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Future Problems of Uncorrected Refractive Errors in Children

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Abstract

Visual impairment secondary to uncorrected refractive errors in childhood is an important health problem, and can lead social, educational and economical disability in adulthood. In this study, we reviewed the literature to reveal future effects of refractive errors in children on social life. Refractive problems can be easily corrected with spectacles as a cost effective treatment modality. However, recognizing refractive errors in children at family or school level is critical. Screening programs are valuable to prevent refractive error related vision loss in children. Moreover, awareness campaigns and education can help to overcome all barriers against visual rehabilitation. In conclusion, collaboration among teacher, parents, ophthalmologist and child should be well established to prevent visual disability and related socio-economical problems.

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Keywords: Amblyopia, education, quality of life, refractive error

1. Introduction

Amblyopia often called "lazy eye" is the most common treatable cause of decreased vision in children. The main causes are uncorrected refractive errors (myopia, hyperopia and astigmatism), strabismus, anisometropia and visual deprivation due to congenital cataract or ptosis (Wu, & Hunter, 2006). Hence, amblyopia as a permanent condition is one of the most common causes of decreased vision in adults, and affects 2% to 6% of the general population (Wu, & Hunter, 2006; 3. Szigeti, 2014). The vision loss ranges from mild (worse than 20/25, Snellen equivalent) to severe (20/200 or worse, Snellen equivalent). Although amblyopia is generally unilateral, it might affect both eyes (Doshi, & Rodriguez, 2007). In addition to decreased visual acuity, other visual functions such as contrast sensitivity and stereo acuity can be deteriorated (Polat, Ma-Naim, Belkin, & Sagi, 2004).

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Visual pathways from eyes to the visual cortex should be stimulated for normal visual development process; otherwise, amblyopia develops (Doshi, & Rodriguez, 2007). Pathogenesis of amblyopia is still being investigated. Previous studies investigating physiologic abnormalities in amblyopia did not find a certain reason for decrement in vision, while cornea, lens, retina and optic disc were normal (Wong, 2012; Doshi, & Rodriguez, 2007). It was suggested that visual deprivation had an effect on cell growth in the lateral geniculate nucleus (LGN) and abnormal neuronal network within primary visual cortex was present in amblyopic subjects (Wong, 2012; Vida, Maurer, 2012). On the other hand, several optic coherence tomography studies demonstrated increased circumpapillary retinal nerve fiber layer thickness in amblyopic eyes, and this finding was suggested to be associated with an interruption in postnatal remodeling of retinal ganglion cells (Szigeti,et.al, 2014).

The Pediatric Eye Disease Investigator Group (PEDIG) guided the clinicians to understand, and treat amblyopia (Gunton, 2013). Clinical trials showed that amblyopia treatment is highly satisfying in 75% of children younger than seven years of age with best refractive correction and patching or atropine penalization. Visual impairment is generally irreversible after the first decade of life (Polat, Ma-Naim, Belkin, & Sagi, 2004).

On the other hand, amblyopia secondary to uncorrected refractive errors in childhood leads not only visual but also social, educational and economical problems in adulthood. A decreased vision, loss of stereo acuity and contrast sensitivity limit occupational performance and ability. Consequent decrease in quality of life causes negative psychosocial impact (Karlica, Matijević, Galetović, & Znaor, 2009; Resnikoff, Pascolini, Mariotti, & Pokharel, 2008).

World Health Organization (WHO) recommends and supports school screening programs to prevent refractive error related vision loss in children. While teachers have an important role in screening programs, awareness campaigns and education of the parents can help to overcome barriers against visual rehabilitation.

In Turkey, most common complaint of refractive error in childhood is watching television closely, inability to read and decrease in school success. Studies revealed that amblyopic children have deficits in learning process, and the period between 6–8 years of age is critical to prevent permanent disability. Refractive problems can be easily diagnosed and corrected with spectacles as a cost effective treatment modality (Resnikoff, Pascolini, Mariotti, & Pokharel, 2008). However, recognition of refractive errors in children at family or primary school level is critical to prevent irreversible visual deterioration from amblyopia (Resnikoff, Pascolini, Mariotti, & Pokharel, 2008).

Increased awareness of amblyopia and better screening techniques are mandatory to detect children who have amblyogenic risk factors at an earliest age. The teachers generally conduct school screening programs and refer suspected children to an ophthalmologist by giving information to the parents. However, after accurate diagnosis of refractive error by a healthcare professional; compliance of children and parents to spectacle should be provided [8-10]. Schoolchildren and parents usually resist wearing spectacles because of many excuses. However, the key for treatment success is collaboration of the parents with the ophthalmologist. Frequent ophthalmologic visits are valuable for checking performance of the therapy (Karlica, Matijević, Galetović, & Znaor, 2009; Latorre-Arteaga, et all., 2014).

In conclusion, amblyopia is an important cause of visual disability in worldwide and it negatively influences socio-economical area of life. Recognizing refractive errors in early childhood is critical to prevent future problems. Therefore, collaboration among teacher, parents, ophthalmologist and child should be well established.

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