

THOSE WITH STRABISMUS

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Background: Fusional reserves play an important role in the development of full binocular vision. Although there is a general agreement among most authors on the values of horizontal and vertical fusional reserves, values reported for cyclofusional reserves vary widely, from 2-3° (Kanski, 2009) and 12-14° (Kashchenko, 2016) to 33° (Ellerbrock, 1954).

Purpose: To investigate the amounts of excyclofusion and incyclofusion obtainable with test objects subtending various angles in children with normal eye position and in those with cyclic strabismus.

Materials and Methods: Twenty-eight children (56 eyes; age, 5 to 17 years), including 16 (32 eyes) with orthotropia, normal visual acuity and binocular vision (group 1), 7 (14 eyes) with cyclic esotropia, mild hyperopia, best-corrected visual acuity (BCVA) of 0.6-1.0 and binocular vision with proper correction for refractive error (group 2), and 5 (10 eyes) with cyclic esotropia, hyperopia, BCVA of 0.7-1.0 and monocular vision with proper correction for refractive error (group 3), underwent examination. Cyclofusion was investigated with a synoptophore by turning one of the two test-objects clockwise or counterclockwise. We used paramacular test objects subtending 10° (degrees of arc) each, and parafoveal test objects subtending 2.5° each. Measurements for the right and left eyes were done.

Results: In children of group 1, the excyclofusion with 10°- and 2.5°-test objects was $13.0^{\circ} \pm 0.2^{\circ}$ and $9.6^{\circ} \pm 0.5^{\circ}$, respectively ($p < 0.001$), whereas the incyclofusion, $12.2^{\circ} \pm 0.8^{\circ}$ and $9.7^{\circ} \pm 0.5^{\circ}$, respectively ($p < 0.001$). In children of group 2 the excyclofusion with 10°- and 2.5°-test objects was $14.0^{\circ} \pm 0.8^{\circ}$ and $8.4^{\circ} \pm 0.5^{\circ}$, respectively ($p < 0.05$), whereas the incyclofusion, $13.4^{\circ} \pm 0.6^{\circ}$ and $8.8^{\circ} \pm 0.4^{\circ}$, respectively ($p < 0.05$). In children of group 3 the excyclofusion with 10°- and 2.5°-test objects was $4.7^{\circ} \pm 0.15^{\circ}$ and $3.6^{\circ} \pm 0.1^{\circ}$, respectively ($p < 0.05$), whereas the incyclofusion, $4.3^{\circ} \pm 0.1^{\circ}$ and $3.2^{\circ} \pm 0.1^{\circ}$, respectively ($p < 0.05$).

Conclusion: The cyclofusional amplitude was found to decrease with a decrease in the angular size of the test object in patients of three groups. Children with cyclic esotropia and monocular vision (group 3) demonstrated lower cyclofusional reserves on both paramacular and parafoveal test objects compared to children in the two other groups, which indicated their need for relevant exercises.