

## WHY THE FUSS OVER SLEEP?

We all know that sleep serves a purpose, but many parents are surprised to learn the complex functions of sleep in children. Sleep is a time of intense neurologic and physiologic activity; there are times where the brain is more active during sleep than awake. For children this is especially true. By the age of three the average child has spent more time sleeping than *all* wakeful times combined. Research clearly shows that sleep affects behavior, health and learning. This is true for young and old alike. For the purposes of this article the primary focus will be on the role of sleep in children.

### Behavior

Parents have experienced accrued sleep loss at one time or another. If we were to make a list of how we felt and behaved when we were behind on our sleep, followed by a list of how we perceive our children feel and behave when they are behind on their sleep, there would be significant overlap. Parents and children exhibit similar behavior when overtired, however, many times children are expected to behave as if they are well rested whether they are or not.

If a list of behavior was generated it would include the following: grumpy, irritable, short tempered, argumentative, cries more, hits and/or grabs more, whines, etc. An important addition to this list is hyperactivity. Many parents believe that their child is not tired until 10pm at night because the child is "bouncing off the walls" and are surprised to learn that this seemingly wide awake behavior is a classic sign of being tired. Although it seems counterintuitive, the body has a neurohormonal stress response in order to adapt and stay awake. This physiologic response increases levels of cortisol, epinephrine and norepinephrine. These hormones help jolt the body so it is able to remain awake. The more overtired children become the more these hormones are released, thus making it increasingly difficult to fall asleep and perpetuating a cycle of poor sleep habits.

If you reflect on how likable you are when overtired, it is easy to extend this to children. Many researchers have found that toddlers with sleep problems, most typically night waking, had more difficult temperaments. Two to five year olds that slept less had higher levels of aggression and children who were tired complained more about feeling bored leading people to view these children as lazy. Three year olds who napped were more adaptable to their environment than those who did not. What does this mean? Children who adapt well are able to make transitions easier both at home and within the classroom and are better at socializing and playing well with peers.

It is important for parents to understand that children do not outgrow these behaviors without the help of adequate sleep. Research is clear in this assertion as well. Children with sleep problems that persisted from eight months to three years of age illustrated increased tantrums and other management difficulties by the age of three. On the flip side, studies that analyzed children ages seven to eleven found that those who slept more experienced less hopelessness, a better self-concept and were more adept at sociability and activity.

Clearly it is in our children's best interest to ensure quality sleep. Not only will they feel and behave better, but how others perceive them--teachers, peers or family--will be positively influence which directly impacts their own self concept.

### **Cognitive Functioning**

Realizing that lack of sleep affects mood and behavior is easy because it is tangible. We can feel it in ourselves and see it in others. Lack of sleep also has a clear impact on learning and processing of memory. Mothers of newborns have a unique window into the effects of this. Many can tell outrageous stories of going to the grocery store still wearing slippers or completely forgetting a conversation that occurred minutes ago! It is very similar for babies and older children. Overtired children have greater difficulty concentrating and are less alert than their well rested counterparts. Children learn by watching. Research consistently shows that overtired babies are not able to keenly observe and process what they are watching as well as rested babies. Some parents have reported a noticeable acceleration in reaching developmental milestones once their child was "sleep trained" and no longer overtired.

Because overtired children are easily bored they are less likely to play independently for as long as well rested children. Learning to play independently is an important life long skill. During this type of play children become more creative, more resourceful and develop emotional maturity. Studies conducted on infants as young as five months old found that those children who slept longer during the day had longer attention spans. The studies looking at seven to eleven year olds reported that those kids who experienced poor sleep exhibited more communication problems and intellectual deficits than those without sleep problems.

It is important that parents understand the link between sleep and the development and maintenance of learning and processing of memory. For our children, regardless how young, we need to ensure they receive adequate sleep in order to optimize their ability to learn.

### **Health**

Sleep is shown to play a role in the growth and healing of body tissue as well as central nervous system repair. Some scientists are asserting that poor sleep habits are as important as poor nutrition and lack of physical activity in the development of chronic illness and contributing to obesity, diabetes and cardiovascular disease. Recent studies have shown that cumulative amounts of sleep loss can cause harmful changes in our metabolic, hormonal and immune function. This is what you find in normal aging.

### ***Obesity***

Studies have shown that sleep loss creates hormonal changes that promote weight gain. Volunteers with significant sleep loss had significantly lower leptin concentrations than those who were well rested. Leptin is a hormone that signals the feeling of being satiated. Mice that lack leptin become morbidly obese. This miscue by the body can slow metabolism, increase fat

deposition and over stimulate the appetite. Sleep deprived people overwhelmingly ask for candy, starchy food and salty snacks.

### *Inflammation*

Modest sleep deprivation may also be associated with low-grade inflammation, which can lead to a myriad of cardiovascular problems. Volunteers studied showed elevated levels of cytokines (molecules released during inflammation and infection), which can cause this inflammation response. Continuous low-grade inflammation can damage artery walls, which can lead to the narrowing of vessels, high blood pressure, heart disease and stroke. Increased cytokines also contribute to insulin resistance and obesity. Also, sleep deprived men showed signs of insulin resistance, which can lead to type II diabetes.

This research is in its infancy and based on adults and animals, but is very provocative. Certainly more research needs to be done to be conclusive and research on pediatric sleep needs to occur to draw definitive conclusions on how it might affect kids.

### Education

Behavior, cognitive functioning and health all affect children with regards to their education. If a child is behind on sleep, they are more prone to get sick, which can result in increased days missed at school. Many of the aforementioned studies found poor academic performance with school-aged children who were sleep deprived. One prominent sleep researcher suggests that sleep is vital to communications between centers of the brain. He compares the brain to a musical instrument. Instruments need to be retuned after much playing so they work properly. The brain too needs sleep in order to resynchronize, a process where nerve cells can regroup and fire at compatible frequencies. When this process is hampered children have problems integrating multiple centers of the brain. An overtired child watching television alone is not likely a problem, but this same child in a stimulating preschool classroom where they need to employ the frontal lobe and limbic emotional memory processing simultaneously are unable. This is where multiple problems are seen.

If you were to reflect on how you feel and behave when you are rested it is easy to generate a list of positive attributes. The same holds true for our children. It is important to understand that children need more sleep than adults. Quality daytime naps affect nighttime sleep and the reverse is equally true. Each sleep period serves a specific function. The morning nap has more REM sleep, which is associated with brain maturation and growth. Afternoon naps have more nonREM sleep which is associated with psychological and physical restoration. Thus, it is important for parents to understand how to achieve and maintain healthy sleep habits.