

1. Streszczenie w języku angielskim

Introduction

Myopia is one of the most common refractive errors of the vision. It bases on the fact that the optical system of the eye focuses the light rays incorrectly. Emmetropic eye without any muscle tension, and therefore without accommodation, focuses parallel rays of light exactly on the retina. In the short-sighted eye, parallel rays are focused in front of the retina.

Myopia is the most common vision defect in the world. It was estimated that in 2010, myopia and high myopia was present respectively in 27% (1893 million) and 2.8% (170 million) of the world's population. It is estimated that in 2020 there will be 2.5 billion nearsighted people in the world. Optical, environmental and genetic factors influence on myopia development.

The most commonly used methods of controlling myopia include: using progressive or bifocal glasses and multifocal contact lenses, orthokeratology and eye drops.

The aim of the study

The aim of the study was to assess the risk factors of myopia and the impact of soft contact lenses on the progression of myopia in children and adolescents.

The specific objectives of the work included:

1. Assessment of the impact of soft multifocal contact lenses on the progression of myopia in patients up to 21 years of age.
2. Assessment of the effect of soft single vision contact lenses on the progression of myopia in patients up to 21 years of age.
3. Analysis of the degree of myopia progression in patients using soft multifocal contact lenses as compared to patients using soft single vision contact lenses and single vision glasses.
4. Analysis of the degree of myopia progress in relation to the period of intensive growth.
5. Assessment of the impact of selected risk factors for myopia on the therapeutic effects of using soft multifocal contact lenses, soft single vision contact lenses and single vision glasses.

Methods

One hundred and two patients with myopia were included to the study: $\bar{x} = -2.34 \pm 1.921$ D (right eye), $\bar{x} = -2.58 \pm 1.89$ D (left eye), $\bar{x} = -2.44 \pm 1.854$ D (binoculars), including 70 females and 32 males, aged 8 to 20; average age: 14.411 ± 2.59 years, under the care of an ophthalmologist and / or an optometrist.

Inclusion criteria: myopia of the one or both eyes; age from 8 years to 21 years; astigmatism ≤ -1.00 Dcyl; consent of the patient and parent to enter the study

Exclusion criteria: anterior segment diseases of the eye constituting contraindications to the application of contact lenses; astigmatism > -1.00 Dcyl

The following groups were distinguished from the examined patients:

Group I consisted of 24 patients with myopia: $\bar{x} = -3.0 \pm 1.889$ D (right eye), $\bar{x} = -3.25 \pm 1.743$ D (left eye), $\bar{x} = -3.12 \pm 1.776$ D (binoculars), 15 females and 9 males, 8-20 years old ($\bar{x} = 14.12 \pm 2.863$), corrected with soft multifocal contact lenses

Group II consisted of 35 people, with myopia: $\bar{x} = -2.69 \pm 2.259$ D (right eye), $\bar{x} = -3.08 \pm 2.180$ D (left eye), $\bar{x} = -2.88 \pm 2.122$ D (binoculars) 30 females and 5 males, aged 11-20 ($\bar{x} = 15.54 \pm 2.24$), corrected with single vision contact lenses

Group III consisted of 43 people, with myopia: $\bar{x} = -1.69 \pm 1.406$ D (right eye), $\bar{x} = -1.79 \pm 1.418$ D (left eye), $\bar{x} = -1.74 \pm 1.412$ D (binoculars), 25 females and 18 males, aged 8-18 ($\bar{x} = 13.65 \pm 2.448$), corrected with single vision glasses

Results

The analysis of the degree of myopia correction after 2 years in total showed statistically significant differences between the group in which myopia was corrected using multifocal contact lenses (Group I), compared to single vision glasses correction (Group III) in the right eye, left eye and binocular and between the group I and II in the left eye. In total, the change in correction after 2 years was statistically significantly different between Groups I and II and I and III if myopia had occurred before the period of intensive growth. When myopia had occurred during the period of intensive growth, a statistically significant difference between Group I and III and II and III for all examined locations: right eye, left eye

and binocular after 2 years totally. When myopia had occurred after a period of intensive growth no significant differences between the groups were observed.

There were no statistically significant differences between groups as far as visual acuity was concerned.

The analysis of the correlation of genetic factors in the whole group, (the occurrence of myopia in parents, siblings, grandparents and distant relatives), and changes in refractive errors when using correction of lenses or glasses showed a significant relationship between the occurrence of myopia in parents and the age at which the defect was detected.

The occurrence of myopia in the family correlated with changes in vision correction when using multifocal contact lenses, monofocal contact lenses and single vision glasses. Myopia in mother strongly negatively correlated with the change in refractive error after two years in total in groups I and II.

In addition, correlations between the time spent in front of the computer, the time spent in front of the phone and the time spent reading books, and the change in correction in the entire population and in individual groups at various level were observed.

Logistic regression analysis showed a statistically significant relationship between the age of entering the study and the risk of failure in the whole group of patients. The odds ratio for this variable was 1.44 / year of observation, confidence interval 1.139 - 1.82 (after 2 years in total).

Conclusions

1. Multifocal contact lenses are useful in the control of myopia in children and adolescents, stopping the progression of the defect after six months of use, thanks to which they can be a therapeutic option in inhibiting the progression of myopia.
2. The best therapeutic effects are observed in the early periods after contact lenses application, and their change persists in the following months.
3. The best effects of using multifocal contact lenses occur when myopia in children occurred before the period of intensive growth.
4. In the cases when nearsightedness in children appeared during the period of intensive growth, soft contact lenses - multifocal, but also some monofocal may reduce the progression of myopia compared to single vision glasses.

5. The occurrence of myopia in the family correlates with changes in vision correction when using both multifocal contact lenses, monofocal contact lenses and single vision glasses.
6. Environmental risk factors, especially time spent in front of phone correlates with the change in correction of both multifocal contact lenses, single vision contact lenses and single vision glasses correction.