

PREVENTION OF DISABILITY BY EARLY AND TIMELY DIAGNOSIS OF NEURODEGENERATION USING BIOMEDICAL ENGINEERING METHOD

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Abstract

The European Commission by funding for Environment and Health research supports the policy on Occupational Health & Safety, which leads to developing of tools and methodologies for better risk assessments, and to design of disease prevention and health promotion actions. The disability of the population due to the negative impact of labor and defense activities is a global social and economic problem that proves the need to develop an effective National Program for the Prevention of disability. The main goal is researchers, functional and clinical diagnosticians collaboration to uncover the mechanisms of induction of degenerative transformations. The patients (n = 15) aged 45-75 YO underwent an initial neurological examination, an anamnesis of the disease was compiled and an assessment of the individual lifestyle was carried out. Computed tomography (CT) of the brain was applied to reveal the presence of neurodegenerative transformations. The Disability Prevention Program conceptually, strategically provides for comprehensive screening of the neuromuscular system; regulating the psycho-emotional state; the biomechanical efficiency of the locomotor activity; the sleep-wake cycle, the presence of sleep disorders; energy and plastic metabolism balancing; aerobic capacity assurance; body composition balancing. The following changes partially were found by the CT application reflecting the genesis of neurodegenerative transformations: expansion of the subarachnoid space; deepening of the interhemispheric fissure; deepening of the Sylvian furrows; symmetrical calcifications in the basal ganglia (> 3.9 cm³); the asymmetry of the brain ventricles; an increase in the diameter, area and volume of the ventricles. A decrease in the diameter of the entorhinal cortex (by 20-30%) was revealed; reduction of the diameter and area of the hippocampal complex (by 15-25%); reduction in the volume of the hippocampus (by 10%). Thus, closer interaction of researchers with diagnosticians and bioengineers is needed in the development of programs for the prevention of disability and health promotion.