Sleep and Early Brain Development

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Key Insight

Sleep is one of the primary activities of the brain during development and plays an important role in healthy cognitive and psychosocial development in early life. However, little is known about how sleep benefits children’s memory or learning. Some of the differences between how children and adults process newly acquired information have been attributed to age-dependent differences in the types of sleep-related processing applied to memory and learning. Compared to adults, children have increased slow-wave sleep (deep sleep). The time spent in deep sleep at night, as well as daytime napping, have beneficial effects on learning in children. Sleep also has an impact on a broad range of outcomes, such as emotional regulation and cortical maturation.

Current knowledge

Sleep is characterized by reduced motor activity and decreased interaction with the external environment. It is also associated with a specific posture (e.g., lying down) and with easy reversibility. With respect to sleep, the neurophysiological systems have been classified into 3 functional states: non-rapid eye movement (NREM) sleep, rapid eye movement (REM) sleep, and wakefulness. Each state is distinctly associated with a discrete pattern of brain electrical activity. Sleep patterns evolve with age, particularly during the first 5 years of life. Early childhood is a critical period for the transition to the normal pattern of sleep-wakefulness, characterized by nighttime sleep consolidation and daytime sleep discontinuation.

Practical implications

So, what is considered a healthy sleeping pattern for children? The National Sleep Foundation, the American Academy of Sleep Medicine, and the American Academy of Pediatrics have issued similar recommendations for sleep duration in the pediatric population. It is important to note, however, that these guidelines were created from a population-wide standpoint; in the clinical setting, these need to be individualized for each patient. Parental sleep-setting behaviors play an important role in establishing a healthy sleep pattern in infants. It is recommended that parents begin promoting good sleep hygiene by establishing a safe and comfortable sleep environment, a regular bedtime routine, and an appropriate sleep onset association starting from infancy and throughout childhood.

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