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The New Face of Sleep

As Patients Balk at Bulky Masks, New Efforts to Treat Sleep Apnea

By KRIS MAHER

For the 18 million people with obstructive sleep apnea, the remedy is far from perfect: bulky and expensive masks that some compare to sleeping in scuba gear.

As the number of people with sleep apnea is expected to rise, doctors and medical device makers are trying new treatments. New masks, while still bulky, aim to be more comfortable. Dentists have begun prescribing an appliance that draws the lower jaw forward to create more space in the airway. Some doctors recommend several types of surgery. And some try basic lifestyle changes, like sleeping in a different position. For patients who don't find relief from any of these, there's an odd recommendation: Learn to play the didgeridoo (more about that later).

Patients with sleep apnea stop breathing during sleep because the soft palate collapses and blocks the upper airway. A tell-tale symptom is chronic and loud snoring. The most common and effective treatment is "continuous positive airway pressure," or CPAP. The treatment involves wearing a breathing mask to sleep—which some people find impossible to do. As few as 50% of people who are prescribed a CPAP device actually use it regularly.

Aging and obesity both can contribute to sleep apnea; research suggests the number of people with the condition will grow, as the population ages. Some experts believe that lack of awareness among some patients and doctors has led to underdiagnosis and that the number of patients actually is closer to 30 million.

The most common symptom is snoring; daytime sleepiness is another sign. Sleep apnea heightens a patient's risk of hypertension, diabetes and heart attacks, because it heightens carbon-dioxide levels in the blood stream and stresses the cardiovascular system. Last fall, the National Transportation Safety Board recommended that drivers and pilots of commercial buses, trucks, airplanes and ships be screened for the condition, citing several accidents in which undiagnosed sleep apnea was thought to play a role.

A variety of specialists, including pulmonologists, ear, nose and throat doctors, neurologists, surgeons and dentists, treat sleep apnea. The most accurate diagnoses are performed in a sleep lab, where the patient goes to sleep overnight while being monitored. The cost, about \$1,000, is usually covered by insurance with a doctor's prescription. Sleep apnea is measured on an apnea-hypopnea index, combining the number of apneas, or pauses in breathing, with hypopneas, or instances of excessively shallow breathing, in an hour. An index of 1 to 15 is considered mild, 16 to 30 is moderate, and over 30 is considered severe. Typically, patients are diagnosed with sleep apnea only if they stop breathing five or more times in an hour.

First mentioned in medical literature in the 1960s, sleep apnea was at first treated with a tracheotomy, a breathing tube inserted into a surgical incision in the windpipe—a treatment that was worse than the disease.

Today, 60% to 70% of patients are treated with CPAP, in which the breathing mask, connected by tube to an air pump, sends pressurized air through the patient's nose. The air flow keeps the upper airway open and prevents apneas.

A 2005 study in the *Lancet* found sleep apnea patients treated with CPAP had cardiovascular mortality rates similar to healthy individuals. A 2006 analysis in the journal *Sleep* concluded that CPAP reduced apnea incidents and improved sleep, but that its impact on cardiovascular risk was mixed.

A patient is supposed to wear the mask while sleeping for eight hours a night for the rest of their life. Usually covered by insurance, the device costs from \$500 to \$4,000.

Some patients experience dramatic relief. Denise Poole, a 56-year-old former manager of a call center who lives in Jeannette, Pa., spent years being exhausted during the day but unable to sleep more than a few hours at night. She was so restless that her husband started sleeping in a separate room. Thinking she was clinically depressed, Ms. Poole went to see her doctor, who prescribed antidepressants.

But that only made sleep more difficult. Cutting caffeine and late-night snacks didn't work, either. Finally, Ms. Poole ended up at a sleep lab, where tests showed she was stopping breathing 47 times an hour while asleep. She was diagnosed with obstructive sleep apnea and prescribed a CPAP device. Within days of using it, she felt a return of energy. "It was like someone turned the light back on in my life," Ms. Poole says.

Still, many patients complain that the CPAP mask and the air pressure make them feel claustrophobic. Others balk at sleeping with a mask and tubes on. "It took me three years to look in the mirror with my mask on," Ms. Poole says. CPAP success is measured by a reduction in the apnea-hypopnea index, or by measures such as a standardized sleepiness scale.

CPAP device makers—including Philips Respironics, a Pittsburgh unit of Philips Electronics NV, and [ResMed Inc.](#), of San Diego—have introduced improvements to the device. Some have built-in humidifiers to keep air moist, and some can have their airflow adjusted to individual patients' needs, making breathing more comfortable. Newer models tend to be smaller and quieter. Makers also are incorporating softer materials into the masks and offering a range of options such as full-face masks (good for people with facial hair, who may have a tough time getting a good seal) and masks that cover only the nose.

CPAP device makers see a bonanza in the U.S. Mike Matson, senior medical device analyst with [Wells Fargo Securities](#), estimates the CPAP market was \$2.3 billion globally last year, with 60% of it in the U.S. He is forecasting 12% growth in the U.S. for 2010. "There's a lot of people who have [sleep apnea] and haven't been diagnosed yet," Mr. Matson says. Respironics and ResMed currently control about 80% of the U.S. market.

Sleep-apnea dental appliances, costing from \$2,500 and \$3,000, are often recommended for patients who can't tolerate the CPAP treatment; there are some indications that compliance with these appliances is higher. But there is a significant downside. They can cause a patient's teeth to move, and the patient risks developing a painful case of temporomandibular jaw syndrome, or TMJ.

When he started waking in the middle of the night choking, Dave Morton, a 35-year-old co-president of an online car-rental company in New York, sought help. At a sleep lab, he was diagnosed with sleep apnea, and his doctor prescribed a CPAP machine. But exhaling against the device's airflow made him feel disoriented, and he often threw the mask off in his sleep. (Sinus problems may have contributed to his difficulties, he says.) "I was very stressed and couldn't sleep," Mr. Morton recalls. "I never woke up feeling refreshed."

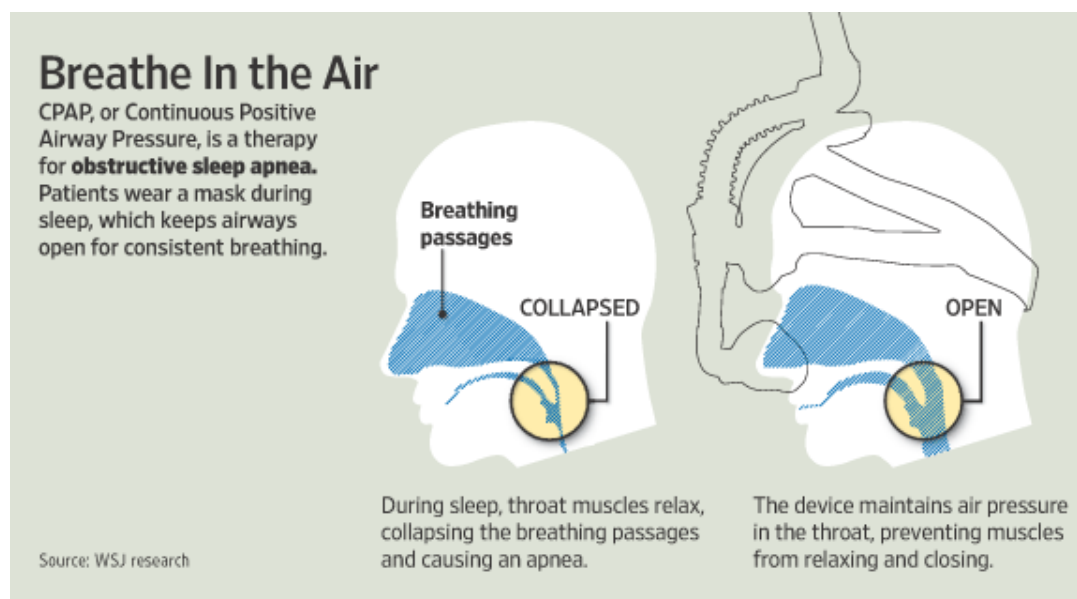
After two years of on-and-off CPAP use, Mr. Morton switched to a dental appliance. He was tested in a sleep lab with the appliance, and his apnea score dropped sharply. "I'm happier and healthier," he said. "I can tell my brain is working better again."

Surgery is an extreme option, often recommended for people with complicating issues such as a deviated nasal septum, nasal polyps or enlarged tonsils. Some interventions involve actually surgically advancing the lower

jaw—which can cost as much as \$50,000 and require weeks of recovery. Less-invasive surgical treatments are becoming more common. Some involve removing soft tissue from the back of the throat and palate; in somnoplasty, radiofrequency energy is used to shrink tissue in the nasal passage. Other procedures create more space in the airway by shifting how the tongue is attached. Injection snoreplasty involves injecting a chemical into the soft palate to create scar tissue, which reduces snoring.

Simple lifestyle changes can add to the benefits of other treatments. Sleeping while lying on the side, instead of the back, can prevent the airway from closing, some studies show. Losing weight can help, and so can stopping smoking, since smoking leads to inflammation and fluid retention in the airway. Sufferers also should avoid alcohol and sedatives, which can further relax the airway during sleep.

If all else fails, there is always the didgeridoo, an indigenous Australian musical instrument. In a study published in the *British Medical Journal*, 25 patients with sleep apnea who practiced playing it for about 30 minutes a day, six days a week for four months, significantly reduced the number of apneas they had during sleep; daytime sleepiness also decreased. Scientists believe the breathing technique required to play the didgeridoo strengthens the upper airway and makes it less likely to collapse.



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