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Shift in Time Zone: The Biologic Clock and Neurology

Zaman Dilimi Değişikliği: Biyolojik Saat ve Nöroloji

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Introduction

Almost every tissue in the human body functions according to an internal clock regulated to a 24-hour circadian rhythm. Tissues and cells that begin to function outside of this rhythm have a tendency toward carcinogenesis (1). The hypothesis of the mechanism of the biologic clock has brought a Nobel prize to its owner (2). With this communication, we emphasize the relationship between the biologic clock and neurology and aim to inspire readers in challenging fields of research.

The 'summer-time' implementation has been rendered permanent in Turkey according to an enactment published in the Official Gazette (No: 29825) on September 8th, 2016, which entered into force the same day. As we do not in fact have a real 'winter time', this can be considered as a 'shift in time zone.' The break-up of the bond between sleep and its most powerful 'zeitgeber' daylight can be searched with the term 'daylight saving time' in the medical literature, and it can be seen that this situation has been the subject of many studies varying from myocardial infarction to the occurrence of stroke (3).

The suprachiasmatic nucleus located in the hypothalamus plays an important role in the regulation of the circadian rhythm. The biologic clock relating to different anatomic structures and neuroendocrine processes has a principal role in the secretion of melatonin, variations in the temperature of the body, cortisol release, and appetite. It also acts in modalities such as attention/concentration, mood, and metabolic and autonomic modulation. The consequences of sleep disorders due to external causes incompatible with the biorhythm can be much more than just physical tiredness. This situation influences perception, data processing, concentration, and recalling functions of individuals in workplaces, in traffic, and at school or home. Waking up with daylight at the last part of a normal night sleep affects daily mental performance positively and facilitates falling asleep at night, and enables preparation for the next day. The response to suppress the effects of environmental time determinants has negative impacts both on cognitive performance and the physical "sense of well-being". Young people and children in particular can encounter problems, which might impact the following years of their lives (4).

Not wearing a biologic clock affects the hypothalamopituitary axis (HPA) with a potential to result in unfavorable outcomes such as obesity, diabetes, and hypertension (5). Epileptic seizures, migraine episodes, and mood disorders can be exacerbated. Stroke and cardiovascular events such as myocardial infarction might develop (4). Impacts on the HPA working in close contact with the biologic clock might alter the attack frequency and severity of autoimmune diseases. The implementation of a 'shift in time zone' enables a unique opportunity to scientists in Turkey to design epidemiologic studies to better understand the link between the biologic clock/circadian rhythm and stroke, migraine, epilepsy, episodes of autoimmune diseases such as multiple sclerosis, myasthenia gravis, and of course sleep disorders. We hope that this paper inspires our colleagues to design studies leading to interesting scientific results.

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Authorship Contributions

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