

Does compliance with amblyopia management improve following supervised occlusion treatment?

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PURPOSE. *To demonstrate improvement in compliance following supervised occlusion therapy for amblyopia in children who had failed to respond to outpatient treatment.*

METHODS. *Retrospective review of the visual outcome of 30 children who were admitted to an ophthalmology ward for 1-day intensive supervised occlusion. These children had documented poor compliance and previously failed to respond to the outpatient occlusion treatment. During their stay a trained ophthalmology nurse educated parents regarding amblyopia and the benefits of occlusion therapy. Visual acuity (VA) of the amblyopic and fellow eyes was recorded on admission, discharge, and at each subsequent visit. The compliance was recorded from parent's history and also indirectly by noticing improvement in vision.*

RESULTS. *The mean supervised occlusion was 7.4 hours (range 4-12 hours). The compliance with occlusion therapy improved in 23 children (77%) after discharge. The mean duration of occlusion after discharge improved to 4 hours (range 1-12 hours). The mean follow-up was 18 months (range 4-24 months). Though there was no dramatic improvement in VA at discharge there was a statistically significant improvement in VA between admission and last recorded VA ($p < 0.0001$). Of the 23 children who were compliant with occlusion following discharge, 21 (91%) gained at least one line of acuity in their amblyopic eye on the last assessment of their VA and five of them achieved 6/12. Of the seven children who did not comply with occlusion following discharge, only one patient gained one line improvement in his amblyopic eye.*

CONCLUSIONS. *This study shows that supervised occlusion treatment and parental education was effective in children who had initially failed traditional outpatient treatment. (Eur J Ophthalmol 2007; 17: 823-7)*

KEY WORDS. *Occlusion, Amblyopia, Admission, Compliance*

Accepted: March 13, 2007

INTRODUCTION

Amblyopia has traditionally been defined as a "decrease of visual acuity caused by formed vision deprivation or abnormal binocular interaction for which no cause can be detected by the physical examination of the eye, and which in appropriate cases is reversible by

therapeutic measures" (1, 2). It affects up to 3.5% of children and is the most common cause of unioocular visual impairment in children and young adults (2) in the developed world. Visual loss from amblyopia is preventable or reversible with the right kind of intervention in most cases. The recovery of vision depends on how mature the visual connections are, the length of depri-

vation, and at what age the therapy is begun (3). Occlusion therapy with patching of the sound eye has been the mainstay of amblyopia treatment despite the lack of meaningful data demonstrating its superiority compared with other modalities. Opinions vary on the number of hours of patching per day that should be prescribed, ranging from a few hours to all day hours (1-5).

Compliance with occlusion therapy is often cited as a major problem because of patients' dislike of occlusion owing to skin irritation and other social and psychological reasons. Reported rates of compliance range widely from 49% to 87% (5-8). In one study with 496 subjects examining compliance with occlusion therapy, 92 (18%) failed to follow the occlusion regimen (8). Not unexpectedly, the success of occlusion therapy is reported to be dependent on compliance. This may at times be difficult to implement because the child might be unwilling to cooperate or it might be considered socially undesirable. In order to achieve compliance with occlusion therapy, parents must have full understanding of the issues surrounding amblyopia and its treatment (5-11).

Previous study revealed the benefits of admitting children who failed to comply with outpatient occlusion therapy (12). Children were admitted for 5 days of supervised inpatient occlusion treatment. During admission, they had full time supervised occlusion therapy and in the majority of these children, the therapy was effective. Achieving compliance with occlusion during admission can inspire parents to continue after discharge. However, is a 5-day admission necessary in order to increase compliance with occlusion?

The main aim of this review was to demonstrate improvement in compliance following 1 day of supervised occlusion therapy for amblyopia in children who had failed to respond to outpatient treatment.

MATERIALS AND METHODS

This retrospective review was designed to investigate the visual outcome of 30 children who were admitted to the ophthalmology ward of Sunderland Eye Hospital (UK) for 1-day intensive supervised occlusion therapy from January 1999 to January 2006. The case records of the 30 children were available at the time of investigation. The group of children admitted for inpatient treatment had documented poor compliance to patching and previously failed to respond to the outpatient occlusion treatment.

All children were refracted and appropriate spectacles were prescribed. However, most of the children who did not comply with occlusion were not complaint with glasses as well. An initial occlusion regime of 2 hours at least a day had been prescribed and increased if the vision failed to respond. Atropine was considered in eight patients without any improvement effect.

Visual acuity (VA) was recorded using age-appropriate methods of assessment including Cardiff cards, Kay pictures, Sheridan-Gardiner single letter, and linear Snellen acuity when appropriate. Visual acuities have been recorded as Snellen equivalents and for statistical analysis acuities have been converted to logMAR equivalents. Visual acuity of the amblyopic and fellow eyes was recorded at each outpatient visit, on admission and at discharge. After discharge vision was checked at 2 to 3 weeks, 3 months, 12 months, and at the most recent clinic visit if still receiving treatment, or at the final clinic visit if discharged.

On admission day, the patient's family was introduced to the ward and the playroom was set up with activities, e.g., jigsaw puzzles and coloring books. Visual acuity was measured by an orthoptist on admission and at the end of the day using the same method. During admission the children received appropriate spectacle wear and full time occlusion therapy under direct staff supervision. A well-trained ophthalmology nurse educated parents regarding amblyopia, benefits of occlusion therapy, and critical period for vision (ABC). The compliance with occlusion after discharge was recorded from parent's history and also indirectly by noticing the improvement in vision. Nonparametric Mann Whitney test was used for statistical analysis.

RESULTS

Seventeen boys and 13 girls were admitted for intensive supervised occlusion therapy. The average age at presentation to the outpatient clinic was 26 months (range 6-60) and the average age at admission was 47 months (range 20-75). Home supervised occlusion was attempted for a mean of 6.4 months before admission (range 4-36 months). Spectacles were prescribed for full time wear in all but one child, however only 10 (33%) of these children were wearing the glasses full time before admission. The compliance increased to 24 (80%) after admission. Twenty-seven (90%) children had strabismic amblyopia, six of whom were anisometropic, and three had anisometropic amblyopia. Visual acuity remained the same or deteriorat-

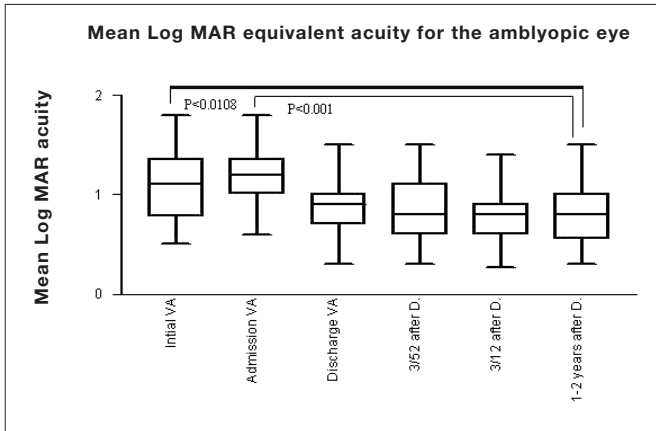


Fig. 1 - Mean logMAR visual acuity of amblyopic eyes, before, during, and after admission.

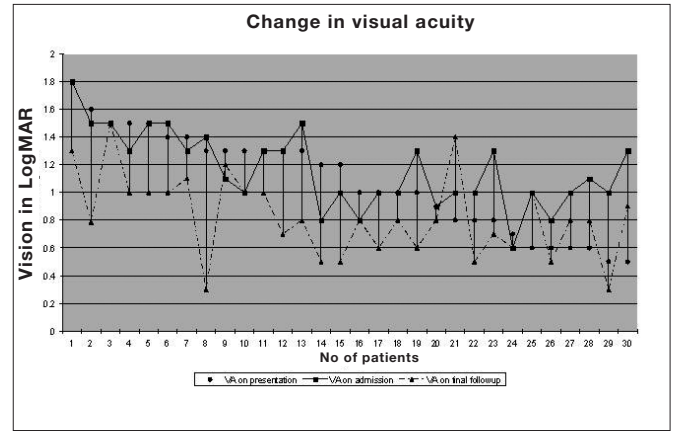


Fig. 2 - The change of visual acuity (VA) for individual patients from admission to last recorded VA.

ed since presentation during outpatient treatment in 24 (80%) of the children and 6 (20%) children gained only one line improvement of Snellen equivalent, although the vision was too poor in three of them to be properly assessed. VA before admission ranged from 6/18 to less than 1/60 with 14 children documented with 1/60 or less. During admission, the mean supervised occlusion was 7.4 hours (range 4-12 hours). The compliance with occlusion therapy improved in 23 children (77%) after discharge. The mean duration of occlusion after discharge improved to 4 hours (range 1-12 hours). The mean follow up was 18 months (range 4-24 months). After admission the visual acuity improved to 6/12 in five children and only seven children were documented with 1/60 or less (Tab. I). Though there was no dramatic improvement in VA at discharge (after admission), there was a statistically significant improvement in VA between admission and last recorded VA ($p < 0.001$), and statistically significant improvement in VA between initial and last recorded VA ($p < 0.010$) (Fig. 1). The VA of the fellow eye either improved or remained the same during the follow-up period. The change of VA for individual patient from admission to last recorded VA is represented in Figure 2. Of the 23 children who were compliant with occlusion fol-

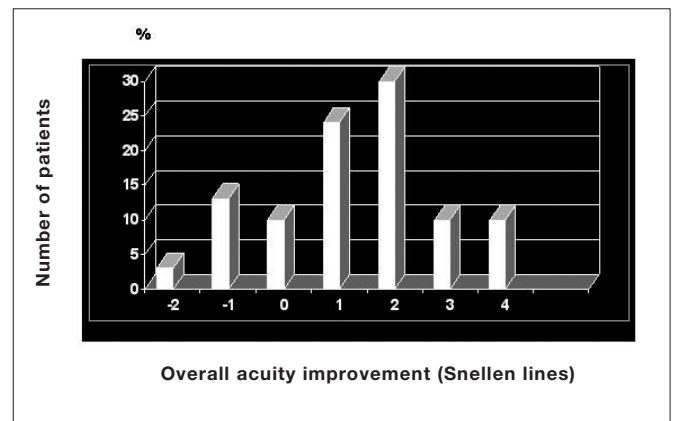


Fig. 3 - Overall number of Snellen lines of acuity gained by the amblyopic eye between admission and final visit.

lowing discharge, 21 (91%) gained at least one line of acuity in their amblyopic eye on the last assessment of their VA and 6 (20%) of those gained three lines or more. The overall number of Snellen lines of acuity gained by the amblyopic eye between admission and final visit is represented in Figure 3. Of the seven children where the compliance was poor even after inpatient treatment, only one patient gained one line improvement in his amblyopic eye.

TABLE I - DISTRIBUTION OF INITIAL AND LAST RECORDED VISUAL ACUITY (VA)

VA	6/12	6/18	6/24	6/36	6/48	6/60	≤1/60	Total
Initial VA	—	2	4	5	—	5	14	30
Last recorded VA	5	4	4	5	1	4	7	30

DISCUSSION

Noncompliance affects many areas of medicine and it is consistently reported as a major factor contributing to the failure of occlusion therapy (5-11). The extent of nonadherence is substantial and has recently been reported to be as high as 54% (10).

Patients or parents lack proper understanding of the importance of occlusion therapy for amblyopia during the critical period of visual development. Despite the regular instructions, explanations, and written information that are given to the parents during outpatient clinic visits regarding amblyopia and occlusion therapy, still a considerable number of children are not compliant with such treatment (10, 11). Therefore, increasing parental knowledge in key areas such as the critical period, importance of occlusion, and potential negative consequences of not treating amblyopia is mandatory in determining the level of compliance with occlusion therapy (10, 13).

In our review study poor compliance with treatment was one of the major factors contributing to failure in improvement of vision during outpatient treatment. With better compliance after inpatient treatment, mean duration of occlusion improved to 4 hours and 21 of 23 (91.3%) children gained improvement in their vision. In the noncompliance group seven of eight children did not gain improvement in VA. Seven children were saved from becoming blind if they had lost the vision in their good eye as an adult.

By admitting children to the ward and creating a suitable environment, many children were happy to wear the patch during their inpatient stay. Parents at this stage were convinced that it could be an achievable target. This also gave an opportunity to educate the parents about the important issues regarding occlusion and its benefits. Once compliance with patching had been established, the majority of parents and children were inspired to continue occlusion following discharge (12).

The overall results of this study are comparable with a previously reported similar study (12). In Dorey et al's study, the objective was to improve vision in children where there was no significant overall improvement in visual acuity during a mean of 9 months of attempted outpatient occlusion before admission. During the 5 days of admission 26 children (67%) gained at least one line of acuity in their amblyopic eye and 5 (13%) gained three or more lines. However, intensive occlu-

sion therapy during admission was not the only factor in determining the final results of this study. The acuities of both the amblyopic and fellow eyes subsequently improved with continuing part time patching as an outpatient after discharge, including in nine of the children who did not respond during admission. At the last recorded visit, 31 (79%) gained at least one line in their amblyopic eye and 15 (38%) gained three lines or more. In our review, the main aim from 1-day admission was to increase compliance with occlusion therapy. With improvement in compliance there was improvement in visual acuity. At the last recorded visit, 22 (73%) gained at least one line in their amblyopic eye and 6 (20%) of them gained three lines or more. Our review proves the same effectiveness with shorter admission. In any health service the cost of admitting children for supervised occlusion therapy will be an issue of concern and this will vary from hospital to hospital and from one country to another. In our study we achieved the same level of outcome as Dorey et al (12) but with shorter admission and therefore lower cost. Increase in compliance with improvement in vision will theoretically reduce the number of outpatient visits and thus should balance the cost of admission.

The present review along with previous published studies has provided evidence both that amblyopia does not, in general, improve spontaneously (12, 14) and patching is an effective treatment even in the majority of those children who are the most resistant to therapy (15, 16).

Being a retrospective review, there were some limitations. VA was not measured by the same methods throughout because of changing age of the children. Also there were limitations of analysis imposed by the use of Snellen-based rather than logMAR acuity measures (17). The acuity data were transformed into logMAR equivalents for statistical analysis but the statistical conclusions were also confirmed using nonparametric statistical methods on the untransformed data. The comparisons of acuity are within subject, making them more reliable, and the effects found were robust.

In conclusion, supervised occlusion treatment and parental education was effective in children who had initially failed traditional outpatient treatment. No matter how much information is given, it is what is understood that can mean failure or success of occlusion therapy.

ACKNOWLEDGEMENTS

The authors thank Carole Lang, inpatient nurse for children, and all members of the Orthoptic Department for their support.

The authors have no proprietary interest.

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