# PUPILOGRAPHY IN THE PATIENTS WITH ACCOMMODATIVE ESOTROPIA

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**Introduction.** According to our data the widespread forms of accommodative esotropia (AE) are refractive (53,7±5,6%), nonrefractive (33,7±5,3%), combinated (8,8±3,2%). The decompensate AE is a rare form of AE (3,8±2,1%).

**The aim to study** the visual functions and the state of accommodation – convergence – pupillary system (ACPS) in children with the most widespread forms of AE.

**Materials and Methods** Except of the standard ophthalmological examination (visometry, refractometry, accommodometry, strabometry, near convergence point's definition) the binocular pupillography was performed in 93 patients aged 6-18 years with refractive AE (48), nonrefractive AE (33), combinated AE (12). The pupillography was performed using the apparatus "Oculograph OK-2" which was developed in Filatov Institute of Eye Disease (Patent №6232A61B3/00). We performed the computer registration of direct, consensual and accommodative convergent-pupillary reaction of leading eye and squinting eye without ametropia correction before and after light stimulation with the calculation of the area of the pupil, latency of pupil constriction. Moment of pupillography is shown in photo 1.

**Results:** Our results proved the data of other authors that refractive AE is characterized by high hypermetropia in both eyes (an average of 5,33 ± 0,36 D for the leading eye and 6,07 ± 0,32 D for squinting eye). In the case of nonrefractive AE the value of hypermetropia was the lowest: an average of 2,52 ± 0,39 D at the leading eyes and 3,51 ± 0,40 D at squinting eyes. Average degree of hypermetropia prevailed in patients with the combined AE: an average of 3,93 ± 0,56 D at the leading eyes and 4,32 ± 0,64 at squinting eyes. The values of squinting eyes' hypermetropia were larger than leading eyes in all cases. Most of them had the low value of anisometropia (an average of 0.75 - 2.0D). Patients with refractive AE and nonrefractive EA had the highest value of anisometropia (an average of 1,16 ± 0,17 D and 0,92 ± 0,13 D), and patients with combined AE had the lowest it's value (0,53 ±0,2 D). Only 18,4 ± 7,5% of patients with refractive AE and 6,9 ± 3,9% of patients with nonrefractive AE had anisometropia from 2,25 to 4,0 D.

The visual acuity with optical correction below 0,3 took place of 55,8±7,6% patients with refractive AE, in 42,0±18,7% cases with combinated AE, and in 33,3±9,1% children with nonrefractive AE. Convergence was normal in all cases of refractive and nonrefractive AE, but was weak in 42,8±18,7% patients with combinated AE. Fusion in haploscopic condition was absent in 65,1±7,3% cases of refractive AE, in 51,9±9,6% patients with nonrefractive AE and in all cases of combinated AE. Worth´s

four dot test showed monocular vision in 88,4±4,9% cases of refractive AE, in 85,1±13,2% patients with combinated AE and in 66,7±17,1% cases with nonrefractive AE.

Analysis of pupillography shows that the investigated parameters of direct and consensual pupillary reactions of both eyes were almost identical in patients with different types of AE. But in conditions of background lighting the of squinting eyes' pupils were more narrow than the pupils of the most patients with any type of AE. The squinting eyes' pupils were statistically significant ($p < 0,05$) more narrow than the pupils of healthy eyes in all types of AE. The leading eye's pupil was statistically significantly more narrow in patients with nonrefractive AE during direct pupillary reaction and in patients with refractive AE during consensual pupillary reaction. Light stimulation led to decrease of both eyes' pupils' size as for direct as for consensual reactions. In any kind of AE the average areas for the direct reaction were in one and a half times greater than in healthy children. And the analogous data of pupils' consensual reactions in both eyes did not differ from that of healthy children. In comparison with healthy persons the significant lengthening of the latent period of the direct and consensual pupils' reactions were found on both eyes in any type of AE.

We evaluated the state of ACPS by the pupils' area, the latent period of pupils' restrictions time during moving of eyes from the remote object (100 cm) to approximate (10 cm). Average values of pupil area in both eyes of patients with any type of AE in condition of the ACPS' relaxation were almost two times lower than in healthy children. With the ACPS' strengthening these rates were almost the same and as in sick children as in healthy ones. The latent periods of the pupillary near reflex in both eyes were longer than in healthy children.

**Conclusion:** Direct and consensual pupillary reactions of both eyes have been weakened in patients with any type of AE in comparison with healthy children. It indicates on reduction of pupillary reactions lability.The presence of narrow pupils, elongation of the latent period of its' constriction in patients with any type of AE show that the ACPS of such patients is in a state of high tension, possibly due to accommodation. Disturbances of pupillary reactions indicate on reduction of lability, increase ACPS's passivity due to functional changes in brainstem.