

RAYONE GALAXY

EVIDENCE REVIEW

Spiral Optics and the Pursuit of Continuous Vision

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THE QUESTION

RANGE OF VISION HAS AN OPTICAL PRICE

Presbyopia-correcting IOLs are judged by two outcomes that do not always move together.

THE CLINICAL TENSION

RANGE OF VISION

versus

QUALITY OF VISION

Diffractional multifocal and trifocal optics can provide strong performance at defined focal distances, but light splitting and simultaneous retinal images may reduce contrast and generate halo or glare. EDOF strategies seek a broader focal region, usually accepting different trade-offs in near performance, pupil dependence or peak optical quality.

THE GALAXY QUESTION

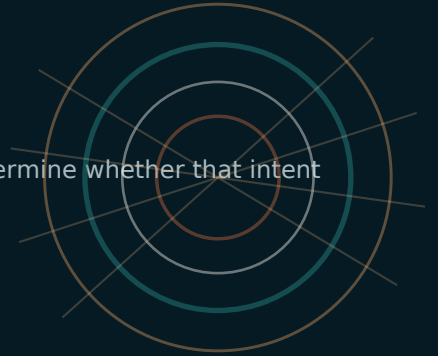
Can a spiral refractive optic broaden functional vision without relying on conventional diffractive light splitting - and can it do so while preserving acceptable visual quality?

Context [7-10,17-18]. The trade-off is a clinical framework, not a claim that all diffractive or EDOF platforms behave identically.

HOW GALAXY WORKS

A SPIRAL DESIGNED TO ELONGATE FOCUS

The design intent is continuous optical power variation. The evidence must determine whether that intent appears in measured behavior.



01 SPIRAL REFRACTIVE OPTIC

Manufacturer-described surface geometry.

02 CONTINUOUS POWER VARIATION

Design intent: progressive change rather than discrete diffractive orders.

03 EXTENDED THROUGH-FOCUS RESPONSE

Observed across TF-MTF, PMTF and interferometric testing.

04 INTENDED CONTINUOUS VISUAL RANGE

Clinical hypothesis - not guaranteed by bench behavior alone.

MECHANISTIC CAUTION

Independent interferometry suggests that radially symmetric aberrations generate much of the measured EDOF behavior, with the spiral component contributing secondarily. The platform is therefore best understood as a multi-mechanism refractive optic.

Design description [1]; mechanistic interpretation [4]. Manufacturer-described intent is separated from experimentally observed behavior.

OPTICAL EVIDENCE

THE BENCH SUPPORTS RANGE - WITH CONDITIONS

Three independent optical approaches converge on an extended response. They also reveal the boundaries of that response.

WHAT THE OPTICAL EVIDENCE ANSWERS

01

DOES THE RANGE EXTEND?

[2-4]

YES.

TF-MTF, simulated VA and interferometric models identify a broad response rather than isolated trifocal peaks.

02

IS THE BEHAVIOR STABLE?

[2-3]

NOT FULLY.

Performance shifts with aperture; intermediate and near metrics decline as pupil size increases.

03

IS THERE AN OPTICAL COST?

[3-4]

YES.

Extended depth is accompanied by moderated contrast rendering and lower peak quality than a monofocal reference.

THE BOUNDARY

Bench performance explains mechanism. It does not measure neuroadaptation, binocular integration, night driving or satisfaction - and it cannot establish clinical superiority.

THE CLINICAL SIGNAL

THE OPTICAL CONCEPT REACHES THE PATIENT

The first multicentre implanted series provides a clear early signal - and a limited level of certainty.

CLINICAL · SINGLE-ARM · 3 MONTHS

87%

within ± 0.50 D MRSE

REFRACTIVE PREDICTABILITY

20/32

or better from +1.00 to -2.80 D

BINOCULAR FUNCTIONAL RANGE

10

participating clinical sites

MULTICENTRE EXPERIENCE

MEAN MONOCULAR CORRECTED ACUITY

-0.03

logMAR

DISTANCE

0.05

logMAR

INTERMEDIATE

0.08

logMAR

NEAR

HOW STRONG IS THE SIGNAL?

Clinically meaningful range is present. Certainty is constrained by the absence of an implanted comparator, short follow-up and incomplete 3-month retention. The published paper combines a separate preclinical comparison with the postoperative cohort.

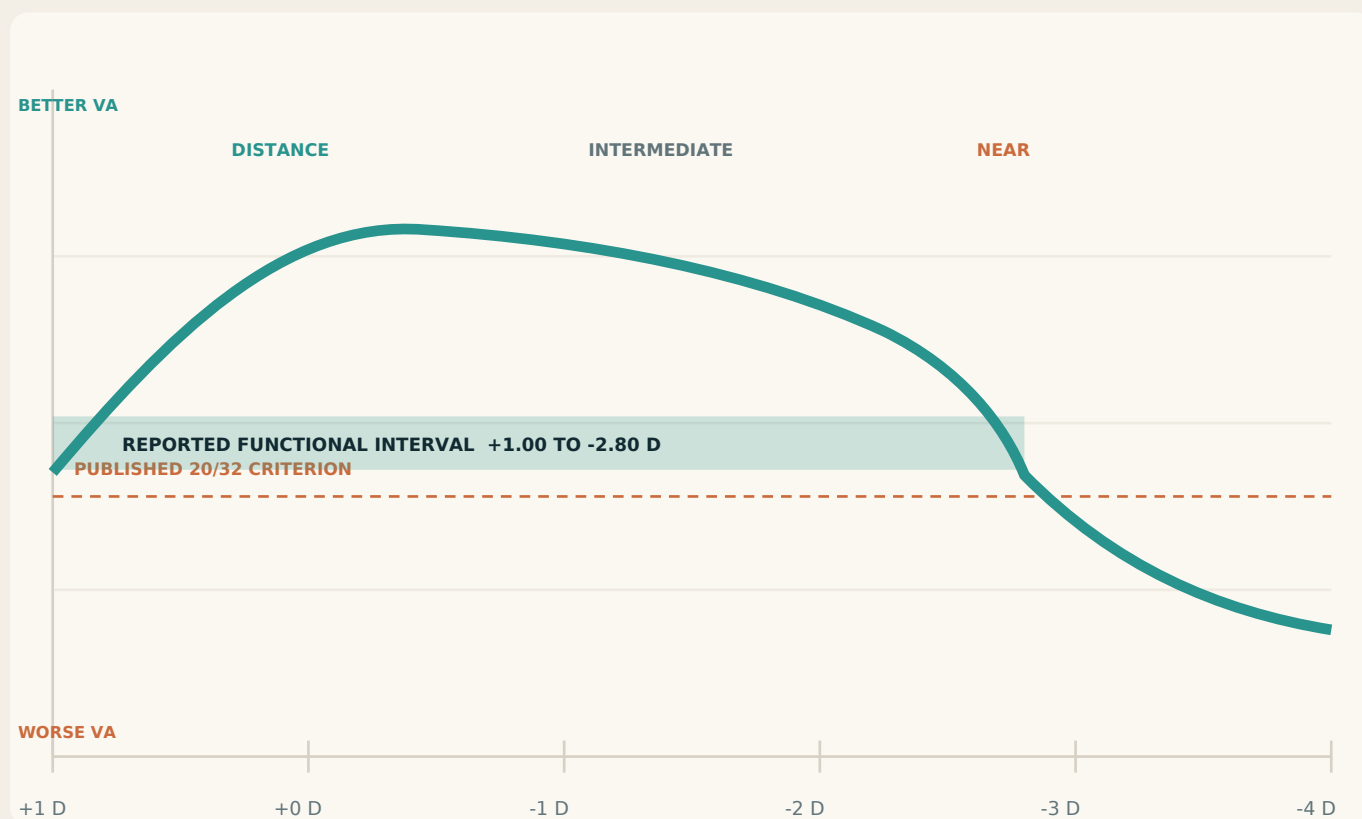
THE DEFOCUS PROFILE

CONTINUITY IS THE CLINICAL PROPOSITION

The published binocular curve is described as a smooth plateau rather than a sequence of separated focal peaks.

QUALITATIVE PROFILE

PUBLISHED INTERVAL + REPORTED MORPHOLOGY



READ THIS CORRECTLY

This is a qualitative rendering of the published curve morphology - not a digitized dataset. Only the reported 20/32 interval is quantitative. The trace must not be used for numerical comparison with another IOL.

Clinical source [1]; interpretation of defocus morphology [7-8]. No cross-study overlay is shown.

QUALITY OF VISION

THE OTHER HALF OF THE EQUATION

The early signal is encouraging. The strength of that signal depends on whether the evidence came from patients, simulation or an optical bench.

THREE LEVELS OF EVIDENCE

01

CLINICAL

>95% reported halo and glare as generally minor; no severe cases were reported.

Single-arm cohort; questionnaire detail and 3-month completeness limit interpretation.

02

PSEUDOPHAKIC SIMULATION

Galaxy produced smaller halo/glare than RayOne Trifocal in the RALV comparison.

Preclinical psychophysics; not implanted head-to-head patient evidence.

03

OPTICAL BENCH

Galaxy/PureSee halo profiles were lower than PanOptix, but higher than monofocal control.

PSF behavior supports mechanism; it does not predict individual symptom burden.

OIE READING

Early visual comfort looks favorable. Evidence is not yet sufficient to conclude that Galaxy clinically reduces dysphotopsia versus established platforms.

EVIDENCE SYNTHESIS

WHAT LOOKS CONVINCING

Three observations survive across different methods without requiring a superiority claim.

01

THE OPTIC GENERATES EXTENDED FOCUS

[2-4]

TF-MTF, PMTF and interferometric testing converge on a broad response. Agreement across methods strengthens the mechanistic signal.

02

THE RANGE APPEARS CLINICALLY USEFUL

[1]

Early bilateral outcomes show strong acuity at distance, intermediate and near, with a broad binocular functional interval.

03

THE VISUAL-COMFORT SIGNAL IS ENCOURAGING

[1,3]

Clinical symptom reporting, simulation and PSF behavior point in the same favorable direction - although at different evidence levels.

Convergence is the strength. Evidence maturity is the limitation.

EVIDENCE GAPS

PROMISING TECHNOLOGY ≠ MATURE EVIDENCE

The unanswered questions are not peripheral. They determine comparative positioning and patient selection.

01 COMPARATIVE CLINICAL PERFORMANCE

No large peer-reviewed randomized implanted head-to-head study establishes relative acuity, QoV or satisfaction.

02 STANDARDIZED VISUAL QUALITY

Validated symptom instruments and standardized photopic/mesopic contrast testing remain limited.

03 PUPIL AND NIGHT FUNCTION

Bench pupil dependence is clear; its clinical effect on mesopic reading and night driving is not.

04 DURABILITY AND TORIC PERFORMANCE

Long-term neuroadaptation, refractive stability and Galaxy Toric-specific rotation need stronger published data.

EVIDENCE HORIZON

The US IDE study is registered, and ESCRS 2026 presented multiple 6- to 12-month and comparative datasets. Until full peer-reviewed methods and results are available, these remain emerging evidence.

CLINICAL INTERPRETATION

WHAT THE EVIDENCE MEANS FOR SURGEONS

Galaxy belongs in the contemporary shift from focal-point counting toward functional continuity - but clinical judgment still precedes platform enthusiasm.

01

WHAT GALAXY MAY OFFER

Broad binocular functional range

A non-diffractive refractive strategy

Potentially smoother distance-to-near transition

02

WHAT REQUIRES CAUTION

Pupil-dependent optical behavior

Visual-quality evidence remains early

No proven clinical superiority

03

WHERE DATA ARE NEEDED

Mesopic contrast and night function

Validated patient-reported outcomes

Randomized platform comparisons

SURGEON'S READING

Galaxy is a credible option within a rapidly diversifying PCIOL landscape. The present evidence supports discussing optical strategy and expected range; it does not justify promising freedom from dysphotopsia or claiming superiority over a mature trifocal. Patient selection should remain driven by corneal quality, pupil behavior, ocular comorbidity, visual priorities and tolerance for uncertainty.

OIE BOTTOM LINE

A CREDIBLE OPTICAL IDEA. AN EARLY CLINICAL SIGNAL.

The appropriate interpretation sits between endorsement and dismissal.

BOTTOM LINE

RayOne Galaxy represents a credible attempt to create broad functional vision through a spiral refractive strategy rather than conventional diffractive light splitting. Independent optical testing supports an extended, relatively smooth and pupil-dependent through-focus response. Early multicentre clinical evidence indicates that this optical behavior can translate into useful binocular vision across a substantial defocus range, while early visual-quality findings are encouraging. The evidence base, however, remains less mature than that of established trifocal platforms - particularly for large independent cohorts, validated quality-of-vision outcomes and randomized implanted comparisons. Galaxy should therefore be viewed neither as proven superior nor as merely theoretical. It is a technologically credible platform with encouraging early clinical evidence whose comparative clinical position remains to be established.

WHAT GALAXY IS

A non-diffractive spiral refractive PCIOL.

WHAT IT DOES NOT YET SUPPORT

Comparative clinical superiority.

WHAT THE EVIDENCE SUPPORTS

Broad optical and early clinical range.

WHY THE DISTINCTION MATTERS

Innovation and evidence maturity are different.

REFERENCES

EVIDENCE MAP

Eighteen sources retained because each supports a defined clinical, optical or methodological claim.

HOW TO READ THE EVIDENCE

PEER-REVIEWED

Direct clinical and optical publications.

REGISTERED

Ongoing clinical evidence without peer-reviewed results.

CONFERENCE

Signals requiring full methods and publication.

DIRECT CLINICAL EVIDENCE

1 Abela-Formanek C, Amon M, Auffarth GU, et al. Performance of the First Spiral Refractive Intraocular Lens for Continuous Full Range of Vision. J Refract Surg. 2025;41:e1213-e1222. doi:10.3928/1081597X-20250829-01.

OPTICAL / MECHANISTIC EVIDENCE

2 Kim DH, Son HS, Wu Z, Auffarth GU, Łabuz G. Estimating Range of Vision and Optical Function Related to Pupil Size in a Spiral IOL. J Refract Surg. 2026;42:e514-e521.

3 Tommasi F, Giorgetti A, Gurioli M, et al. Optical Performance of a Novel Non-diffractive Presbyopia-Correcting IOL as a Function of Defocus and Pupil Size. J Refract Surg. 2026;42:e701-e709.

4 Gatinel D, Entin A, Stern B. In vitro optical characterization of the RayOne Galaxy spiral EDOF IOL using high-resolution Mach-Zehnder interferometry. Biomed Opt Express. 2026;17:3984-4001.

ONGOING / EMERGING EVIDENCE

5 Rayner Surgical. Safety and Effectiveness of the RayOne Galaxy IOL. ClinicalTrials.gov NCT06605638. Results not yet peer reviewed.

6 ESCRS 2026 Galaxy clinical and comparative presentations. Conference evidence; full methods and peer-reviewed confirmation pending.

Search updated 16 September 2026. References without a meaningful claim-support role were removed.

REFERENCES

CONTEXT & METHODOLOGY

Comparator literature and measurement standards provide context without being treated as Galaxy-specific clinical proof.

COMPARATIVE / FOUNDATIONAL EVIDENCE

7 MacRae S, Holladay JT, Glasser A, et al. AAO Task Force Consensus Statement for EDOF IOLs. Ophthalmology. 2017;124:139-141.

8 Fernández J, Ribeiro F, Rocha-de-Lossada C, Rodríguez-Vallejo M. Functional Classification of IOLs Based on Defocus Curves. J Refract Surg. 2024;40:e108-e116.

9 Karam M, et al. EDOF Versus Trifocal IOLs: Updated Systematic Review and Meta-analysis. Am J Ophthalmol. 2023.

10 Tavassoli S, et al. Trifocal versus EDOF IOLs after cataract extraction. Cochrane Database Syst Rev. 2024;CD014891.

11 Zhu D, et al. Complete Spectacle Independence With PanOptix: Systematic Review and Meta-analysis. Ophthalmol Ther. 2023.

12 Corbett D, Black D, Roberts TV, et al. Quality of Vision Outcomes for a Fully Refractive EDOF IOL. Eye. 2024;38(Suppl 1):9-14.

13 Shultz MC, Wiley WF, Liang E, et al. enVista Envy Versus Monofocal: Randomized Multicenter US Trial. Am J Ophthalmol. 2025;280:493-507.

14 Niknahad A, Wu Z, Son HS, et al. Vivity and PureSee: Optical Quality, Depth of Focus and Misalignment Effects. Sci Rep. 2025;15:26943.

15 McAlinden C, Pesudovs K, Moore JE. Development of the Quality of Vision Questionnaire. Invest Ophthalmol Vis Sci. 2010.

16 Lasch K, et al. Development and Validation of the QUVID Questionnaire. Am J Ophthalmol. 2022.

17 Romano V, et al. Recommendation for Presbyopia-Correcting IOLs: Delphi Consensus. Am J Ophthalmol. 2023.

18 Megiddo-Barnir E, Alió JL. Latest Development in EDOF IOLs: An Update. Asia Pac J Ophthalmol. 2023;12:58-79.

PUBLICATION TRANSPARENCY

CONFLICT OF INTEREST

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EVIDENCE DISCIPLINE

Bench ≠ clinical. Single-arm ≠ randomized comparison. Conference ≠ peer-reviewed publication. Industry involvement is disclosed and informs weighting; it does not automatically invalidate a study.

Contextual and methodological references support interpretation; they do not establish Galaxy-specific superiority.

OIE EVIDENCE REVIEW · 02 · SEPTEMBER 2026

13