THE EFFECTS OF SEDENTARISM ON THE HUMAN BODY

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The last decades have shown us that the human's survival means has undergone changes, and in some cases these changes are radical. Technological development and evolution, the development of the society, environmental changes, social influences have produced changes in everyday human behaviour, they have altered or changed the communication possibilities of people and their need for socialization, have made categorical changes in the way people perceive movement and travel, the way we work and shop etc. These changes definitely influence human behaviour. The association between the behaviour of modern man, either at home or in the society, and physical inactivity, can be found, as effects, in structural, physiological and psychological changes, sometimes irreversible. This material synthesizes some of the effects of sedentarism on the human body, while also highlighting the possible diseases to which we are exposed because of the lack of physical activity.

Keywords: sedentarism; movement; human body; physical activity; sedentary behaviour; inactivity.

The behaviors and habits of the modern world determine important changes in the humans' evolution over the course of their lives. If the beginning of life is marked by discovery, play, study, its second part is driven by the need for survival, by the actual existence. The need to exist is often found in the behaviors dictated by the reasoning of a job, its stability, convenience, tranquility, and last but not least the physical safety offered by the non-involvement in different physical activities.

Adding reading (from the perspective of the lack of movement, inactivity), watching TV programs or other entertainment activities that require a screen (phone, monitor, tablet etc.) definitely creates the premises of a sedentary life, lacking the beneficial contribution of movement. As a matter of fact, "movement is a characteristic of the living matter; the human, as a form of existence of the living matter, is defined by movement. Adaptation to external environmental conditions, to social conditions, is under the effect of human movement"[1].

The effects of sedentaryism on the human body

As mentioned earlier, movement is life. If social evolution indicates or determines how we behave, then we should look at activities that involve a form of movement and involve the expenditure of energy on our part as ways of combating sedentaryism.

But what is sedentaryism? In a broad sense, sedentaryism can be understood as the state in which the body is not involved in any kind of motor activity, does not perform any action other than sitting on the chair (armchair, sofa etc.), lying down (except for periods of sleep during the night) or inclined, a behavior that is simply characterized by our ability to do nothing.

In a precise vision, sedentary behavior is understood to be characterized by a low energy expenditure where the metabolic consumption is less than the value of 1.5 MET. "A metabolic equivalent (MET) is defined as the amount of oxygen consumed while at rest and is equal to 3.5 ml O_2 per kg body weight x min"[2]. The MET concept is a simple, practical and easy procedure understood to express the energy cost of physical activities as a multiple of the metabolic rate at rest. This consumption of O_2 transposed in kcal would be for a sedentary man with a weight of 70 kg in 24 hours, about 2300 kcal, given that during sleep the energy consumption is lower, reaching the value of 0.9 MET. In other words, a sedentary man weighting 70 kg needs about 2300 kcal to live. At the opposite end, we can say that any energy requirement higher than this value of 1.5 MET is a consequence of the sedentary behavior changes through the emergence of various motion-related activities that involve motor activity, neuropsychological activity or their combination.

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According to the World Health Organization, one in four adults does not carry out enough physical activity and inactivity is one of the major threats to the population, being ranked as the fourth leading cause of death worldwide. We do not have to look for statistics to become mere observers of this state. It is enough to look within our entourage to get an idea from this point of view. It is much simpler, convenient and accessible to do nothing than to go out in the park for a walk, go shopping, get up from the couch and dance on a series of songs that we like, to go to a swimming pool or to the gym.

If we look at and analyze Figure 1, we can see some examples of activities that people can do daily, as well as the approximate time they spend performing them.

Another effect of sedentaryism is cancer. A profound analysis of over 40 studies, including more than 4 million people, a significant figure for any research, has shown that sedentaryism can be the cause of many cancers: colon cancer – about 24%, lung cancer – approximately 21% risk, endometrial cancer – 32% risk and even breast cancer. The risk of death is accentuated by how low physical activity is.

Otherwise a cause of this inactivity is television. Those who spend more than 7 hours in front of him pose an obvious risk of getting one of the above cancers as compared to those who watch TV programs up to an hour a day[6]. Studies show that, for every hour spent in front of the TV, if there is a regular behavior to use between 2 and 4 hours without a break, it may increase the risk

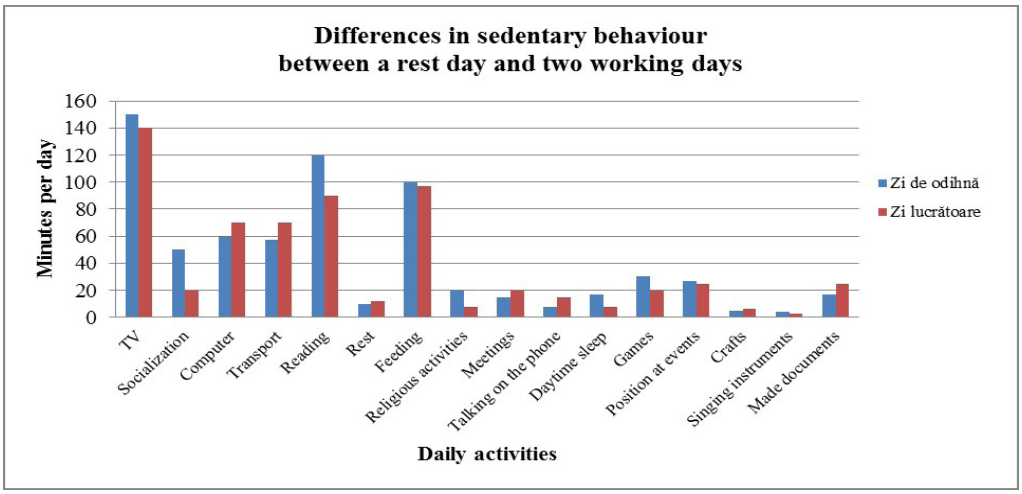

Figure 1. ***Examples of daily activities and the time allocated to them***[3]

The impact of these minutes spent in physical, sedentary inactivity can be found in a number of negative effects on the body, some of them with irreversible health effects. A first effect of the sedentary behavior, not necessarily important, is found in changes in the circulatory system. In the sense of inactivity, these changes in the circulatory system are materialized by the occurrence of cardiovascular diseases. There are studies[4] showing that sedentaryism has an incidence of between 2% and 17% in terms of increasing the incidence of cardiac and vascular incidences, blood pressure in adults, young people and children. There is also a direct link between a cause of cardiovascular mortality and sedentaryism. It favors pulmonary embolism[5], as a consequence of deep venous thrombosis.

of diabetes, cancer or cardiovascular diseases with values ranging from 9% to 11%, on a case-by-case basis.

Inactivity can lead to type 2 diabetes, another effect of sedentaryism. Even if we have a rational diet and body weight is good, the amount of sugar in the blood can increase, much more if there is no form of its consumption. In other words, your blood sugar level may exceed your normal range. For an adult, the blood sugar level has a baseline ranging from 75 to 110 mg/dl, measured in the morning without caloric or hydric intake. But what is type 2 diabetes? Diabetes mellitus is a malfunction of the pancreas, an internal organ that secretes insulin in the body. The role of insulin is to regulate the amount of glucose in the blood, which tends to increase as a result of glucose intake or

sugar-containing products. As a result of pancreatic dysfunction, the amount of glucose in the blood can no longer be controlled, leading to an increase in blood glucose above 110 mg/dl.

This increase may lead to diabetes. In case of complete pancreatic disability to insulin secretion, type 1 diabetes mellitus appears – in this case, in order to continue life, insulin is administered as treatment. Where there is only a decrease in the amount of insulin, whether we are talking about low secretion or another action independent of the pancreas that prevents its proper functioning, we are talking about type 2 diabetes. In this type of diabetes, hyperglycemia may occur in excess of 300-350 ml/dl, which could lead to the installation of a type of coma.

Understanding what diabetes means, we can associate sedentaryism with the chances of developing and the onset of type 2 diabetes, knowing that physical activities can be potentially consuming blood sugars. Considering that at an average increase in the risk of installing an illness by 10%/hour spent in front of the TV for two hours, the risk of developing type 2 diabetes increases by about 20%.

The study "Breaking prolonged sitting reduces postprandial glycaemia in healthy, normal-weight adults: A randomized crossover trial" states that a break of about 1 minute and 40 seconds every 30 minutes of inactivity is more effective than a 30-minute walk in fighting the increase in glucose concentration.

Another effect of the sedentary behavior is found in changes in the amount of body fat, in the sense that its increase leads to obesity and being overweight. As a matter of fact, obesity and overweight are defined as excessive accumulation of fat in the body both around the internal organs and subcutaneously, which could cause serious diseases such as hypertension, dyslipidemia, type 2 diabetes, cardiac disease, osteoarthritis, cerebrovascular, respiratory, various cancers or even death. It is estimated that 35% of deaths from coronary artery disease, 32% of deaths from colorectal cancer and 35% of deaths from diabetes can be directly attributed to sedentaryism and being overweight, according to the study "The public health burdens of sedentary living habits: theoretical but realistic estimates"[7].

The lack of movement together with the inappropriate consumption of food for the work a person carries out can lead to obesity. This is not generally true, knowing that about half of the world's population is characterized by rapid metabolism - this does not mean that the body does not work properly, on the contrary it burns or consumes excess nutrients and does not create energy deposits (also understood as accumulations in excess fat).

If, simultaneously with this increase of fat, occurring around the waist (central obesity), there appears an increase in blood pressure, an increased number of triglycerides, the decrease of the "good" cholesterol (HDL), and a slight increase in blood glucose, one must admit that people are susceptible to the onset of the metabolic syndrome. This may also be an effect of sitting in front of the TV too long. The study "Sedentary behavior and health outcomes: An overview of systematic reviews" supports the link between irrational and unhealthy eating, physical inactivity and TV. Men or women who do not have physical activity may have an increased risk of developing this syndrome, ranging from 73% -76%, compared to those who carry out any kind of activity[8].

In parallel with all these aspects focusing on obesity, as a result of sedentaryism, Harvard University states that men with a waist over 107 cm (42 inches) are prone to erectile dysfunctions.

Also, the sedentary behavior may be the cause of osteoporosis, muscle degeneration, spinal cord pain. As far as osteoporosis is concerned[9], bone metabolism is a more dynamic process, more effective if the human body performs more movements. "By this, the bones directly involved in action are more developed. The lack of activity leads to their thinning"[10]. Some sedentary activities may be associated with this bone degeneration. Knowing one of the roles of the bones, supporting the body and ensuring its locomotion, one can quite simply deduce the importance of maintaining their health.

In the situation of inactive muscle groups, they reduce their elasticity, extensibility, contractility, strength. Muscles, by their fundamental function of ensuring the movement of the body, coupled with the assertion of the postulate, that "any organ that is not used is atrophic" we can admit that these are a key to ensuring the survival of man.

The sitting position is associated in many cases with back pain in the lumbar region - most often, and in the cervical area. According to the study "Breaking up workplace sitting time with intermittent standing bouts improves fatigue and musculoskeletal discomfort in overweight/obese office workers", some workers who were working in the sitting position were asked to stop their work for a short period of time every 30 minutes. In this way, those who discontinued work experienced a decrease in the back discomfort by up to 32%. Also the sitting position may accentuate the anterior-posterior curvature of the spine, creating additional pressure on the intervertebral discs. Over time, these pressures may cause disc degradation and disc herniation (movement of an intervertebral disc).

Another major effect that sedentaryism can have is also found is connected to mental health. Inactivity can be a prerequisite for depression by increasing the time spent on dominant negative thoughts. Knowing the social character of sports activities, which are often held in groups or around people, we can admit that physical activity is a solution to fight depression. It was also found that cognitive performance improves by up to 18% following a moderate-intensity physical activity over a 12-week period. Also for the same period there was also a reduction of the biological age by 6-8 years.

Although inactivity or a sedentary behavior tends to become a lifestyle and its negative effects can influence its development, combatting it can be done quite easily, given the multiple choices of

Table 1

EXAMPLES OF ACTIVITIES AND CHOICES OF BEHAVIOUR[11]

CONTEXT	LOCATION OF BEHAVIOUR	ACTIVITY	BEHAVIOURAL CHOICES	
			Physical activity	Sedentary behaviour
Community	Public spaces (park, beach) Sports bases Stores Social areas (coffee shops, restaurants etc.)	Recreation/ socializing	Walking, jogging, participation in sports activities, dancing, group walk	Sitting position and socializing, TV, attenting events, feeding activity, computer activity, video games
		Organized recreational programs	Group walking, exercises in and with the group	Reading within a group, group work
House	Interior Exterior	Household work/ relaxation	Vacuuming, general cleaning, garden work	Dishwashing, ironing, sitting down and laying down
Occupational	Desk Commerce and industry Services	Production	Walking, using stairs	E-commerce, using the elevator
		Communication, services	Going to one's peers	E-mail, telephone
Educational	School Other forms of training	Occasional activities	Walking, using stairs	Using the elevator, sitting
		Extracurricular activities	PE within the school curricula, extracurricular sports activities	Use of internet and the computer, relaxation and socializing
Transport	Street Access ways for walking and riding a bike Metro	Commuting	Walking, riding a bike	Driving, public transport

Although inactivity or a sedentary behavior tends to become a lifestyle and its negative effects can influence its development, combatting it can be done quite easily, given the multiple choices of

how to deal with different daily tasks. There are enough ways we can make a choice to fight this behavior. *Table no. 1* presents several types of activities in everyday life, as well as variants to prevent a sedentary behavior.

Conclusions

We have noticed a series of effects that sedentaryism can have on the human body. These effects, in some situations, are irreversible and, if treated superficially, can even cause death. Obesity, cancer, diabetes or cardiovascular disease are not just simple diseases. They are obvious causes for the death of millions of people annually globally.

The role of activities involving physical effort is found in a series of beneficial effects on the body and in fighting the negative ones. Moreover, practicing sporting activities, even decentralized, will "positively influence some structural-functional components of the body (somatic sphere, major functions, energy reserves, psychic resources), having beneficial effects"[12], within certain limits, on the body, irrespective of age and gender, regardless of the geographical area where the person is.

In all this social blend, something cannot really be neglected. This "something" is represented by the children's behavior. Children, we all know it, have an incredible ability to copy or imitate our adult behavior, looking for and seeing us as examples. Or, in this situation, a sedentary tendency can definitely occur among them, especially if we, as parents or adults, are dominated by this kind of behavior, physical inactivity.

Without an active involvement of adults in self-education and changing the sedentary behavior, in educating and altering the children's behavior, we will become a society of obese, sick people, where health problems will be more and more often, and unfortunately, more serious.

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