



## BRAIN THAT LASTS - HOW TO PRESERVE HEALTHY BRAIN

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### ABSTRACT

Health represent a totality of physical and mental health. In order to preserve overall health, it is important to preserve the health of each organ and organ system individually, but for the overall health, the brain is very important as an organ, because many physical but also mental illnesses are caused by changes in the brain itself. Therefore, there is no health without health of the brain. On the other hand, brain illnesses are, due to their nature, the consequences they cause and the cost of treatment, major personal, social, national, but also worldwide concern. After depression, dementia and stroke are among the most common brain diseases, along with Parkinson's Disease, epilepsy and multiple sclerosis. It is therefore very important to preserve the health of the brain in order to prevent the onset of these diseases. This is possible by nourishing the five pillars on which the brain is based: physical activity, healthy nutrition, emotional stability, constant brain training in term of learning and treatment of risk factors leading to stroke and dementia.

**KEYWORDS:** Brain, brain health.

### INTRODUCTION

In order to preserve and improve overall health, it is very important to be aware of the fact that there is no health without health of the brain. The brain represents an organ without which there is no movement, speech, thinking, feeling of satisfaction..., and overall health functioning. In healthy male person brain weights around 1300 grams, and in female around 1,200 grams. Our goal is to preserve it throughout life in the total, but also to preserve the function it has.<sup>[1]</sup>

In order for the brain to function properly it is necessary that at any moment it is supplied with sufficient amount of blood, which carries nutrients as a source of energy for that work, but also oxygen, which is about 60ml of blood per 100 grams of brain substance per minute. This is possible if the system of blood vessels, including the heart, is preserved and can provide this inflow. Heart as a good pump and the blood vessels of both the front carotid and the back vertebrobasilar system, has to be elastic walls without narrowing of their lumen, so that the blood circulation system is uncompromised. When the flow, from the level of 60ml of blood per 100 grams of brain substance per minute decreases by one third, it already causes brain function disorders and causes reversible damage, and if it decreases to one half, if it affects sensitive regions and lasts long enough (sometimes few minutes are enough), irreversible damage occurs.<sup>[2]</sup>

During lifetime, blood vessels are also subjected to the process of aging, atherosclerosis, which is manifested by the formation of deposits on the intimate wall of the blood vessels, resulting in the reduction of their lumen, and later in arteriosclerosis, all accompanied with the reduction in the blood vessels walls elasticity, which consequently reduces blood flow to the particular irrigation area and ischemia of that part of the brain. If ischemia occurs acutely, as a consequence of a stroke, and if the ischemia lasts long and has a chronic character it results in diffuse hypoperfusion and subsequent dementia.<sup>[3]</sup>

Atherosclerosis is a process that begins during childhood and continues throughout life. There are many factors that contribute to it, and which cannot be influenced (aging, gender, genetic predisposition), but there are also many factors that can be influenced (smoking, what and how much we eat, what we drink, how much we are sitting, whether we are subjected to stress, control our blood pressure, fat in the blood, as well as blood sugar) by changing lifestyle.

There are many illnesses that primarily affect the brain, primarily depression that affects about 350 million people, epilepsy that affects about 70 million people, dementia affecting about 50 million people, stroke which affect about 15 million people around the world, Parkinson's A disease affecting almost 10 million, followed by multiple sclerosis affecting about 2.5 million

people. On the other hand, brain diseases are taking a very large percentage of financial resources that are consumed from the total sum for preserving the health around the world.

Only on the problem of stroke and dementia, I will try to explain how important brain health is. Stroke that equally affects men and women and all races and whites is among the leading causes of death in the world, but it is also often a cause of dementia and complete disability.<sup>[4]</sup>

### **The cognitive deficit that occurs after the stroke is as important as the physical...**

Numerous studies have shown high incidence of cognitive impairment and dementia after a stroke with rates ranging from 6 to 32% during a follow up period from three months up to 20 years. Practically, the development of dementia after a stroke occurs in a period of 3 months, with different intensity. If with the stroke are affected the cortical areas, clinical picture is dominated by aphasia, apace and epileptic manifestations, and if subcortical area is affected, then the clinical picture is characterized by disorders of the behavior, planning, decision making and behavioral disorders, apathy, depression, emotional incontinence, gait disorders and pseudobulbar paralysis.

Predictive factors for the development of dementia after the stroke are the size of the brain's infarction, the localization, but also the level of education so that persons with lower education level have a higher risk for dementia, as well as older people, and as well as those with repeated stroke.<sup>[5,6]</sup>

Lakelous brain infarctions often does not leave motor deficits, but often the result in cognitive impairment.

In a clinical practice, a period of three months is usually taken to resolve possible delirium after a stroke and a to obtain more reliable estimate of cognitive function. On the other hand, about 50% of patients with acute stroke may show improvement in global cognition within 1 year after stroke (Ballard *et al.*, 2003). Long-term improvement in cognitive function is more common in patients with stroke of the left-brain hemisphere.

It is established that the with age increases the risk of dementia after a stroke. Other risk factors may be elevated Body Mass Index (BMI), atrial fibrillation, presence of white brain mass and cortical atrophy (especially in the temporal lobe) recorded by neuroimaging, hypertension, obesity, elevated homocysteine or high lipoprotein values and diabetes mellitus.

Most studies did not found any link between gender and dementia, but two studies have confirmed a higher incidence in women than in men.<sup>[7,13]</sup>

### **Diagnosis**

Diagnosis of dementia is based on anamnesis and heteroanamnesis, a clinical picture with the use of MMSS, Moka test or clock drawing test. None of these tests are absolutely reliable, does not allow distinction between Alzheimer from vascular dementia and are more susceptible to left hemisphere disorders. The treatment of dementia, both Alzheimer's and vascular are based on acetylcholinesterase inhibitors and memantine preparations, but the results are not encouraging. Therefore, it is very important, after a stroke, to start cognitive rehabilitation at the same time as physical in order to protect the person from congenital decay, because dementia is a global problem at both personal and family, social and national levels.<sup>[7,8]</sup>

### **How to preserve brain health**

Brain health depends on the genetic factors, the influence of the environment and our life styles. Genetic factor affects only 20% of brain health, and the lifestyle other 80%. Back in 1904, Santiago Ramon said that every man is the sculptor of the health of its brain and can change it with its behavior. Individuals who are active in the profession, in the sense of education and lifelong learning, have a lower risk of developing dementia by about 30-40% during old age. Brain aging begins after the age of 20 years, and after 60 years of age, the volume of the brain decreases by 0.4 to 1% each year. This results in difficulties in acquiring new knowledge and skills, but also in forgetting those which have been previously acquired. The main causes of brain aging are: normal physiological aging, stroke and vascular dementia, Alzheimer's dementia, brain trauma and inflammatory diseases. In order to prevent this, we need to work on the preservation of brain health.<sup>[5,9,10]</sup>

Brain health lies on 5 different pillars, which should be preserved and nurtured:

1. Physical activity,
2. Healthy diet,
3. Emotional stability,
4. Constant brain training - continuous learning,
5. Treatment of risk factors.

Physical activity is the first pillar of good brain health in many ways. As first, regular physical activity prevents the decay of neurons in frontal parts of the brain which are responsible for executive functions, then improves total cerebral blood flow, thereby enhancing the detoxification of the body, but also protects the heart and other blood vessels from the onset of cerebrovascular disease. On the other hand, it is very important fact that physical activity promotes the production of neurotrophin, which in turn stimulates the growth of brain cells and thus contributes to neuroplasticity of the brain.<sup>[11]</sup>

Physical activity thus acts counter-proportionally to cognitive decline. Higher physical activity, slower and less decaying in cognitive functions. Rizzolati *et al.*

examined the premotor cortex, the area F5 in monkeys and noticed that neurons showed activity when fetching food by hand, but the same activity in the neurons of the same area were observed also when the monkey look as another Monkey reaches for food or look at the researcher.<sup>[12]</sup>

One study in UK was examining brain activity of taxi drivers, where the steering wheel is on the right side, when driving passengers and finding streets, how their brains produce the same activity as physical activity, or a case of piano playing where it has been determined that the motor performance of the piano playing produces the same effect as the cognitive process of tracking that action. So far, a number of studies have been published that point to the fact that physical activity largely protects the brain from aging and thus prevents the emergence of stroke and dementia.

What needs to be emphasized is that it is desirable to walk and not run in order to protect our hearts from the effort.<sup>[13,14,15]</sup>

Healthy nutrition would be the second pillar of brain health preservation. The same implies a lot of fruits and vegetables in the diet, plenty of blue fish, grains, and very little or no potatoes. Additionally, to eat a lot of seeds rich with unsaturated fatty acids. Mediterranean nutrition is very good. Of course, this is all in accordance with the financial possibilities, forcing frequent and smaller meals with the consumption of 10 mL of wine during the lunchtime, either white or red as a protector of the blood vessels. The small amount of alcohol acts protective, unlike large amounts that accelerate the process of atherosclerosis of the blood vessels.<sup>[16]</sup> Smoking is not allowed at all. In addition to this the use of chocolate, besides it is acting as antidepressant, it also has a positive effect on dementia prevention, as well as the daily use of a couple of cups of coffee that protects against dementia. Similar effect has couple of cups of green or black tea a day. It is not recommended to use animal fat.<sup>[17,18]</sup>

Emotional stability is a very important factor for brain health. Stress is a very dangerous factor that accelerates brain aging in a manner that stress through the hypothalamic and adrenal axis directly affects heart function, and on the other hand, glucocorticoids act to augment oligodendrogliosis in the adult hippocampus, which later results in cognitive impairment. It is known that cortisol changes the stem cells leading to a decrease in their function, and chronic stress changes the connections between neurons. It is important for the health of the brain to live in love, socialize every day with friends, acquaintances, establish new contacts with other people. Because happiness is love, which contributes to the relaxation of the nervous system, without the stress that makes life easier.<sup>[19]</sup>

Mental stimulation - continuous brain training, continuous learning is very important for brain health, because constant training enhances memory, attention, increases concentration, hearing and visual perception as well as speech skills. When the brain is in contact with the new stimulus, it is necessary to increase attention and concentration, efforts are needed, so the new neural connections are being created. Merzenich and many other authors have shown that motor and sensory maps in one person are not constant, but on the contrary, they change during life which is very important for brain health. Wollett *et al.* analyzed the activity of the hippocampus of London taxi drivers while finding new addresses, and recorded intense activity in the hippocampus, suggesting that the new stimulus stimulates the activity of the hippocampus and other regions responsible for learning.<sup>[20]</sup>

By modifying ten risk factors, it is possible to prevent stroke in 90% of cases. These factors are: increased blood pressure, smoking, at least 30 minutes of walking during each day, a reduction of the BMI below 25, with reduction of sugar, fats, alcohol intake and stress. The American Brain & Heart Association has given instructions how with 7 simple steps improve life.

1. Get Active,
2. Control Cholesterol,
3. Eat Better,
4. Manage Blood Pressure,
5. Lose Weight,
6. Reduce Blood Sugar,
7. Stop Smoking.<sup>[21]</sup>

## CONCLUSION

For overall brain health, one should know that happiness is love in life, establish new contacts with people, improve old, make new relationships and friendships because that is the happiness with which we need to know to stop when we reach it with physical activity, constant brain training, healthy eating and fighting risk factors.

## Conflict of interest

The authors declare that they have no conflict of interest.

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