

Scientific ESSAY: An Efficient Treatment and New Criteria for Cure of Strabismic Amblyopia: Reading and Bangerter Foils

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INTRODUCTION

In the last 50 years, treatment of strabismic amblyopia has gone from occlusion therapy to treatment by an apparatus such as the Euthyscope, the Pleoptophore, CAM therapy, and now back again to occlusion. Many different techniques for amblyopia treatment are currently in use, but part time occlusion with various schedules, penalization or sectors is most popular and common.

Consolidation of good results in the treatment of amblyopia were first thought possible by normalization of anomalous retinal correspondence and of binocular vision. Yet, with time, we had to realize that this goal could almost never be reached in cases of strabismic amblyopia.

What is the best criterion for "cure" in amblyopia? Should there be required equal vision in both eyes, or allow one or two lines less in the amblyopic eye? With which of the too numerous optotypes should this be measured?

These questions and the problem of compliance with treatment have been discussed again and again, but to this day no valid answer has been found (1).

READING AMBLYOPIA

Allow me here to refer to a paper presented, together with my orthoptist Mrs. Zürcher, at the 11th ESA Meeting in London, 1979 (2). There, we pointed out that the reading ability in cases of so called "cured" strabismic amblyopia was much lower than the visual acuity examined with linear optotypes: in 50 patients, distance linear vision for the "cured" amblyopic eye was 1.0; but near vision with Birkhäuser (reading) Text was only 0.56; whereas with the good eye it was 1.0.

I first became aware of reading amblyopia when, in 1971, on re-examination of a 13 year old youngster I found an apparently satisfactory vision of 0.9 in the microtropic eye, yet the patient said to me: "However, I can not read with that eye". From then on I checked all my cases for reading and found reading amblyopia again and again. Yet, I was amazed not to find any mention of reading amblyopia in the literature.

Since this discovery, I did not stop amblyopia followup treatment until my young patients were able to read equally well with each eye.

How can this reading amblyopia be prevented?

The main problem of amblyopia treatment is compliance [adherence]. In glaucoma treatment this has been recog-

nized, and "the simpler the better" schedules have been adopted; i.e., only one drop a day instead of multiple administrations. For amblyopia, numerous schedules with intermittent occlusion have been proposed and have ultimately led to the development of devices for the measurement of compliance in patients (3). The results show that compliance with *intermittent* occlusion is very feeble (4). Parents and patients soon get tired of it and abandon it.

INITIAL TREATMENT

For strabismic amblyopia atropinization and/or occlusion are the most efficient treatments. In cases of unilateral strabismus it is useful to start with atropinization of the good eye for one month. Parents are advised that if, after one month, no alternation is reached; i.e., at least distance vision with the good and near vision with the amblyopic eye, then occlusion must be employed.

When alternation is reached after one month of atropine, atropinization can be weaned: once every two days, then every three days, then once a week and finally alternating: once a week in the good eye and once a week in the formerly amblyopic eye.

When glasses must be worn, occlusion of the spectacles can be used. When children remove their glasses or look over them, then atropinization of the good eye has proven useful to start them off on occlusion.

If, after one month of atropinization, alternation is not reached, one can be sure that deep amblyopia exists, and facial occlusion must be initiated, first in a unilateral manner, then alternately.

But how long must one continue in order to assure long term treatment compliance and followup?

TAPERING OFF OCCLUSION

Once good visual acuity is reached, occlusion should not be stopped totally, since this can provoke suppression and a relapse of amblyopia.

There exists a very detrimental opinion on occlusion that it should not be administered continuously without interruption, so to give the binocular neurons and binocular interaction the possibility to function. But this is true only after central fixation is reached, and is best taken into consideration by applying graded filters in a tapering off manner, rather than interrupting the occlusion.

When central fixation is reached by occlusion or atropinization of the good eye, we change to total alternating

occlusion of the glasses, first emphasizing the good eye, then alternating every day. After some months we employ "tapering off occlusion" with the graded occlusive foils of Bangerter, made by RYSER. These foils are available in different densities which allow a visual acuity from less than 0.1; 0.1; 0.3; 0.4; 0.6; 0.8 up to 1.0. Bangerter used these filters as a "sneaking in occlusion" beginning with the weakest foil (5). A sneaking out occlusion was only allowed in straight eyes but not in strabismic cases, since it would oppose the goal of total cure.



Since we could not experience a perfect binocular cure, we always used the "tapering off" occlusion beginning with the densest filter. As the densest filter of "less than 0.1" was sometimes not sufficient to provoke a switch of fixation, I asked RYSER to produce a filter which allows no contours to be seen, only light perception (LP), and an additional 0.2 filter to smooth the transition from the 0.1 to 0.3 filter.

After having reached alternation with total occlusion, the translucent occluder for light perception (LP) is alternately used for about 6 months, with followups every 3 months. After 6 months we usually go to the next grade of density of "less than 0.1". One must carefully observe that the patient is not able to fixate through the filter. After several months, one can gradually change to the filters 0.1; 0.2; 0.3; 0.4; 0.6; 0.8; and finally to 1.0.

This treatment is continued, as a rule, up to the age of 10 years; that means until the child can read fluently with each eye and alternation can be triggered by the weakest translucent foil of 1.0. Compliance can easily be checked at each consultation since the foil is on the glass.

ADVANTAGES

This treatment has psychological and practical advantages. The occlusion schedule is not complicated. As the parent has to clean the glasses each morning, it is easy for her to then change the foil to the other side; this is much easier than trying to follow an irregular or complicated schedule of intermittent occlusion.

With the initiation of treatment the child does not appear to be monocular because the transparent foils are cosmetically much less disturbing than total occlusion and much less apparent. By reducing the opacity of the foils the progress achieved by the treatment becomes apparent to the parents, since the foil must provoke a change of fixation this method is self regulating.

With this we now have two new criteria for the "cure" of strabismic amblyopia, namely equal reading ability in each eye, and the switch of fixation by an almost invisible 1.0 filter.

In addition, binocular interaction is encouraged and diplopia avoided. On the basis of a harmonious microtropic anomalous retinal correspondence, gross stereopsis can be achieved and demonstrated to the parents by the "two pencil test" for near and Lang's stereoscopic version of Bagolini's Striated Glasses (right eye 175°, left eye 5°) for distance. Random dot stereopsis is usually not achieved.

The disadvantage of this treatment is that glasses must be worn. On the other hand, with this treatment, parents understand why glasses are necessary.

The author has used this treatment since his first publication thereof in 1972 (6). It has proven to be very gratifying for patients and parents, as well as for the orthoptist and the ophthalmologist. This treatment is therefore highly recommended.

SUMMARY

Atropinization and/or facial occlusion is the initial treatment of choice for strabismic amblyopia. The goal of this treatment should be an equal reading ability in each eye. This goal can be reached by alternately "tapering off" occlusion with Bangerter graded occlusive foils during the first school years. Its progress can be demonstrated to the parents by the weakening of the filters. The child is not monocular, and the cosmetic appearance is better than with total occlusion. compliance therefore is highly improved. This treatment is self-regulating and ends with a foil allowing vision of 1.0 and producing alternation as a criterion for cure and equal reading ability in each eye.

The author has no financial interest in graded occlusion foils.

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