



ASTIGMATISM IN CHILDREN AND ADOLESCENTS WITH TUBERCULOSIS

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Abstract

The article provides information about the incidence of astigmatism in children and adolescents with tuberculosis.

Uncorrected astigmatism causes defective development of visual functions in children, and can also lead to a decrease in existing ones.

Studies have shown that in children and adolescents with tuberculosis, simple myopic astigmatism was detected in $2.2 \pm 0.3\%$, complex myopic – in $1.3 \pm 0.3\%$, simple hypermetropic – in $1.5 \pm 0.3\%$, complex hypermetropic - in $1.0 \pm 0.2\%$ and mixed astigmatism was detected in $1.9 \pm 0.3\%$ of the total number of subjects.

Keywords: Astigmatism, incidence, children, adolescents, tuberculosis.

Introduction

Relevance:

Astigmatism, as is known, is a congenital pathology. According to B.L. Radzikhovsky (1969), it occurs in 45-55% of the world's population [5].

In some children and adolescents, it may be insignificant, physiological, and does not interfere with normal vision. In some children and adolescents, astigmatism can be higher than physiological values and significantly reduces the sharpness of near and far vision [1, 2, 7]. Long-term projection of unclear images onto the retina, which occurs with uncorrected astigmatism, is the cause of incomplete formation of visual functions in children, and may also lead to a decrease in existing ones [3, 4, 6].

Also, uncorrected astigmatism can lead to inadequate accommodation response, accommodation spasm, and progression of myopia, meridional amblyopia [8, 9].

Purpose of the study: To study the occurrence of astigmatism in children and adolescents with tuberculosis.

Materials and methods of research. A study was conducted on children and adolescents aged 1 to 17 years who were undergoing treatment for tuberculosis at the Andijan Regional Tuberculosis Dispensary.





Comprehensive ophthalmological examination included: determining visual acuity without correction and with correction, sciscopy, autorefractometry, biomicroscopy, examination of binocular functions, direct and reverse ophthalmoscopy. Clinical, biochemical, immunological, microbiological studies, and specialist examinations were also conducted.

Results and Discussion:

During the examination, we identified astigmatism in 135 children and adolescents with tuberculosis, which constitutes $8.0 \pm 0.6\%$ of the total number of examined individuals. Boys were 44.4% (60 people), and girls - 55.6% (75 people) of cases.

Astigmatism is a measure of the opacity of the optical system of the eye. Based on the combination of refractions in the main meridians, 5 types of astigmatism are distinguished.

In the examined children and adolescents with tuberculosis, all types of astigmatism were detected, namely: simple myopic astigmatism was found in 38 ($2.2 \pm 0.3\%$), complex myopic - in 22 ($1.3 \pm 0.3\%$), simple hypermetropic - in 25 ($1.5 \pm 0.3\%$), complex hypermetropic - in 17 ($1.0 \pm 0.2\%$), mixed astigmatism - in 33 ($1.9 \pm 0.3\%$).

The detection of simple myopic astigmatism depending on the age and sex of the examined individuals is presented in Table 1.

Table 1. Frequency of simple myopic astigmatism among children and adolescents with tuberculosis

Age	Boys		Girls		Total	
	abs	%	abs	%	abs	%
1-3 years old	-	-	-	-	-	-
4-6 years old	-	-	2	2,3 ±1,6	2	0,7±0,5
7-9 years old	5	1,6±0,7	6	3,0±1,2	11	2,2±0,6
10-14 years old	7	2,4 ±0,9	11	4,2±1,2	18	3,2 ±0,7
15-17 years old	3	2,0±1,1	4	3,4 ±1,7	7	2,6±1,0
Total	15	1,5±0,4	23	3,3 ±0,7	38	2,2 ±0,3

Note: * - difference compared to the norm is statistically significant, $p < 0.01$.

As can be seen from Table 1, the detection of simple myopic astigmatism increases from 6 to 14 years, and at 15-17 years, this indicator decreases somewhat. Among girls, simple myopic astigmatism was detected almost 1.5 times more frequently than in boys - $3.3 \pm 0.7\%$ versus $1.5 \pm 0.4\%$, respectively ($p < 0.01$).



Trends in the occurrence of complex myopic astigmatism in the examined population (Table 2.) are similar to the simple and also exceed the boys by 2 times in girls: 1.8 ± 0.5 versus 0.9 ± 0.3 , however, the differences are not statistically significant ($p > 0.05$).

Table 2. Frequency of complex myopic astigmatism among children and adolescents with tuberculosis

Age	Boys		Girls		Total	
	abs	%	abs	%	abs	%
1-3 years old	-		-		-	
4-6 years old	-		-		-	
7-9 years old	2	0.6 ± 0.4	2	1.0 ± 0.7	4	0.8 ± 0.4
10-14 years old	5	1.7 ± 0.7	8	3.1 ± 1.1	13	2.3 ± 0.6
15-17 years old	2	1.3 ± 0.9	3	2.6 ± 1.5	5	1.9 ± 0.8
Total	9	0.9 ± 0.3	13	1.8 ± 0.5	22	1.3 ± 0.3

The frequency of simple hypermetropic astigmatism in girls and boys was almost the same, both depending on age and gender, and amounted to $1.4 \pm 0.4\%$ and $1.6 \pm 0.5\%$, respectively (Table. 3).

Table 3. Frequency of simple hypermetropic astigmatism among children and adolescents with tuberculosis

Age	Boys		Girls		Total	
	abs	%	abs	%	abs	%
1-3 years old	-		-		-	
4-6 years old	1	0.5 ± 0.5	1	1.1 ± 1.1	2	0.7 ± 0.5
7-9 years old	6	1.9 ± 0.8	4	2.0 ± 1.0	10	2.0 ± 0.6
10-14 years old	6	2.0 ± 0.8	5	1.9 ± 0.8	11	2.0 ± 0.6
15-17 years old	1	0.7 ± 0.7	1	0.8 ± 0.8	2	0.7 ± 0.5
Total	14	1.4 ± 0.4	11	1.6 ± 0.5	25	1.5 ± 0.3



Complex hypermetropic astigmatism among boys was detected in $0.8 \pm 0.3\%$ of cases, among girls in $1.3 \pm 0.4\%$, the differences are statistically insignificant (Table. The patterns and trends in the detection of complex hypermetropic astigmatism are similar to the characteristics of other types, it should be noted that in the 15-17 age group, not a single case of this type of astigmatism was detected.

Table 4. Frequency of complex hypermetropic astigmatism among children and adolescents with tuberculosis

Age	Boys		Girls		Total	
	abs	%	abs	%	abs	%
1-3 years old	-		-		-	
4-6 years old	-		1	$1,1 \pm 1,1$	1	$0,3 \pm 0,3$
7- 9 years old	3	$1,0 \pm 0,6$	4	$2,0 \pm 1,0$	7	$1,4 \pm 0,5$
10-14 years old	5	$1,7 \pm 0,7$	4	$1,5 \pm 0,7$	9	$1,6 \pm 0,5$
15-17 years old	-		-		-	
Total	8	$0,8 \pm 0,3$	9	$1,3 \pm 0,4$	17	$1,0 \pm 0,2$

Analysis of the occurrence of mixed astigmatism allows us to conclude that the detection rates depending on age and gender coincide in level and dynamics with other types of astigmatism in the studied groups (Table. 5). It is noteworthy that girls in all age groups have higher indicators, and according to the final indicators, 1.9 times higher than boys ($2.7 \pm 0.6\%$ versus $1.4 \pm 0.4\%$).

Table 5. Frequency of occurrence of mixed astigmatism among children and adolescents with tuberculosis

Age	Boys		Girls		Total	
	abs	%	abs	%	abs	%
1-3 years old	-		-		-	
4-6 years old	1	$0,5 \pm 0,5$	1	$1,1 \pm 1,1$	2	$0,7 \pm 0,5$
7-9 years old	3	$1,0 \pm 0,2$	2	$1,0 \pm 0,7$	5	$1,0 \pm 0,4$
10-14 years old	8	$2,7 \pm 0,9$	11	$4,2 \pm 1,2^*$	19	$3,4 \pm 0,8$
15-17 years old	2	$1,3 \pm 0,9$	5	$4,3 \pm 1,9^*$	7	$2,6 \pm 1,0$
Total	14	$1,4 \pm 0,4$	19	$2,7 \pm 0,6$	33	$1,9 \pm 0,3$

Note: * - the difference is statistically significant compared to the age of 7-9 years, $p < 0.01$.



Decreased visual acuity in children and adolescents with astigmatism in all cases was accompanied by asthenopic complaints. During visual exertion, children noted pain in the eyes, in the area of the forehead and temples, headache, dizziness, irritability, and quick fatigue. Asthenopic complaints were more frequently detected in girls.

Conclusion

Thus, the results obtained by us showed that among children and adolescents with tuberculosis, the highest percentage of detection was simple myopic ($2.2 \pm 0.3\%$) and mixed astigmatism ($1.9 \pm 0.3\%$).

The frequency of astigmatism detection was statistically significantly higher among girls ($10.6 \pm 1.1\%$), compared to boys ($6.1 \pm 0.8\%$; $p < 0.001$).

Astigmatism is the cause of incomplete formation of visual functions in children with tuberculosis and requires timely diagnosis and correction to prevent irreversible decline in visual acuity.

References

1. Егоров А.Н., Каменкова Е.А., Егоров В.А., Правильникова П.А. Сравнительная характеристика результатов объективного и субъективного методов исследования астигматизма до и после циклоплегии // Военно-медицинский журнал. - 2021. - Т. 342. - №7. - С. 47-52. doi: 10.17816/RMMJ82623
2. Лещенко И.А., Лобанова И.В., Рыбакова Е.Г. Показания к подбору контактных линз у детей и подростков. //Российская детская офтальмология. – 2016.- №3.- С.33-44
3. Лобанова И.В., Маркова Е.Ю., Хаценко И.Е., Ульшина Л.В. Влияние вида и полноты коррекции астигматизма на формирование зрительных функций у детей и подростков. // Российская детская офтальмология. -2012.- №1-2.- С. 49-52.
4. Проскурина О.В. Влияние очковой коррекции на развитие рефракции и остроты зрения у дошкольников и школьников с астигматизмом //Рефракционная хирургия и офтальмология.- 2007.- Т.7. - № 2.- С. 46-50.
5. Радзиховский Б.Л. Астигматизм человеческого глаза.-М.:Медицина, 1969.- 196 с.
6. Чередниченко Н., Кореньяк Г., Карпов С., Байда А. и Барбос Ю. Сравнительный анализ рефракционной патологии у детей дошкольного и школьного возраста // Врач. – 2018.-№ 8(29).-С. 66-68.



7. Hashemi H, Asharlous A, Khabazkhoob M, Yekta A, Emamian MH, Fotouhi A. The profile of astigmatism in 6-12-year-old children in Iran. *J Optom.* 2021 Jan-Mar;14(1):58-68. doi: 10.1016/j.optom.2020.03.004. Epub 2020 Apr 25. PMID: 32345571; PMCID: PMC7752993.
8. Kam KW, Chee ASH, Tang RCY, Zhang Y, Zhang XJ, Wang YM, Li SL, Chen LJ, Young AL, Tham CC, Pang CP, Yam JC. Differential compensatory role of internal astigmatism in school children and adults: The Hong Kong Children Eye Study. *Eye (Lond).* 2023 Apr;37(6):1107-1113. doi: 10.1038/s41433-022-02072-9. Epub 2022 Apr 26. PMID: 35473966; PMCID: PMC10102244.
9. Liu T., Thibos L.N. Compensation of corneal oblique astigmatism by internal optics: a theoretical analysis // *Ophthalmic. Physiol. Opt.* – 2017.- Vol.37, N^o 3.- P.305-316. DOI: 10.1111/opo.12364. Epub 2017 Mar 9.

