Sequel™

CLINICAL WHITE PAPER

Sequel PAL

Visual Comfort, Clarity, and Digital Eye Strain Relief in Progressive Lens Wearers

Newton™

Introduction

Digital device use has become a ubiquitous part of everyday life across all age groups.[1,2] Studies indicate that up to 69% of computer users experience symptoms related to digital eye strain, a condition estimated to affect approximately 60 million people worldwide, with nearly one million new cases identified each year.[3,4] As work, education, and social interaction have become increasingly screen-driven, the clinical burden of digital eye strain continues to grow.[5]

For patients over 40 who have experienced a decline in accommodative function, progressive addition lenses (PALs) are frequently prescribed to maintain clear vision across all working distances.[6] However, conventional PAL designs address the accommodative system primarily and do not account for the vergence demands associated with prolonged near and intermediate tasks. The plus power required for near correction can induce exophoria, placing additional convergence demand on the visual system and contributing to eye strain, particularly during extended digital device use.

To overcome this limitation, Sequel™ PAL was developed to address both the accommodative and vergence systems simultaneously, through the integration of Convergence Boost™ technology into a premium freeform progressive design.

SEQUEL™ WITH CONVERGENCE BOOST™ TECHNOLOGY

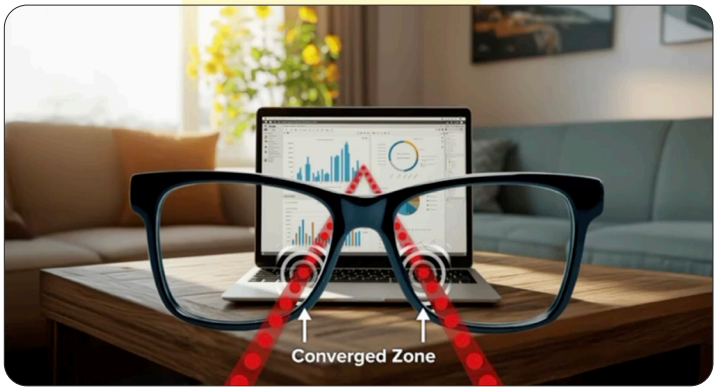
As the eyes move down through a lens into the intermediate and near zones, unintended optical effects are introduced that vary depending on lens design, prescription, add power, and other factors. In conventional PAL designs, the plus power added for near correction can induce an outward prismatic effect, requiring the visual system to exert continuous convergence effort to compensate,which can be a source of strain during sustained screen use.

Convergence Boost technology applies a gentle, proprietary prismatic correction through the lower intermediate and near zones, counteracting these optical variables and supporting the eyes toward a more natural vergence position during near and digital tasks. This correction is integrated into a proprietary lens design specifically engineered to serve each patient's visual needs. No patient measurement or additional diagnostic step is required — Sequel PAL is prescribed and dispensed as any other premium progressive lens.

STUDY OBJECTIVES

To evaluate the real-world clinical performance of Sequel PAL, Newton commissioned a prospective clinical study conducted across six U.S. clinical sites. This white paper presents participant-reported outcomes (N=29, 6-week wear period) and summarizes the study methodology, key findings, and implications for clinical practice.

Figure I: Illustration of Standard versus Sequel lenses



Standard Lenses

When performing prolonged near tasks, our eyes are required to be in an uncomfortable, converged state.

Sequel Lenses

Convergence Boost technology shifts images at near, allowing our eyes to be in their most natural, comfortable position.

Key Highlights

The following headline results represent the most clinically significant outcomes. All findings are based on participant-reported outcomes from a prospective clinical study (N=29, 6-week wear period).

71%
improvement in digital eye strain symptoms after 6 weeks*

83%
of participants very comfortable performing everyday tasks*

76%
reported no end-of-day eye fatigue at week 6*

65%
very satisfied after 6 weeks of wear*

>40
NPS across all visual comfort domains*

>60
NPS across all visual clarity domains*

A statistically significant reduction in CVS-Q scores was observed at week 6 ($p < 0.05$), with a median score reduction of 5 units — representing a clinically meaningful improvement in digital eye strain symptoms.

Methods

STUDY DESIGN

This was a prospective clinical study. Participants were enrolled over a two-month period across six clinical sites in the United States. Following baseline assessment and completion of informed consent, all participants were fitted with Sequel PAL prescription lenses and followed for six weeks.

Coating and refractive index were matched to each participant's existing lenses to maintain consistency. The CVS-Q was used as the method to assess digital eye strain symptom severity at baseline and at the six-week follow-up and is a validated, widely used instrument for assessing digital eye strain — providing a credible, standardized primary endpoint. Net Promoter Score (NPS) was applied systematically across all comfort and clarity domains, enabling a consistent, domain-level view of wearer experience rather than a single aggregate score.

PARTICIPANTS

Thirty participants were enrolled; 29 completed the study. Eligible participants were aged 40 years and older, were established progressive lens wearers with a minimum of 4 hours of digital device use per day, and met the following prescription criteria:

- Spherical power between +4.00D and –8.00D
- Cylinder power no greater than –3.00D
- Addition power between +0.50D and +3.00D
- Less than 0.75D spherical equivalent difference and less than 0.50D addition power difference between habitual and updated spectacle prescriptions

Key exclusion criteria included lack of binocular vision (strabismus, amblyopia, or suppression),current prism lens wear, habitual contact lens wear, greater than 2.00D spherical equivalent difference between eyes, and any clinically significant posterior segment pathology.

Table I summarizes the baseline demographics of the 29 participants who completed the study.

DEMOGRAPHIC	SEQUEL PAL (N=29)
Gender	11 male, 18 female
Average Age (years)	58.28 (±7.48)
Average Baseline CVS-Q Score	6.83 (±3.46)
Average Spherical Equivalent OD (D)	–0.56 (±2.18)
Average Spherical Equivalent OS (D)	–0.46 (±2.11)
Average Near Add Power (D)	2.24 (±0.33)

Clinical data presented as mean (± standard deviation).

OUTCOME MEASURES

Primary outcome: Change from baseline in computer vision syndrome-questionnaire (CVS-Q) scores at week 6.

Secondary outcomes: Visual comfort and clarity Net Promoter Scores at week 6, assessed across all evaluated task domains.

DATA ANALYSIS

Study outcome data was collected via digital platforms and organized in Microsoft Excel. Descriptive and statistical analysis was performed using Prism GraphPad. A Mann–Whitney U test was used to compare pre- and post-CVS-Q scores; a p-value of less than 0.05 was considered statistically significant.

CVS-Q: A validated 16-item questionnaire in which participants rate the frequency and intensity of digital eye strain symptoms. A score of 6 or more defines a participant as symptomatic.[7]

NPS Methodology: NPS methodology was applied to individual questions within the visual comfort and clarity domains. Participants rated each item on a 5-point scale; responses were categorized as Promoters (4–5), Passives (3), or Detractors (1–2). The NPS for each item was calculated by subtracting the percentage of Detractors from the percentage of Promoters, yielding scores from – 100 to +100. Scores above 40 were considered indicative of a high level of participant satisfaction and positive overall experience.

Data Analysis & Results

DIGITAL EYE STRAIN SYMPTOM REDUCTION

When comparing CVS-Q scores between baseline and week 6, a statistically significant improvement was observed ($p < 0.05$). The median score decreased from 7 at baseline to 2 at week 6, representing a median change of 5 units and a 71% improvement in digital eye strain symptoms. This reduction is clinically meaningful, with the median score crossing the established threshold between symptomatic (≥6) and non-symptomatic status on the CVS-Q.

VISUAL COMFORT

Net Promoter Scores for visual comfort exceeded 40 across all evaluated domains at week six, indicating high levels of participant-reported comfort with Sequel PAL lenses. The highest NPS scores within the comfort domain were observed for viewing the dashboard while driving.

Additional comfort findings at week 6:

- **83%** of participants reported being very comfortable performing their everyday routine tasks while wearing Sequel lenses.
- **76%** reported feeling comfortable with the field of view provided by the lenses.
- **66%** reported being comfortable performing longer hours of computer-based tasks.

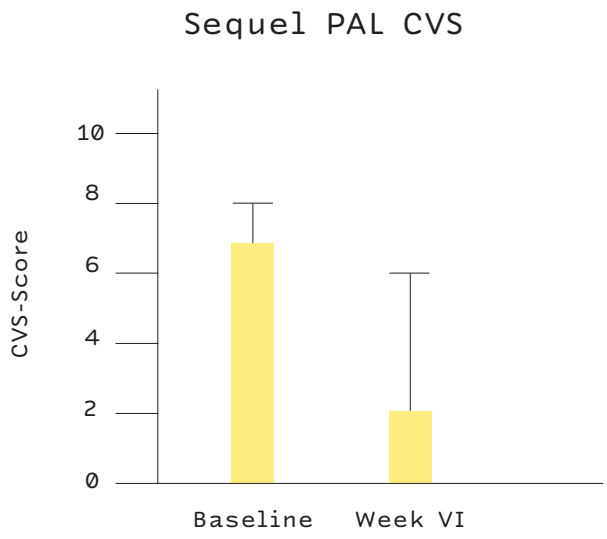


Figure II: Presents the median (95% Confidence intervals) CVS-Q scores at baseline and at week six for the Sequel PAL group.

VISUAL CLARITY

Net Promoter Scores for visual clarity exceeded 60 across all evaluated domains at week 6 — indicating an even stronger result compared to the visual comfort domains. The highest NPS scores for clarity were reported for viewing the dashboard and watching television.

Additional clarity and performance findings at week 6:

- 76% of participants reported no eye fatigue by the end of the day.
- 72% reported clear vision when switching from distance to near viewing zones.
- 86% reported no swaying sensation while wearing the Sequel PAL lenses.
- More than 65% reported no distortion or blurring while viewing through the lenses.

OVERALL SATISFACTION

NPS scores for overall satisfaction with the lenses also exceeded 40 at week 6, indicating meaningful acceptance within a relatively short wear period. 65% of participants reported being very satisfied after six weeks of Sequel PAL wear.

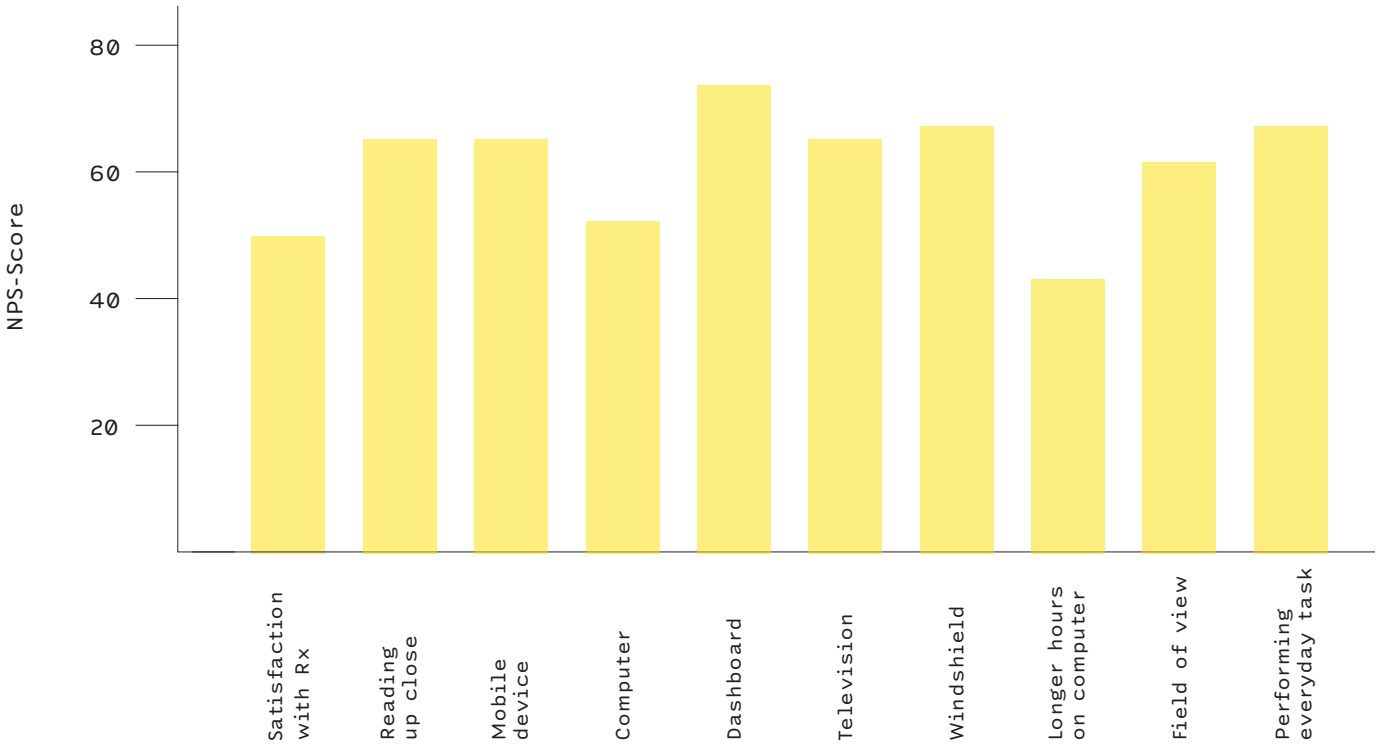


Figure III: Presents the Net Promoter Scores for each visual comfort domain measured at week six in the Sequel PAL group.

Discussion

INTERPRETATION OF FINDINGS

This study evaluated Sequel PAL in an established progressive lens-wearing population with active digital device use. Several aspects of the study design support confidence in the findings:

- Participants were experienced PAL wearers, making any adaptation effects attributable to Sequel PAL specifically rather than to progressive lens wear generally.
- Statistical significance was achieved on the primary endpoint ($p < 0.05$), indicating that the improvement is likely to reflect a clinical effect rather than chance.

INTERPRETING THE CVS-Q REDUCTION

A median baseline CVS-Q score of 7 places the study population just above the validated symptomatic threshold of 6. Following six weeks of Sequel PAL wear, the median score fell to 2 —below the symptomatic threshold — representing a 71% reduction in symptom score. This is a clinically meaningful shift, moving the median participant from a symptomatic to a non-symptomatic classification on a validated instrument.

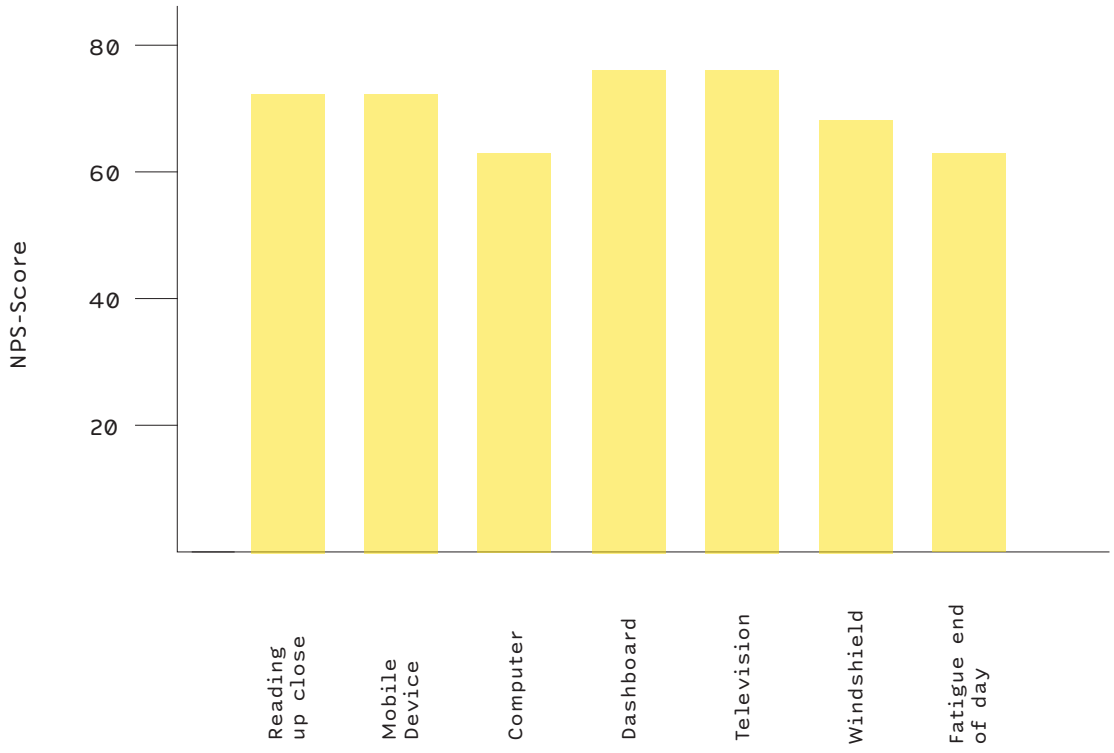


Figure IV: Presents the Net Promoter Scores for each visual clarity domain measured at week six in the Sequel PAL group.

NPS: COMFORT VS. CLARITY

A notable finding is that NPS scores for visual clarity (>60 across all domains) were consistently higher than those for visual comfort (>40 across all domains). This suggests that participants experienced clear, high-quality vision with Sequel PAL from an early stage of wear, even as comfort continued to develop. For established PAL wearers accustomed to premium design, achieving clarity NPS above 60 across every measured domain is a strong indicator of optical performance.

STUDY LIMITATIONS

The following limitations should be noted when presenting these findings:

Sample size: Twenty-nine participants completed the study. Larger trials would strengthen the generalizability of these findings.

Implications for Clinical Practice

WHO IS SEQUEL PAL FOR?

The clearest candidates are established PAL wearers who present with complaints of eye strain, end- of-day fatigue, or visual discomfort tied to digital device use. The study enrolled patients averaging over 4 hours of daily screen time, with a mean age of 58 — a population that already has the progressive lens habit and is likely to tolerate a new design well, as reflected in the strong acceptance and satisfaction data.

A CVS-Q threshold of 6 or above was not used as an inclusion criterion, and participants were not required to be symptomatic. However, the findings suggest that individuals with higher baseline CVS-Q scores, particularly those with significant screen use, may be more likely to experience meaningful, measurable symptom improvement within six weeks.

SETTING PATIENTS UP FOR SUCCESS

Because all study participants were already adapted to progressive lenses, the adaptation narrative for Sequel PAL is straightforward: patients are not learning to use a progressive for the first time —they are transitioning to a design that adds vergence support on top of the optics they already know. Framing the lens this way at dispensing manages expectations well and is consistent with the strong field-of-view and no-swaying results observed in the study.

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* Based on participant-reported outcomes from a prospective controlled clinical study of Sequel PAL (N=29, 6-week wear period). Newton Data on File. Full study data available on request.

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