

Impact of a Novel Extended Depth of Focus Intraocular Lens on Lifestyle Enhancement

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Financial Disclosures

- Alanna Nattis DO, FAAO: Alcon (consultant, research), Glaukos (research), Novartis (consultant) Ocular Therapeutix (research), Sight Sciences (consultant), Tarsus (consultant)
- Eric Rosenberg DO, MSE: Alcon (consultant, research), Ocular Therapeutix (consultant) Sight Sciences (consultant), Zeiss (consultant, research), Tarsus (consultant), Eyevance (consultant), Omeros (consultant)
- Richard Nattis: none

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Purpose

- This study evaluated the ability of the Vivity (Alcon, Fort Worth TX) extended vision intraocular lens (IOL) to provide a significant impact on patient **lifestyle** (*independence from spectacles with a low rate of visual disturbances*) in a 'real-world' setting

Methods/Study Design

- Prospective, nonrandomized study
- Assessed the impact of pre-and-perioperative factors, (IOL formulae used, use of femtosecond laser, intraoperative aberrometry, pupillary expansion devices) on surgical success in patients undergoing bilateral sequential cataract surgery with spherical and/or toric Vivity IOL implantation across a diverse group of surgeons.
- Improvement **visual acuity**, as well as degree of **spectacle independence**, **visual disturbance** and **visual quality** was assessed at 3 months postoperative, as compared to baseline.
- Post-myopic and hyperopic LASIK/PRK patients were *not excluded*

Perioperative Overview

15 patients (30 eyes) underwent successful cataract extraction with Vivity IOL implantation across 4 surgeons

	Value(s)
Sex (%M v F)	4M (26%), 11F (73%)
Mean Age	62.45 SD 11.59 (Range 34-85)
Mean Baseline BCVA	20/50 (range 20/25 – 20/80)
% Toric IOL used	14% (n=4)
% LRI Used	86% (n=24)
% Femto Used	100%
% ORA Used	17% (n=5)
Difference between predicted refraction and ORA refraction	0.36 ± 0.18 (range 0.07 - 0.61)
% IOL changed based on ORA	17% (n=5)

Results: Visual Acuity at Each Time Point

	Distance VA (Snellen)	Intermediate VA (Snellen)	Near VA (Snellen)
POD1 UCVA	20/30 (20/20 to 20/80)	20/25 (20/20 to 20/60)	20/25 (20/20 to 20/60)
POD1 BCVA	20/25 (20/20 to 20/80)	20/25 (20/20 to 20/60)	20/25 (20/20 to 20/60)
POW1 UCVA	20/25 (20/20 to 20/40)	20/25 (20/15 to 20/40)	20/25 (20/20 to 20/50)
POW1 BCVA	20/25 (20/20 to 20/30)	20/25 (20/15 to 20/30)	20/25 (20/20 to 20/50)
POM1 UCVA	20/25 (20/20 to 20/40)	20/25 (20/15 to 20/30)	20/25 (20/20 to 20/30)
POM1 BCVA	20/25 (20/20 to 20/30)	20/25 (20/20 to 20/30)	20/25 (20/20 to 20/30)
POM3 UCVA	20/25 (20/20 to 20/40)	20/25 (20/15 to 20/30)	20/25 (20/20 to 20/30)
POM3 BCVA	20/25 (20/20 to 20/30)	20/25 (20/15 to 20/30)	20/25 (20/20 to 20/30)

- At POM3, there was no loss of UCVA or BCVA across patients and techniques
- No surgical complications or adverse events were recorded
- No significant difference in visual outcomes between post-LASIK and surgery-naïve eyes (t-test, distance UCVA ($p=0.643$), distance BCVA ($p=0.926$))
- No significant difference in visual outcomes between toric and non-toric eyes

VA = visual acuity, UCVA = uncorrected visual acuity, BCVA = best corrected visual acuity, POD1 = Postoperative day 1, POW1 = postoperative week 1, POM1 = postoperative month 1, POM3 = postoperative month 3 (numbers in parentheses represent range of visual acuity)

Results: Visual Improvement Over Time

	POD1 %20/40 or better	POD1 %20/25 or better	POW1 %20/40 or better	POW1 %20/25 or better	POM1 %20/40 or better	POM1 %20/25 or better	POM3 %20/40 or better	POM3 %20/25 or better
Distance UCVA	80	43	100	79	96	69	100	60
Distance BCVA	93	52	100	83	100	81	100	70
Intermediate UCVA	96	45	97	69	100	73	100	70
Intermediate BCVA	93	55	97	72	100	76	100	90
Near UCVA	93	48	97	76	96	62	100	80
Near BCVA	93	58	97	86	100	65	100	80

VA = visual acuity, UCVA = uncorrected visual acuity, BCVA = best corrected visual acuity, POD1 = Postoperative day 1, POW1 = postoperative week 1, POM1 = postoperative month 1, POM3 = postoperative month 3 (numbers in parentheses represent range of visual acuity)

Results: Trend in MRSE

	Spherical Equivalent (SE)
POD1	-0.49 ± 0.75
POW1	-0.41 ± 0.55
POM1	-0.57 ± 0.49



MRSE = manifest refraction spherical equivalent, POD1 = Postoperative day 1, POW1 = postoperative week 1, POM1 = postoperative month 1, POM3 = postoperative month 3

Results: Visual Quality Questionnaire

Protocol Level
Sep 21, 2020











Visual Quality Questionnaire

Patient ID(coded ID):

Date:

Surgeon:

Date of Surgery: OD _____ //OS _____

1. Do you have difficulty seeing steps, stairs or curbs due to your vision?
(1) Never (2) Rarely (3) Sometimes (4) Most of the time (5) All the time  100% never
2. Do you have difficulty taking part in sports (e.g. bowling, handball, tennis, golf) due to your vision?
(1) Never (2) Rarely (3) Sometimes (4) Most of the time (5) All the time  100% never
3. Do you have difficulty working on a computer?
a. (1) Never (2) Rarely (3) Sometimes (4) Most of the time (5) All the time  100% never
4. Do your eyes feel strained while working on a computer?
(1) Never (2) Rarely (3) Sometimes (4) Most of the time (5) All the time  33% never, 33% sometimes, 33% rarely
5. Do you have difficulty writing checks or filling out forms?
(1) Never (2) Rarely (3) Sometimes (4) Most of the time (5) All the time  100% never
6. Do you have difficulty playing games, such as card games, bingo, dominos?
(1) Never (2) Rarely (3) Sometimes (4) Most of the time (5) All the time  100% never
7. Do you accomplish less than you would like because of your vision?
(1) Never (2) Rarely (3) Sometimes (4) Most of the time (5) All the time  100% never
8. Do you rely more on others (e.g. giving instructions, identifying objects in front of you) due to your vision?
(1) Never (2) Rarely (3) Sometimes (4) Most of the time (5) All the time  100% never
9. If you currently drive, do you find you are driving less *during the day* due to your vision?
(0) N/A (1) Never (2) Rarely (3) Sometimes (4) Most of the time (5) All the time  100% never
10. If you currently drive, do you find you are driving less *at night* due to your vision?
(0) N/A (1) Never (2) Rarely (3) Sometimes (4) Most of the time (5) All the time  100% never

Results: Spectacle Independence

1. Overall, in the past 7 days, how often did you need to wear eyeglasses to see?

0	1	2	3	4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Never → MOVE TO SECTION 2 (Page 4)	Rarely	Sometimes	Most of the time	All the time

0.33 ± 0.47

2. In the past 7 days, how often did you need to wear eyeglasses to see "up close" (for example, reading a book)?

0	1	2	3	4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Never	Rarely	Sometimes	Most of the time	All the time

0.33 ± 0.47

3. In the past 7 days, how often did you need to wear eyeglasses to see "at arm's-length" (for example, using an ATM or seeing the dashboard of a car)?

0	1	2	3	4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Never	Rarely	Sometimes	Most of the time	All the time

4. In the past 7 days, how often did you need to wear eyeglasses to see "far away" (for example, seeing street signs)?

0	1	2	3	4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Never	Rarely	Sometimes	Most of the time	All the time

21. Overall, in the past 7 days, how satisfied were you with your vision?

0	1	2	3	4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very Satisfied

22. Given your vision today, if you had to do it all over, would you have the same lenses implanted again?

0	1
<input type="checkbox"/>	<input type="checkbox"/>
No	Yes

Why or Why not? (Please explain): _____

23. Given your vision today, would you recommend the lenses you had implanted to your family or friends?

0	1
<input type="checkbox"/>	<input type="checkbox"/>
No	Yes

Why or Why not? (Please explain): _____

>85% of patients stating they had 'no need for spectacle correction' for most activities in dim and bright lighting conditions

"you're able to see the beauty of the world again, very clear, very safe surgery!"

Results: Visual Disturbance Profile

No Starbursts and No Halos



Starbursts



Halos



IF YES, answer the following questions (*mark one box per row*):

1.1 In the past 7 days, how often did you experience **starbursts**?

0	1	2	3	4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Never	Rarely	Sometimes	Most of the time	Always









1.2 Using the pictures below, rate how severe your worst experience was with **starbursts** in the past 7 days. These pictures may not look exactly like what you see, but are a guide to help you choose your answer.

0	1	2	3	4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None	A little	Mild	Moderate	Severe

1.3 In the past 7 days, how much have your **starbursts** bothered you?

0	1	2	3	4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not bothered at all	Bothered a little bit	Bothered somewhat	Bothered quite a bit	Bothered very much

Results: Visual Disturbance Profile

- 1. In the past 7 days, have you experienced starbursts?  100% no
 - If YES, how often did you experience them?
 - 0 = never, 1 = rarely, 2 = sometimes, 3 = most of the time, 4 = always
 - Rate your worst experience:
 - 0 = none, 1 = a little, 2 = mild, 3 = moderate, 4 = severe
 - How much have your starbursts bothered you?
 - 0 = not bothered at all, 1 = bothered a little bit, 2 = bothered somewhat, 3 = bothered quite a bit, 4 = bothered very much
- 2. In the past 7 days, have you experienced halos?  100% no
- 3. In the past 7 days, have you experienced glare?  100% no
- 4. In the past 7 days, have you experienced hazy vision?  100% no
- 5. In the past 7 days, have you experienced blurred vision?  100% no
- 6. In the past 7 days, have you experienced double vision?  100% no
- 7. In the past 7 days, have you experienced a dark area?  100% no
- 8. Do your symptoms above bother you enough that you would want to have another surgery, if the lens was the cause?
 - 0 = no, 1 = yes, 3 = n/a  100% n/a

Rate of visual disturbance, namely glare, haloes and starbursts VERY low!

Discussion

- Our data demonstrated significant postoperative visual success of bilateral cataract surgery with Vivity IOL implantation across multiple surgeons, techniques and pre-and-perioperative variables
 - Significant visual improvement at distance, intermediate and near
 - Significant improvement in visual quality
 - Low rate of visual aberrations
 - Significant degree of **spectacle independence**
- Results reinforce that this non-diffractive extended vision IOL is an excellent option for cataract surgery patients, including those post-LASIK

Thank you!

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