Personalized approach to IOL selection

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Purpose

Evaluation of refractive results of intraocular correction in patients with myopia, presbyopia and keratotomy notches

Objectives

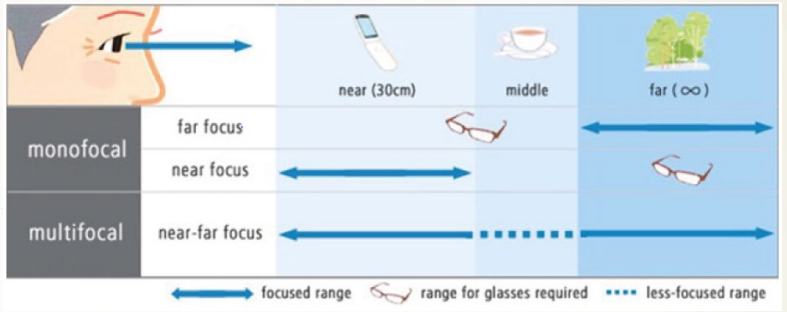
1. Identify the primary indications for intraocular lens (IOL) implantation
2. Determine the main criteria for personal choice of IOL
3. Provide examples of IOL selection based on a clinical cases
4. Summarize and provide recommendations

Materials and methods

Patients with high myopia, post-radial keratotomy and prebyopia was measured before and after cataract surgery. The Barret Universall II formula was used to calculate the IOL power. Diagnostics was performed by Optical biometry (Alladin (Topcon)), Corneal topography (Oculus Pentacam AXL), Navigation system (Alcon Verion). Patients received Johnson & Johnson IOLs. The operations was performed by one surgery.

Main choice criteria and parameters of IOL selection

- Cataract surgery at any stage of maturity;
- Surgery at high ametropia (refractive lens exchange (RLE));
- Surgery at presbyopia



Modern medical indications for IOL implantation

- Patients where refractive laser surgery is not advised required mini-monovision, EDOF IOL or multifocal intraocular lenses implantation;
- Understand their near and intermediate needs based on a detailed history of their work, hobbies, and lifestyle;
- The modern "gold standard" is a postoperative spherical/cylindrical refraction of ±0.5, and a toric multifocal is advised;
- Presence of comorbid conditions (glaucoma, corneal dystrophies, type A personality*

Multifocal IOL requirements

- Consult patient about events including halo, glare, reduced contrast sensitivity;
- Aberrometry is useful to assess the patient’s pre-operative higher order aberration;
- Avoidance of Multifocal IOL in patients with pupillary abnormalities such as corectopia or colobomas;

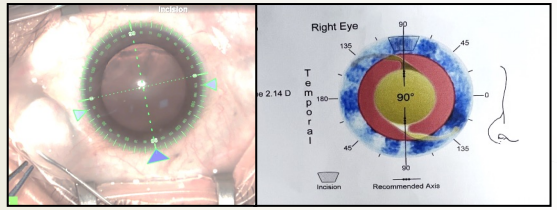
Results by clinical case

- Patient T., 58 years old
- **Date of visit:** May 21, 2023
- **Complaints of:** poor vision in both eyes. Wears glasses -6.5 with a cylindrical component. For the past 2-3 years, she has experienced discomfort when working at close range, and it is difficult to drive a car.
- **Diagnosis**: OU High degree myopia. Compound myopic astigmatism. Presbyopia. Posterior capsular cataract.

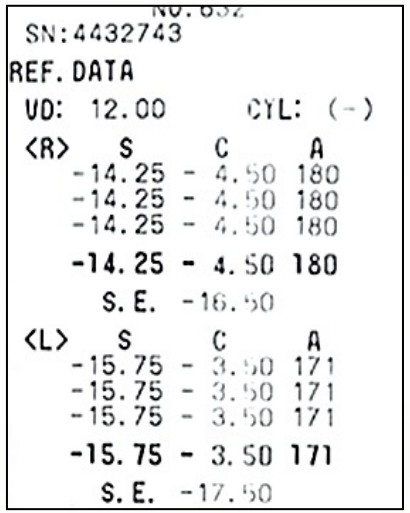
Visual acuity pre-op:
OD = 0,03 with corr. -14,0 cyl -2,5 ax180 = 0,5
OS = 0,05 with corr. -12,0 cyl -3,5 ax170 = 0,4

Keratometry pre-op:
OD 44,50 ax177 OS 45,00 ax173
47,50 ax87 47,75 ax 83
cyl -3,50 cyl 2,75

Operation:
15/05/2023 OS Phaco+IOL +12,5 DIU300 Eyhance Toric
23/05/2023 OD Phaco+IOL +12,0 DIU300 Eyhance Toric



Pre-op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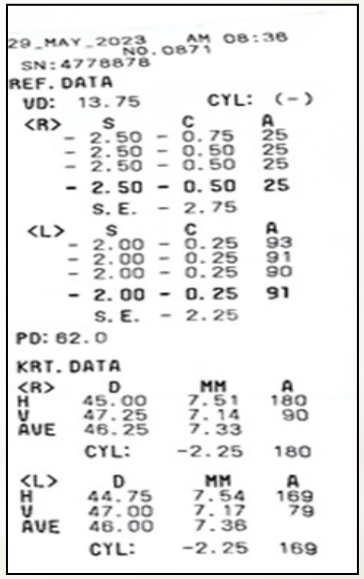
<R>	-14.25	- 4.50	180
	-14.25	- 4.50	180
	-14.25	- 4.50	180
	-14.25	**- 4.50**	**180**
	S.E.	-16.50	
<L>	S	C	A
	-15.75	- 3.50	171
	-15.75	- 3.50	171
	-15.75	- 3.50	171
	-15.75	**- 3.50**	**171**
	S.E.	-17.50	

Post-op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<R>	- 2.50	- 0.75	25
	- 2.50	- 0.50	25
	- 2.50	- 0.50	25
	- 2.50	**- 0.50**	**25**
	S.E.	- 2.75	
<L>	S	C	A
	- 2.00	- 0.25	93
	- 2.00	- 0.25	91
	- 2.00	- 0.25	90
	- 2.00	**- 0.25**	**91**
	S.E.	- 2.25	

PD: 62.0
KRT. DATA

	D	MM	A
<R>			
H	45.00	7.51	180
V	47.25	7.14	90
AVE	46.25	7.33	
	CYL:	-2.25	180
<L>	D	MM	A
H	44.75	7.54	169
V	47.00	7.17	79
AVE	46.00	7.36	
	CYL:	-2.25	169

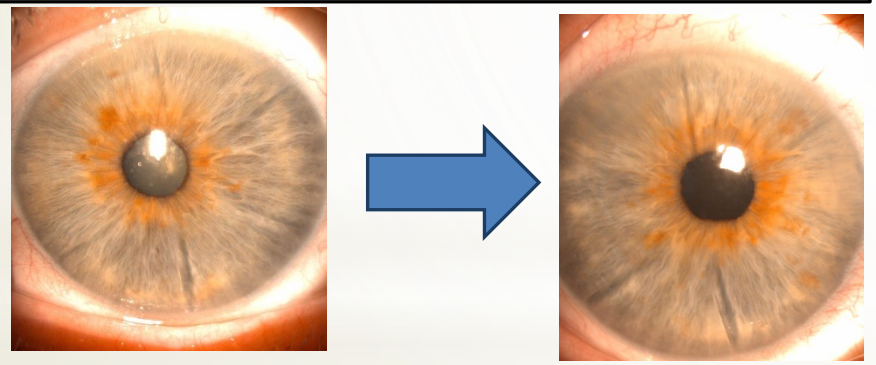
EdOF IOL was preferred in both eyes with calculations for residual myopia for close-range work and the need for glasses for far distance*

Visual acuity post-op:
OD = 0,3 with corr. (-) 2,0 = 0,9
OS = 0,3 with corr. (-) 2,0 = 1,0

Clinical case №2

- Patient T., 64 years old
- **Date of visit:** 06.09.2024
- **Complaints of:** blury and poor vision in both eyes. Wears glasses OD +4,00// OS +2,50 for reading. In 1990 was performed Radial Keratotomy on both eyes. Concomitant pathologies: Diabetes mellitus 2 type, Arterial Hypertension 3 grade.
- **Diagnosis**: OU Immature age-related cataract. Moderate degree myopia with compound myopic astigmatism. Presbyopia. Ophtalmohypertension. AMD.

Visual acuity pre-op:
OD = 0,1 with corr. +6,00 cyl -2,75 ax142 = 0,2
OS = 0,1 with corr. +4,00 cyl -3,00 ax45 = 0,3

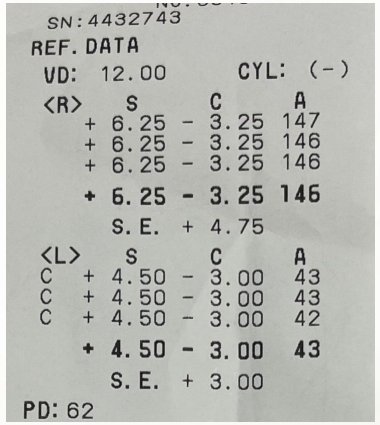


Operation:

06/03/2025 OD Phaco+IOL +30,0 J&J Sensar

Due difficult IOL calculation, to patient was planned operation **OD - Phaco+IOL** with monofocal IOL implantation

Pre-op



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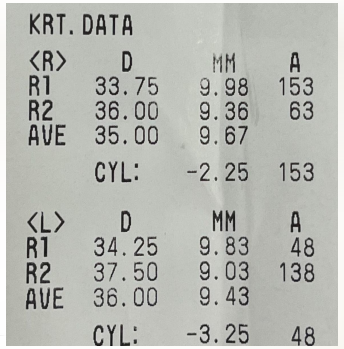
	S	C	A
<R>	+ 6.25	- 3.25	147
	+ 6.25	- 3.25	146
	+ 6.25	- 3.25	146
	+ 6.25	**- 3.25**	**146**
	S. E.	+ 4.75	
<L>	S	C	A
C	+ 4.50	- 3.00	43
C	+ 4.50	- 3.00	43
C	+ 4.50	- 3.00	42
	+ 4.50	**- 3.00**	**43**
	S. E.	+ 3.00	

PD: 62

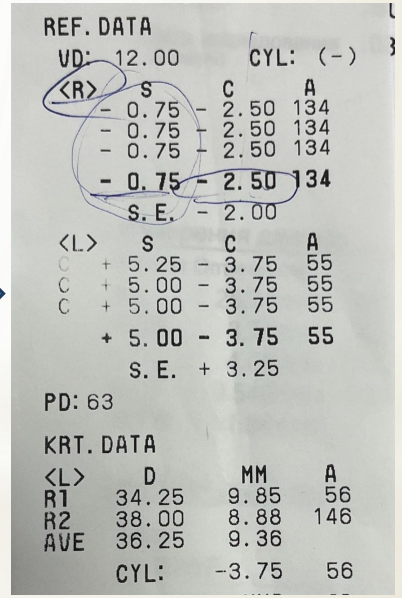


KRT. DATA

<R>	D	MM	A
R1	33.75	9.98	153
R2	36.00	9.36	63
AVE	35.00	9.67	
	CYL:	-2.25	153

<L>	D	MM	A
R1	34.25	9.83	48
R2	37.50	9.03	138
AVE	36.00	9.43	
	CYL:	-3.75	48

Post-op



REF. DATA
VD: 12.00 CYL: (-)

	S	C	A
<R>	- 0.75	- 2.50	134
	- 0.75	- 2.50	134
	- 0.75	- 2.50	134
	- 0.75	**- 2.50**	**134**
	S. E.	- 2.00	
<L>	S	C	A
C	+ 5.25	- 3.75	55
C	+ 5.00	- 3.75	55
C	+ 5.00	- 3.75	55
	+ 5.00	**- 3.75**	**55**
	S. E.	+ 3.25	

PD: 63

KRT. DATA

<L>	D	MM	A
R1	34.25	9.85	56
R2	38.00	8.88	146
AVE	36.25	9.36	
	CYL:	-3.75	56

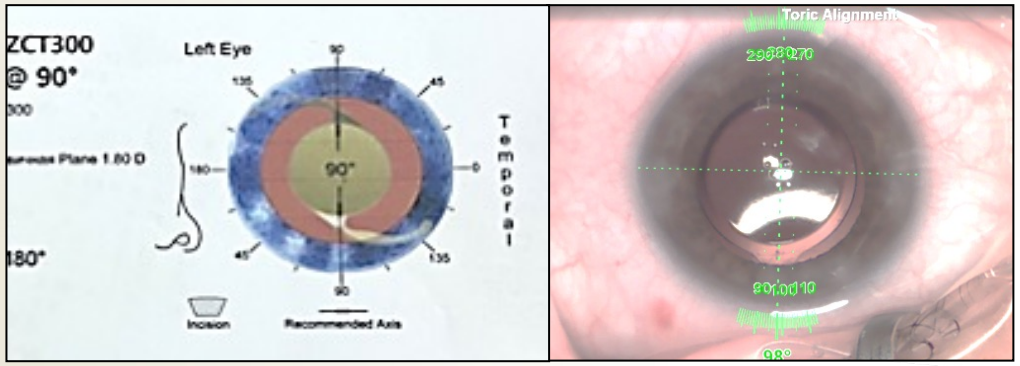
Visual acuity post-op:
OD = 0,6-0,7 with no correction

Clinical case №3

- Patient A., 57 years old
- **Date of visit:** 20.04.2024
- **Complaints of:** poor distance vision in both eyes. Constantly wears bifocal contact lenses (-) 2,50 for distance and (+) 1,00 for reading. Planning RLE operation.
- **Diagnosis**: OU Moderate degree myopia. Presbyopia. Peripheral chorioretinal degeneration.

Visual acuity pre-op:
OD = 0,1 with corr. -3,25 = 1,0
OS = 0,1 with corr. -3,00 = 1,0

Operation:
25/04/2024 OD Phaco+IOL +19,0 J&J Synergy
27/04/2024 OS Phaco+IOL +19,5 J&J Synergy



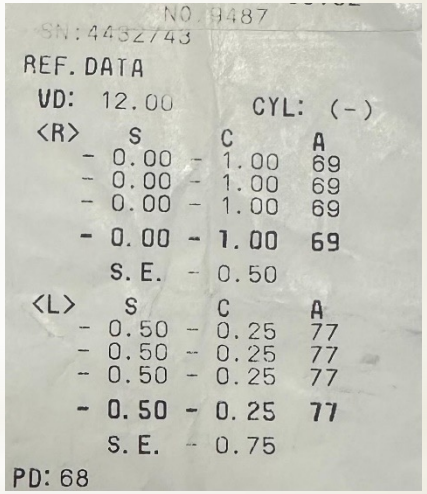
Pre-op


SN:4432743
REF. DATA
VD: 12.00 CYL: (-)

<R>	S	C	A
C	- 3.50	- 0.75	71
C	- 3.50	- 0.75	71
C	- 3.50	- 0.75	71
	- 3.50	**- 0.75**	**71**
	S. E.	- 4.00	

<L>	S	C	A
C	- 3.75	- 0.25	80
C	- 3.75	- 0.25	80
C	- 3.75	- 0.25	80
	- 3.75	**- 0.25**	**80**
	S. E.	- 4.00	

Post-op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<R>	S	C	A
	- 0.00	- 1.00	69
	- 0.00	- 1.00	69
	- 0.00	- 1.00	69
	- 0.00	**- 1.00**	**69**
	S. E.	- 0.50	

<L>	S	C	A
	- 0.50	- 0.25	77
	- 0.50	- 0.25	77
	- 0.50	- 0.25	77
	- 0.50	**- 0.25**	**77**
	S. E.	- 0.75	

PD: 68

Visual acuity post-op:
OU = 1,0
Reading text №2-3

Conclusion

- For patients considering trifocal IOLs, selecting **toric lenses** can optimize the refractive results of the procedure and provide better vision.
- Precise IOL power calculation requires 3x keratometry readings and the choice of a suitable formula