

Near vision problems and learning difficulties in school age children

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**Purpose:** During school years, children experience a lot of stress factors for their visual system – reading, writing, using computers, interactive boards etc. The first sign of near vision fatigue is inappropriate work of accommodation and vergence system. Significant refractive errors, strabismus, and amblyopia are detectable and usually corrected before school (until six years of age). Accommodative and vergence problems are detectable only at a later age. The aim of this work was to study near vision problems in school age children and to evaluate their possible relationship with learning problems.

**Method:** In Latvia, no official guidelines exist for vision examination in school age children. Therefore, we developed a screening model including tests for visual acuity at distance, hyperopia, accommodation, suppression and stereovision, heterophoria, near point of convergence, vergence facility, and colour vision (87% sensitivity, 77% specificity). We evaluated the screening results of 10,861 (aged 7-18 years; girls – 51%; 30 schools) school age children examined between 2011 and 2013: 10,648 children were from standard schools and 213 children were from schools with different education system for children with learning difficulties.

**Results:** Analysing screening results in standard schools, 47.5% children (out of 10,648) failed the screening: 18.9% had complaints related to vision and 28.6% had no complaints. The largest group of children (30.9%) may experience problems with near visual tasks because they failed near vision skill tests. Both complaints and vision acuity at distance showed a dependence with the age of the patients; they increased significantly up to the age of 12-13 years. Accommodation and vergence problems showed no effect of age. Children with learning difficulties had significantly more visual complaints, more positive results of hyperopia test, more esophoria cases, significantly slower accommodation response, a little bit slower vergence response, and more significantly reduced or lacking stereovision.

**Conclusion:** These results demonstrate a wide range of near vision problems in school aged children. Children do not always complain; it is easier for a child not to read than to tell the parents or teacher about any visual discomfort during reading. One way to find children with near vision problems is through vision screening performed in 2nd, 4th, and 6th grades, where children rarely complain or do not relate their complaints to vision problems. Early detection and correction of near vision problems, especially balancing of accommodation and vergence system functions, should be the first steps in helping a child to keep their interest in learning and overcome some learning problems.

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