

Izzet Can, MD. Prof.

**MODERN METHODS OF
TORIC IOL IMPLANTATION
AND ACRIVA^{UD} TORIC**

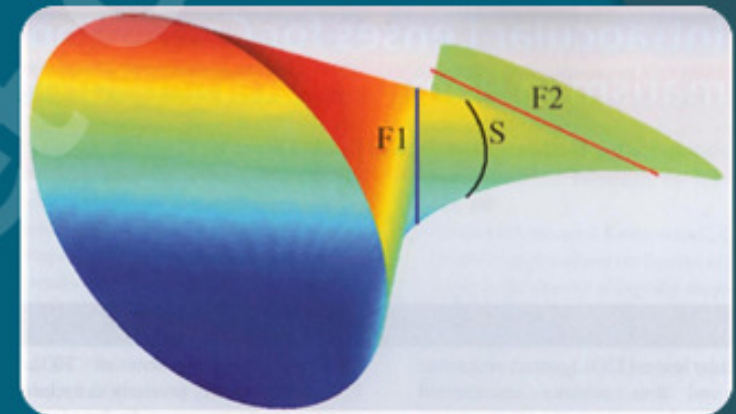
ESCRS, Milan, 2012

Main topics

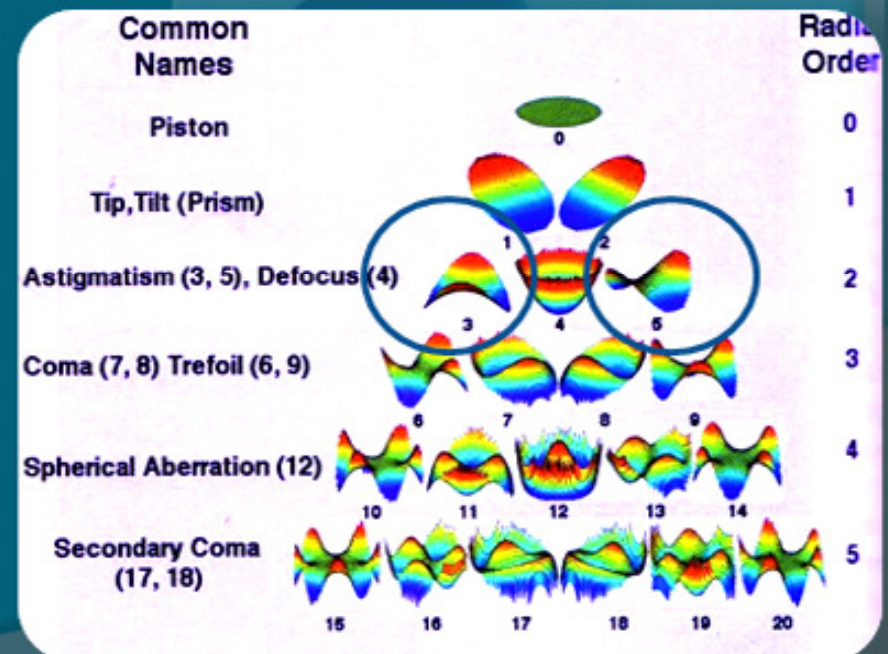
- *What is astigmatism?*
- *How to treat astigmatism during cataract surgery?*
- *How to measure corneal astigmatism?*
- *Who is a good candidate for toric IOL?*
- *Who is inappropriate patient for Toric IOLs?*
- *What are the features of Acriva Toric IOLs?*
- *How to calculate toric IOL parameters?*
- *How to perform surgery?*
- *What are the results ? / Rotational stability*

What is astigmatism?

- Astigmatism is caused by refractive aberrations in the cornea and/or lens.
- That focus light unevenly onto the retina, consequently, distorting images.
- Corneal astigmatism is basically the difference between flat meridians (low refractive power) and steep meridians (high refractive power).

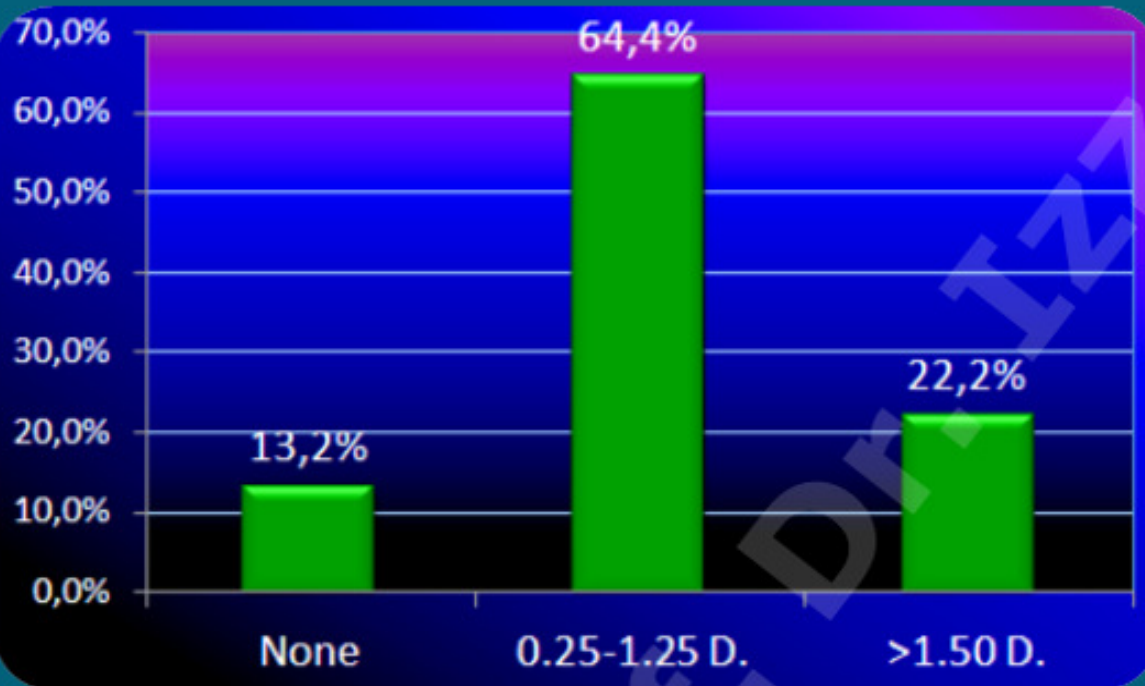


Total astigmatism = Corneal + ~~Lenticular~~

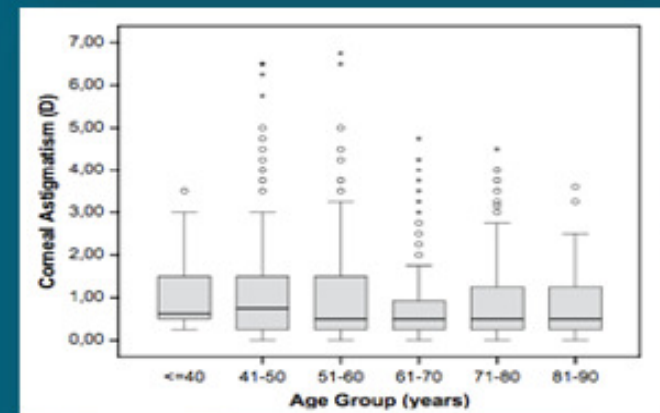
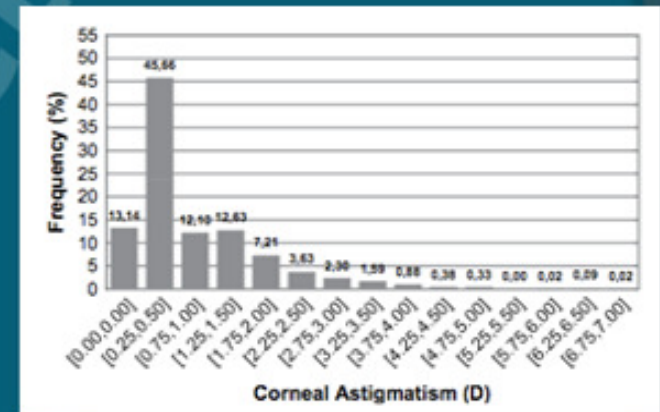


What is astigmatism?

4540 Cataract Patients



Ferrer-Blasco T et al. Prevalence of corneal astigmatism before cataract surgery. J Cataract Refract Surg 2009; 35:70–75.



How to treat astigmatism during cataract surgery?

- ⦿ On-K (steep axis) incisions
- ⦿ Peripheral corneal relaxing incisions
 - LRI
 - AK
- ⦿ **Toric IOLs**

Prof. Dr. Izzet Can

How to treat astigmatism during cataract surgery?

ASCRS Trend Survey 2011

Specialty IOL's

What percent of your cataract patients are you inserting presbyopic IOLs?



Presbyopia IOLs accounted for 11% (down 3% from 2010) of total IOL volume

Of the presbyopia IOLs, 76% were using multifocal and 24% accommodative IOLs

78% were using a presbyopia IOL, down 3% from 81% in 2010

29% say the percent of their cataract patients receiving presbyopia IOL has increased, unchanged over last year

Percent of cataracts you are inserting toric IOLs



Toric IOLs (14% of IOL volume), unchanged over last year

85% were using a toric IOL... up from 79% in 2009

46% say the percent of their cataract patients receiving Toric IOL has increased

How to treat astigmatism during cataract surgery?

ASCRS Trend Survey 2011

Other notable findings...in 2011

- 54% of members used a capsular tension ring ↓3%
- 9% felt they had a case of TASS...↓10% from previous years
- Top three perceived most important new technologies...
 - #1 Toric IOL's
 - #2 Torsional phaco
 - #3 multifocal IOL's
- Lowest interest level in
 - #1 micro incision less than 2mm
 - #2 glaucoma ab interno devices at time of cataract surgery
 - #3 wavefront aberrometry in cataract surgery
- 97% of members participate with Medicare (NC)

How to measure corneal astigmatism?

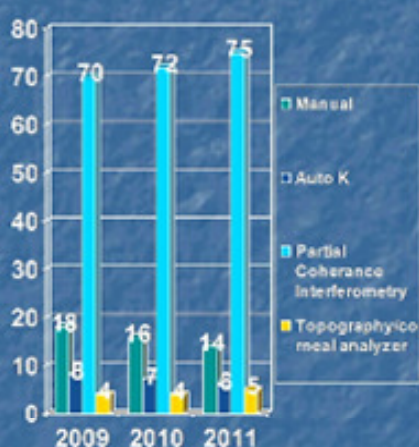
- Manual Keratometry
- Automatic Keratometry
- Non-contact Biometry
 - Partial coherence interferometry (IOLMaster)
 - Low coherence interferometry (Lenstar)
- Topography

- *Before drops*
 - *Exception: artificial tears*
- *Remove CLs 2-3 weeks prior to measurements*

How to measure corneal astigmatism?

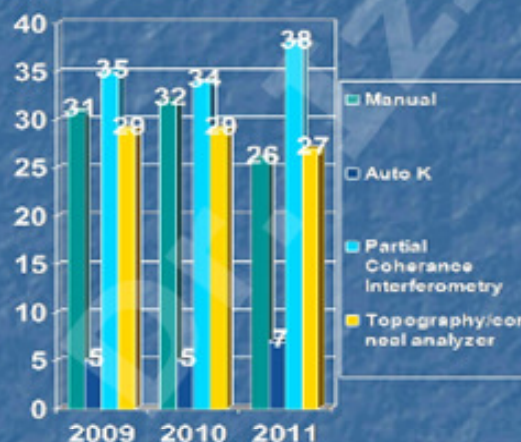
ASCRS Trend Survey 2011

Preferred method of keratometry for ...



Routine IOL Calculations

Strong reliance of interferometry platform for K's



Toric IOL Calculations

Less trusting of Interferometry platform for K's
(90% use multiple methods to get K's)

Leaming D, Duffey R.

leamingsurveys.com and duffeylaser.com

How to measure corneal astigmatism?

What If Measurements Do Not Correlate?

- Wallace RB. ASCRS 1995; 67-72.
 - Refractive cylinder of patients?
 - Keratometric data?
 - Corneal topographic data?
- Especially < 2.0 D. astigmats show bad correlation between these methods.

- Repeat all measurements
- Ensure that lids / tear film are optimal
- Make sure CLs were removed and drops were not used.

How to measure corneal astigmatism?

If the results differ?

Precedence	For Power	For Axis
1	Manual Keratometry	Autokeratometry
2	Autokeratometry	Non-contact optical biometry
3	Non-contact optical biometry	Topography
4	Topography	Manual Keratometry

•Hill W, Osher R, Cooke D, Solomon K, Sandoval H, Cervantes RS, Potvin R. *J Cataract Refract Surg* 2011; 37:2181-7.

•Lee H, Chung JL, Kim EK, Sgrignoli B, Kim T. *J Cataract Refract Surg* 2012; 38:1608-15.

How to measure corneal astigmatism?

VD=12

<R>	SPH	CYL	AX
+ 0.50	-1.25	160	
+ 0.50	-1.25	159	
+ 0.50	-1.25	159	
0.00	-1.00	154	
0.00	-0.50	143	
+ 0.25	-1.25	141	
<hr/>			
+ 0.50	-1.00	154	

<R>	mm	D	AX
R1	7.96	42.50	163
R2	7.65	44.00	73
Ave	7.80	43.75	
CYL		-1.50	163

<L>	SPH	CYL	AX
+ 1.50	+1.25	105	
+ 1.50	+1.25	103	
+ 1.50	+1.00	106	
+ 1.50	+1.00	98	
+ 1.50	+1.00	98	
<hr/>			
+ 1.50	+1.00	106	

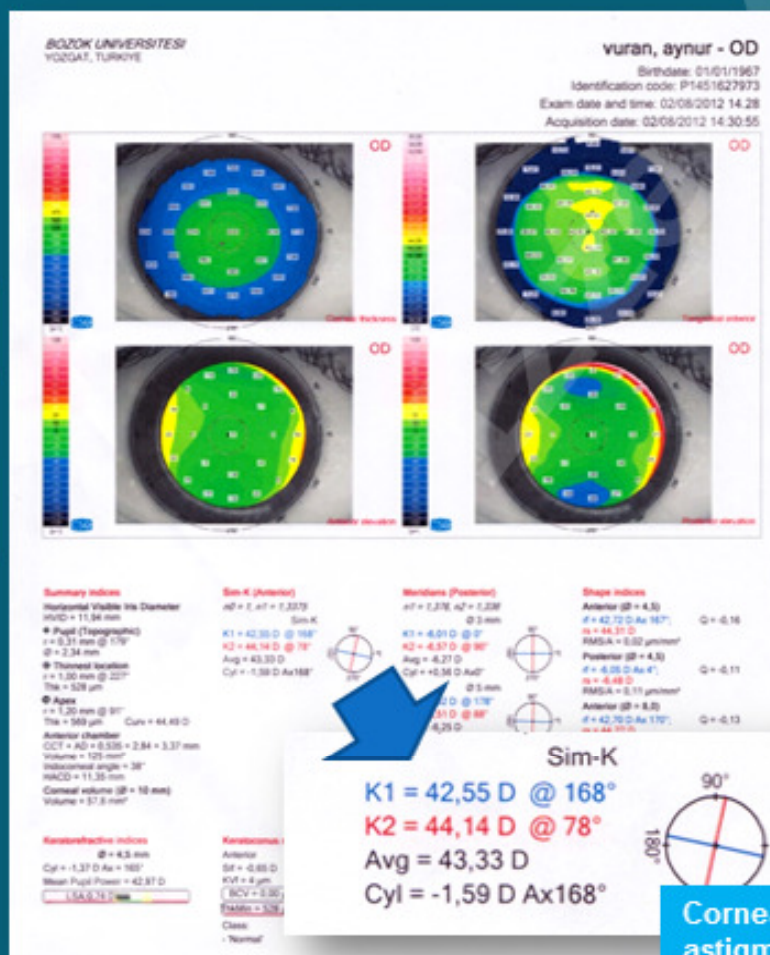
<L>	mm	D	AX
R1	7.92	42.50	2
R2	7.83	43.00	92
Ave	7.87	42.75	
CYL		-0.50	2

PD = 63

Reichert RK600

Total astigmatism

Corneal astigmatism



Corneal astigmatism

VURAN AYNUR, 01.01.1967

Examination 1 of 02.08.2012
Analysis 4, standardized
Biometry

Time: 14:29
Duration: 5 Min

	OD	OS
	Right eye	Left eye
Measuring mode	Mode Phakic	---
Axial length	AL 21,77 mm ±0,008 mm	---
Cornea thickness	CCT 534 µm ±3,3 µm	---
Aqueous depth	AD 2,76 mm ±0,022 mm	---
Anterior chamber depth inc.	ACD 3,30 mm ±0,020 mm	---
Lens thickness	LT 2,96 mm ±0,005 mm	---
Retina thickness	RT 200** µm ±0,0 µm	---
<hr/>		
Flat meridian	K1 42,51 D @ 165° ±0,046 D	---
Steep meridian	K2 44,09 D @ 75° ±0,050 D	---
Astigmatism	AST 1,58 D @ 75° ±2,8°	---
Keratometric index	n 1,3375	---
<hr/>		
White to White	WTW 11,95 mm ±0,005 mm	---
Iris barycenter	ICX -0,32 mm ±0,005 mm	---
	ICY 0,00 mm ±0,005 mm	---
<hr/>		
Pupil diameter	PD 3,12 mm ±0,237 mm	---
Pupil barycenter	PCX -0,17 mm ±0,018 mm	---
	PCY -0,01 mm ±0,030 mm	---

Corneal astigmatism

EyeSuite™ Biometry, V1.3.0
LS 900, SN 1482, V 1.1.0

HAAG-STREIT INTERNATIONAL

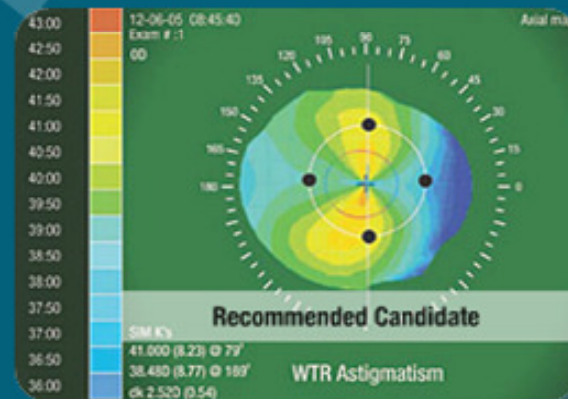
Autorefractokeratometry printout

Scheimpflug - Placido topographer (Sirius) printout

Optical Low - Coherence Reflectometry (Lenstar) printout

Who is a good candidate for toric IOL?

- Preoperatively
 - Corneal astigmatism > 0.75 D.
 - Manual keratometry: Regular astigmatism
 - Corneal topography: bowtie or wedge type regular astigmatism
- Intraoperatively
 - Surgery should be free of problems
 - Centralized and regular CCC
 - Intact posterior capsule
 - In the bag placement



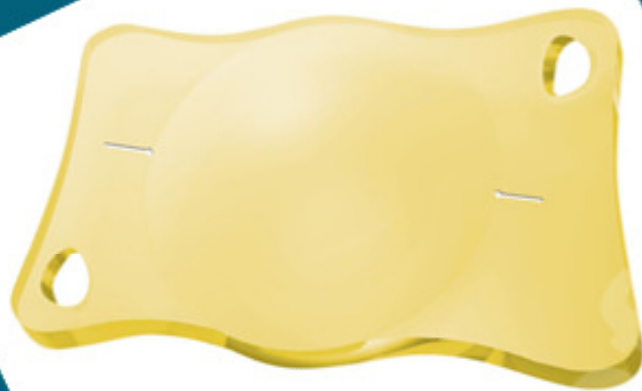
Who is inappropriate patient for Toric IOLs?

- ⦿ Young patient with forme fruste keratoconus
 - (exception: older patient with stable KC)
- ⦿ Severe zonular abnormalities
- ⦿ Previous hyperopic LASIK

What are the features of Acriva Toric IOLs?



MONOFOCAL
TORIC



Acriva UD T- UDM 611



MULTIFOCAL
TORIC

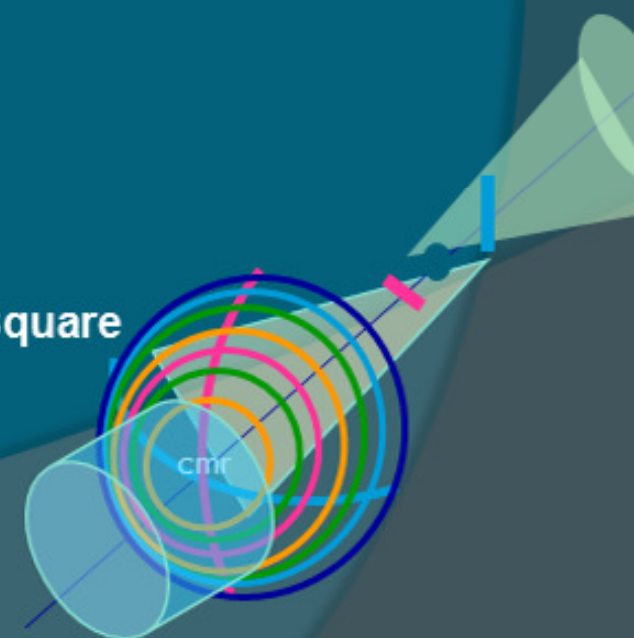


Acriva UD Reviol T- MFM 611

What are the features of Acriva Toric IOLs?

Material	25% Water content hydrophilic acrylic with hydrophobic surface Yellow chromophore
Design	Biconvex, Aspheric aberration controlled, Plate haptic, 0°
Optic/ Overall diameter	6.0 mm / 11.0 mm.
Power Range	sph -20.00 D to +32.00 D cyl +1.00 D to +10.00 D
Recommended A constant Acoustic / Optic	118.0 / 118.3 (SRK-T)
Margin Design	All Square™ 360° Enhanced Square
Refractive Index Dry / Wet	1.509 / 1.462

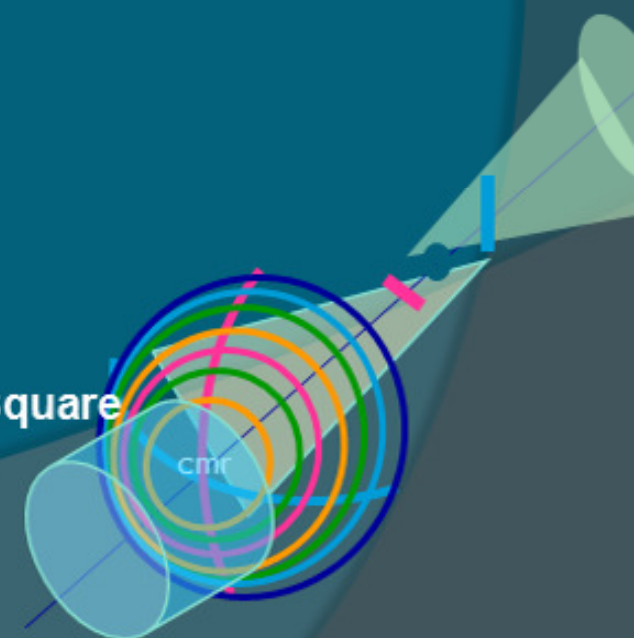
Acriva ^{LLC} **BB**
toric



What are the features of Acriva Toric IOLs?



Material	25% Water content hydrophilic acrylic with hydrophobic surface Yellow chromophore
Design	Biconvex, Diffractive anterior, Toric posterior, +3.75 D. near add, Aspheric aberration controlled, Plate haptic, 0°
Optic/ Overall diameter	6.0 mm / 11.0 mm.
Power Range	sph 0.0 D to +32.0 D cyl +1.0 D to +10 D
Recommended A constant Acoustic / Optic	118.0 / 118.3 (SRK-T)
Margin Design	All Square™ 360° Enhanced Square
Refractive Index Dry / Wet	1.509 / 1.462



How to calculate toric IOL parameters?

- ⦿ Which parameters do we have to calculate?
 - Spherical power / for spherical correction
 - Cylindrical power / for astigmatic correction
 - Final steep corneal axis / to align with our IOL

How to calculate toric IOL parameters?

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VSY BIOTECHNOLOGY

XXX CONGRESS OF THE ESCRS
8-12 September 2012
Milan

Products

Acryva^{UD} Reviol

Acryva^{UD} Reviol offers the patient high contrast sensitivity even during night vision. Acryva^{UD} Reviol multifocal lenses maintain less visual distortion and greatly improve far, middle and near vision.

Click for details

Videos

Incision Surgery

Click for all videos

Patients & Family

TORIC
Acryva^{UD} BB T UDM 611

Custom Toric Order Form

Acryva^{UD} TORIC calculator
EASY WAY TO ORDER ONLINE

Click to enter

News & Events

The 30th Congress of ESCRS will be held on 8-12 September

Acryva^{UD} Easy Toric Calculator Is Now Available In AppStore Without Any Charge

<http://www.vsybiotechnology.com/Products.aspx>

<http://www.vsybiotechnology.com/>

*I pad application as
also available!*
EASY TORIC CALCULATOR

How to calculate toric IOL parameters?

Accriva[®]
easy TORIC
calculator

Toric IOL
Accriva[®]
toric

Multifocal Toric IOL
Accriva[®]
Reviol[®]
toric



VSY
BIOTECHNOLOGY

<http://www.vsybiotechnology.com/>

How to calculate toric IOL parameters?

Acryva[™]
Reviol[®] BB
toric

Acryva[™]
easy **TORIC**
calculator

VSY
BIOTECHNOLOGY

Surgeon

Name-Surname (*) :
Clinic (*) :
Phone (*) :
E-mail (*) :
Country :

(*) Required field.

RIGHT (OD)

K (*) : p (diopter) r (mm)

Keratometer (*) : K1 (Flat K): 35.00D~ 50.00D
Flat Axis: 0° ~ 180°

K2 (Steep K): 35.00D~ 50.00D
Steep Axis: 0° ~ 180°

IOL Spherical Power (*) :

Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D

Incision Location (*) : 0° ~ 360°

Patient

Name-Surname :
Additional Information :
IOL Type : Acryva^{UD} Reviol BB Toric T MFM 611

LEFT (OS)

K (*) : p (diopter) r (mm)

Keratometre (*) : K1 (Flat K): 35.00D~ 50.00D
Flat Axis: 0° ~ 180°

K2 (Steep K): 35.00D~ 50.00D
Steep Axis: 0° ~ 180°

IOL Spherical Power (*) :

Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D

Incision Location (*) : 0° ~ 360°

Next

Next

How to calculate toric IOL parameters?



Surgeon

Name-Surname (*) :
Clinic (*) :
Phone (*) :
E-mail (*) :
Country :

(*) Required field.

RIGHT (OD)

K (*) : p (diopter) r (mm)
Keratometer (*) : K1 (Flat K): 35.00D~ 50.00D
Flat Axis: 0° ~ 180°
K2 (Steep K): 35.00D~ 50.00D
Steep Axis: 0° ~ 180°
IOL Spherical Power (*) :
Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D
Incision Location (*) : 0° ~ 360°

Patient

Name-Surname :
Additional Information :
IOL Type :

LEFT (OS)

K (*) : p (diopter) r (mm)
Keratometre (*) : K1 (Flat K): 35.00D~ 50.00D
Flat Axis: 0° ~ 180°
K2 (Steep K): 35.00D~ 50.00D
Steep Axis: 0° ~ 180°
IOL Spherical Power (*) :
Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D
Incision Location (*) : 0° ~ 360°

Next

Next

Incision Location (*) : 0° ~ 360°

Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D

Incision Location (*) : 0° ~ 360°

Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D

How to calculate toric IOL parameters?



Surgeon

Name-Surname (*) : Izzet Can
Clinic (*) : Bozok
Phone (*) : 0532 4480401
E-mail (*) : izzetcan@yahoo.com
Country : Turkey

(*) Required field.

RIGHT (OD)

K (*) : p (diopter) r (mm)
Keratometer (*) : K1 (Flat K): 41,60 35.00D~ 50.00D
Flat Axis: 120 0° ~ 180°
K2 (Steep K): 43,80 35.00D~ 50.00D
Steep Axis: 30 0° ~ 180°
IOL Spherical Power (*) : 24,00 ▾
Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D
Incision Location (*) : 0° ~ 360°

Patient

Name-Surname : Deneme Hastası
Additional Information :
IOL Type : Acryva^{UD} Reviol BB Toric T MFM 611

LEFT (OS)

K (*) : p (diopter) r (mm)
Keratometre (*) : K1 (Flat K): 35.00D~ 50.00D
Flat Axis: 0° ~ 180°
K2 (Steep K): 35.00D~ 50.00D
Steep Axis: 0° ~ 180°
IOL Spherical Power (*) : 20,00 ▾
Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D
Incision Location (*) : 0° ~ 360°

Next

Back

A-constant: 118.0 acoustically and 118.3 optically / SRK-T

How to calculate toric IOL parameters?



Surgeon

Name-Surname (*) :

Clinic (*) :

Phone (*) :

E-mail (*) :

Country :

Patient

Name-Surname :

Additional Information :

IOL Type :

(*) Required field.

RIGHT (OD)

K (*) : p (diopter) r (mm)

Keratometer (*) : K1 (Flat K): 35.00D~ 50.00D
Flat Axis: 0° ~ 180°

K2 (Steep K): 35.00D~ 50.00D
Steep Axis: 0° ~ 180°

IOL Spherical Power (*) :

Surgically Induced Astigmatism (*) : 0.00D ~ 2.50D

Incision Location (*) : 0° ~ 360°

LEFT (OS)

K (*) : p (diopter) r (mm)

Keratometre (*) : K1 (Flat K): 35.00D~ 50.00D
Flat Axis: 0° ~ 180°

K2 (Steep K): 35.00D~ 50.00D
Steep Axis: 0° ~ 180°

Incision sizes and localizations	Superior (70-110°)	Oblique (110-160°)	Temporal (160-200°)
2.2 mm ↓	0.75	0.50	0.25
2.2 - 2.8 mm	1.00	0.75	0.50
2.8 - 3.5 mm	1.25	1.00	0.75

How to calculate toric IOL parameters?



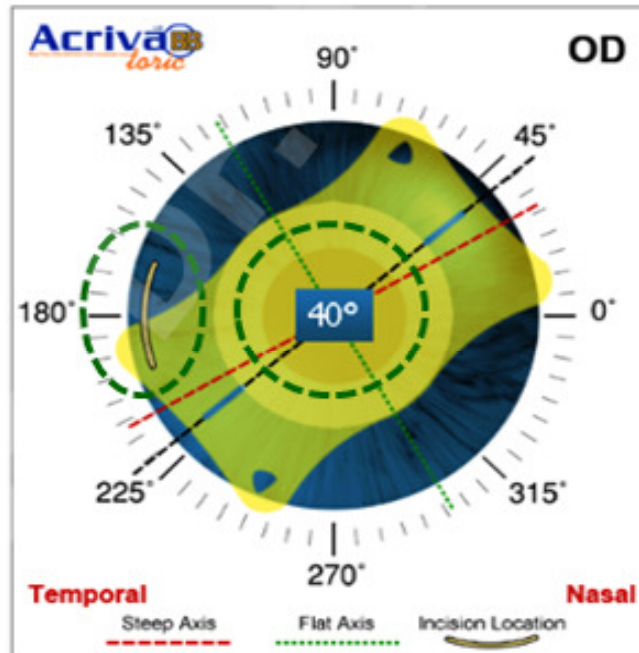
Surgeon	
Name-Surname	Izzet Can
Clinic	Bozok
Phone	532 4480401
E-Mail	izzetcan@yahoo.com
Country	Turkey

Patient	
Name-Surname	Deneme Hastası
Additional Information	
IOL Type	Acryva [®] BB Toric T UDM 611

RIGHT (OD)	
K1 (Flat K)	41.60 D
Flat Axis	120°
K2 (Steep K)	48.60 D
Steep Axis	30°
IOL Spherical Power	24.00 D
Surgically Induced Astigmatism	0.75 D
Incision Location	180°

Calculation Details	
Pre-Op Corneal Astigmatism	2.20 D @ 30°
Surgically Induced Astigmatism	0.75 D @ 90°
Crossed-Cylinder Result	1.45 D @ 135°
Anticipated Residual Astigmatism	0.22 D @ 40°

Lens Details	
IOL Spherical Power	24.00 D
Cylinder Power (Corneal Plane)	1.72 D
Cylinder Power (IOL Plane)	2.50 D
Axis of Placement	40°



Your transaction has been completed successfully.

Multifocal Toric order will be produced and delivered to your address within 21 days.

Thank you for your attention.

Back Print Approve Order

Cancel Cancel Cancel



How to calculate toric IOL parameters?



Surgeon

Name-Surname (*) : IZZET CAN, MD, PROF.
Clinic (*) : BOZOK UNV. MED. FAC. EYE DEPT.
Phone (*) : 0532 4480401
E-mail (*) : izzetcan@yahoo.com
Country : TURKEY

(*) Required field.

RIGHT (OD)

K (*) : p (diopter) r (mm)
Keratometer (*) : K1 (Flat K): 35.00D ~ 50.00D
Flat Axis: 0° ~ 180°
K2 (Steep K): 35.00D ~ 50.00D
Steep Axis: 0° ~ 180°
IOL Spherical Power (*) :
Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D
Incision Location (*) : 0° ~ 360°

Patient


Name-Surname : AYNUR VURAN
Additional Information : 45 YEARS OLD, WOMAN, RIGHT CATARACT VA: 0,2
IOL Type : Acryva^{UD} RevioLBB Toric T MFM 611


LEFT (OS)


K (*) : p (diopter) r (mm)
Keratometre (*) : K1 (Flat K): 35.00D ~ 50.00D
Flat Axis: 0° ~ 180°
K2 (Steep K): 35.00D ~ 50.00D
Steep Axis: 0° ~ 180°
IOL Spherical Power (*) :
Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D
Incision Location (*) : 0° ~ 360°

Next

How to calculate toric IOL parameters?








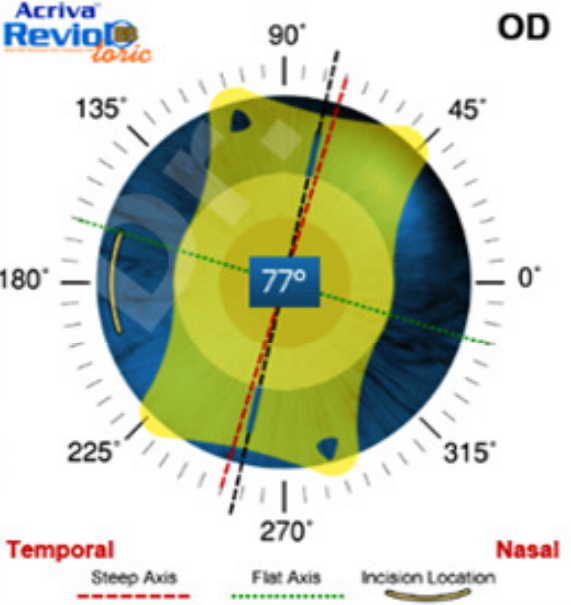
Surgeon		Patient	
Name-Surname	IZZET CAN, MD, PROF.	Name-Surname	AYNUR VURAN
Clinic	BOZOK UNV. MED. FAC. EYE DEPT.	Additional Information	45 YEARS OLD, WOMAN, RIGHT CATARACT, VA: 0.2
Phone	0532 4480401	IOL Type	Acryva [®] Reviol BB Toric T MFM 611
E-Mail	izzetcan@yahoo.com		
Country	TURKEY		

RIGHT (OD)	
K1 (Flat K)	42.50 D
Flat Axis	163°
K2 (Steep K)	44.00 D
Steep Axis	73°
IOL Spherical Power	27.00 D
Surgically Induced Astigmatism	0.50 D
Incision Location	180°

Calculation Details	
Pre-Op Corneal Astigmatism	1.50 D @ 73°
Surgically Induced Astigmatism	0.50 D @ 90°
Crossed-Cylinder Result	1.05 D @ 99°
Anticipated Residual Astigmatism	0.21 D @ 77°

Lens Details	
IOL Spherical Power	27.00 D
Cylinder Power (Corneal Plane)	1.72 D
Cylinder Power (IOL Plane)	2.50 D
Axis of Placement	87°


OD



Temporal
Nasal

Steep Axis
Flat Axis
Incision Location

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How to calculate toric IOL parameters?



Surgeon

Name-Surname (*) : IZZET CAN, MD, PROF.
Clinic (*) : BOZOK UNV. MED. FAC. EYE DEPT.
Phone (*) : 0532 4480401
E-mail (*) : izzetcan@yahoo.com
Country : TURKEY

(*) Required field.

RIGHT (OD)

K (*) : p (diopter) r (mm)
Keratometer (*) : K1 (Flat K): 35.00D~ 50.00D
Flat Axis: 0° ~ 180°
K2 (Steep K): 35.00D~ 50.00D
Steep Axis: 0° ~ 180°
IOL Spherical Power (*) :
Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D
Incision Location (*) : 0° ~ 360°

Patient

Name-Surname : AYNUR VURAN
Additional Information : 45 YEARS OLD, WOMAN, RIGHT CATARACT, VA: 0,2
IOL Type : Acryva^{UD} Reviol BB Toric T MFM 611

LEFT (OS)

K (*) : p (diopter) r (mm)
Keratometre (*) : K1 (Flat K): 35.00D~ 50.00D
Flat Axis: 0° ~ 180°
K2 (Steep K): 35.00D~ 50.00D
Steep Axis: 0° ~ 180°
IOL Spherical Power (*) :
Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D
Incision Location (*) : 0° ~ 360°

Next

How to calculate toric IOL parameters?



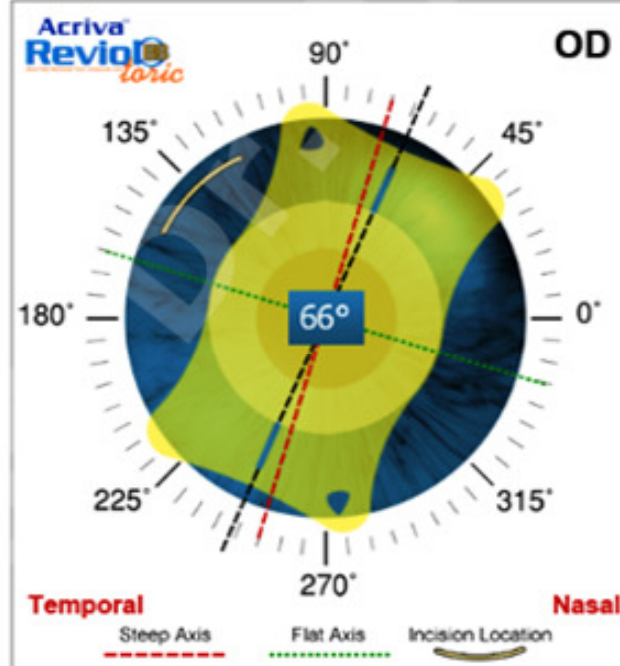
Surgeon	
Name-Surname	IZZET CAN, MD, PROF.
Clinic	BOZOK UNV. MED FAC. EYE DEPT.
Phone	0532 4480401
E-Mail	izzetcan@yahoo.com
Country	TURKEY

Patient	
Name-Surname	AYNUR VURAN
Additional Information	45 YEARS OLD, WOMAN, RIGHT CATARACT VA: 0.2
IOL Type	Acryva [®] Reviol BB Toric T MFM 611

RIGHT (OD)	
K1 (Flat K)	42.50 D
Flat Axis	163°
K2 (Steep K)	44.00 D
Steep Axis	73°
IOL Spherical Power	27.00 D
Surgically Induced Astigmatism	0.50 D
Incision Location	135°

Calculation Details	
Pre-Op Corneal Astigmatism	1.50 D @ 73°
Surgically Induced Astigmatism	0.50 D @ 45°
Crossed-Cylinder Result	1.05 D @ 66°
Anticipated Residual Astigmatism	0.11 D @ 66°

Lens Details	
IOL Spherical Power	27.00 D
Cylinder Power (Corneal Plane)	1.73 D
Cylinder Power (IOL Plane)	2.50 D
Axis of Placement	66°



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How to calculate toric IOL parameters?



Surgeon

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Phone (*) : 0532 4480401
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Country : TURKEY

(*) Required field.

RIGHT (OD)

K (*) : p (diopter) r (mm)

Keratometer (*) : K1 (Flat K): 35.00D~ 50.00D
Flat Axis: 0° ~ 180°

K2 (Steep K): 35.00D~ 50.00D
Steep Axis: 0° ~ 180°

IOL Spherical Power (*) :

Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D

Incision Location (*) : 0° ~ 360°

Patient

Name-Surname : AYNUR VURAN
Additional Information : 45 YEARS OLD, WOMAN, RIGHT CATARACT, VA: 0,2
IOL Type : Acryva^{UD} Reviol BB Toric T MFM 611

LEFT (OS)

K (*) : p (diopter) r (mm)

Keratometre (*) : K1 (Flat K): 35.00D~ 50.00D
Flat Axis: 0° ~ 180°

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IOL Spherical Power (*) :

Surgically Induced Astigmatism (*) : 0,00D ~ 2,50D

Incision Location (*) : 0° ~ 360°

Next

How to calculate toric IOL parameters?



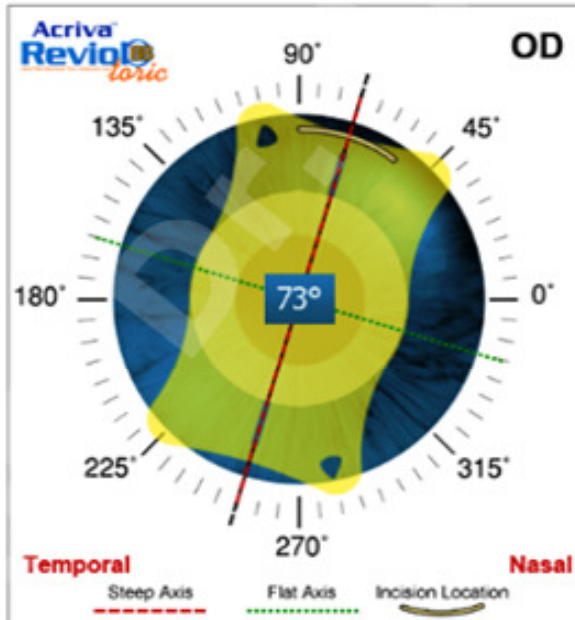
Surgeon	
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Clinic	BOZOK UNV. MED. FAC. EYE DEPT.
Phone	0532 4480401
E-Mail	izzetcan@yahoo.com
Country	TURKEY

Patient	
Name-Surname	AYNUR VURAN
Additional Information	45 YEARS OLD, WOMAN, RIGHT CATARACT, VA: 0.2
IOL Type	Acriva [®] Reviol BB Toric T MFM 611

RIGHT (OD)	
K1 (Flat K)	42.50 D
Flat Axis	163°
K2 (Steep K)	44.00 D
Steep Axis	73°
IOL Spherical Power	27.00 D
Surgically Induced Astigmatism	0.50 D
Incision Location	73°

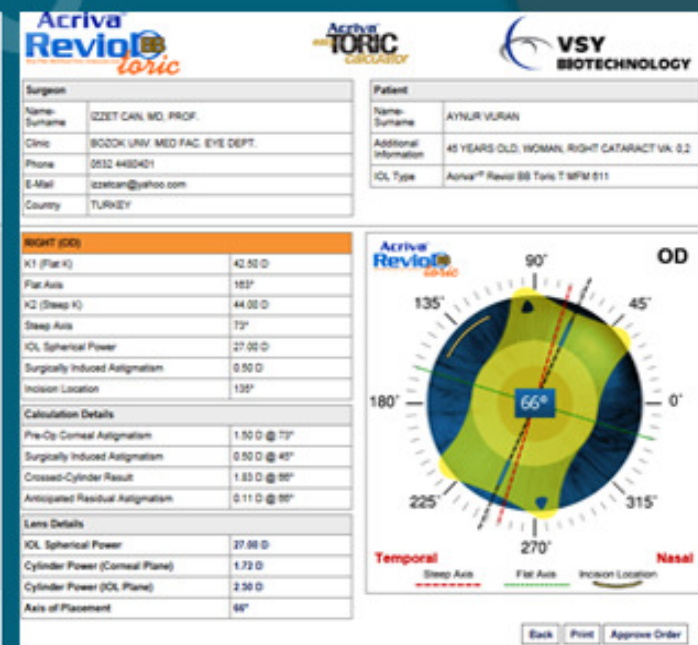
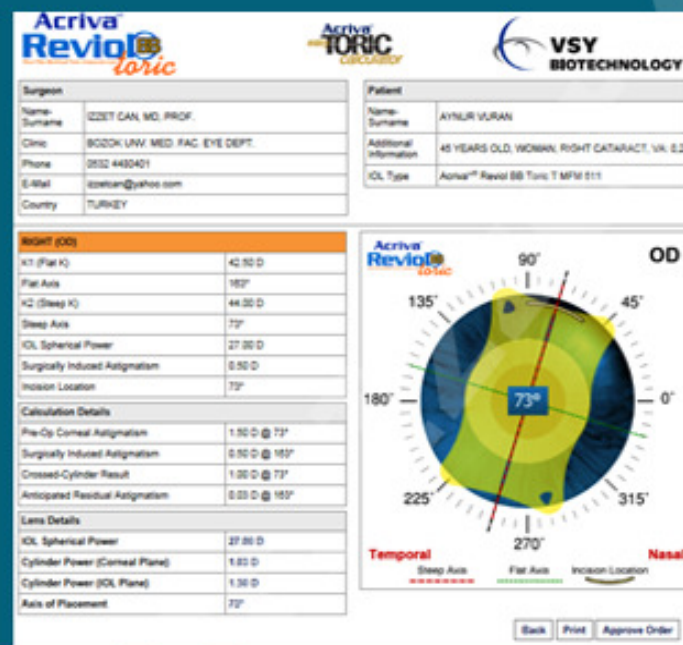
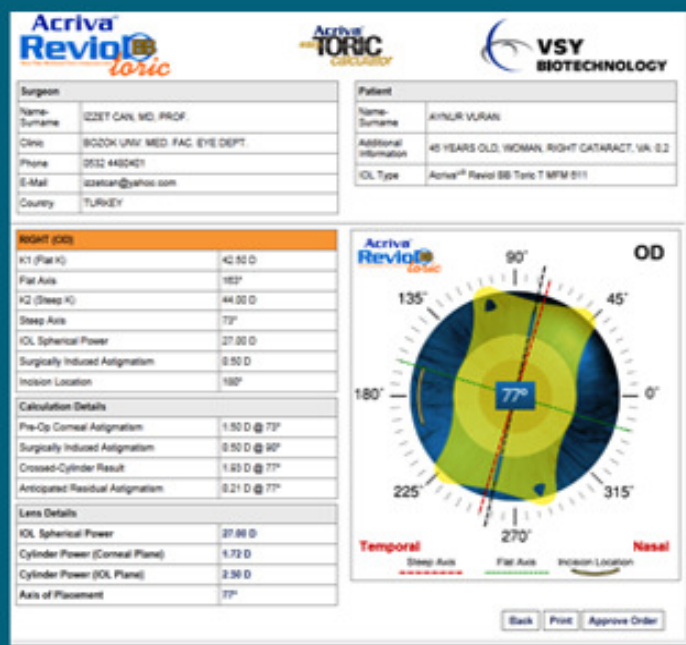
Calculation Details	
Pre-Op Corneal Astigmatism	1.50 D @ 73°
Surgically Induced Astigmatism	0.50 D @ 163°
Crossed-Cylinder Result	1.00 D @ 73°
Anticipated Residual Astigmatism	0.03 D @ 163°

Lens Details	
IOL Spherical Power	27.00 D
Cylinder Power (Corneal Plane)	1.03 D
Cylinder Power (IOL Plane)	1.50 D
Axis of Placement	73°



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How to calculate toric IOL parameters?



Temporal Incision (180°)

- Anticipated Residual Astigmatism: 0.21 D.
- IOL Cylinder Power: 2.50 D.

Steep Axis (on-K) Incision (73°)

- Anticipated Residual Astigmatism: 0.03 D.
- IOL Cylinder Power: 1.50 D.

Easiest Incision for Right Handed Surgeon (135°)

- Anticipated Residual Astigmatism: 0.11 D.
- IOL Cylinder Power: 2.50 D.

Do your surgery from steep axis or do as close as to the steep axis you can.

How to do surgery?

Requirements for Success

- Measuring the existing anterior corneal astigmatism
- Accounting for any astigmatism induced by the surgical incision
- Implanting the toric IOL at the appropriate angle to compensate for the combined preoperative and surgically induced astigmatism
- Rotational stability of IOL

How to do surgery?

- No meaningful difference from ordinary phacoemulsification.
- Differences
 - Reference and axis marking
 - IOL positioning to align with corneal steep axis

How to do surgery?

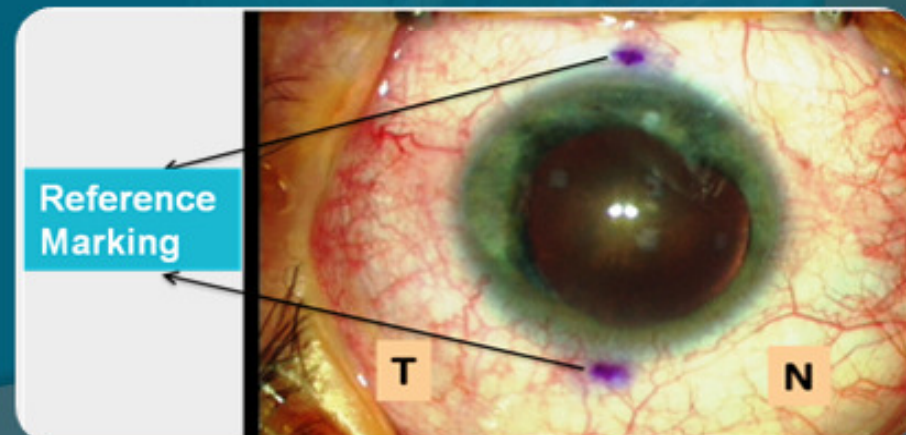
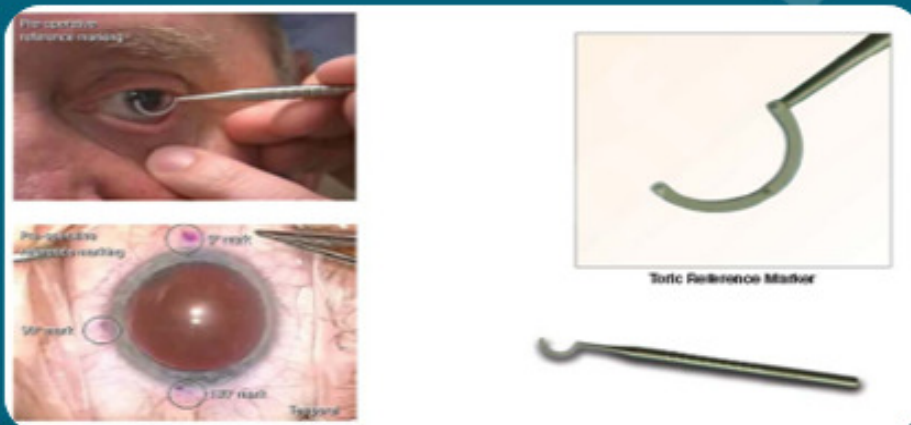
Small Pearls For Surgery

● **Make reference marks on the cornea preoperatively while patient is sitting up to avoid cyclorotation.**

- Mean torsional rotation **$4.1^\circ \pm 3.7$**
 - (right eye 3.8 ± 3.7 degrees, left eye 4.2 ± 3.6 degrees).
- 8% had a deviation greater than 10 degrees.



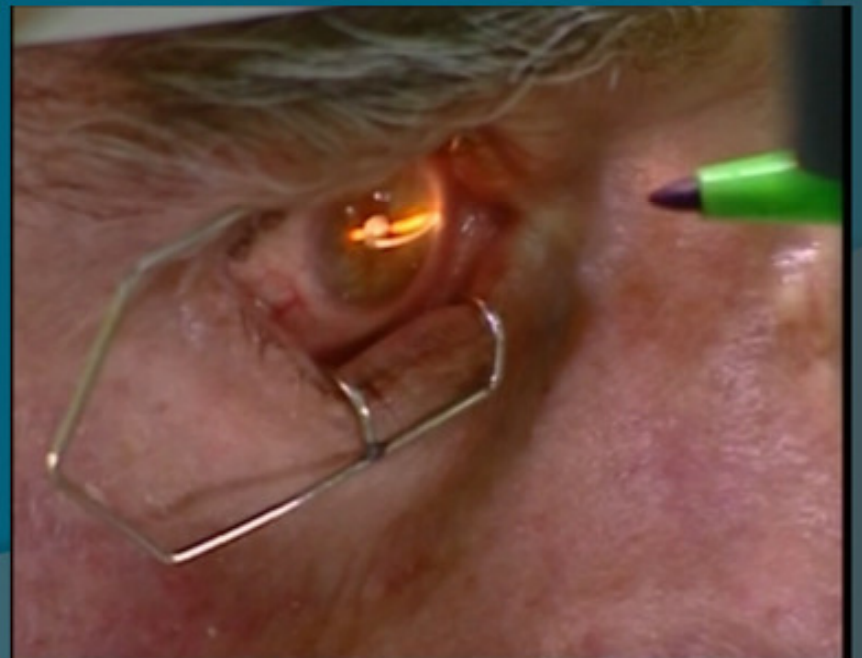
Swami AU et al. AJO 2002;133:561-2.



How to do surgery?



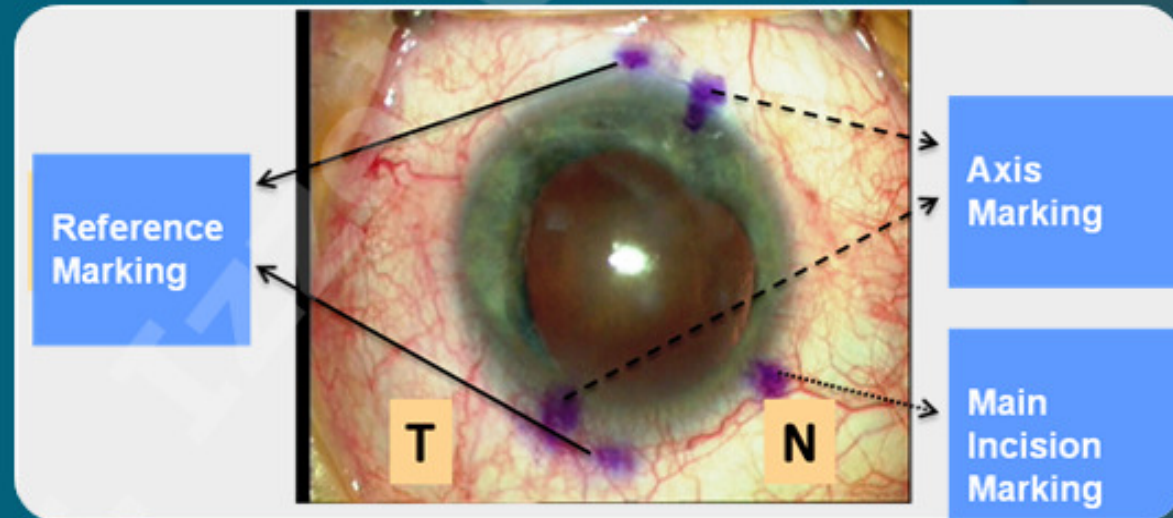
Reference marking



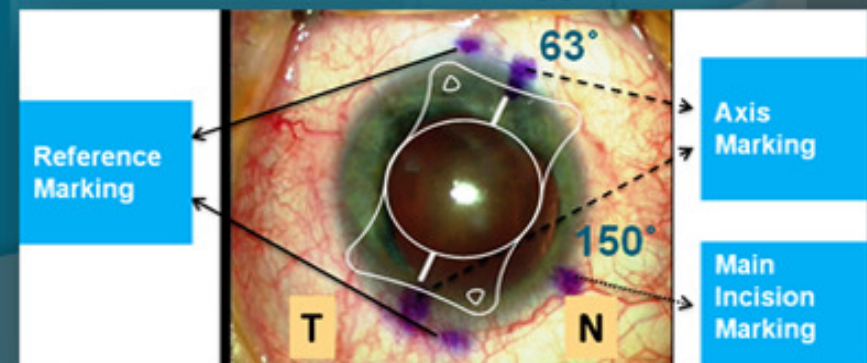
How to do surgery?

Small Pearls For Surgery

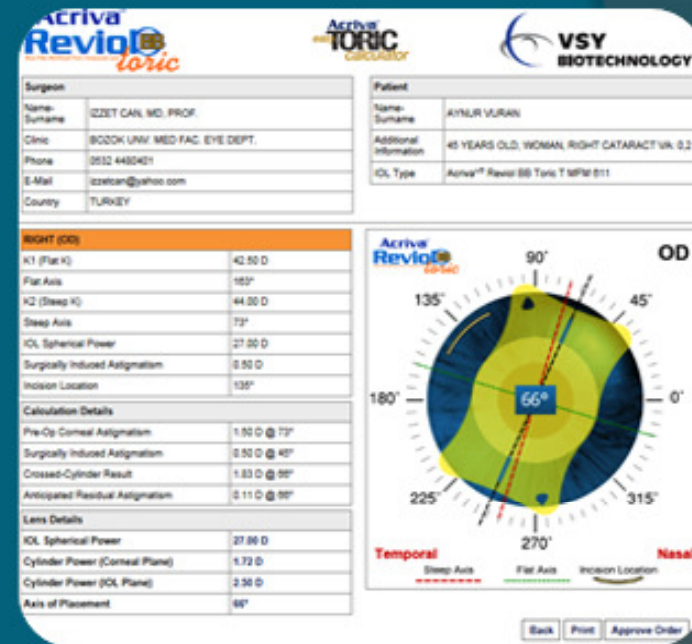
- When patient is in supine position make axis marking (pre-calculated steep axis) and main incision site using the reference marks.



How to do surgery?



How to do surgery? / Tips



- Don't change your technique
- Adrenaline in BSS bottle
- Regular and centralized capsulorhexis
- Be polite in IOL implantation

- Completely remove OVD
- Finish your surgery with normal IOP
- Recheck your alignment after removing drapes

What are the results ? / Rotational stability

Importance of Rotational Stability in Toric IOLs

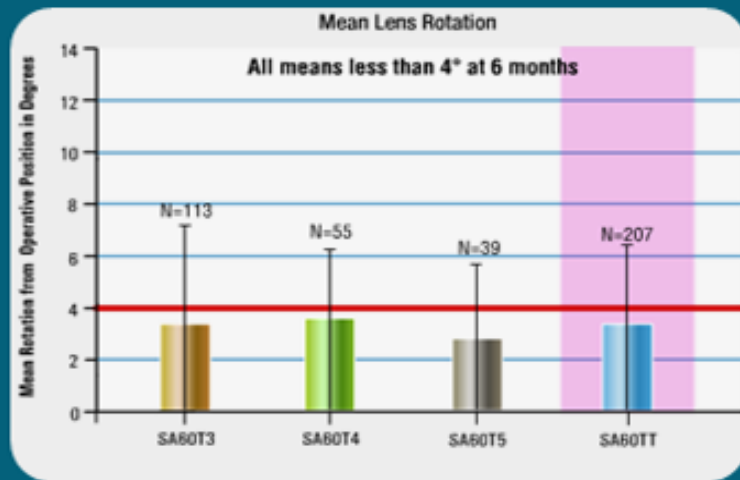
Off-axis rotation	Loss of Cylinder Correction
1 °	3.3%
10 °	33%
15 °	50%
30 °	100%
90 °	Preoperative astigmatism doubles

What are the results ? / Rotational stability

Toric IOL	Author / Year	Eye (n)	Follow-up (Month)	Rotation
Staar Toric	Schimizu (1994)	47	3	%44.6 30°
	Ruhswum (1999)	37	20.3	%18.9 25°
	Sun (2000)	130	3	%18 20-40°
	Till (2002)	100	8	%27 5-15°
	Chang (2003)	50	1	%72 5°
Alcon Acrysof SN60TT	Mendicute (2008)	30	3	%96 10°
	Zuberbuhler (2008)	44	3	%95 5°
Dr Smith Microsil Humanoptics / Torica	Dick (2006)	68	3	%85 5°
	De Silva (2006)	21	6	%90 10°
AcriComfort 646 TLC	Alio (2010)	21	3	%95 5°



What are the results? / Rotational stability



AcrySof Toric FDA Study / 2005

Postoperative data	Acrysof Toric	Acri.Comfort 646 TLC	AT.Lisa 909M
Rotation (degree)			
1.Mo.	3.35°		1.30°
3.Mo.	4.80°	-1.75°	1.33°
6.Mo	5.06°		3.10°
	Alio et al. JCRS 2011; 37: 1038-49.	Alio et al. JCRS 2010;36: 44-52.	Alio et al. JCRS 2011; 37: 1217-29.

*Thank You Very
Much For Your
Kind Attention.*

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Eye Department, Yozgat, Turkey