Original article

ACCOMMODATIVE STATUS IN AMBLYOPES AND ITS EFFECT ON QUALITY OF LIFE

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Abstract

PURPOSE: The purpose of this study is to assess accommodative status in amblyopic subjects and its effect on quality of life.

METHOD: A cross sectional non randomized study was performed at tertiary eye care hospital. Study was carried out in five stages starting from collection of demographic data, anterior and posterior segment evaluation followed by cycloplegic refraction of selected amblyopes. Lag of accommodation was measured post adaptation, via monocular estimation method (MEM). ASQE questionnaire was filled up by amblyopic subjects or their parents. In the final stage control subjects were evaluated in similar manner, their lag of accommodation was measured and ASQE questionnaire was been filled up by subjects. Statistical analysis was performed using SPSS software.

RESULTS: Total of 91 subjects diagnosed with amblyopia was enrolled in study between 3 to 21 years of age with a mean value of 9.6 ± 4 years. Best corrected Visual acuity in amblyopic eye was in range of 1.77 to 0.30 log unit, while in better or good eye visual acuity was in range of 0.00 to 0.17 Mean value of MEM retinoscopy for amblyopes was found out to be lag of OD :+1.32 ±0.59 D and OS +1.34 ±0.57 D , while that of control subjects was OD: +0.71 ±0.21 D , OS: 0.69±0.24 D. Paired t-test compares lag of accommodation obtained in amblyopes to that of normal subjects .p value was found to be significant i.e. less than 0.001.For amblyopes R^2 value came to be 2.6% while on the other hand R^2 value for controls was 87%.ASQE scoring for amblyopes was between range of 29 to 49 ,score for near work domain was 9.51 (mean of 1.58) for amblyopes , 6.78 (mean of 1.13)for controls.

CONCLUSION: Accommodative response in amblyopic subjects was affected as well as their quality of life as compared to controls. Lag of accommodation directly correlates with the near domain of quality of life score in amblyopes.

Introduction: Amblyopia is a preventable and a treatable condition especially if detected early. In amblyopes, apart from visual acuity other vital parameters like contrast sensitivity, stereopsis, accommodation are also affected. Due to time constraint all parameters cannot be assed in screening camps and/or clinic but measuring lag of accommodation would be a faster and of greater importance. At times in spite of a significant improvement in visual acuity improper accommodative response may develop considerable problems. Difficulty or faulty accommodative system can hamper many activities related to near work and hence affect quality of life of subjects. The purpose of this study was to assess accommodative status in amblyopic subjects and whether it affects the near domain of quality of life.

Method: The study was carried out at tertiary eye care centre in Gujarat. All subjects referred to outpatient department were included in analytical phase. After collection of demographic data, detailed history taking was performed. In the first stage of clinical examination, slit lamp examination was carried out for evaluating any anterior segment anomaly. Detailed fundus evaluation with binocular indirect ophthalmoscopy (BIO) was done to rule out any posterior segment abnormality. Later these subjects were referred to binocular vision and orthoptic unit, where objective and subjective refraction of all subjects was performed. Subjects whose best corrected visual acuity was less than normal were selected as subjects for detailed evaluation.

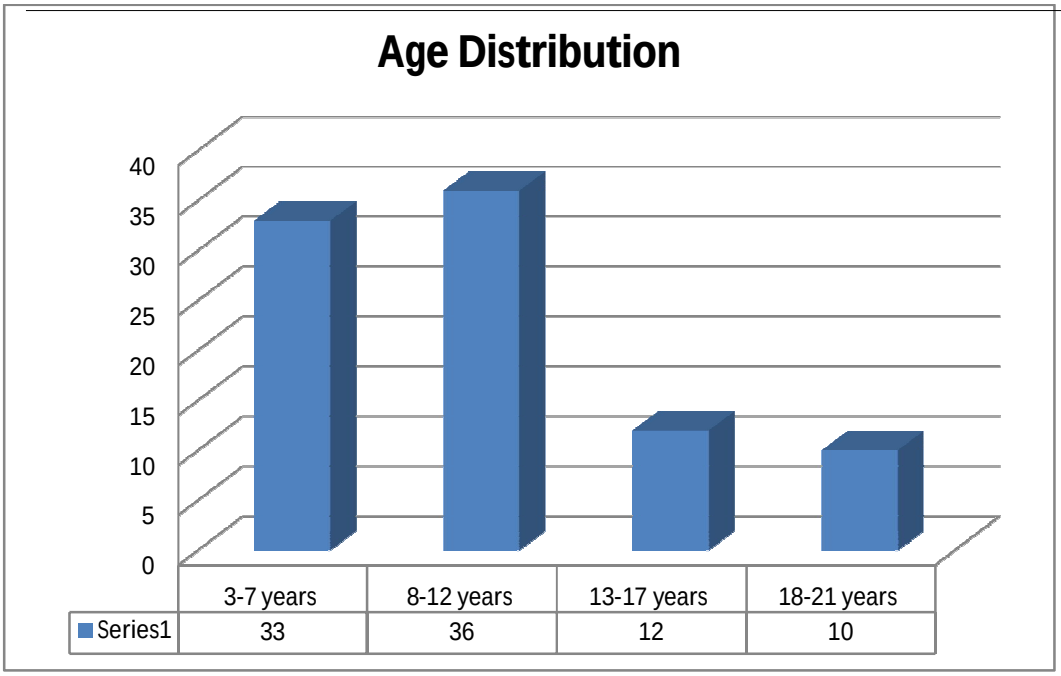
In the second phase selected amblyopic subjects were further evaluated. Atropine was used to perform cycloplegic refraction .Glasses with full correction was prescribed followed by adaptation period of one month. Number of occlusion hours was decided as per the Pediatric Eye Disease Investigator group guidelines[1]. Subjects who were on amblyopic therapy for at least more than 1 month were included in the study. Accommodative response was evaluated using dynamic retinoscopy technique MEM(monocular estimation method).

Functional amblyopic patient age 7 to 21 years, amblyopia associated with strabismus, anisometropia or both, visual acuity in the amblyopic eye poorer than 0.30 in logMAR inclusive, visual acuity in the sound eye 0.30 or better were included as subject. Ametropic subject with no anterior and/or posterior segment anomaly with best corrected visual acuity 0.00 to 0.17 monocularly in logMAR were considered ass controls. Subjects with nystagmus, any anterior or posterior segment pathology and visual deprivation amblyopia were excluded.

Amblyopia and Strabismus Questionnaire questionnaire[2] was translated to Guajarati language Translated questionnaire was validated by subject experts. A brief description about ASQE questionnaire and its purpose was explained to both subjects and their parents, they were also provided assistance if there was any query with questions, for very young children parents were allowed to fill up questionnaire

Statistical analysis was performed using SPSS software; unpaired t test was performed to assess the significant differences between lag of accommodation in case i.e. amblyopic population and controls. Regression coefficient was performed to assess the R square values, with an aim to study the relationship and dependency of age and accommodation.

Results: Total of 91 subjects diagnosed with amblyopia was enrolled in study between 3 to 21 years of age with a mean value of 9.6 ± 4 years. Best corrected Visual acuity in amblyopic eye was in range of 1.77 to 0.30 log units, while in better or good eye visual acuity was in range of 0.00 to 0.17.



Graph 1: represents age distribution in four different groups 3-7 years (n=33), 8-12 years (n=36), 13-17 years (n=12), 18-21 years (n=10).

Chart 1 represents percentage distribution out of 91 patients 37 i.e. 41% patients were found to be orthotropic while 54 patients i.e. 59% had some form of deviation.

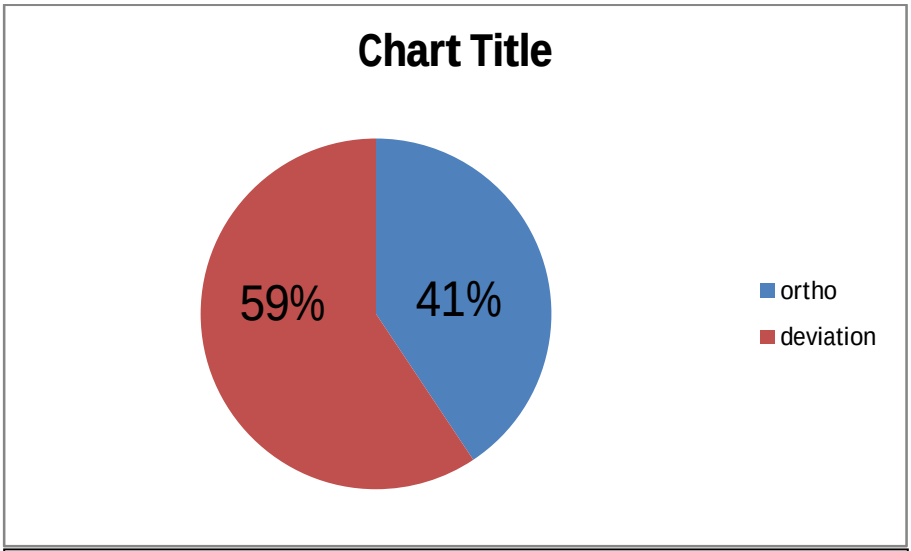
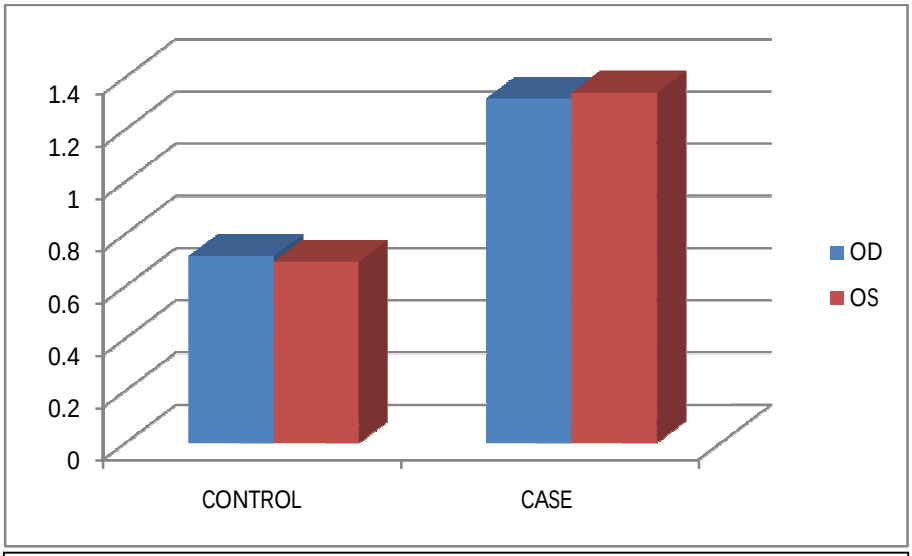


Chart 1: Distribution of subjects with and without deviation

Mean value of MEM retinoscopy for amblyopes was found out to be lag of OD :+1.32 ±0.59 D and OS +1.34 ±0.57 D , while that of control subjects was OD: +0.71 ±0.21 D , OS: 0.69±0.24 D.



Graph 2: lag of accommodation values

Graph 2 :depicts comparative values of lag of accommodation seen in case- control groups, significant lag of accommodation is observed in amblyopes as compared to normal subjects.

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	.70139	.91772	.15295	.39088	1.01190	4.586	35	.000
Pair 2	.60417	.84383	.14064	.31865	.88968	4.296	35	.000

Table 1: paired t test values for comparing lag of accommodation

Paired t-test was performed to compare lag of accommodation obtained in amblyopes with MEM values obtained from normal subjects .p value was found to be less than 0.001.

Regression coefficient was performed with an aim to calculate correlation coefficient i.e. R^2 value, for both amblyopes and controls. R^2 value establishes correlation between age of subjects and accommodative lag. For amblyopes R^2 value came to be 2.6% while on the other hand R^2 value for controls was 87%.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.161[a]	.026	.004	5.159

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.930[a]	.87	-.109	5.122

Table 2: regression coefficient values

ASQE scoring for amblyopes was between range of 29 to 49 which shows overall quality of life is affected. While the domain created, comprised of six questions that were associated with near work and hence accommodation, comparative scores of this domain was 9.51 (mean of 1.58) for amblyopes , 6.78 (mean of 1.13).

Discussion:

The objective of this study was to determine lag of accommodation in amblyopes and if there was an association between this lag and quality of life. In the study carried out by Steven c Hokoda and Kenneth J Ciuffreda, monocular accommodative amplitudes were always reduced in amblyopic eyes using the minus lens and retinoscopy techniques[6]. In the current study dynamic retinoscopy was used to assess accommodative lag. Hence to measure accommodation status accurately in paediatric population objective test that in MEM monocular estimation method was selected to evaluate lead/lag of accommodation. Significant lag of accommodation was found in amblyopes as compared to normal subjects.
Difficulty or faulty accommodative system can hamper many activities related to near work. From the result of our study, it can be seen that greater amount of lag affects near work related activities of subjects. As per the current lifestyle paediatric population is engaged with

lot of near work related activities hence it was of keen interest to see if quality of life is affected due to detriment of one of the important system of visual system.

ASQE scoring for amblyopes was between range of 29 to 49 , which suggests that overall quality of life is affected while the domain created, comprised of six questions that were associated with near work and hence accommodation, comparative scores of this domain was 9.51 (mean of 1.58) for amblyopes , 6.78 (mean of 1.13).

Looking at the scores obtained for this particular domain it can be concluded that near work is hindered and hence quality of life is affected. Discriminative validity was evaluated through comparison of the median scores of amlyopic subjects with those of the normal adults using the Mann–Whitney U test. Independent samples kruskal wallis test was used, The hypothesis laid was that, the lag of accommodation affects the quality of life. Results obtained are also similar. It retains the null hypothesis.

Conclusion: Accommodative response in amblyopic subjects was affected as compared to controls. Lag of accommodation directly correlates with quality of life score in amblyopes.

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