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published in 2004 in the journal *Sleep*, looked at 34 children with ADHD. All of them showed a deficit of rejuvenating delta sleep, compared with only a handful of the 32 control subjects.

A 2006 study in the journal *Pediatrics* showed something similar, from the perspective of a surgery clinic. This study included 105 children between ages five and 12. Seventy-eight of them were scheduled to have their tonsils removed because they had problems breathing in their sleep, while 27 children scheduled for other operations served as a control group. Researchers measured the participants' sleep patterns and tested

years old, the mothers completed a behavioral questionnaire to gauge their children's levels of inattention, hyperactivity, anxiety, depression, and problems with peers, conduct, and social skills.

The study found that children who suffered from sleep-disordered breathing in infancy were more likely to have behavioral difficulties later in life—20 to 60 percent more likely to have behavioral problems at age

the journal *Nature Neuroscience* found that the amount of delta sleep in seniors correlates with performance on memory tests. And a study published several years ago in the journal *Sleep* found that while subjects who were deprived of sleep didn't necessarily report feeling sleepier, their cognitive performance declined in proportion to their sleep deprivation and continued to worsen over five nights of sleep restriction.

As it happens, "moves about excessively during sleep" was once listed as a symptom of attention-deficit disorder in the *Diagnostic and Statistical Manual of Mental Disorders*. That ver-

the culprit. People don't like to hear that they may have a different, stranger-sounding problem that can't be fixed with a pill—though this often changes once patients see the results of their sleep studies.

## ADHD AND SLEEP: IT'S PERSONAL

Beyond my day job, I have a personal interest in ADHD and sleep disorders. Beginning in college, and for nearly a decade, I struggled with profound cognitive lethargy and difficulty focusing, a daily nap habit, and weekend sleep addiction. I got through my med school exams only by the grace of memoriza-

## Attention-deficit problems are not the only reasons to take lack of quality sleep seriously. Laboratory animals die when they are deprived of delta sleep.

for hyperactivity and inattentiveness, consistent with standard protocols for validating an ADHD diagnosis. Of the 78 children getting the tonsillectomies, 28 percent had ADHD, compared with only 7 percent of the control group.

Even more stunning was what the study's authors found when they followed up with the children. A full half of the original ADHD group who received tonsillectomies—11 of 22 children—no longer met the criteria for the condition. In other words, what had appeared to be ADHD had been resolved by treating a sleeping problem.

But ADHD-like symptoms may persist even after a sleeping problem is resolved. Consider the long-term study of more than 11,000 children in Britain, published three years ago, also in *Pediatrics*. Mothers were asked about symptoms of sleep-disordered breathing in their infants when they were six months old. Then, when the children were four and seven

four, and 40 to 100 percent more likely to have such problems at age seven. These problems occurred even if the disordered breathing had abated, implying that an infant's breathing problem might cause some kind of potentially irreversible neurological injury. There is more going on in the nocturnal lives of our children than any of us have realized. Typically, we see and diagnose only their downstream, daytime symptoms.

## ADULT SLEEP CHALLENGES

There has been less research into sleep and ADHD after childhood. But a team from Massachusetts General Hospital found, in one of the few studies of its kind, that sleep dysfunction in adults with ADHD closely mimics the sleep dysfunction in children with ADHD. There is also some promising research being done on sleep in adults, relating to focus, memory, and cognitive performance. A study published several years ago in

the journal *Nature Neuroscience*, published in 1980, was the first to name the disorder. When the term ADHD, reflecting the addition of hyperactivity, appeared in 1987, the diagnostic criteria no longer included trouble sleeping. The authors said there was not enough evidence to support keeping it.

What if doctors, before diagnosing ADHD in their patients, did have to find evidence of a sleep disorder? Psychiatric researchers typically don't have access to the equipment or expertise needed to evaluate sleep challenges. It's tricky to ask patients to keep sleep logs or to send them for expensive overnight sleep studies, which can involve complicated equipment. (And getting a sleep study approved by an insurance company is by no means guaranteed.) As it stands, ADHD is usually diagnosed with only an office interview.

Some of my patients have resisted my referrals for sleep testing, since everything they have read identifies ADHD as

tion skills and the fact that ephedra was still a legal supplement.

I was misdiagnosed with various maladies, including ADHD. Then I underwent two sleep studies and was found to have an atypical form of narcolepsy. This was a shock to me, because I had never fallen asleep while eating or talking. But, as it turned out, over 40 percent of my night was spent in REM sleep—or "dreaming sleep," which normally occurs only intermittently throughout the night—while just 5 percent was spent in rejuvenating delta sleep. I was sleeping eight to 10 hours a night, but I still had a delta sleep deficit.

It took some trial and error, but with the proper treatment, my cognitive problems came to an end. Today, I eat well and respect my sleep needs instead of trying to suppress them. I also take two medications: a stimulant for narcolepsy and, at bedtime, an SNRI (or serotonin-norepinephrine reuptake inhibitor) antidepressant—an off-label treatment that curtails REM