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## Research Article

# EFFECTIVENESS OF SURGICAL TREATMENT OF HORIZONTAL STRABISMUS IN CHILDREN

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## ABSTRACT

Our aim was to improve the efficacy of treatment of common strabismus in young children. Material and methods of research: The analysis of treatment efficacy was studied on 52 eyes (26 patients, equally boys and girls). All children were diagnosed with permanent, alternating strabismus. Results of the study: were considered positive for strabismus with the value of the deviation angle in the range from 0° to 5° according to Hirschberg. Visual acuity was determined by assessing the gaze fixation reaction when following an object and a light source. Conclusion: the optimal age for strabismus surgery in children is 4-6 years of age.

## KEYWORDS

Common horizontal strabismus, amblyopia, visual acuity.

## INTRODUCTION

Convergent strabismus is often formed precisely at an early age. The peculiarity of the pathology is the deviation of the visual axis of one or both eyes to the

nose. When the eyes are located symmetrically, the images of objects fall into the cortical sections of the visual analyser and merge into a single binocular

picture. In strabismus (strabismus) fusion does not occur, and to avoid double vision, the central nervous system "switches off" the image coming from the squinting eye. If strabismus is not treated, amblyopia develops (the squinting eye does not participate in the visual process). According to various authors, the frequency of strabismus in preschool children varies from 1 to 3% [1]. Age affects the heterogeneity of the distribution of different types of strabismus [4]. At an early age, convergent strabismus (exotropia) appears more often. Divergent strabismus (exotropia) occurs at an older age. According to Krasilnikov V.L. [5], the frequency of strabismus increases from 2.5% at 3 years to 14.9% at 6 years.

Traditionally, strabismus is divided by the nature of its origin into accommodative, partially accommodative and non-accommodative strabismus. Accommodative strabismus is usually treated with conservative methods. For this purpose, pleoptics, orthoptics and diploptics[4] are used. Surgical methods are included in the complex of treatment of partially accommodative and non-accommodative strabismus. In horizontal strabismus, surgical treatment is performed on the horizontal muscles of the eyeball. The aim of strabismus surgery is to achieve symmetry or close to symmetry of the eye position necessary to create conditions for the development of binocular vision, to increase the field of vision and to achieve a better appearance, as well as to improve the psychological state of the patient, which contributes to the improvement of his self-esteem.

**Purpose of the study:** to improve the effectiveness of treatment of unilateral strabismus in young children.

## MATERIAL AND METHODS

The analysis of treatment efficacy was studied in 52 eyes (26 patients, equally boys and girls). All children

were diagnosed with permanent, alternating strabismus. Of them 23 patients had non-accommodative strabismus, 3 had partially accommodative strabismus. Convergent strabismus was observed in 21 patients, and divergent strabismus - in 5 patients. The average age of the children was 4-5 years (from 1.5 to 9 years). Treatment results were assessed by the magnitude of the strabismus angle and changes in visual functions.

## RESULTS

Orthotropia was achieved in 89% of cases, good cosmetic effect was obtained in 96%. No complications were observed. Reoperation was required in 4.0% of patients, adjustable suture in 13.4% of patients. In 5.4% of hypo- (4.1%) and hypereffect (1.3%) cases, the residual strabismus angle was corrected by adjustable suture on the next day after the operation. In all cases of pre-correction, the state of orthotropy was achieved. No significant conjunctival thickening at the site of the rectus muscle duplication was observed when performing the modified tenorrhaphy technique. were considered positive in strabismus with the deviation angle ranging from 0° to 5° according to Hirschberg. Visual acuity was determined by assessing the gaze fixation reaction when following an object and a light source. Eye fixation and refraction were assessed using an autorefractometer at a narrow pupil and 15-20 min after tropicamide solution (1%) was injected into the conjunctival sac. The angle of strabismus was determined by the Hirschberg method. Antibiotics and antiseptics were administered in both eyes 3 days before injection. Patients under general anaesthesia. The dose is adjusted according to the age of the patient, the magnitude of the strabismus angle, refractive anomalies and type of strabismus. After the operation and during the next 7 days we administered instillations of antibiotic levofloxacin (0.5%) and

antiseptic picloxidine (0.05%) 1-2 drops in both eyes. The children were monitored in the ophthalmological department for two days. Effectiveness of artificial muscle paresis balances extraocular muscles, which creates conditions for physiological formation of binocular vision in the early sensory period of the child's development. There is reversibility of the induced paresis. Already one month after the beginning of treatment, 84.62% showed levelling of the strabismus angle. The result improved up to 92.31% and remained stable up to 15 months from the beginning of observation. The mean strabismus angle in patients before treatment was 30° Hirschberg. At the end of the follow-up period, 95.65% of patients had a completely levelled strabismus angle (0-5°). If the strabismus angle was up to 25°, more than one injection was required in 46.15% of cases, and if the angle was greater than 25° - in 83.33% of cases. The greater the angle of strabismus, the more often repeated injections were required. In patients with a strabismus angle up to 25°, visual acuity improved in 80.77% of cases, and more than 25° - in 41.67% of cases. In the total group, visual acuity improved in 53.85% of patients. Complications were observed only after the first injection in 3.85% of the total number of patients (one child) and were levelled by eyelid gluing after 3 weeks. Only partial and temporary ptosis was induced without observed amblyogenic effects. Hyperaemia may occur as a result of accidental touching of the vessel with tweezers. Hypereffect after injection occurred in 15.4% of patients and usually resolved in 1-2 weeks. All complications are reversible. Intraoperative complications include nausea, vomiting, and ocular pain. The oculocardiac reflex and possible bradycardia are associated with muscle manipulation, so some patients may experience fainting, dizziness, and sweating. These complications are managed by administering a subconjunctival injection of lidocaine around the adjustable sutures at the beginning of their adjustment

and making slow, careful movements, informing the patient of what to expect at each step of the procedure. (13%) patients developed suture granuloma and (7%) patients developed subconjunctival infection.

Four patients who developed severe conjunctival failure requiring amniotic membrane transplantation after strabismus surgery using adjustable sutures, and one patient (0.3%) had a sliding adjustable suture knot.

Conclusion: Treatment of strabismus in children is an urgent problem of paediatric ophthalmology. The use of complex system of diagnostics and treatment of strabismus allows to choose the optimal tactics of surgical intervention, to estimate the degree of muscle displacement. the optimal age for strabismus surgery in children is 4-6 years old. In case of normal anatomical structure of the eye, according to our observations, binocular vision was restored in the distant terms (more than 2 years) in almost all patients. One of the main reasons for unfavourable outcomes of strabismus surgery is the presence of anisometropia. Therefore, the development of optimal methods of correction of anisometropia in children, is an urgent problem of modern ophthalmology. The use of one-stage surgical intervention in combined horizontal-vertical strabismus with hyperfunction of the inferior oblique muscle on horizontal (duplication of the internal rectus) and vertical (recession of the inferior oblique) muscle groups is an effective method of treatment, allows to increase the efficiency of surgical treatment, reduce the duration of anaesthesia, and reduce the number of repeated operations. Carrying out complex treatment in the pre- and postoperative period, including pleopto-orthopto-diploptic, training, and training of the inferior oblique muscle groups.

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