Bedeutung der Linsenposition für die optische Abbildugsqualität-
Ein neues Messverfahren mittels Purkinje Reflexbildern

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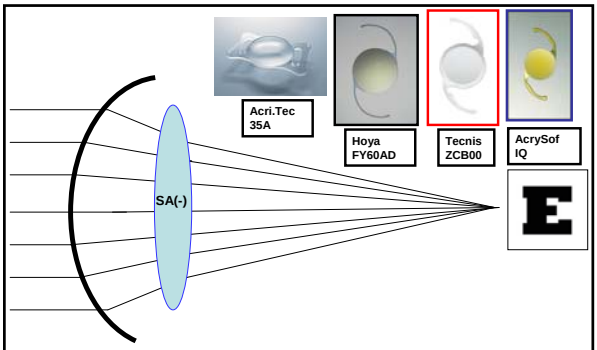
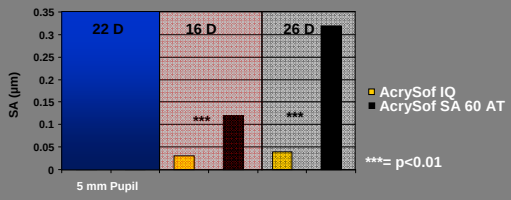
(Sulzbach/Saar)

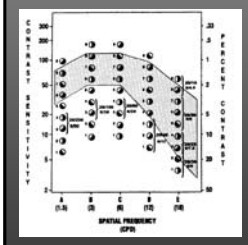


Cornea: +0.27µm SA **SA = ~ 0 µm**

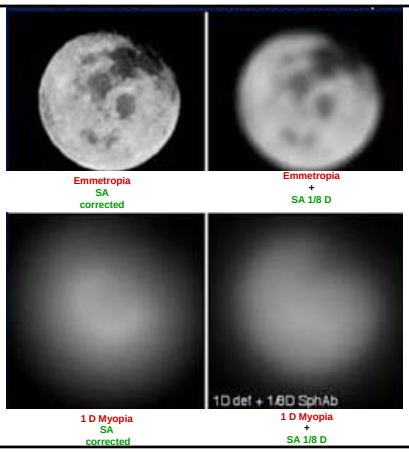


Theoretical Considerations

Contrast sensitivity

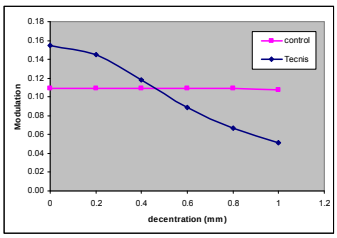


	AcrySof IQ) (AUC)	AcrySof SA60AT (AUC)	p-value
photopic	26.5±3.9	23.8±4.1	<0.01 +11%
mesopic	25.4±3.9	22.4±3.7	<0.01 +11%
mesopic with glare	24.3±4.3	22.0±3.3	<0.05 +13%



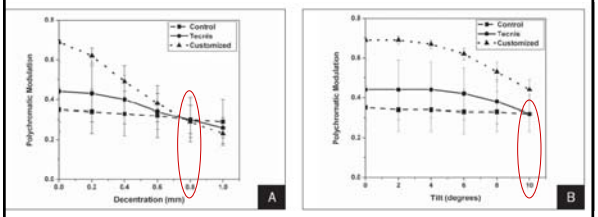
Thibos, 2002

Average Radial MTF vs Decentration
(symmetric eye models - monochromatic)



Holladay, J., et al (2002). *J Refract Surg*, *18,* 683-91.

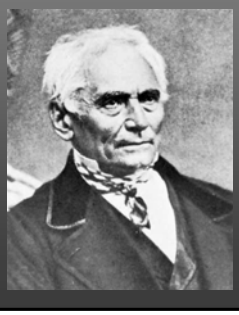
Average Radial MTF vs Decentration **(asymmetric eye models - polychromatic)**



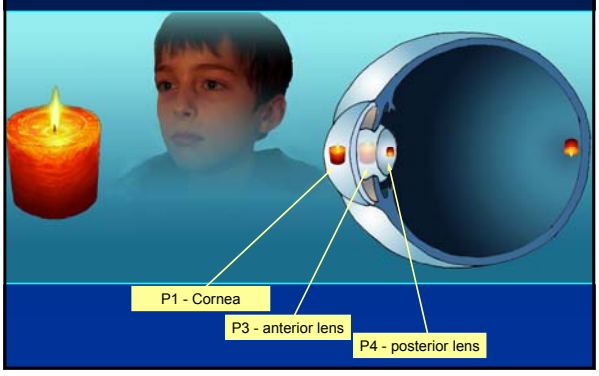
Piers P, 2007

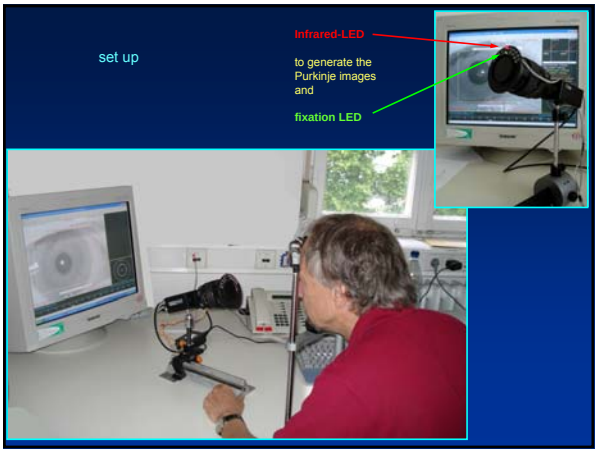
Assesment of IOL decentration and tilt

Jan Evangelista Purkyně (1787-1869)

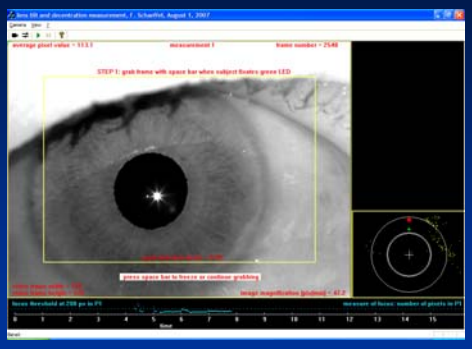


Purkinje images 1, 3 and 4

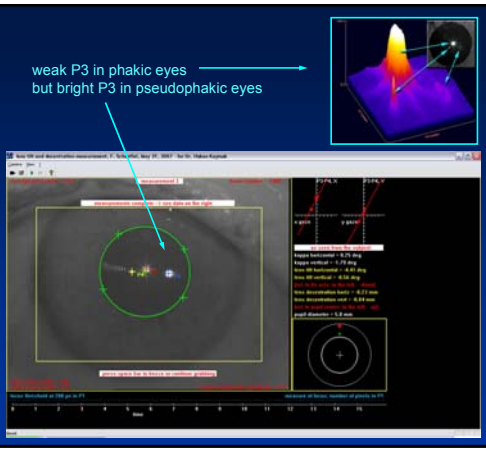




Movement of the Purkinje images with eye movements



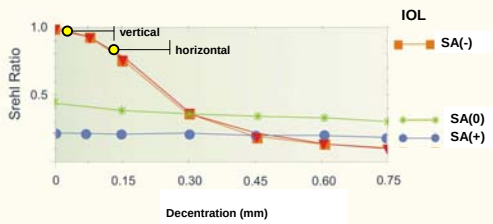
weak P3 in phakic eyes
but bright P3 in pseudophakic eyes



Own Results

Strehl Ratio with IOL decentered

(5 mm pupil size, 20 D IOL power)

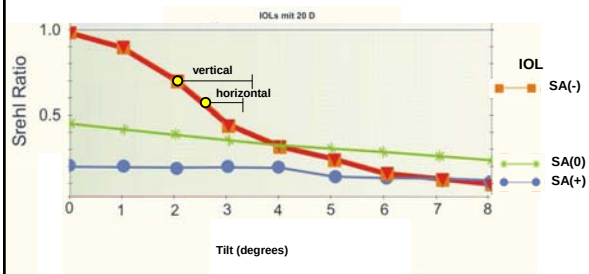


Tecnis 1-piece
mean decentration

Pieh, 2007

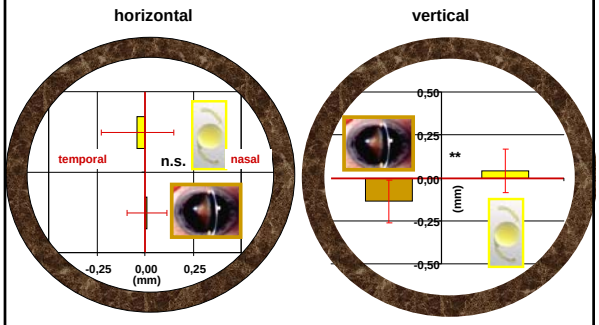
Strehl Ratio with IOL tilted

(5 mm pupil size, 20 D IOL power)

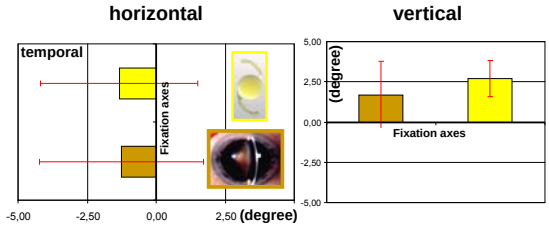


Tecnis 1-piece
Mean Tilt

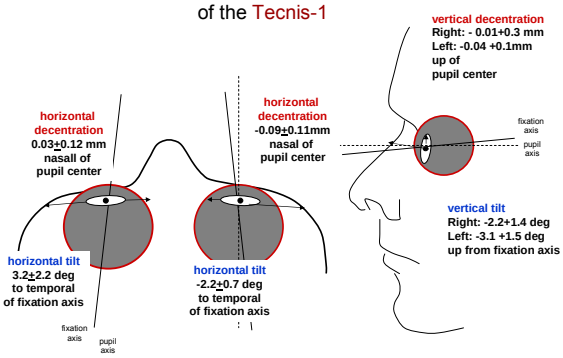
Decentration



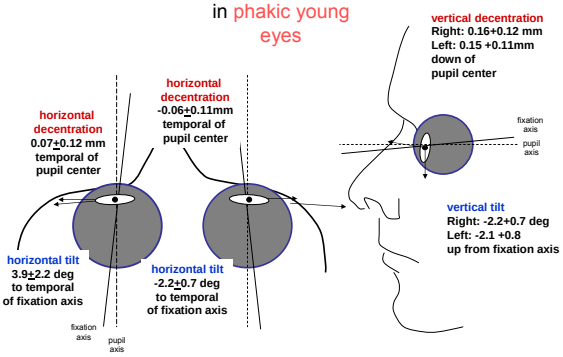
Tilt



Lens Position of the Tecnis-1



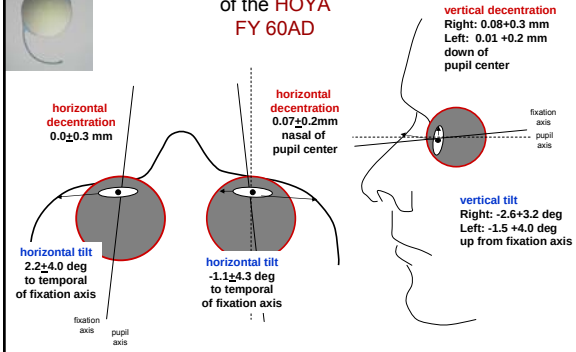
Lens Position in phakic young eyes

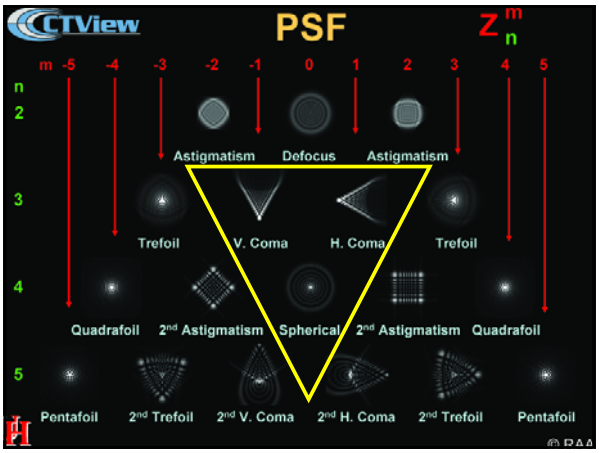


Tecnis ZCB decentration and tilt vs. young phakic eyes

	Young phakic eye	Tecnis ZCB eye
Horizontal decentration (mm)		
RE	-0.06 ± 0.11	-0.09 ± 0.11
LE	0.07 ± 0.12	-0.03 ± 0.12
Vertical decentration (mm)		
RE	0.16 ± 0.12	-0.01 ± 0.3
LE	0.15 ± 0.11	-0.04 ± 0.1
Horizontal tilt (deg)		
RE	-2.2 ± 0.7	-2.2 ± 0.7
LE	3.9 ± 2.2	3.2 ± 2.2
Vertical tilt (deg)		
RE	-2.2 ± 0.7	-2.2 ± 1.4
LE	-2.1 ± 0.8	-3.1 ± 1.5

Lens Position of the HOYA FY 60AD

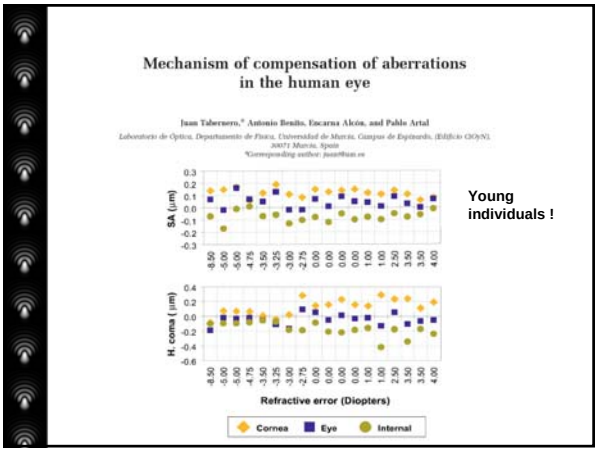




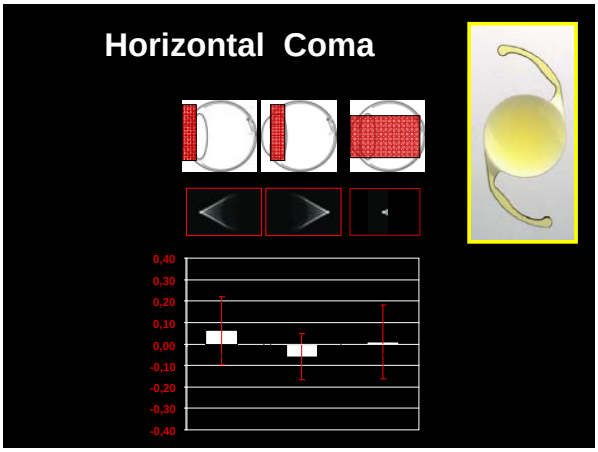
5 ° tilt = 0.12 coma for aspheric IOL

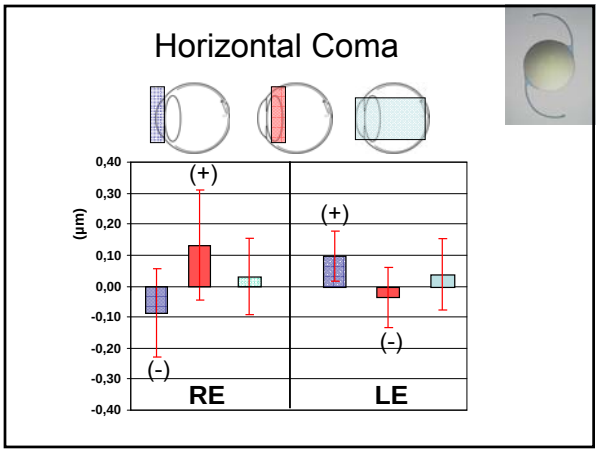
0.2 mm decentration = 0.09 coma for aspheric IOL

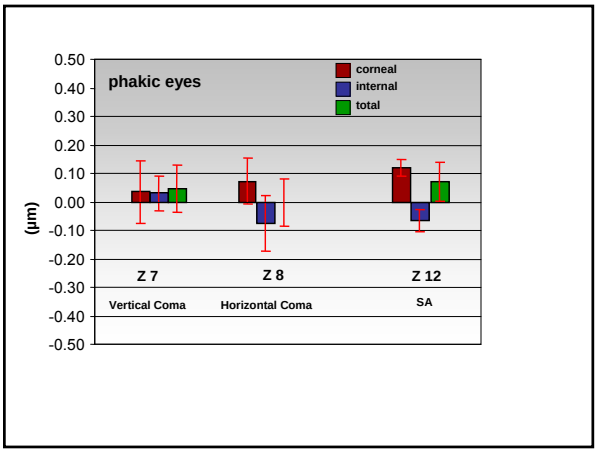
Tabernero et al 2006

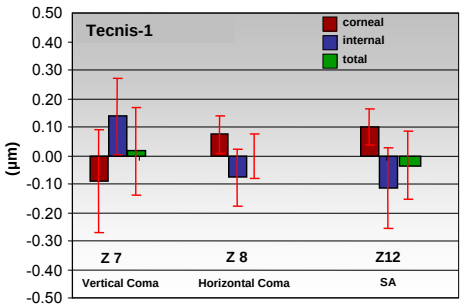


Young individuals !









Summary

- **The use of the new Purkinjemeter allows a fast and easy assessment of the lens/IOL position.**
- **Our results confirm that, the natural crystalline lens is neither perfectly centered nor free of tilt.**
- **Aspheric IOLs show similar amounts of decentration and tilt as the crystalline lens in young individuals. Concerns about deterioration of image quality with asperic IOls due to malposition of the IOL can therefore not be confirmed.**
- **The slight "malposition" of the crystalline lens as well as of the aspheric IOL contribute to a compensation of horizontal coma, the second most important high order aberration for optical performance.**

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Optical aberrations of intraocular lenses measured *in vivo* and *in vitro*

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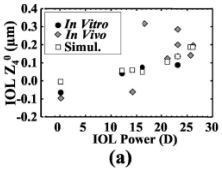

Intraocular lens to correct corneal coma

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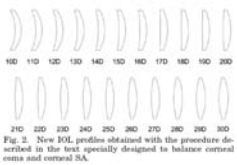
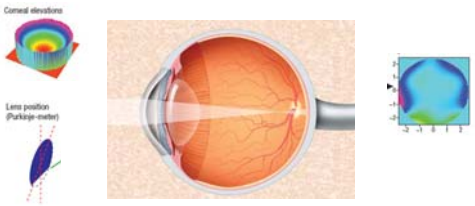
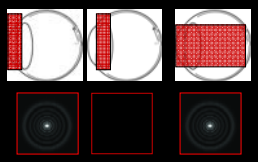


Fig. 2. New IOL profiles obtained with the procedure described in the text specially designed to balance corneal coma and corneal SA.

Studiendesign:
Hochmyope Patienten
(20 Augen; 10 Patienten) nach Implantation der Alcon MA60 AT (3 stückig)
Dioptrienstärke: 0,6 ± 3,6 Dioptrien
Pupillendurchmesser: 6mm



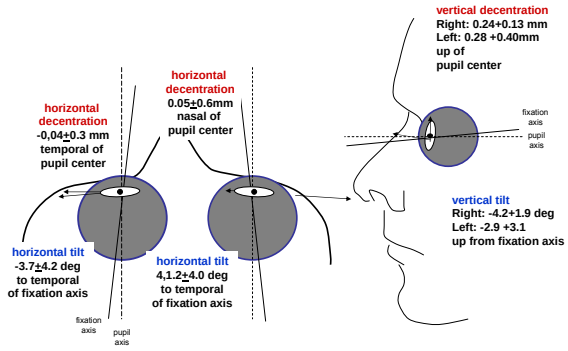
Spherical aberration



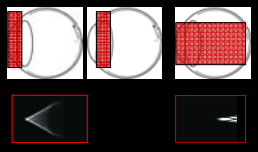
RE: 0.22 ± 0.06 µm
LE : 0.19 ± 0.1 µm

0.23 ± 0.11 µm
0.24 ± 0.12 µm

Lens Position



Horizontal Coma



RE: -0.03 ± 0.12 µm
LE : 0.03 ± 0.18 µm

-0.07 ± 0.16 µm
0.17 ± 0.16 µm