

CORRELATION BETWEEN CORNEAL CURVATURE AND AXIAL LENGTH IN MYOPIA CHILDREN AT ADAM MALIK GENERAL HOSPITAL MEDAN

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Abstract

Background : The axial length of the eye is one of the factor that determine a person's refractive status beside the curvature and strength of the corneal dioptr. In myopia, the axis of the eye is longer than normal and so is the dioptr of corneal and it was said that the elongation of the axis is directly proportional to the degree of myopia.

Aim : To determine the relationship dioptr power of the cornea with axial length of Myopia in children at Adam Malik General Hospital Medan.

Method :This research is observational analytic with total sampling method. Total sample of 59 children with 118 eyes who came to the ophthalmology polyclinic Pediatric Ophthalmology subdivision of Adam Malik General Hospital from March to May 2017. All children were assessed visual acuity, corrected and examined with slit lamp (Appasamy) to assess the anterior segment. Then calculated the average axial length each eye, then the result is compared.

Result : The average curvature of the cornea and the axial length of the eye to the degree of myopia is curvature of the cornea with myopia mild 43.121 diopters ± 0.722 , myopia was 43, 887 diopters ± 0.807 , myopia weight of 44.400 diopters ± 0.823 and the long axis of the eyeball with the degree of myopia is mild myopia 23.120 mm (SD 0.664 mm), myopia was 24.256 mm (SD 0.661 mm), severe myopia 25.038 mm (SD 0.762 mm).

Conclusion : there is a relationship between Mild, Moderate and Severe Myopia to Corneal Curvature with axial length of Myopia in children

Keywords: *corneal curvature, axial length, myopia in children*

I. INTRODUCTION

Myopia is a sensory disorder often affected in school-aged children. School-aged children have a high prevalence of myopia. According to research of Dulker Bj et al. in 2009, the main cause of blindness in the world due to unrepaired refraction disorder, in Europe as much as 19% children with myopia. In China, from the data of Jung M. Selt et al. In 2011, the number of childhood myopia is about 42% of the total number of school children and the axial length of the eyeball in school-age myopia of ± 23.14 mm.^{1,2,3}

In Indonesia, the prevalence of refractive abnormalities in school children first in cases of myopia and myopathic abnormalities in Indonesia in nearly 25% of the total school-aged population. Therefore, the researcher wanted to see the correlation between corneal curvature and the long axis of the eyeball in the child's myopia patient who went to the Eye Polyclinic of the Pediatric-Ophthalmology Division of RSUP H. Adam Malik Medan.⁴ Refracting by the curvature of the cornea is the strongest in the medium of refraction ranging from 42 to 44 diopters. Larger corneal congestion will result in stronger refraction so that the shadow falls in front of the retina. The normal axis length of the eyeball is 21.6-22.8 mm and the axial length in the child's myopia is longer than normal size and the average length of the eyeball in the child's myopia is ± 23.14 mm and depending on the weight mild degree of myopia In Korea, according to research data Sivian et al in 2009, the long axis of the eyeball in childhood myopia is ± 23.22 mm and the mean corneal curvature in school-age myopia is ± 41.98 diopters.^{5,6,7,8}

Research Rong Zao et al in India in 2011 said that large corneal curvature associated with the degree of myopia. This is caused by the surface of the cornea that greatly affects the magnitude of the cornea's dioptric strength. The larger the corneal bone, then the degree of myopia will also be more severe in refraction of light. According to M. Hosny et al in 2011 in Spain, the long axis of the eyeball greatly affects the degree of myopia and the average length of the eyeball axis in miopa school-age children is ± 23.07 mm. The longer the axis of the eyeball the degree of myopia will be greater and this study is also in line with the research of Meng Ling Yan et al in 2013 in Taiwan, there is a linear relationship between the corneal curvature and the length of the eyeball axis with the degree of myopia. Decai Wang et al in 2011 in China also said there is a relationship between large corneal curvatures and myopia degree especially in junior secondary students where the growth age of the eyebrow axis also begins to slow down over the age of 12 years and increase only about 0.02 mm until the age of 18 years.^{9,10,11,12}

II. METHODS

This research is observational analytic with total sampling method. Total sample of 59 children with 118 eyes who came to

the ophthalmology polyclinic Pediatric Ophthalmology subdivision of Adam Malik General Hospital from March to May 2017. All children were assessed visual acuity, corrected and examined with slit lamp (Appasamy) to assess the anterior segment. Then calculated the average axial length each eye, then the result is compared.

III. RESULT

This research was conducted at Haji Adam Malik General Hospital Medan from March 2017 until April 2017. The research subjects taken to be a research sample is a child of myopia aged 12-17 years who came to the eye clinic of Pediatric-Ophthalmology. division of Adam Malik General Hospital Medan which amounted to 59 people (n = 59).

Childhood myopia age between 15-17 years old as many as 45 patients (76.27%) and age 12-14 years as many as 14 patients (23.73%). Myopia in boys were 25 patients (42.37%) and the most were girls as many as 34 patients (57.63%). The Most children with Mild Myopia on the right and left eyes of 45 patients (76, 27%) while the moderate myopia was 9 patients (15.25%) and severe myopia as many as 5 patients 8.48%).

Table 1. Relationship between corneacurvature (right & left eye) with degree of Myopia

Degree of Myopia	N (11 8)	Cornea Curvature of right eye	Cornea Curvature of Left eye	P-Value
		$\bar{x} \pm SD$	$\bar{x} \pm SD$	
Mild	90	42,940 ± 0,096	43,301 ± 0,709	*0,016
Moderate	18	43,546 ± 0,750	44,228 ± 0,747	*0,021
Severe	10	44,056 ± 0,376	44,744 ± 0,459	*0,034

*The mean is significant at the < 0,05 level

Mild, moderate and severe Myopia are significant with cornea curvature of right & left eye.

Table 2. Relationship between axial length (right and left eye) with degree of Myopia

Degree of Myopia	N (11 8)	Axial length of right eye	Axial length of left eye	P-Value
		$\bar{x} \pm SD$	$\bar{x} \pm SD$	
Mild	90	23,059 ± 0,628	23,180 ± 0,662	*0,027
Moderate	18	24,040 ± 0,754	24,473 ± 0,505	*0,032
Severe	10	24,622 ± 0,563	25,454 ± 0,746	*0,039

*The mean is significant at the < 0,05 level

Table 3. Relationship between cornea curvature of both eyes and axial length of both eyes with degree of Myopia

Degree of	n (11)	Cornea curvature of both eyes	Axial length of both eyes	P-Value
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Myopia	8)	$\bar{x} \pm SD$	$\bar{x} \pm SD$	
Mild	90	43,121 ± 0,722	23,120 ± 0,644	*0,014
Moderate	18	43,887 ± 0,807	24,256 ± 0,661	*0,018
Severe	10	44,400 ± 0,823	25,038 ± 0,762	*0,012

*The mean is significant at the < 0,05 level

IV. CONCLUSION

From the research conducted on the patient of myopia in children aged 12-17 years who went to the Ophthalmology polyclinic of Pediatric-Ophthalmology Division Adam Malik General Hospital Medan in March 2017 - May 2017, obtained some conclusions are:

1. Myopia in children most found at age 15-17 years old that is as many as 44 Children (74,57%) and found at age 12-14 year that is 15 children (25,43%)
2. The most common sexes were girls 32 children (54.24%) and boys 27 children (45.76%)
3. There was no significant mean difference from the degree of both eye with myopia in children aged 12-17 years
4. There was a significant relationship between mild myopia, moderate myopia and severe myopia with large corneal curvatures
5. There is a significant relationship between mild myopia, moderate myopia and severe myopia with the axial length of the eyeball.

V. DISCLOSURE

Patients have been approved prior to the study conducted and cost involved in this research is borne by researcher

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