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Editorial

Pediatric sleep medicine: a key sub-specialty for the pediatrician

The field of Pediatrics grows more demanding every day. The pediatrician must follow the child from the first breath of life, through the growth and tribulations of childhood, puberty, and onset of adulthood. One of the difficulties facing the pediatrician is detecting subacute health concerns that are latent or subtle in early life, but that persist and slowly establish during child development, only to be fully manifest at a time when intervention is already belated and often less effective. The onset of puberty and associated influx of sex hormones may further complicate this evolution, as a new homeostasis must be achieved across organ systems, in particular the brain, where neural pruning and reorganization occur. Indeed, new challenges await the clinician at this stage especially, as heretofore subtle or hidden problems may abruptly present along fully "new" health concerns. Those in clinical practice will tell you: fasten your seatbelts, the ride may be bumpy!

For no subspecialty is this truer, perhaps, than for Sleep Medicine. In Sleep Medicine, we face all of the challenges of general medicine, through the particular filter of sleep and wake. An understanding of sleep itself, and circadian rhythm, adds complexity, but also insight, to our understanding of the developing individual: It is in the early hours of sleep that the growth hormone is secreted and allows the optimal development of infants and children; it is in the early morning that the trough of the temperature curve, an index of the combined effects of one's heritable circadian chronotype and one's day-night cycle, occurs when REM sleep become prominent and lengthy. It is not surprising that the lower-airway resistance peaks at this time, leading to nocturnal asthma attacks. During sleep, which is organized into visually different sleep EEG patterns, which have been grossly grouped into "sleep-stages", many basic reflexes will change and autonomic nervous system controls will be modified by sleep states. Even during phasic REM sleep, the dogma of "homeostasis" is very much challenged, by short and abrupt events associated with Ponto-Geniculo-Occipital waves. The pediatrician will have very few overt clues from their patients regarding underlying problems when "poor sleep" surfaces; and from parents, even less. Abnormal behavior during sleep, daytime irritability, or daytime somnolence may be observed, but these basic observations bring little specificity regarding the underlying problem.

Today, however, such observations as "daytime inattention," or "hyperactivity" have led to a pharmacological revolution. Perhaps it would be wise to pause our pens: no more prescription of stimulants such as methylphenidate, no more prescription of atomoxetine, without first a systematic investigation of sleep-wake. Behavior during sleep provides for us a small window of insight on some of the changes occurring during this state of alertness. We know now that learning, attention, memory consolidation is related to sleep. And we also know now that many health problems will have indicators during sleep before been noted during wakefulness. The old faculty of medicine at our venerable institutions may have had difficulty adjusting to the fast pace of changes ushered in by medical research. Sleep Medicine is barely mentioned in the medical school curriculae, and often limited to Obstructive Sleep Apnea and Narcolepsy. Specialty training goes a bit further, but commonly continues to present knowledge as it existed from the turn of the century, complaining about the difficulties of nocturnal sleep tests, not realizing that patients monitor with their smartwatches, smartphones, pillows and more, detailed recordings of actigraphy, heart rate, temperature and other biological variables. They present to clinic with apps and graphs and questions. The study of sleep/wake means study of the brain, independent of the symptoms presented; but computers have revolutionized our views of how to monitor and how to interpret the monitoring of vital functions during sleep. The analytic window in any automated sleep system is no more than 1 s, while we base our visual scoring on a minimum of 3 s. Even the new specialty of Sleep Medicine has to adjust to these advances. Technology increasingly allows the medical community to monitor simple brain wave activity and many different biological variables during sleep, reducing cost and waiting time for testing. Indicators of brain and autonomic nervous system activity during monitoring is critical, but current technology allows such testing, eliminating these inaccurate studies where only peripheral variables are been monitored. Currently available, wearable devices exist which allow providers to have a proxy of the activity of the most important element when looking at sleep medicine: the brain.

In this issue, many aspects of current pediatric sleep medicine are presented and if they will be integrated in the everyday practice, this would be a great clinical advance.

The International Pediatric Sleep Association makes an effort to be the world leader in pediatric sleep medicine advances. Its biannual congress, occurring in a different continent each session, makes an effort to have the most knowledgeable specialists present, and to have the latest well documented findings presented. Publication of these findings, after peer review, is also critical to extend the frontiers of the field. Pediatricians are continuously challenged to stay up to date on new findings and how to integrate such findings in their daily practice. In the U.S., the subspecialty of "Sleep Medicine" requires only one year of extra study, but it is probably the most important additional year of study for the

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practicing pediatrician: Sleep is 80% of the life of the new-born, and still at least 8 h of the life of a teenager, and during that time not only growth, learning and memory occur, but in fact maturation of our vital functions will develop and mature. Sleep is critical; the *sine qua non* of development, maturation, and health on the journey from infancy to adulthood.

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