

Management of Anisometropic Amblyopia in adults

Ali Tayyab,¹ Ayisha Kausar,² Amena Masrur,³ Kamran Naseem⁴

Abstract

Amblyopia is characterised by decrease in vision in one or both eyes as a result of processing defect in the visual pathways of the brain. It is considered an irreversible process if detected in the adult age group. This study was conducted from July 1 to December 31, 2010, at Shifa Foundation Community Health Centre, Islamabad, to determine if anisometropic amblyopia detected in adults can be reversed. A total of 15 adults, 11 (73.33%) males and 4 (26.66%) females, were managed for anisometropic amblyopia. All the patients were prescribed full cycloplegic correction in the anisometropic eye simultaneously with part-time occlusion therapy. Success was defined as visual acuity of 6/18 or better at the end of the therapy. All patients were required to complete a structured questionnaire regarding their experiences with the therapy. Reversal of amblyopia was observed in 11 (73.33%) patients who felt more confident about performing tasks for which they had earlier considered themselves unsuitable. Poor compliance was responsible for not producing the desired outcome in 4 (26.66%) patients. Anisometropic amblyopia in adults is reversible with dedicated efforts on behalf of both the ophthalmologist and the patient.

Keywords: Adults, Anisometropic amblyopia, Occlusion therapy.

Introduction

Amblyopia is defined as developmental defect of spatial visual processing that occurs in the central visual pathways of the brain.¹ It is responsible for a majority of the cases of monocular visual disability in children.² Anisometropic amblyopia occurs due to the presence of an asymmetric refractive error in the two eyes. If it stays undetected, the disability endures in adult age. Though previously thought to be incurable, recent research reveals that we have a partial understanding of the plasticity of the visual system of the human brain, and adults with anisometropic amblyopia can also benefit

from appropriate therapy.³ Novel ideas in the treatment of anisometropic amblyopia, like video game therapy, might also be of help.⁴ Reversal of amblyopia in adults (defined as individuals of age > 18 years) has not been studied before in South Asian population in medline indexed literature. The purpose of this study was to investigate whether amblyopia detected in adults can be reversed using part-time occlusion therapy.

Methods and Results

A total of 15 adult patients, defined as age \geq 18 years, 11 (73.33%) males and 4 (26.66%) females were recruited between July 1 and December 31, 2010, at the Shifa Foundation Community Health Centre, Islamabad. The inclusion criterion was anisometropia as the only cause of decreased vision in the amblyopic eye. The fellow eye in all patients had an unaided visual acuity of 6/6. Patients with co-morbid (anisometropia with another independent cause of decreased visual acuity in the amblyopic eye) were excluded from the study. A full disclosure of the study was made to the patients and informed consent was taken from them. Explanation concerning anisometropia, amblyopia and how age can have an impact on visual function recovery was provided to all the patients. After detailed history, the patients underwent a complete ocular and orthoptic examination. Therefore, cycloplegic refraction with 1% topical cyclopentolate hydrochloride drops was performed followed by prescription of maximal tolerable refractive correction. A 4-week period of adaptation was allowed. Occlusion therapy for a continuous period of 5 hours/day for reversal of amblyopia was initiated along with the prescription of full cycloplegic correction. The patients were encouraged to use the amblyopic eye by performing routine ocular tasks which were dependent on the patient's profession. The patients were followed every month until the visual acuity showed no change on two consecutive visits.

The mean age of the patients was 20.47 ± 2.32 years (range: 18 to 24). The age, gender, presenting visual acuity, amblyopic eye, refractive error in the amblyopic eye and the final visual acuity were noted down (Table-1). Simple hypermetropic refractive error was responsible for amblyopia in 10 (66.66%) patients, while 5 (33.33%) patients had astigmatic anisometropic

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^{1,2}Department of Ophthalmology, Shifa College of Medicine, Islamabad. ³Post Graduate Trainee; Ophthalmology, Pakistan Institute of Medical Sciences, Islamabad. ⁴Shifa International Hospital, Islamabad, Pakistan.

Correspondence: Ali Tayyab. Email: ali.tayyab@gmail.com

Table-1: Patient characteristics at the start of the therapy.

Patient #	Age	Gender	Amblyopic Eye	Visual Acuity in amblyopic eye	Refractive Error in amblyopic eye	Final	Visual Acuity
1	18	Male	Right	6/60	+6.5/-1.5*180		6/24#
2	18	Male	Left	6/24	+3.00		6/12
3	20	Female	Left	6/24	-0.25/-2.5*180		6/6
4	20	Male	Right	6/36	+6.50		6/24#
5	24	Male	Right	6/36	+6.00		6/12
6	22	Male	Right	6/60	+5.50		6/12
7	24	Male	Left	6/36	+7.0/-3.0*35		6/24 #
8	20	Male	Right	6/36	+4.00		6/36 #
9	22	Female	Left	6/36	+4.00		6/18
10	22	Male	Left	6/60	+6.00		6/18
11	18	Female	Right	6/24	-4.00/-3.00*175		6/9
12	23	Male	Left	4/60	+5.0		6/18
13	18	Male	Left	6/24	+3.00		6/12
14	20	Female	Left	6/60	+4.00		6/18
15	18	Male	Left	6/60	+4.5/-1.5*180		6/18

#Therapy failed to produce the desired outcome.

Table-2: Patient responses at the end of the therapy.

Questions	Agree	Neutral	Disagree
I had consulted an ophthalmologist about my eye condition before	8	0	7
I was told to perform a similar therapy before but I did not do it (completely or partially)	0	0	15
I was confident that the therapy would help me if I did as I was told	5	5	5
I had to convince myself to continue the therapy despite little obvious improvement during the initial phase of the therapy	9	2	4
The results from this therapy will help me with tasks that I deemed myself incapable of doing before (including employment related)	11	0	4
I considered leaving the therapy due to ridicule at home/ college or work place	1	9	5
The therapy helped me gain self confidence	7	4	4

amblyopia. Visual acuity at the time of recruitment was $\leq 6/60$ in 6 (40%) patients; 5 (33.33%) patients had visual acuity of 6/36; while 4 (26.66%) patients had a visual acuity of 6/24.

Successful reversal of amblyopia, defined as final visual acuity of 6/18 or better in the amblyopic eye, at the end of the follow-up period was seen in 11 (73.33%) patients: 7 (63.63%) males and 4 (36.36%) females. Among the patients in which therapy was successful, 6 (54.54%) patients had a visual acuity of 6/12 or better, while 5 (45.45%) patients met the minimal criteria of 6/18 vision. The therapy did not produce the desired visual outcome in 4 (26.66%) patients; 3 (75%) of them failed to comply with the prescribed occlusion therapy, while 1 (25%) gave up the therapy when it failed to produce subjective improvement in visual acuity.

All patients were required to answer a structured questionnaire based on a 3-item Likert scale regarding their experience with the amblyopia therapy the results of which were noted down (Table-2).

Discussion

The reversal of amblyopia seen in our case series of patients exhibited the plasticity of the visual system in adults. Similar phenomena in the adult amblyopic brain have been shown by using video games⁴ or by employing perceptual learning technique in the form of repeated positional discrimination tasks.⁵

Successful reversal of anisometric amblyopia by occlusion therapy, using a management protocol that closely matched ours, was demonstrated in a study.⁶ However the age used to define the adult group was >12 years as opposed to our study which defined it as ≥ 18 years.

All the patients in our study who successfully completed the therapy had a visual acuity better than the prescribed criteria for low vision, as stipulated by the World Health Organisation (WHO) compared to their pre-therapy visual acuity which fell in the purview of low vision.⁷ Patients with better visual acuity at the time of recruitment generally had better final visual acuity.

Patients in which the therapy failed to produce the desired results had poor treatment compliance. This highlighted the importance of patching in the reversal of amblyopia in our patients. Monitoring compliance is a major concern when managing amblyopia in adults.⁶ If we excluded these patients from our study, the success rate would be higher. Interestingly, all the patients in whom therapy failed to produce the desired visual acuity were males. Epidemiological factors influencing therapy outcomes need to be explored in a large study to understand gender-based failure rates.

Left eye was more affected by anisometropic amblyopia as compared to the right. This was in agreement with published literature and was influenced by factors that included microtropia, sighting dominance, developmental or neurological factors, laterality in the development of refractive error.⁸

The study also showed that ophthalmologists are reluctant to encourage adult amblyopic patients to enter a therapy programme. Eight (53.33%) of the 15 patients in our study had prior ophthalmic consults for their amblyopia. None of them were encouraged to try amblyopia therapy.

Our study also reflected the demographics of adult anisometropic population. Of the 11 male patients recruited in the study, 5 were diagnosed with anisometropia during medical screening for overseas employment.

The psychological impact of the therapy was highlighted by one of the patients who had considered dropping out due to peer pressure. The patient, when interviewed at the end of the therapy, felt more confident about competing with her peers. Though alteration of psychological functions in adults undergoing amblyopia therapy have not been explored, studies done on teenagers showed that peer pressure is a factor that influences psychology of these patients.⁹

The therapy also boosted self-confidence of the patients

who had undergone successful reversal of amblyopia. All the participants, who successfully completed the therapy, felt that they could perform tasks that they had earlier found themselves unsuitable for, and thought they could compete better for employment opportunities.

Conclusion

Patients of all ages with anisometropic amblyopia must be encouraged to enter a management programme with clearly stated goals and outcomes with frequent follow-ups to monitor progress and provide necessary counselling and encouragement. Successful reversal not only provides visual rehabilitation but also improves the quality of life as well as self-confidence, and offers greater chance of employment. To fully explore the benefits of amblyopia therapy in adults, a large-scale multi-centre randomised clinical study is required at the regional level.

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