

Original Article

Prevalence of Accommodation Spasm in Children

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Received: 09 September 2023

Revised: 16 October 2023

Accepted: 06 November 2023

Published: 25 November 2023

Abstract - Objective: To study the prevalence of accommodation spasms in children. **Methods:** 450 patients (900 eyes) participated in the study, where a detailed medical history was taken, age and sex information was recorded, and after obtaining informed consent, a comprehensive ophthalmic examination was performed that included examination of visual ability corrected visual ability, measurement of worst refraction by Autorefractor device, in addition to examination using the slit lamp of the anterior sections of the eye and the fundus of the eye. It has done 1% cyclopentolate instillation into both eyes 3 times at an interval of 10 minutes and measurement of worst refraction 20 minutes after the third time with Autorefractor. **Results:** In this study, we found that 40.4% of the included patients had accommodation spasms and found statistically significant differences with regard to the occurrence of spasms in accommodation and sex; the incidence of spasms in accommodation was higher in the male group, and there was a statistically significant relationship between the incidence of Spasms in conformity and age Psychological stress and the use of smartphones and electronic games As the cases that had a spasm in conformity were between 10-18 years, and the cases in which convulsion occurred increased with the increase in psychological pressure and the increase in the use of smartphones and electronic games. **Conclusion:** Based on these results, we can propose Performing a Shell Conformity Test for Pediatric Patients because of the high prevalence of conformance spasms that may be caused by the nature of modern life.

Keywords - Automatic refractometer, Accommodation shell, Cyclopentols, Conforming spasm.

1. Introduction

The eye's refractive state is one of the basic visual characteristics in determining the visual ability that can be reached without correction. It is an important indicator in refractive surgery, cataract surgery and pediatric ophthalmology.

Accommodation is the ability of the eye to increase its refractive power when looking at nearby objects or as self-correction of hyperopia, because of which refractive changes occur (latent hyperopia, pseudomyopia), especially in children where their accommodation capacity is large [2].

Congruence spasm is a condition that occurs in children, adolescents and young adults that tends to be bilateral steadily or intermittently and occurs when looking far and/or near and is often associated with pupillary constriction and convergence reflex and disappears when accommodation shawls are used [2]. When this phenomenon occurs, the patient may appear hyperopia in lower degrees than the real. The right person may pretend to have degrees of myopia, and the person who is sad pretends to have higher degrees of myopia than the real one.

Excessive use of smartphones and close work is considered to cause severe stimulation of the ciliary muscle, causing conformance spasms [3]. The main complaints of an

accommodation spasm patient are headache, blurred vision, and cases of the appearance of medial strabismus[4].

This study aims to investigate the prevalence of conformance spasms among a sample of reviewers considering the prevalence of excessive use of electronic devices and poor lighting.

2. Patients and Methods

450 patients (900 eyes) of the eye clinic at Tishreen University Hospital in Lattakia participated in the study during the time period 2020-2021. Investigators inclusion criteria in the research where a detailed medical history was taken, age and sex information was recorded. After obtaining informed consent, a comprehensive ophthalmic examination was performed that included an examination of visual ability, corrected visual ability, measurement of the worst refraction by an Autorefractor device, in addition to examination using the slit lamp of the anterior sections of the eye and fundus. 1% cyclopentolate was instilled into both eyes 3 times at an interval of 10 minutes, and the worst refraction was measured 20 minutes after the third time by Autorefractor.

Criteria for admission to the study:

Patients between the ages of 4 years to 18 years.

The exclusion criteria included:

- Curvaccissis of the grape.
- Glaucoma.



- Anamnesis of operations on the crystalline body.
- History of refractive surgery.
- Anamnesis of ocular trauma.
- Strabismus patients.
- Patients were taking medications that affected the subsistence system.
- Patients were taking psychiatric drugs and tranquillizers.
- Cardiac history (ischemia, hypertension).
- Neurological diseases that affect accommodation, such as Adie's pupil.
- Anamnesthesia polysclerosis or intracranial hypertension.
- People with diabetes.

1.1. Shell Conformance Protocol adopted at the hospital:

1% cyclopentolate was distilled into both eyes 3 times with an interval of 10 minutes, and the worst refractive was measured 20 minutes after the third time.

The worst refraction is expressed in the Spherical Equivalent (SE). It will be calculated according to its typical

equation: the algebraic addition of the spherical value with half the cylindrical value of the worst refraction.

1.2. Ethical consideration

After discussing the study, all patients were provided with full and clear informed consent. The Helsinki Declaration conducted this study.

1.3. Statistical Analysis

Descriptive Study (Cross-sectional)

- Description Statistical
Quantitative variables were expressed in arithmetic mean, standard deviation, and qualitative variables in frequencies and percentages.
- Independent T student test to compare the differences of averages between two independent groups. Chi-square test to study the relationships between qualitative variables.

Table 1. Average values of patients' ages and ocular measurements were taken among patients visiting the eye clinic at Tishreen University Hospital in Lattakia during the time period 2020-2021

Variables	Number	Mean ± SD	Range
Age (Year)	450	13.5±4.2	4 – 18
Spherical equivalent before the accommodation shell (as a fraction)	900	-1.2 ± 2.2	- 6, 4.25
Spherical equivalent after accommodation shell (as a biography)	900	- 0.3 ± 2.5	- 5.25, 5.5
VA	900	5.17± 3.08	6/100, 10/10
BCVA	900	9.69± 0.5	7/10, 10/10

2. Results

The research sample included 450 children (900 eyes) from the children visiting the eye clinic at Tishreen University Hospital in Lattakia during 2021-2022 and investigators of the criteria for inclusion in the research.

The necessary ocular tests were carried out. A comparison was made between the values of the worst refraction before and after the accommodation paralysis to know the prevalence of conformance spasms in these children and its relationship to the variables studied. Ages 4 to 18 years old with an average of 13.5±4.2 years.

Table 2. Distribution of a sample of 450 patients according to the occurrence of spasms in conformity with the auditors of the eye clinic at Tishreen University Hospital in Lattakia during the time 2020-2021

Research Sample	Number	Ratio
With accommodation spasm	182	40.4%
Without accommodation spasm	268	59.6%
Total	450	100%

We can see from the previous table that the prevalence of conformance spasm in the studied research sample was 40.4%

Table 3. Distribution by sex and according to the occurrence of spasm in conformity among patients admitted to Tishreen University Hospital in Lattakia during the time period 2020-2021

Sex	Research Group		P-value
	With accommodation spasm	Without accommodation spasm	
Male	114(62.6%)	130(48.5%)	0.01
Females	68(37.4%)	138(51.5%)	

We note from the previous table that there are statistically significant differences regarding the occurrence of spasm in accommodation according to sex, where we find that the conformance spasm was higher in males.

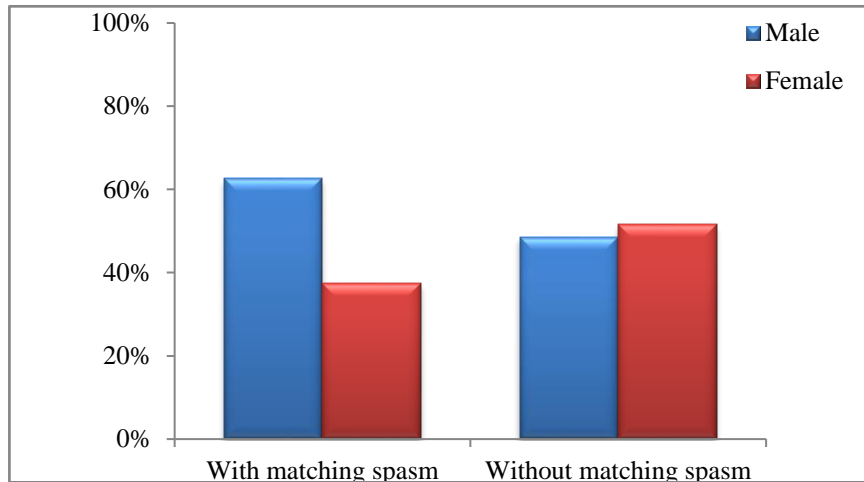


Fig. 1 Distribution by sex and according to the occurrence of spasm in conformity among patients admitted to Tishreen University Hospital in Lattakia during the time period 2020-2021

Table 4. Distribution by age groups and according to the occurrence of spasms in conformity among patients admitted to Tishreen University Hospital in Lattakia during the time period 2020-2021.

Age Groups	Research Group		P-value
	With accommodation spasm	Without accommodation spasm	
4 – 6	15(8.3%)	69(25.8%)	0.003
6 – 10	33(18.1%)	125(46.6%)	
10 – 14	77(42.3%)	49(18.3%)	
14 – 18	57(31.3%)	25(9.3%)	

We note from the previous table that there are statistically significant differences regarding the occurrence of spasm in conformity according to age groups, where we find that conformance spasm with the age groups 10-14 and 14-18 years.

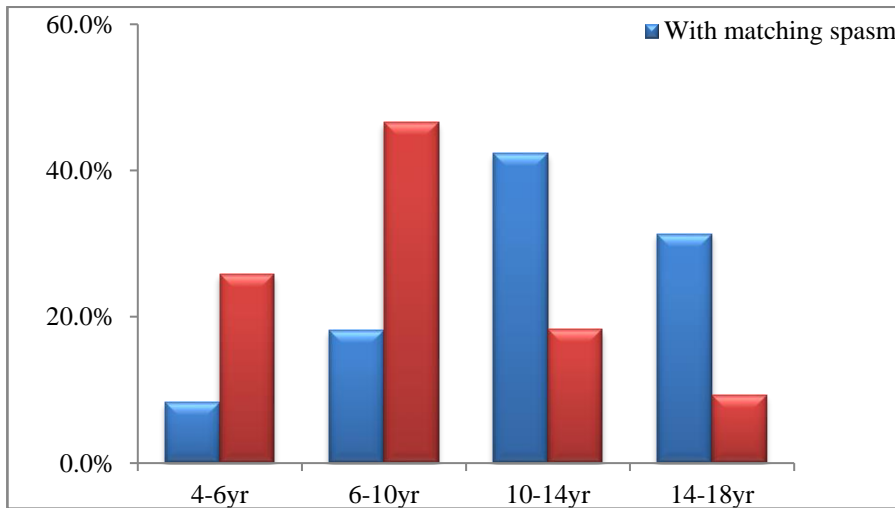


Fig. 2 Distribution by age groups and according to the occurrence of spasm in conformity among patients admitted to Tishreen University Hospital in Lattakia during the time period 2020-2021

Table 5. Distribution according to the presence of psychological stress and according to the occurrence of spasms in conformity among patients admitted to Tishreen University Hospital in Lattakia during the time period 2020-2021

Psychological stress	Research Group		P-value
	With accommodation spasm	Without accommodation spasm	
Exist	135(74.2%)	82(30.6%)	0.001
Does not exist	47(25.8%)	186(69.4%)	

We note from the previous table that there are statistically significant differences regarding the occurrence of spasms in conformity and the presence of psychological stress, as the incidence of conformity spasms was high in the presence of psychological stress.

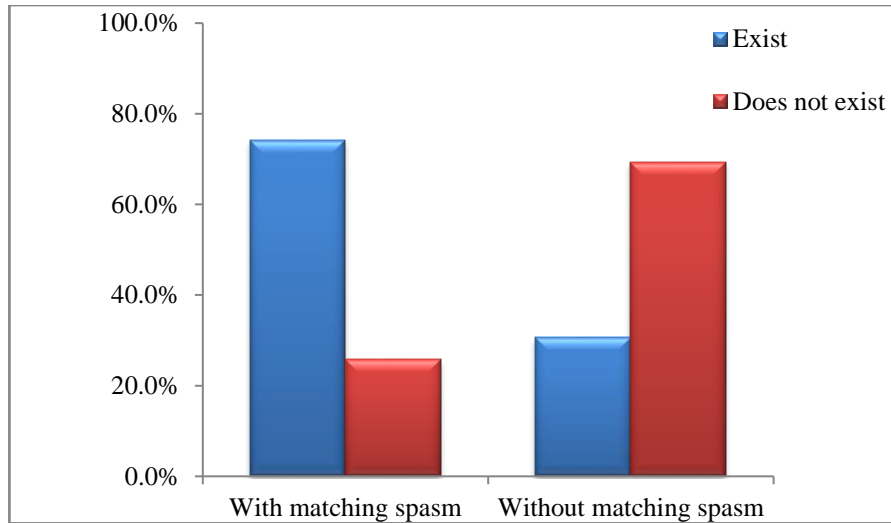


Fig. 3 Distribution according to the presence of psychological stress and according to the occurrence of spasms in conformity among patients admitted to tishreen university hospital in latakia during the time period 2020-2021

Table 6. Distribution by number of hours of use of electronic devices and according to the occurrence of spasm in conformity among patients admitted to tishreen university hospital in latakia during the time period 2020-2021

Number of hours of use of electronic devices	Research Group		P-value
	With accommodation spasm	Without accommodation spasm	
<2	38(20.9%)	232(86.6%)	0.0001
>2	144(79.1%)	36(13.4%)	

We note from the previous table that there are statistically significant differences regarding the occurrence of spasms in conformity and the number of hours of use of electronic devices, as the incidence of conformity spasms was high with its use for a period of more than two hours per day.

3. Discussion

In this study, we found that 40.4% of the included patients had a conformance spasm. We found statistically significant differences with regard to the occurrence of spasms in accommodation and sex, as the incidence of spasms in accommodation was higher in the male group. There was a statistically significant relationship between the occurrence of spasms in accommodation and age, as the cases with conformance spasms were between 10 and 18 years, and between the occurrence of spasms in accommodation, smartphones and electronic games.

Where the convulsions in conformity increased with the increase in the number of watches, smartphones and electronic games, and between the occurrence of spasms in accommodation and psychological pressure, the cases with spasms in conformity were more in those who suffer from psychological pressure.

The result of our study was like that of >Singh et al.<, where the percentage was 21%, knowing that this study included patients between 13 and 17 years of age and our study included ages 4-18 years.

The result of our study was like the results of the study of > Rupally et al. < where the percentage was 28.97%, knowing that this study included 267 children while our study included 450 children.

The result of our study differed from those of > Shen et al.<, > Bancia et al.<, > Francesco et al.<, and > Maran et al.< where their percentages were 3.7%, 5.1 %, 6.4%, and 5%. The reason for the difference in the results may be that all these studies did not use accommodation Shell drops. However, they used different techniques to relax the ciliary body muscles. These techniques are considered personally affected by the examiner, unlike the accommodation Shell drops, which are considered an objective examination. Also, these studies were conducted in a previous period. The reason for the difference in results may be the change in lifestyle and the heavy reliance on electronic devices at work and study. It is known that prolonged use of electronic devices causes an increase in the occurrence of accommodation spasms.

In a study conducted by > Shayman et al.<, the percentage of patients with conformance spasm was 1.8%, considered the lowest percentage in studies published in the medical literature. The reason for this may be the study sample chosen, which included patients aged from 6 months to 1 8 years. It is known that accommodation is not complete in the first months of life and may need 10 months to complete.

We also found in our study that most of the children who had conformity spasms were males. Our results differed from those of >Singh et al.<, and > Shayman et al.<, where they also found that females are more likely to have

accommodation spasms, which may be due to male children's use of smartphones and electronic games at a higher rate in females.

We also found a direct correlation between smartphone use and electronic games and accommodation spasms; the more they are used, the greater the occurrence of accommodation spasms.

We also found in our study a positive relationship between psychological stress and conformance spasms where the current conditions increased psychological stress in families, which in turn increased the likelihood of conformance spasms in children.

One of the most important features of this study is our reliance on cyclopentolate droplets to paralyze the ciliary muscle, so the results are more accurate than using personal methods in the examination.

4. Conclusion

Based on these results, we can propose to perform a Shell conformity test for all children because of the high prevalence of conformance spasms that may be caused by the nature of modern life.

Recommendations

- Routinely perform a Shell Conformity Test for Children.
- Doing more studies

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