Article • The Success of Patching Therapy in An Infant Population at Rehabilitative Kindergartens/Nursery schools

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ABSTRACT

Purpose: Patching has long been an accepted treatment method in treating or preventing amblyopia and strabismus, particularly in infants. Eliya is a non-profit network of rehabilitative kindergartens/nursery schools for the blind or partially sighted in Israel. As many of our children are accepted with recommendations for patching, it was felt that it would be useful both for our staff and the referring doctors to monitor the results of the recommended patching regimen.

Methods: An initial group of 29 was identified by the referring documents as having patching recommended. They were located in four out of our five centers throughout the country. In each center, a staff member underwent training by the primary author (an optometrist with 50 years of experience) until they were proficient. The test chosen for monitoring was the Lea Paddle Acuity test. This was both available, easily trainable, and successful. All infants with a recommendation for patching were included in this project; no pre-selection was done regarding diagnosis or the amount of patching that was recommended.

From the initial group of 29, nine children dropped out either due to total non-compliance with patching or a change in the recommendation of the referring doctor. The twenty remaining children consisted of 14 post-cataract surgery (average age at time of surgery was 6.8 weeks) and six with varying retinal problems. They were tested every three to four months for a final testing period of approximately one year from the start of the study

Results: At the end of one year, 12 of the 14 post-cataract children showed marked improvement or had normal acuity in the affected eye, while only one of the retinal cases showed any improvement.

Conclusions: Patching one eye produced satisfactory results in cases of post-surgical monocular cataracts. It was largely ineffective in cases of retinal defects, especially so as the defects themselves were not resolved prior to the treatment.

Keywords: amblyopia, infants, patching

Introduction

The use of patching one eye as a treatment for or prevention of amblyopia in infants and children has a long history.[1-3] While there continues to be a debate about the hours patched and whether this is the best treatment protocol, it is still widely accepted.[4-12] One basic measure of the success of the treatment is the change in visual acuity. While here also there are differences of opinion of whether this is the best measure of "success," it continues to be the standard measurement of treatment.[13] The basic theory behind the use of patching is not to "strengthen the weak eye," but to improve the communication between the eye and the visual cortex. As such, in most cases, patching is instituted after correcting pathological and optical causes for poor vision. In some cases, patching has been used without correcting such defects, although the reasoning behind this seems to be much weaker.

Eliya is a non-profit organization under Government supervision, with a network of five rehabilitative nursery school/kindergarten frameworks. Our purpose is visual rehabilitation and training for infants who are blind or visually impaired. In Israel, this also includes children who are visually impaired in one eye, even if this is due to recommended patching.

The early intervention programs and professional services foster the full potential of children who are visually impaired or blind. Adopting a holistic approach, Eliya nurtures children's visual, emotional, social, and intellectual skills. Learning happens best in a sensory-

rich, developmentally based curriculum based on fun and exploration. Eliya provides treatment in all phases of infant development: speech/communication therapy, physical therapy, occupational therapy, and emotional support, all integrated with visual development therapy. The guiding principle is integrative therapy, in which each discipline interacts and coordinates with the others to maximize the visual aspects of all treatment, whether it be in the therapeutic swimming pool, the outer playground, the meal table, the music room, or any activity in our facility. There are general outlines for programs for all the children, and additionally, each child has his own specific Individual Educational Plan (IEP) tailored to his needs. The children who were patched took part in all the treatment programs, the only difference being that this was done while they were wearing a patch. During the course of this study, all the patching was done at Eliya.

Eliya does not have its own eye clinic, and all patient referrals undergo opthalmologic exams, usually in a hospital setting, before being accepted to our program. As such, we are charged with fulfilling the referring doctor's recommendations in full. This is true even when our own opinions may differ from those of the referring source. Needless to say, not following the outside recommendations would harm our relations with our referring sources.

As was noted, all infants referred to Eliya had previously been evaluated by pediatric ophthalmologists, and all recommendations for patching were given in writing. All of the infants referred had no previously measured visual acuity recorded. The previous assessments were observational, such as F&F (fixates and follows) or CSM (central steady fixation maintained). As our staff have the time to develop a rapport with the infants and children, we often have an easier time achieving the cooperation necessary to test visual acuity in infants than in a hospital setting. The patching was performed while the children were exposed to various visual, visual motor, and sensory motor enrichment tasks in order to promote normal development. This included but was not limited to sessions in a dark room and a sensory room. No specific amblyopia therapy activities were performed. Numerous studies have indicated that although amblyopia can be treated at any age, the earlier the intervention, the more success that has been noted.[14-17] Most of these studies have had their early entry age level at age 3 years, which further underscores the importance of this study.

Methods

A review of all the records of children currently at Eliya produced a list of 29 subjects for the study. All the infants selected had congenital impairments present at birth, whether cataract or retinal problems. However, before implementation of the testing protocol, nine children were dropped either due to total lack of success in patching or a change in the medical recommendation. The remaining 20 were then tested every three to four months, for a final testing period of approximately one year from the start of the study. The age range at the start of the study was 6 months to 3 years 6 months, and the average age was 1 year 5 months.

Visual acuity testing was performed using the LEA paddle test, with a screening set consisting of the following options: 0.25 CPD, 0.50 CPD, 1.0 CPD, 2.0 CPD, 4.0 CPD, and 8.0 CPD when tested at 57 centimeters. Other values were available by altering the testing distance to 25.5 or 85.5 centimeters. The LEA paddle test was chosen for both economic and practical reasons. The staff already had 3 years' experience using the LEA paddles before starting the study, and the LEA paddles were already available in each branch before beginning this study. Before initiating the study, selected staff underwent additional training to ensure their proficiency in performing the test. The age 4-5 group were also tested at the end of year using a 9.6 CPD paddle and additionally checked using the LEA Symbol chart with a Snellen notation. If there were any doubts as to the accuracy of the testing, the result was rechecked by the supervising optometrist. All of the patching was unilateral of the better eye.

At the initiation of the patching, in the cataract cases, the vision in the normal eye was within the normal range of the LEA test, and in most cases was 8.0 cpd. All cataract patients had been operated on before age 2 months, with the exception of two: AG (21 months) and YA (7 months). All of the unilateral cataract children were corrected with a contact lens; none of the subjects had intra-ocular lens implants. As was stated previously , the treatment at Eliya is designed to improve visual functioning, with no specific goals or methods to improve visual acuity. The treatment stresses integrating vision with all other capabilities, such as kinesthetic and auditory skills.

Results

Tables 1 & 2 summarize the results in the group of subjects with cataracts, and Table 3 shows those with retinal problems. Table 1 gives the initial and

Table 1. Cataract (Mono): Testing of Patched (Normal) Eye

Name	Amount of patching	Initial VA	Change (CPD)	Final VA Better eye
AA *	30 minutes	4.0	+4	8.0
RA	3 hours	8.0	0	8.0
AA	4 hours	1.0	+1	2.0
AG	3 hours	1.0	+7	8.0
AH	3 hours	4.0	0	4.0
HB	6 hours	8.0	0 **	8.0 (6/12)
YA	6 hours	4.0	+4	8.0
MM	6 hours	8.0	0	8.0
MM	6 hours	8.0	0 (+1.6)	9.6
MN	2 hours	8.0	0	8.0
IG	3 hours	8.0	0 (+1.6)	9.6
AS	6 hours	8.0	0	8.0
SA	4 hours	8.0	0	8.0
AZ	6 hours	8.0	0	8.0

Table 2. Cataract (Mono): Testing of Non-Patched Eye

Name	Amount of patching	Initial VA in Better Eye	Change (CPD)	Final VA
AA *	30 minutes	2.0	0 **	2.0
RA	3 hours	4.0	+4	8.0
AA	4 hours	1.0	+1	2.0
AG	3 hours	2.0	+6	8.0
AH	3 hours	1.0	+1	2.0
HB	6 hours	8.0	0 **	8.0 (6/12)
YA	6 hours	2.0	+6	8.0
MM	6 hours	8.0	0 **	8.0
MM	6 hours	8.0	0 **	9.6
MN	2 hours	2.0	0	2.0
IG	3 hours	2.0	+7	9.6
AS	6 hours	2.0	+2	4.0
SA	4 hours	0.8	+4	4.0
AZ	6 hours	8.0	-4	4.0

*Bilateral cataracts

** The reason for no change was excellent VA from the start

final acuities in the better eye in order to indicate any possible harm to the better eye due to the patching (occlusion amblyopia). Table 2 shows the initial and final acuity results of the non-patched eye. Although it was not the purpose of this study to determine the optimum amount of patching, Table 4 shows that the amount of time that patching was administered did not seem to affect the outcome.

Discussion

As can clearly be seen by the results, patching

Table 3. Other Causes of Poor Vision

Name	Amount of patching	Defect	Change (CPD)	Final VA (CPD)
KA	2 hours	Cone/rod dystrophy	0	2.0
HD	2 hours	Coloboma of optic nerve	0	2.0
LK	30 minutes	Coloboma of optic nerve	0	1.0
PG	3 hours	Retinal dystrophy	0	1.0
GB	5 hours	Albinism, Foveal hypoplasia	+2	4.0
TS	2 hours	Albinism, Foveal hypoplasia	0	4.0

Table 4. Children Who Achieved Either Normal (8.0 or better) or Greatly Improved Visual Acuity as a Function of Hours Patched.

Hours patched	Number of children with significant change or normal VA
3	4/5
4	2/2
6	5/6
30 minutes	1/2

along with the typical visual enrichment program at Eliya was very effective in improving the visual acuity in post-cataract infants and largely ineffective in other cases, where the cause for the poor acuity obviously could not be eliminated. In addition, one can see that there were infants with apparently normal visual acuity before the patching was initiated, and therefore it is questionable whether they needed to be patched at all. This supports the need for some form of visual acuity testing before instituting patching in order to determine whether patching is necessary. Additionally, one can see the need for visual acuity to be monitored during the patching regimen in order to check the efficacy of the treatment and the need to modify or even to cease the patching regimen.

While there were no cases of occlusion amblyopia (damage caused to the eye that was patched), one cannot ignore the possible deleterious effect of early patching on the development of binocular vision. While some believe that early patching will either help or do no harm, there is evidence to show that early monocular functioning can be detrimental to the general and motor development of the infant.[18,19] The necessity for

automatically recommending patching originated at a time when cataract surgery for infants was performed at a later stage (1-3 years of age) than today, when most infants are operated on at age 6-8 weeks.[20] While it was not the purpose of this study to determine what amount of patching was most effective, it is interesting to note the similar results of various patching regimens. It should be noted that the author and the facility had no ability to alter the treatment recommendations, and if given such an opportunity, would have opposed using patching on some of these patients. Patching can be traumatic for the patient and the parent and can affect both general development and the development of binocular vision. As such, it should be approached with caution.

Conclusions

This study shows that in cases of unilateral cataracts, patching, along with a visual enrichment program, is an effective method of improving visual acuity. Additionally, the lack of success in the cases where the defect remained casts doubt on the wisdom of recommending patching in these cases. It does not show which of these elements is critical if either one alone would be sufficient. Additionally, given the lack of any evidence-based research to support patching in retinal disorders, or any patching without first treating the underlying cause for poor vision, this study confirms the lack of success of this treatment paradigm. Recommending patching without first testing the need for patching by evaluating the visual acuity in infants should no longer be considered standard practice. The various methods available to test visual acuity in infants certainly support this philosophy of care.

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