



Non-Ionizing Radiation & Children's Health

International Joint Conference
18 - 20 May 2011, Ljubljana, Slovenia

PLATFORM PRESENTATION ☒

Growth And Development Of Children With A Special Focus On Sleep

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The first two decades of life are characterised by tremendous, complex biological processes, which induce and control all the changes, which are necessary that a highly differentiated organism with tissues, organs and organ systems evolves from a single cell. These processes involve growth and maturation as well as differentiation.

One of these organ systems is the Central Nervous System (CNS) where among others internal and external stimuli are integrated, responses of the body are prepared and where communication with the second great control system of the human body, the endocrine system, takes place. One of the complex behaviours which are regulated by the brain is the sleep-wake cycle (and within sleep the NREM-REM sleep cycle). The paper will briefly discuss mechanism of the sleep regulation and how the underlying anatomical structures and physiological circuits evolve during the first two decades of life. Furthermore the behavioural output will be discussed in an ontogenetic perspective.

From an anthropological point of view it can roughly be distinguished between pre- and postnatal development. During prenatal life embryogenesis (week 3 to 8 after conception) is vulnerable for major morphological damages while fetogenesis (week 9 until birth) is vulnerable to the development of functional and minor morphological abnormalities. Sex differences in morphology and physiology are already in place at birth.

After birth growth and maturational processes continue and sex differences become more obvious. While the outcome of growth processes during childhood and adolescence are not exactly known (e.g. adult height), the endpoints of maturational process, e.g. fully functional organs, are known. The speed, however, with which these endpoints are reached vary individually and between sexes. In both sexes the high individual variability is reflected by more or less marked differences between the chronological and the biological age. The concept of biological age will be introduced and discussed.

The discussion of age-related changes in sleep will comprise changes at the physiological level (e.g. changes in the frequency and amplitude of EEG signal, as well as development and distribution of sleep stages), changes in the corresponding behaviour (e.g. changes in the absolute amount of sleep and the distribution of sleep and wakefulness in 24h perspective) and finally the subjective perception of sleep and sleep as a measure of well-being.