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Paper Abstracts

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Five-year myopia management efficacy of extended depth of focus soft contact lenses in white children with progressing myopia

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Purpose: To evaluate the progression of myopia as assessed by change in axial length (AL) and spherical equivalent (SE) from baseline in white children with progressing myopia (>0.75D progression in the last year) wearing extended depth of focus soft contact lenses (EDOF-CL) compared to distance single-vision spectacles over a 5-year period.

Method: Longitudinal prospective non-randomized clinical trial. A total of 47 myopic progressor children (10.9 ± 1.2 years) were fitted with EDOF-CL (mark'ennovy, Spain), whereas 51 wore spectacles. Cycloplegic refraction was measured with an auto-refractometer (Topcon TRK-2P, Japan) and AL with a biometer (IOLMaster-700, Zeiss, Germany) at 6-month intervals. High-contrast visual acuity (HCVA) was assessed at 12-month intervals.

Due to 41 wearers in the control group dropping out (3 in EDOF-CL group), a two-stage supervised approach modelled SE and AL progression in the control group with high dropout. First, a linear mixed-effects model predicted longitudinal trends. Then, LightGBM with Huber loss refined residuals to capture non-linear patterns and improve imputation accuracy.

Comparisons of AL, SE, and HCVA values between spectacles and CL groups were performed with ANOVA General Lineal Model test with Statgraphics Centurion 18 software ($\alpha=0.05$).

Results: At the 5th year, predicted mean change in SE/AL in the spectacles group was -2.41 ± 0.10 D/ 1.46 ± 0.24 mm and measured -1.50 ± 0.41 D/ 0.85 ± 0.06 mm in the EDOF-CL group ($p<0.001$). Cumulative absolute reduction in axial elongation (CARE) was 0.61mm and SE difference -0.91 D (0.02mm and 0.09D differences from control measured results, respectively).

A HCVA mean reduction <1 line (0.07 logMAR) was found in the EDOF-CL group compared with the spectacles group, being statistically but not clinically significant ($p<0.001$).

Conclusions: EDOF-CL wear reduced myopia progression, assessed as axial elongation and spherical equivalent, compared to distance single-vision spectacles after 5 years of follow-up.

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