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Evaluation Of Capsular Bag-Fixated
And Ciliary Sulcus-Fixated Iol
Centration And Tilt Using Swept-
Source Optical Coherence
Tomography



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Evaluation of Capsular Bag-Fixated and Ciliary Sulcus-Fixated IOLs: Centration and Tilt Using Swept-Source Optical Coherence Tomography

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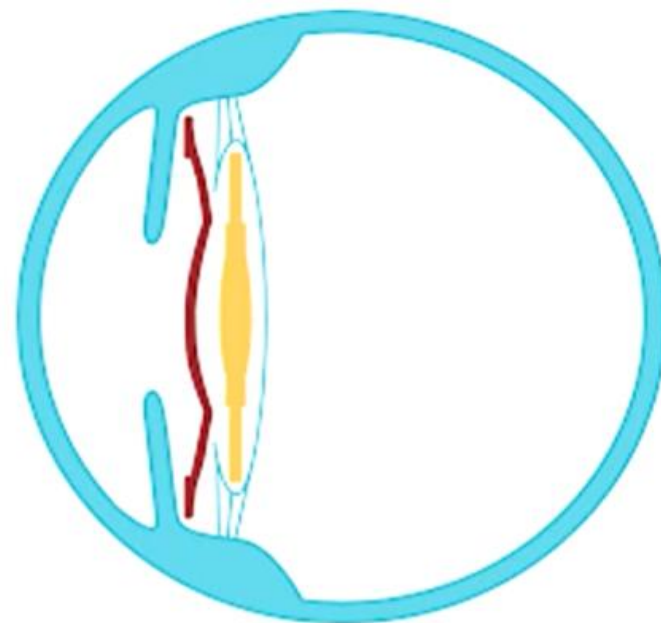
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Background

Pseudophakic additive sulcus-fixated intraocular lenses (IOLs), in this case the Rayner Sulcoflex[®], have been used for some time to compensate for postoperative ametropias and/or to achieve reversible multifocality.

To our knowledge, there is not yet any OCT-based data on centration and tilt available.

Objective of the study: To evaluate centration and tilt of sulcus-fixed IOLs and compare it to capsular-bag IOLs



Background

Rayner Sulcoflex Pseudophakic Supplementary IOLs are specifically indicated for:

- The correction of post-surgical ametropia
- Enhancement of the refractive result after RLE or PRELEX.
- Enhancement of near / far vision in the pseudophakic eye
- Correction of any residual corneal astigmatism
- Extreme myopia or hyperopia
- Patients experiencing a dynamic change of refraction

Physical Parameters

Optic Body Diameter	6.5mm
Overall Length	14.0mm
Haptic angulation	10°
Optic configuration	Anterior Convex, Posterior Concave



Study Design / Methods

In a retrospective analysis, postoperative anterior segment OCT images (swept-source OCT, Anterion[®], Heidelberg Engineering) were measured.

Using a dynamic mathematical software program (GeoGebra Suite, Version 6.0.691.0) the tilt and centration of the capsular-bag IOL and of the sulcus-fixated IOL (Rayner Sulcoflex[®]) for each eye relative to the corneal vertex were evaluated.

In the Heidelberg Anterion[®] SS-OCT the measurements are assisted by eye-tracking technology centered on the corneal vertex.

Study Design / Methods

- Capsular-bag-fixated IOLs:
 - Alcon Acrysof SN60AT/SA60AT®
- Sulcus-fixated IOL:
 - Rayner Sulcoflex®
- Single Surgeon, single center
- 21 eyes of 11 patients were evaluated
- Postoperative examination: 9-38 months (mean 23,5 months)

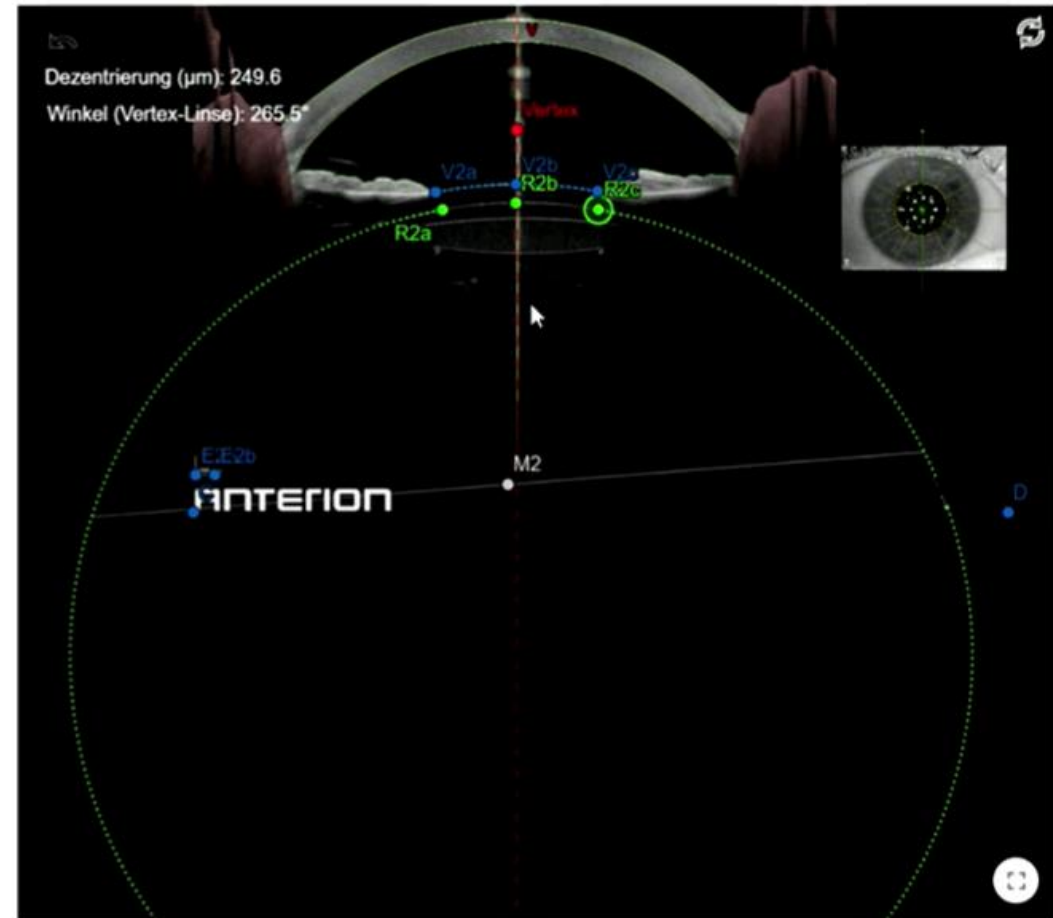


Study Design / Methods

Plotting of 3 points for anterior and posterior IOL plane, thus creation of 2 circles (the planes are not parallel)

A straight line was drawn through the intersection of the two circles and the center point was defined.

Perpendicular to this, another straight line was constructed and the angle to the corneal vertex / visual axis was determined.



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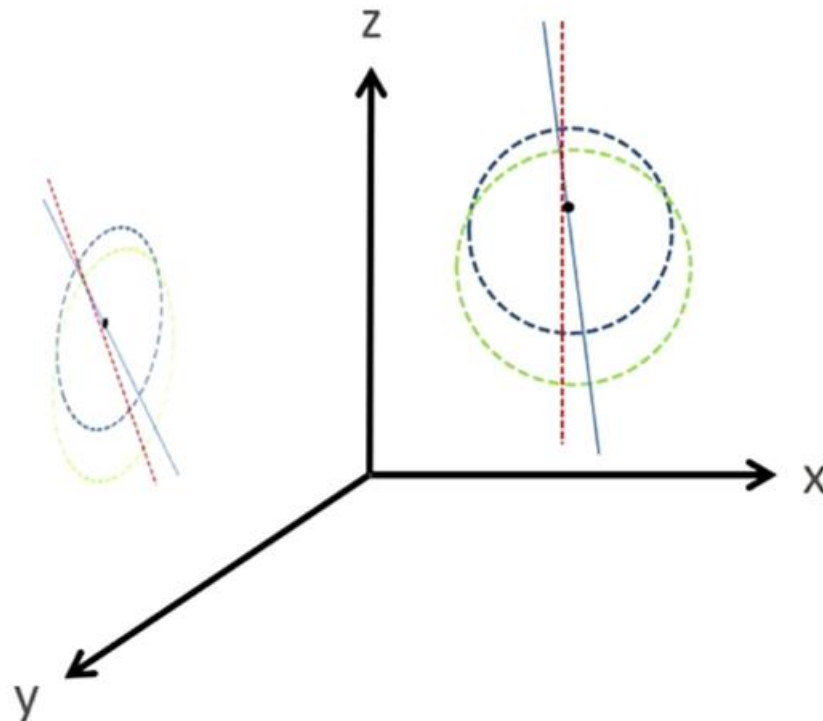
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Study Design / Methods

The calculation is done in 2 scans that are offset by 90° .

By plotting the vectors in a 3-dimensional matrix system as well as the tangential function of the angles the true tilt and decentration can be estimated. This helps find a more accurate result than measuring the outcomes simply in the horizontal / vertical plane.

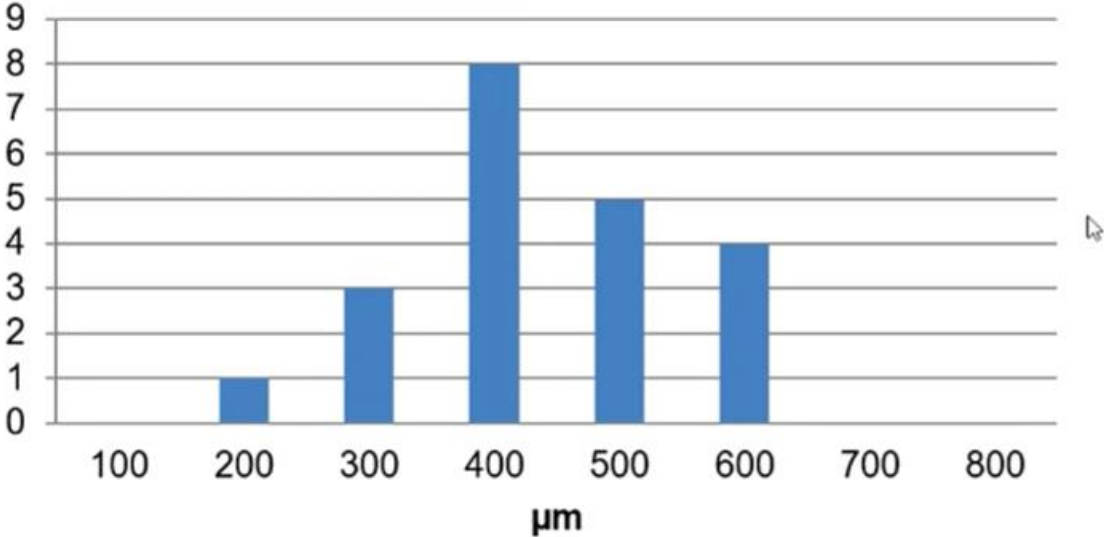


Results – Decentration

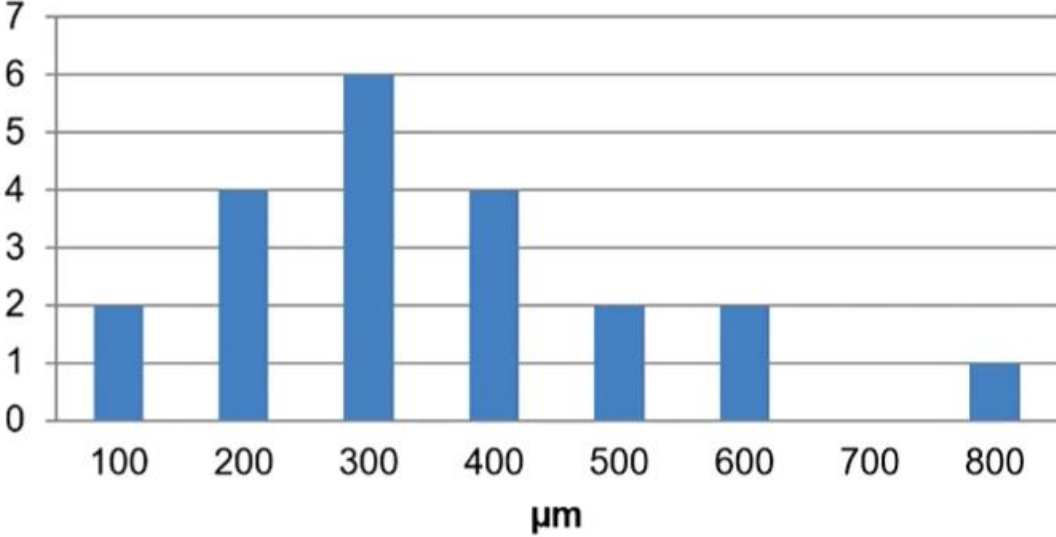
	Sulcus-fixated	Capsular-bag
Average	306,15 μ m	389,75 μ m
SEM	25,77	34,97
one-tailed T-Test p-Value: 0,057 (>0,05)		

Results - Decentration

Capsular bag: frequency of decentration



Sulcus fixated: frequency of decentration

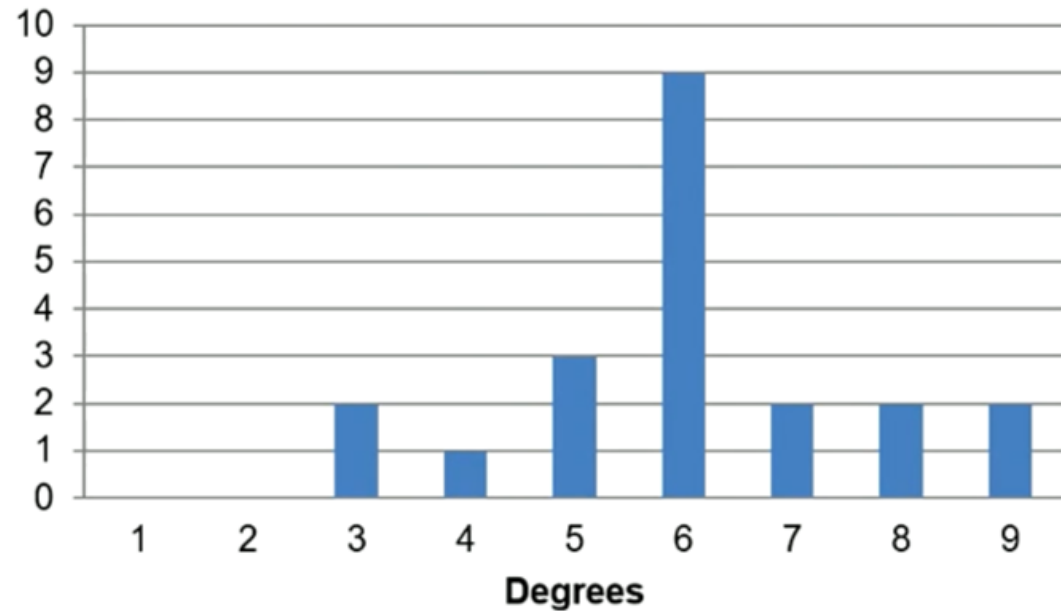


Results – Tilt

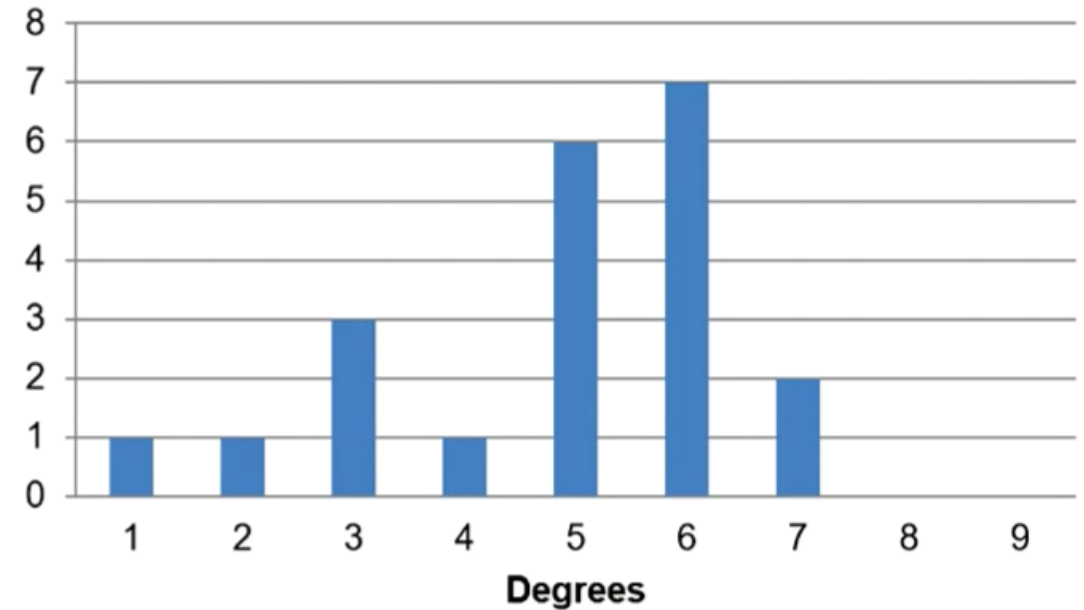
	Sulcus-fixated	Capsular-bag
Average	4,38°	5,52°
SEM	0,34	0,35
one-tailed T-Test p-Value: 0,007 (<0,05)		

Results - Tilt

Capsular bag: frequency of tilt



Sulcus fixated: frequency of tilt



Discussion

- For both types of IOLs the results in terms of centration and tilt are as expected.
- There is no significant difference in centration, even though there is a strong tendency that the sulcus-fixated IOL shows better centering behavior.
- However, there is a strong significance regarding the tilt between the capsular-bag IOL and the sulcus-fixated IOL.
- The method used can be applied in eyes with miotic or dilated pupils.
- To our knowledge this is the first time that the tilt of the Rayner Sulcoflex[®] is estimated.

