ALTERNATING SHIFT WORK. MEDICAL AND SOCIAL ASPECTS

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Abstract: In the alternating shift work, a way of organizing in time the work of workers, there are both medical problems relating mainly to melatonin secretion and outphasing the biological rates and social, family issues leading finally to a specific state of mental stress, an increase in the levels of anxiety, all of them being exacerbated or dimmed by the worker’s adapting abilities.

Keywords: alternating shift work, biological rhythms, melatonin, disrupting couples’ life, chronobiology

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Chronomedicine represents a specific chapter, which studies the relations between the variables of chronobiology and chronopathology of the biological rhythms of the human body and work.

The biological rhythms represent the subject of Chapter 2. Special attention shall be paid to chronanatomy and chronophysiology of the central nervous structures that occur in the chronoregulation of the biological functions through the central horolge - the suprachiasmatic nucleus - functionally accompanied by the pineal gland through the melatonin secretion. Synchronization and de-synchronization are relevant properties of the biological rhythms.

Melatonin, N-acetyl-5-methoxytryptamine, is a chemical substance produced by the pineal gland and is involved in signalling "the daytime", a kind of chronological peacemaker. It is synthesised from tryptophan (an amino acid), the reaction being catalyzed by two enzymes (arilalkilamine N-acetyltransferase and hydroxindol-o-metiltantransferase) and is encountered in all living bodies, from algae to humans at varying levels.

Melatonin is quickly metabolized by the liver. It is produced by the pineal gland, as well as at the level of retina, bone marrow, lymphocytes, and the digestive tract. The production and release of melatonin is stimulated by darkness (it is the chemical expression of darkness perception by man) and inhibited by light.

The information linked to the presence of the light or dark is transmitted to the pineal gland by retina through the hypothalamus suprachiasmatic nucleus and through the central nervous system.

Melatonin secretion is determined by the presence of serotonin, a neurotransmitter released in the presence of darkness. Synchronization and desynchronization are relevant properties of the biological rhythms.

The primary roles of melatonin are:
- sleep triggering;
- biological clock adjustment;
- it is one of the most powerful anti-oxidant and is a terminal antioxidant (in reaction with the free radicals, it produced stable final forms);
- it regulates the endocrine system;
- it increases the body’s defence ability (acting on the MT1 and MT2 receptors of the immuno competent cells);
- it stimulates the osteoblasts;
- low levels of melatonin are found in those with anxiety, anorexia, and depression disorders;
- subtracting melatonin is a risk factor for the production of the breast cancer;
- it decreases the rate of protein hyper-phosphorylation (hyper-phosphorylation which causes the death of the neurofibilar degeneration involved in the mechanism of the development of Alzheimer disease;
- it facilitates the adaptation to time zones changes;
- those who suffer from autism have low levels of melatonin (because of low activity of the ASMT, gene involved in hormone’s synthesis);
- it increases the level of prolactin;
- it inhibits the FSH formation having antigonadotropic role.

Performing alternating shift work can lead not only to problems of desynchronized biological rhythms but also can disturb the couples’ life, by directly affecting the accomplishment of the family and social parts, leading to the occurrence of conflicts and to a certain mental stress, increased level of anxiety, altering self-esteem, all of them being exacerbated or dimmed according to each one’s adaptation skills.

The quantity and quality of the social interactions are in a direct relation to the physical and mental health.

Shift work can adversely affect marital stability, in particular in couples with children.

Activity planning is made more difficult due to the non-standard hours of work, reducing thus the time to spend with each one’s family.

Furthermore, alternating shift work can affect the relationship between parent and child, because of the parents’ limited free time.

The "emotional download" effect is also a possible outcome, which occurs when stress and exhaustion of the job are taken out on the members of the family.

In conclusion, alternating shift work can lead to complex medical and social disorders.

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