Pathways to Sleep: IV Snoozing with a Little Help from Our Friends (Sleep Aids)

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We have arrived at the final set of pathways to high quality sleep. There is both good and bad news regarding this fourth set. It is important to note first that sleep aids are often the most direct and immediate means of improving sleep quality. We don't need to be concerned about comfortable pillows, a quiet sleep environment, or a previous day of healthy eating and exercise. We can pop a pill and glide into sleepy land. We can strap on the breathing device and look forward to an uninterrupted night of sleep. Our sleeping partner is thankful that we are not snoring. We can overcome the challenge of jet lag having just travelled halfway around the world via a large-body 747. This is the good news. The major benefits associated with use of sleep aids have been realized.

On the negative side are the many cautions voiced by physicians and other health care experts about dangers in the use of many sleep-aid medications and the downsides associated with the often cumbersome and sleep-disturbing use of sleep-aid appliances. Unfortunately, the negative side becomes quite difficult to assess given that there is often strong disagreement regarding the hazards associated with some medications and the effectiveness of most appliances. None of this is made any easier in a world filled with multiple ads in which specific medications and applications are marketed. It seems that considerable money can be made off the sale of many medications and appliances. The profit margins are very high and there is a strong desire on the part of many people to find a direct and immediate solution to their sleep quality challenges:

"I need sleep right now and don't have time for adopting new life habits or redesigning my bedroom!"

"My life partner said I need to get something to stop snoring right now or they will go to the other bedroom or living room couch in order to get a good night of sleep!"

"I simply can't afford another night of restless sleep. I have too much work to do when I am awake."

"I will take a pill only this one time. It's an emergency!"

Unfortunately, the pill might only work for a week or two and then our body adjusts to it and we find it hard to sleep once again. Our partner finds that the appliance I am wearing is just as annoying as the snoring. They still threatened to find another place to sleep. We continue to have too much work to do and soon become addicted to the pill we are taking. We find a good excuse (another emergency) to take that pill again. We are soon hooked and require an increasing number of pills to take at bedtime or require a second (or second and third) pill part of the way through the night. Bodily adaptation, inconvenience and addiction all too often accompany the use of specific sleep aids.

However, these aids can be quite beneficial if used in an appropriate manner and if carefully monitored with regard to not only effectiveness, but also pattern of usage.

As I have done in previous essays in this series on quality sleep, I provide some suggestions in this essay about sleep aids and begin by offering a chart summarizing findings from my *Pathways to Sleep* project.

This chart lists some of the sleep aid pathways, as well as ratings by experts and users, along with costs and accessibility. In each case, a rating of "3" is high and a rating of "1" is low. A "v" indicates that this pathway is controversial (wide variation in ratings—high variance score). A "D" indicates that this aid has often been labeled as "dangerous."

Pathway	Sub-Pathway	Expert	User	User Cost	User
		Rating	Rating		Access
СРАР		2.75	2.50v	3	3
Other Air-Driving Devices		1.75	1.25	2.75	2.75
Electronic Devices	Eye Stimulation	1	1.00	2.75	2.75
Essential Oils/Herp Oils		1.75	2.25v	2.50	2.50
Melatonin		2	2.25	2.50	1.25
Natural /Herbal Sleep Aids: Single Ingredient	Lornithine	1.75	1.25	2	1.25
Natural /Herbal Sleep Aids: Single Ingredient	Valerian	1.75	1.25v	2	1.25
Natural /Herbal Sleep Aids: Single Ingredient	Turmeric	1.75	1.25	2	1.25
Natural /Herbal Sleep Aids: Single Ingredient	Норѕ	1.75	1.25	2	1.50
Natural /Herbal Sleep Aids: Single Ingredient	Lavender	1.50	2.25v	2	1.25
Natural /Herbal Sleep Aids: Single Ingredient	Rosemary	1.50	1.25	2	1.25
Natural /Herbal Sleep Aids: Single Ingredient	Passionflower	1.50	1.25	2	1.50
Natural /Herbal Sleep Aids: Single Ingredient	Calcium	1.50	1.25	2	1.25

Component Four: Sleep Aids

Natural /Herbal Sleep Aids: Single Ingredient	Magnesium	1.75	1.50	2	1.25
Natural /Herbal Sleep Aids: Single Ingredient	St. John's Wort	1	1.25	2	1.50
Natural /Herbal Sleep Aids: Mixed Ingredients		1.75	1.50	2	1.50
Non-Benzodiazepine Sedative	Ambien	0	1.50v D	3	3
Non-Benzodiazepine Sedative	Lunesta	0	1.25 D	3	3
Trazadone		1	1.50 D	2.50	2.75
Benzodiazepine Sedative		1	2.50v D	2.75	3
Over-The-Counter Sleep Aids with Alcohol		0	2.25 D	2	1.25
Over-The-Counter Sleep Aids without Alcohol or Pain Relief (Antihistamine)	Diphenhydramine (Benadryl, Aleve PM, others)	1.50	2.50	2	1.25
Over-The-Counter Sleep Aids with Pain Relief	Acetaminophen (Tylenol PM/Excedrin PM/Generic)	1.50	2.50	2	1.25
Over-The-Counter Sleep Aids with Pain Relief	lbuprofen (Advil PM/Generic)	1.50	2.50	2	1.25

Machines and Appliances

Some of the most widely used and effective pathways to uninterrupted sleep come not in a pill but instead in a machine or appliance placed in one's mouth. Each of these devices is intended to keep one's throat open for the free flow of air and the reduction (if not elimination) of sleep apnea (the sudden disruption of breathing).

CPAP Machines

The most widely used (and controversial) appliance is the C-PAP machine. I offer an overview of this machine, as well as its benefits and drawbacks as presented by the Cleveland Clinic (2024):

A CPAP (continuous positive airway pressure) machine helps treat sleep apnea. This device delivers continuous air through your mouth and/or nose to help keep your airways open while you sleep. A CPAP machine includes: A mask that fits over just your nose or both your nose and mouth. Straps to position the mask on your face. A tube that connects the mask to the machine's motor. A motor that blows air into the tube. An air filter that purifies the air entering your nose or mouth. Some CPAP machines have other features as well, like heated humidifiers and adjustable pressure settings.

A CPAP machine is just one type of PAP (positive airway pressure) device. CPAP is the most common among these machines. Other types include:

Auto CPAP: This device self-regulates, using a range of pressures to keep your airways open.

Bi-level PAP: This machine uses two different pressures — a higher pressure while breathing in (inhalation) and a lower one while breathing out (exhalation).

Auto-bilevel PAP: This machine self-regulates the inhalation and exhalation pressures.

Adaptive servo-ventilation (ASV): ASV is for people with certain types of central sleep apnea. ASV monitors your breathing and adjusts the pressures to make your breathing more stable. It may also deliver a breath when necessary.

The Cleveland Clinic goes on to identify the functions served by this sleep-aid device:

CPAP machines treat obstructive sleep apnea (OSA). In OSA, you briefly stop breathing while you sleep when your airways relax so much that they narrow down or completely close. This can happen hundreds of times in a single night, leading to a lack of oxygen. Using a CPAP machine when you sleep keeps your airways open, so you don't stop breathing.

The operations of the CPAP machine are then described:

A CPAP machine takes in room air, then filters and pressurizes it before delivering it through a tube and into your mask. The continuous flow of air gently keeps your tongue, uvula and soft palate from shifting too far into your airway. This stabilizes your breathing and improves your overall sleep quality.

Requirements for making fully effective use of the CPAP machine are then identified:

For the sleep apnea treatment to work, you must use your CPAP machine every time you sleep. This includes at home, while traveling and during naps. You must also clean your mask and tube every day and refill your medical device prescription when necessary to replace the mask and tube.

Variations in the type of CPAP machines being used are provided by the Cleveland Clinic:

CPAP machines mainly vary in the type of mask you can use with it. The kind that's best for you depends on your comfort level, breathing habits and the type of sleep apnea you have. CPAP mask types include:

Nasal mask: This option covers your nose. Healthcare providers often recommend a nasal mask if you move around a lot when you sleep.

Nasal pillow mask: Rather than covering your entire nose, a nasal pillow mask only covers your nostril area. Some options also have prongs that fit into your nostrils. People who wear nasal pillow masks can wear their glasses comfortably.

Full mask: This triangular mask fits over your nose and mouth. A full mask is best if you breathe through your mouth during sleep. Your provider may also recommend this type of mask if you have a nasal blockage.

Hybrid mask: This is a type of full face mask that fits over your mouth and has prongs or cushions that seal your nostrils without covering the bridge of your nose.

Finally, we come to the risks and benefits associated with use of the CPAP machine as a sleep-aid:

What are the benefits of a CPAP machine? Consistently using a CPAP machine to treat sleep apnea has both short- and long-term benefits. The main benefit of using a CPAP machine is that it reduces breathing interruptions when you sleep. Because of this, short-term benefits include: Improved sleep quality, which may make you feel better rested. Reduced snoring. Less daytime sleepiness (hypersomnia). Improved mood. Long-term benefits of consistent CPAP machine use may include: Improved blood pressure. Reduced risk of cardiovascular disease events, like heart attack and stroke. Improved memory and thinking abilities (cognitive function).

What are the downsides of a CPAP machine? The first few times you use a CPAP machine may be difficult. Many people at first find the mask uncomfortable, claustrophobic and/or embarrassing. It may be difficult to fall asleep at first. It can also be cumbersome to travel with a CPAP machine.

I have offered this more detailed description of the CPAP machine because it comes in several different types and because decisions regarding its purchase and use involve expenditure of a rather large amount of money--usually from \$500 to \$1,200 (with additional expenses associated with its maintenance and accompanying equipment). This machine also requires a significant alteration in one's sleeping behavior (and the sleeping behavior of one's sleeping partner). There is now an additional "partner" in bed with you!

While the Cleveland Clinic offers an informed review of the CPAP machine, I would suggest that there are some additional "downsides" that they have not identified. Many people who have purchased a CPAP machine never get comfortable with its use. It is not just "the first few times." There is also the matter of the ongoing maintenance of the machine. Extensive marketing is engaged regarding devices that one "must have" to keep air passages of the machine clean. Then there is the matter of traveling with the CPAP machine. As the Cleveland Clinic notes, you "must use your CPAP machine every time you sleep." This means toting it around when you travel, stay with your grandkids, or decide to take a nap in that favorite recliner in your den: "the darn machine is very demanding!"

What about the evaluation of those filling out our Pathways to Sleep inventory? In general, their ratings were pretty high—but not quite as high as those offered by the "experts." It is also worth noting that the user ratings were quite variable. CPAP machines are indeed controversial. They are also quite expensive and certainly not as accessible as purchasing inexpensive pills at the supermarket. CPAP machines require considerable research for they come in many forms and are available at a rather wide range in price.

Given some of the potential drawbacks associated with the CPAP machine alongside the proven bigmoney market for these devices, there are now several alternatives to this sleep-aid. Most of the alternatives (other air-driven devices) received rather low ratings—perhaps because most raters are not aware of these devices. This lack of awareness is appropriate since most of the alternative air-blown devices are actually just variations of the CPAP machine, though several introduce more oxygen into the air being breathed by the user. Most of these variants on the CPAP machine are much smaller than the traditional CPAP machine and are intended for use when traveling. The expert ratings were a bit higher than the user ratings, but the costs are generally not much lower than those charged for CPAP machines.

There is another alternative for use with people who are "on the move" and spend many days and nights on airplanes. These are the eye masks that many travelers wear on airplanes. Some of these not only block out light, but also offer an array of images that tend to promote drowsiness. These masks are often accompanied by headphones that cut out ambient noise and (if desired) provide relaxing and sleep-inducting sounds. There are even bracelets that purport to promote sleep. Users are quite skeptical regarding the use of the portable sleep-enhancing devices, as are the experts. With the advent of AI and increasing use of head gear that offers virtual reality to the wearer, we are likely to find the invention of new devices that offer an entire visual, auditory (and perhaps kinesthetic) world which leads one to "sleepy-time land"—even while flying 35,000 feet above the real world or sleeping in a noise-filled hotel room. There will be no need to count imagined sheep in our sleep, we will be able to count visually projected sheep that are passing before our mask-covered eyes.

We don't even have to look ahead to new technologies that help us attain a high-quality night of sleep. There is already a quite dramatic (and heavily marketed) technological breakthrough. There is a new alternative to the CPAP machine that has recently come on the market. This is a device that is implanted in one's body! Used for what is defined as obstructive sleep apnea (OSA), these devices deliver pulses to one's airway muscles that keep airways open (much as in the case of the CPAP) so that one can breathe regularly and sleep soundly. Specifically, the pulses move one's tongue out of the way each time a breath is taken.

Jaw-Alignment Devices

There is yet another option that is usually less expensive and less obtrusive than either the CPAP machine or the implant device. This is the jaw-alignment appliance that one places in their mouth at night. This alignment device helps to keep one's throat open so that air can pass freely.

These jaw alignment appliances can be obtained from a dentist. They are most often used for the jaw alignment of children or adolescents. However, they can also be used for adults with sleep disruption caused by interrupted breathing. While these appliances come in several different forms, they typically involve a molding that fits over the top teeth and a molding that fits over the bottom teeth. A thin metal band is attached to both molds. The band is adjustable, allowing the two molds to be at differing angles to one another. The greater the distance between the upper teeth mold and the lower teeth mold, the further forward the lower jaw extends beyond the upper jaw—thus keeping one's air passage open. These devices require a dentist and are expensive (more than \$500).

Less expensive alignment devices are available without having to set up an appointment with one's dentist. The molds can be fitted to one's teeth by simply warming the molds and fitting them over the teeth. The same type of adjustable mental band is used. These devices typically sell for less than \$100.

An even less expensive version of the jaw alignment device can be purchased on-line or at any drug store. This device consists of two molds for the upper and bottom teeth that are attached at an angle with the lower mold extending beyond the upper mold. They come with different degrees of alignment and usually cost less than \$30. Even less expensive plastic devices are placed over the upper teeth and prevent the grinding of teeth. They might also increase the blow of air across the teeth and into the throat.

Medications

While sleep enhancing devices are commonly used, their use pales by comparison with the use of pills to ensure (or at least increase) sleep quality. Some of these pills are prescribed by physicians. However, most of the pills are purchased "over the counter" at local drug stores or (increasingly) via the Internet. As I have already noted, some of the prescription drugs in particular are controversial and potentially addictive and dangerous. Many of the over-the-counter medications are either ineffective or "quietly" addictive. I turn first to those medications that can only be obtained with a doctor's prescription.

By Prescription

One specific medication stands out among all of the others—both because of its effectiveness and its addictive quality. This drug is zolpidem (usually marketed as "Ambien"). When one takes this "splendid" soporific, there is an almost immediate sense of peace and desire to slumber. I know of this effect personally, for as I indicated in my opening essay, I took Ambien for many years. Initially, it was to help me sleep when I was traveling halfway around the world to Asian countries. Ambien was quite new at the time. Not much was known about its addictive properties. It was appropriate that my physician prescribed this pill so that I could get some sleep and operate all full capacity during the day.

Then I started taking Ambien when I was back home—usually about once a week when I was having problems getting to sleep (often adjusting to the time-zone differences when I arrived back home from Asia). Then it was every other night. And then every night. And then felt a bit desperate if I ran out of pills. I was quite demanding with regard to getting the prescription refilled "right away!" It was only when I was in the midst of a series of earthquakes in Bali that I determined that I needed to remain fully vigilant when the next quake hit. So, after more than a decade I went "cold turkey" and never took Ambien again. It was a very hard "detoxing" experience.

I share this personal experience because one must be very careful about taking this very attractive drug. It is not only addictive, but also associated with sleepwalking and even more detailed "unconscious" activities. I ate a whole meal one night at a high-altitude home in New Mexico and had no recollection of eating this meal (even though the dirty plate was still in the sink, serving as evidence of my mid-deed at a friend's home!).

Drugs that operate in a similar manner to Ambien are now available—such as Lunesta. Another set of sleep-inducing drugs contain benzodiazepine. Drugs such as Valium, Xanax and Halcion help us to fall asleep primary because they tend to reduce pain and provide some relief from anxiety and troubling

thoughts that leave us thrashing around in bed. Another drug, Trazadone, is similarly intended to treat several different conditions—in this case disrupted sleep and depression.

All of these drugs are only taken when prescribed by a physician and each has its own addictive properties. While usually not as immediately addictive as Ambien, and more helpful in addressing sleep-related issues (such as anxiety and depression), the medications just mentioned must be taken with great care. Trade-offs must be weighed between taking one of these "convenient" medications and finding more "natural" ways to secure a good night of sleep (such as I have been identifying throughout this series of essays).

What about the ratings of our users and experts? They tend to concur with one another. Ambien and Lunesta are rated at the lowest point by experts and not much higher by the users. Trazadone similarly is rated low by both users and experts. It is also rated as "dangerous"—being a source of nightmares for some users. Added to this are matters of cost and accessibility. All of these drugs and other prescription drugs like them are not very accessible (needing a physician's authorization). Furthermore, they are all very expensive in the long run (even with insurance discounts). This expense is not just financial. It is also psychological.

Over the Counter

There always is another option. Rather than waiting for a doctor to prescribe a drug following our meeting with this professional, we can simply go to our local drug store or supermarket and grab something off the shelf. These medications are usually less expensive than the prescribed drugs (though the costs of prescription drugs are often covered by government or private insurance plans). Unfortunately, we also are not restricted in the use of these drugs. We can take them as often as we want. While over-the-counter drugs are usually less addictive and have fewer side effects than the prescription drugs, they can still take over our life and generate unhealthy side effect.

One of the key differentiating factors when considering the use of an over-the-counter drug concerns their origins in "nature" or in a laboratory. At most drug stores (and even supermarkets) there is a shelf devoted to the "natural" sleep-enhancers. Many of these medications come in pill-form and contain such common ingredients as turmeric, hops, lavender, rosemary, passionflower, St.John's Wort and Valerian. Stores often also carry sleep-enhancing medications that provide a mixture of several natural ingredients. Many variations of these mixed medications are on full display at organic food stores and stores specializing in health-enhancing and sports-related products. There are also the hemp-based drugs that contain cannabidiol (CBD). These sleep-enhancing and pain-reducing medications come in many forms (cream, lotion, rubs, oil and even gummies). They are becoming increasing available and popular with the approval in many states of cannabis (marihuana) when used for health-related matter.

There are also the essential oils that are marketed by individual providers as well as being sold in some drug stores. As in the case of hemp-based products, essential oils come in many forms. Regardless of its form, an essential oil is a concentrated hydrophobic liquid containing easily evaporated chemical compounds derived from plants. An essential oil is essential in that it contains the essence of the plant's fragrance. "Essential" does *not* refer to this oil's indispensability—though it is sometimes marketed as the cure-all for all human ailments. For some people, this oil (often applied to one's forehead) does help to induce sleep.

It seems that not all sleep-aids "grow on trees [or in fields]." Many sleep-enhancing drugs are produced in the laboratory or extracted from some natural products. These drugs include calcium and magnesium. The most frequently used of these extracted products are Melatonin and Tryptophan. Both of these latter medications are found naturally in the food we eat. Furthermore, melatonin is produced "naturally" every day and is associated with the regulation of our circadian rhythm and sleep cycle. Then there are the drugs such as Lornithine that are derived from more complex processes and relate to other elements in the regular functioning of the human body.

Finally, we are left with the most commonly used sleep-aids that are found on all market and drug store shelves. These are the widely marketed pills and syrups that claim to provide us with a lovely, uninterrupted night of sleep. Some of the syrups have traditionally contain alcohol. However, they are now more likely to contain such nonalcoholic substances as melatonin or valerian. Some of the commonly available drugs are intended to reduce pain as well as promote sleep. These are the pills with acetaminophen (Tylenol PM, Excedrin PM, and related Generics), as well as the pills with ibuprofen (such as Advil PM and related Generics). There are also sleep enhancing and pain-relieving medications containing diphenhydramine (Benadryl, Aleve PM and related Generics). With this abundance of options, the real challenge is to determine which (if any) of these medications to take when trying to get a good night of sleep. Some of these over-the-counter drugs are tough on the stomach, while others increase blood pressure. It might be appropriate to consult with a doctor – or simply read the cautionary notes contained on the drug's label or the more extensive notes to be found on the Internet.

Our users and experts chime in at this point. They provide us with ratings of each type of over-thecounter medication. As in the case of the prescription drugs, our experts are not very keen about the medications that we can purchase at the supermarket or drug store. Despite all of the hype (found in both the print and visual media), these drugs are found to be ineffective or not consistently effective. Our user ratings differed from the experts. All of the over-the-counter sleep aids were rated at least at the 2.25 level. Apparently, those who actually use these medications find them to be helpful. Is this just a placebo effect? Is the drug mostly helping people to be less afraid of going to bed? Do people relax a bit after taking Tylenol PM or Aleve PM, looking forward to a good night of sleep. This anticipation might, in turn, be self-fulfilling. We relax and fall asleep—perhaps the formula for high quality sleep is as simple as this....

Yet, this self-fulfilling prophecy may come at a cost. We can become addicted to the sleep aid—not because of its inherent addictive properties but because we anticipate a lousy night of sleep if we DON'T take the drug. Our child can't sleep without their teddy bear. We can't sleep without our Excedrin PM. Why this type of addiction is much less harmful than physical addiction, it is still constraining our behavior and our choices. Furthermore, some of the over-the-counter drugs can increase our blood pressure or damage the lining of our stomach. So, harm is possible. And addiction of any type is never desirable.

Auxiliary Medications

When considering medications to take when seeking to gain a good night of sleep, it is often helpful to consider the various conditions that influence our ability to sleep. There might be medications (either prescribed or over the counter) to take that indirectly impact sleep. Stomach medications might be of value. It is hard to sleep with an acidy stomach. Headache medications may also be an option. It is hard

to sleep with a severe headache. We can get even more elaborate. Prostate medication can help to reduce the urge/need to pee. What about Heart medications? Do we need to consider the use of medications (or various straps, hosiery, braces, etc.) that reduce bodily pains which interfere with sleep?

Conclusions

To sum it up, there is considerable emphasis in our contemporary world on the use of sleep aids. Many dollars have been spent on appliances that might help us find high quality sleep. Even more money is devoted to the marketing of medications that proport to offer us a good night of sleep. There is not overwhelming evidence that any appliance really does the trick. Evidence regarding medications is even less convincing. In his very thoughtful book regarding sleep, Matthew Walker (2017, p. 284) offers the following report regarding a major study of the impact of medications on sleep:

[M]any individuals experience only a slight increase in "sleep" from . . . [sleep-aiding] medications, and the benefit is more subjective than objective. A recent team of leading medical doctors and researchers examined all published studies to date on newer forms of sedative sleeping pills that most people take. They considered sixty-five separate drug-placebo studies, encompassing almost 4,500 individuals. Overall, participants subjectively felt they fell asleep faster and slept more soundly with fewer awakenings, relative to the placebo. But that's not what the actual sleep recordings show. There was no difference in how soundly the individuals slept. Both the placebo and the sleeping pills reduced the time it took people to fall asleep (between ten and thirty minutes), but the change was not statistically different between the two. In other words, there was no objective benefit of these sleeping pills beyond that which a placebo offered.

With Walker's cautionary report in hand, we return to the overarching themes introduced in this set of essays about pathways to high quality sleep. The sleep-aids identified in this essay are best considered only one set of pathways to sleep. Healthy habits, appropriate preparation for sleep and sleep-inducive bedroom environments can enhance the impact of sleep aids—or even make it unnecessary to employ any aid. The best "aid" after all is to be found inside our own body and mind. We "don't need no stinking help from strangers!" These "strangers" are the devices we strap to our face and jaw. They are the pills we take before going to bed or in the middle of the night when we can't fall back to sleep. Like all strangers, they might be helpful or they might do us harm . . .

References

Cleveland Clinic (2024) CPAP Machine: What It Is, How It Works and Side Effects. Link: <u>CPAP Machine:</u> <u>What It Is, How It Works & Side Effects (clevelandclinic.org)</u> Retrieved October 6, 2024.

Walker, Matthew (2017) Why We Sleep. New York: Scribner.