

A material with permeation coefficients at 0.7×10^{-11} , 10×10^{-11} , 43×10^{-11} cm²/s and ice-like water contents at 6.4 ± 0.2 , 9.7 ± 0.6 and 9.3 ± 0.8 respectively. Free-water content plays an important role in SiHy functionality; a threshold of ~8% ice-like water was found to be critical for protein permeation. Size and charge of the protein influenced their movement through these complex biomaterial structures.

Conclusions: As contact lens technology has evolved the need to maintain a pre- and post-lens tear film that mimics the tear film has become the dominating goal. SiHys intrinsic micro and nanostructure leads to areas of low and high water content, consequently different phases with different hydrophilicities and sizes develop which can allow tear components to move at different rates through the polymer structure - demonstrated by the distinct protein permeation profiles observed in this study.

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Pupil diameter impact on mf fitting and performance

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Purpose: Pupil size is considered an important variable when fitting multifocal (MF) contact lenses. It has been shown that, with Alcon MF lenses, 98% of patients can be fit with two lenses or less per eye and that 80% can be fit with one lens per eye. The purpose of this study was to evaluate the association of pupil size and 1) the number of lenses required for fitting and 2) visual performance.

Method: Presbyopes ($n=84$) successfully wearing a variety of soft MF lens designs were refitted with Alcon MF lenses, in lotrafilcon B, nelfilcon A, and delefilcon A materials. Pupil size was measured under photopic, intermediate, and mesopic lighting using ORC Eye-Dentify pupil card. The number of lenses required for the initial fitting were recorded. Following a successful fitting logMAR acuity and subjective visual quality (1–10 scale) were measured at 40 cm, 80 cm and 4m. Paired comparisons and linear correlation analyses assessed relationship between pupil size (right eye only) and clinical measures.

Results: Mean (SD) photopic, intermediate and mesopic pupil sizes were 3.6 (0.84), 4.5 (1.06), and 5.4 (1.22)mm, with an overall range of 2.0–8.0 mm. There was no significant difference in the number of lenses required over the photopic pupil size range on the initial fit (mean = 1.36 lenses, $p > 0.05$). Photopic Pearson linear correlation coefficient (near, intermediate, distance respectively) with VA was $r=0.20$, $r=0.046$, $r=0.048$ and for subjective vision was $r=-0.004$, $r=-0.069$, $r=-0.002$ ($p > 0.05$ in all instances). Mesopic Pearson linear correlation coefficient for VA was $r=0.14$, $r=0.03$, $r=0.099$ and for subjective vision was $r=-0.098$, $r=-0.18$, $r=-0.14$ ($p > 0.05$ in all instances).

Conclusions: Alcon MF contact lenses are pupil size independent and work successfully across a wide range of pupil sizes. Pupil diameter was not related to the number of lenses required for a successful fit and was not associated with subjective and objective visual outcomes.

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Quantification of accommodative response and visual performance in non-presbyopes wearing low-add contact lenses

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Purpose: Digital eye strain encompasses a range of ocular and visual symptoms across all age groups. Recently, symptoms associ-

ated with accommodative or binocular vision stress has become a major problem especially in young individuals. The purpose of this prospective, single-blinded study was to objectively quantify the accommodation response and visual performance of low-add soft contact lenses (CLs) in young non-presbyopic individuals.

Method: Tested lens was a daily disposable low-add bifocal design lens (low-add CL), which employed a centre-distance optical zone and peripheral zone with the addition power of +0.50 D to support near vision. Sixteen subjects aged 20–39 years were enrolled in the study. Refractive state and accommodation (static and dynamic) were measured using an open-field autorefractor with three target vergences, namely, -0.20 D, -2.5 D, and -4.0 D. Binocular high (100%) and low contrast sensitivity (40%, 20%) and reading ability were assessed. Monofocal soft CLs were used as controls.

Results: Accommodative response with low-add CLs was significantly smaller than those with two monofocal CL wearing conditions, i.e., at 40 cm (2.5 D of stimulus) and 25 cm (4.0 D of stimulus) (all $p < 0.05$). The 20% contrast sensitivity at distance was significantly better with low-add CLs and second-time monofocal CLs, compared with first-time monofocal CLs (all $p < 0.05$). The reading ability was not significantly different.

Conclusions: Quantification of accommodative response and visual performance demonstrated that using low-add CLs alleviated the accommodation under the near-vision condition, without sacrificing distance vision, in non-presbyopes.

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Randomised double-masked trial of the cumulative treatment profile of intense regulated pulsed light therapy for meibomian gland dysfunction

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Purpose: To assess the long-term cumulative treatment effects of intense regulated pulsed light (IRPL) therapy in patients with meibomian gland dysfunction (MGD).

Method: Eighty-seven participants (58 females, 29 males; mean \pm SD age, 53 ± 15 years) with clinical signs of MGD were enrolled in a prospective, double-masked, parallel-group, randomised controlled trial. Participants were randomised to three treatment groups, and underwent IRPL (E-Eye, E-Swin, France) therapy with four or five homogeneously sequenced light pulses or placebo treatment to the eyes. Visual acuity, ocular surface characteristics, and tear film parameters were assessed immediately before treatment on days 0, 15, 45, 75, and one-month following the completion of the treatment course on day 105. Expression of markers of ocular surface inflammation and goblet cell function, and eyelid swab microbiology cultures were evaluated at baseline and day 105.

Results: Baseline measurements did not differ between groups (all $p > 0.05$). Significant decreases in OSDI, SPEED, and SANDE symptomology scores, and meibomian gland capping, accompanied by augmentation of tear film lipid layer thickness, and inhibition of *Corynebacterium macginleyi* growth were observed in both treatment groups (all $p < 0.05$). Sustained clinical improvements were observed in the two treatment groups from day 75 onwards, although significant changes in lipid layer quality, meibomian gland capping, OSDI and SANDE symptomology were limited to the five-flash IPL group on day 45 (all $p < 0.05$).

Conclusions: IPL therapy effected significant improvements in dry eye symptomology, tear film lipid layer thickness, and meibomian gland capping in MGD patients. The findings also demonstrated superior clinical efficacy of five-flash than four-flash