

WEAR EXPERIENCE WITH A DAILY DISPOSABLE SOFT CONTACT LENS FOR ASTIGMATISM IN CURRENT WEARERS OF A REUSABLE SOFT TORIC CONTACT LENS

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ABSTRACT

Objective: This study aimed to evaluate the wear experience of satisfied wearers of a particular reusable toric soft contact lens when refit into a water surface technology daily disposable toric soft contact lens.

Methods: Thirty participants completed the study over three visits. At the first visit, subjects were refitted with their habitual reusable toric soft contact lens (comfilcon A) to maximize fit and vision. Subjects returned after one week and were then refit into the study daily disposable soft contact lenses (verofilcon A) and completed surveys of their initial impressions of comfort, vision, and satisfaction. Participants wore the study lenses for two weeks and then returned for their final visit to complete a vision and ocular health check. At the final visit, subjects also completed surveys to rate their overall and end-of-day comfort, quality of vision, stability of vision, and dryness using a visual analog scale (VAS). Participants also answered questions about their wear experience with the lenses. All data and surveys' overall median and interquartile range (IQR) were calculated.

Results: Initial impressions of the study lenses revealed a median (IQR) score of 85 (28) for vision, 91 (25) for comfort, and 87 (21) for satisfaction. Overall VAS scores after two weeks of wear found median scores of 93 (16) for quality of vision, 88 (28) for stability of vision, and 91 (20) for comfort. End-of-day median scores were 82(27) for quality of vision, 90 (35) for stability of vision, and 80 (38) for comfort. Overall dryness scores were 20(45), and end-of-day dryness was 39 (46). Median(IQR) binocular logMAR visual acuity with the study lenses was -0.16(0.1). The median rotation of the lenses was 0(4.3) degrees.

Conclusion: Participants wearing the daily disposable study lenses for astigmatism gave high scores in vision and comfort at the initial fitting and after two weeks of lens wear. Results showed that satisfied wearers of comfilcon A reusable toric soft contact lenses can be successfully refitted with verofilcon A daily disposable contact lenses.

Keywords: daily disposable contact lenses, single use contact lenses, reusable contact lenses, comfort, vision

INTRODUCTION

Soft daily wear contact lenses are a common form of vision correction internationally.¹ Advances in lens materials and lens designs have helped improve oxygen transmissibility with silicone hydrogel materials used widely for reusable and daily disposable lenses.¹ Daily disposable lenses have been shown to have health benefits compared to reworn lenses, with a lower infection rate and corneal infiltrative events.^{2,3} Additionally, no solutions are used for cleaning or disinfecting the lenses, which makes their use not only convenient,⁴ but also less likely to be affected by discomfort and corneal staining found associated with lens care solution use.^{5,6}

Success with soft contact lens wear requires lenses that minimize risks to ocular health and require materials and designs that provide satisfactory vision and comfort. Numerous studies have found that poor comfort is a leading cause of contact lens wear discontinuation.⁷⁻⁹ An extensive review of factors that could play a role in contact lens comfort found lens surface properties associated with comfort.¹⁰ Lenses with a lower coefficient of friction are associated with improved comfort at the end of the day.¹¹ Increasing the lubricity of the surface of the lens to decrease the friction between the lens surface and the lid margin has been studied by adding lens coatings,¹² and by using surface treatments.^{13,14}

Comfort and vision have also been associated in previous studies, showing that poor vision can affect the perception of comfort.¹⁵ This is particularly important when fitting patients with more complicated prescriptions, such as those with astigmatism, as the refractive correction must remain oriented in the proper position to provide clear and consistent vision. A study by Richdale et al. found that patients with low amounts of astigmatism (1 diopter or less) had statistically improved vision with soft toric contact lenses compared to soft spherical lenses.¹⁶ A study on contact lens discontinuation found that soft lens wearers with astigmatism have significantly lower short-term success than those without astigmatism, indicating that well-corrected

vision plays an important role in successful contact lens wear.¹⁷ Successful contact lens wear for patients with astigmatism requires lenses to be rotationally stable,¹⁸ and different lenses accomplish this stability with different lens designs.¹⁶ Because fitting a patient with astigmatism can take more time than a more simple lens design, it is possible that an eye care provider may be tempted not to change successful toric lens wearers to a different toric contact lens despite the availability of lenses that may have the health benefits of more frequent replacement.

This study assessed participants' astigmatism satisfaction and wear experiences when fit with daily disposable water surface contact lenses among wearers of a commonly fit soft toric contact lens.

METHODS

This non-comparative, open-label study was registered on clinicaltrials.gov (NCT05102383) and was reviewed and approved by the Institutional Review Board at The Ohio State University. All participants completed the informed consent process before beginning the study. Participants were 18-40 years of age and habitual wearers of a widely used monthly replacement toric contact lens (Biofinity® toric, comfilcon A, CooperVision, Pleasanton, CA, USA). A diagram of the study design is presented in Figure 1. Participants reported to the initial exam wearing their current comfilcon A lenses. Visual acuity and an evaluation of the subject's ocular health was performed to determine whether eligibility criteria were met, including visual acuity of 20/25 or better, no ocular inflammation or systemic inflammation that could affect contact lens wear, and a positive response to the question, "Are you satisfied with your current contact lenses?" The reusable lenses were evaluated as a part of the screening process to ensure that the habitual lenses fit properly. Those who were eligible were refit to optimize prescription and ensure that the participants were starting with clean lenses to maximize their comfort so that participant responses would not be influenced by a change in prescription or lenses toward the end of their wear schedule.

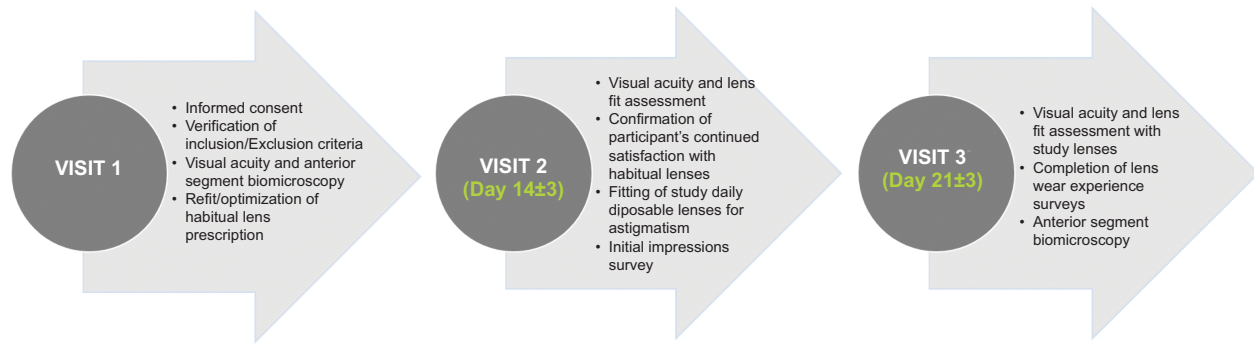


FIGURE 1 Study design.

Participants returned for a second visit after wearing these optimized habitual lenses for 1 week of daily wear. Patients were asked to confirm whether they were still satisfied with their optimized habitual contact lenses and proceeded to an assessment of vision, lens fit and ocular health. Participants were then refitted with the water surface daily disposable study lenses (PRECISION1® for Astigmatism, verofilcon A, Alcon, Fort Worth TX, USA). A visual analog scale (VAS) survey of initial lens impressions was deployed to the smartphone of each participant using Research Electronic Data Capture (REDCap).^{19, 20} Each VAS survey was completed by moving a slider along a line to correspond with their impression of each quality on a scale from 0 to 100. These surveys evaluated the initial impressions of the quality of vision, comfort, and satisfaction. The initial vision and comfort VAS survey quality were anchored with “POOR” at 0 and “EXCELLENT” at 100. The initial satisfaction VAS was anchored with “NOT Satisfied” at 0 and “EXTREMELY Satisfied” at 100. After the visit, additional study lenses were dispensed for wear each day until Visit 3.

The final study visit occurred approximately 2 weeks (± 3 days) after the daily disposable study lenses fitting. Participants completed assessments of visual acuity, ocular health, and lens fit and then completed surveys regarding their lens wear experience with the study lenses, including the Contact Lens Dry Eye Questionnaire – 8 (CLDEQ-8),²¹ and VAS surveys (0-100) of overall quality of vision, stability of vision, comfort, and dryness. Participants also responded to

the VAS surveys rating the same experiences they recalled at their “end-of-day.” Additionally, 0-10 scale surveys of study lens convenience, ease of use, and satisfaction were completed. Overall and end-of-day quality of vision VAS surveys were anchored with 0 as “POOR Quality” and 100 as “EXCELLENT Quality.” Overall and end-of-day stability of vision were anchored with 0 as “POOR Stability (Not stable)” and 100 as “EXCELLENT Stability (Consistent vision)”. Overall comfort and end-of-day comfort were each anchored with “POOR Comfort” at 0 and “EXCELLENT Comfort” at 100. Overall dryness and end-of-day dryness were anchored with “No Dryness” at 0 and “MAXIMUM Dryness” at 100. The final survey captured participants’ impressions of convenience, ease of use, and satisfaction with the study lenses. The scale for convenience, ease of use, preference, and satisfaction was 0 to 10, where a score of 0 is not convenient, easy, or satisfied; 5 was marked as neutral; and 10 was labeled as very convenient, easy, or satisfied.

RESULTS

Thirty subjects completed the study. Participants’ average age (mean \pm standard deviation) was 27.2 ± 4.0 years (Range: 19-34). There were 10 male participants and 20 female participants. Thirty individuals reported they were not Hispanic or Latino. Participants identified their race, with 19 identifying as White, 7 as Asian, 4 as Black/African American.

Of the 60 eyes fit with the study lenses, 23 wore -0.75 cylinder power, 17 wore -1.25 cylinder power, 14 wore -1.75 cylinder power, and 6 wore -2.25 cylinder power. After being refit into optimized, habitual lenses, all participants affirmed positively that they remained satisfied with their habitual, planned replacement lenses and were refit into the daily disposable study lenses. Median values (interquartile range) for the initial impression VAS surveys of the study lenses were 85 (28) for quality of vision, 91 (25) for comfort, and 87(21) for satisfaction (n=30).

The overall impression VAS survey results, completed at the end of the study can be found in Table 1. Overall results [median(interquartile range)] were 93(16) for quality of vision, 88 (28) for stability of vision, and 91(20)for comfort. Median dryness levels were on the low side of the scale, with a median score of 20(45). End-of-day median scores were 82(27) for quality of vision, 90(35) for stability of vision, and 80 (38) for comfort. The median end-of-day dryness score was 39 (46). All values calculated for end-of-day surveys are reported in Table 2. The median CLDEQ-8 score was 10(7) after two weeks of wearing the study lenses.

The final impressions of the study lenses are reported in Table 3. On a scale of 0-10, the median responses to the survey questions about convenience and ease of use of the study lenses were 10

(2) and 10 (0), respectively. The median satisfaction rating with the study lenses was 9 (2). Visual acuity was measured at every visit. Vision while wearing the study daily disposable contact lenses in this study was measured with LogMAR ETDRS charts, and participants had exceptional vision monocularly and binocularly. Monocular visual acuity [median (IQR)] with the study lenses was -0.09 (0.20) in the right eye and -0.12 (0.10) in the left eye. The median binocular visual acuity of -0.16 (0.10) is equivalent to 20/12.5⁻² Snellen visual acuity.

Rotation of Lenses

Lens fit and rotation was assessed after lenses had settled on the eyes for at least 10 minutes. The median(IQR) rotation for all 60 eyes was 0.0(4.3) degrees. Of the 60 toric lenses evaluated for rotation at Visit 3, 40 eyes (67%) had zero rotation, 57 (95%) had rotation 5 degrees or less, and all 60 eyes (100%) had 10 degrees of rotation or less. A refit with a second lens was indicated if lens rotation or an over-refraction impacted vision. One eye of the 60 eyes fit with the lens and required a second toric lens to succeed. The low rotation and excellent stability of lens position are likely why all participants had visual acuity of 20/20 or better OU at Visit 3, with 29 of 30 participants having visual acuity better than 20/20. The stability of these lenses during the

TABLE 1 Overall Wear Experience Visual Analog Scale Results After Two Weeks of Wear With the Verofilcon A Study Lenses for Astigmatism.

(n=30)	Overall Quality of Vision	Overall Stability of Vision	Overall Comfort	Overall Dryness
Median	93	88	91	20
Interquartile Range	16	28	20	45

TABLE 2 End-of-Day Visual Analog Scale Results After Two Weeks of Wear With the Verofilcon A Study Lenses for Astigmatism.

(n=30)	End of Day Quality of Vision	End of Day Stability of Vision	End of Day Comfort	End of Day Dryness
Median	82	90	80	39
Interquartile Range	27	35	38	46

study is shown by the VAS ratings, with a median (IQR) score of 88 (28) for overall stability of vision and 90 (35) for end-of-day stability of vision.

Adverse Events

One adverse event occurred in the study. A participant had a hordeolum on the left upper eyelid upon arriving at Visit 3. The participant was instructed to treat the hordeolum with warm compresses and was given additional study lenses to wear after the resolution of hordeolum, with Visit 3 repeated after two weeks of study lens wear.

DISCUSSION

Fitting soft lens wearers with a lens with the health benefits of a daily disposable replacement regimen, high oxygen transmissibility, a lubricious surface, and a toric design that provides consistent and stable vision can benefit patients with astigmatism. In this study, existing wearers of a specific monthly soft toric contact lens were refit into a water surface daily disposable lens; their initial impressions of comfort, vision, and satisfaction, along with their overall and end-of-day experiences with lens comfort and vision, were assessed. Finally, participants' preference for and willingness to purchase daily disposable lenses was determined.

In this study, the daily disposable contact lenses for astigmatism provided exceptional visual acuity and excellent subjective measures of quality and stability of vision. According to the literature, a score of ≥ 12 on the CLDEQ-8 suggests patients experience frequent symptoms of dryness, whereas those scoring < 12 do not.²² After wearing the study lenses for 2 weeks, the median CLDEQ-8 score was less than 12, suggesting that dryness symptoms were not an issue for wearers with this lens. This is further substantiated by the participants' high scores on visual analog comfort scales and low scores on dryness.

The benefits of daily disposable silicone hydrogel contact lenses are well understood by eye care providers, even though they resist prescribing them

due to a perception of higher cost.²³ However, subjective vision and stability of vision have been shown as predictors of an individual's willingness to purchase contact lenses.²⁴ The current study's results showed excellent visual acuity measurements and subjective vision assessments. This, combined with the positive comfort, dryness, and convenience scores found in this study, suggest that verofilcon A lenses for astigmatism are an excellent option for eye care practitioners seeking a healthy lens alternative to reusable lenses for their patients with astigmatism. Further, the results showed that satisfied monthly comfilcon A toric contact lens wearers can be successfully refitted into verofilcon A daily disposable lenses for astigmatism and achieve an excellent wear experience.

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