

# Comparison of Patching for Strabismic and Anisometropic Amblyopia

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*Pak J Ophthalmol 2017, Vol. 33 No. 1*

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**Purpose:** To compare the effectiveness of patching for the treatment of strabismic and anisometropic amblyopia among 4-10 years old children.

**Study Design:** Prospective case series.

**Place and Duration of study:** Amanat Eye Hospital from May 2014 to November 2014.

**Material and Methods:** Prospective case series was conducted in 100 children among the age group 4 – 10 years. Cycloplegic refraction was done by the use of cyclopentolate eye drops 1.0% in every child. After best-corrected refraction in the amblyopic eye, patients were instructed to use glasses strictly along with patching of the good eye. Patching was done for the time period of 2 hours, 3 hours and 6 hours according to the severity of amblyopia.

**Results:** The mean age and SD of the patients was 7.09 years $\pm$ 1.821SD. There were 56% male and 44% female. There was an insignificant difference in best-corrected visual acuity for strabismic and anisometropic amblyopia among three and six months patching result. Vision improvement was seen in 75% patients while 25% did not improve after three months of the patching treatment. After further three months of patching treatment and at the end of 6 months, further vision improvement was observed in 51% patients while 49% did not improve. Vision improvement at six months after 3 months of further patching treatment was comparatively less than the initial three months of patching treatment.

**Conclusion:** Improvement of vision in first three months of patching treatment was comparatively greater than further 3 months of patching (at the end of six months) among patients with strabismic and anisometropic amblyopia.

**Key words:** Amblyopia, patching therapy, strabismus, anisometropia.

Amblyopia is a visual disorder due to the ineffectiveness of eye and brain working together. It is the most common causes of decreased vision among children and younger adults. It is always associated with strabismus, anisometropia or form deprivation early in life<sup>1</sup>. Amblyopic patients have poor spatial acuity, low contrast sensitivity and reduced sensitivity to motion<sup>2</sup>. About 90% of work in the children's eye services is related to amblyopia<sup>3</sup>.

The standard treatment for amblyopia is occlusion therapy, which involves patching of the dominant eye to encourage the use of an amblyopic eye. In young

children, this treatment is quite effective with 75% of the children showing improvement in visual acuity<sup>4</sup>. However, its effectiveness decreases in older children and adults<sup>5</sup>.

Adults with amblyopia<sup>6</sup> are currently offered no treatment in clinical practice, due to the finding that patching of the fellow eye is ineffective after the age of 10 years<sup>7</sup>, presumably due to the lack of plasticity in the adult visual cortex<sup>8</sup>. However, recent studies have shown that monocular functions of the amblyopic eye can be partly recovered as a result of intensive training of the amblyopic eye, which in turn suggests the

existing of some degree of plasticity in adult amblyopes at the monocular site<sup>9,10</sup>. Poor response to amblyopia treatment includes older age, worse visual acuity and strabismus.

Compliance is another factor that can have the major effect on the final outcome of treatment for amblyopia. The level of compliance with occlusion treatment has been found to be poor<sup>11,12</sup>. In addition to clinical parameters, it has been related to factors involving communication with the parents and patients<sup>13,14</sup>. Education of the parents with written information concerning amblyopia, the critical period and treatment reduced the level of non-compliance.

The objective of the study was to evaluate the efficacy of patching treatment in terms of best corrected visual acuity in strabismic and anisometropic amblyopic patients after the follow-up period of 3 months and 6 months among 4-10 years age group.

## MATERIAL AND METHODS

A prospective study was conducted in the settings of Amanat Eye Hospital, Rawalpindi. Consecutive sampling technique was used to collect the sample of 100 children from May 2014 to November 2014 who presented with amblyopia and were 4-10 years old. There were 50 patients who presented with anisometropia and 50 with strabismus. Properly informed consent was taken from parents of the amblyopic patients. An approval was taken from the hospital ethical committee.

Inclusion criteria were, age of 4-10 years, no improvement with best-corrected refraction in one eye than other, amblyopia associated with strabismus and anisometropia, cycloplegic refraction, no history of the previous patching. Exclusion criteria included neurological impairment, nystagmus, macular and optic nerve disease.

Monocular and binocular visual acuity was taken by using Snellen's chart at the distance of 6 m. After pupillary reactions and ocular motility were assessed, cover-uncover test and prism cover test were performed in strabismic patients. Cycloplegic refraction was done by the use of cyclopentolate eye drops 1.0% in every child. After obtaining the best-corrected refraction in the strabismic and anisometropic patients, they were instructed to use glasses along with patching of the good eye to encourage the use of an amblyopic eye. Patching was done for the time period of 2 hours, 3 hours and 6

hours according to the severity of amblyopia. The patients who were responding to the occlusion therapy, patching time was reduced. Detailed information and instructions to the parents and children regarding poor compliance to patching therapy and visual outcomes of patching therapy were explained. Patients were followed up at 3 months and 6 months for evaluating improvement in visual acuity with patching treatment, no patching was done for more than 6 months.

Statistical analysis was performed by using SPSS version 22.0. Visual acuities were converted to Log MAR for statistical analysis. Pre and post-op visual acuity before and after the patching treatment was compared using independent sample t-test. All the results were evaluated at the confidence interval of 95%.  $p$ -value  $< 0.05$  was considered to be statistically significant.

## RESULTS

The mean age of the patients was 7.09 years  $\pm$  1.821 SD. There were 56% males and 44% females. Right eye was affected in 57% and left eye was affected in 43% of the participants.

An independent sample t-test was conducted to compare the best-corrected visual acuity after three months of patching treatment in strabismic and anisometropic amblyopic patients. There was an insignificant difference in best-corrected visual acuity for strabismic and anisometropic patching treatment with  $p$  value = 0.894 at 95% CI = (-0.0830 to 0.0950). The effect size was small (0.01). The results of three-months patching treatment in the amblyopic eye are shown in Table 1.

Graphical representation showed total vision improvement in strabismic and anisometropic amblyopia after three months of patching treatment, as vision improved in 75% and did not improve in 25% (Figure 1).

Independent sample t-test reported that there was an insignificant difference among strabismic and anisometropic amblyopia after six months of patching treatment with  $p$ -value = 0.815 at 95% CI = (-0.0745 to 0.0945). The effect size was small (0.01). Six months patching treatment visual results were shown in table 2.

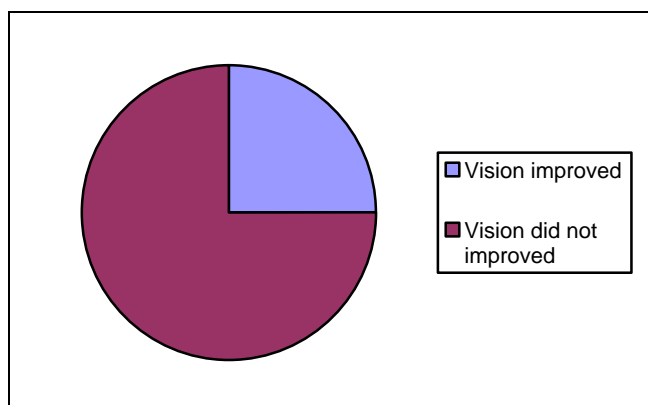
Graphical representation showed vision improvement in strabismic and anisometropic amblyopia after six months of patching treatment, as

**Table 1:** Results of initial three-months patching treatment in amblyopic eye.

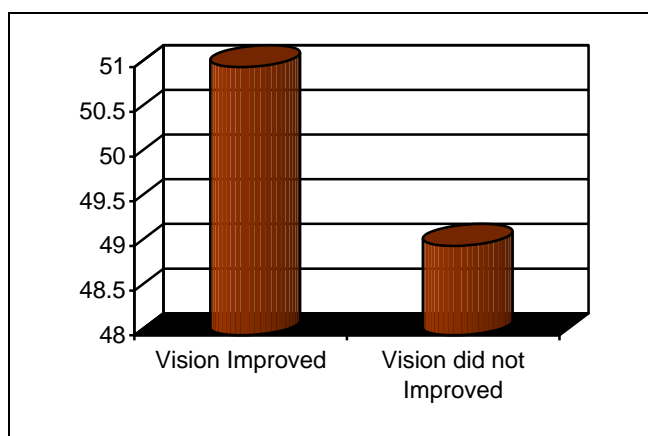
Type of Amblyopia	Vision Improved	Percentage	Vision did not Improved	Percentage	p-value (Effect Size)
Strabismic Amblyopia	38	76%	12	24%	0.894(0.01)
Anisometropic Amblyopia	37	74%	13	26%	

**Table 2:** Results of further 3 months of patching treatment in amblyopic eye seen at the end of 6 months.

Type of Amblyopia	Vision Improved	Percentage	Vision did not Improve	Percentage	p-value (Effect Size)
Strabismic amblyopia	24	48%	26	52%	0.815 (0.01)
Anisometropic amblyopia	27	54%	23	46%	



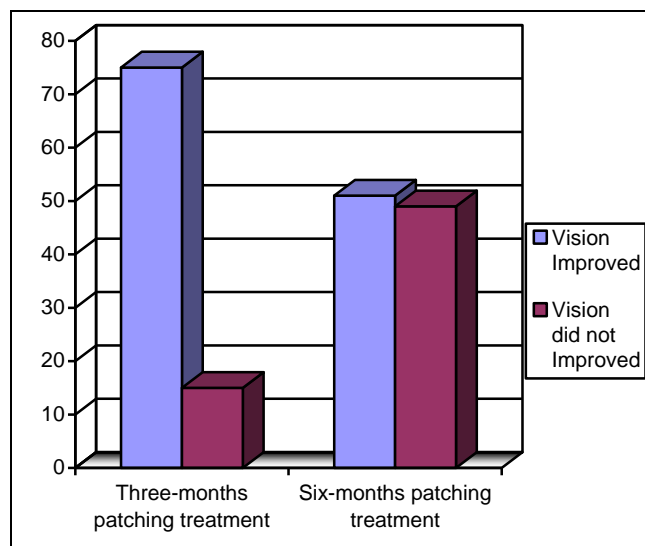
**Fig. 1:** Three months patching result.



**Fig. 2:** Six months patching result.

vision improved in 51% and did not improve in 49% (Figure 2).

Graphical representation showed that the results of vision improvement were comparatively less in strabismic and anisometropic amblyopia with six months patching treatment as shown in figure 3.



**Fig. 3:** Three and six months patching result.

**DISCUSSION**

This comparative study assessed the strabismic and anisometropic amblyopic patching therapy among the age group 4-10 years. Correction of refractive error

with spectacles along with the patching treatment results in significant improvement in visual acuity. It is generally believed that the critical period for visual development in humans ends at the age of 6 to 7 years. Some eye care professionals believed that amblyopia treatment is effective until 9 or 10 years. The American academy of ophthalmology preferred practice pattern for amblyopia recommends treatment up to age 10 years<sup>15</sup>.

Oliver et al<sup>16</sup> reported that children older than 8 years showed a significant improvement in their visual acuity, almost as good as that in younger children. Rutstein and Fuhr<sup>17</sup> reported that age above 8 years, visual acuity of 6/12 or better could be obtained in only 27% of patients. However, in this study visual acuity of 6/12 or better could be obtained in 30% of patients older than 8 years.

Epelbaum et al<sup>18</sup> reported that the results of patching therapy could be observed best when patching treatment is done before three years of age in strabismic amblyopia. Rutstein et al<sup>19</sup> reported that the visual acuity improvement is somewhat lesser in patients older than seven years than in younger patients. However, In this study there was a child aged 8 years presented with anisometropia, best corrected visual acuity 6/24 after giving patching trial of 6 hours, visual acuity improved to 6/12 and then after six months reached to 6/7.5. Visual improvement initially was faster in the patching group, but after six months analysis the difference of both patching group was small.

Various studies have favored amblyopia treatment at the age < 6 – 7 years<sup>20,21</sup> but few studies have reported better outcomes in older children<sup>22,23</sup>. This study results showed that the visual outcomes were independent of the patient's age, suggesting that the amblyopia can be treated successfully beyond the age that is considered to be the critical period for the visual development.

Increased prevalence of blindness in the population is still a reality in this part of the world. One way of preventing future blindness is to detect amblyopia at an early stage and give adequate patch treatment. This could be done by school health care, at eye clinics, in the local health center, thus preventing blindness for a low cost.

The limitations of the study include smaller sample size and shorter follow-ups.

## CONCLUSION

This study concludes that the improvement of vision after three months of initial patching treatment was comparatively greater than further 3 months of patching (at the end of 6 months) among patients with strabismic and anisometropic amblyopia.

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Ms. Sumaira Amir  
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Dr. Mubashir Jalis  
Sharing of data.

Ms. Sadaf Ishtiaq  
Data analysis.

Ms. Bisma Ikram  
Data analysis.

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