• Clinical Research •

Effects of orthokeratology lens wear on myopia progression and axial elongation in children: a 1:1 age-matched retrospective study

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Abstract

● **AIM:** To evaluate the effects of orthokeratology lens wear on myopia progression and axial elongation in children using a 1:1 age-matched design and to compare outcomes according to lens type.

● **METHODS:** This retrospective study included 1854 children (3708 eyes) who wore orthokeratology lenses between April 2019 and January 2026 and 1854 age-matched controls (3708 eyes) who did not receive myopia-control treatment at a single institution. Controls were matched 1:1 by age within ±1mo. Spherical equivalent (SE) and axial length (AL) were measured at 6-month intervals for up to 36mo. Annual rates of change were estimated using linear mixed-effects models, excluding baseline for SE and including baseline for AL.

● **RESULTS:** The mean age at baseline was 9.4±1.83y in the orthokeratology group and 9.4±1.79y in the control group (*P*=0.965). The proportion of girls was significantly higher in the orthokeratology group than in the control group (55.9% *vs* 51.5%, *P*=0.008). At baseline, the orthokeratology group had greater myopia than controls (*P*<0.001). However, from 6 to 36mo, myopia was significantly less in the orthokeratology group. The annual SE progression rate was -0.30 D/y in the right eye and -0.28 D/y in the left eye, significantly slower than in controls (-0.44 and -0.41 D/y; *P*<0.001). Annual axial elongation was 0.23 and 0.21 mm/y in the orthokeratology group and 0.21 and 0.21 mm/y in controls, without significant differences, although AL was longer in controls at 36mo (*P*<0.05). SE progression did not differ between two lens types (Premier and CRT groups), whereas axial elongation was slower in the Premier group, although interpretation is limited by the smaller CRT sample size and missing AL data.

● **CONCLUSION:** Orthokeratology is associated with slower myopia progression in children compared with age-matched controls. However, its effect on axial elongation is less consistent with no significant difference in the rate of axial elongation. No clear difference is observed in myopia control efficacy between lens types.

● **KEYWORDS:** orthokeratology; myopia; progression; axial length; elongation

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INTRODUCTION

Myopia usually progresses throughout childhood and adolescence and is closely associated with axial elongation. Progression to high myopia increases the risk of vision-threatening complications, including retinal detachment, myopic maculopathy, and glaucoma[1-3]. Therefore, effective interventions to slow myopia progression are of substantial clinical importance[4-6].

Orthokeratology lenses are widely used for myopia control because they temporarily reshape the cornea, reduce central refractive power, and induce peripheral myopic defocus[7-11]. Previous studies have shown that orthokeratology can slow myopia progression and reduce axial elongation compared with conventional spectacle correction or standard contact lens wear[12-14]. However, in real-world clinical settings, treatment outcomes may vary according to lens design, patient characteristics, and follow-up duration[15-17]. In particular, because the rates of myopia progression and axial elongation vary with age[18-19], differences in age distribution, baseline refractive status, axial length (AL), and visit intervals may affect the interpretation of treatment efficacy[20].

To compare the effectiveness of orthokeratology in a large

patient population, a retrospective study design that allows evaluation during the period of active lens wear without discontinuation during the critical years of ocular growth is required. Such an approach enables the inclusion of real-world clinical data across a broad spectrum of patients and provides insight into treatment outcomes under routine practice conditions. However, retrospective designs are inherently subject to selection bias and unmeasured confounding, particularly when comparing treated and untreated groups in real-world settings.

Because myopia progression is strongly age-dependent, with younger children showing faster refractive progression and axial elongation, age matching was considered the most appropriate strategy for minimizing bias in this retrospective comparison[21-25]. Orthokeratology is more commonly applied in children with moderate to higher degrees of myopia and has been shown to demonstrate greater efficacy in these groups[16]. Accordingly, children receiving orthokeratology tend to present with more myopic baseline refractive error compared with untreated controls. Therefore, matching for baseline refractive error would have introduced imbalance in age distribution between groups and potentially distorted comparisons of longitudinal progression.

The present study was designed to compare longitudinal changes in spherical equivalent (SE) and AL between an orthokeratology group and a control group using 1:1 age matching, with the primary outcome defined as the annual rate of change in SE and the secondary outcome as axial elongation. Other variables were not controlled because of the retrospective study design. In addition, we sought to evaluate whether treatment outcomes differed according to the type of orthokeratology lens prescribed.

We hypothesized that orthokeratology would reduce the rate of myopia progression and axial elongation compared with untreated controls. In addition, we hypothesized that treatment outcomes may differ according to orthokeratology lens design and material, given the potential influence of these factors on corneal reshaping and peripheral defocus.

PARTICIPANTS AND METHODS

Ethical Approval This study adhered to the tenets of the Declaration of Helsinki and was approved by the institutional review board of the designated public institutional bioethics committee of the Ministry of Health and Welfare (IRB No. P01-202603-01-036).

Study Design and Participants This retrospective study reviewed the medical records of patients diagnosed with myopia at a single institution between April 2019 and January 2026. The orthokeratology group comprised participants who were prescribed and wore orthokeratology lenses during the study period. The control group comprised participants who were followed during the same period for myopia progression but did not receive myopia-control treatment, including atropine eye drops, contact lenses, or optical interventions intended to slow myopia progression.

Patients who initiated bilateral orthokeratology lens wear during the study period and continued treatment for at least 6mo were eligible for inclusion. Patients were excluded if they wore orthokeratology lenses unilaterally, discontinued lens wear within 6mo, underwent concurrent myopia control treatment, or had ocular disease or prior ocular surgery that could affect refractive or AL measurements. Subjects were included if at least two longitudinal measurements of SE or AL were available during the study period. For the SE analysis, patients were required to have at least two SE measurements, including baseline, obtained at approximately 6-month intervals during lens wear. For the AL analysis, patients were required to have at least two AL measurements obtained at approximately 6-month intervals to enable assessment of longitudinal change. Because the outcome of interest was the rate of axial elongation rather than absolute AL at baseline, patients without baseline AL measurements were included if sufficient follow-up data were available. All patients in the orthokeratology group who met the inclusion criteria during the study period were consecutively included. For the control group, myopic patients identified during the same study period were randomly selected and subsequently matched for age. Control patients were selected by one-to-one matching according to the age at initiation of orthokeratology lens wear in the treatment group. The time point at which age matching was performed was defined as baseline.

Age Matching To minimize the influence of age-related differences in myopia progression and axial elongation, 1:1 matching was performed using the nearest-neighbor method based on age in months at baseline, with a matching tolerance of ±1mo. Age was selected as the primary matching variable because myopia progression is strongly age dependent. Matching for baseline refractive error was not performed because patients receiving orthokeratology in routine clinical practice often present with more myopic refractive error than untreated controls of the same age.

Data Collection At each visit (baseline and 6, 12, 18, 24, 30, and 36mo), SE was measured using an autorefractor (Topcon KR-800, Topcon, Japan), and AL was measured using the IOLMaster 500 (Carl Zeiss Meditec, Jena, Germany). In the orthokeratology group, the lens type worn by each patient was recorded. For subgroup analysis according to lens type, patients were reclassified into the 2 most commonly prescribed orthokeratology lens groups.

Statistical Analysis Statistical analyses were performed using SPSS version 20.0 (IBM Corp, Armonk, NY, USA). Continuous

Table 1 Baseline demographic and ocular characteristics of the orthokeratology and control groups

Parameters	Orthokeratology (*n*=1854)	Control (*n*=1854)	*P*
Age, y	9.4±1.83 (range 4–17)	9.4±1.79 (range 4–17)	0.965[a]
Male/female, *n* (%)	817 (44.1)/1037 (55.9)	899 (48.5)/955 (51.5)	0.008[b]
Spherical equivalent, D			
Right eye	-2.01±1.38 (*n*=1854)	-1.57±1.93 (*n*=1854)	<0.001[a]
Left eye	-2.06±1.40 (*n*=1854)	-1.56±1.93 (*n*=1854)	<0.001[a]
Axial length, mm			
Right eye	24.46±0.85 (*n*=463)	24.34±1.00 (*n*=142)	0.186[a]
Left eye	24.47±0.83 (*n*=463)	24.35±1.01 (*n*=142)	0.174[a]

Data are presented as mean±standard deviation except for sex, which is presented as *n* (%). [a]Student's *t*-test; [b]Chi-square test.

variables are presented as mean±standard deviation, and categorical variables as number and percentage. Baseline characteristics were compared using the independent-samples *t*-test and Chi-square test, as appropriate. Between-group comparisons of SE and AL at each time point were performed using the independent samples *t*-test for descriptive purposes. The primary analysis of longitudinal changes in SE and AL was conducted using linear mixed-effects models. In these models, time (months), group (orthokeratology *vs* control), and the interaction between time and group were included as fixed effects. Baseline SE was additionally included as a covariate in both the SE and AL models to account for baseline refractive imbalance between groups. Patient identification number was included as a random intercept to account for within-subject correlation across repeated measurements. No additional covariance structure for repeated measures was specified beyond the random intercept. For SE, baseline measurements were excluded and the analysis was restricted to follow-up data from 6 to 36mo. For AL, baseline measurements were included and longitudinal changes were analyzed from baseline to 36mo. All analyses were performed separately for right and left eyes to avoid potential bias related to inter-eye correlation. A *P* value <0.05 was considered statistically significant.

RESULTS

A total of 1854 participants (3708 eyes) in the orthokeratology group and 1854 age-matched participants (3708 eyes) in the control group were included in the analysis. The mean age at baseline was 9.4±1.83y in the orthokeratology group and 9.4±1.79y in the control group (*P*=0.965). The proportion of girls was significantly higher in the orthokeratology group than in the control group (*P*=0.008). At baseline, SE was significantly more myopic in the orthokeratology group than in the control group in both eyes (Table 1). By contrast, baseline AL did not differ significantly between groups (Table 1).

Among the orthokeratology lenses prescribed, Premier (Lucid Korea Co., Ltd., Seoul, Republic of Korea) was the most frequently used lens type, accounting for 1055 patients (2022 eyes), followed by Premier Toric in 532 patients (976 eyes). Paragon CRT (CooperVision Specialty EyeCare, Inc., Gilbert, AZ, USA) was used in 253 patients (489 eyes), and Paragon CRT Toric in 74 patients (131 eyes). CH2 (Lucid Korea Co., Ltd.) and CH (Lucid Korea Co., Ltd.) lenses were used in 44 patients (88 eyes) and 1 patient (2 eyes), respectively.

Despite having greater baseline myopia, the orthokeratology group showed significantly less myopia than the control group from the 6-month visit onward, and this difference persisted through the 36-month follow-up (Figure 1). In the linear mixed-effects model excluding baseline measurements, the annual rate of SE progression from 6 to 36mo was significantly slower in the orthokeratology group than in the control group in both eyes: right eye, -0.30 D/y [95% confidence interval (CI), -0.33 to -0.27] *vs* -0.44 D/y (95%CI, -0.48 to -0.40), *P*<0.001; left eye, -0.28 D/y (95%CI, -0.31 to -0.25) *vs* -0.41 D/y (95%CI, -0.45 to -0.37), *P*<0.001.

At baseline, AL tended to be slightly longer in the orthokeratology group, although the difference was not statistically significant. From 6 to 24mo, AL was generally comparable between the 2 groups. At the final 36-month follow-up, however, AL was significantly longer in the control group than in the orthokeratology group in both eyes (right eye, 25.32 *vs* 24.92 mm, *P*=0.011; left eye, 25.24 *vs* 24.91 mm, *P*=0.038; Figure 2). In the linear mixed-effects model including baseline measurements, the annual rate of axial elongation did not differ significantly between the orthokeratology and control groups [right eye, 0.23 mm/y (95%CI, 0.22 to 0.23) *vs* 0.21 mm/y (95%CI, 0.19 to 0.23), *P*=0.273; left eye, 0.21 mm/y (95%CI, 0.20 to 0.22) *vs* 0.21 mm/y (95%CI, 0.18 to 0.23), *P*=0.526].

For subgroup analysis according to lens type, 1499 patients who wore Premier or Premier Toric lenses were classified as the Premier group, and 310 patients who wore CRT or CRT Toric lenses were classified as the CRT group. The number of patients using CH and CH2 lenses was small (*n*=1 and *n*=44, respectively), and therefore these groups were not included in the inter-lens comparison. At baseline, SE tended to be more myopic in the Premier group than in the CRT group,

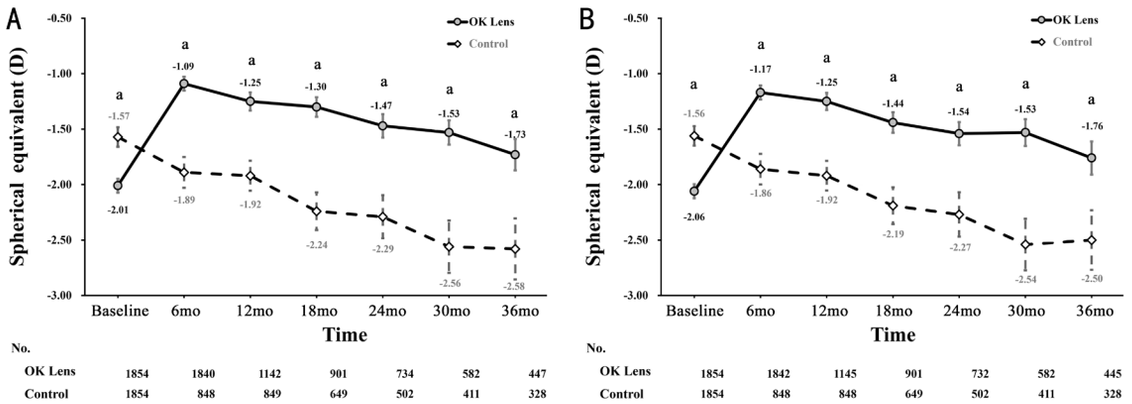


Figure 1 Time-dependent changes in spherical equivalent in the orthokeratology and control groups for the right (A) and left (B) eyes Data are presented as mean±95% confidence interval. More negative values indicate greater myopia. Measurements were obtained during continued orthokeratology lens wear without a washout period. [a]Statistically significant differences between groups at each time point based on independent-samples *t*-tests. Numbers below the graphs denote the number of eyes included at each follow-up visit.

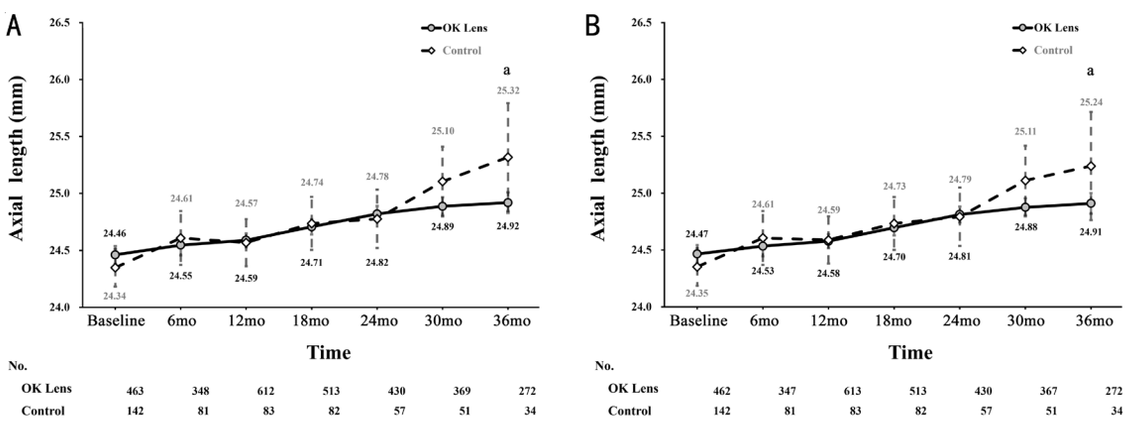


Figure 2 Time-dependent changes in axial length in the orthokeratology and control groups for the right (A) and left (B) eyes Data are presented as mean±95% confidence interval. [a]Statistically significant between-group differences at each time point based on independent-samples *t*-tests. Numbers below the graphs denote the number of eyes included at each follow-up visit.

Table 2 Baseline demographic and ocular characteristics of the Premier and CRT groups

Parameters	Premier (*n*=1499)	CRT (*n*=310)	*P*
Age, y	9.2±2.09	9.3±2.13	0.866[a]
Male/female, *n* (%)	660 (44.0)/839 (56.0)	138 (44.5)/172 (55.5)	0.900[b]
Spherical equivalent, D			
Right eye	-2.04±1.41	-1.88±1.19	0.060[a]
Left eye	-2.10±1.43	-1.93±1.22	0.048[a]
Axial length, mm			
Right eye	24.47±0.84 (*n*=340)	24.45±0.88 (*n*=119)	0.777[a]
Left eye	24.47±0.82 (*n*=340)	24.45±0.85 (*n*=119)	0.814[a]

Data are presented as mean±standard deviation except for sex, which is presented as *n* (%). [a]Student's *t*-test; [b]Chi-square test. Premier: Premier lens (Lucid Korea Co., Ltd., Seoul, Republic of Korea); CRT: Paragon CRT lens (CooperVision Specialty EyeCare, Inc., Gilbert, AZ, USA).

with statistical significance observed only in the left eye (right eye, *P*=0.060; left eye, *P*=0.048). Baseline AL did not differ significantly between the 2 groups (Table 2).

During follow-up, no significant between-group differences in SE were observed at any time point from 6 to 36mo (Figure 3). Consistently, in the linear mixed-effects model excluding baseline measurements, the annual rate of SE change did not differ significantly between the Premier and CRT groups in either eye [right eye, -0.29 D/y (95%CI, -0.32 to -0.26) *vs* -0.33 D/y (95%CI, -0.38 to -0.27), *P*=0.387; left eye, -0.28 D/y (95%CI, -0.31 to -0.25) *vs* -0.30 D/y (95%CI, -0.35 to -0.26), *P*=0.662].

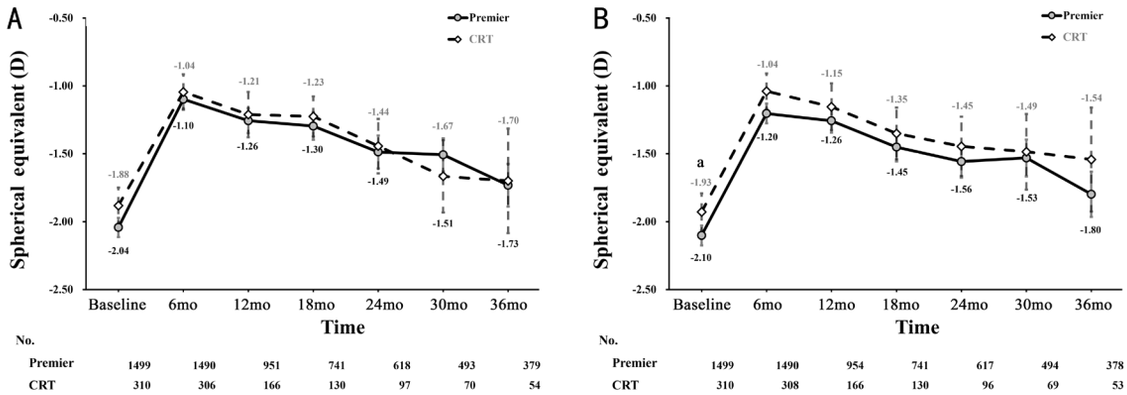


Figure 3 Time-dependent changes in spherical equivalent in the Premier and CRT groups for the right (A) and left (B) eyes Data are presented as mean±95% confidence interval. [a]Statistically significant differences between groups at each time point by Student's *t*-test. Numbers below the graphs denote the number of eyes included at each follow-up visit. Premier: Premier lens (Lucid Korea Co., Ltd., Seoul, Republic of Korea); CRT: Paragon CRT lens (CooperVision Specialty EyeCare, Inc., Gilbert, AZ, USA).

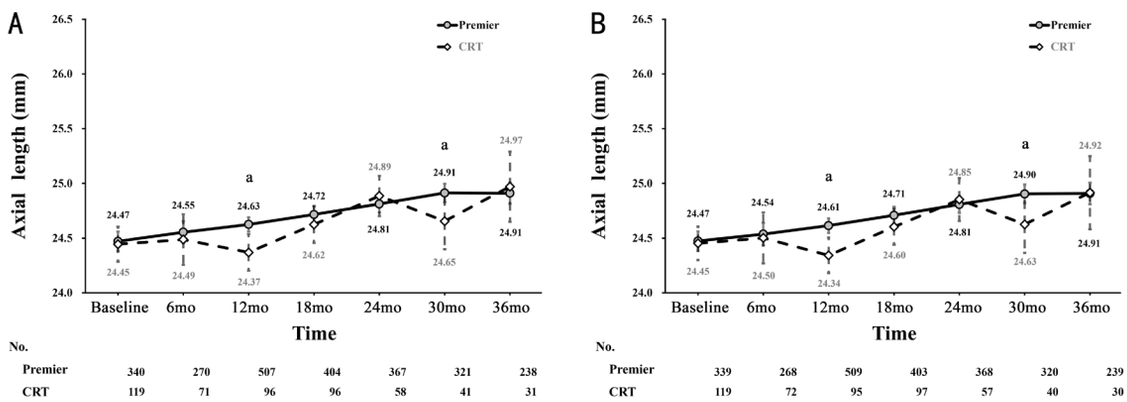


Figure 4 Time-dependent changes in axial length in the Premier and CRT groups for the right (A) and left (B) eyes Data are presented as mean±95% confidence interval. [a]Statistically significant differences between groups at each time point by Student's *t*-test. Numbers below the graphs denote the number of eyes included at each follow-up visit. Premier: Premier lens (Lucid Korea Co., Ltd., Seoul, Republic of Korea); CRT: Paragon CRT lens (CooperVision Specialty EyeCare, Inc., Gilbert, AZ, USA).

For AL, no significant difference was observed between the Premier and CRT groups at most follow-up visits, except at 12 and 30mo (Figure 4). However, in the linear mixed-effects model including baseline measurements, the annual rate of axial elongation was significantly slower in the Premier group than in the CRT group in both eyes [right eye, 0.22 mm/y (95%CI, 0.21 to 0.23) *vs* 0.25 mm/y (95%CI, 0.23 to 0.28), *P*=0.002; left eye, 0.21 mm/y (95%CI, 0.20 to 0.22) *vs* 0.24 mm/y (95%CI, 0.22 to 0.27), *P*=0.019].

DISCUSSION

In this age-matched retrospective study, orthokeratology lens wear was associated with significantly slower myopia progression than that observed in untreated controls over a 3-year follow-up period. Although the orthokeratology group had greater baseline myopia, the degree of myopia became significantly lower than that of the control group from 6mo onward and remained so throughout follow-up. Moreover, the annual rate of SE progression was significantly slower in the orthokeratology group in both eyes.

These findings are broadly consistent with previous studies showing that orthokeratology is effective in slowing myopia progression in children. In the present study, the annual rate of SE change in the orthokeratology group was -0.30 D/y in the right eye and -0.28 D/y in the left eye. These values appear slightly greater than the -0.21 D/y reported in a previous study of children who wore orthokeratology lenses for more than 5y[26]. However, such differences may be attributable to differences in sample size, baseline refractive error, inclusion criteria, and the statistical methods used to estimate annual progression.

Another study reported an annual SE progression of -0.25 D/y in children who wore orthokeratology lenses for a mean of 3.4y[27]. In that study, refractive measurements were obtained after confirming reversal of the corneal flattening effect, and baseline values were included in the annual progression analysis. Although the analytical approach differed from that of the present study, the overall magnitude of progression was not substantially different.

From a methodological standpoint, if annual SE progression had been calculated simply by subtracting the mean SE at 6mo from that at the final visit and dividing by the follow-up duration, the orthokeratology group would have shown smaller progression values of approximately -0.26 D/y in the right eye and -0.24 D/y in the left eye. However, because the present dataset consisted of repeated measurements with missing observations at some time points, we considered a linear mixed-effects model more appropriate for estimating longitudinal changes while making use of all available data.

The present study also warrants careful interpretation of refractive outcomes because orthokeratology induces temporary corneal epithelial redistribution, with central thinning and midperipheral thickening, resulting in a transient reduction in myopic refractive error[28-30]. For this reason, many previous studies have recommended obtaining refractive measurements after discontinuation of orthokeratology lens wear and recovery of corneal shape[15,31]. In contrast, because of the retrospective nature of the present study, refractive measurements were obtained during continued lens wear in routine clinical practice. To reduce the influence of the initial corneal reshaping phase, baseline measurements were excluded from the longitudinal SE analysis, and the annual rate of SE change was estimated using data obtained from 6mo onward. This approach is clinically meaningful because it reflects refractive status under continued orthokeratology treatment rather than after washout[32].

A discrepancy was observed between the results for SE progression and axial elongation. While significant differences were noted in refractive progression, axial elongation did not differ significantly between groups. This difference may be explained by both biological and statistical factors. Refractive error can be influenced by corneal reshaping and other optical changes, whereas AL more directly reflects structural eye growth. In addition, the smaller sample size in the AL analysis, due to incomplete data in routine clinical practice, may have reduced the statistical power to detect between-group differences. Although the graphical analysis suggests greater separation in AL between groups at later time points, the mixed-effects model did not demonstrate a statistically significant difference in the overall rate of axial elongation. This likely reflects differences between point-specific comparisons and model-based estimates of longitudinal change, as well as increased variability and reduced sample size at later follow-up visits. Although AL was significantly greater in the control group at the final 36-month follow-up, this represents a point-specific finding and should be interpreted cautiously. The overall longitudinal analysis did not demonstrate a significant difference in axial elongation rates, and therefore this result should be considered exploratory rather than definitive evidence of a long-term treatment effect.

Another noteworthy finding of this study is that orthokeratology and control groups showed no significant baseline difference in AL despite the orthokeratology group having more myopic baseline SE. This discrepancy may reflect differences in corneal power, lens wear selection patterns in routine practice, or other biometric factors not controlled for in the present analysis. Even so, the age-matched design likely reduced one of the most important confounding factors in pediatric myopia progression, namely age-related variation in progression rate.

In the subgroup analysis according to lens type, no significant difference in SE progression was observed between the Premier and CRT groups. By contrast, axial elongation was significantly slower in the Premier group than in the CRT group. Consistent with the findings of the present study, previous studies comparing orthokeratology lens designs have reported that CRT lenses, which typically have a three-curve design, may demonstrate a relatively weaker effect in myopia control compared with lenses incorporating 5 or more curves[17,33]. This difference has been attributed to variations in lens design and material properties[17,33-34]. In particular, CRT lenses generally have a thinner central thickness and lower rigidity, which may reduce their ability to induce corneal reshaping[33]. In the present study, the Premier lens used for comparison with CRT lenses is based on a multicurve design with five curves and is manufactured from a high-Dk material (Boston XO), which is similar in both design and material characteristics to previously studied lenses with 5 or more curves. Therefore, it is plausible that the relatively greater myopia control effect observed with the Premier lens compared with CRT lenses in this study may be explained, at least in part, by these design and material differences. However, these results should be interpreted with caution. Lens selection was not randomized, and therefore selection bias cannot be excluded. Lens selection in clinical practice may be influenced by baseline characteristics and clinical preference, which could further contribute to selection bias in this subgroup analysis. In addition, there was a substantial imbalance in sample size between groups, with a smaller CRT group, and a higher proportion of missing AL data during follow-up, particularly at later time points. These factors may have reduced statistical power and influenced the stability and interpretability of the model estimates. Given these limitations, our data do not support a definitive conclusion regarding the superiority of one lens design over another for axial elongation control. Accordingly, the findings from this subgroup analysis should be considered exploratory rather than definitive.

A recent study also reported more favorable AL outcomes with VST-based lenses than with CRT-based lenses over a 3-year

follow-up period[35]. This finding is consistent with both prior literature and the results of the present study. In contrast, the present study was designed primarily to evaluate the long-term effectiveness of orthokeratology in a large real-world pediatric cohort with age-matched controls. In addition, we assessed both SE progression and axial elongation using linear mixed-effects models and performed an exploratory comparison of commonly used lens types in clinical practice. Therefore, our findings provide complementary evidence by demonstrating the refractive benefits of orthokeratology in a large age-matched cohort, while also emphasizing the need for cautious interpretation of lens-type differences in axial elongation due to sample size imbalance and missing AL data.

This study has several limitations. First, because of its non-randomized retrospective design, missing data were present at several follow-up visits, particularly for AL measurements. AL measurements were not available at baseline for all eyes included in the AL analysis. Although axial elongation was assessed based on longitudinal changes using at least two measurements, the absence of baseline data may have introduced bias and should be considered when interpreting the results. Second, baseline SE differed between groups. This imbalance reflects real-world treatment selection, as patients undergoing orthokeratology tend to have greater baseline myopia than untreated controls. Because myopia progression is strongly age-dependent, age was prioritized for matching. However, residual confounding due to baseline refractive error cannot be excluded. Third, the number of observations differed between the right and left eyes at certain time points due to incomplete or missing measurements in this retrospective dataset. Although all patients wore orthokeratology lenses bilaterally, not all measurements were successfully obtained or recorded at every visit. This reflects real-world clinical practice and may have introduced variability in follow-up data availability. Fourth, actual wearing time and adherence to orthokeratology lens use could not be objectively verified. Therefore, patients with suboptimal compliance may have been included, potentially leading to underestimation of the treatment effect. Fifth, refractive measurements were obtained during orthokeratology lens wear. Because orthokeratology induces corneal reshaping, refractive outcomes may reflect temporary optical effects in addition to true changes in myopia progression, potentially leading to an overestimation of treatment efficacy. However, this approach is consistent with several previous studies that evaluated refractive outcomes without a washout period in real-world clinical settings. Therefore, while our findings are comparable with prior literature, they should be interpreted with caution and in conjunction with AL measurements, which more directly reflect structural changes. Finally, because this was not a randomized comparative study, residual confounding and treatment-selection bias may have affected the comparison between lens types.

Despite these limitations, this study has several strengths. It included a large number of children, used 1:1 age matching to reduce an important source of confounding, and evaluated longitudinal outcomes over as long as 36mo in a real-world clinical setting. In addition, the study provides clinically relevant information on refractive and axial outcomes during continued orthokeratology treatment, which may be useful for interpreting long-term follow-up data obtained in routine practice.

In conclusion, orthokeratology lens wear was associated with slower myopia progression in children compared with age-matched controls. However, its effect on axial elongation was less consistent, as the annual rate of axial elongation did not differ significantly in the linear mixed-effects model. Although AL was shorter in the orthokeratology group at the final 36-month follow-up, these findings should be interpreted with caution, given that AL represents a key structural outcome of myopia progression. No significant difference in myopia control efficacy was observed between the Premier and CRT lens groups. Although model-based analysis suggested a difference in axial elongation between lens types, this finding should also be interpreted cautiously due to sample size imbalance and missing data. Further prospective, randomized studies are needed to clarify whether specific orthokeratology lens designs differ in their effects on axial elongation.

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Data Availability Statement: The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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