



Original Research Article

TREATMENT OF AMBLYOPIA WITH PARTIAL OCCLUSION IN CHILDREN AGED 5 TO 15: A CLINICAL STUDY

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ABSTRACT

Background: Binocular single vision can only be established if both eyes are ametropic and orthophoria. To have binocular single vision, both retinas must have normal point-to-point correspondence, with the fovea serving as the primary corresponding points. While both eyes may appear to have developed normally anatomically, amblyopia can result when the physiological development of one eye's visual acuity is disrupted.

Materials and Methods: This was the cross-sectional, 25 children were taken for the study at Department of Ophthalmology, REH, Kakatiya Medical College, Warangal, Telangana, India, from June 2022 to May 2023. Participants are between the ages of 5 and 15 that will be used. If a potential participant appears to meet all inclusion and exclusion criteria, they will be contacted about participating in the study.

Results: In our investigation, we found that amblyopia was more prevalent in the younger age group than in the older age group. In this research, slightly more boys than girls were tested. Patients who visited our OPD most frequently reported visual discomfort, followed by ocular deviation, when their concerns were properly analyzed. Fewer yet reported both asthenopia and vision difficulties.

Conclusion: The findings of this research highlight the critical necessity of community ophthalmology in the fight against amblyopia. In recent decades, there has been growing acceptance of the concept of avoidable blindness, which encompasses both preventable and curable forms of blindness.

Keywords: Clinical study, partial occlusion therapy, amblyopia, children.

INTRODUCTION

The building blocks of binocular single vision are ametropia and orthophoria in both eyes. A normal correspondence between the two retinas, with the fovea serving as the primary corresponding sites, is required for binocular single vision. Amblyopia can occur when one eye's visual acuity develops normally while the other's does not due to a physiological delay.^[1,2] Clinically, amblyopia is recognized as a decline in best-corrected visual acuity on one or both sides due to form vision deprivation and/or abnormal binocular interaction, in the absence of an obvious biological explanation. Amblyopia is classified as bilateral when best-

corrected central vision is less than 6/12 and as unilateral when there is a disparity of two lines or more between the two eyes. If timely treatment is administered, this form of vision impairment can be reversed. This definition relies entirely on measures of visual acuity, which ignore the qualitative changes in vision that amblyopes frequently experience and lead to far worse eyesight than what is measured.^[3-5] The most prevalent cause of preventable monocular blindness in children is amblyopia, which can have long-lasting effects on a person's scholastic and athletic success as well as their sense of self-worth. The fact that amblyopia may be treatable makes it a serious issue. Amblyopia is a leading cause of vision impairment in children. Nutritional blindness,

trachoma, congenital cataract, genetic and metabolic eye problems, corneal opacity, premature retinal detachment, and trauma are some of the other causes of vision loss in young children. About 35% to 40% of the world's population is made up of kids. Given that 30% of India's blind would go blind before turning 20, it's crucial that children with vision problems be identified and treated as soon as possible.^[6-8]

Thus, school-aged children are a crucial population to reach, and vision screenings at schools are crucial to the early discovery of amblyopia and the initiation of appropriate therapy, both of which are of great benefit in preventing the development of permanent visual morbidity. Since binocular single vision is the basic requirement for good performance in both academics and sports, my work is solely dedicated to screening the children, the future of the nation, in whom early identification of visual disability and proper management can drastically improve their scholastic performance. Amblyopia can be effectively managed with the use of simple, low-cost treatment as well as parental and child incentive. The concept of "critical period," which explains the reversibility of amblyopia in younger age groups when the brain and visual system are immature and connections between neurons are still being formed and stabilized, emphasizes the importance of introducing the treatment at an early age, thereby enhancing the visual outcome.^[7-9]

Therefore, this idea clarifies why treatment outcomes tend to worsen with patient age. Therefore, amblyopia can be completely cured if treatment begins at a young enough age.^[10] The purpose of this research was to assess the incidence of amblyopia among school-aged children in and around Warangal. Examine the various forms of amblyopia that manifest themselves over the academic years.

MATERIAL AND METHODS

This was the cross-sectional, 25 children were taken for the study at Department of Ophthalmology, REH, Kakatiya Medical College, Warangal, Telangana, India, from June 2022 to May 2023. Participants are between the ages of 5 and 15 that will be used. If a potential participant appears to meet all inclusion and exclusion criteria, they will be contacted about participating in the study.

Inclusion Criteria

- Patients that are 5 to 15 years old.

Exclusion Criteria

- Patients with a known cause of decreased visual acuity

- Prior intraocular surgery
- A known skin sensitivity to patch or bandage adhesive
- Patients who dropped out were noncompliant.

RESULTS

The ages of the patients ranged from 5-15 years old. In our investigation, we found that amblyopia was more common in the younger age group than in the older age group. The gender breakdown is seen in the table below. [Table 1]

In this research, slightly more boys than girls were tested. The study population reported the following problems, as shown in the table below. [Table 2]

The majority of patients who visited our OPD reported issues with their vision, followed by issues with eye deviation, and finally, a small percentage of patients reported issues with asthenopia. [Table 3]

Thorough examination of the anterior portion of these patients indicated that the majority had normal anatomy while the others had tropias. [Table 4]

Examination of the posterior segment often reveals a normal fundus, with some patients exhibiting slight temporal pallor. In order to rule out brain pathology, non-invasive imaging procedures, such as CT scans, were used to further assess the individuals who presented with temporal pallor. These patients helped us rule out organic causes of amblyopia by having normal CT scans. We excluded patients who had extreme myopia from the trial. [Table 5]

Simple myopia and simple hypermetropia were the most common refractive errors among these patients. Twenty percent of people were found to have simple myopia, while forty percent had simple hypermetropia. Partial occlusion treatment lasted anywhere from three to six hours daily. Children with moderate amblyopia were recommended three hours of daily occlusion, while those with severe amblyopia were recommended six hours. Patients were told the value of focusing their near vision on close objects. Encouragement from the child's parents and instructors in the use of occlusion patches was sought. [Table 6]

According to the results of the study, moderate amblyopia is more common than severe amblyopia. Visual acuity is considered moderate amblyopia, while 6/36 or worse is considered severe amblyopia. [Table 7]

Our research showed that the prevalence of amblyopia was greater in the rural population than in the urban population. [Table 8]

Table 1: Age Distribution

Sr. No.	AGE	Frequency	%
1.	5 – 10 years	16	64%
2.	11 – 15 years	09	36%
	Total	25	100%

Table 2: Sex Distribution

Sr. No.	SEX	Frequency	%
1.	Boys	13	52%
2.	Girls	12	48%
	Total	25	100%

Table 3: Distribution of Complaints

Complaints	Frequency	%
Asthenopia	3	12%
Visual Discomfort	12	48%
Tropia	8	32%
Asthenopia and Visual discomfort	2	08%
Total	25	100%

Table 4: Anterior Segment Examination

Sr. No.	Anterior Segment	Frequency	%
1.	Normal	18	72%
2.	Tropia	07	28%
	Total	25	100%

Table 5: Posterior Segment Examination

Sr. No.	Posterior segment	Frequency	%
1.	Normal	23	92%
2.	Temporal Pallor Present	1	4%
3.	Tesselated Fundus	1	4%
	Total	25	100%

Table 6: Refractive Status

Sr. No.	Refractive Status	Frequency	%
1.	Simple Myopia	05	20%
2.	Simple Hyperopia	10	40%
3.	Myopic Astigmatism	2	8%
4.	Hyperopic Astigmatism	2	8%
5.	Esotropia-hypermetropia	1	4%
6.	Exotropia- myopia	5	20%
	Total	25	100%

Table 7: Degree of Amblyopia

Sr. No.	Degree of amblyopia	Frequency	%
1.	Moderate	18	72%
2.	Severe	07	28%
	Total	25	100%

Table 8: Residence Distribution

Sr. No.	Residence	Frequency	%
1.	Rural	14	56%
2.	Urban	11	44%
	Total	25	100%

DISCUSSION

Screening for amblyopia at a young age has been demonstrated to improve outcomes, according to studies. Amblyopia rates have decreased in nations where preschoolers are given regular eye exams. Amblyopia screenings start early in life. Premature infants, children with a family history of congenital cataract, children with a history of delayed milestones, and children with a history of genetic sickness are all high risk individuals who should be checked for full eye examination. A paediatrician should refer a patient for a comprehensive ocular evaluation if there is a history of strabismus or ptosis in the family. Preschool vision screening typically looks for amblyopia and amblyogenic variables since, as has been noted in other

publications, amblyopia cannot be effectively treated after the age of 8.^[11,12]

Recent research on the therapy of amblyopia in older children has shown an improvement in visual acuity. Therefore, the study also includes older children who responded adequately to partial occlusion therapy in terms of their visual potential. There is a risk of recurrence of amblyopia that ranges from around 17 percent to 95 percent, even after adequate treatment for occlusion therapy. A recent study by the PEDIG group found that approximately 24% of children analyzed one year after therapy for amblyopia still showed signs of the condition. As soon as the 12th week has passed after treatment has been stopped, the recurrence rate can be tracked.^[13-15]

The prevalence of amblyopia was found to be greater in the younger age group in our study compared to the older age group. In this research, guys made up a slightly larger proportion of those screened than girls did. Patients who visited our OPD most frequently complained of visual pain, followed by a deviation of the eye, as evidenced by our thorough analysis of their complaints. Asthenopia and visual problems were only reported by a small number of patients.^[16,17]

Thorough examination of the anterior segment in these patients revealed normal anatomy in virtually all cases, with the exception of a few with tropias. Most individuals with mild temporal pallor had normal fundi on posterior region evaluation. Common refractive errors among these patients included myopia, hyperopia, and astigmatism in that order of prevalence. The incidence of myopic astigmatism equal to hyperopic astigmatism. Exotropia was more common than esotropia among tropias.^[18,19] In our study, the prevalence of amblyopia was greater among the rural population than among the urban. This information highlights the need for school screening programs to detect amblyopic youngsters living in rural locations. When patients with amblyopia were followed up with three months after undergoing partial occlusion therapy, it was found that the success rate was as high as while of the patients showed no improvement in visual acuity. Additionally, the length of occlusion therapy and the frequency of follow-ups for these patients were both increased. Occlusion therapy was suggested for three hours for individuals with mild amblyopia and six hours for patients with severe amblyopia.^[20-22]

Therefore, in order to reduce the recurrence risk of amblyopia, it is essential to perform adequate weaning of therapy, such as treating children who were given patching treatment for six hours per day with a weaning therapy of two hours patching per day prior to ceasing treatment. Until the child reaches visual maturity, the likelihood of a recurrence remains high. as in roughly ten years old. As a result, close observation is required up to the age of 1 year, every 2 months between the ages of 2 and 4, and every 4 to 6 months thereafter, until the age of visual maturity is achieved.^[23-26]

CONCLUSION

Since amblyopia is the leading cause of preventable blindness in children, it's critical that we find a way to treat it as soon as possible. The central vision abnormality known as amblyopia can be effectively treated with early diagnosis and treatment. More children will be able to receive treatment for amblyopia if routine screening programs for monitoring and early identification are implemented, especially in remote areas. As a result, exams of the macula and analyses of the optic nerve's performance are crucial. Thousands of

youngsters can benefit greatly from simple, cost-effective procedures taken early on, which can improve the health of the nation as a whole by restoring their vision. The community ophthalmologist plays a crucial part in amblyopia prevention as well. The concept of avoidable blindness, which encompasses both curable and preventable blindness, has gained popularity during the past few decades.

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REFERENCES

1. Pediatric eye disease investigator group. Treatment of Anisometropia amblyopia in children with refractive correction. *Ophthalmology* 2006; 113:895-903.
2. The Pediatric Eye Disease Investigator Group. The clinical profile of moderate Amblyopia in children younger than seven years" *Arch Ophthal* 2002; 120:281-7.
3. Thiagarajan P, Ganapathirajesh S, Hidayat N, Anitha S, Manonmani SV. A clinical study of partial occlusion therapy in management of amblyopia in children aged 5 years to 15 years. *Journal of Evolution of Medical and Dental Sciences*. 2016 Sep 22;5(76):5613-7.
4. Gao TY, Anstice N, Babu RJ, Black JM, Bobier WR, Dai S, Guo CX, Hess RF, Jenkins M, Jiang Y, Kearns L. Optical treatment of amblyopia in older children and adults is essential prior to enrolment in a clinical trial. *Ophthalmic and Physiological Optics*. 2018 Mar;38(2):129-43.
5. Holmes JM, Lazar EL, Melia BM, Astle WF, Dagi LR, Donahue SP, Frazier MG, Hertle RW, Repka MX, Quinn GE, Weise KK. Effect of age on response to amblyopia treatment in children. *Archives of ophthalmology*. 2011 Nov 10;129(11):1451-7.
6. Al-Zuhaibi S, Al-Harthi I, Coymans P, Al-Busaidi A, Al-Farsi Y, Ganesh A. Compliance of amblyopic patients with occlusion therapy: a pilot study. *Oman journal of ophthalmology*. 2009 May;2(2):67.
7. Chang L. Current Management of Amblyopia. In *Pediatric Ophthalmology* 2022 Oct 28 (pp. 45-52). Singapore: Springer Nature Singapore.
8. American Academy of Ophthalmology; Amblyopia preferred Practice Pattern. San Francisco, American Academy of Ophthalmology 2007.
9. Weber JL, Wood J. Amblyopia: Prevalence, natural history, functional effects and treatment. *Clinical and experimental Optometry*. 2005; 88: 365- 75.
10. Rohit Saxena, Shailesh GM. Amblyopia: Seeing beyond visual acuity. *Ophthalmology Today* 2008; 9: 120-122
11. F Hamton Roy MD, Frederick W, Fraunfelder MD, Frederick T, Fraunfelder MD. Current ocular therapy. Functional amblyopia. Saunders Elsevier, 6th edition; 2008: 213-15
12. Pediatric eye disease investigator groups. A comparison of atropine and patching regimens for moderate Amblyopia by patientage, cause of amblyopia, depth of amblyopia, and other factors. *Ophthalmology* 2003; 110:1632-7.
13. Clarke M, Wright C, Hrisos S, Anderson J, Henderson J, Richardson S. Randomised controlled trial oftreatment of unilateral visual impairment detected at preschool vision screening. *BMJ* 2003; 327:1251-56
14. Pediatric Eye Disease Investigator Group. Randomised trial of treatment of amblyopia in children aged 7-17 years. *Arch Ophthalmol*. 2005; 123:437- 47.
15. Pediatric Eye Disease Investigator Group. Treatment of anisometropic amblyopia in children with refractive correction. *Ophthalmology* 2006; 113: 895-903
16. Chen PL, Chen JT, Tai MC. Anisometropic amblyopia treated with spectacle correction alone: possible, factors predicting success and time to start patching. *Am J Ophthalmol* 2007; 143:54-60.

17. Pediatric Eye Disease Investigator Group: A randomized trial of patching regimens for treatment of moderate amblyopia in children. *Arch ophthalmol*.2003; 121:603-11.
18. Pediatric Eye Disease Investigator Group: A randomized trial of patching regimens for treatment of severe amblyopia in children. *Ophthalmology* 2003; 110: 2075-87
19. Williams C, Northstone K, Harrad RA, Sparrow JM, Harvey I, for the ALSPAC Study Team. Amblyopia treatment outcomes after screening before or at age 3 years: follow up from randomised trial. *BMJ* 2002; 324: 1549.
20. Patwardhan Neela A. Is age relevant for the success of treatment of anisometropic amblyopia? 2007; 55(6): 469-70.
21. Pediatric Eye Disease Investigator group. A prospective, pilot study on treatment of amblyopia in children 10-<18 years old. *Am J Ophthalmol* 2004; 137: 581-83
22. Brar GS, Banyopadhyay, Kaushik S, Raj S. Efficiency of occlusion therapy for management of amblyopia in older children. *Indian J Ophthalmol* 2006; 54: 257-60
23. Murthy GV, Gupta SK, Ellwein LB, Munoz SR, et al. Refractive errors in an urban population in New Delhi. *Invest Oph Vis Sci* 2002; 43: 623-31.
24. Dandona L, Dandona L, Srinivas M et al. Refractive errors in children in a rural population. *Invest Oph Vis Sci* 2002; 43: 615-22
25. Shah M, Khan MT, Khan MD, et al. Clinical profile of amblyopia in Pakistani children age 3 to 14 years. *J Coll Physicians Surg Pak*.2005; 15(6): 353-7
26. Hamdi MM, Galal AS, Ragheb TR, Fawzy SM. Comparison of the outcome of partial time occlusion therapy in strabismic versus anisometropic moderate amblyopes. *Journal of the Egyptian Ophthalmological Society*. 2022 Oct 1;115(4):199.