KHARKIV NATIONAL MEDICAL UNIVERSITY

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CONTESTS

Maryenko Nataliia

FRACTAL ANALYSIS OF THE HUMAN CEREBELLUM (MAGNETIC RESONANCE IMAGING STUDY)

Kharkiv National Medical University
Department of Histology, Cytology and Embryology
Kharkiv, Ukraine
Scientific advisor: ass.prof. Stepanenko Olexander

Modern diagnostic methods of neuroimaging (CT, MRI, etc.) are the methods of choice for lifelong assessment of the morphofunctional state of various brain structures and the diagnosis of various pathological changes and diseases of the nervous system. The use of fractal analysis as a morphometric method allows to investigate biological structures that have the properties of fractals, including the human cerebellum. Adaptation of fractal analysis techniques to assess the state of brain structures using magnetic resonance imaging is an important area of modern morphology.

Objective: to determine the values of the fractal dimension (FD) of cerebellar tissue and its external linear contour different areas parts of the cerebellum according to magnetic resonance imaging using pixel dilation method.

Methods. Digital T2 weighted images of magnetic resonance imaging scans of 120 patients were used in the study of the cerebellum. The walues of the fractal dimension of the outer linear contour of the cerebellum and its tissue for the upper and lower cerebellar lobes were determined using pixel dilation method in the author's modification.

Results. It was found that the average value of FD of the cerebellar vermis on the midsagittal section on T2 weighed images with a brightness threshold of 100 was 1.691 ± 0.01. The FD values of the cerebellar hemisphere tissue were: in the paravermal zone on the left 1.683 ± 0,01, on the right 1.685 ± 0.01; in the central zone of the hemisphere on the left 1.679 ± 0,01, on the right 1,672 ± 0,01; on the lateral zone of the hemisphere on the left 1.665 ± 0.01, on the right 1.682 ± 0.01. These values do not differ statistically significantly in the symmetrical areas of the right and left hemispheres and do not differ from the FD values of the cerebellar vermis.

The average FD of the cerebellar tissue was 1.836±005, of the upper lobe – 1.816±0.005, of the lower lobe – 1.855±0.005. The average FD of the external contour of the cerebellum was 1.400±0.008, of the upper lobe – 1.370 ± 0.009, of the lower lobe – 1.431±0.008. Both FD values of the lower lobe of the cerebellum statistically significantly exceed the corresponding values of the lower lobe.

The developed algorithm of research can be used for diagnostics of a condition of a cerebellum as additional morphometric study for magnetic resonance imaging of a brain. Fractal analysis allows an objective assessment of the morphofunctional condition of the cerebellum, which can be used to diagnose various diseases of the cerebellum and other CNS structures.

Nazar Burlakov

MEDICAL STUDENTS` SLEEP QUALITY IN CORRELATION WITH THEIR HEALTH

Kharkiv National Medical University
Department of Medical Biology
Kharkiv, Ukraine
Scientific advisor: assoc. prof. Dzhameyev V. Y.

There is no doubt that sleep is significantly needed to maintain the proper functioning of our organisms. Sleep is responsible for the restorative processes of our body and mind. Humans spend, approximately, a third of their lives sleeping. Calculations based on numerous researches advise us to sleep at least 8 hours a day. Nevertheless, these recommendations cannot be applied to everyone’s daily routine, because of individual factors such as age, circadian rhythms, diseases, etc.

Many students underestimate the role of sleep in their lives, and this causes serious problems with their health. We have done studies to find out what is the root of poor health quality of students aged 16-23 years old, how is it chained to sleep and its duration, and what are the exact ways to improve it.

We have created questionnaires to achieve the goal of our research. More than 500 people participated in this investigation, which has shown that 17% of medical students sleep at least 5-6 hours, 28% — 6-7 hours, 40% — 7-8 hours, 12% — 8-9 hours, and