

Presentation Time: 3:45 PM–5:30 PM

Feasibility Testing of a Novel Soft Contact Lens Optical Design to Reduce Suspected Risk Factors for the Progression of Juvenile Onset Myopia

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Purpose: The global rise in prevalence and severity of myopia is well documented. Incorporating therapeutic optical designs into the vision correction for myopia is an exceptionally cost-effective approach to retard myopia progression (MP). This study tests the feasibility of a novel optical design in soft contact lenses (SCLs).

Methods: Thirty-two children 10 to 16 yrs. (median 13.5) were enrolled in a double-masked, bilateral crossover study testing Control (C) vs. Test (T) SCLs for one month each. The lenses were lathe-cut, polymacon 38%, 8.3mm basecurve and 14.5 mm diameter. C lenses had a spherical power profile, while T lenses had a continuously increasing positive power starting from the center and extending into the periphery of the optical zone (US Patents 6474814 and 7178918).

Contact lens examinations were conducted at dispensing, 1 and 4 wks. The outcome measures were distance and near high contrast visual acuity (VA), Pediatric Refractive Error Profile (PREP) quality of life score, MNREAD test scores, amplitude (near point push-up, AofA) and lag (dynamic retinoscopy, LofA) of accommodation, and peripheral auto-refraction (Grand Seiko WAM-5500, PR).

Results: Thirty-one subjects completed the study. Statistically significant reductions in VAs were found for the T relative to the C (ANOVA all $p < 0.05$); however, the differences were all less than 2 letters (< 0.04 logMAR). The overall PREP score was statistically higher with the C (79.3 vs. 78.3; ANOVA $p = 0.028$), but less than the clinically significant PREP difference of 7 units. There were no significant differences between lens types on MNREAD (C vs. T = 198 vs. 199 words / min, -0.17 vs. -0.18 reading acuity and -0.02 vs. -0.05 logMAR critical print size), and AofA (C = 15.9D, T = 15.4D).

The T lens showed significantly smaller LofA (0.33D) than C (0.44D) (ANOVA $p < 0.001$). There were no significant differences between lens types for PR.

Conclusions: The optical design tested in this study reduces accommodative lag, a suspected risk factor for myopia progression while having minimal effect on VA, PREP score quality of life and MNREAD scores in children of the age that myopia progresses quickly. Further studies are warranted to test this optical design in an interventional study as an inhibitor against the progression of juvenile-onset myopia.

Commercial Relationships: Rick E. Payor, Visioneering Technologies Inc. (C); Jill Woods, Visioneering Technologies Inc. (F); Desmond Fonn, Visioneering Technologies Inc. (F); Ping Situ, Visioneering Technologies Inc. (F); Sally M. Dillehay, Visioneering Technologies Inc. (E), Visioneering Technologies Inc.

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