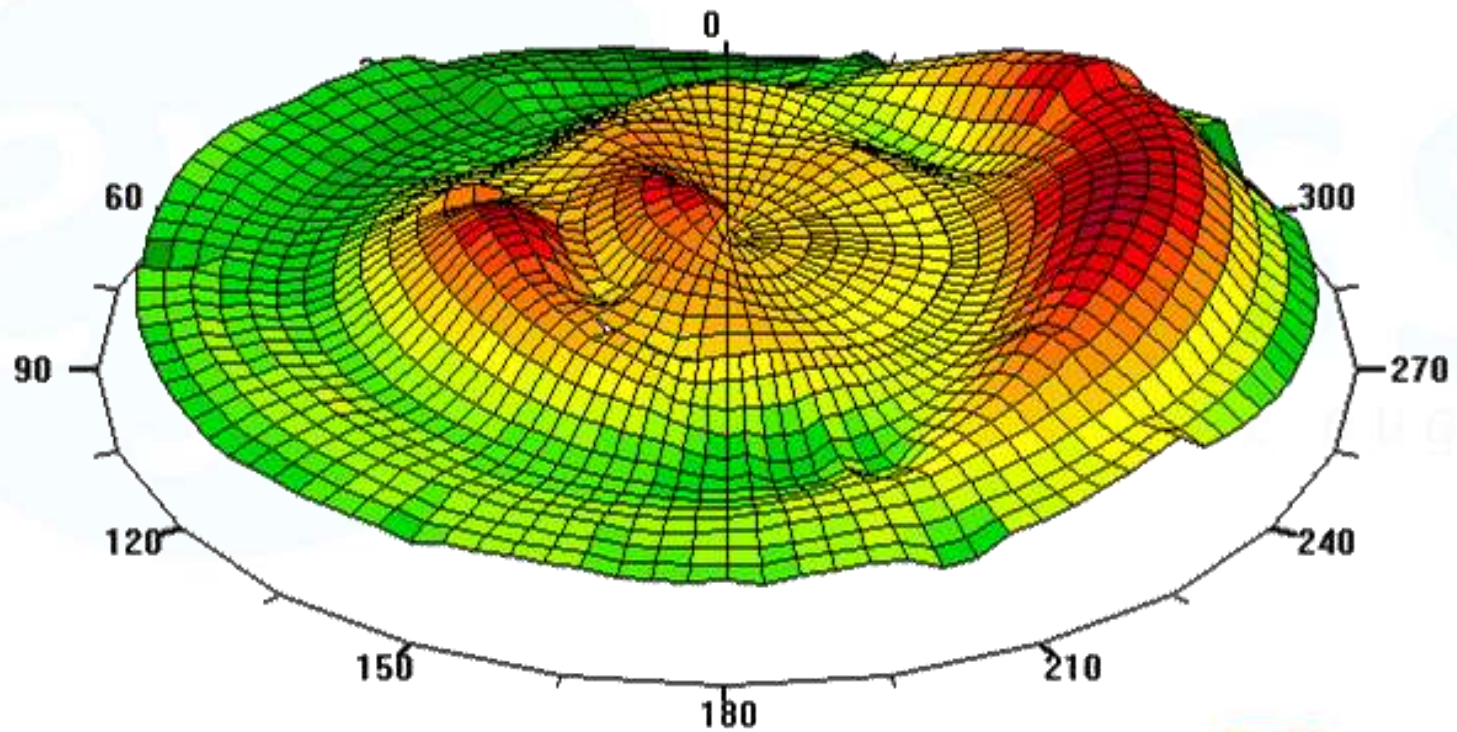
3D Images

Irregular Astigmatism
post Trauma



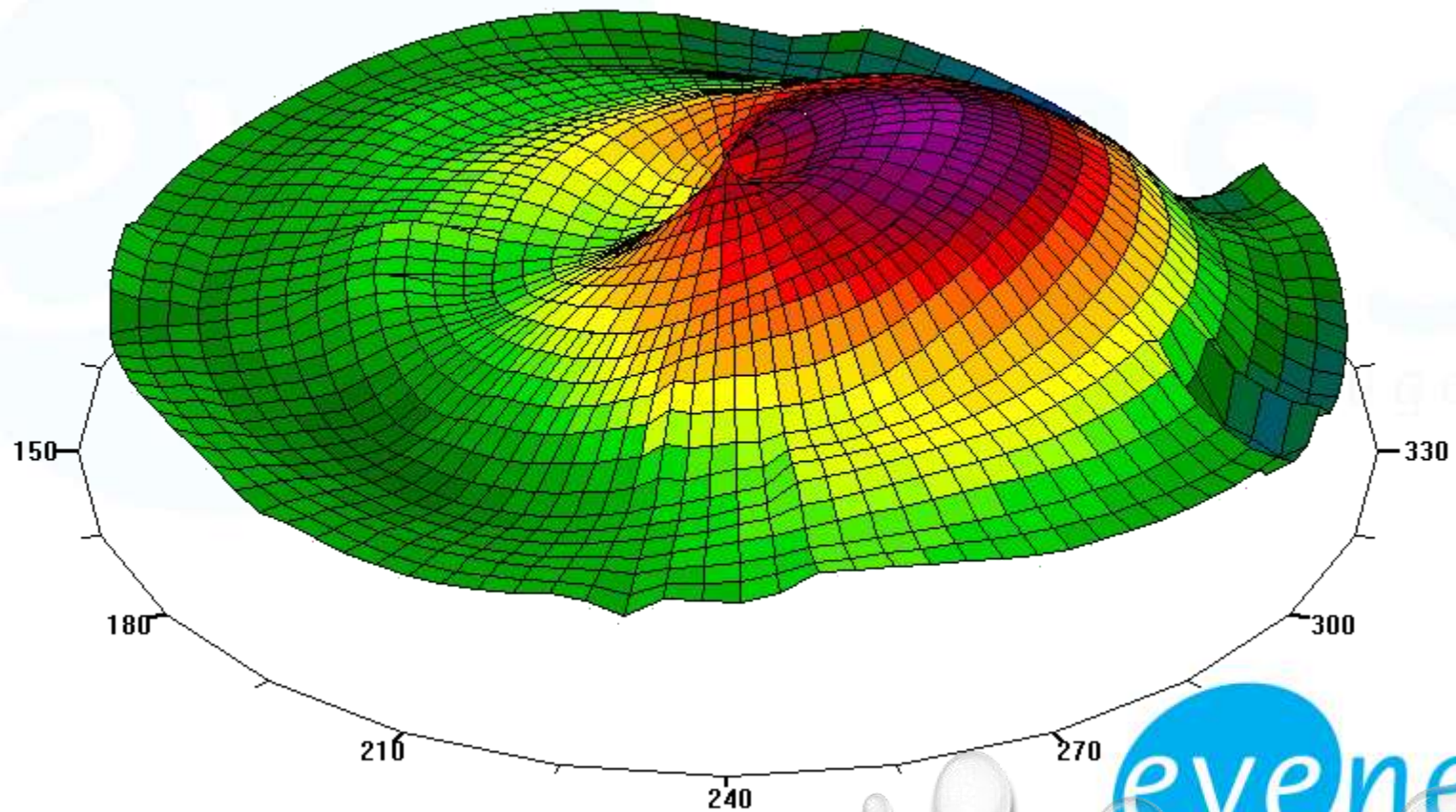
3D Images

Pseudo Keratoconus (high riding contact lens)



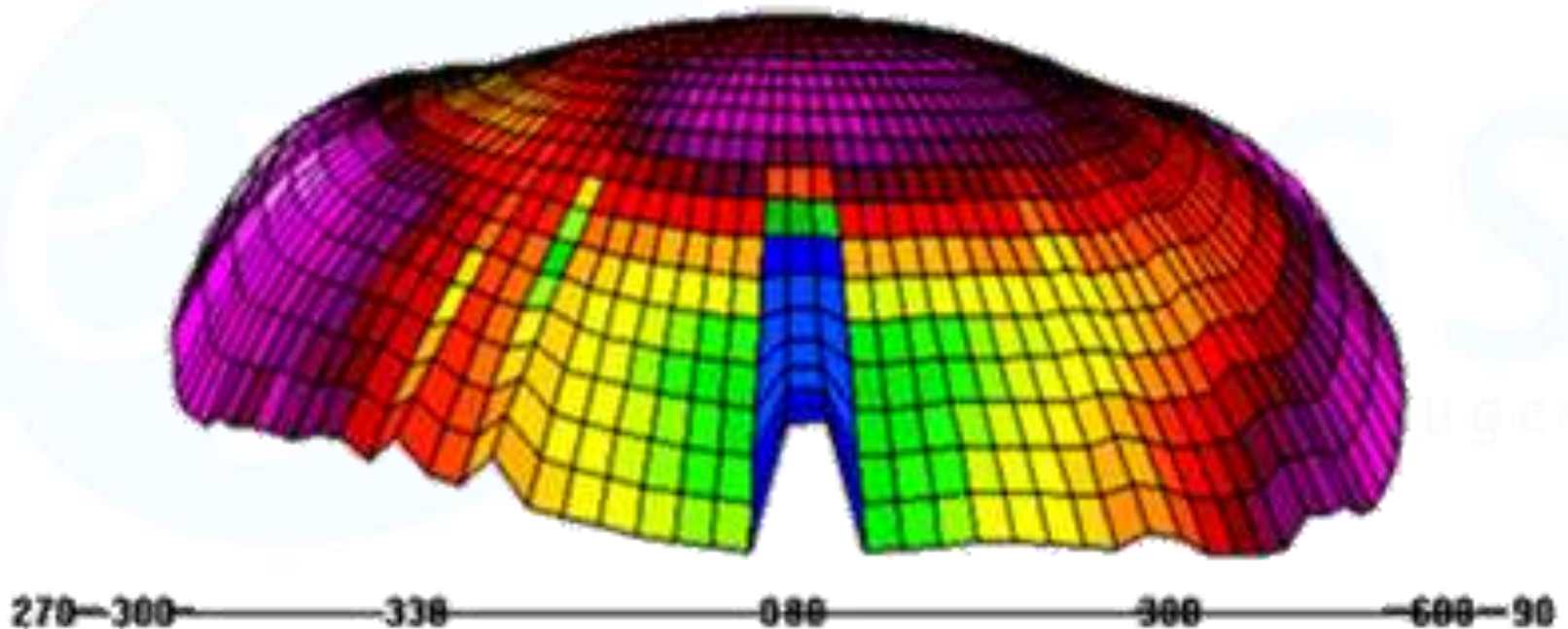
3D Images

Keratoconus



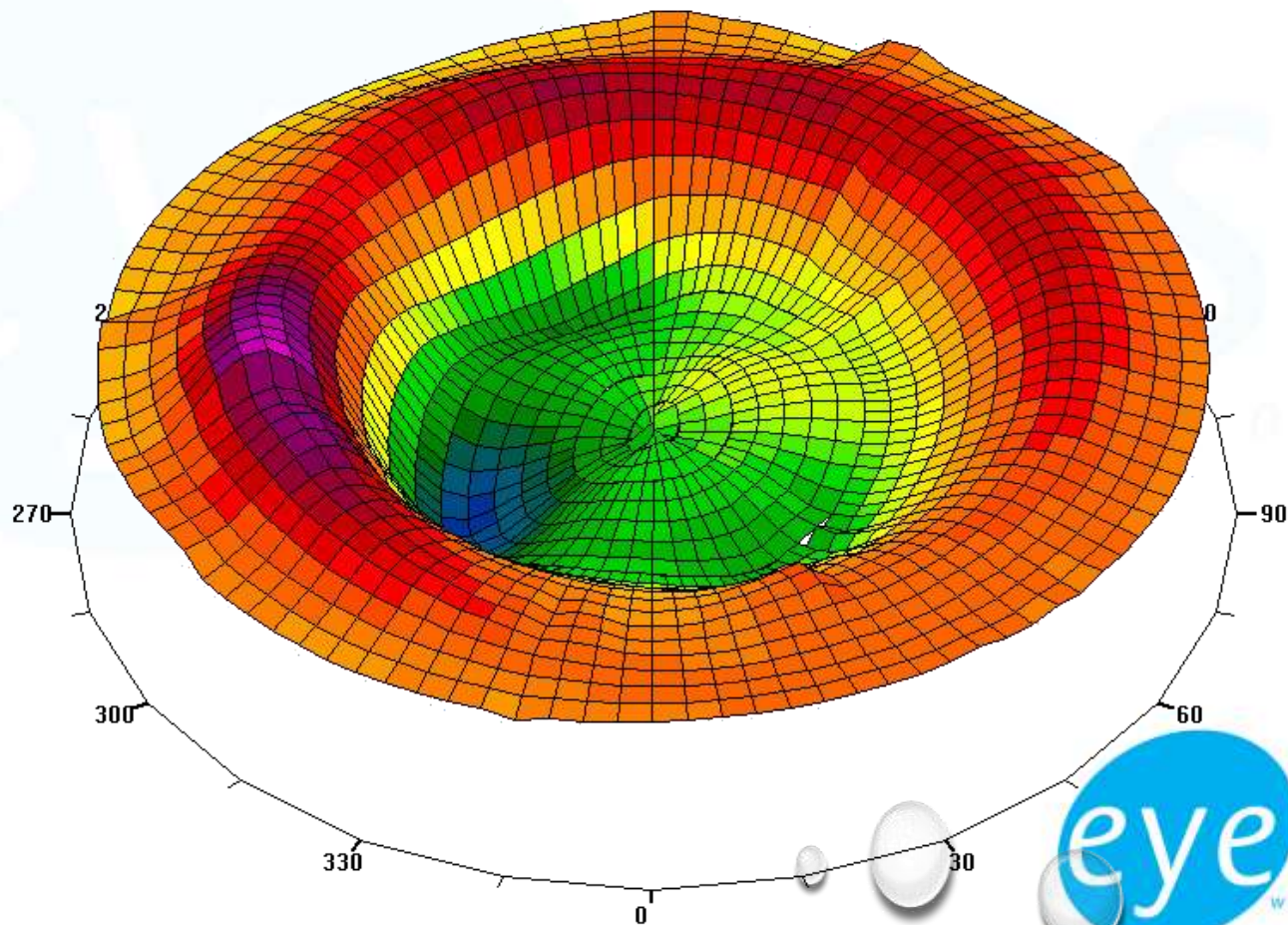
3D Images

Keratoplasty



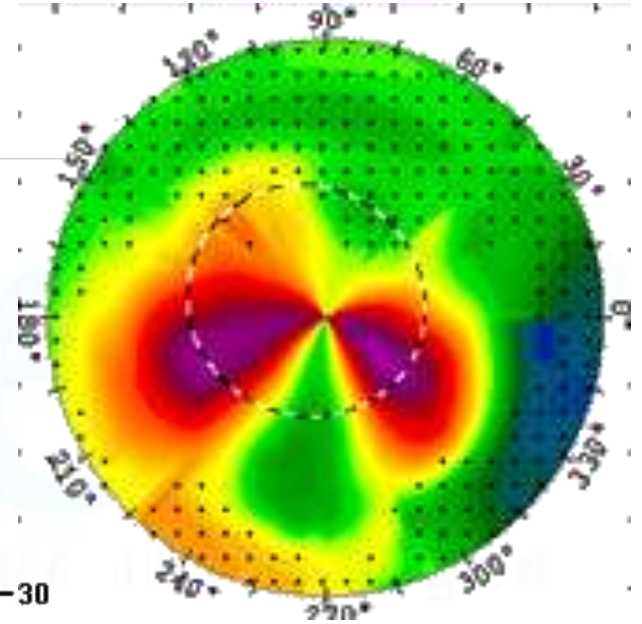
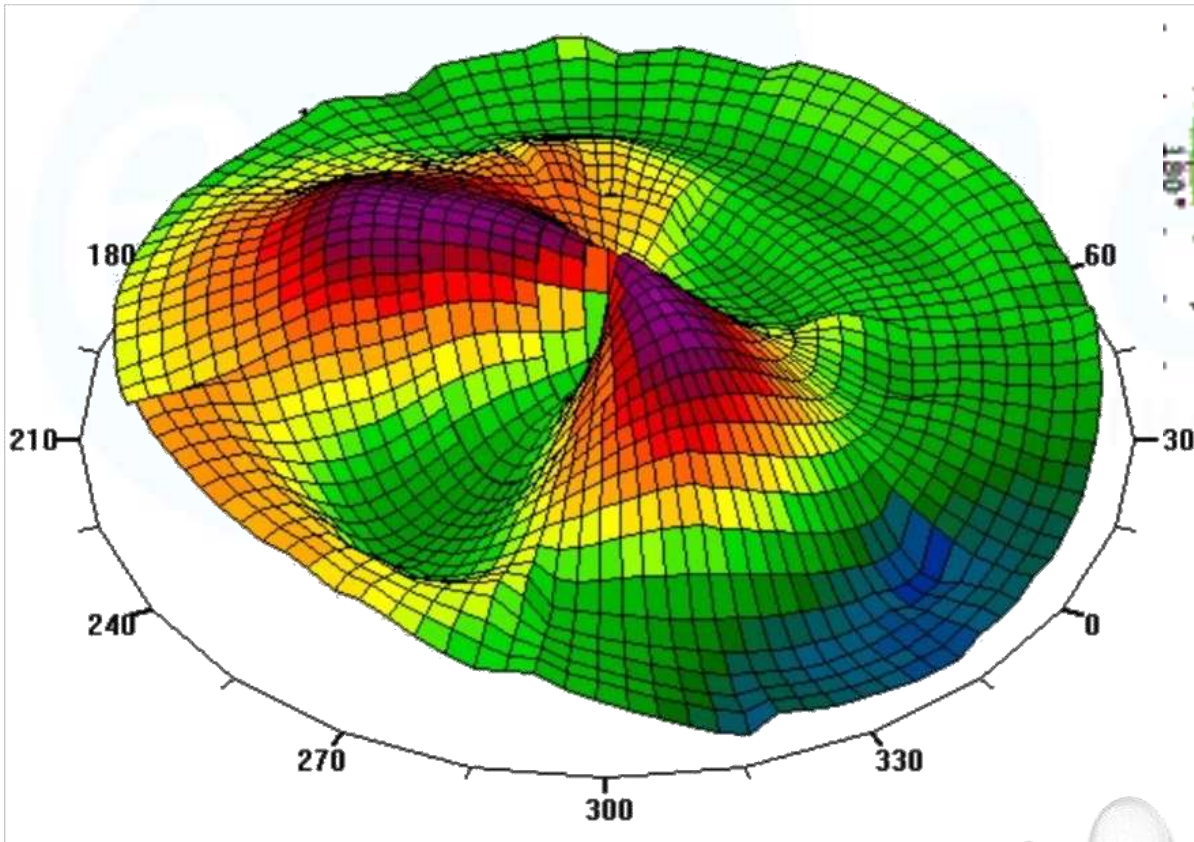
3D Images

LASIK / Orthokerathology



3D Images

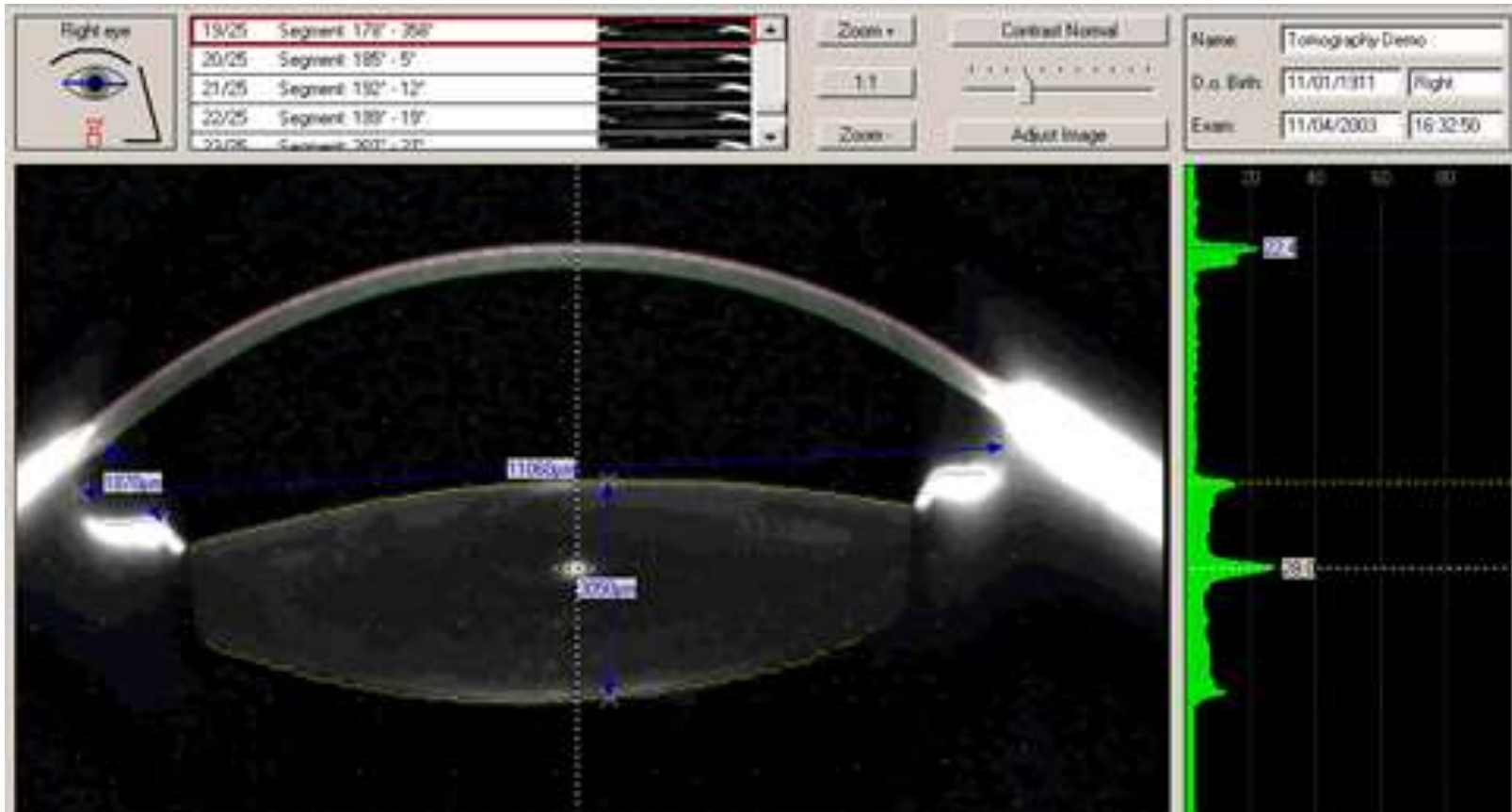
Pellucid marginal Degeneration



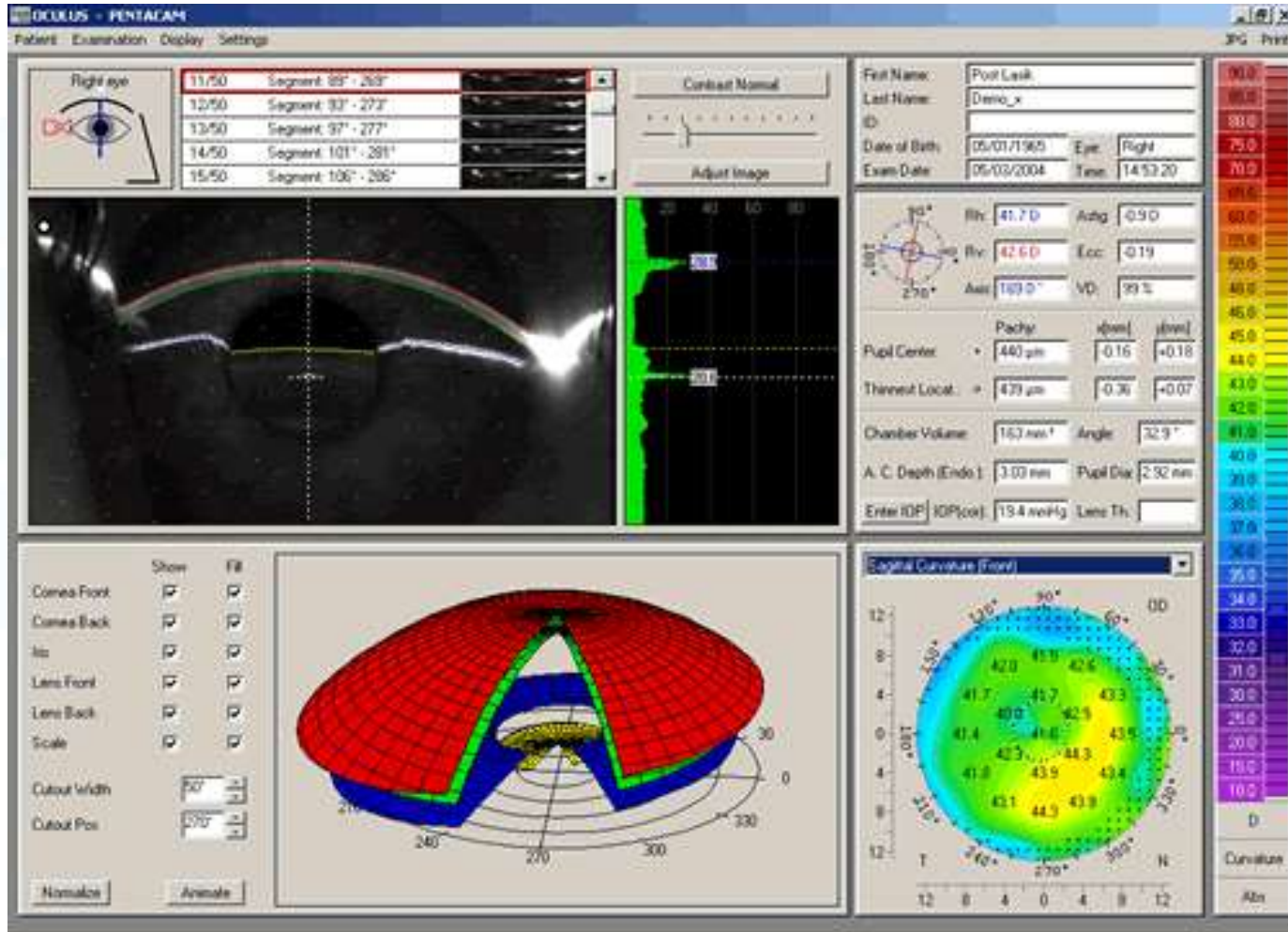
Scheimpflug Technology

- Slit illumination creating a cross-sectional image of the anterior chamber
 - True elevation data rather than curvature values
 - Measurement of anterior and posterior surface, center of cornea really measured
 - Independent of tear layer quality
 - Detection of opacities in cornea and cristalline lens

Scheimpflug Technology



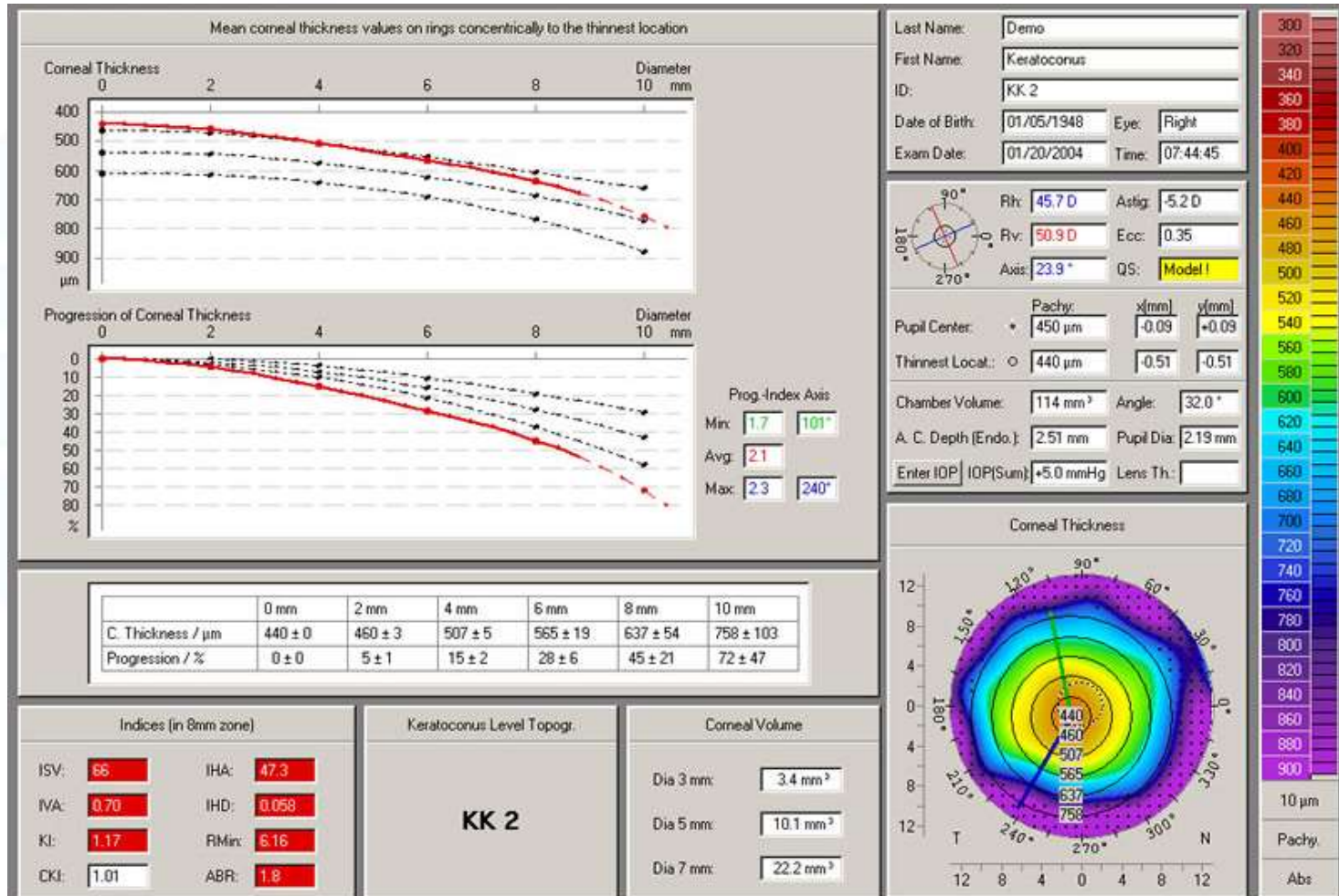
Diagnostic Software



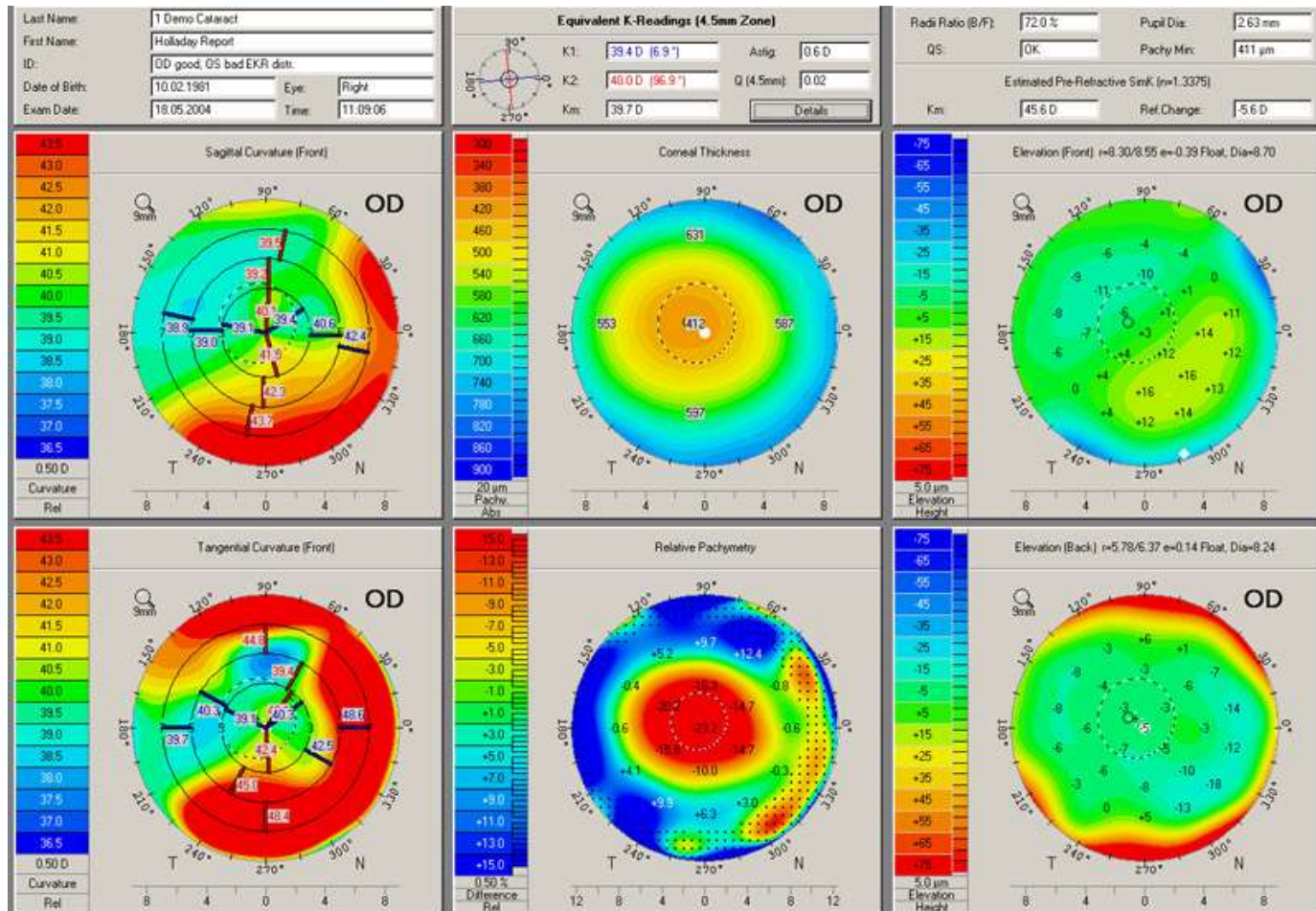
Diagnostic Software (Mapping)

- Topography and elevation data of anterior and posterior corneal surface
 - Keratoconus detection (very early due to the posterior surface evaluation) and classification
 - Advanced topographical calculation due to refractive surgery
 - Comparative displays for progression control and follow-up

Diagnostic Software (Pachy & Topo)

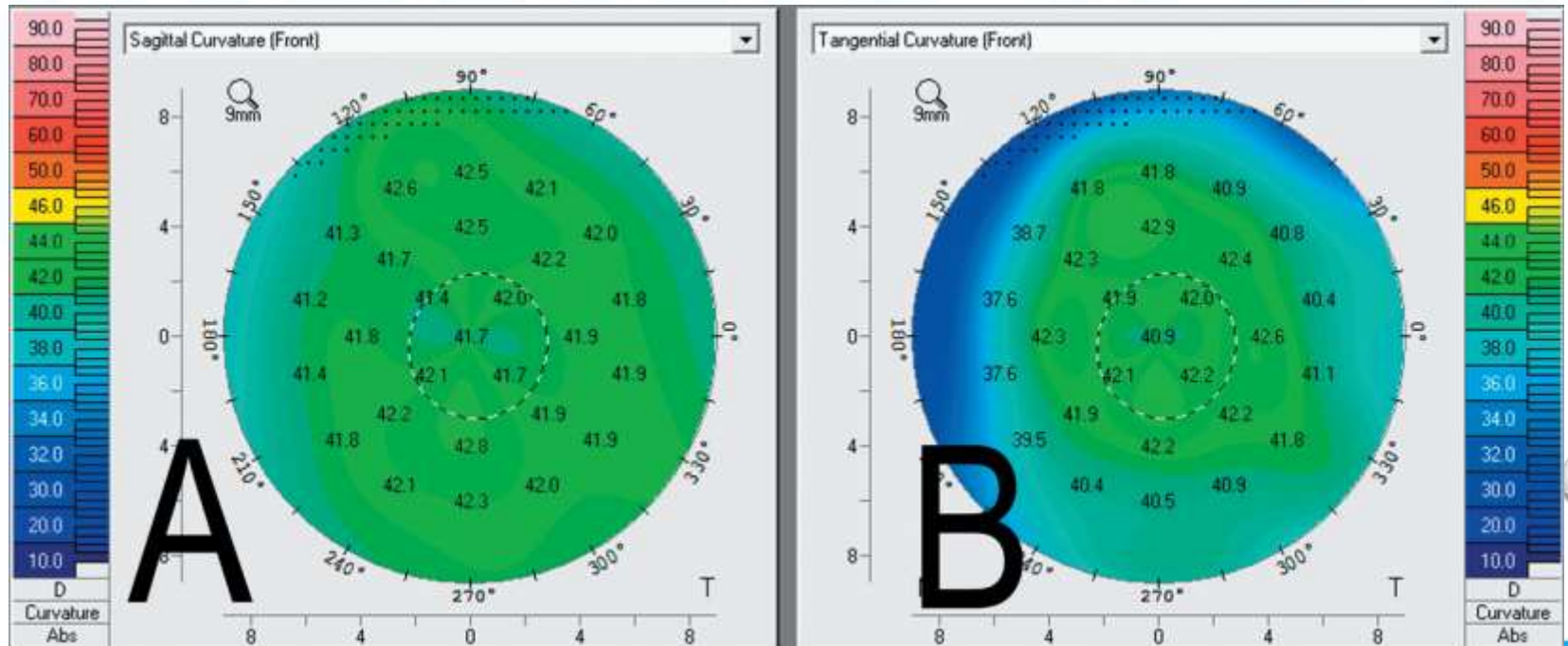


Diagnostic Software (Holladay Report)



Diagnostic Software (Belin/Ambrosio)

- Sagittal and tangential mapping shows similar results and no evidence of abnormality



OCT Technology

- Optical Coherence Tomography (OCT)
 - Mapping and Keratoconus detection software already available
 - Resolution between 5µm - 60 µm
 - Maximum of four scans, to date

OCT Technology

Patient	
Degel, Sindy F	
Degel, Sindy F	
Gloeckler, Silke	
Test Patient	
Tester, Testy	
we, we w	
we, we w	

Visit	
12/02/2010	9 Scans

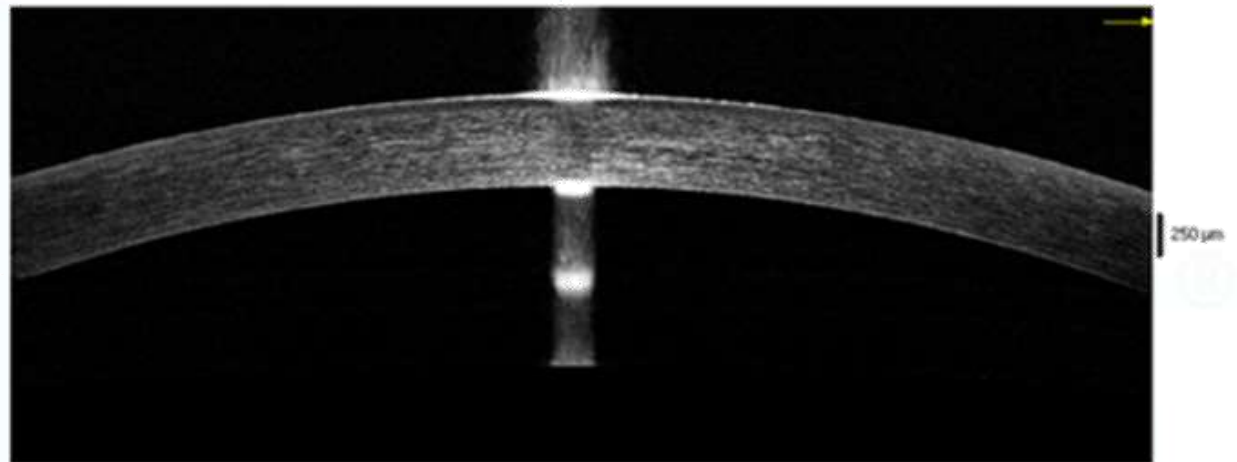
Scan	
<input type="checkbox"/>	OD Retina 02:54:14
<input type="checkbox"/>	OD Retina 02:55:51
<input checked="" type="checkbox"/>	OD Glaucoma 11:58:46
<input checked="" type="checkbox"/>	OD Glaucoma 11:59:16
<input checked="" type="checkbox"/>	OS Glaucoma 12:00:19
<input checked="" type="checkbox"/>	OD Cornea 12:12:55
<input checked="" type="checkbox"/>	OD Cornea 12:13:40
<input checked="" type="checkbox"/>	OS Cornea 12:18:25
<input checked="" type="checkbox"/>	OS Cornea 12:18:47

Tool	

Cornea

Scan Quality Index: **Good**

Left / C



Keratoconus

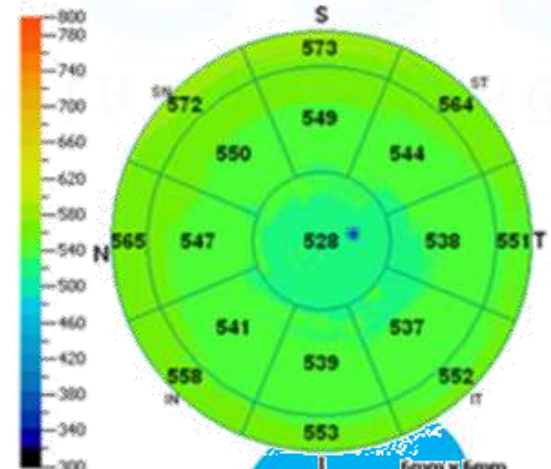
Pachymetry analysis within 5mm zone. Unit = µm.

SN-IT(2-5mm): S-I(2-5mm):

Min: Location Y:

Min-Median: Min-Max:

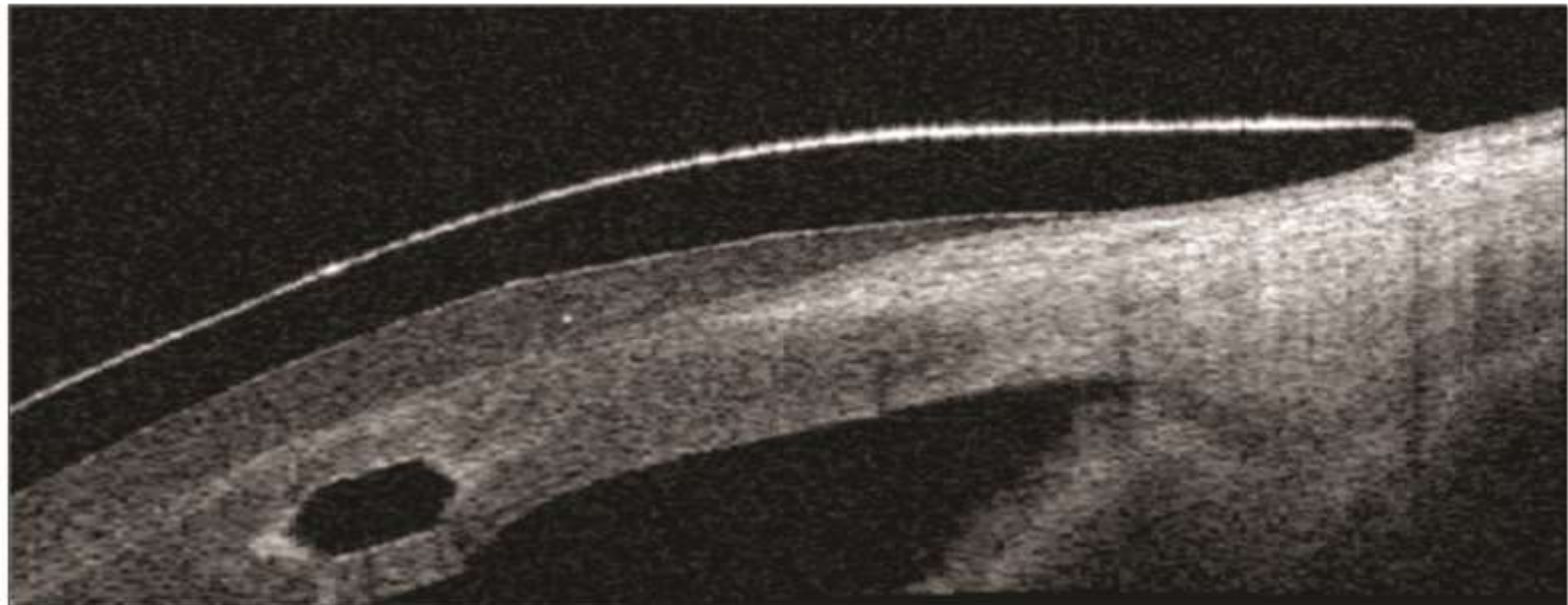
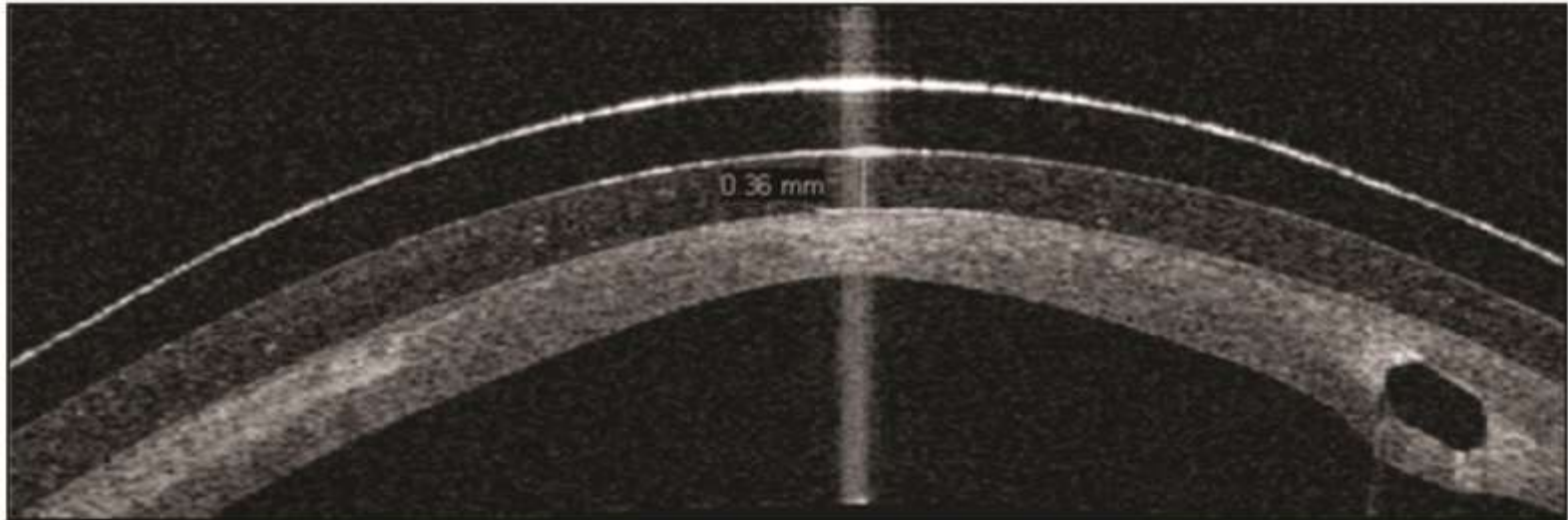
Min thickness at (0.463mm, 0.105mm) indicated as *



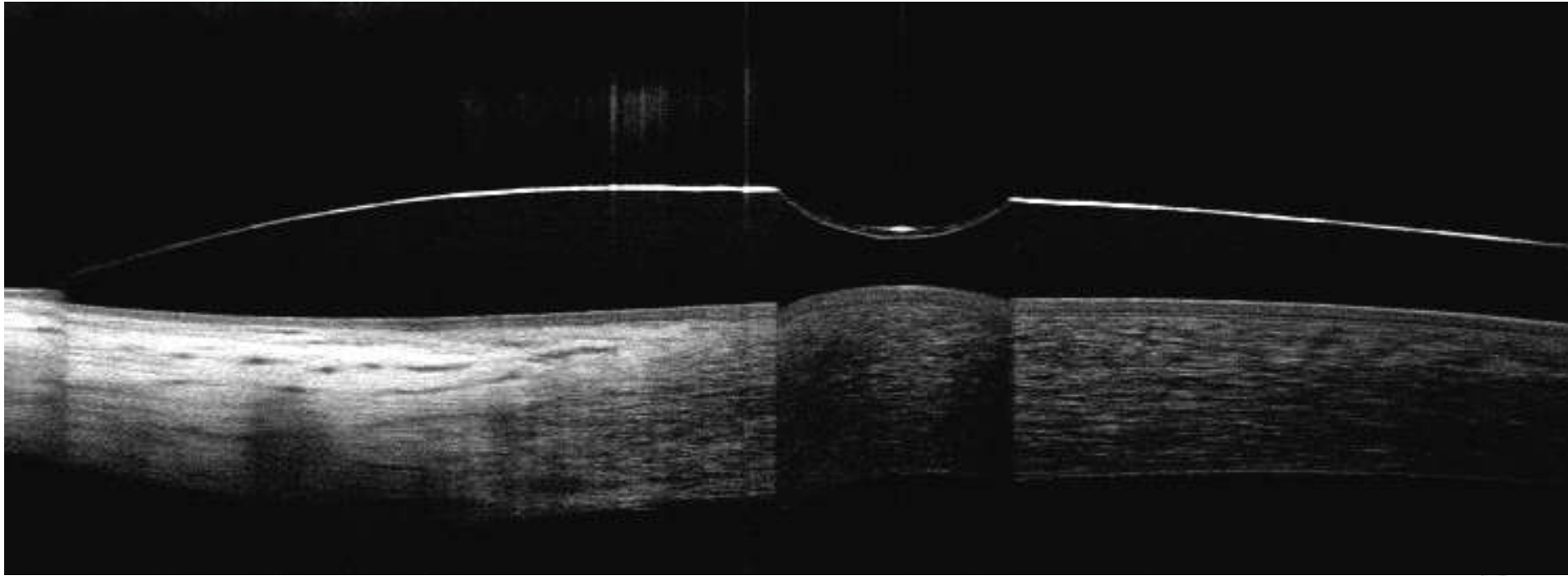
OCT Technology

- OCT and contact lenses
 - Measurement coverage up to 16.00mm and include Sclera/Conjunctiva data
 - Simplify scleral lens fitting process
 - Allows in-situ validation of any contact lens, even Hydrogel's

OCT Technology



OCT Technology

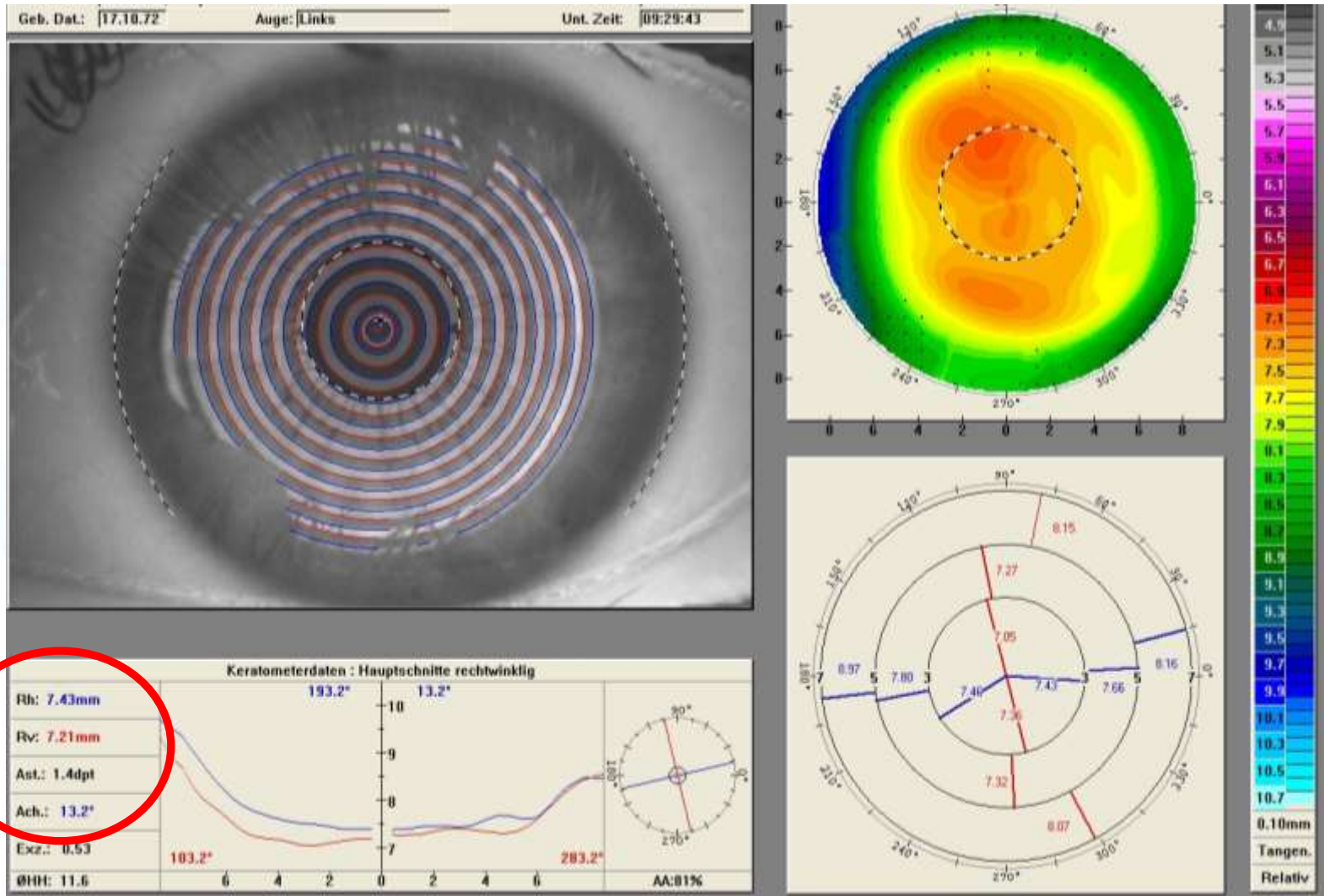


Toric Soft Lens Fit Analysis

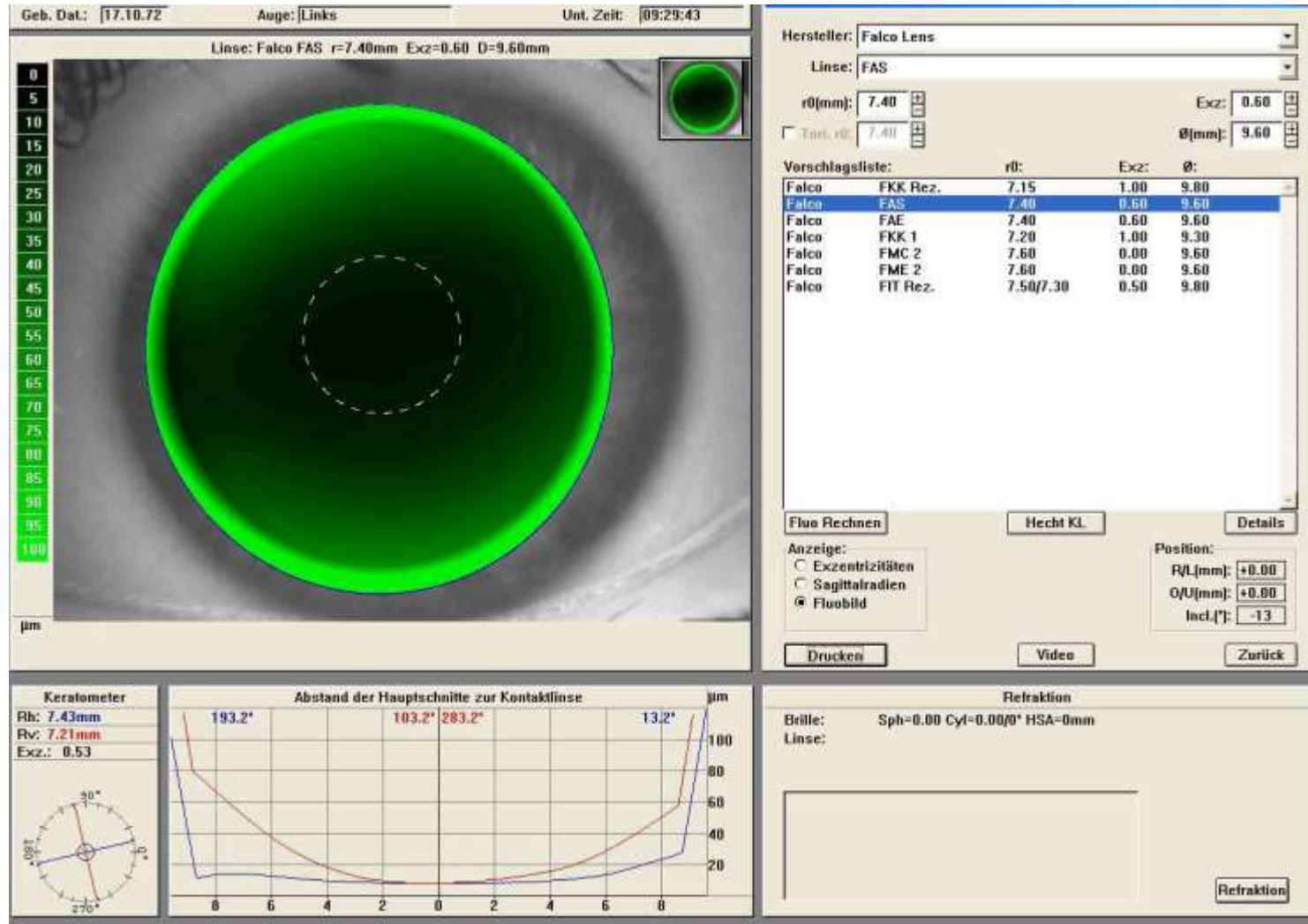
Fitting procedure

1. Anamnesis and History taking
2. Perform Slitlamp observation and Topography measurement
3. Check central and peripheral corneal astigmatism
4. Check ametropia and total eye astigmatism
5. Define wearing modality
6. Choose your ideal fitting strategy (Physiology and Optic)
7. Define the ideal material, lens geometry and over all diameter OAD
8. Check centration, rotation (stabilization axes) and vertical movement
9. Define Lens Care regime
10. Organize regular CL and Eye Checks
11. Send final report to Ophthalmologist

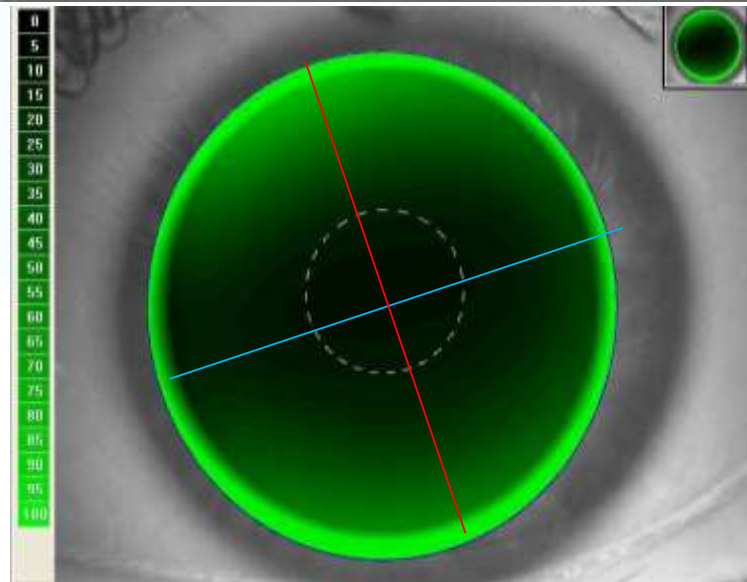
CL Fitting Software



CL Fitting Software

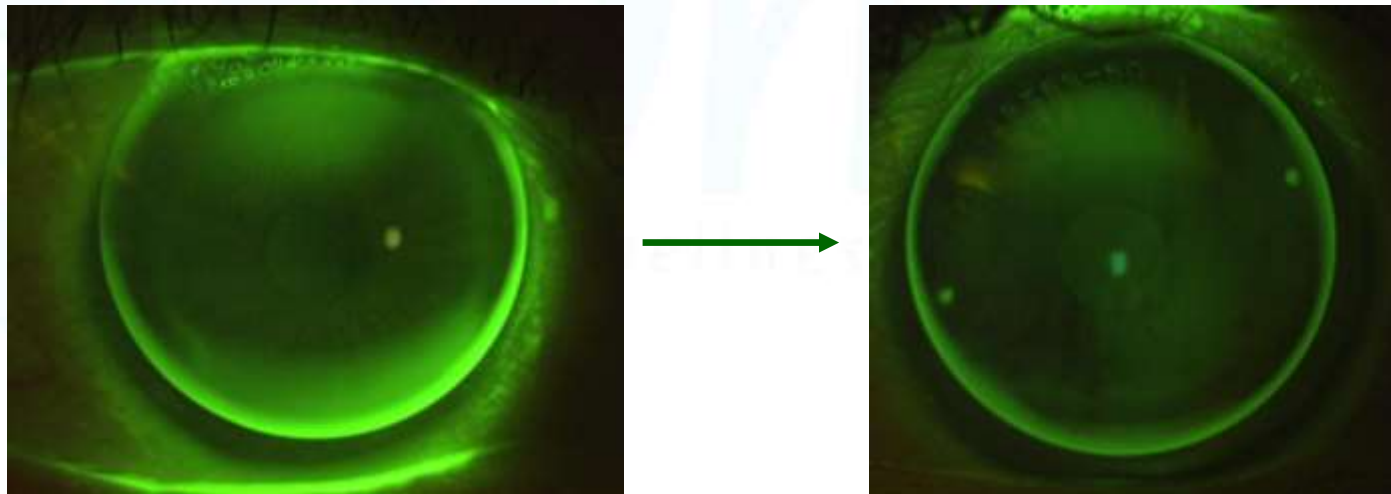


Fitting Software Oculus



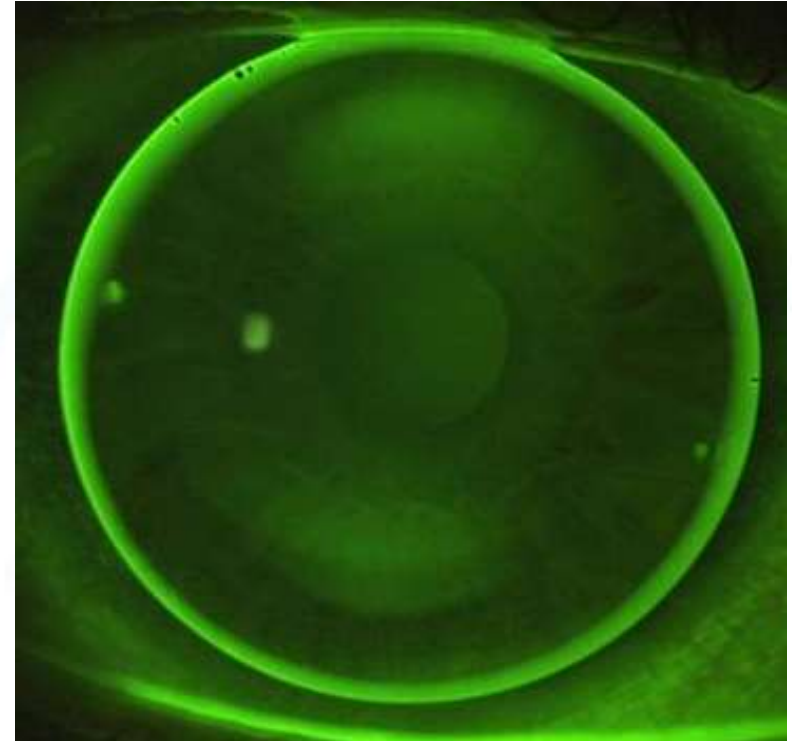
Fitting Software

- “Real Life” peripheral Astigmatism
 - The lens rocks around flat meridian
 - High or Low Riding lens as a consequence



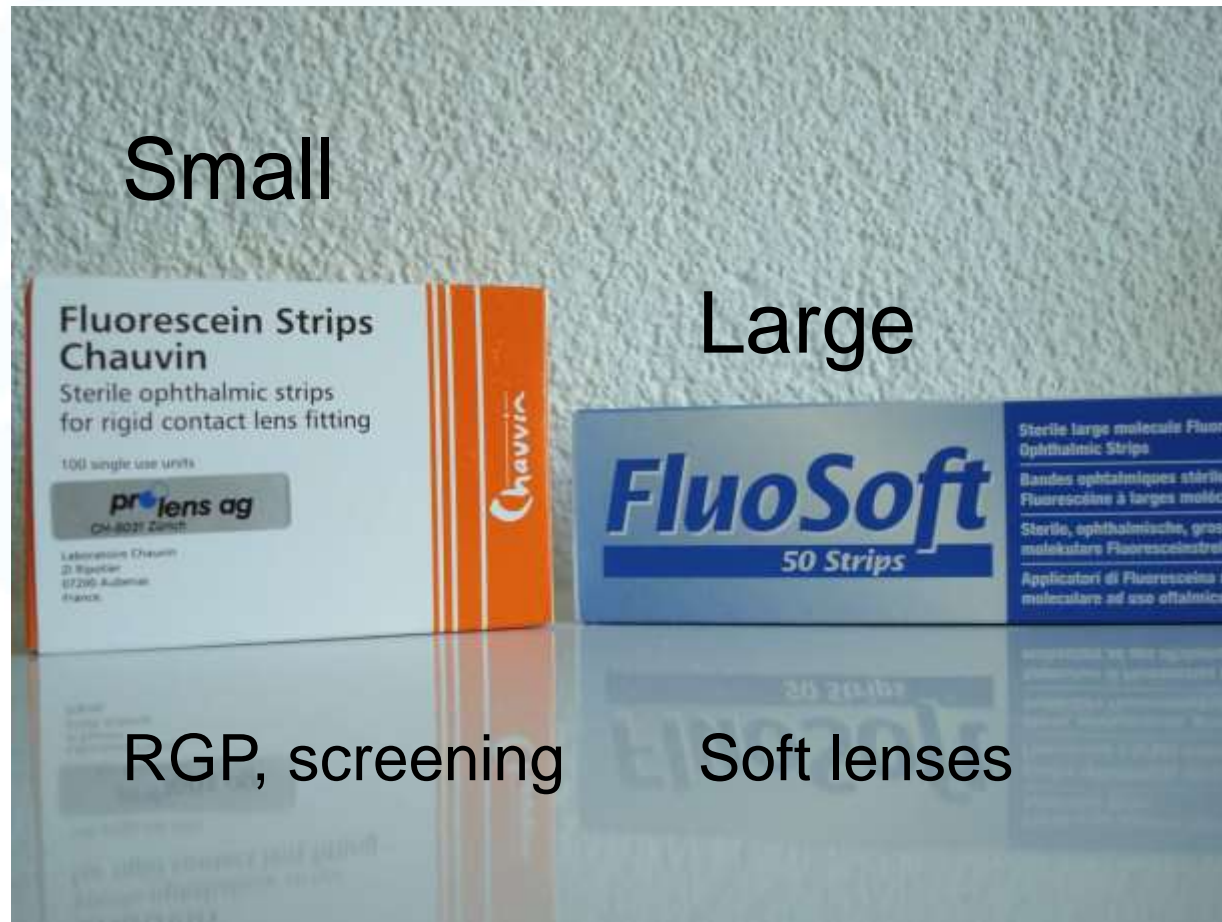
Final Fitting Result

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



Rigid Lens Fluorescein Patterns

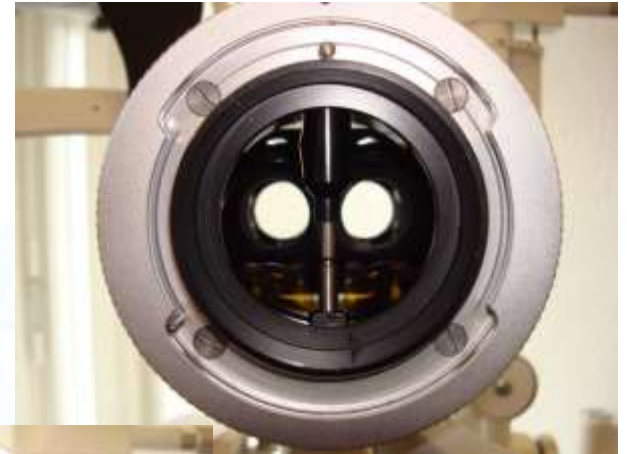
Products (Small molecular / Large molecular NaFl)



Rigid Lens Fluorescein Patterns

Technical approach (Kobalt Filter, Yellow (Wratten) Filter)

Kobalt Filter



Rigid Lens Fluorescein Patterns

Mobile Alternatives



LED hand held



Wratten

Yellow Filter 12

Rigid Lens Fluorescein Patterns

Application / Installation of NaFl



Install only a small (!) drop of NaFl, diluted with NaCl

Characteristics: Diameter

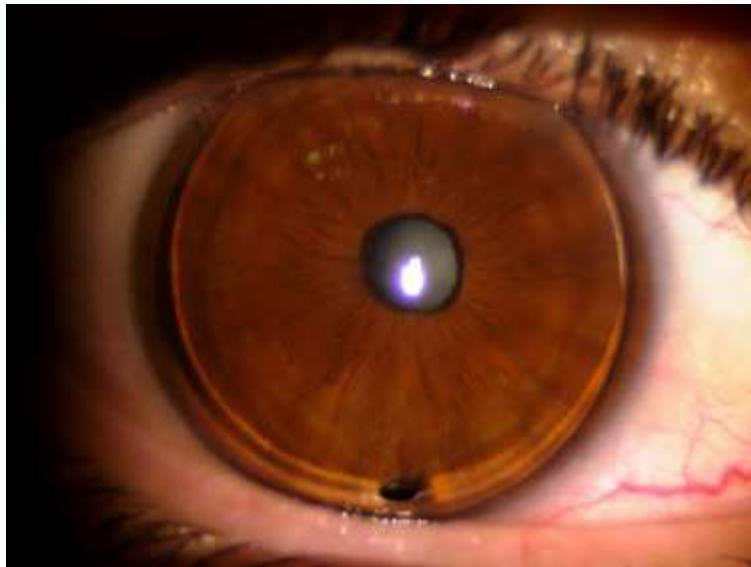
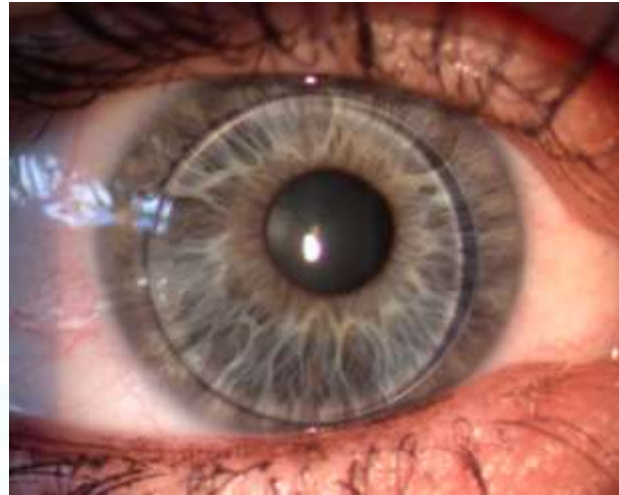
Small lenses :

Tear exchange

Oxygen

Movement

Price (standard lenses)



Large lenses (intra-limbal):

Comfort

Stabilization

Safety

Less dust (foreign body)

Handling

Characteristics: Diameter

Very large lenses :
("Miniscleral" or Scleral)

Comfort

Stabilization

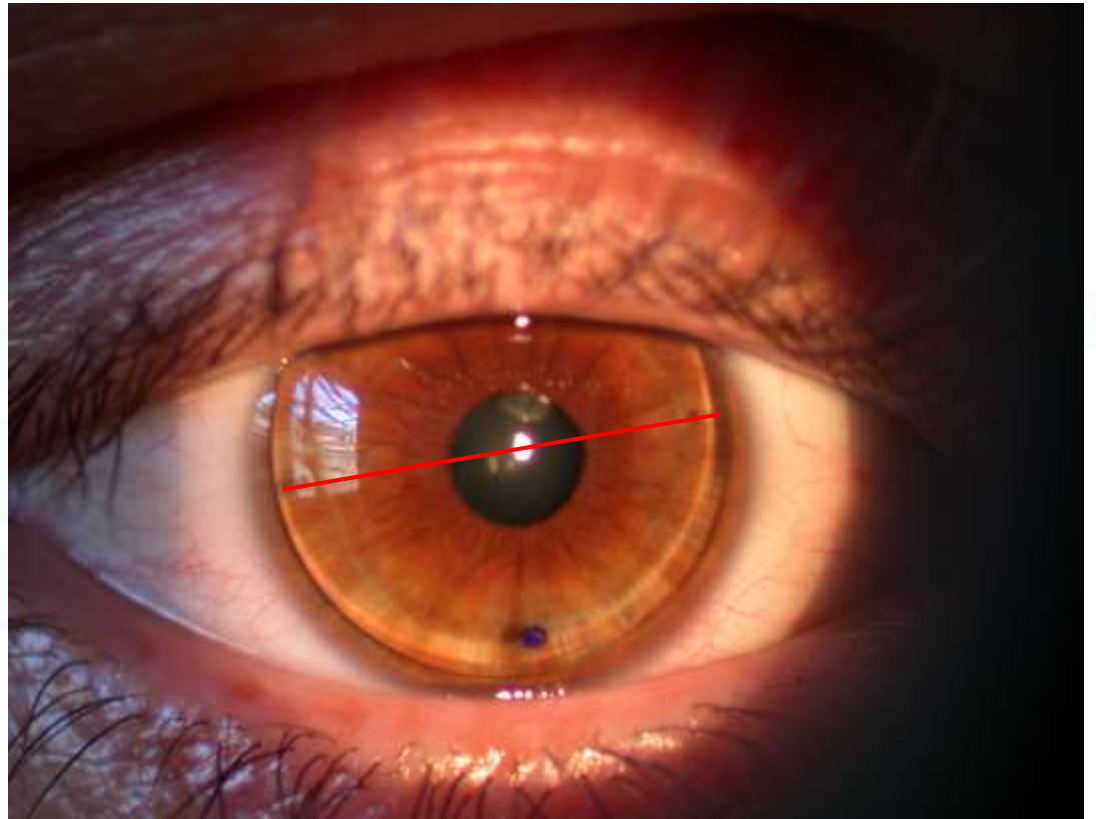
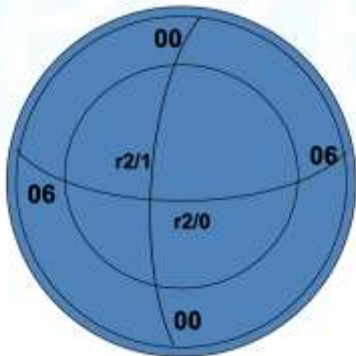
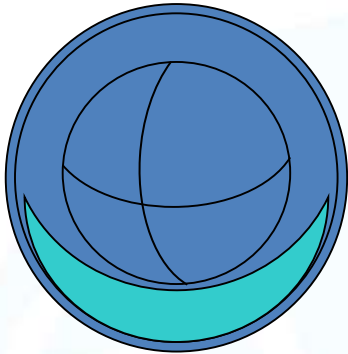
Less dust (foreign body)

Protection

Visual acuity !



Contact Lenses for Astigmatism



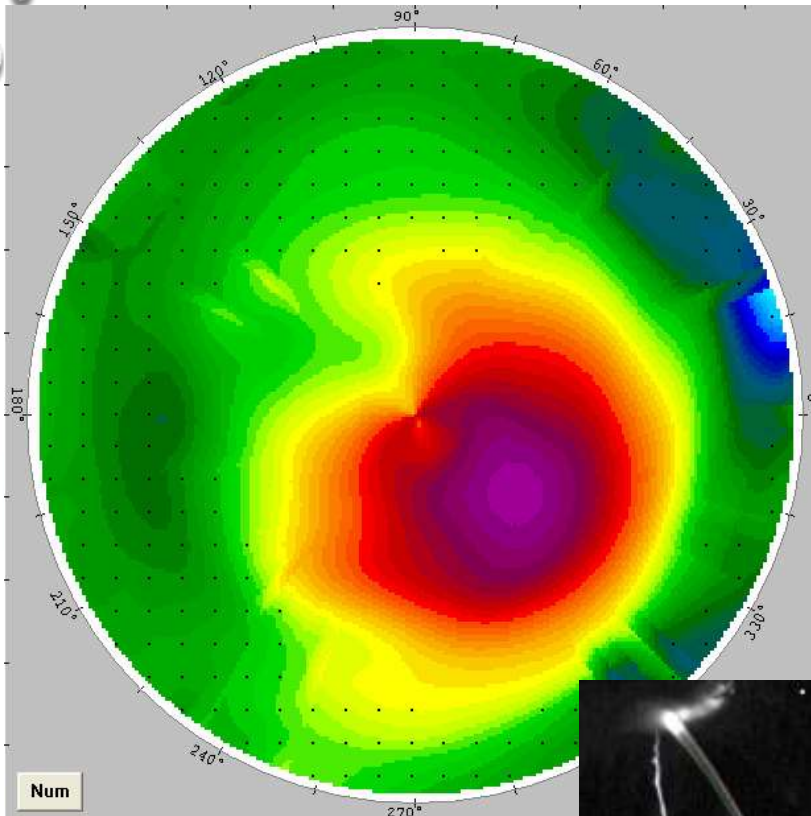
Available for Soft and Hard GP Lenses up to +/- 20dpt cyl

Contact Lenses for Irregular Corneas

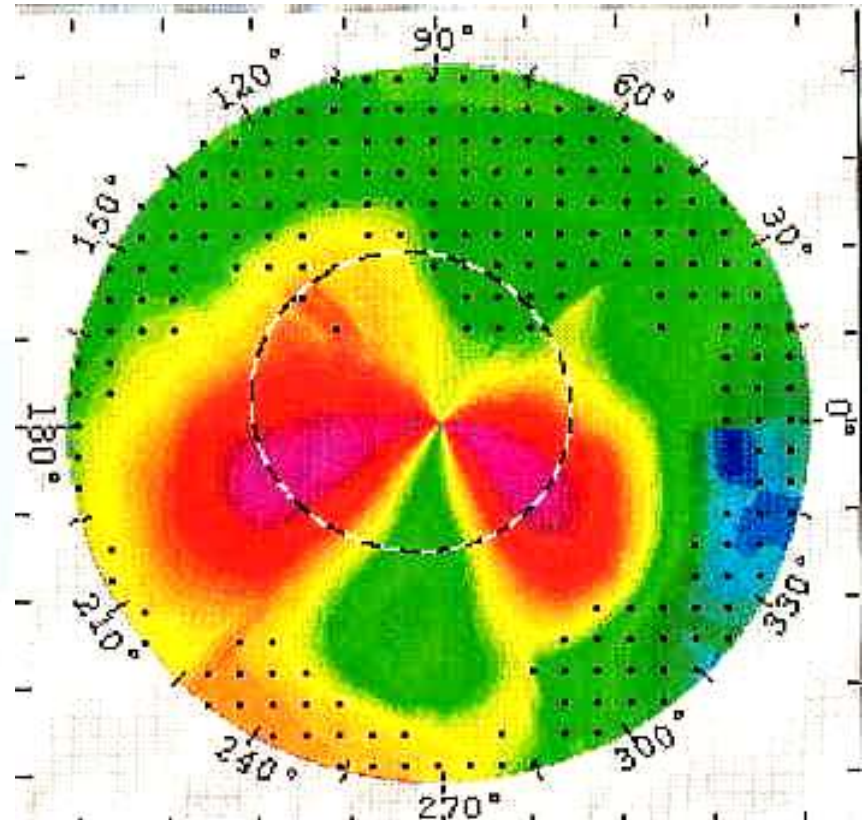
Due to :

Contact lens use	(Deformation, unacceptable fit, Pseudo Keratoconus)
Trauma	(Physical, chemical)
Infections	(Microorganism)
Degeneration	(Keratoconus, Marginal Deg., Salzmann, Band Deg,...)
Dystrophy	(EBM Dystrophy, Mapdot-fingerprint, Meesmann, Fuch's, bullous Epitheldys., Granular, Lattice,)
Systemic	(e.g. Lyell Syndrom)
Post surgery	(PKP, lamellar Keratoplasty, Trabectectomy / Filtering bleb)
Refractive surgery	(RK, PRK, LASIK/LASEK, SMILE...)

Typical Topographies



Keratoconus



Pellucid marginal
or Terrien Degeneration

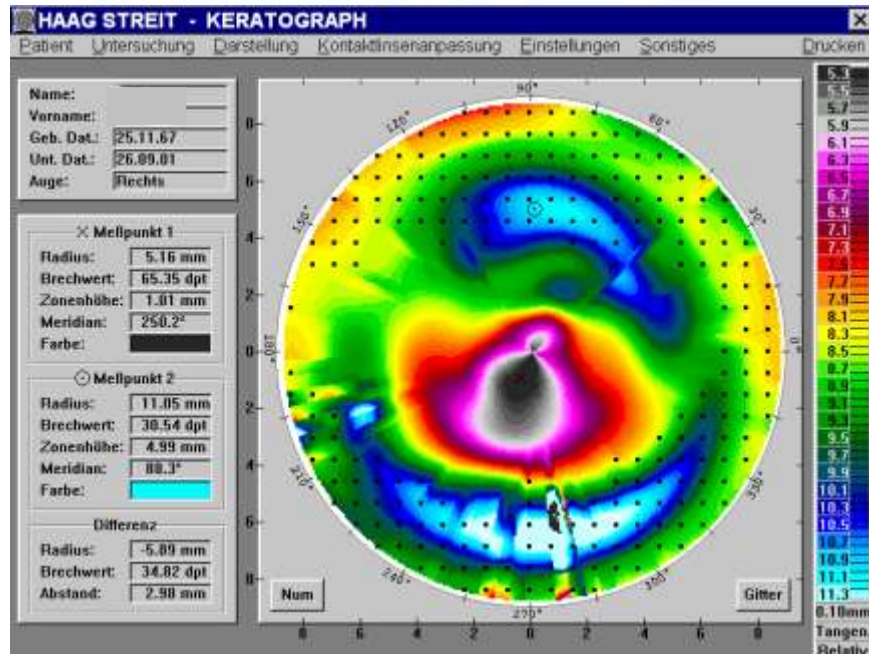
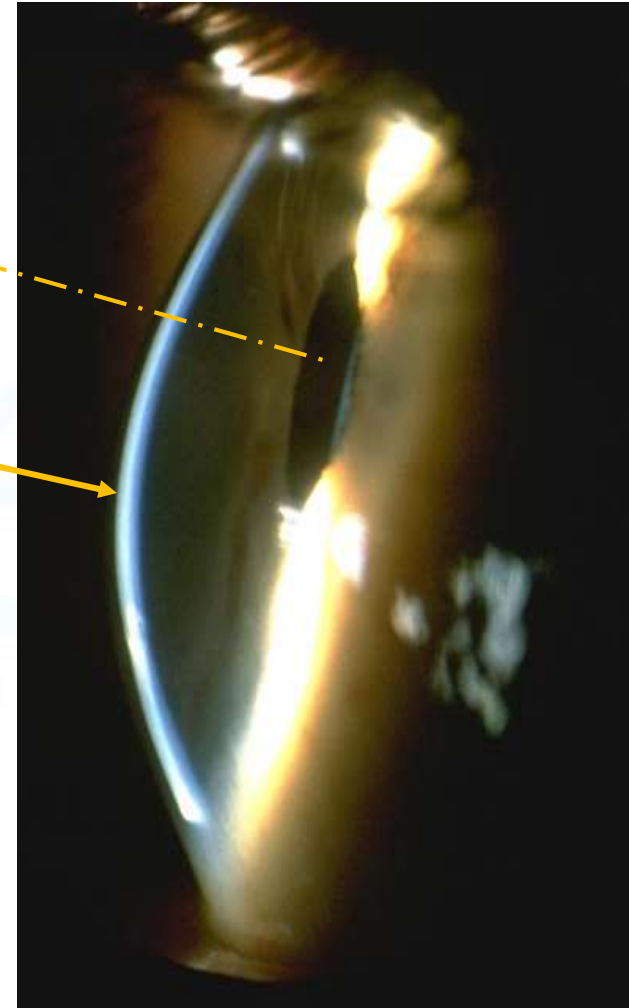
Keratoconus

Scars and
folds
(Vogt Striae
or Haab
Lines)

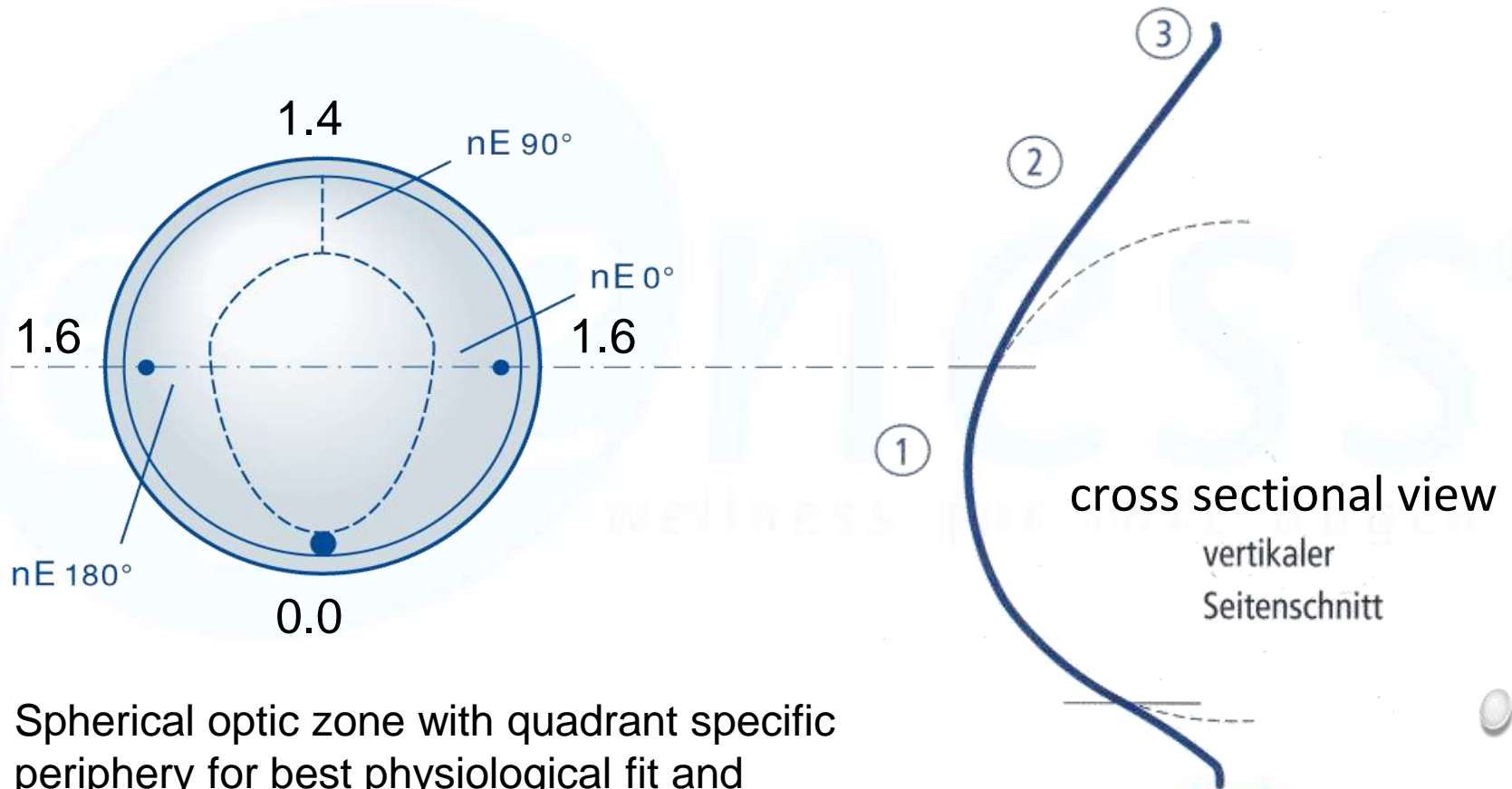


Optical Axes
Center of Pupil

Apex caudal
decentered

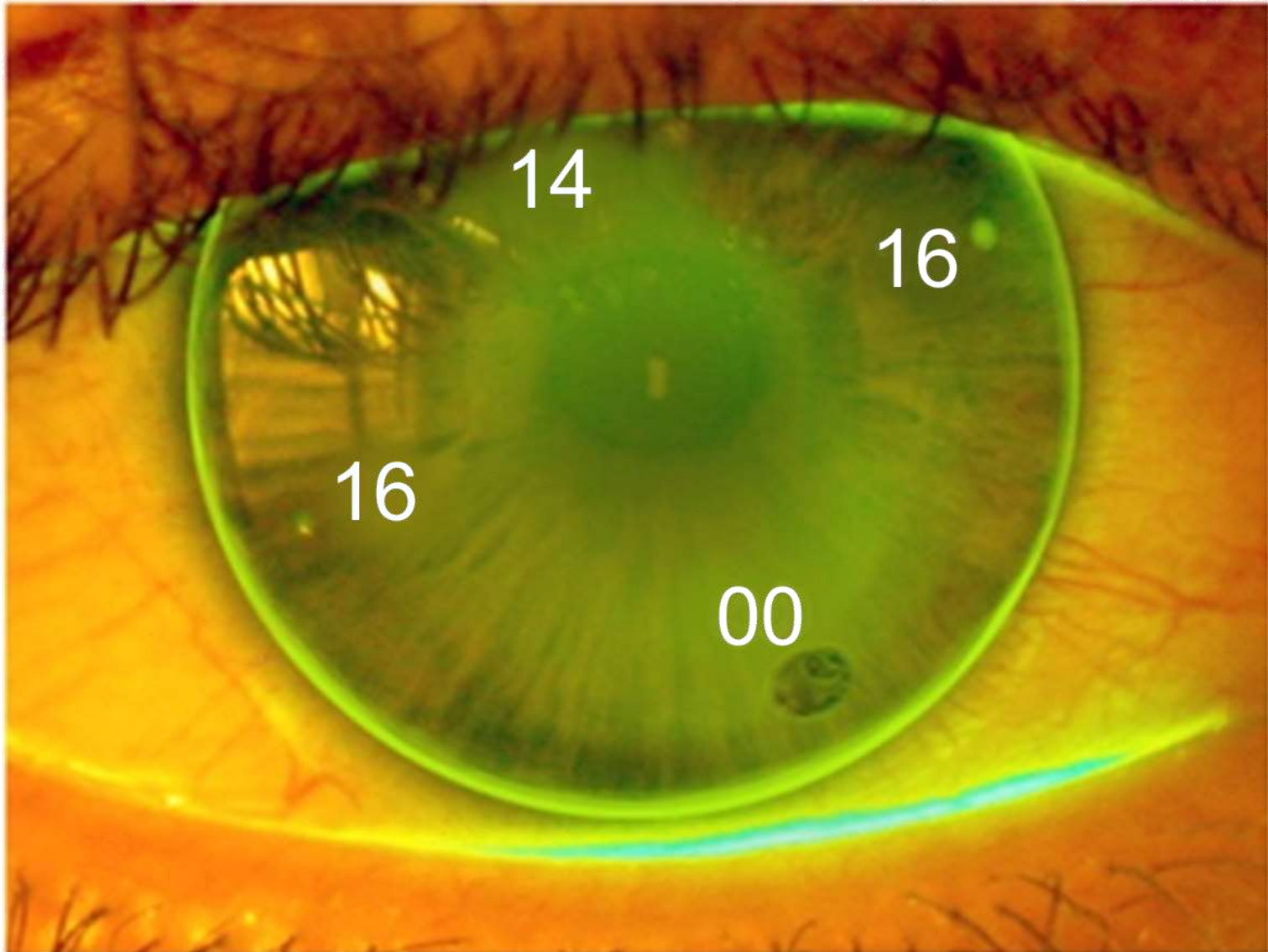


Quadrant-specific Design

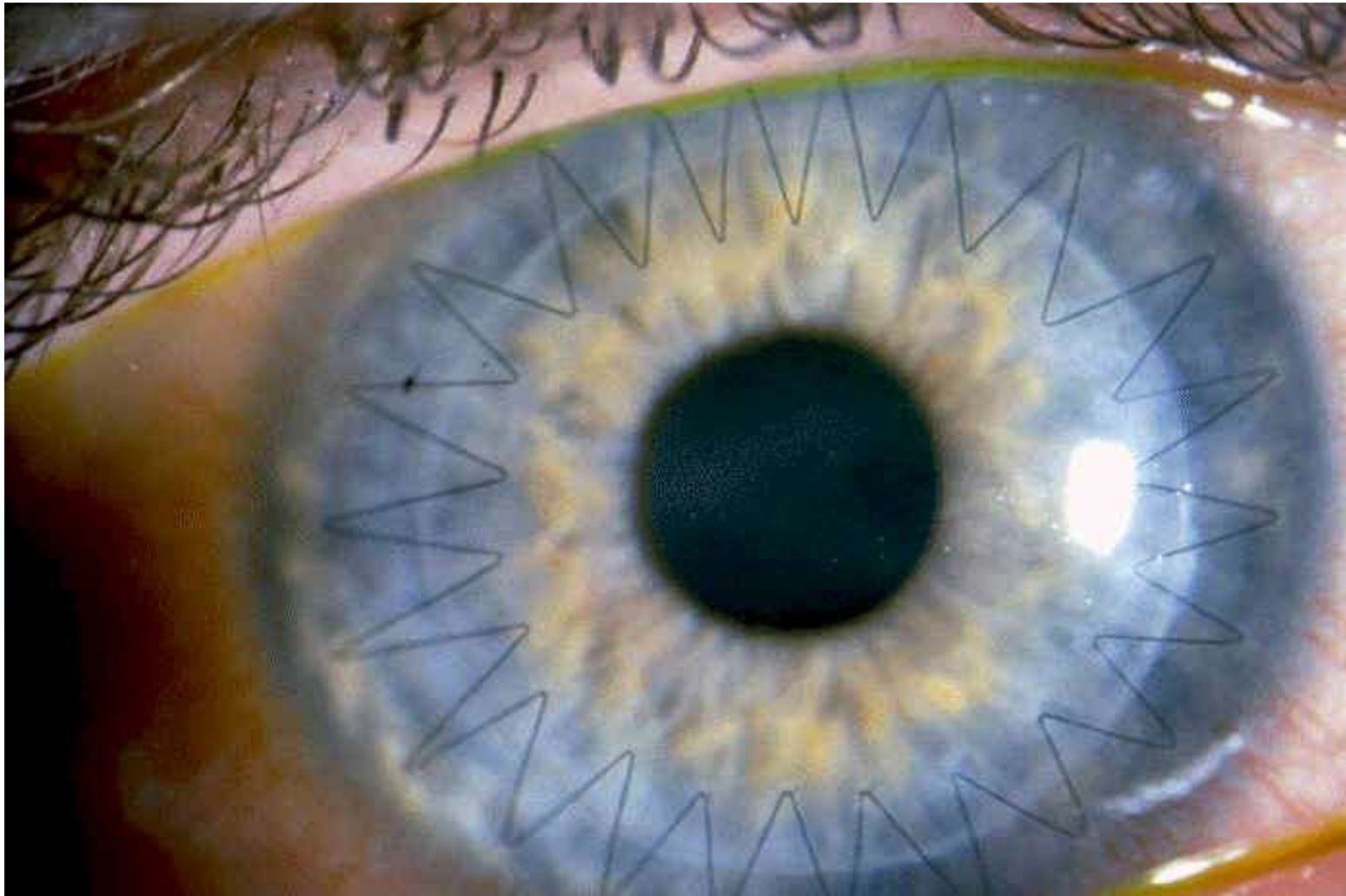


Spherical optic zone with quadrant specific periphery for best physiological fit and maximized visual acuity.

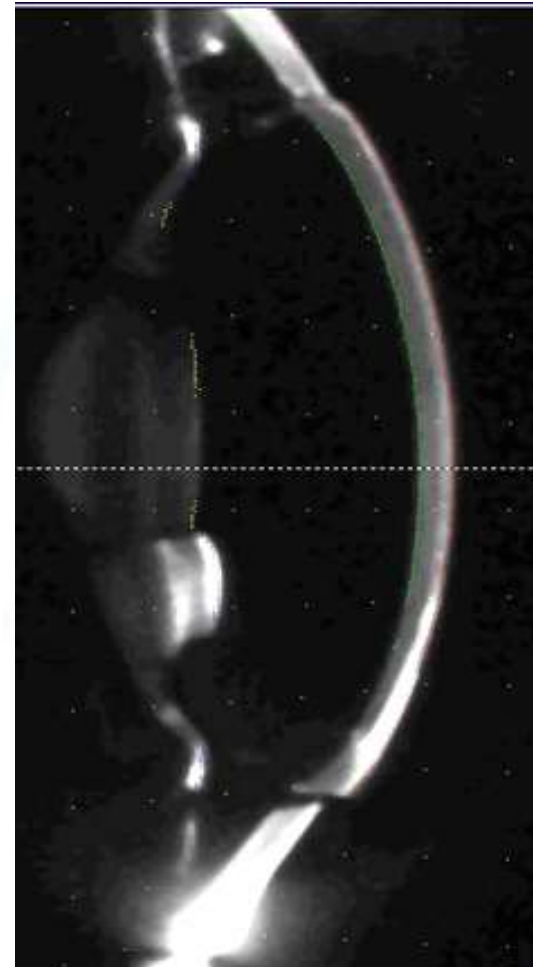
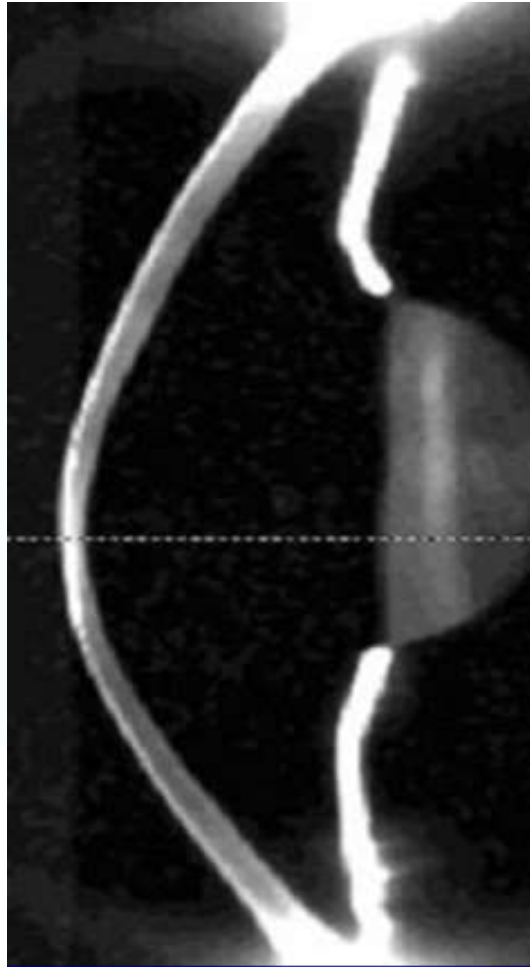
Quadrant-specific Design



Penetrating Keratoplasty



Cross section view Comparison



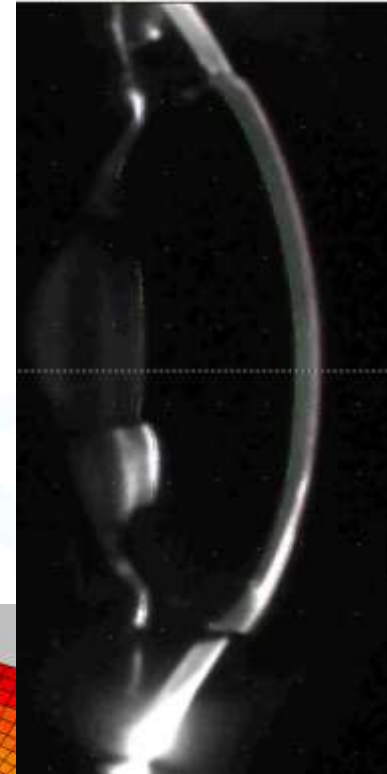
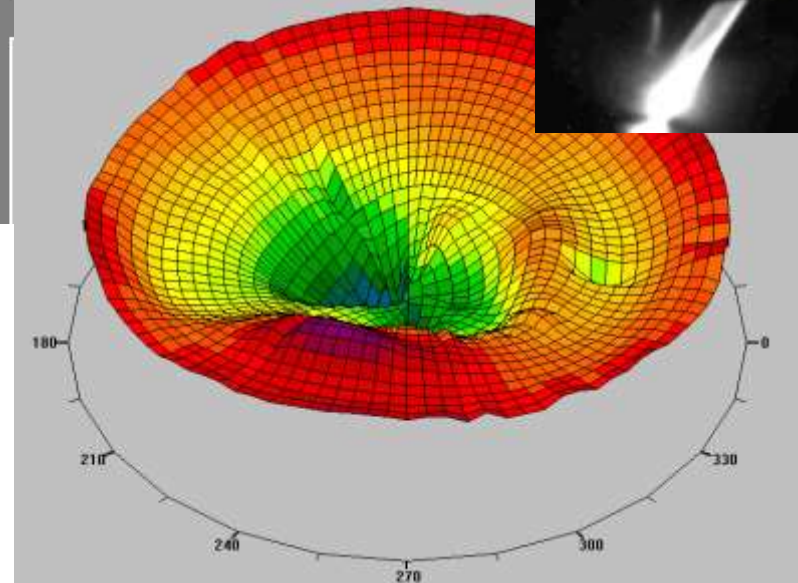
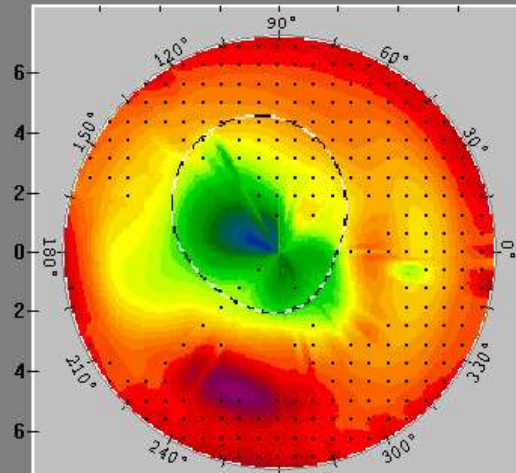
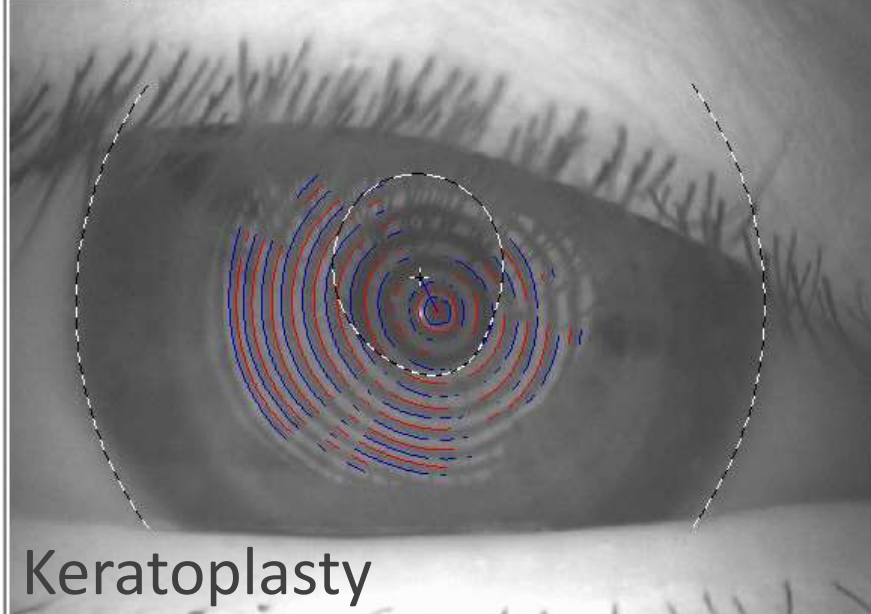
Typical Topographies

OCULUS - KERATOGRAPH

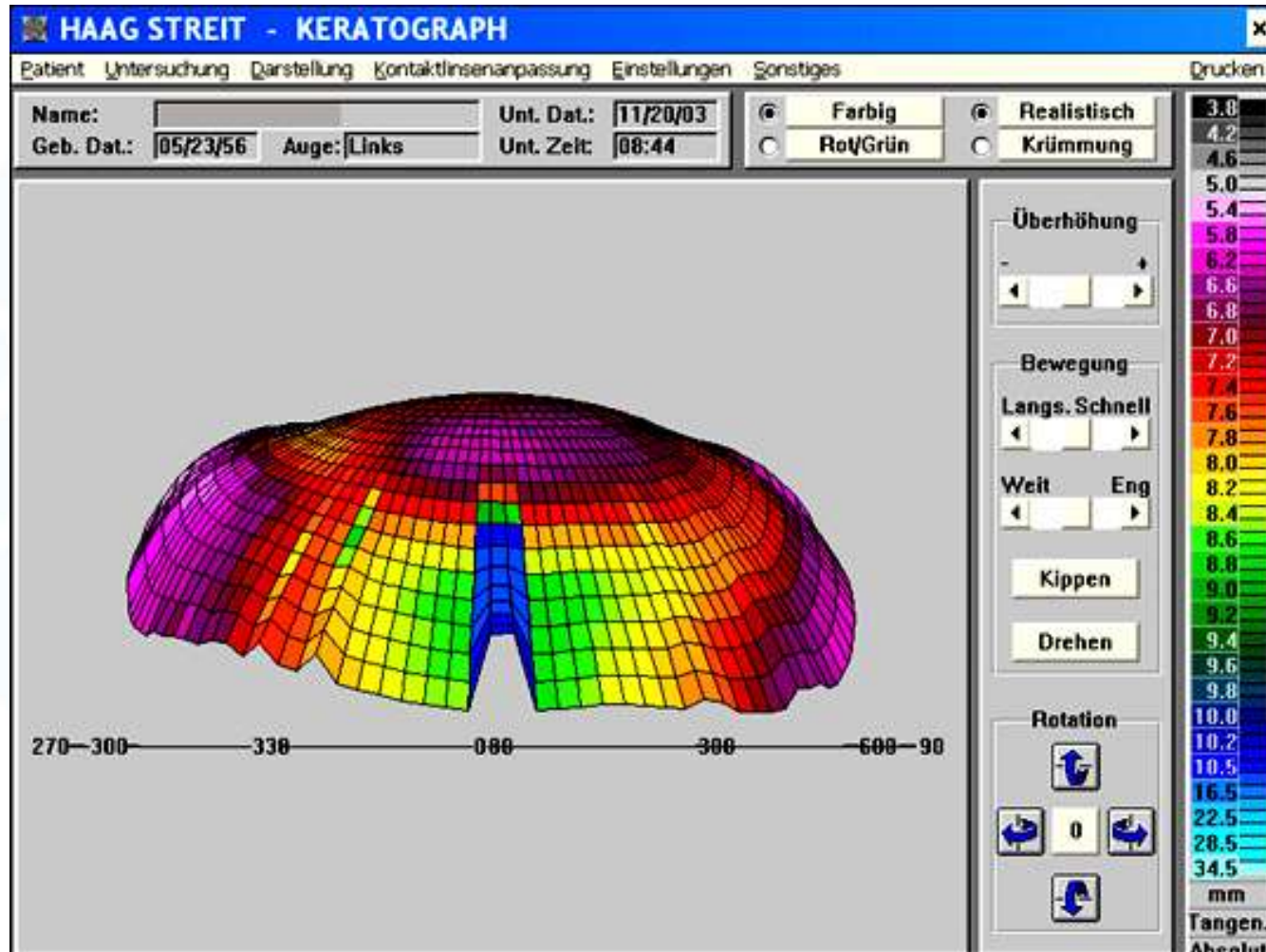
Patient Untersuchung KL-Test Darstellung Kontaktlinsenanpassung Einstellungen Sonstiges

Name: Unt. Dat.: 22.01.07
Geb. Dat.: 27.05.64 Auge: Rechts Unt. Zeit: 14:33:24

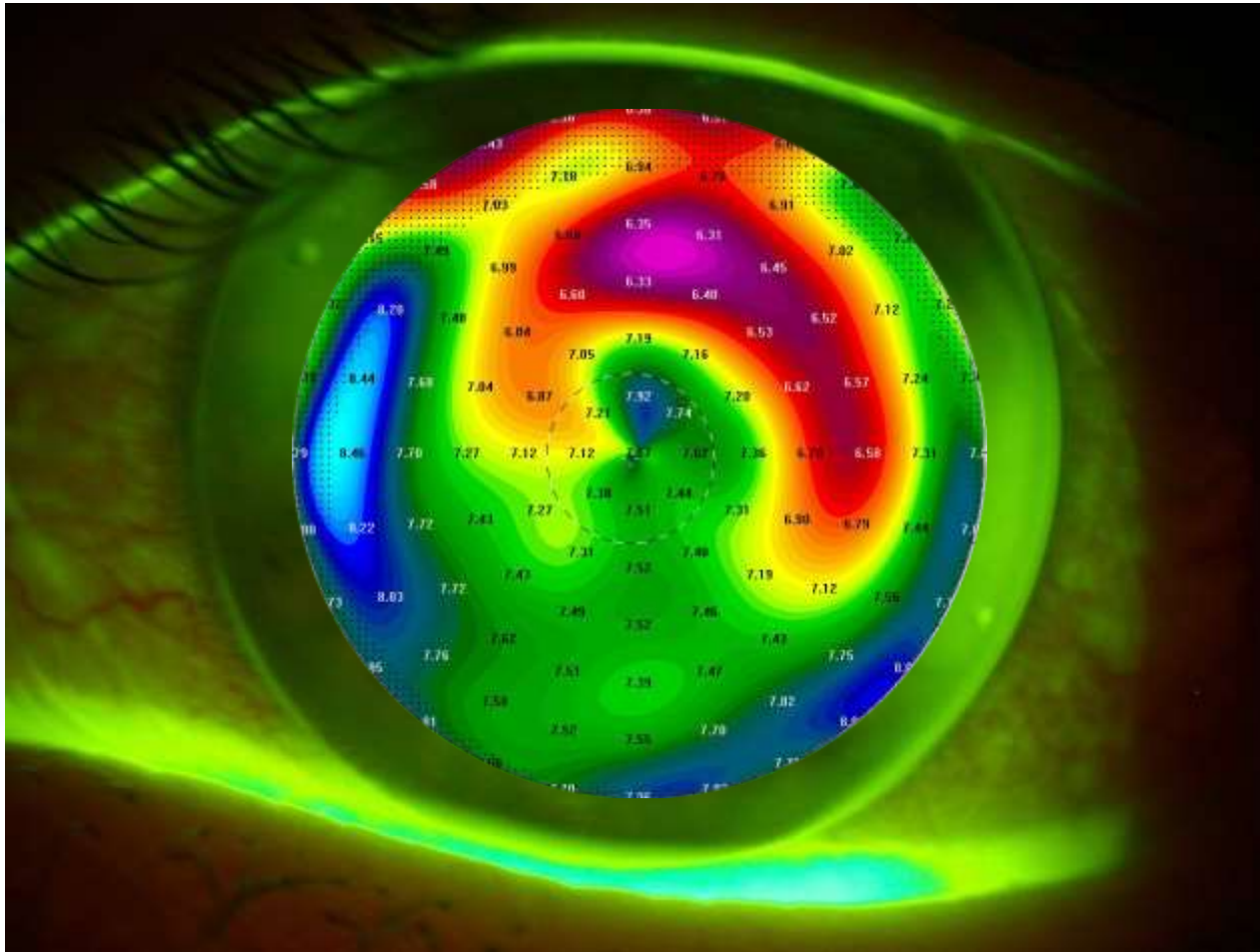
manuel ausgelöst



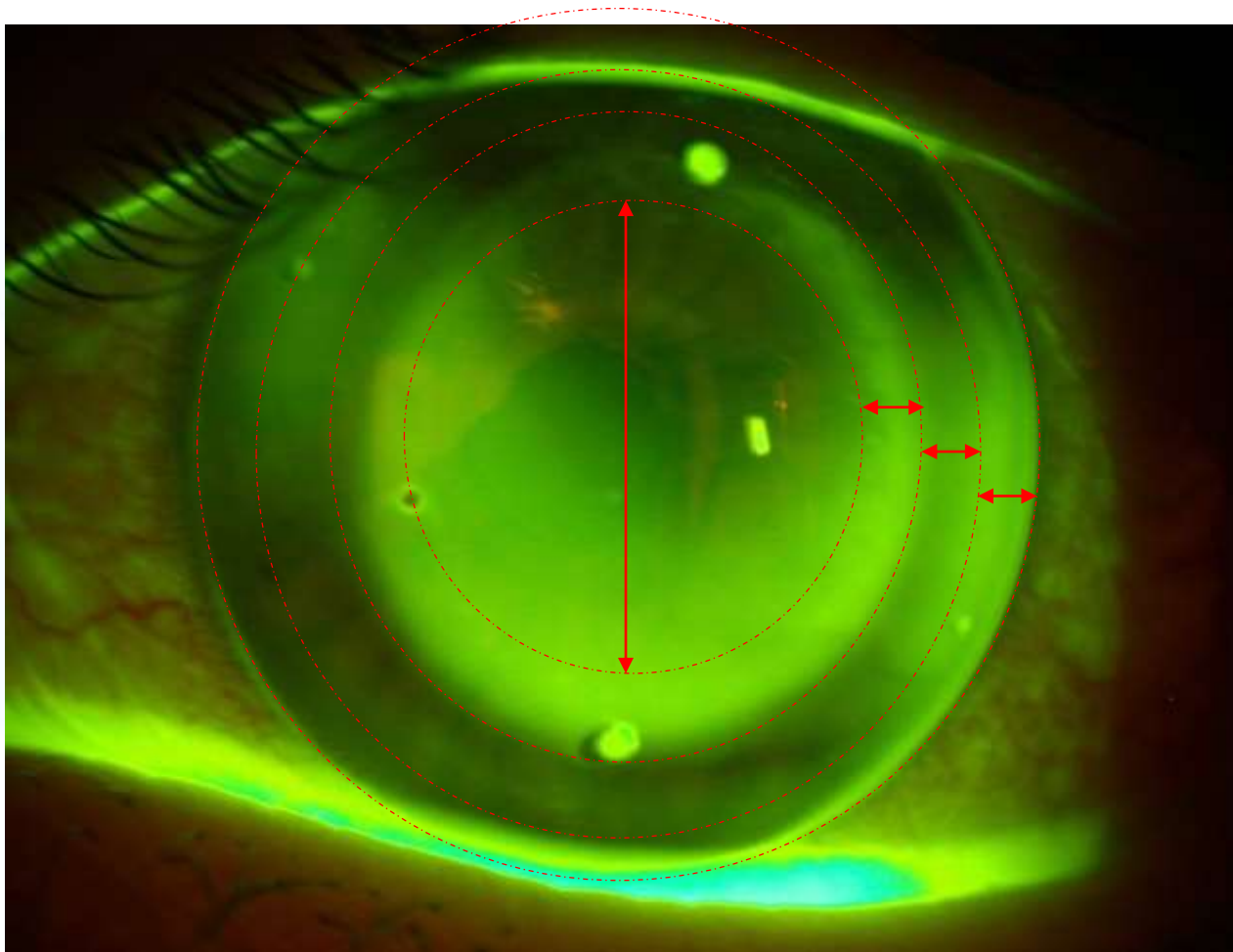
Case Keratoplasty



Case Keratoplasty



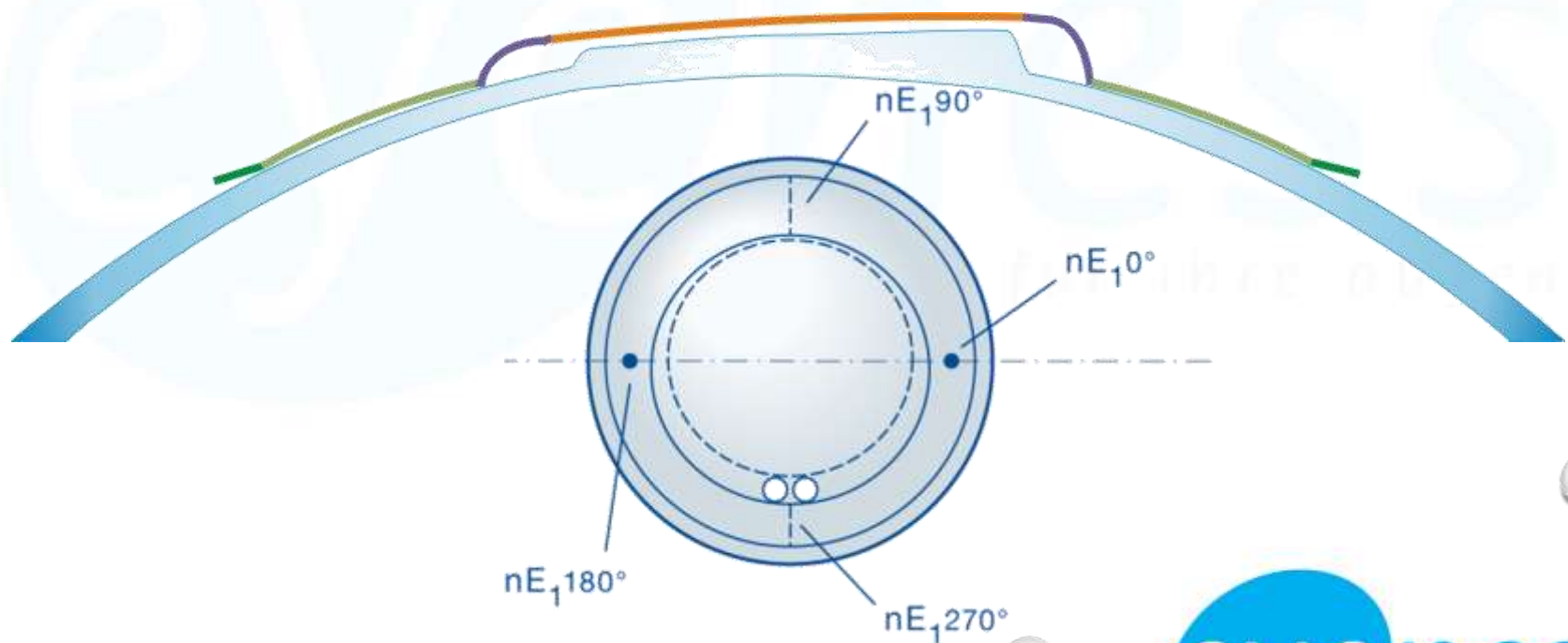
Case Keratoplasty



Multicurve, reverse geometry with 2 fenestration holes

Quadrant specific Keratoplasty CL

- New Geometry (Falco Switzerland) for tilted grafts
 - Quadrant specific geometry with tilted reverse geometry



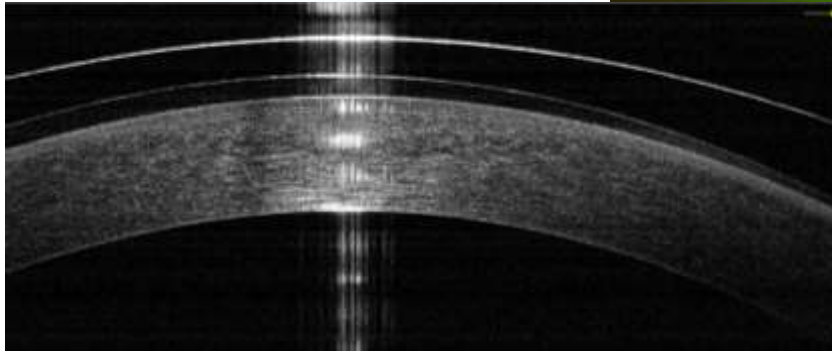
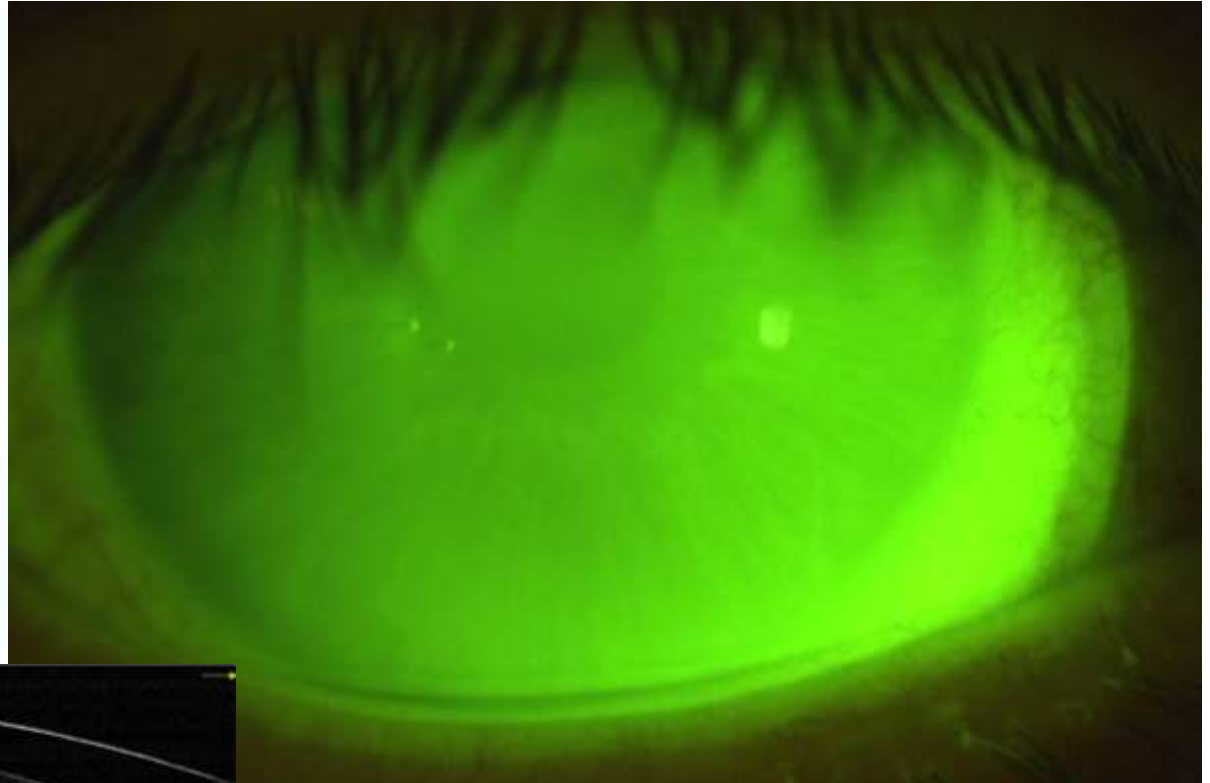
Scleral Lenses

Advantages

- 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

Scleral Fitting Technic

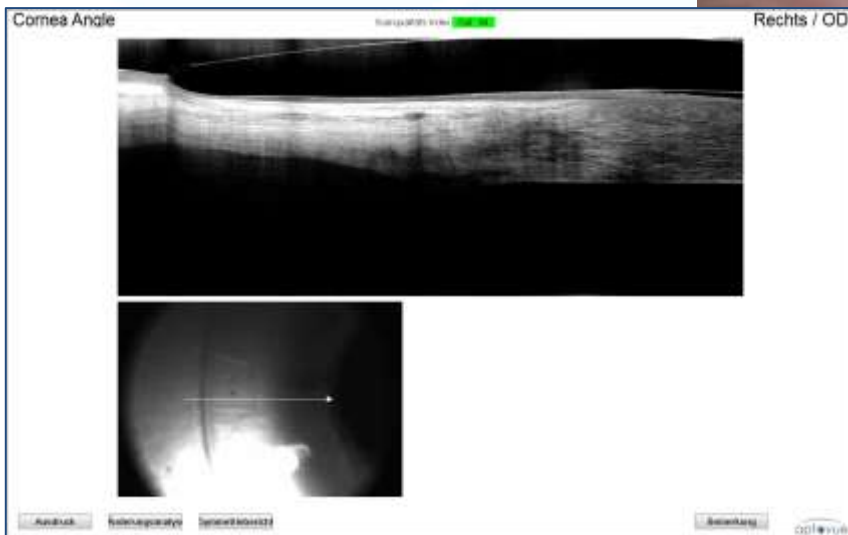
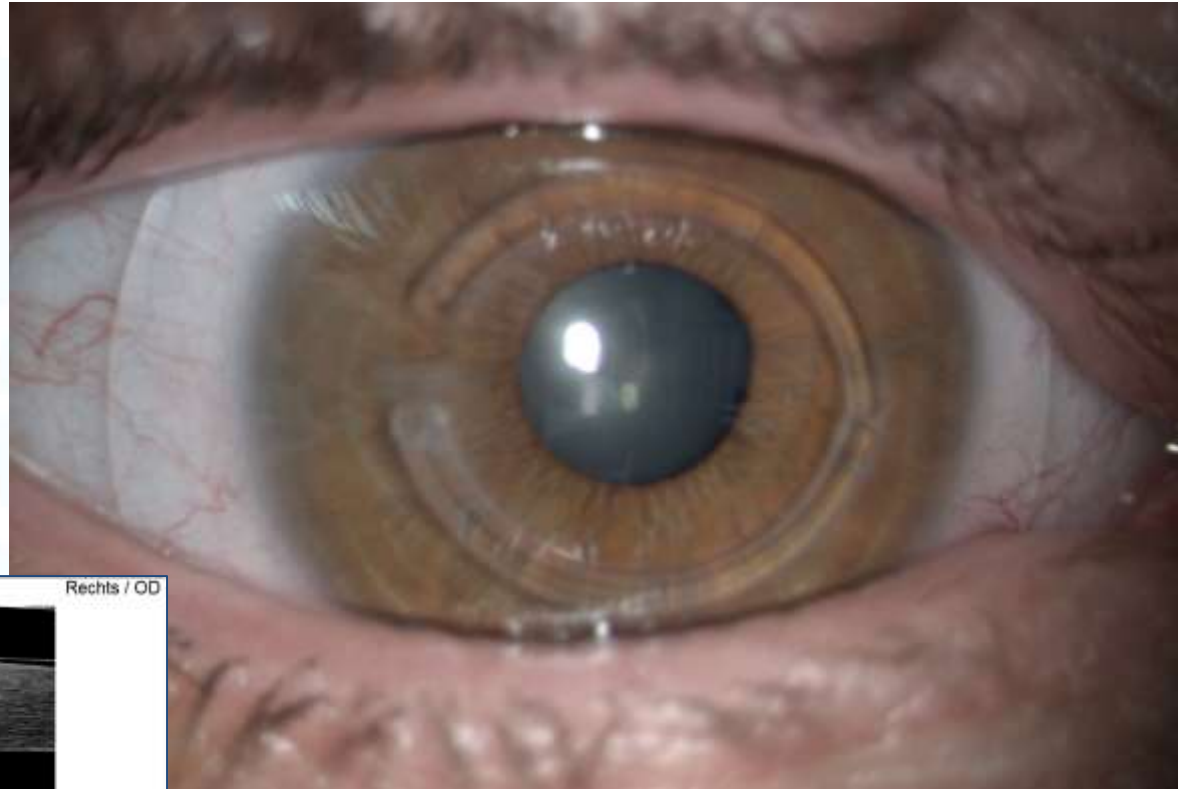
Central Area - Fluorescein Pattern



Scleral Fitting Technic

The entire fit, centration and stabilization of the whole CL lays on the conjunctiva/sclera

- OAD 15 - 18mm
- Extreme high Dk



Contact Lenses for Presbyopia



Translating bifocal Systems

Korrektionsprinzip

Maßstab 1:4

physikalisch
Segment

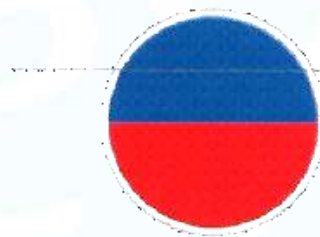


optisch
bifokal



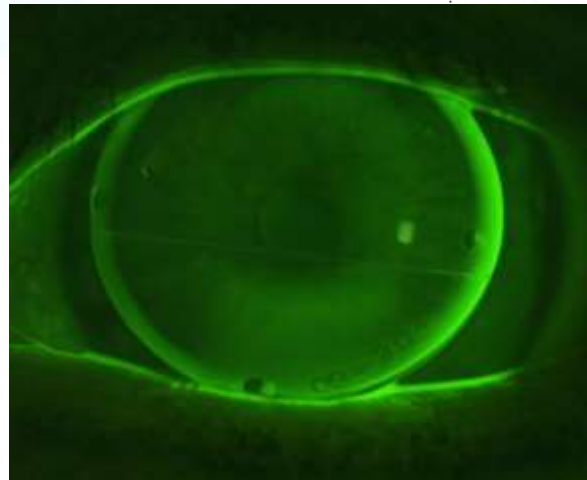
visuell
alternierend

a) Situation Fernsicht



■ distance

■ near

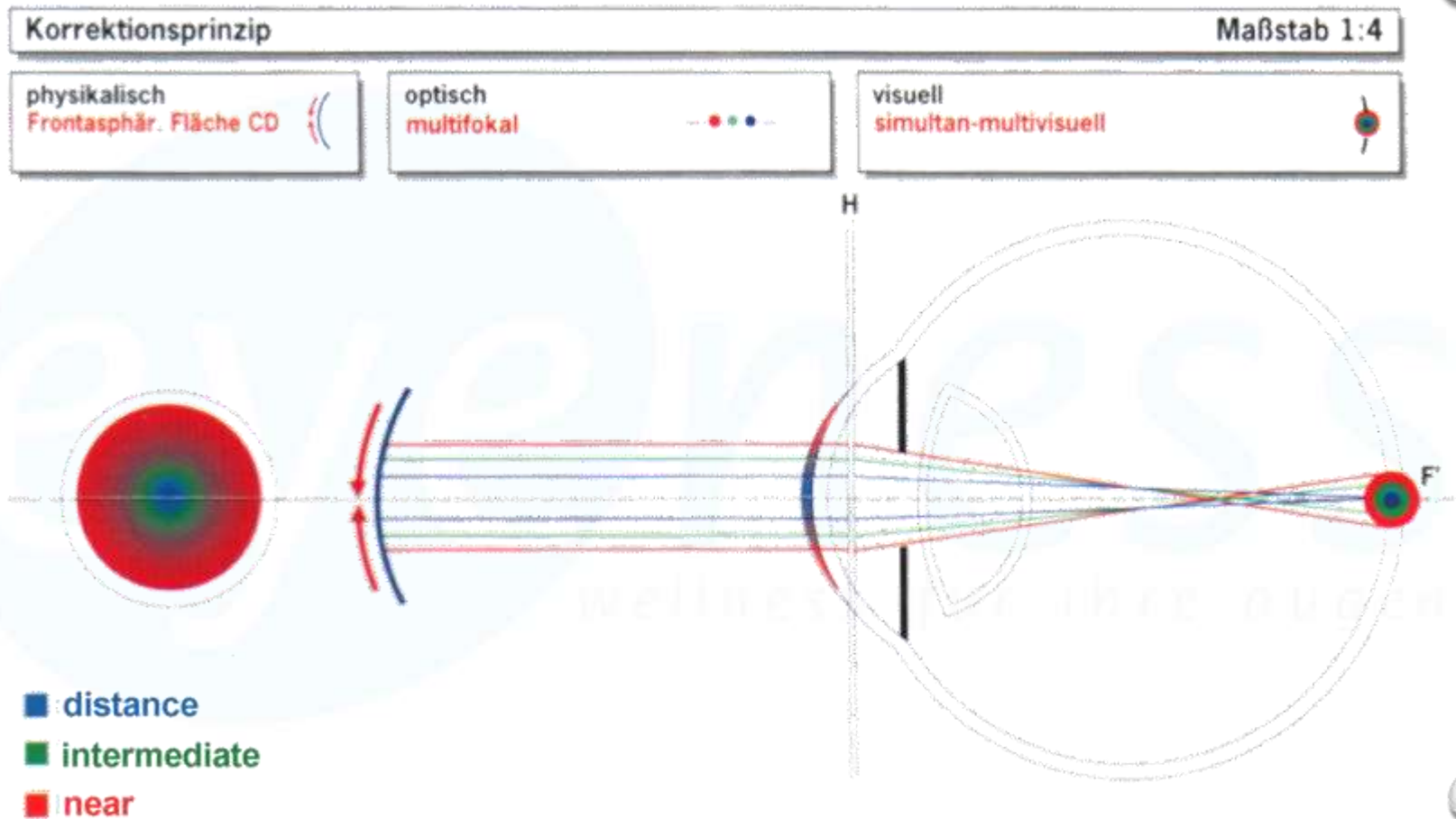


H

F

© by Bach Optik

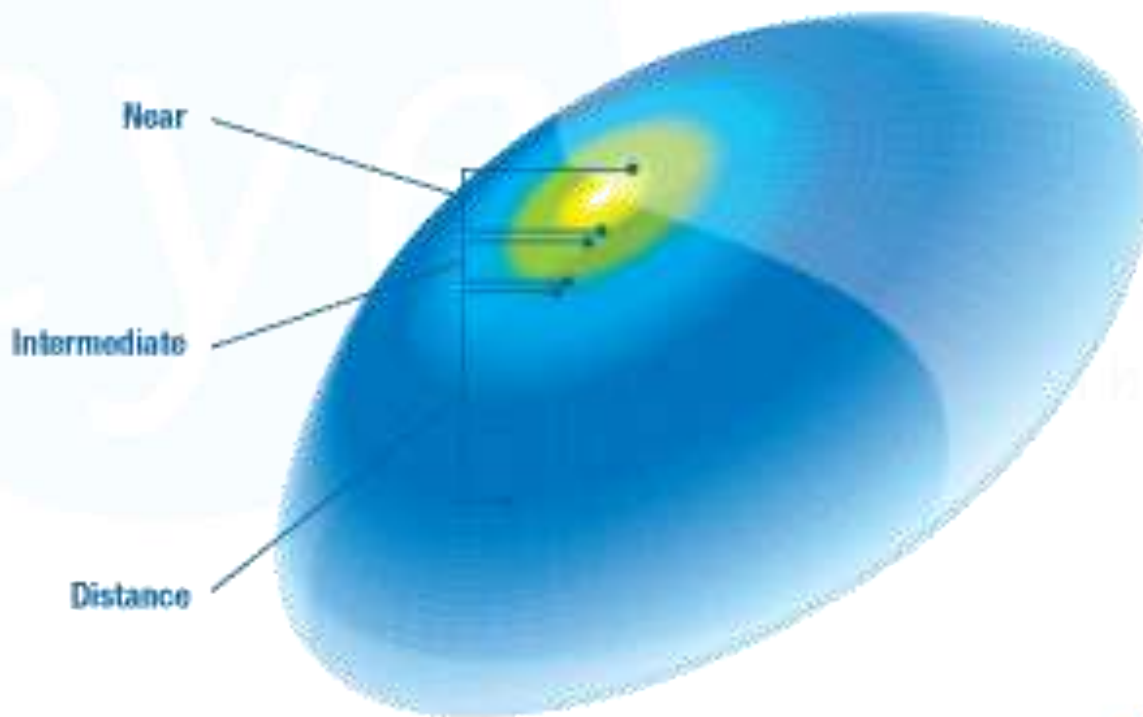
Multifocal, Simultaneous DC



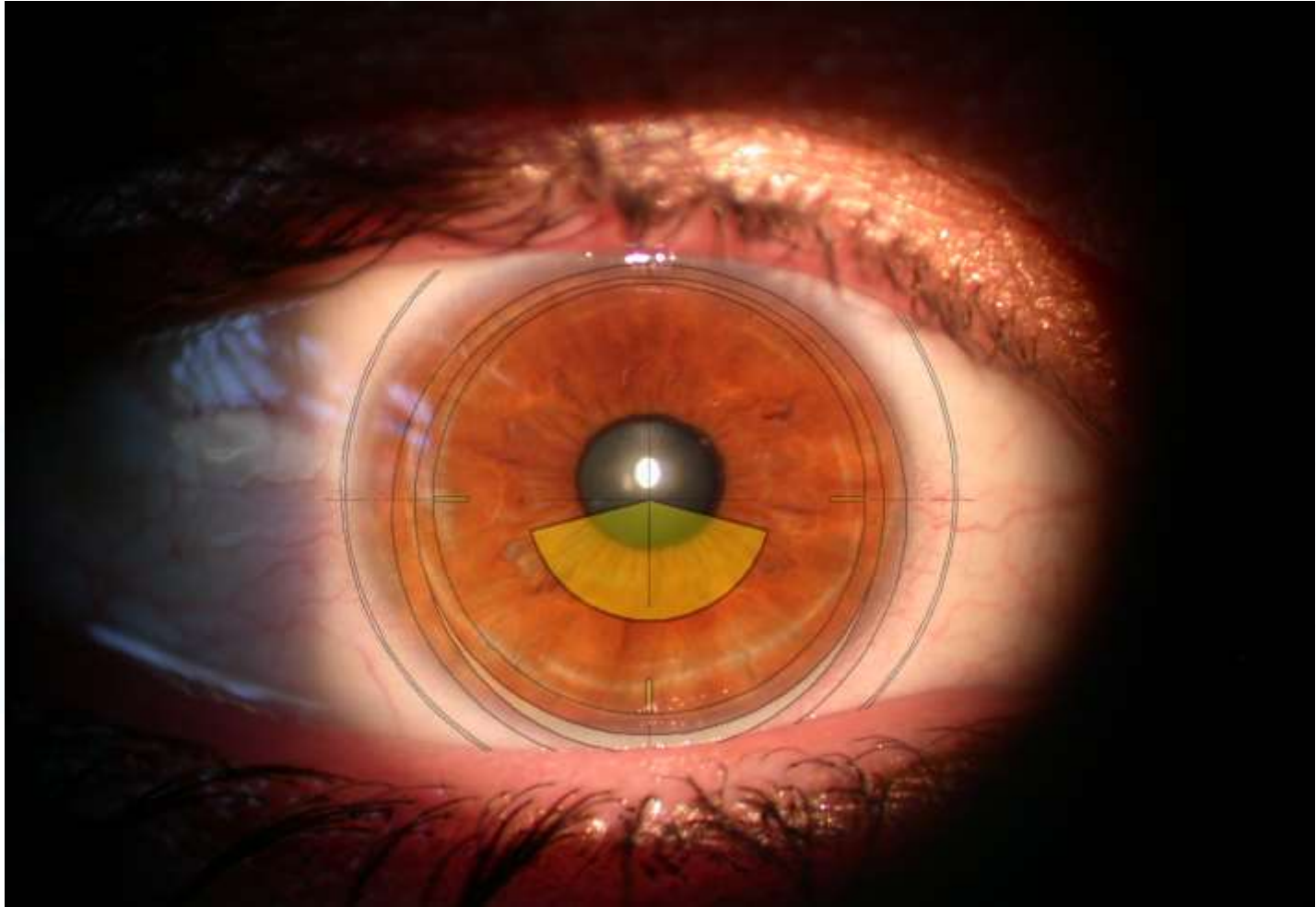
© by Bach Optik

Soft and disposable Contact Lenses

- Distance or Near central optic zone, with progressive or degressive power changes

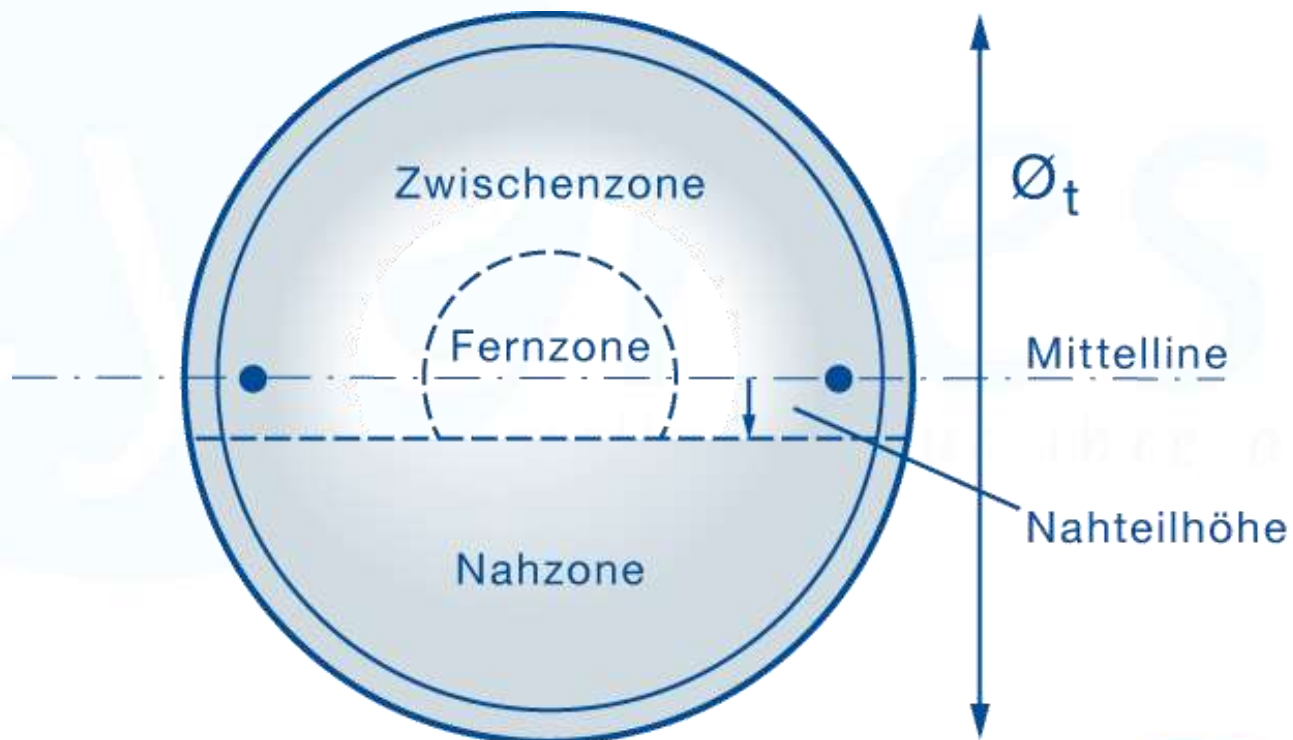


Translational Soft (BYO Royal™)

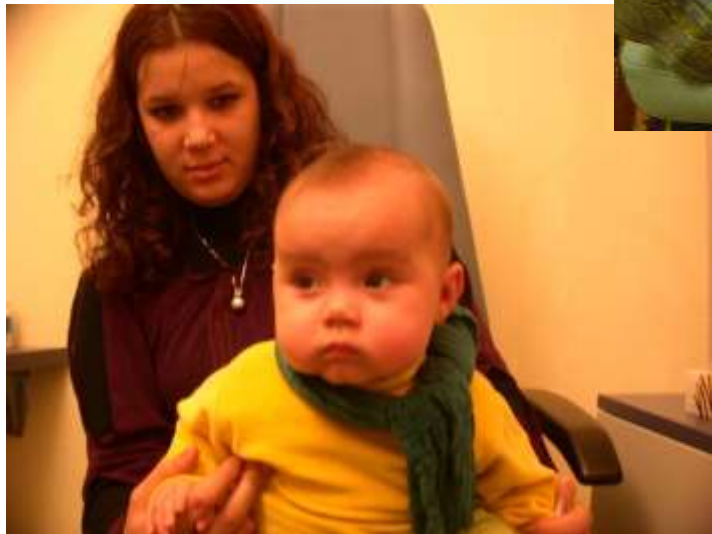


The Future is Now!

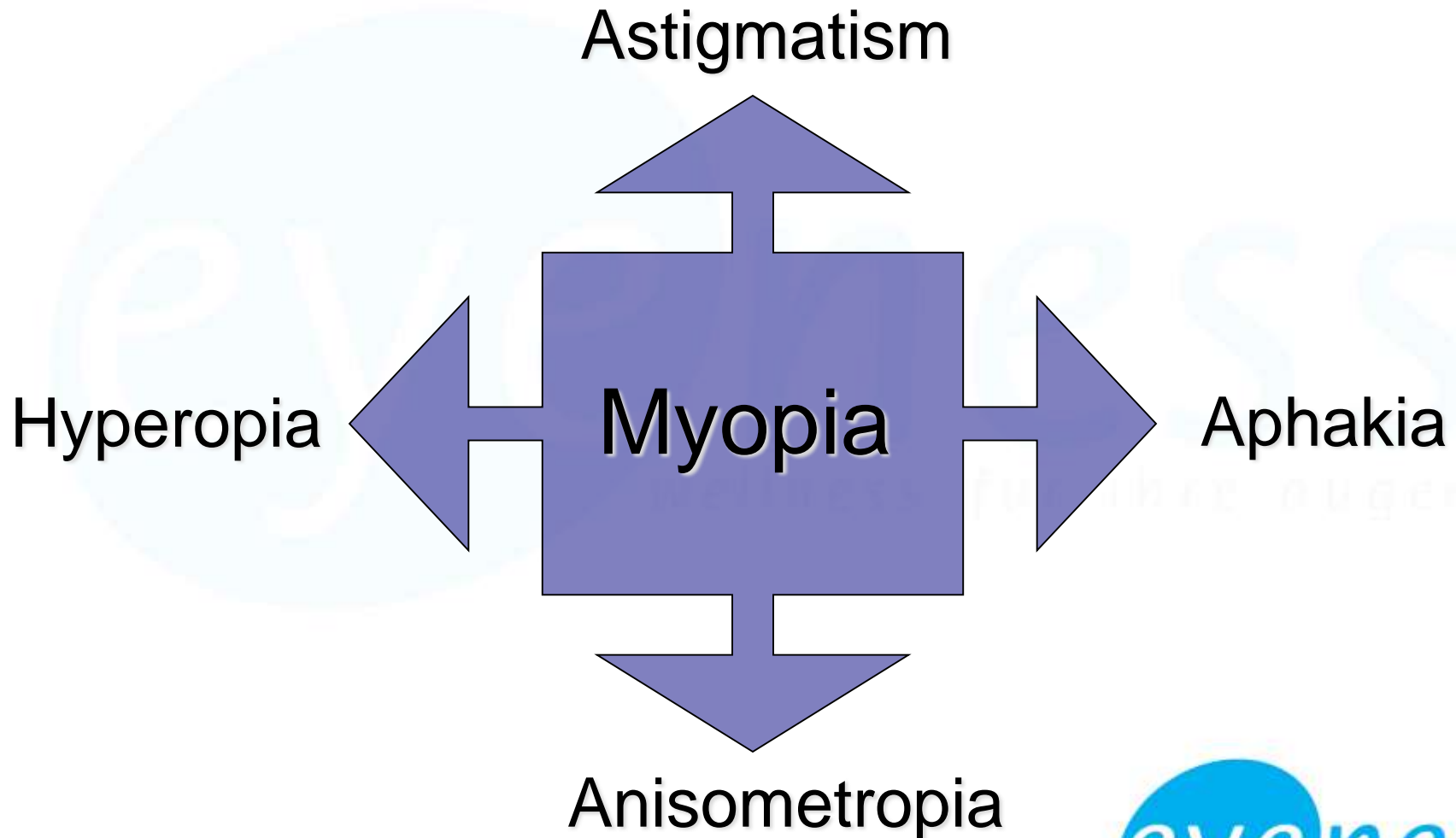
Segmented-Simultaneous Design (Falco Kontaktlinsen Switzerland)



Contact Lenses for Children



Reasons for CL for Children



Children and eye glasses

Children loves eye glasses ? (Hyperopia +8.0 dpt)



At least their parents believe and unfortunately some eye “experts” as well !

Children and contact lenses

Children loves contact lenses ! (Hyperopia +9.0 dpt)



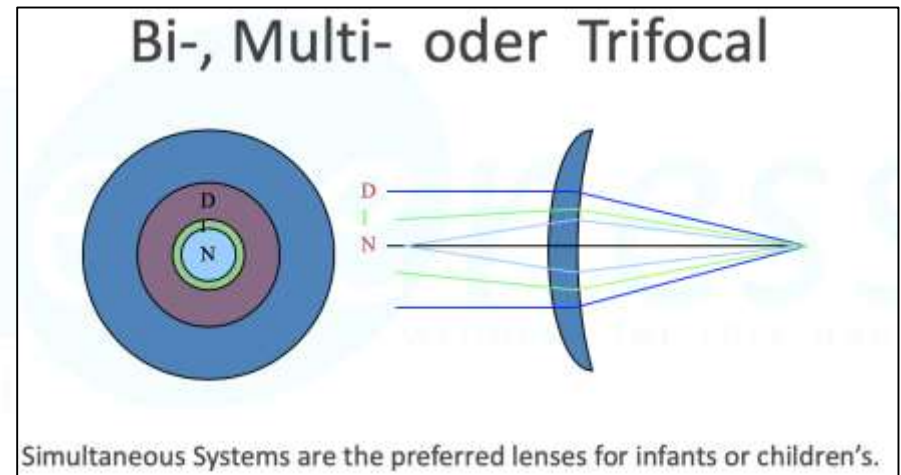
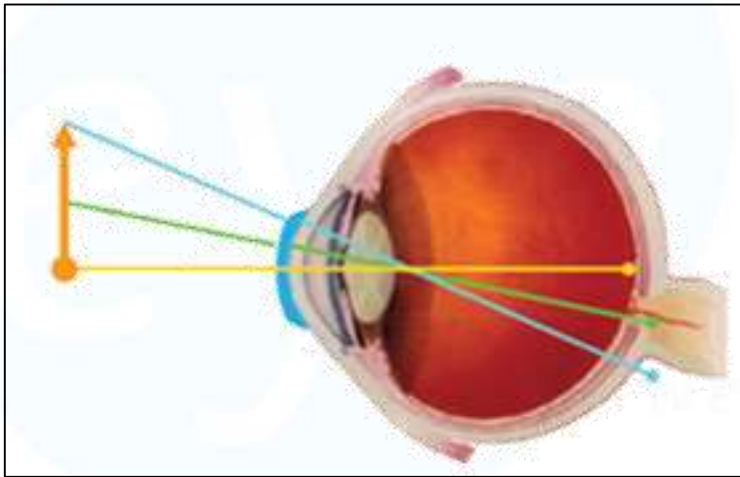
This is what the children believes and their contact lens specialists !

Children and contact lenses

The two most common reasons today are :

- Myopia Management

- Aphakia



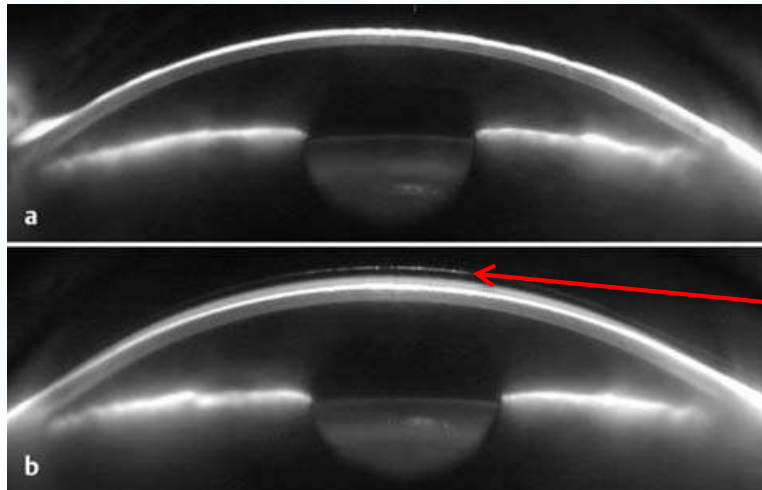
- Special soft and „hard“ GP contact lenses are suitable for children.
- Well tolerated and at least as safe as for adults.
- Hygiene and regular CL/eye checks are evident.

Contact Lenses for Therapy

- Pain reduction
- Protection against environmental factors
 - dirt, mechanical friction, evaporation of tear film
- Improving the epithelial healing process
- Stabilization and modulation of corneal surface
 - Improvement of VA
- Optical Rehabilitation
- Cosmetic Rehabilitation
- (carrier for pharmacologic drugs)
- **Improvement of overall comfort, vision and safety !**

Method

Fitting of therapeutic and refractive effective soft or hard bandage contact lenses as ocular surface protection layer.



Without contact lens

With protecting contact lens

OCT image of anterior ocular segment

Materials

- Hydrogel (“old style”)
 - Traditional (BG 80%, Benz-G)
 - Disposable (Daily, Monthly)
- Silicone Hydrogel (new style)
 - Disposable (Daily, Bi-weekly, Monthly)
- Gas Permeable (Hard) Specialty CL and Scleral Lenses
- Hybrid Lenses (Hard GP center, Soft skirt)

Main Material for Clinic

- Past....:

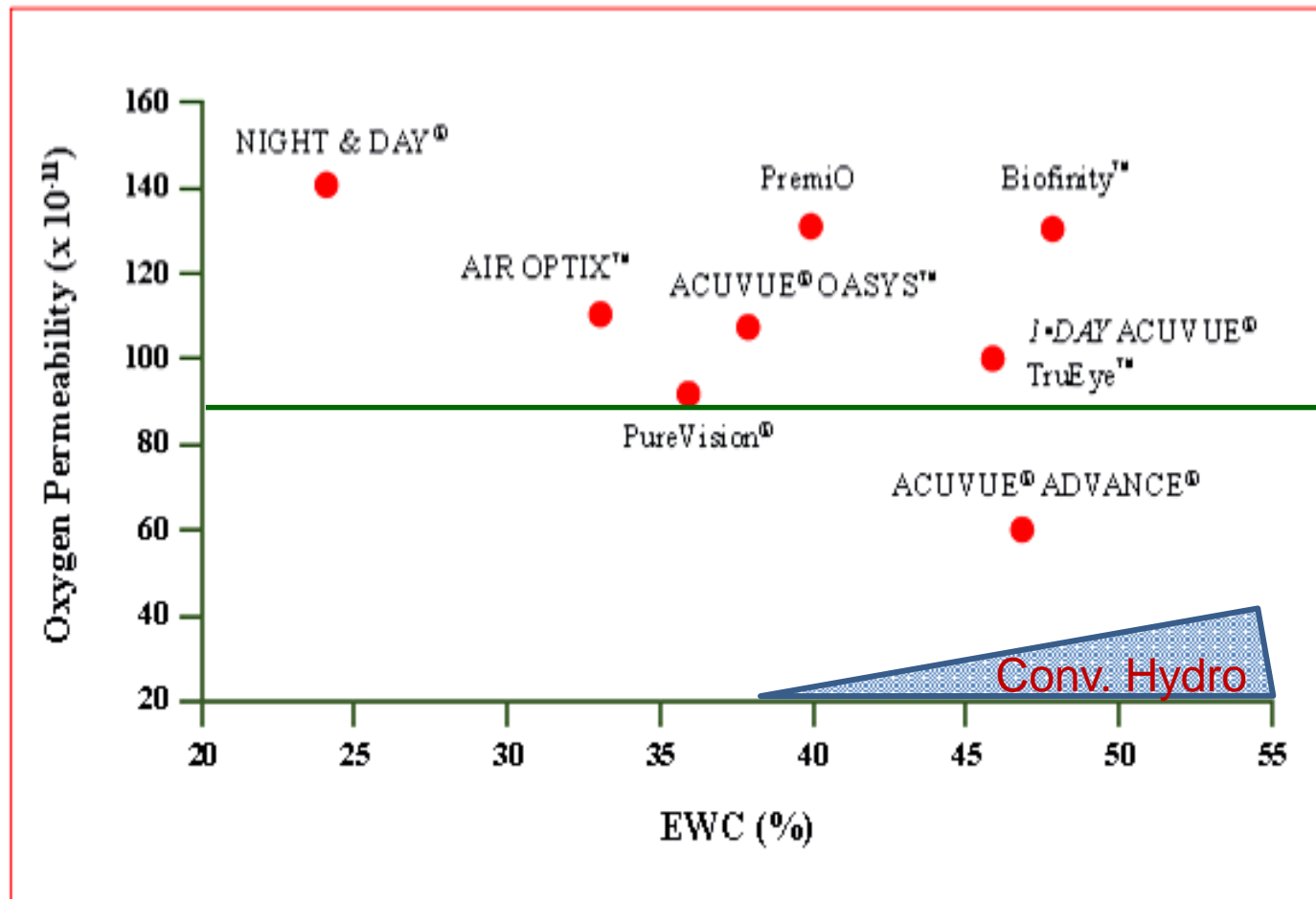
- Hydrogel with $\uparrow \text{H}_2\text{O}$ content

- ...Present:

- Silicone Hydrogel !



O₂-Permeability of Silicone Hydrogel CL



Excellent Results

e.g. Px with Epidermolysis Bullosa



- Eliminate pain
- Stabilize Epithelium
- Reduce inflammation
- Increase or restore vision

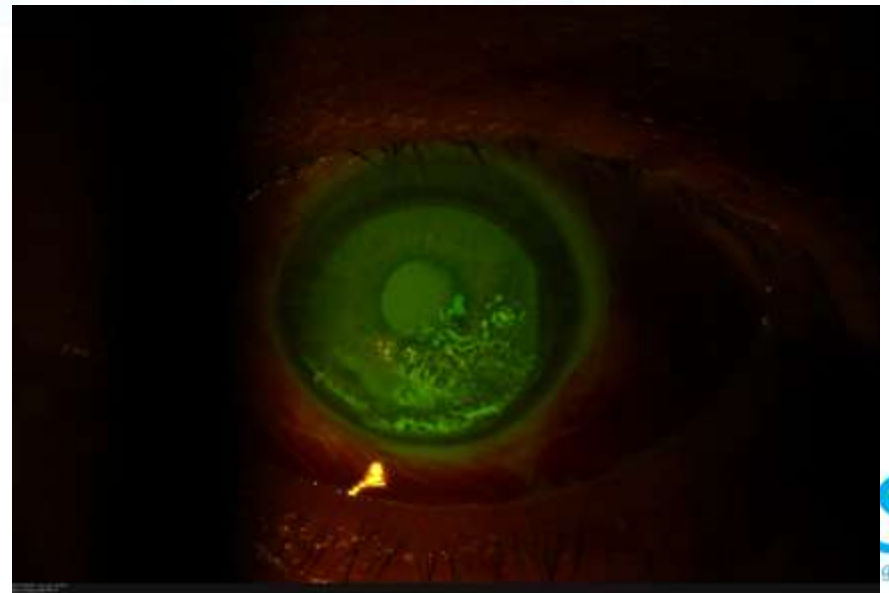
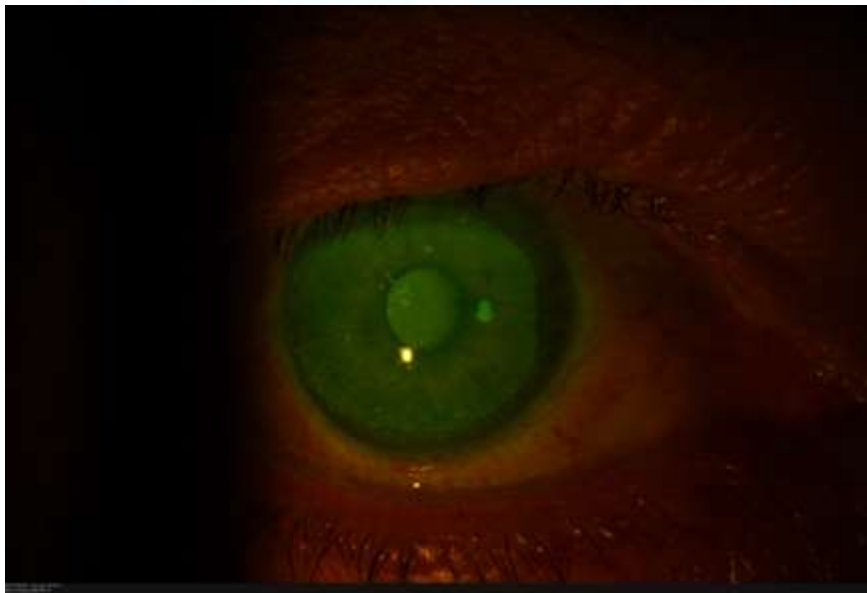
Excellent Results

Epithelial basement membrane Dystrophies EBMD :
(Cogan or Map-Dot-Fingerprint)

- Eliminate Discomfort
- Increase physiological
and optical/visual
Stabilization



Clinical Case: EBMD



Clinical Case: EBMD

B.H., m, 59 y/o

Since 6/2010:

Biofinity sph / Biofinity Toric

Vacc: OD 0.9 , OS 0.8



Constant wear 1 week, cleaning, changes every 4 weeks.

Rewetting drops as needed.

Conclusion

Short term prognosis :

- Therapeutic bandage contact lenses are useful to protect the compromised cornea from negative environmental influences.
- They are helpful to protect the patient from discomfort and pain.
- They are usable as a drug deposit with care.

Conclusion

Intermediate and long term prognosis :

- Therapeutic bandage contact lenses are useful to protect the long term dystrophic cornea from negatives environmental influences.
- They help to remodel the irregular cornea for better vision.
- They help to protect the patient from discomfort and pain.

They make patients happy!

Contact Lenses for Orthokeratology

History: Dr. J. Ball 1850 developed eye cup it spring mounted
mallet to pound the cornea flat through the closed eye



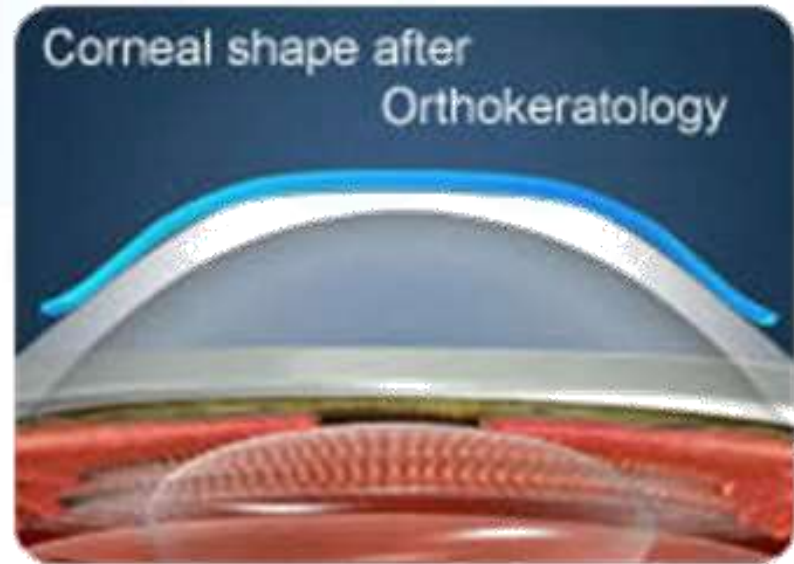
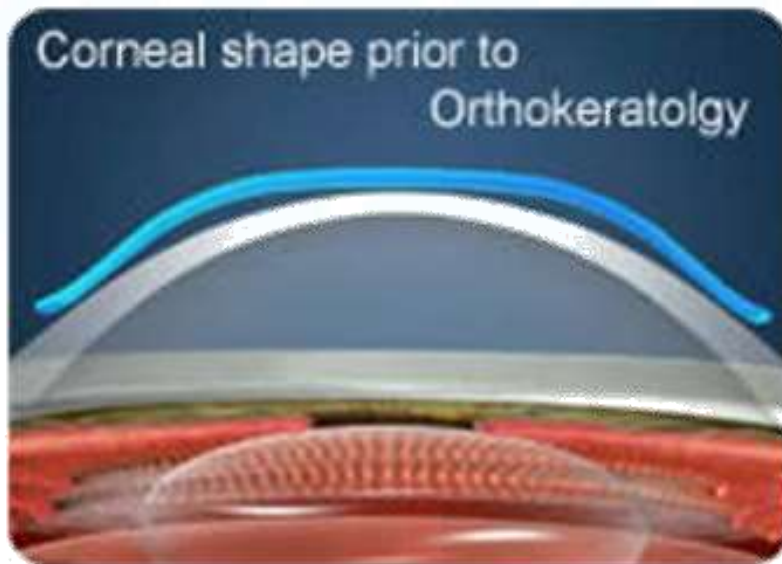
History

With CL initially reported 1960 by Jessen (Old)*

- Spherical lens, daily wear, PMMA ($Dk = 0$)

1997 Mountford introduced new Design (accelerated Ortho-K)

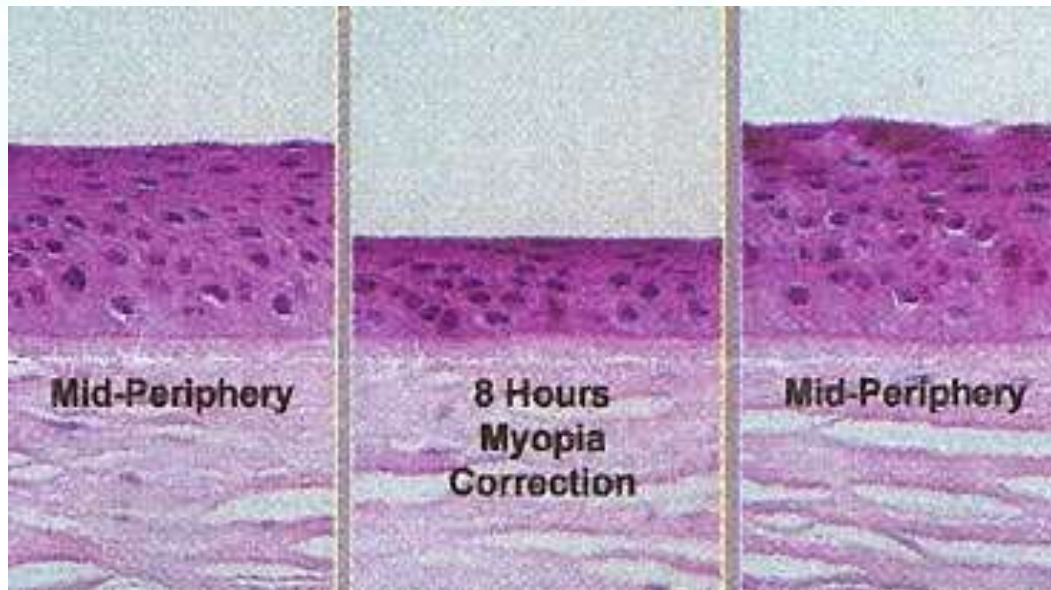
- 4-5 Zones Reverse Geometry, Overnight wear, extrem high $Dk > 100$



*Please: Don't mix up old and new Ortho-K

How it works

- Change in epithelial thickness
 - 4 weeks in Cats results in 8.4microns reduction, results in -4.0D of Ortho-K effect !
- Munnerlyn Formula (tissue displacement)
 - Optical Zone Diameter² x refractive Error / 3
 - e.g. **-5.0D correction** with Treatment Zone of 3.0mm (tangential mapping) results in **15microns** Epithelium displacement



Histology in Ortho-K

- Central epithelial thinning
 - Focal cell compression (Wing and Basal cells) rather than cell migration or loss of cell layers
 - Microvilli and Desmosomes unaffected
- Midperipheral epithelial/stromal thickening
 - Increased surface (squamous) cell and nucleus size
 - After 24h: Stromal +2.5% / Epithelial +16.89%
 - No classical stromal Edema, more likely increased cell retention!
- Endothelium
 - No changes at all
- Anterior Radii vs posterior Radii
 - Ortho-K alters the anterior corneal shape rather than the posterior radius of the corneal curvature and the anterior chamber depth
 - There is no overall “corneal bending”

Tsukiyama, Eye & Contact Lens 34(1): 17–20, 2008

Contact lenses for Continuous wear

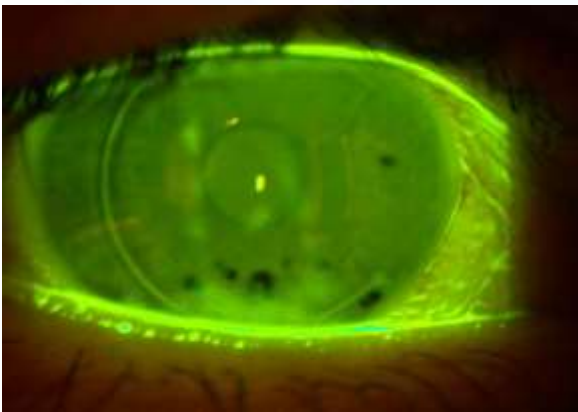
- Pediatric and Geriatric Patients
- Therapeutic Indications
- Extreme High Altitude Climbers



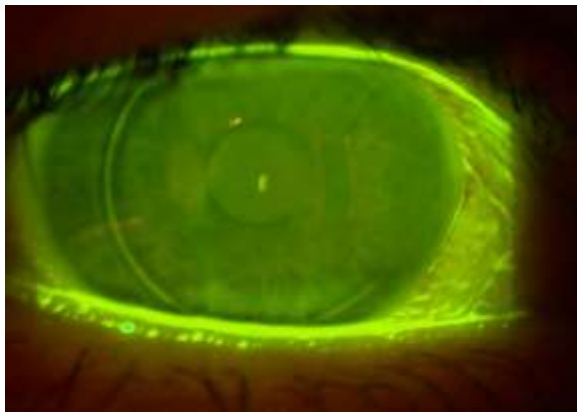
Indication for continuous wear

- Bandage contact lens after surgery or injury
- Therapeutic use in cornea disorders
 - EBMD (Map-dot-fingerprint dystrophy) and recurrent corneal erosion
 - Epidermolysis Bullosa
 - Elagophthalmus
 - Incomplete lid closure during sleep

Post LASIK: Pre-Therapy CL



With Therapy CL



Products Overview

	Purevision (Toric, multi)	Night&Day (Children)	AirOptix (Toric, multi)	Oasys (Toric, multi)	Biofinity (Toric, multi)
DK/t	110	175	138	154	160
H ₂ O	36%	24%	33%	40%	48%
Radius	8.60	8.40 / 8.60	8.60	8.40	8.60 (8.7)
Ø	14.00	13.80	14.2	14.00	14.00 (14.50)
Dioptr	+6.0 / -12.0	+6.0 / -10.0	+6.0 / -10.0	+6.0 / -12.0	+10.0 / -10.0
Cylinder	-0.75 -1.25 -1.75 -2.25	*****	-0.75 -1.25 -1.75 -2.25	-0.75 -1.25 -1.75 -2.25	-0.75 to -5.75
CW	30 days	30 days	7 days	7 days	30 days
Replace	1 month	1 month	1 month	1 week	1 month
Modulus	1.50	1.52	1.2	0.72	0.75

Risk factors for infiltrative event

Table 1. Multivariate Analysis of Risk Factors for All Corneal Infiltrates

Factor	Hazard Ratio (95% Confidence Interval)	P Value
Age	0.99 (0.96-1.03)	.97
Sex	1.61 (0.74-3.49)	.23
Smoking	1.76 (0.66-4.80)	.26
Corneal neovascularization	0.54 (0.20-1.41)	.21
Corneal staining	7.23 (2.93-17.87)	<.001
Limbal redness	3.18 (1.22-8.29)	.02

Szczotka-Flynn L. *et al.*: Predictive Factors for Corneal Infiltrates with Continuous Wear of Silicone Hydrogel Contact Lenses; *Arch Ophthalmol.* 2007;125:488-492

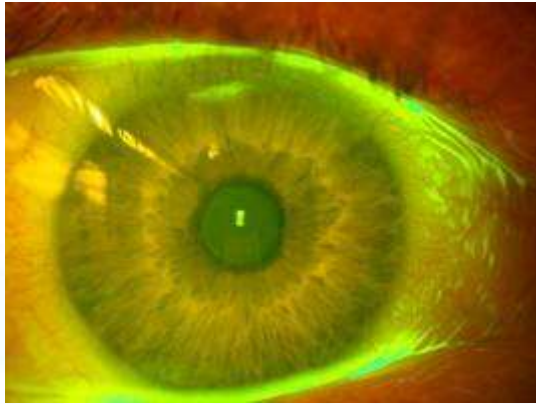
Extended or continuous wear is not for everybody and deserves special care !



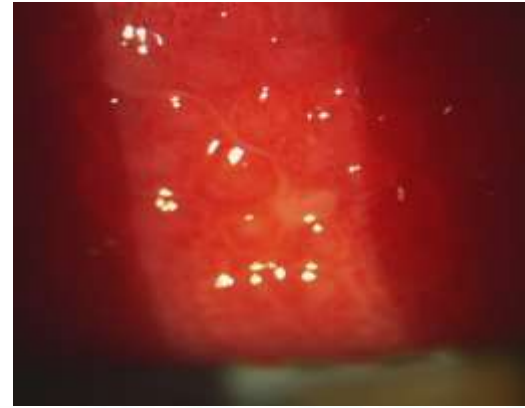
Complications

- Evaporation / Dehydration
- Lack of Oxygen
- Microbial Inflammations or Infections
- Chemical contamination
- Allergies

Complications



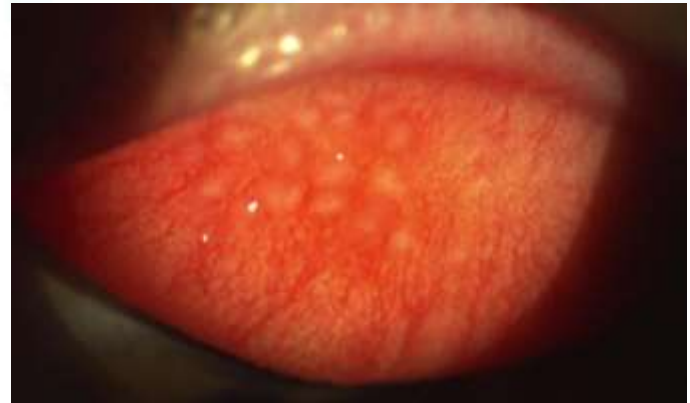
Superior Epithelial Arcuat Lesion SEAL



Gigantopapillary Conjunctivitis GPC
vs
Follicle (FoCoSi)



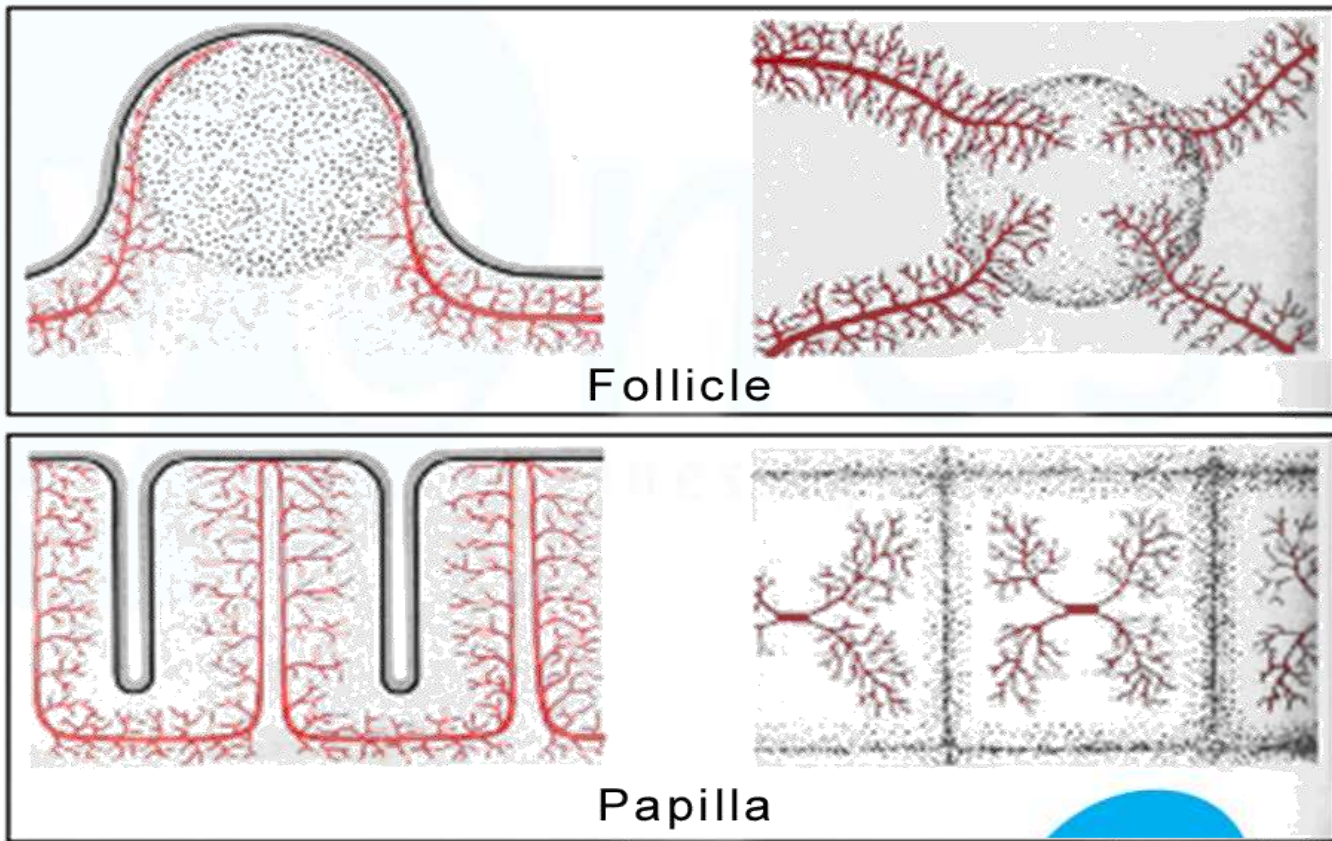
Contact Lens induced acute red Eye CLARE



Complications CLPC

Differential diagnosis Papillae versus Follicle

Naumann
Pathologie
des Auges
1980;
12:252



Complications

MK vs. CLPU vs. IK/AIK

- **microbial keratitis MK** (bacterial or fungal, single infiltrate, scar, irreversible, vision loss)



- **contact lens related peripheral ulcer CLPU** (bacterial toxins, single infiltrate, scar, reversible over time, no vision loss)



- **(asymptomatic) infiltrative keratitis SIK/AIK** (viral or unspecific, no scar, reversible in months, no vision loss)



Contact Lens related Peripher Ulcus (CLPU)

“CLPU is an inflammatory reaction of the cornea that is characterized in its active stage by focal excavation of the epithelium, infiltration, and necrosis of the anterior stroma.

However, **Bowman's layer is intact**”

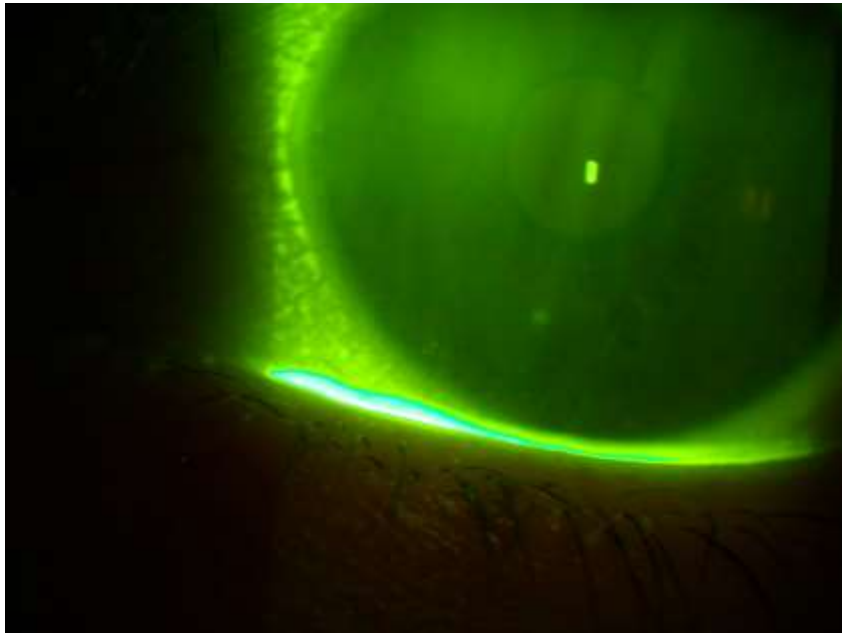
Holden BA, Reddy MK, Sankaridurg PR, et al. The histopathology of contact lens induced peripheral corneal ulcer. *Invest Ophthalmol Vis Sci* 1997;38:s201.

Microbial (infectious) Keratitis

“MK is an infection of the cornea by microbes that is characterized by excavation of the corneal epithelium, Bowman’s layer, and stroma with infiltration and necrosis of the tissue.”

Cokington CD, Hyndiuk RA. Bacterial keratitis. In: Tabbara KF, Hyndiuk RA (eds): Infection of the Eye. 2nd ed. Little, Brown & Co, 1996.

Differential Dx: CLPU vs MK

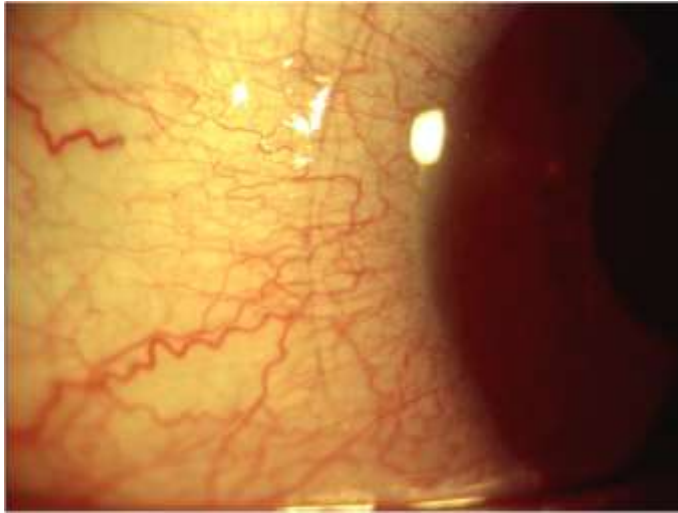


Active phase: CLPU Fluo „negativ“



MK Fluo strong positive

Complications



Chronic Red Eye (Ideology ?)

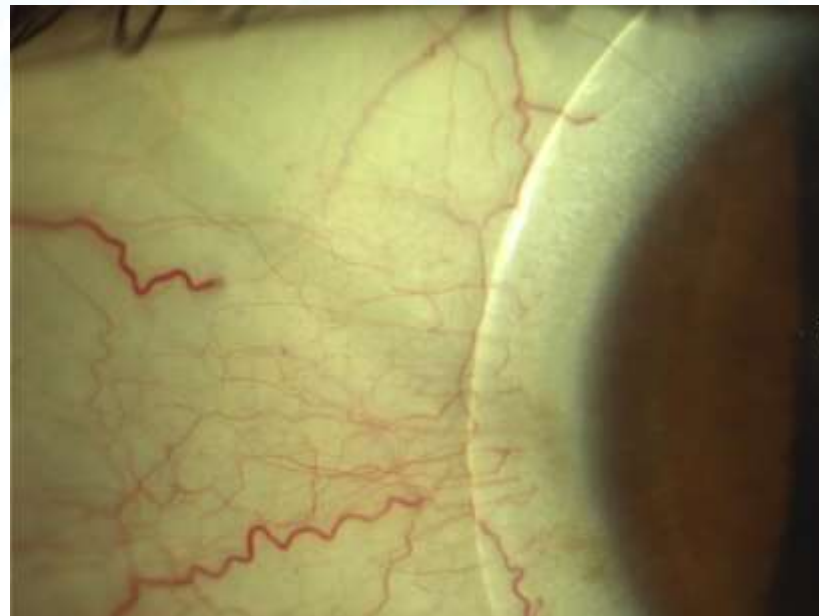


Bacterial Blepharitis due to chronic MGD

=>

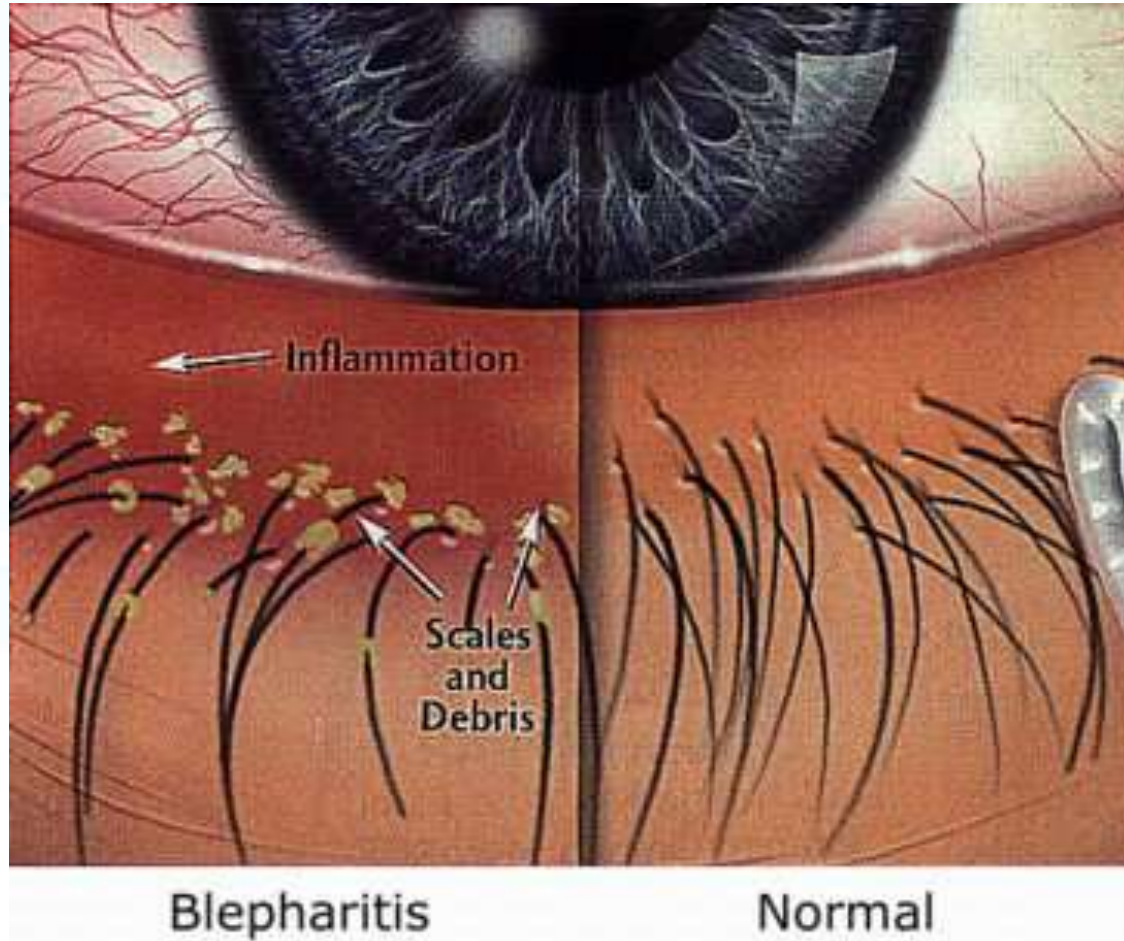
Intense Lidcare, warm compresses, Omega-3 substitution

Final result
after 6 months



Predisposing factors for adverse events

Blepharitis and Meibomian Gland Dysfunction (MGD)



KEY STEPS TO ENSURING CONTACT LENS SAFETY



Follow this new contact lens care guideline to ensure optimum maintenance and hygiene:

CONTACT LENS CLEANING

Safety is enhanced significantly by **rubbing and rinsing** contact lenses both **prior to and following** storage. (Do not use water or peroxide based solution to rinse lenses before inserting - ask your Eye Care Practitioner if in doubt). If you drop a lens, clean and rinse before reinserting.

LENS CASE CLEANING

Lens case hygiene is extremely important. The inside of your contact lens case should be cleaned with your disinfecting solution and **left to air dry** after every use (When using peroxide based solution avoid getting the solution on the outside of the lens case).

Dispose of your old case and replace at least every month.

DISINFECTING SOLUTION

Never **'top up'**, i.e. add additional solution to the solution already in the lens case.

Replace open bottles of solution monthly.

Never **re-use** the solution in a contact lens case.

When lenses have been stored for **more than 7 days**, regardless of whether peroxide based or multipurpose solutions are used, lenses should be effectively **re-disinfected** before use.

WASH YOUR HANDS

Contact lenses should always be handled with **cleaned, washed, dry** hands. Preferably use an appropriate (non-moisturising, non-residue) soap or disinfectant and dry your hands with lint-free tissues or cloths.



WATER

Never use tap water to store, clean or rinse your contact lenses or lens case. Water is a common source of bugs that can produce sight-threatening infections.

Avoid splashing water directly into your eyes while wearing your contact lenses.

Storing your contact lenses and lens cases in the bathroom carries a high risk of airborne contamination with bacteria.

HOLIDAYS AND SWIMMING

One of the high risk occasions is going on holiday - an appropriate 'travel kit' should be carried and used. Make sure you have enough solution, a clean case and a spare pair of glasses whenever you travel.

Always keep your glasses up to date in case of a broken or lost lens or if an adverse response occurs.

Another high risk occasion for contact lens wearers

is exposure to potential contaminants from **beach, swimming pool or spa water** - goggles should be worn while swimming with lenses or lenses should be removed.

After swimming, lenses should be cleaned and disinfected before being reinserted.



SALIVA

Do not allow saliva to come into contact with your lenses, lens case or swimming goggles as it is a potential source of contamination.

SLEEPING WITH CONTACT LENSES

Never sleep in your contact lenses unless advised by your Eye Care Practitioner

If you have been advised by your Eye Care Practitioner you are able to sleep in your contact lenses:

only sleep in lenses specifically prescribed for extended wear do not sleep in lenses if you are sick

EVERY DAY

Check that your eyes **Look good, Feel good and See well**. If not, **contact your Eye Care Practitioner immediately**.

PROFESSIONAL ADVICE

Ask your contact lens practitioner if you have any questions about your lens care.

Seek professional advice immediately and remove your contact lenses if your eyes become red or sore.

Eye Care Practitioner Details

Adapted from Asia Pacific Summit on Contact Lens Care 2007, made possible through an educational grant from Advanced Medical Optics (AMO).

Attendees:

Prof Brian Holden, Prof Deborah Sweeney, Ms Wendy Ho, Ms Joeli Davis, Prof Xiao-Mei Gu, Dr Stan Isaraka, Prof Jai Min Kim, Dr Uman Huan, Mr Joseph Fung, Dr Koh Meng Chung, A/ Prof Pauline Cho, Dr Huey-Chuan Cheng, Prof Pei-Ying Xie, Mr Kevin Siew, Mr Alan Saks, Dr Wilfred Tong, Dr Hsi-Ming Yang



Hygiene and Safety: Important Informations for CL wearers



Contact Lens Care

Soft

Peroxid

Hard GP

All-in-One

Rinsing (NaCl 0.9%)



Cleaning



Desinfection

& Storage

Specials (De-Protein)



Always **Rub** & Rinse with All-in-One products !



Contact Lens Care



Contact Lens Care

		Branded Solutions								Private Label Solutions			
		Unisol ¹ 4 Saline	Clear Care ⁴	Opti-free Express ¹	Opti-free Replenish ¹	Renu Multiplus ³	Renu Multipurpose ³	Complete MPS Easy Rub ²	Aquify ⁴	Walmart MPS (Renu M+)	Target MPS (Renu M+)	CVS MPS (Renu M+)	Walgreen MPS (Renu M+)
Hydrogel	Acuvue ⁵ 2	1%	1%	2%	5%	1%	1%	1%	1%	1%	1%	1%	1%
	Proclear ⁶	1%	1%	1%	2%	57%	23%	6%	12%	61%	54%	53%	42%
	Soflens ³ 66	1%	1%	1%	1%	73%	32%	17%	8%	66%	62%	63%	56%
Silicone Hydrogel	Acuvue Advance ⁵	1%	1%	1%	1%	13%	4%	12%	2%	16%	13%	12%	12%
	Acuvue Oasys ⁵	2%	1%	3%	5%	9%	5%	4%	3%	12%	8%	13%	10%
	Biofinity ⁶	2%	2%	3%	2%	4%	2%	2%	2%	4%	3%	3%	2%
	Purevision ⁸	2%	1%	4%	7%	73%	43%	15%	21%	71%	76%	No Testing Planned	No Testing Planned
	O2 Optix ⁴	2%	1%	2%	5%	24%	7%	3%	3%	41%	28%	28%	24%
	1light & Day ⁴	2%	1%	2%	3%	24%	11%	1%	3%	36%	24%	26%	22%
Updated: August 25, 2008		Saline	H ₂ O ₂	POLYQUAD			Biguanides						

Staining Zone Color Codes

under 10% 10% to 20% over 20%

Explanation of color coding



Conclusion and Discussion

Contact lenses are offering a high amount of technical and physiological possibilities to correct nearly every kind of ametropia.

They offer an acceptable safety level for all ages, but fitting and communication has to be age related.

Contact lenses are much more than just “another kind of glasses”.



www.eyeness.ch/downloads