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Augenklinik am Neumarkt
Köln

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30th Cologne Advent Symposium

REFRACTIVE LENS EXCHANGE (RLE) IN NON-PRESBYOPIC HYPEROPES

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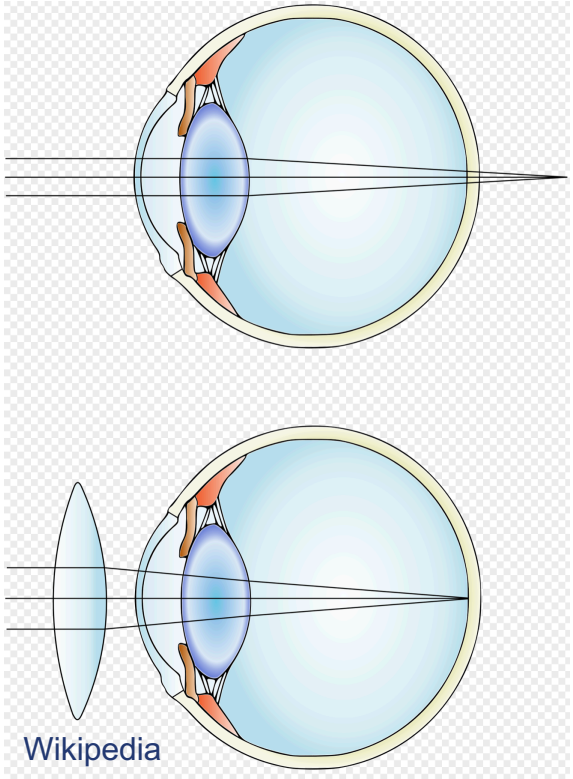
31.05.23

NO FINANCIAL INTERESTS

Hyperopia And Visual Acuity

Moderate and high hyperops suffer from both poor near **and** distance vision !

- An abnormal condition of the eye in which vision is better for distant objects than for near objects.



Wikipedia

Table H1 Approximate relationship between uncorrected absolute hyperopia and visual acuity					
			Snellen visual acuity		
hyperopia	decimal		(m)		(ft)
+4.5D	0,05		6/120		20/400
+3.5D			6/90		20/300
+2.5D	0,1		6/60		20/200
+2.0D			6/36		20/120
+1.5D	0,3		6/24		20/80
+1.0D			6/18		20/60
+0.75D			6/12		20/40
+0.50D			6/9		20/30

Dictionary of Optometry and Visual Science, 7th edition. © 2009 Butterworth-Heinemann

Hyperopia And Glaucoma

The prevalence of primary angle closure glaucome PACG scales with the amount of hyperopia !

Published in final edited form as:

Ophthalmology. 2016 January ; 123(1): 92–101. doi:10.1016/j.ophtha.2015.07.002.

The Association of Refractive Error with Glaucoma in a Multiethnic Population

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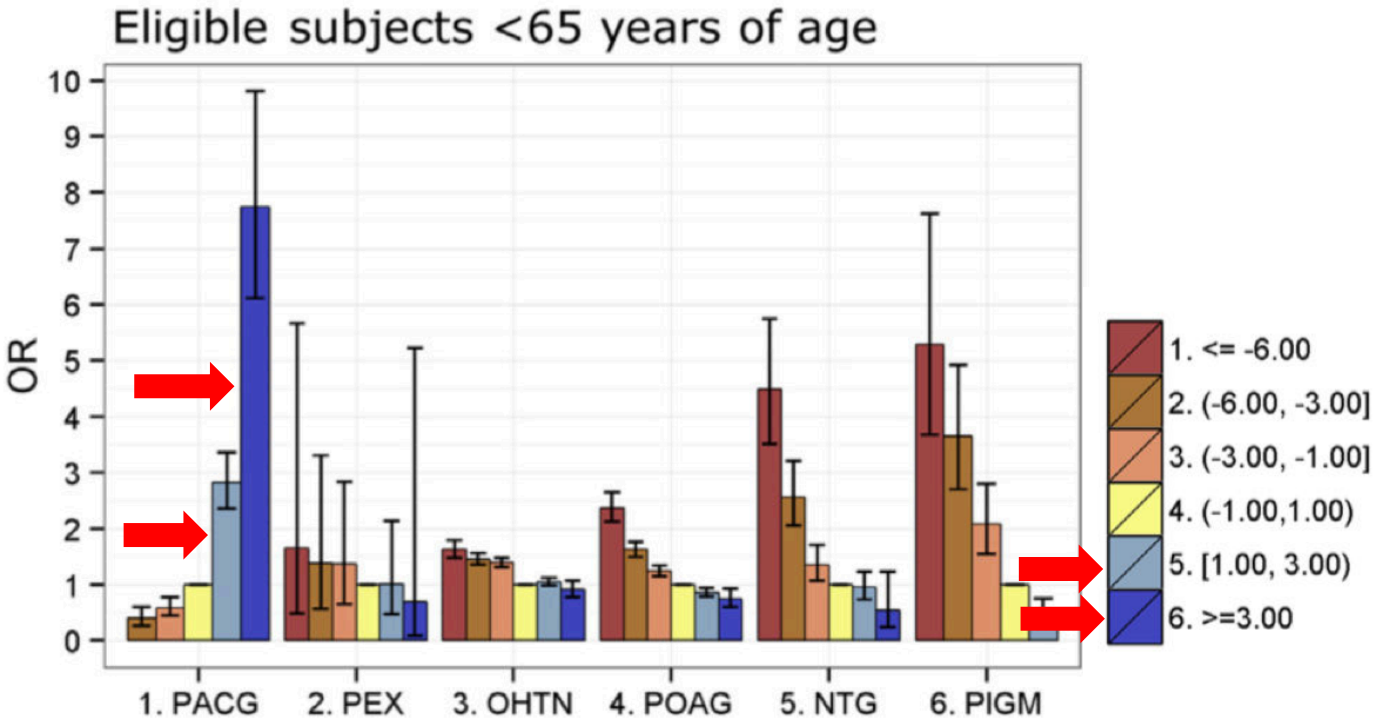

Methods—We identified 34 040 members with glaucoma or ocular hypertension (OHTN; cases) and 403 398 members without glaucoma (controls). Glaucoma cases were classified as primary angle-closure glaucoma (PACG); 1 of the 4 forms of open-angle glaucoma: primary open-angle glaucoma (POAG), normal-tension glaucoma (NTG), pigmentary glaucoma (PIGM), and

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Long-Term Effect of Early Phacoemulsification in Primary Angle Closure Glaucoma Patients with Cataract: A 10-Year Follow-Up Study

Hazem Helmy in Clinical Ophthalmology 2021:15 3969–3981

- **Materials and Methods**
- A prospective cohort long term follow-up study that included 102 eyes of 102 patients with PACG on medical treatment and reasonable cataract. Anterior chamber angle grade 2 or more according to Shaffer grading scale in 3 or all quadrants is an essential parameter in cases to be eligible for the study. All patients underwent phacoemulsification plus foldable IOL implantation.
- **Conclusion:** Phacoemulsification with IOL implantation is a safe and effective early modality for long-term control of IOP in PACG patients with coexisting cataract. The effects can persist for at least 10 years.

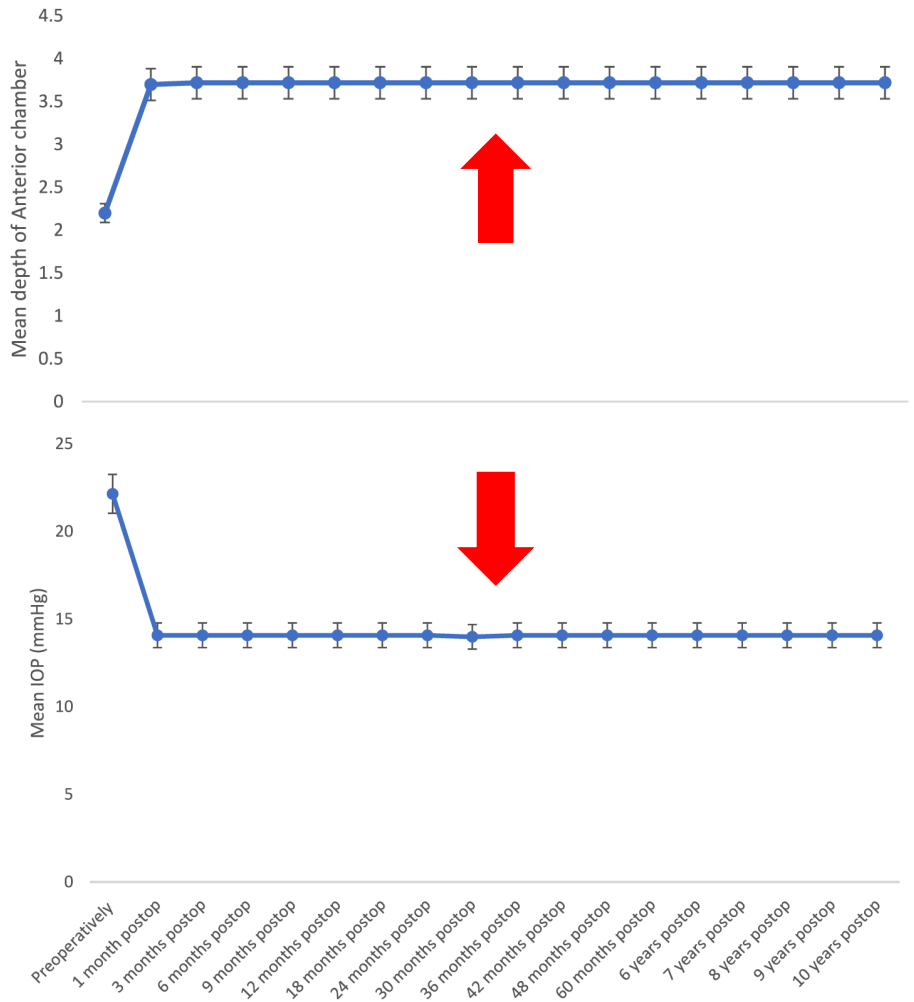

Figure 3 Line graph showing change in IOP pre and postoperatively among the studied patients.

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Target Problem In Hyperopia Treatment

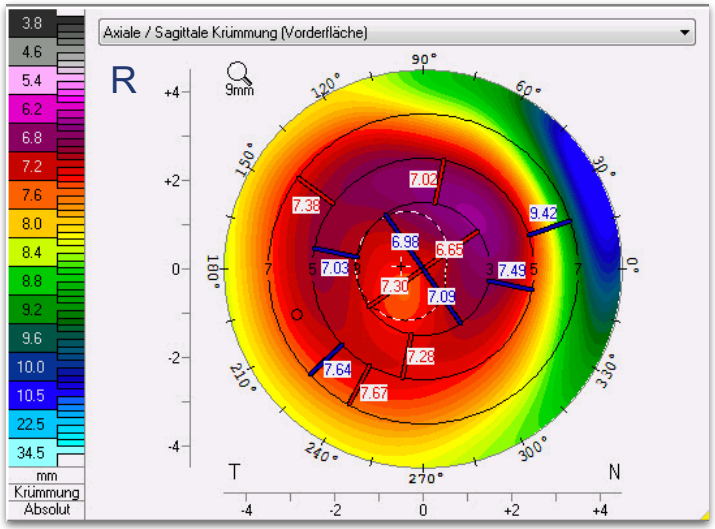
Latent Hyperopia Scales With Age In Non-Presbyopic Eyes !

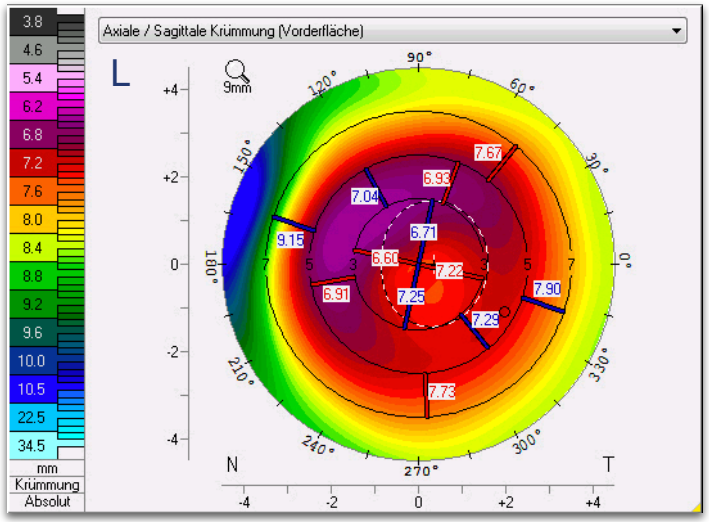
- **Total Hyperopia**
  - Amount of hyperopia with all accommodation suspended by cycloplegic eyedrops (atropine)
- **Manifest Hyperopia**
  - Is the maximum hyperopia that can be corrected with a convex lens (surgery that increases the refractive power of either the lens or cornea)
- **Latent Hyperopia**
  - Is the difference between total and manifest hyperopia

Limitations Of LVC In High Hyperopia

Exemplary Case Report: High & Moderate Hyperopia

- 30 Y Female
- **BCVA: R = 0,8** (+6.0 / -2,5 @ 14*) Amblyopia
- **BCVA: L = 1,0** (+4.25 / -1.5 @ 174*)
- Latent Hyperopia R/L +0.75D
- H-Femto-LASIK R/L in 2/2021 (OZ=6,5mm/TZ=9,0mm)
- 12 Mo Post-OP
- UCVA: R = 0,4
- **BCVA: R = 0.6** (+1.75 / -1.50 @ 82*)
- UCVA: L = 0,5
- **BCVA: L = 0.8** (+0.25 / -0.74 @ 140*)
- R/L = **Loss of 2 Lines BCVA**





Sicca S.+++

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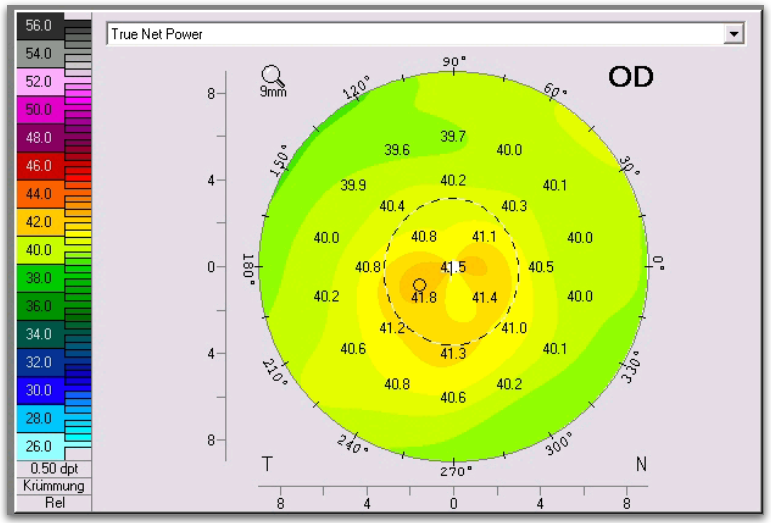
Limitations Of LVC In Low Hyperopia

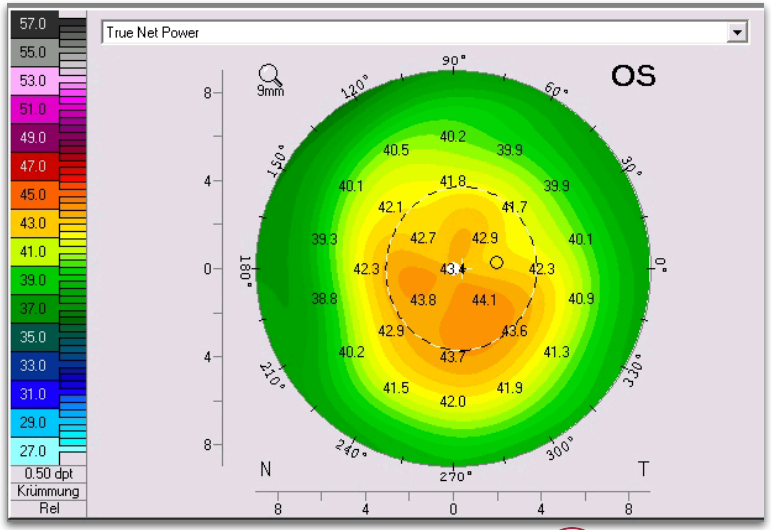
Exemplary Case Report:

Regression In Low & Moderate Hyperopia (Onset Of Presbyopia)

- **47 Y Female (Presbyope)**
- **2003: R/L H-LASIK @ Age 26Y**
- BCVA: R = 1,2 (**+1.25** / -0,75 @ 110*) **ACD = 2.93mm**
- BCVA: L = 1,0 (**+3.50** / -0.75 @ 174*) **ACD = 2.87mm**
- Latent Hyperopia R/L +1.00D
- **2022: 19Years Post-H-LASIK**
- BCVA: R = 1.0 (**+2.25** / -0.75 @ 90*) **ACD = 2.69mm**
- BCVA: L = 1.0 (**+2.00**) **ACD = 2.60mm**
- **Near Additon +2.0D !**

What to do next ???





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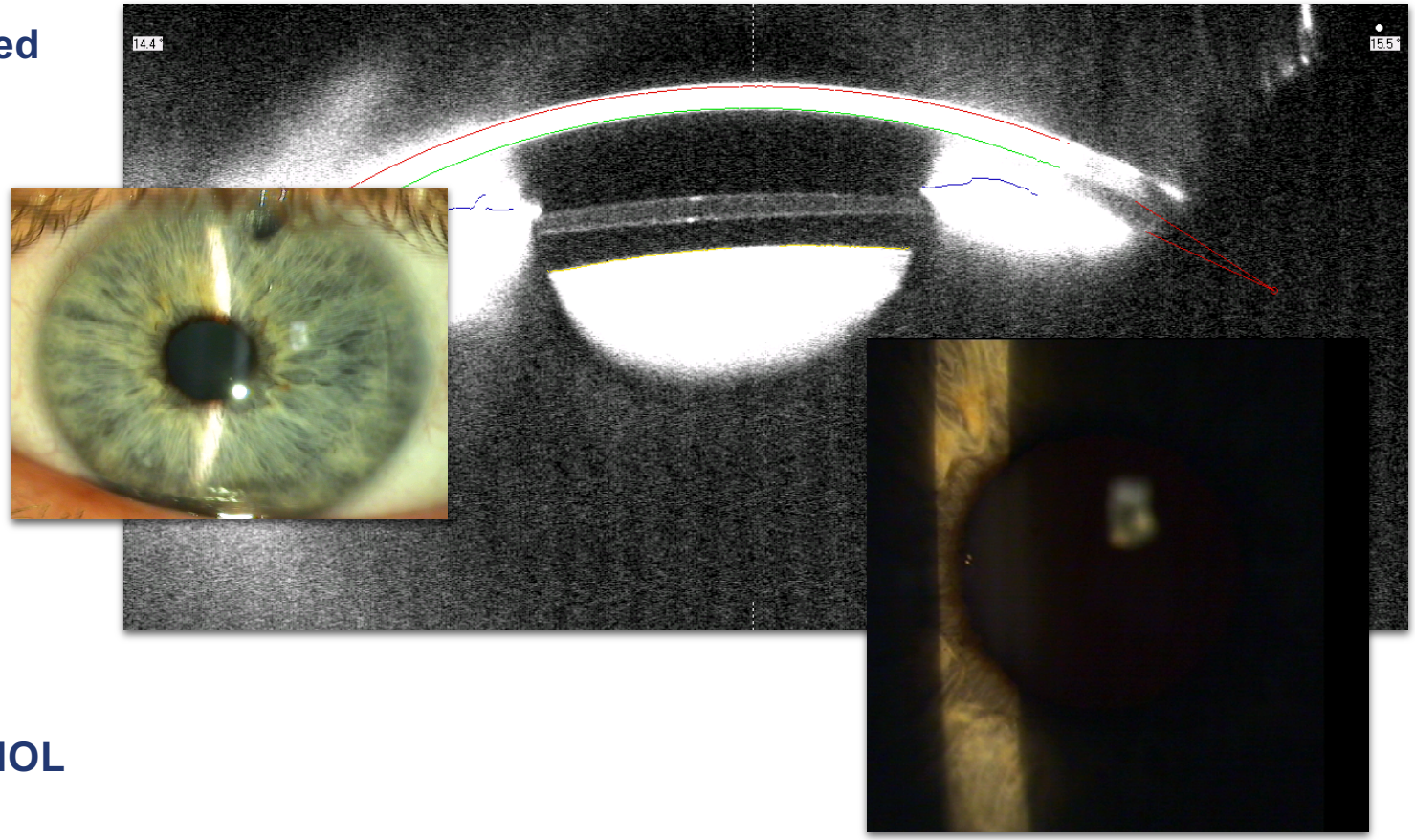
Limitations Of PIOL Implantation In Hyperopia

Crowded Eye Syndrome: Ocular Hypertension | Narrow angle | Affected Pupil Motility

- **Male Patient | 35Y**
- **Contact lens intolerance / Highly motivated**
- **Manifest Refraction: R/L +7,5D**
- **ACD: R/L 2,7mm**
- **IPCL Implantation R/L ex domo in 2020**
- **IPCL Exchange 2X (sizing problems)**
- **UCVA: R/L 20/20**
- **Tensio: R/L 23mmHg**
- **Complaints: photic phenomena L**
- **Anisokoria**
- **Plan: IPCL explantation and RLE with MFIOL**



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Refractive Lens Exchange

Non-Presbyopic Hyperopes (Cologne Experiences)

- 49 Eyes
- Mean age @ OP: 33Y (19Y to 45Y)
- pre SR equiv: Mean +5,64 D ± 2,20 D° (0,00 - +10,25)
- pre SR sph: Mean +6,99 D ± 1,82 D° (2,75 - +12,50)
- pre SR cyl: Mean -2,70 D ± 2,15 D° (-8,50 bis 0,00)
- Follow-Up up to 25 Years
- Phacoemulsification (Femto-Laser assist)
- Monofocal (toric) IOL
- EDOF (toric) IOL
- Multifocal (toric) and AddOn IOL

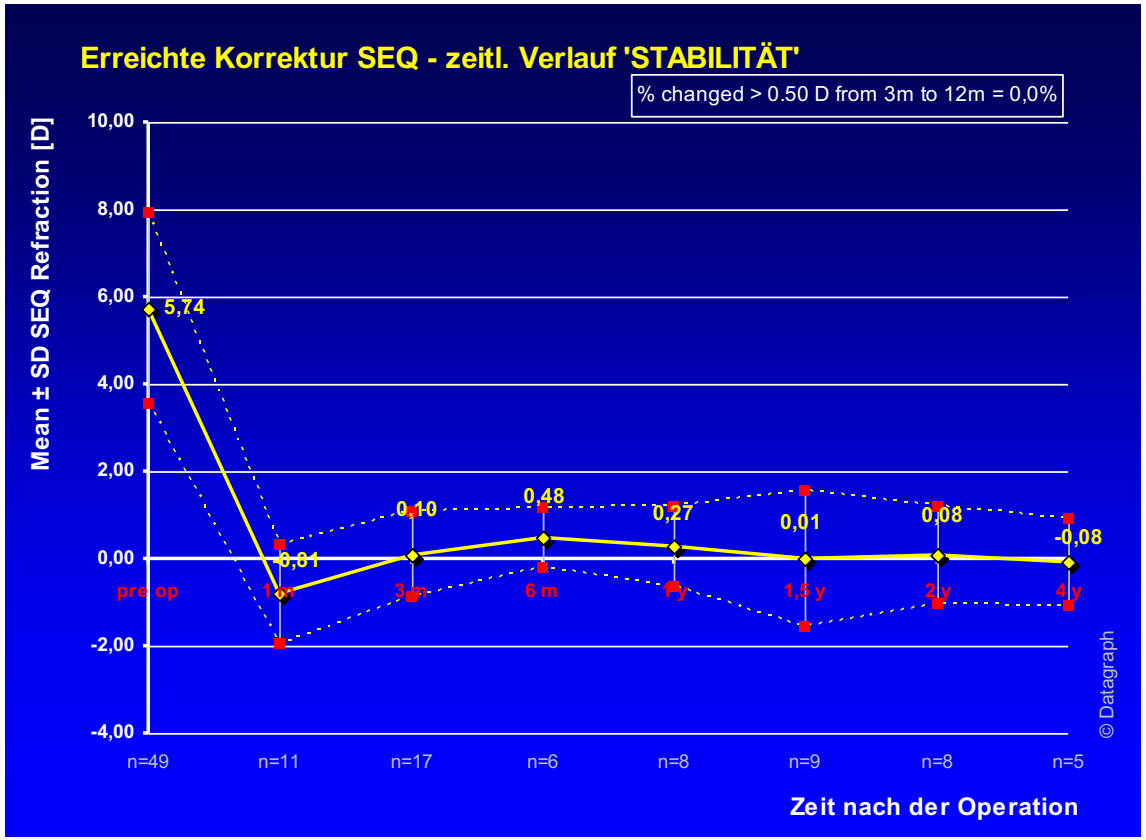
- No surgical complications
- No retinal complications
- No glaucoma
- Secondary cataract with YAG Laser
- IOL Rotation (toric)
- AddOn Exchange (multifocal)
- LVC touch-up (Lasik/PRK)

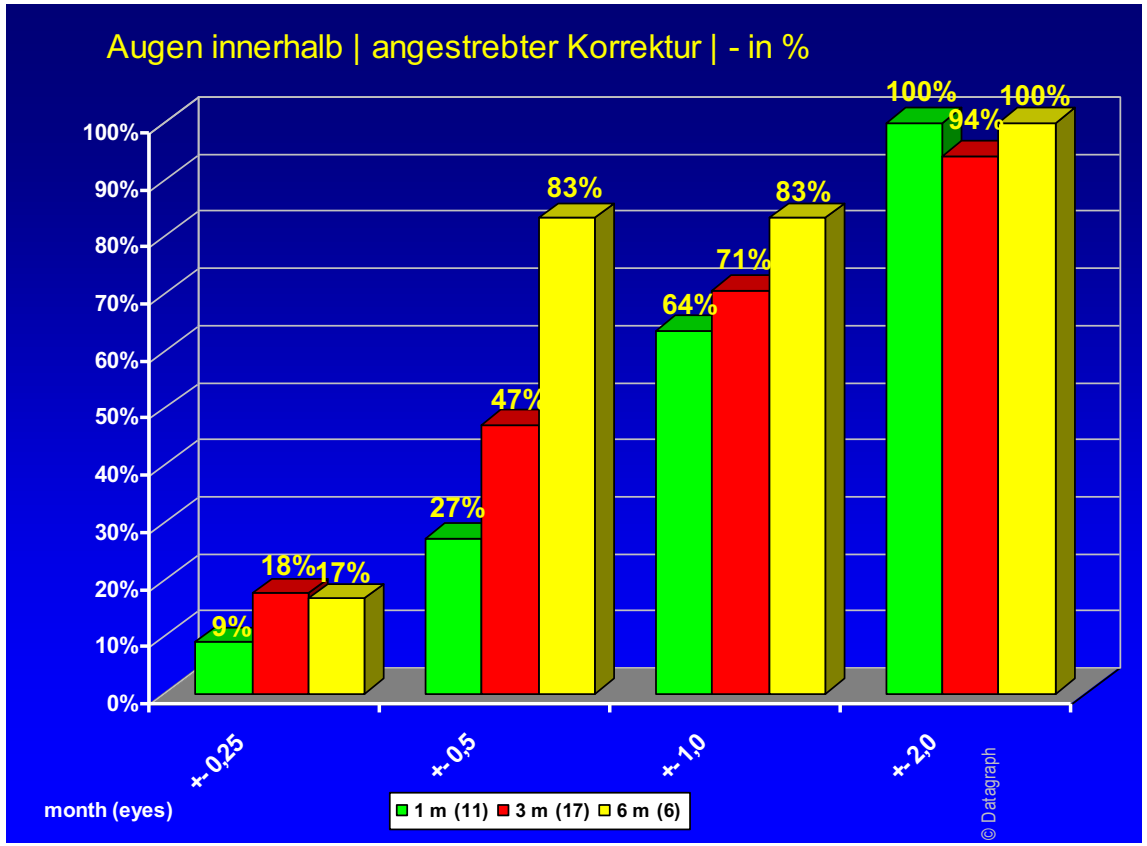
Refractive outcome:

- post SR equiv: Mean 0,48 D ± 0,67 D° (-0,25 - +1,75)
- post SR sph: Mean +0,83 D ± 0,56 D° (+0,25 bis +1,75)
- post SR cyl: Mean -0,71 D ± 0,68 D° (-1,75 bis 0,00)

Refractive Outcome

RLE in Hyperopes





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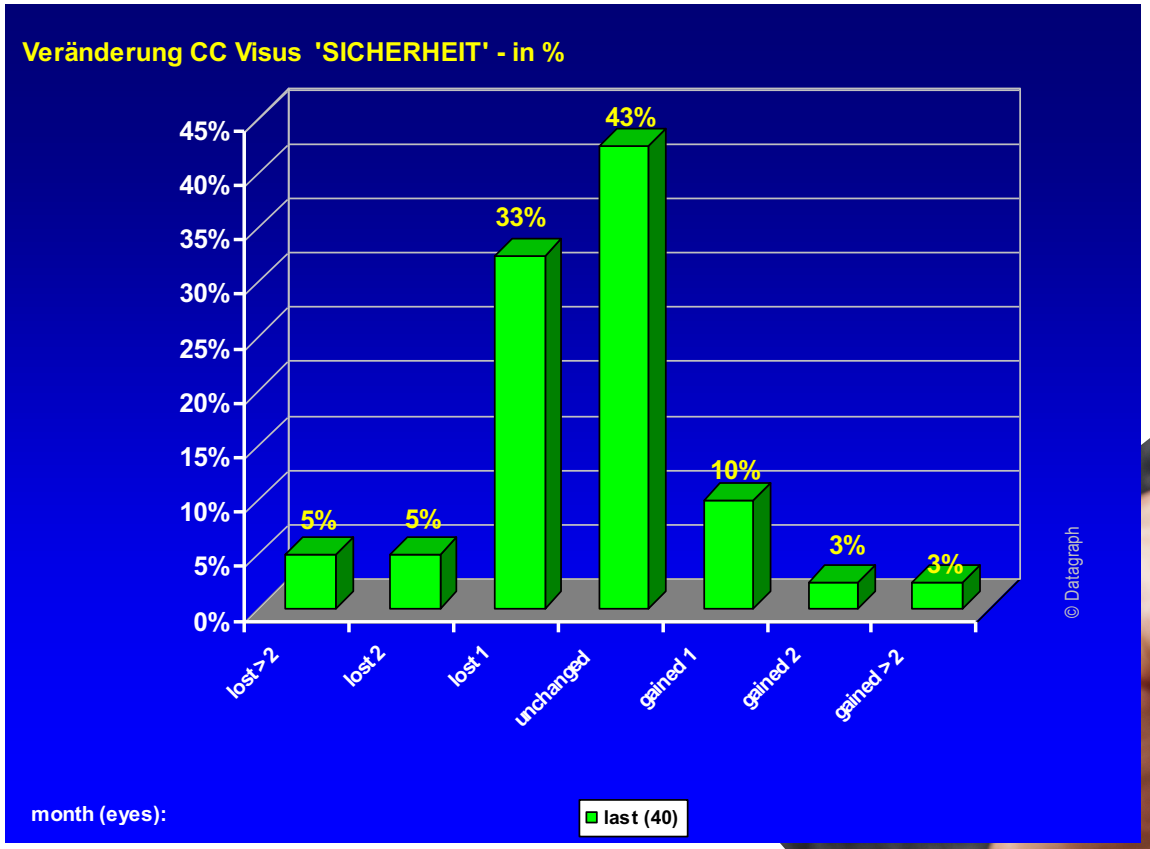
Safety (BCVA Pre- and Post-OP)

RLE In High Hyperopes



RLE (>+3D / UCVA<20/40) In Non-Presbyopic Eyes

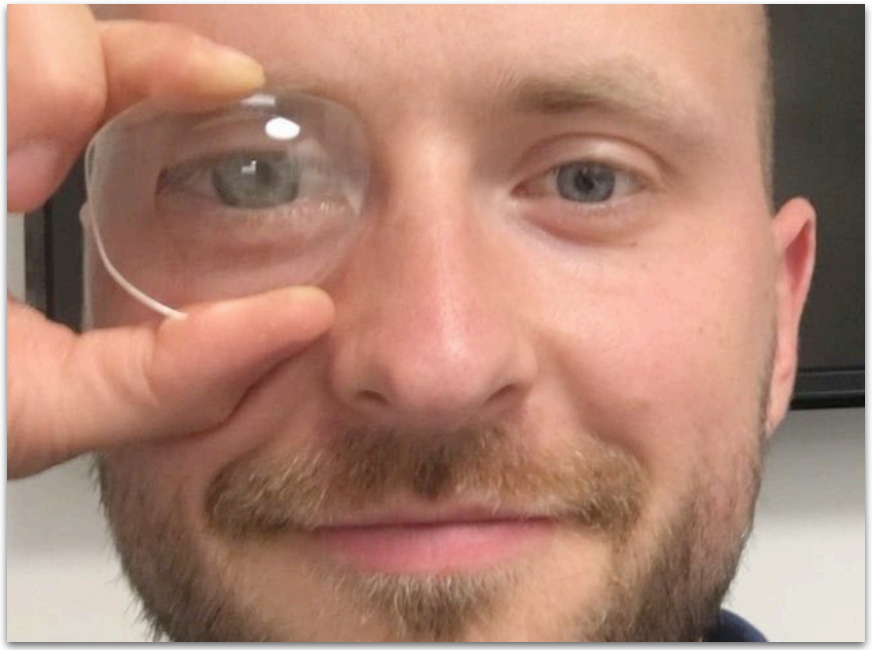
The Objectives Of Refractive Lens Exchange In Treatment Of Moderate And High Hyperopia:

Cost & Health Saving Provedure !

- **Approved procedure** (>8 Million/Year Phako & PCL in Europe)
- **Preventing** transformation to dysfunctional lens syndrome (**cataract**)
- **Preventing** PAC**Glaucoma** (less monitoring effort)
- **Less risky** than PIOL (crowded eye; multiple surgeries)
- **Better optical quality** compared to LVC (nodal point correction)
- **Stable correction** of total hyperopia (PCL doesn´t change shape)

- **Loss of natural accommodation ?**
- High-end **pseudo-accommodative optics** available
- Excellent **neuro-adaption** in young adults
- Extremely **motivated patients**

Die Brillenmacher Wallstadt



Hyperopia correction with glasses is stigmatizing and uncomfortable. Contact lenses are not well tolerated because of the optics thickness

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The question is not if, but when the lens will be replaced !

Thank You !

Dr. Omid Kermani, Medical Director

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