Clinical effect of orthokeratology lens on children of different ages

Tan Liwei
Optometry, Yongnian outpatient department, Handan, Hebei 057150

Abstract
Objective: To compare the effect of myopia prevention and control in children of different ages wearing orthokeratology lenses.
Methods: from January 2022 to October 2023, 39 patients (65 eyes) who were optometrically matched with orthokeratology lenses in the Yongnian comprehensive outpatient department of Handan aiyan ophthalmology were selected and divided into groups according to different ages, 12-16 years old as group A and 8-11 years old as group B. The ocular axis control of the two groups after wearing glasses for half a year was observed without other interference factors.
Results: in group A, there was no significant difference in ocular axis after wearing glasses for 6 months compared with that before wearing glasses (P = 0.320); The ocular axis of group B patients after wearing glasses for 6 months was longer than that before wearing glasses, and the difference was statistically significant (p<0.001). After wearing glasses for 6 months, the growth of ocular axis in group B was higher than that in group A, and the difference was statistically significant.
Conclusion: there are differences in the prevention and control effect of orthokeratology on myopia in children of different ages, and the effect of older patients is better than that of younger patients.
Key words: orthokeratology lens; Age; Ocular axis

Orthokeratology is an effective method to control the development of myopia in children and adolescents. Studies have shown that orthokeratology can improve patients' naked eye vision and control the growth of ocular axis [1]. However, in clinical practice, there are significant differences in the effect of eye axis control when patients have no other wearing behavior. The purpose of this study was to observe the axial control of 8-16-year-old adolescents after wearing orthokeratology lens for half a year without other interference factors, and to explore whether the age difference has an impact on the myopia prevention and control effect of orthokeratology lens.

1 Data and methods

1.1 Clinical data From January 2022 to October 2023, 39 patients (65 eyes) wearing orthokeratology lenses in the Yongnian comprehensive outpatient department of Handan aiyan ophthalmology were selected for observation. The patients were divided into two groups according to their age: group A (12-16 years old) and group B (8-11 years old). Inclusion criteria: 1. age 8-16 years; 2. the corrected visual acuity shall not be less than 1.0; 3. eye examination was normal; 4. lens matching; 5. be able to wear and recheck normally. Exclusion criteria: 1. have other eye diseases affecting

vision, such as amblyopia, congenital cataract, etc. 2. history of eye surgery and trauma; 3. combine with other treatment methods, such as light feeding apparatus.

1.2 Methods ophthalmic examination: all patients underwent routine eye examination before matching glasses, including visual acuity, eye position, anterior segment (slit lamp microscope), fundus, corneal endothelial cells, corneal topography, ocular axis, objective Optometry (computer optometry and retinoscopy optometry), subjective optometry (integrated Optometry). Reexamination: after 6 months of glasses, the length of the patient's ocular axis was measured.

1.3 Statistics SPSS 26.0 was used for statistical analysis. The measurement data are expressed as the mean ± standard deviation. The paired t-test is used for the group that conforms to the normal distribution before and after wearing glasses, and the paired sample Wilcoxon test is used for the group that does not conform to the normal distribution. The amount of axial growth in the two groups was measured by Mann Whitney test with independent samples. $P<0.05$ indicates statistically significant difference.

2 Results

There were 20 patients (33 eyes) in group A and 22 patients (42 eyes) in group B. In group A, there was no significant difference in ocular axis after wearing glasses for 6 months compared with that before wearing glasses ($P = 0.320$); The ocular axis of group B patients after wearing glasses for 6 months was longer than that before wearing glasses, and the difference was statistically significant ($p<0.001$). After wearing glasses for 6 months, the growth of ocular axis in group B was higher than that in group A, and the difference was statistically significant. See Table 1 and table 2.

Table 1. ocular axis before and after matching glasses in two groups

Group	Number of eyes	AL before matching glasses	AL after wearing glasses for 6 months	*Z/t*	*P*
Group A	33	25.072±0.959	25.068±1.01	0.995	0.320
Group B	42	24.486±0.786	-5.831	-5.831	0.000

*P<0.01

Table 2. changes of ocular axis in two groups before and after matching glasses

Group	Number of eyes	Axial variation
Group A	33	-0.004±0.212
Group B	42	0.097±0.107*
P		0.009

3 Discussion

In this study, the axial growth of group B (8-11 years old) was higher than that of group A (12-16 years old). It can be inferred that age has a great impact on the control of axial growth by orthokeratology lens, and orthokeratology lens has a better control effect for older age. The control effect of orthokeratology on juvenile myopia has achieved remarkable clinical effect, and has been highly praised by the optometry circle at home and abroad [2]. There is no unified standard for the effect of ocular axis control in clinic. In the absence of other factors, age has a great impact on the effect of ocular axis control by orthokeratology [3]. Emmetropia is a process in which the

refraction of adolescents is constantly changing, and the development of myopia gradually slows down or stops with age, which is similar to the results of this study "clinical study of children of different ages wearing orthokeratology lenses" that the effect of myopia prevention and control in older patients is better than that in younger patients "[4]. Therefore, the wearing effect of orthokeratology lenses is different at different ages. The control effect cannot be determined by slowing down the growth of the eye axis. The real control effect should be combined with age and other factors.

References

[1] Guo X, Yang LN, Xie PY. Long-term effect of corneal orthokeratology on adolescent myopia [J]. Ophthalmology, 2012, 21(6): 371-374.

[2] Xie PY. Re-understanding corneal orthokeratology [J]. Ophthalmology, 2012, 21(6): 361-365.

[3] Li J, Li S, Chen M, et al. Analysis of the effect of corneal orthokeratology on controlling the progression of adolescent myopia [J]. International Journal of Ophthalmology, 2017, 17(8): 1516-1518.

[4] Xia G, Wei S, Han E, et al. Clinical observation of corneal orthokeratology for the correction of myopia in different age groups of adolescents [J]. International Journal of Ophthalmology, 2011, 11(7): 1298-1299.