8:00 AM Room 225-AB
P-15 **Papers: Myopia**
Moderator: Jeffrey J. Walline, OD, PhD, FAAO

8:00 AM. **AXIAL ELONGATION WITH CORNEAL RESHAPING, SOFT BIFOCAL, AND SPHERICAL CONTACT LENS WEAR** (120062)
Jeffrey J. Walline, OD, PhD, FAAO, Lisa Jones-Jordan, PhD, FAAO, The Ohio State University College of Optometry

RESULTS: The average ± SD cycloplegic spherical equivalent autorefraction at baseline was -2.35 ± 0.89 D for corneal reshaping, -2.23 ± 1.01 D for soft bifocal, and -2.27 ± 0.84 D for spherical contact lens wearers (ANOVA, p = 0.89). The average ± SD axial elongation was 0.22 ± 0.29 mm for corneal reshaping, 0.29 ± 0.18 mm for soft bifocal, and 0.59 ± 0.36 mm for spherical contact lens wearers (ANOVA, p < 0.001). Post hoc analysis indicates greater growth for spherical than corneal reshaping contact lens wearers (Fisher's LSD, p < 0.001), spherical than soft bifocal contact lens wearers (Fisher's LSD, p < 0.001), but similar growth between corneal reshaping and soft bifocal contact lens wearers (Fisher's LSD, p = 0.33).
PURPOSE: Corneal reshaping and soft bifocal contact lenses have both been shown to slow myopic eye growth, but a comparison of the two modalities has not been reported. The purpose is to compare axial elongation between corneal reshaping, soft bifocal, and spherical contact lens wearers.
METHODS: Eight to 11 year old subjects were fit with corneal reshaping (Corneal Refractive Therapy, Paragon Vision Sciences, Mesa, AZ), soft bifocal (Proclear Multifocal "D" with +2.00 D add, CooperVision, Fairport, NY), or spherical (Proclear, CooperVision, Fairport, NY) contact lenses and followed for two years. Ten baseline cycloplegic spherical equivalent autorefraction readings were averaged. Five a-scan ultrasound measures were averaged at baseline and after two years. Analysis of variance was used to compare means between contact lens modalities, and Fisher's LSD was used to adjust for multiple post hoc comparisons.
CONCLUSIONS: Corneal reshaping and soft bifocal contact lenses significantly slow myopic eye growth compared to spherical contact lens wear, but there is no difference in the rate of growth between corneal reshaping and soft bifocal contact lens wearers.
ADDITIONAL COMMENTS: Supported by J&J Vision Care, CooperVision, and Alcon.

8:15 AM. **PERIPHERAL DEFOCUS AND MYOPIA PROGRESSION IN CHILDREN WEARING SINGLE VISION AND PROGRESSIVE ADDITION SPECTACLE LENSES** (120220)
David A. Berntsen, OD, PhD, FAAO, Christopher Barr, PhD, University of Houston College of Optometry, Donald O. Mutti, OD, PhD, FAAO, Karla Zadnik, OD, PhD, FAAO, The Ohio State University College of Optometry

RESULTS: The baseline mean (±SD) age and spherical equivalent refractive error were 9.9 ± 1.3 years and -1.96 ± 0.78 D, respectively. We previously found that PALs resulted

in a one-year reduction in myopia progression of 0.18 D ($p = 0.01$). Baseline peripheral defocus in the nasal, temporal, and inferior retina was not associated with the one-year change in myopia (all $p > 0.13$). Peripheral myopic defocus measured 30° in the superior retina was associated with less foveal myopia progression ($\beta = 0.07$ D less progression per D of myopic peripheral defocus; $p = 0.02$).
PURPOSE: Progressive addition lenses (PALs) result in a modest reduction in juvenile-onset myopia progression compared to single vision lenses (SVLs). Here we investigate the association between peripheral defocus (while wearing PALs or SVLs) and foveal myopia progression in children.
METHODS: Children were randomly assigned to wear SVLs (n = 43) or PALs with a +2.00-D add (n = 41). The one-year change in cycloplegic spherical equivalent refractive error was measured (OD) by autorefraction. Ocular aberrometry was performed 30° nasally, temporally, and superiorly and 20° inferiorly on the retina and combined with corresponding spectacle measurements to specify the peripheral defocus when wearing spectacles. Multivariate linear models were used to assess the association between peripheral defocus and foveal myopia progression.
CONCLUSIONS: More myopic (less hyperopic) peripheral defocus in the superior retina, corresponding to the location where PALs have the greatest influence on peripheral defocus, was associated with less foveal myopia progression. This finding supports investigating optical interventions that induce a myopic shift 360° in the periphery to determine whether such an intervention results in a greater reduction in myopia progression than PALs.
ADDITIONAL COMMENTS: Support: NIH/NEI grant K12-EY015447, Essilor of America Inc., and an AOF Presidents Circle Ezell Fellowship (to DAB); Clinicaltrials.gov: NCT00335049

8:30 AM. **MYOPIA CONTROL WITH ORTHOKERATOLOGY CONTACT LENSES IN SPAIN (MCOS): PREDICTIVE FACTORS ASSOCIATED WITH MYOPIA PROGRESSION** (120571)
Jacinto Santodomingo-Rubido, OD(EC), PhD, FAAO, Menicon Co. Ltd., Cesar Villa Collar, OD(EC), PhD, FAAO, Ramon Gutierrez-Ortega, MD, PhD, Clinica Oftalmológica Novovision, Bernard Gilmartin, PhD, FAAO, Aston University

RESULTS: In the OK group, children of younger age ($\beta=-0.606$, $p<0.001$), longer axial length ($\beta=0.234$, $p=0.006$), prolate corneal shape ($\beta=-0.027$, $p<0.001$), later onset of myopia ($\beta=0.363$, $p=0.003$), greater myopia progression at baseline ($\beta=-0.230$, $p=0.014$), smaller pupil diameters ($\beta=-0.332$, $p=0.002$) and larger iris diameters ($\beta=0.125$, $p=0.053$) exhibited greater increases in axial length ($R2=0.99$; $p<0.001$). In the SV group, children of greater corneal power ($\beta=2.352$, $p=0.001$) and earlier onset of myopia ($\beta=1.5$, $p=0.002$) exhibited greater increases in axial length ($R2=0.99$; $p=0.001$)
PURPOSE: To examine the degree to which baseline measurements constitute predictive factors for axial length growth over 2-years in children wearing orthokeratology contact lenses (OK) and single-vision spectacles (SV)
METHODS: Sixty-one children (ages 6-12 years) with myopia between -0.75 to -4.00D and astigmatism ≤1.00DC were prospectively assigned to wear either orthokeratology contact lenses (n=31) and single-vision spectacles (n=30) for 2-years. The change in axial

length relative to baseline was taken as the outcome variable. Variables assessed as predictive factors for myopia progression included: age, mean spherical equivalent refraction, iris and pupil diameters, axial length, anterior chamber depth, corneal power and shape (p-value), age of myopia onset, parents? mean spherical equivalent refractions and amount of myopia progression prior to the beginning of the study. The contribution of the baseline variables to the 2-year change in axial length was assessed using multivariate regression analysis.
CONCLUSIONS: Children of older age, shorter axial lengths, oblate corneal shapes, earlier onset of myopia, lower myopia progression at baseline, larger pupil and smaller iris diameters are more likely to benefit from orthokeratology lens wear for myopia progression control

8:45 AM. **CAN MANIPULATION OF ORTHOKERATOLOGY LENS PARAMETERS CHANGE THE PERIPHERAL REFRACTION PROFILE?** (120992)

Pauline Kang, BOptom, PhD, Paul Gifford, OD, FAAO, Helen A. Swarbrick, PhD, FAAO, University of New South Wales, School of Optometry and Vision Science

RESULTS: No significant difference in peripheral refraction profiles was seen after 14 days overnight wear of a 6mm or 5mm OZD ($p=0.307$) or between a 1/4 and 1/2 tangent OK lens ($p=0.485$). Furthermore, no significant differences(all $p>0.05$) in corneal shape change as defined by primary (Z12) and secondary (Z24) spherical aberration or coma RMS were found.
PURPOSE: To determine if changes in orthokeratology (OK) lens parameters can alter the peripheral refraction profile, as a means to individualize the influence of peripheral refraction on myopic progression
METHODS: Both eyes of 17 adult myopic subjects were fitted with standard BE OK lenses (Capricornia Contact Lens) which were worn overnight for 2 weeks. Peripheral refraction (Shin-Nippon autorefractor) along the horizontal meridian and corneal topography (Medmont E300) were taken at baseline and after 1,4,7 and 14 nights of OK lens wear. After a 2 week washout period, one eye from each subject was randomly chosen and refitted with an OK lens with a smaller OZD (5mm) and the other eye was fitted with a steeper peripheral curve (1/2 tangent). Measurements were taken again at baseline and after 1,4,7 and 14 days of overnight wear of the second OK lens set. Doubly MANOVA was used to assess changes in peripheral refraction profiles between the two sets of OK lenses. Paired t-tests on Zernike polynomials derived from corneal topography elevation data across a 6mm diameter were used to identify differences in corneal shape changes between overnight wear of OK lenses with standard and modified OZD and peripheral tangent.
CONCLUSIONS: OK lens wear caused significant changes in peripheral refraction and corneal topography. Changing OZD from 6mm to 5mm or peripheral tangent from 1/4 to 1/2 did not cause any significant changes in peripheral refraction profiles or corneal shape. It appears that manipulation of OZD or peripheral tangent of OK lenses does not provide a feasible approach to individualize the peripheral refraction profile in OK lens wearers.

ADDITIONAL COMMENTS: Funded through the Australian Research Council Linkage Project Scheme