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Aspects of Brain Disorder and Visual Impairment in Young People Using Computer Intensively

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The widespread introduction of computer technology has a powerful effect on the human visual system. For people of many professions, an hour of work at the monitor has become mandatory. This led to a significant increase in the load on the organs of vision. The visual system significantly exceeds other sensory analyzers with regard to receipt of information in the human brain. It provides a complete orientation in the surrounding world.

The creation of virtual reality systems began from the study of stereoscopic features of functioning of the visual analyzer and the implementation of the results in applied video simulators [1,2]. Such systems are designed for interactive communication between a computer and the human brain in the field of perception and processing of figurative information. Computer-aided synthesis of three-dimensional images and their display in virtual space, in particular a VR-headset, have become widely used for computer games.

Materials and methods

In order to study the possible impact of technical devices that generate virtual reality on the human visual system, a survey was conducted among the students studying information and computer technologies at a university in Minsk. The questionnaire method was used. in an anonymous study, 106 people took part in an anonymous study: females - 39 (36.8%), males - 67 (63.2%). Students' age was from 17 to 19 years. The average computer experience was 10 years. The survey was conducted in the first trimester (September). All students were informed about the purpose of the study, and agreed to participate in the survey.

We used the Amsler test and a questionnaire developed by us to identify visual disturbances because of intensive computer use [3,4,5].

The key questions of the questionnaire were as follows:

1. Perhaps someday, when you went outside after a long stay at a computer or a tablet, you saw that large objects, such as buildings or cars, break down and/or collapse; smaller objects: trees, people, poles, etc. distorted, broken, partially or completely disappear?

2. If you observed a distortion of the environment in the real world, then indicate after using which computer resource it was (a game, a film, working with software).

The questionnaire includes questions about the duration of visual impairment and the period of occurrence– in the past or in the present– and an additional question about unusual visions.

Results

The analysis showed that in 29 persons (27.4%) of the number examined, there were deviations both in the visual perception and in the visual system.

10 persons (9.4%) of the number examined gave an affirmative answer to the above first question. Of these, in 6 persons deviations were detected by the Amsler test (fuzzy or wavy lines, dark spot in the centre, grid angles not visible).

Distortion and destruction of visual images of the real world within a few scores of minutes after using a computer were observed by 4 persons, but only two of them showed some deviations according to the Amsler test.

Photopsies in the form of multi-colored lights, flashes, dark spots, dots, etc. were observed by 2 persons after long work with the text. After the sessions of a computer game, 4 persons indicated distortions in the visual perception of images of the real world.

The second question was answered positively by 6 persons. (5.7%), indicating that such a distortion of visual images appears after working with software (usually in small text) and is observed for several seconds. Deviations according to the Amsler test in this group were found in 2 persons: blurred lines, blurred sides and grid angles in one eye. 2 persons explained to themselves the unreality and temporary nature of the distortion of the images of the world due to the emotional richness of experiences.

13 persons (12.3%) revealed deviations according to the Amsler test without concomitant distortion in the perception of visual images of the surrounding reality.

Of the deviations from the test after prolonged work with Amsler's text, the most common occurrences are: dark spots on the grid and around the point - 11 cases; invisible corners, blur, distortion of the sides and grid angles - 10 cases, waviness and/or curvature of the lines - 10 cases. 7 persons revealed two or more deviations by the Amsler test, in 3 persons there were deviations in one eye.

To the additional question about unusual visions, 2 students pointed to spontaneously arising visions in them (human figure, hairy back), without detecting other deviations in visual perception.

It is noteworthy that 7 first-year students have the following deviations: according to the Amsler test - 4 persons, distortion of visual images of the surrounding world - 5 persons. This indicates the formation of the pathology of the visual system already in childhood due to inactivity during the growth period of the body [6].

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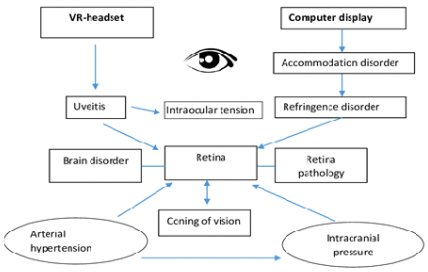

Fig. 1. The scheme of the retina pathology formation in users

Conclusion

The survey allows us to conclude that the formation of people who are intensively using a computer of both disorders of visual perception of images and pathology of the retina.

The survey indicates the formation of visual disorders in computer users. This testifies to the need for neurophysiological studies.

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