



## RESEARCH ARTICLE

## Comparative Study of Anisometropic Amblyopia treatment with Spectacles alone and Combined spectacles with Patching

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### ABSTRACT

Comparative study of anisometropic amblyopia treatment with spectacles alone and combined spectacles with patching

**Purpose:** To compare duration and amount of improvement with spectacles alone and spectacles with patching in anisometropic amblyopia.

**Study Design:** Prospective comparative interventional study

**Methods:** This prospective study was conducted at Department of Ophthalmology GMC Doda, GMC Rajori, GMC Handwara, GMC Anantnag and District hospital pulwama J&K for period of five years. Difference in BCVA of 2 snellen lines or more in absence of any structural abnormality or visual pathway was considered indicative of amblyopia.

**Inclusion criteria:** Unilateral amblyopia, V/A < 6/9, Age 4 to 10 years, Anisometropia > 1D

**Exclusion criteria:** Stimulus deprivation amblyopia, Age < 4 & > 10 years, Bilateral Amblyopia, Already treated or under treatment amblyopia. 68 Amblyopic children were either treated with spectacles alone or with combined spectacle and patching. Follow up was done after every 2 months.

**Results:** Among 68 amblyopic children 30 were treated with spectacles alone and 38 were treated with combined spectacles and patching. Mean age at start of treatment in former was 6.2 +/- 2.3 and 5.8 +/- 2.6 in combined group. Final V/A after treatment was 20/40 and 20/25 respectively among two groups. Mean time of amblyopia improvement was 7.3 +/- 4.1 and 6.2 +/- 3.5 in spectacles alone and combined spectacles and patching respectively.

**Conclusion:** Amblyopic children treated with combined spectacles and patching showed better results in amount as well as duration of treatment than those treated with spectacles alone.

**Keywords:** Anisometropic amblyopia, Spectacle correction, Occlusion therapy, Best corrected visual acuity (BCVA).

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### INTRODUCTION

Amblyopia means unilateral or less commonly bilateral reduction in best corrected visual acuity that can not be attributed directly to the effect of any structural abnormality of the eye or the posterior visual pathway. A difference in best corrected visual acuity of two snellen lines or more is indicative of amblyopia. Amblyopia can be Strabismic, Anisometropic, Isoametropic, Stimulus deprivation or Meridional amblyopia. Amblyopia develops due to visual or light deprivation or abnormal retinal correspondence. Amblyopic eye also known as lazy eye provides blurred image to the retina and brain leading to amblyopia. Refractive correction along with occlusion is efficacious and preferred treatment for amblyopia by many ophthalmologists but occlusion has its own risks and besides less compliance there is also social issue. Many authors had reported orthophoric eyes becoming strabismic after occlusion and there is risk of development of amblyopia in sound occluded eye. In present study we studied whether

spectacle correction alone can be successful and as effective as combined spectacles with patching in the treatment of amblyopia

### Study Design

Prospective cross-sectional study

### Methods

This prospective study was conducted at Department of Ophthalmology GMC Doda, GMC Handwara, GMC Rajori, GMC Anantnag, and District hospital pulwama for period of 5 years from January 2021 to Jan 2026

### Inclusion criteria

Unilateral amblyopia, V/A < 20/30, Age > 4 years to 10 years, Ametropia > 1D,

### Exclusion criteria

Bilateral Amblyopia, Stimulus deprivation amblyopia, Age < 4 & > 10 years, Ametropia < 1D, already treated or under

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treatment amblyopia, 68 amblyopic children aged between 4 to 10 years were selected as per inclusion and exclusion criteria. Visual acuity was noted in each child. Difference of atleast two snellen's lines between two eyes was diagnostic of amblyopia. After initial visual assessment cycloplegic refraction was done using 1% atropine in children younger than 5 years and 1% cyclopentolate in older children. Full correction was prescribed to children. In some children who were intolerant (mostly higher degree hyperopes) 1D less than full cycloplegic correction was prescribed. Best corrected visual acuity using appropriate glasses was noted. Children were randomly subjected to spectacle alone or spectacles with patching. 38 children were given occlusion therapy by patching along with appropriate spectacle correction and 30 children were treated with spectacles alone without occlusion therapy. Occlusion was done by patching sound eye for 4 hours for 6 days in a week. Advice was given to strictly use spectacles along with patching. Both groups were advised to use spectacles for full time. Children were followed after every 2 months from start of treatment till one and a half year. At every follow up visual acuity was noted, cycloplegic refraction was done and appropriate adjustment in spectacle prescription was made if needed. Snellen's visual acuity data was converted

to log mar and data was subjected to statistical analysis. P value of  $\leq 0.05$  was considered significant.

## RESULTS

Among 68 amblyopic children 41 were male and 27 female. Mean age among males was 6.9 +/-1.2 and females 6.5 +/- 1.9. 23 children ( 13 males and 10 females) were aged between >4-6 years, 33 children (21 male and 12 females) were aged > 6 to 8 years and 12 children (7 males and 5 females) were aged > 8 to 10 years. 25 children (16 males and 9 females) were Myope, 30 children (18 males and 12 females) were hyperope and 13 children (7 males and 6 females) were having astigmatism. Myopes had refractive error of -2 to -7 D. Hyperopic error was between +1.5 to +6 D and astigmatic error between +/- 1.75 to 4.00 D. 20 children (11 males and 9 females) had initial visual acuity of 20/30 to 20/60, 33 children (22 males and 11 females) had initial visual acuity between 20/80 to 20/120 and 15 children (8 males and 7 females) had initial visual acuity of 20/120 to 20/200. Mean initial visual acuity among myopic was 20/100 (males 20/80 and females 20/120, among hyperopes 20/100 (males 20/120 and females 20/80). Initial visual acuity among astigmatic was 20/170 (males 20/200 and females 20/100). 38 children were given occlusion therapy by patching along with appropriate spectacle correction and 30 children were treated with spectacles alone without occlusion therapy. Mean age at start of treatment in former was 5.8 +/- 2.6 and 6.2 +/-2.3 and spectacles alone group. Among those treated with combined treatment 15 were myopes, 18 hyperopes and 5 having astigmatism. Among those treated with spectacles alone 10 were myopes, 12 hyperopes and 8 having astigmatism. Mean initial visual acuity was 20/120 and 20/100 in combined and spectacle alone group respectively. Among 38 children who were treated with combined spectacles and patching 7 (18.5%) didn't show any improvement in visual acuity and in 31 (81.5%) children mean final visual acuity of 20/25 was achieved. Among 30 patients treated with spectacles alone 8 (26.6%) didn't show any improvement and in 22 (73.3%) mean final visual acuity of 20/40 was achieved. Mean visual acuity achieved in combined treatment group was 20/30, 20/25 and 20/40 among myopes, hyperopes and astigmatics respectively. Mean visual acuity achieved in children treated with spectacles alone was 20/40, 20/50 and 20/40 in myopes, hyperopes and astigmatics respectively. Mean time to reach final visual acuity among combined treatment and spectacle alone group was 6.2 +/- 3.5 and 7.3 +/- 4.1 months. Mean time to reach final visual acuity in children treatment with combined spectacles and patching was 5.6

+/- 3.2, 6.9 +/- 3.7 and 6.5 +/- 3.9 in myopes, hyperopes and astigmatics respectively. Mean time to reach final visual acuity in children treatment with spectacles alone was 7.2 +/- 4.1, 8.2 +/- 5.1 and 5.9 +/- 4.1 in myopes, hyperopes and astigmatics respectively.

## DISCUSSION

The basic factors responsible for amblyopia include visual deprivation (anisometropia/Isoametropia) which can be Monocular or Binocular visual deprivation, Light deprivation (In stimulus deprivation), Abnormal binocular interaction (in strabismus), Foveal form vision deprivation or Active cortical inhibition. Anisometric Amblyopia occurs due to difference in refractive power between two eyes which causes disparate images to project upon the two foveas. The eye projecting blurred image to brain is not preferred by brain and becomes lazy. This visual acuity doesn't improve initially even after appropriate spectacle correction but can be reversed till amblyogenic age usually up to 8 years. In present study we tried to find out whether Amblyopia can be reversed by projecting clear image to fovea of amblyopic eye without necessarily blurring the non-amblyopic eye. In our present study we assessed age, visual acuity, initial best corrected visual acuity, type and amount of ametropia and correlated it with outcome like amount of maximum improvement and time to reach improvement that can be achieved with spectacles alone and compared results that were achieved with treatment by combined spectacles and blurring image of dominant eye.

In our study we had quite larger number of patients, 68 amblyopic children (41 males & 27 females). Hyperopes (30) were more than myopes (25) and lesser number of astigmatic children (13). Number of children were more in age group of 6-8 years at time of initial presentation to us. Mean initial visual acuity between combined and spectacle alone group was not statistically different ( $P < 0.10$ ) being 20/120 and 20/100 in combined and spectacle alone group respectively. Initial visual acuity was not significantly different among myopes and hyperopes  $P < 0.07$  but was significantly lesser in Astigmatics  $P < 0.03$ . 38 children were treated with combined spectacles and patching and 30 with spectacles alone. In both groups number of hyperopes was more than myopes and lesser number of astigmatic children. Patients were followed after every two months after starting treatment. Children treated with combined spectacles and patching showed better results than spectacles alone not only in terms of number of patients improved but also in terms of amount of final visual acuity achieved and time interval taken to

reach final visual acuity. 81.5% of children who were treated with combined treatment showed improvement where as only 73.3% of children treated with spectacles alone showed improvement. Difference was statistically significant ( $P \leq 0.01$ ). Final visual acuity achieved by combined treatment was significantly higher 20/25 than spectacles alone group 20/40 ( $P \leq 0.005$ ). Visual acuity improved from 20/120 to 20/25 in combined group and from 20/100 to 20/40 in spectacles alone group. In myopes visual acuity improved from 20/100 to 20/30 by combined treatment and from 20/120 to 20/40 by spectacles alone treatment. In hyperopes visual acuity improved from 20/120 to 20/25 by combined treatment and from 20/100 to 20/50 by spectacles alone treatment. In astigmatics visual acuity improved from 20/170 to 20/40 by combined treatment and from 20/80 to 20/40 by spectacles alone treatment. Mean time interval to reach final visual acuity was significantly less ( $P \leq 0.008$ ) in combined treatment group than spectacles alone group (6.2 +/- 3.5 and 7.3 +/- 4.1 months in combined treatment and spectacle alone group respectively). In both groups hyperopes took more time interval to reach final visual acuity than myopes and astigmatics but time interval taken was significantly better in myopes ( $P \leq 0.005$ ) and hyperopes ( $P \leq 0.003$ ) treated with combined treatment than treated with spectacles alone. Surprisingly unlike myopes and hyperopes time interval taken by astigmatics was significantly more ( $P \leq 0.008$ ) in those treated with combined treatment than treated with spectacles alone. Children who presented with worse visual acuity at initial presentation and also who presented at older age took more time interval to reach final visual acuity.

## CONCLUSION

Visual deprivation amblyopia due to ametropia can be treated by spectacles alone and also with spectacles combined with occlusion. In present study we compared improvement achieved by two. Those treated with combined spectacles and patching showed better results than spectacles alone not only in terms of number of patients improved but also in terms of amount of final visual acuity achieved and time interval taken to reach final visual acuity. Improvement was seen in 81.5% of children who were treated with combined treatment and 73.3% of children treated with spectacles alone. Final visual acuity achieved by combined treatment was significantly higher 20/25 than spectacles alone group 20/40 ( $P \leq 0.005$ ). Visual acuity improved from 20/120 to 20/25 in combined group and from 20/100 to 20/40 in spectacles alone group. Mean time interval to reach final visual acuity was significantly less ( $P < 0.008$ ) in combined treatment group than spectacles alone group (6.2 +/- 3.5 and

7.3 +/-4.1 months in combined treatment and spectacle alone group respectively). Children who presented with worse visual acuity at initial presentation and also who presented at older age took more time interval to reach final visual acuity. Hyperopes achieved improvement in more time than myopes and astigmatics in both groups.

In conclusion we can say combined treatment by appropriate spectacle and occlusion is better option in treating amblyopic children than spectacle alone treatment

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