Late results of pleoptic treatment

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Although numerous reports have been published on the primary results of pleoptic treatment and this method has been employed for several years in many centres throughout the world, reports on the late results of the treatment are rarely seen. Ehrich and Piening (1959) reported on a series of 203 patients, in which their criterion for a successful primary result was 5/7 vision and 0.4 near visual acuity. Primary success was obtained in 22.7 per cent. of cases, and at a follow-up examination made on the average 20 months later there were still 10.3 per cent. of successful cases. Girard, Fletcher, Tomlinson, and Smith (1962) presented a series of 43 successfully treated patients. The follow-up period varied from 3 to 18 months, at which time seventeen patients had a visual acuity of 20/30 or more. Aust (1962) reported on thirteen patients in whom a primary result of 5/25 to 5/5 visual acuity had been achieved. In three cases the vision attained deteriorated during an observation period of 12 months. In a series of 58 patients reported by von Noorden and Lipsius (1964), a visual acuity of 6/12 or more was achieved in 8 patients only. Four of these were in the follow-up group of 24 patients: one had undergone relapse, while 3 still showed improvement. The follow-up period averaged 22 months. Among more recent reports is that of Cüppers (1967) on 38 patients with a successful primary result who were followed up for 1–10 years; on the basis of the results he emphasizes (as do some other authors) that the best guarantee of preservation of the results attained with pleoptic treatment is the achievement of binocular vision. However, according to Cüppers, the preservation of the attained result is a problem that no longer belongs to pleoptics. Leydhecker, Ricklefs, and Rühling (1967) presented the late results after 8 to 10 years in 22 patients treated by Cüppers's technique. Only five patients were able to maintain the degree of visual acuity which was achieved by the treatment, and central fixation was maintained by only four. Aichmair and Frey (1968) presented the late results after at least 2 years (average 3.7) in 192 patients treated for amblyopia. 61 patients of 110 with eccentric fixation received pleoptic treatment. Sixteen of these achieved a visual acuity of 0.5 or better, and sixteen were not able to retain the degree of visual acuity achieved. The authors do not state how many in these two groups overlap.

The series cited above are not comparable, but they clearly indicate that a large proportion of satisfactory primary results may be followed by a rapid deterioration after treatment is discontinued.

This paper presents the late results in 412 amblyopic patients who had received pleoptic treatment in the strabismus department of the Eye Hospital of the University of Helsinki.

Clinical material

The 412 patients were treated from 1959 to 1962. Their ages ranged from 5 to 26 years. There were only four patients aged 5 years, and thirteen patients were over 14 years, so that 395 patients were 6 to 14 years of age (mean 9 years 9 months). Initial visual acuity in the amblyopic eye was

between 0.1/1 m. and 0.4, with the exception of 0.5 in five patients and 0.6 in one. Visual acuity was examined with the aid of the Snellen E-table. Eccentric fixation was present in 337 and 75 showed central stable or labile fixation when treatment was begun. Fixation was determined by means of the visuscope. Ophthalmoscopic examination revealed no organic defects in the eyes to be treated. A few cases of high anisometropia were not accepted for pleoptic treatment at the hospital, but otherwise the series was unselected.

Method

Treatment was given according to Bangerter's method using the pleoptophore, centrophore, finger-lamp exercises, Haidinger's brushes, and other pleoptic exercises, once or twice daily for about 2 hours. A normal course of treatment lasted for 20 weekdays. About a quarter of the patients received more than one course of treatment. Before starting a course the amblyopic eye was occluded for one month, and this occlusion was continued until fixation became central during the treatment. After this the better-seeing eye was occluded. Frequently the occlusion was continued after the termination of pleoptic treatment, depending on the patient's age and educational level, the results of treatment, and so on. If he had manifest squint he was in some cases taught to alternate, and in most of the successful cases the supplementary treatment consisted of temporary occlusion of the better-seeing eye. When necessary, an operation to correct the angle of squint was undertaken either before or after treatment. If possible, binocular exercises were also given with and after pleoptic treatment to obtain binocular vision.

The results after 1, 2, 3, 4, 5, and 6 years are presented in this study. If the course of treatment was repeated, the follow-up time was counted from the end of the last course. Special follow-up examinations were not made for this study, and the statistical data were compiled from the hospital records. Further examinations of these patients are now being conducted at special follow-up clinics.

The results of pleoptic treatment were regarded as good if the visual acuity had increased by at least 100 per cent., for example from 0.4 to 0.8; a further criterion was a final visual acuity of not less than 0.6. This generally signified also that central fixation had been achieved.

Results

These are presented in the Table. A good primary result compatible with the above criteria was obtained in 164 cases (39.8 per cent.); the result was unsatisfactory in 248 (60.2 per cent.). One year later 109 of the successful cases were examined at the hospital, and in 57 the result had remained good according to the criteria stated; 21 (37 per cent.) of them, however, had had central fixation before treatment.

In the other 52 cases the vision was no longer good enough to permit classification as successful.

In those cases—55 in all—in which the follow-up time was less than 1 year, relapse of the amblyopia had occurred in 33 and the good result was preserved in 22 patients.

Table *Primary and late results of pleoptic treatment*

Result		Primary result	Late result (yrs after a good primary result)					
			1	2	3	4	5	6
Good	No.	164	57	48	33	27	11	2
	Per cent.	39.8	52.3	84.2	97.1	100	100	100
Not good	No.	248	52	9	1	0	0	0
	Per cent.	60.2	47.7	15.9	2.9			
No. of Patients		412	109	57	34	27	11	2

A total of 48 of these 57 patients who visited hospital 2 years after treatment still showed a good result, and after 3 years the result was good in as many as 33 out of 34 patients. In all the patients who came for examination 4, 5, and 6 years after treatment the result had remained good.

Discussion

It is not intended in this paper to compare the primary results of treatment with those achieved elsewhere. A good result in 39.8 per cent. of cases should, however, be considered fairly satisfactory, since the patients were practically unselected. The result corresponds approximately to that recorded in a previous study in this hospital (Tommila, 1961), but is probably somewhat poorer than in the series studied in St. Gallen (Steidele, 1962). In addition to the successful cases, improved vision was achieved in a further 20 per cent. of our patients.

Assuming that the result in the 55 patients whose follow-up period was less than one year was the same as in those examined after 2 years, we obtained a good result in 44 per cent. of the patients with primary success, and relapse of the amblyopia in 46 per cent. After this period only one case of deterioration was diagnosed. This accords quite well with the observation of Ehrich and Piening (1959) that 25 months after discontinuation of pleoptic treatment there is hardly any relapse of amblyopia. Accordingly a stable good result was achieved in 17.5 per cent. of patients in the present series. 18 per cent. had shown central fixation before treatment and 37 per cent. of the good results after 1 year belong to this group. There is thus no doubt that primary central fixation offers a more favourable prognosis.

Since relapse of amblyopia occurs within the first two years after completing the treatment, the course at the clinic should be followed by home exercises, particularly in cases in which binocularity has not been obtained; in most cases temporary occlusion of the better-seeing eye is usually necessary. Frequent recording of the type of fixation present and of the visual acuity is important.

Many of the patients whose good primary result was lost nevertheless achieved a significant improvement in visual acuity which could again be attained when necessary by occlusion or by a further course of pleoptic treatment.

It is our intention to publish shortly a more detailed analysis of this series, examining factors influencing the final result. Since, in the majority of cases, binocular vision is not attained, it now appears evident that further training of the amblyopic eye after the course of pleoptic treatment is necessary for a permanent good result. This, again, depends upon the patient's co-operation, or perhaps still more on that of the parents. In certain cases, however, the successful result was maintained even when the exercises were discontinued soon after the actual pleoptic treatment was completed.

Pleoptic treatment has received much criticism, but we consider that this preliminary investigation clearly indicates its usefulness in amblyopic patients of school age.

Summary

The late results of pleoptic treatment are presented in a series of 412 patients with amblyopia treated in the strabismus department of the Eye Hospital of the University of Helsinki. The result was regarded as good if visual acuity according to the Snellen chart was 0.6 and vision had improved by at least 100 per cent. The series was unselected, except for the exclusion of a few cases of high anisometropia.

A good primary result was obtained in 39·8 per cent. of the patients treated. In 44 per cent. of these the good vision was stable during an observation period of 2 years. Practically no relapse of amblyopia occurred after this period. A stable result was achieved in 17·5 per cent. of the whole series and a large proportion also obtained a significant improvement in visual acuity. Recurring amblyopia can usually be corrected by a further course of treatment.

The authors consider that the results indicate the usefulness of pleoptic treatment in patients of school age who are suffering from amblyopia.

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