

Case Report**High myopia related to computer vision in a 14-year-old boy: A case report****Zeynep Dadacı¹, Mehmet Borazan¹, Banu Bozkurt²**¹ Department of Ophthalmology, Mevlana (Rumi) University Faculty of Medicine, Konya, Turkey² Department of Ophthalmology, Selçuk University School of Medicine, Selçuklu, Konya, Turkey

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Introduction

There is a world-wide increase in the prevalence of myopia and high myopia (1). High myopia, which is usually associated with pathologic myopia, is defined as myopia higher than -6.0 D or an axial length of more than 26 mm. By so far both genetic factors and environmental factors were accused for being myopia (1-6). In fact, environmental factors seemed more important in the development of myopia according to some researchers (1-4). There are many studies suggesting that factors such as near work, continuous reading and close reading distance (1-4), presence or absence of light and UV radiation (5) may be causative. Herein, we report a patient with short onset high myopia, probably caused by extreme near work of up to ten hours of computer vision daily for the last ten months. Although it is proposed that the development and the progression of myopia is related with near work, we found no previous reports in the literature demonstrating development of high myopia in such a short period of time associated with computer vision.

Case report

A 14-year-old boy presented to our clinic with the complaint of a reduction in his far vision for the last few months. He claimed that his far vision was excellent and he was not prescribed any glasses before in previous examinations. On his ophthalmologic examination, uncorrected distance visual acuity was measured 20/200 (Snellen chart),

biomicroscopic examination was normal and fundus examination did not reveal any significant pathologies except small peri papillary atrophies. Cycloplegic measurements were taken 30 minutes after instillation of one drop of 1% cyclopentolate on both eyes. His refraction was -4.75/-2.25 X 96 (spherical equivalent -4.75 D) in the right eye and -5.75/-1.75 X 79 (spherical equivalent -6.75 D) in the left eye (Topcon autorefractometer model RM 8900; Topcon Corporation., Tokyo, Japan). Axial length measurements of right and left eyes were 27.26 mm and 27.94 mm respectively (Ultrasound biometry Accutome A-scan Plus; Accutome, Inc., Malvern, USA). The patient reported that he used the computer up to ten hours daily since his father has given him a computer as a gift on his birthday ten months ago. His parental history was positive for myopia as his mother and sister was both myopic. His parents reported that he had no significant rise in his height during the last year. On his examination two months later, the corrected distance visual acuity was 20/25 in both eyes with his glasses (right eye -4.50/-1.0 X 100 and left eye -5.50/-1.0 X 80).

Discussion

Myopia is a common refractive disorder in which the eye cannot focus light coming from the infinity properly on the retina. When the eye is long or has excessive corneal or lenticular power, the image of the distant object falls in front of the retina. The concern about myopia is the risk of development of

pathologic myopia, which carries the risk of sight threatening eye diseases such as retinal degeneration, retinal detachment, glaucoma, and cataract (4). In modern world, as the computers are more commonly integrated into our daily lives, some inconveniences come along with them. Eye and vision problems associated with the use of computers are defined as computer vision syndrome (CVS). Usually short term problems such as eye strain, irritation, redness, blurred vision, and dry eye are classified as CVS. But long term effects of computer use on refraction and eye may be more bothersome (2). Prolonged gazing on a computer screen may induce myopia in susceptible people. Environmental factors related to myopia are mainly about near vision. It is proposed that prolonged reading (1-4), continuous reading more than 30 minutes and reading distance less than 30 cm (3), reading in dim light (5) may play a role in the development of myopia. Especially children are spending increasingly more time on using computers. Such excessive near work at their ages may provoke myopia (2). It is accepted that myopia commonly starts between the ages of 8 and 12 years. Many researchers accept myopia developing before the age of 13 years as early-onset myopia, which is believed to be more susceptible to genetic factors and tend to result in higher degrees of myopia. Myopia developing after the age of 15 years is accepted as late-onset myopia, which has presumably more environmental component and commonly results in lesser degrees of myopia (6). Our case was 14 years old but developed high myopia apparently related to computer vision. Relationship between near work and myopia is well established in many studies (1-6). But how near work induces myopia is somewhat unclear. Defective accommodation is the dominant theory accepted by many researchers in which near work induced transient myopia (NITM), caused by insufficient relaxation of the ciliary muscle after prolonged near work, is accused (6). Mallen et al found considerable inter subject variability of sympathetic inhibition, up to 30% of the population had a deficit of sympathetic inhibitory system (7). Hence, a deficit in sympathetic function after

parasympathetic activity for a high accommodative task demand would produce a relatively large and transient myopic after effect. Vasudevan and Ciuffreda speculated in their studies that with repeated cycles of near work, residual NITM may contribute to the progression of permanent myopia (6). Another explanation for the development of myopia is the retinal blur theory. According to this theory, imposed myopic defocus slows while imposed hyperopic defocus increases the rate of eye growth. Blurred retinal image related to near focus initiates a biochemical process in the retina, stimulating biochemical and structural changes in the sclera and choroid that lead to axial elongation (8). Our case was 14 years old and developed myopia within a year probably related to extensive computer vision. His mother and sister also had myopia, which supports the opinion that genetics is an important underlying cause and environmental factors induce more progression in susceptible or already myopic eyes than in emmetropic eyes. With this case report, we emphasized the possible effect of computer vision on the development of high myopia in a teen-age, inducing a myopic shift in a short period of time unrelated with the increase in height of the patient. In conclusion, extreme near work may be related with the development of high myopia, therefore, excessive use of computers especially at school years, should be avoided. Further studies are needed to demonstrate the appropriate time period for near work, especially for subjects who are at risk, i.e. patients with myopic parents, for development or progression of myopia.

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