



Introduction to Rayner Trifocal Technology and clinical results : How to optimise and enhance outcomes

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Introduction

- 1) Introduction to RayOne Trifocal Lens technology
- 2) Retrospective study of 18 patients (36 eyes N=36) Private practice London, UK
- 3) Video of implantation technique
- 4) Observations based on 216 eyes (108 patients)
- 5) Optimising the ocular surface
- 6) Sulcoflex Trifocal: Pseudophakic Case study

RayOne® Family

RayOne
ASPHERIC

RayOne
SPHERIC

RayOne
TORIC

RayOne
TRIFOCAL



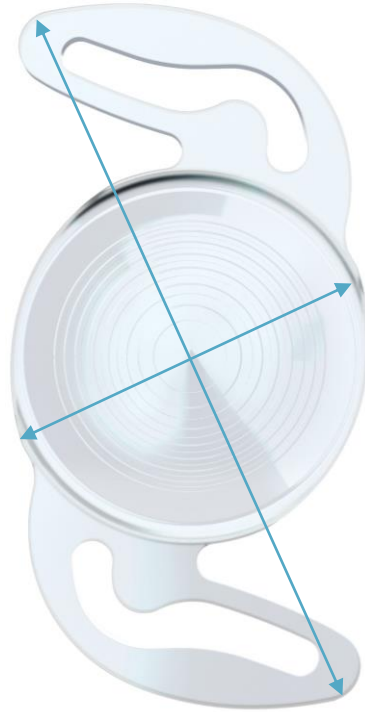
RayOne Trifocal is the new member of the RayOne family of IOLs. Based on the well-known, high performance Rayner platform **that performs again and again.**



RayOne[®] Trifocal Platform; an enhanced 6.0 mm optic

12.5 mm overall haptic length

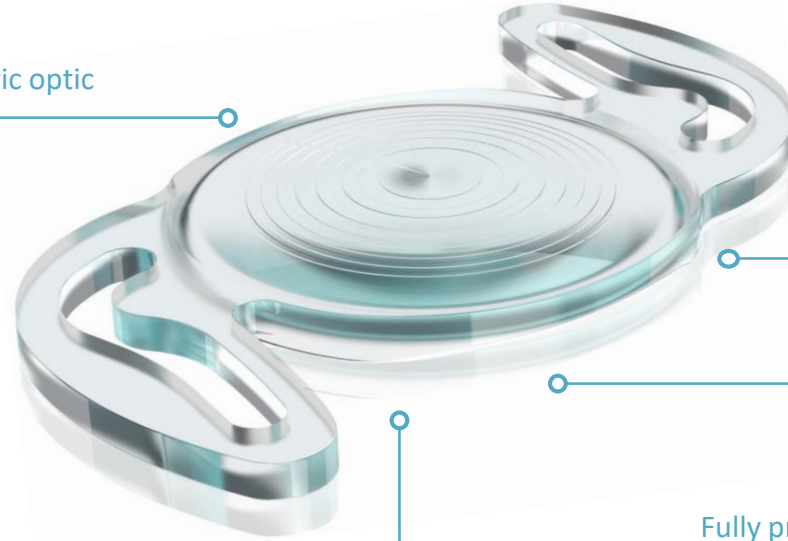
6.0 mm optic diameter



RayOne[®] enhanced 6.0 mm optic

aberration-neutral aspheric optic

Based on proven
haptic technology for
excellent stability^{1,2}

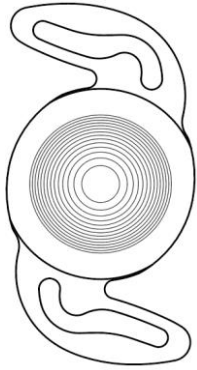


Amon-Apple enhanced
square edge for minimal
PCO (1.7% at 24 months⁷)

Zero glistenings

Fully preloaded across entire
power range, 0.0 D to +30.0 D

Improved visual outcomes designed for less pupil dependency



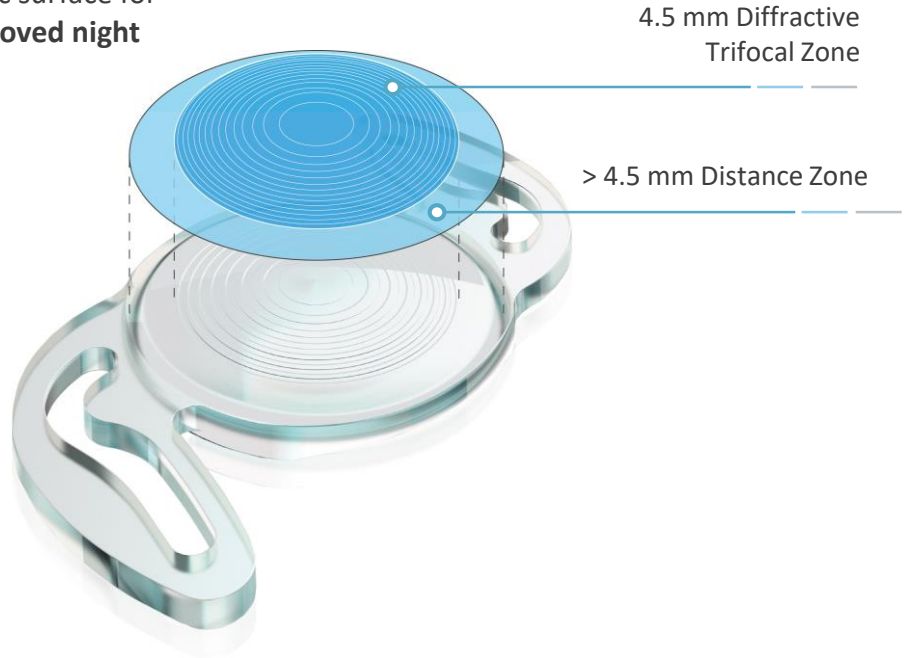
RayOne® Trifocal has fewer rings on the IOL optic surface for **reduced potential visual disturbances and improved night vision.**

Features:

- 16 diffractive steps / rings
- 4.5 mm diffractive zone
- > 4.5 mm monofocal, distance

Benefits:

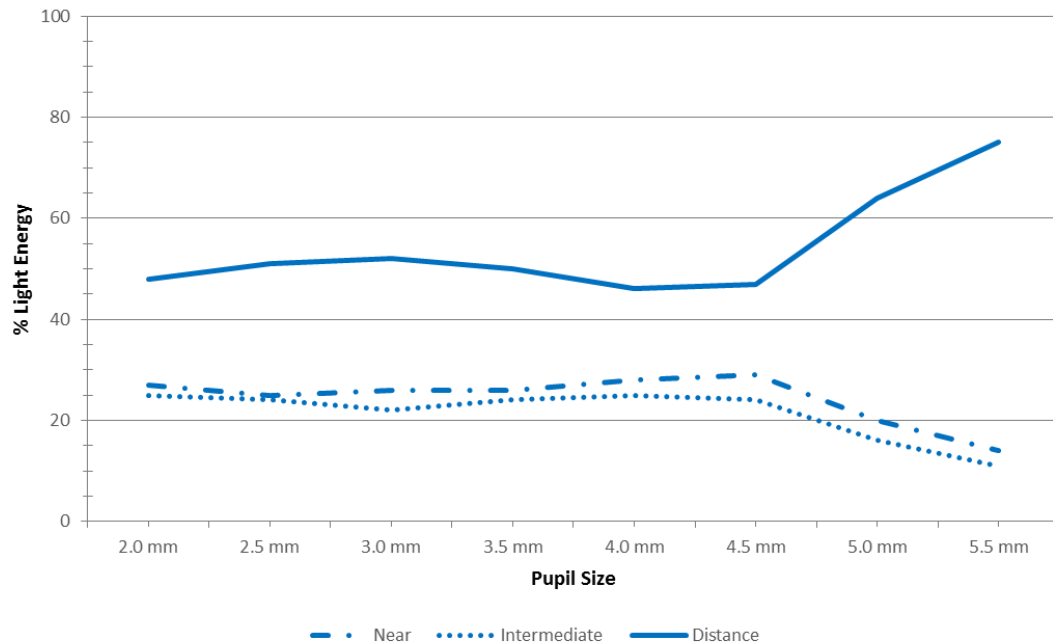
- Reduces visual disturbances
- Developed to be less dependent on pupil size or lighting conditions
- Improves distance vision in mesopic condition



Exceptional Light Usage

Our patented diffractive step` trifocal technology reduces **light loss to only 11%**

- It transmits 89% of light to the retina with a pupil of 3 mm
- Allocates half the light for distance
- Divides the rest between near and intermediate vision
- Light Energy Split at 3.0 mm pupil
 - **52% Distance**
 - **22% Intermediate**
 - **26% Near**



Study design and methods

- **Setting**

- Private practice, London, UK

- **Design**

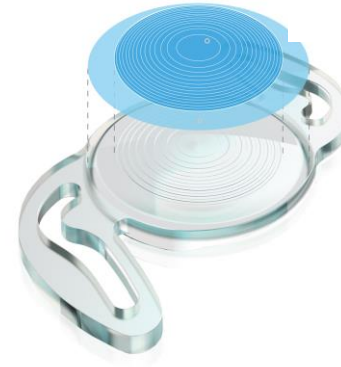
- Retrospective, single-centre, single surgeon

- **Method**

- Subjects underwent bilateral refractive lens exchange or cataract surgery with RayOne trifocal intraocular lenses (Rayner, United Kingdom). Preoperative manifest refraction, and uncorrected visual acuity at far, intermediate, and near distances were compared with follow-up at 1 month. Dysphotopsias, quality of vision issues and other adverse events were reported.

- **Results**

- 36 eyes of 18 patients with mean age 63.0 ± 12.3 years were included. One month following surgery, average binocular UCDVA was -0.07 ± 0.15 logMAR and UCNVA was 0.16 ± 0.06 logMAR. All patients achieved an intermediate visual acuity of N6. 89 % of patients achieved post-op refraction of within ± 0.5 D and 100 % within ± 0.75 D spherical equivalent. All patients experienced mild night-time halos that were non-disabling, and 3 patients developed PCO. All patients were happy with the results.



Patient	R. UCDVA	L. UCDVA	Binoc UCDVA	R. UCIVA	L. UCIVA	Binoc UCIVA	R. UCNVA	L. UCNVA	Binoc UCNVA
GB	6/5	6/5	6/5	N6	N6	N6	N4	N4	N4
LC	6/4	6/4	6/4	N6	N6	N6	N5	N5	N4
RH	6/9	6/9	6/9	N8	N10	N6	N5	N8	N5
ST	6/6	6/6	6/5	N8	N8	N6	N6	N6	N5
CC	6/5-1	6/6	6/5						N5
SW	6/5	6/9	6/5						N4
SJ	6/6	6/6	6/6				N10	N6	N5
MR	6/9	6/9	6/9						N4
SS	6/6	6/4	6/4			N6	N4	N4	N4
KH	6/6	6/7.5	6/5				N5	N6	N4
RM	6/10	6/10	6/7.5				N6	N4	N4
MD	6/6	6/5	6/4						N6
AB	6/6	6/5	6/4				N6	N6	N5
SD	6/9	6/6	6/5	N8	N8		N5	N5	N5
VP	6/5	6/6	6/5				N4	N4	N4
PD	6/6	6/4	6/4	N8	N8	N6	N6	N6	N5
MS	6/4	6/6	6/4	N8	N8	N6	N5	N5	N5
NS	6/9	6/5	6/5				N5	N5	N5

Patient	R. UCDVA	L. UCDVA	Binoc UCDVA	R. UCIVA	L. UCIVA	Binoc UCIVA	R. UCNVA	L. UCNVA	Binoc UCNVA
GB	-0.08	-0.08	-0.08	0.30	0.30	0.30	0.10	0.10	0.10
LC	-0.18	-0.18	-0.18	0.30	0.30	0.30	0.20	0.20	0.10
RH	0.18	0.18	0.18	0.40	0.50	0.30	0.20	0.40	0.20
ST	0.00	0.00	-0.08	0.40	0.40	0.30	0.30	0.30	0.20
CC	0.08	0.00	-0.08						0.20
SW	-0.08	0.18	-0.08						0.10
SJ	0.00	0.00	0.00				0.48	0.30	0.18
MR	0.18	0.18	0.18						0.10
SS	0.00	-0.18	-0.18			0.30	0.10	0.10	0.10
KH	0.00	0.10	-0.08				0.18	0.30	0.10
RM	0.22	0.22	0.10				0.30	0.10	0.10
MD	0.00	-0.08	-0.18						0.30
AB	0.00	-0.08	-0.18				0.30	0.30	0.20
SD	0.18	0.00	-0.08	0.40	0.40		0.20	0.20	0.20
VP	-0.08	0.00	-0.08				0.10	0.10	0.10
PD	0.00	-0.18	-0.18	0.40	0.40	0.30	0.30	0.30	0.20
MS	-0.18	0.00	-0.18	0.40	0.40	0.30	0.20	0.20	0.20
NS	0.18	-0.08	-0.08				0.20	0.20	0.20

Results & Summary

• Distance visual acuity

Snellen	LogMAR	No. of patients	Cumulative %
6/4	-0.18	6	43 %
6/5	-0.08	8	78 %
6/6	0.00	1	83 %
6/7.5	0.10	1	89 %
6/9	0.18	2	100 %

Near visual acuity

Roman chart	LogMAR	No. of patients	Cumulative %
N4	0.10	5	33 %
N5	0.20	9	93 %
N6	0.30	1	100 %

Post-op refraction

- 89 % of eyes within +/-0.5D
- 100 % of eyes within +/-0.75D (spherical equivalent)

Issues

- 3 patients developed Posterior capsular opacification
- All patients reported night-time haloes although none complained of this phenomenon (i.e. non disabling, mild)

Summary

- High percentage of patient achieving 6/6 distance vision and N5 reading vision unaided

Surgical implantation of RayOne Trifocal IOL



Observations:

- Very simple for any surgeon familiar with the RayOne platform
- Fully preloaded range 0D to 30D
- Easy insertion through small incision
- IOL centres well

Post-Op observations

- Vision tended to improve between one week and one month of follow up. Often patients accepted a refraction of -0.25 to -0.50 in the first postoperative week which tended to emetropia as the the capsule fibroses
- All patient reported halos at night but none of them complained of this phenomenon i.e. they were mild
- Neuroadatption very fast with patients very happy at one week timepoints
- Forgiving lens with patients tolerating small amounts of refractive and cylindrical error at one week time points

Post-Op observations

- No early cases of posterior capsular opacification (NB caution RE: using monofocal PCO rates)
- Two patients (RH) had a large angle kappa and so centration was not ideal but again not complaining i.e. forgiving of angle kappa
- One patient with zonulopathy – CTR used. One eye has 1mm superior IOL decentration and symptomatic of dysphotopsia at night
- Thus far no laser enhancements required and PCO rate is low (less than 5%)
- High percentage of patients achieving better than 6/6 vision and N4 for reading unaided

How to optimise outcomes

- Corneal and ocular surface disease
- Cylindrical rotation of toric IOLs
- Cylinder and residual refractive error
- Capsular opacification
- Cystoid Macular Oedema
- Consecutive treatment
- Counselling

Chapter 13

Presbyopic Intraocular Lenses Managing Unhappy Patients

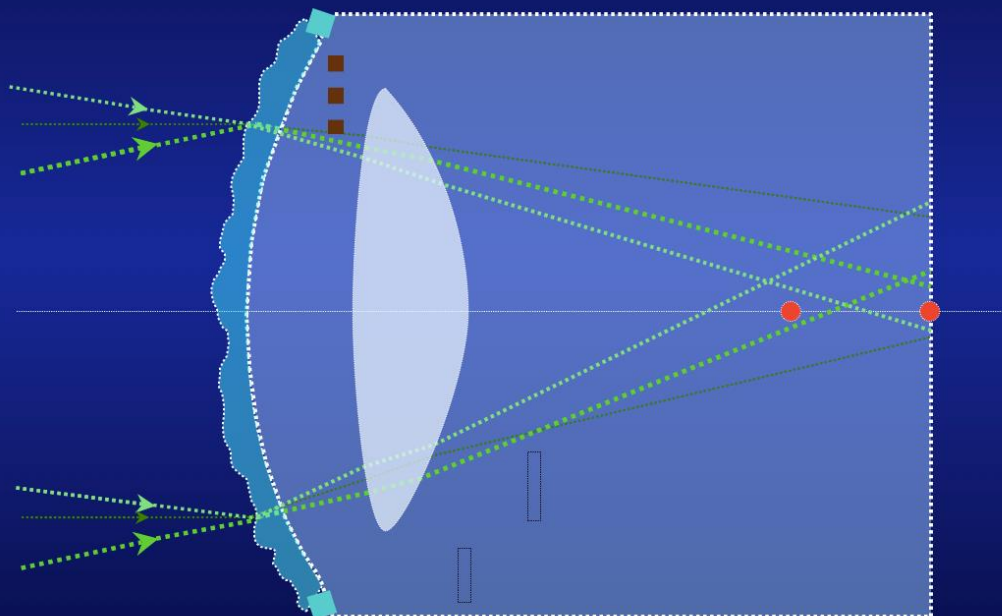
*Allon Barsam, MD, MA, MRCOphth and
Eric D. Donnenfeld, MD, FACS*

Hovanesian JA, ed.
Premium Cataract Surgery: A Step-by-Step Guide (pp 117-126).
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Optimising the ocular surface



Disruption of the Ocular Surface Induces Distortion that is Magnified by a Multifocal IOL



- Visual acuity and quality of vision all start with the tear film.
- The pre-operative and post-operative use of CsA (ikervis - Santen), low dose corticosteroids, omega-3 fatty acids, preservative-free artificial tears and punctal plugs significantly improve visual outcomes in patients implanted with a multifocal IOL.
- Accurate keratometry (IOL power) and tomography (astigmatism control and confirm regular cornea)
- Education regarding the presbyopia correction journey – starts with the ocular surface

Case study on Sulcoflex Trifocal Pseudophakic patient

- Wife of a happy Rayner trifocal
- Cataract surgery 12 years ago elsewhere
- Tetraflex – initially happy but lost intermediate and reading vision in the years that followed

Presenting complaint

1. difficulty reading or with other near visual tasks

Had IOLs J Josephs 12 years ago. Lovers her unaided dist vision. Husband had MFs with AB and he is v happy so needs advice.

Past medical history

Medical history

M/S osteoarthritis - IOLs 12 years ago for emmetropia

Social history

Keen bridge player

Distance VA									
Right eye						Left eye			
				Unaided 6/5			Unaided 6/5		
Right eye						Left eye			
SE: +0.50		+0.50 DS	6/4	Subjective Dist.	+0.25 DS	6/4		SE: +0.25	
		Add +2.50	N5	Subjective Near	Add +2.50	N5			
		R				L			
Goldmann	At 12:20	17		IOP	15				
Right eye				Examination		Left eye			
				corneal arcus	Cornea	corneal arcus			

akic

Case study on Sulcoflex Trifocal Pseudophakic patient



Case study on Sulcoflex Trifocal Pseudophakic patient

- - -

Distance VA

Right eye

Unaided
6/4

Unaided
6/4

Left eye

Near VA

Right eye

Unaided
N4

all @ 30 cm

Unaided
N4

Left eye

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