UW Integrative Health

Department of Family Medicine and Community Health



Recharge Overview - Part II

Self-Care and Sleep

Physical Activity

Physical exercise is an important tool for addressing multiple sleep-related issues, including insomnia. It has been observed to have multiple beneficial effects on sleep including decreasing sleep latency, increasing slow wave sleep, and delaying onset of rapid eye movement (REM) sleep, possibly because it increases body temperature.¹ Since sleep quality as measured by the percentage of deep non-REM (slow wave) sleep declines with age, exercise may be a particularly helpful foundation for a self-care plan for insomnia that affects older patients.²

Physical activity during the day helps the mind-body unit transition into sleep at night.

A systematic review of the effect of exercise training in middle-aged and older adults with sleep problems reviewed six trials involving 305 study participants aged 40 or greater.³ All studies used the self-reported Pittsburgh Sleep Quality Index (PSQI) to asses sleep quality. Study participants were assigned to either moderate-intensity aerobic exercise or high-intensity resistance training. Those assigned to the exercise groups had improved PSQI scores and reduced sleep latency, but they did not differ in reported sleep duration, sleep efficiency, sleep disturbances, or daytime functioning.

A Cochrane Review of physical exercise for sleeping problems in adults aged 60 or greater found only one study that met criteria for inclusion in the review.⁴ In this research, study participants were randomized to either 16 weeks of moderate intensity endurance exercise (four 30-40 minute sessions per week of either brisk walking or low-impact aerobics) or a wait-listed control condition. Compared with people in the control group, those who randomized to exercise reported increased PSQI global sleep scores at 16 weeks (p<.001) as well as improved sleep quality and sleep onset latency.⁵

In a 2018 study assessing the relationship between physical activity and sleep quality, 2,649 people aged 45-86 years old were evaluated in a cross-sectional fashion. Greater amounts of physical activity and less sedentary behavior were associated with higher sleep efficiency and a lower likelihood of evening chronotype (being overactive in the evening). This paper even demonstrated that "weekend warriors" compared to predominantly inactive people, were more likely to have higher sleep efficiency. The authors did not find any associations between physical activity and sleep duration in this study. ⁶

While many of these studies discuss the benefits of general aerobic activity on sleep quality, it is helpful to recognize some specific forms of movement have also been shown to support healthy sleep. Tai Chi is one such example. A 2013 systematic review and meta-analysis analyzed results from 11 trials, totaling 994 subjects. Practicing Tai Chi on average of 1.5 to 3 hours each week for a total of 6 to 24 weeks led to improved PSQI scores in both healthy individuals

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School of Medicine and Public Health

and those with chronic conditions (including fibromyalgia, heart failure, and cerebrovascular disease). ⁷ In addition to Tai Chi, the practice of Qigong has been shown to improve sleep quality. One particular series of Qigong movements that has been studied in relationship to insomnia is called "Ba Duan Jin", often translated as "Eight Section Brocade". As explained in a 2017 systematic review and meta-analysis of 14 trials (randomized controlled trials and prospective controlled trials), Ba Duan Jin Qigong was found to significantly improve PSQI scores, including significant improvements within the subscales of subjective sleep quality, sleep latency, sleep efficiency, sleep duration, sleep disturbance and daytime dysfunction. ⁸

Another form of movement that has been shown to enhance sleep quality is yoga. In a pilot study of 20 individuals with chronic primary insomnia, an eight week intervention of daily yoga was associated with improvements in self-rated sleep efficiency and total sleep time, and decreases in sleep latency and wakefulness after sleep onset.⁹ A randomized trial of yoga in 139 adults over age 60 who lived in the community evaluated several mental health indicators, including sleep. Yoga led to statistically significant improvements in all parameters, including global PSQI scores, rating of sleep latency, sleep efficiency and daytime function.¹⁰ A systematic review and meta-analysis of 18 studies of yoga interventions involving 649 study participants found that while the studies were generally small and hampered by mixed methodological quality, yoga appeared superior to other more conventional physical activity interventions in improving general self-rated health status, aerobic fitness and strength. In addition, a significant improvement in multiple self-reported sleep measures, including improved PSQI scores, decreased sleep latency and increased sleep duration were reported.¹¹

For most adults with sleep complaints, exercise is a useful element of a personal health plan (PHP). Given the low risk, low cost, and myriad of other health benefits of physical activity, it should be strongly recommended to all patients with sleep complaints as a part of a comprehensive approach.

Surroundings

The sleeping environment can have a major effect on sleep quality. One of the first-line interventions to promote healthy sleep is a collection of behaviors and suggestions related to the sleep environment, known as "sleep hygiene." In 1971, Dr Peter Hauri coined this term and developed a set of "rules" based primarily on his clinical observations of patients with poor sleep. Since then, there have been countless variations on these rules and depending on the study different sleep hygiene practices are included. A few common sleep hygiene suggestions as they relate specifically to the sleep environment¹² include the following:

- Eliminate noise from the bedroom
- Maintain a regular bedroom temperature (not excessively warm, nor excessively cold)
- Eliminate bedroom clock
- Use bedroom only for sleep (ie, not as an office space or place to watch TV).
- Sleep in a comfortable bed
- Minimize light levels

The intention of these and other recommendations to be discussed in later sections is to avoid behaviors that interfere with a normal sleep pattern and engage in behaviors that are conducive to healthy sleep. A 2017 systematic review and meta-analysis of the effect of sleep hygiene

Recharge Overview Part II University of Wisconsin Integrative Health www.fammed.wisc.edu/integrative education on insomnia found that there was a significant improvement in sleep quality, though the effect size was small to medium. ¹³ While not all of the individual components of sleep hygiene have been studied in isolation, there are a few that have been found to be more supported by empirical data over time. In particular, the well-studied areas related specifically to the sleep "surroundings" include electronics usage and associated light exposure.

Allergens and sleep environment

Indoor air quality problems can result in respiratory allergies and, potentially, exacerbation of sleep-related breathing problems. While research is limited on this topic, it stands to reason that maintaining a dust-free and clean bedroom is important. The use of a high-efficiency particulate air (HEPA) filter in the bedroom can further ensure good indoor air quality. Ensuring fresh air in the bedroom by slightly opening a window can mitigate the effects of outgassing from furnishings and building materials, especially in new homes. Hidden sources of mold and other allergens, such as dust mites in carpets and old bedding, should be eliminated or thoroughly cleaned. Bedding should be as good-quality as possible and cleaned frequently.

Electromagnetic fields (EMFs) such as those generated by electrical appliances and home electronics can affect sleep in a dose-related fashion.¹⁴ Animal studies have shown that EMFs in the 50 to 60 Hz range suppress melatonin secretion by the pineal gland.¹⁵ For this reason, it is wise to minimize—and whenever possible, eliminate—electrical appliances and electronics in the bedroom. Electronic devices that connect to the alternating current electric supply of the home should be kept as far away from the head of the bed as possible. Instead of a plug-in clock radio on the bedside table, a small battery-powered electronic clock is preferable. In many cases, the clock can also result in behavioral activation due to clock-watching, so it is optimal for the clock to be moved across the room, as far away from the head of the bed as possible.

Appropriate timing of light exposure is essential for optimal sleep. The use of bright indoor lighting and electronic screens, televisions, computers, hand-held devices and smartphones during the evening can result in delayed sleep onset due to suppression of melatonin secretion.¹⁶ Individuals with delayed sleep phase syndrome are particularly susceptible to this effect.¹⁷ Melatonin suppression in the brain is most sensitive to blue spectrum light. This light is commonly produced by flat screens.¹⁸ Technology to block the blue light, such as blue-blocking glasses or screens or the use of apps which decrease blue levels, should be considered if exposure cannot be eliminated. Avoiding suppression of melatonin secretion in the evening by bright light is an important step in self-care of healthy sleep, insomnia prevention, and treatment.

A cross-sectional study of 9,846 adolescents aged 16-19, evaluated the relationship between quantity of screen time (including television, computer, cell phone, tablet) and quality of sleep. Participants who had a total of four or more hours of screen time after school were more likely to have a sleep onset latency of 60 minutes or more. In addition, all daytime screen use of two or more hours as well as screen use within one hour before bedtime was significantly associated with a sleep deficit of two or more hours.¹⁹

Another study involving 855 hospital employees and university students assessed the association between in-bed use of electronic social media and sleep quality. Individuals who

School of Medicine and Public Health

used even small amounts of social media in bed were found to have a shorter duration of sleep during the weeknights. Those participants who used social media for an hour or more in bed were also found to have higher levels of anxiety and insomnia.²⁰

Strategies to Increase Endogenous Melatonin to Improve Sleep

- Ensure a dark environment for sleep. Shift workers, in particular, should use eye covers or extra curtains on windows to reduce light exposure.
- Avoid exposure to screens from computers, TVs, tablets, and cell phones before bed. The blue light they emit can inhibit melatonin.
- Keep all electrical devices (e.g. cell phones, clock radios, and computers) at least 3 feet from the head of the bed while sleeping. Avoid electric blankets.
- Eat vegetables and fruits. They contain the nutrient building blocks for melatonin production.
- Keep the sleeping environment cool.

Light Therapy

While light from electronics at night may be detrimental to healthy rest, certain types of light at certain times of day may be helpful for improving sleep quality. This practice has been termed "light therapy." A randomized controlled trial assessed the effect of bright light therapy on non-seasonal major depression and found that both light therapy alone and light therapy in conjunction with fluoxetine were helpful in decreasing depressive symptoms. Therapy included use of 10,000 lux intensity light for 30 minutes once daily for 8 weeks. ²¹ One meta-analysis of light therapy for older adults with cognitive impairment suggests there may be a small benefit from light delivered in a certain way. Specifically, the studies included in this analysis suggested that light intensity may range from 210-10,000 lux with morning exposure for a period of 1-10 weeks. ²²

Mind and Emotions

Each of us literally chooses, by way of attending to things, what sort of universe he shall appear to himself to inhabit.

—*William James, 1842-1910*

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Mind-body approaches can be extremely helpful in addressing insomnia and can be foundational in developing a PHP that addresses insomnia and related conditions.

Cognitive Behavioral Therapy for Insomnia (CBT-I)

CBT-I is regarded as the gold standard for the treatment of insomnia.²³ It is important to acknowledge that cognitive behavioral therapy was once considered an alternative therapy. As the research has shown it to have superior results, it has moved into the mainstream therapy. CBT-I uses a combination approach to address behavioral and cognitive issues that interfere with sleep. From a behavioral perspective, interventions include sleep restriction, stimulus control, and relaxation.

• In sleep restriction, the goal is to temporarily limit the time a person sleeps (especially during the day) in order to increase the homeostatic sleep drive. This is something that

anyone who has been chronically sleep-deprived (as in residency training) is intuitively familiar with.

• Stimulus control seeks to minimize the impact of behavioral stimulation on arousal mechanisms. Examples include using the bed only for sleep, removing electronic devices like televisions and hand-held devices from the bedroom, relaxation routines prior to bedtime, and removing the alarm clock from the bedside table to avoid clock watching. Sleep hygiene, discussed earlier, is linked closely with this.

Relaxation involves using various mind-body tools to more successfully attain a relaxed state that is more conducive to sleep. The cognitive component of CBT-I addresses beliefs or feelings about sleep that cause behavioral arousal and interfere with sleep. A good example is the tendency to exaggerate the effect of a bad night's sleep on the following day, "If I don't get to sleep, I'll never get through tomorrow." Another example is the emotional reaction that can occur with early morning awakening. Simply advising a patient that no one sleeps straight through the night and that awakenings are a natural part of sleep organization can help. Suggesting that they replace anger or frustration over their awakenings with gratitude for being able to spend the time in their sleeping area also might be of benefit.

CBT-I has been shown to be as good as or better than medications in short-term studies of insomnia; furthermore, patients treated with CBT-I continue to maintain and, in many cases, improve even further after the treatment is completed. In a systematic review comparing the effectiveness of CBT-I with standard sleep medications, CBT-I was noted to have more durable long-term benefits.²⁴ Another review found that CBT had a significant and larger positive effect on sleep quality in college students compared to sleep hygiene education and relaxation/mindfulness/hypnosis training. ²⁵ One meta-analysis demonstrated that even CBT-I conducted via the internet (instead of in-person), may also yield salutatory effects on anxiety and depression associated with insomnia. ²⁶

Current data supports cognitive behavioral therapy for insomnia (CBT-I) as one of the most effective nonpharmaceutical therapies available for promoting a healthier sleep-wake cycle.

One drawback of CBT-I is that it is not always easily accessible. F or more information about this and a number of other mind-body options for improving sleep go to "Hints for Encouraging Healthy Sleep."

Mindfulness Meditation

Mindfulness has been defined as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally." ²⁷ By cultivating an awareness of a person's relationship to various aspects of their health, mindfulness practices allow for the possibility of a shift from habitual (and perhaps unhealthy) ways of living to a different (perhaps healthier) approach to their life. So how might a mindfulness meditation practice facilitate a sleep pattern conducive to restfulness? One study suggests that the salutatory effects of mindfulness result from these practices increasing both moment-to-moment awareness as well as an attitude of acceptance and letting go when faced with situations or thought patterns perceived as stressful or challenging. ²⁸ Garland, and colleagues propose that mindfulness acts on both physiological arousal and cognitive arousal, i.e., both the physical/chemical shifts in the body that lead to

School of Medicine and Public Health

increased wakefulness at bedtime as well as the worry/fear/anxiety thoughts processes that often follow physiological arousal.²⁹

This approach to healthy sleep has been studied in a variety of populations. A 2016 randomized controlled trial used a 6-week mindfulness intervention called Mindful Awareness Practices (MAPs) and assessed its effect on older adults, average age 66.3 years). The MAPs group showed significant improvement compared to the sleep hygiene education (control) group in outcomes related to insomnia symptoms, depression symptoms, fatigue interference, and fatigue severity. ³⁰ A systematic review of the 8-week Mindfulness Based Stress Reduction (MBSR) curriculum found that there was a significant increase in sleep quality. ³¹ A review of 6 randomized controlled trials of varied mindfulness-based interventions in cancer survivors suggested that preliminary evidence points to healthier sleep in this population, though more studies are necessary. ³²

When reviewing literature specifically assessing mindfulness-based interventions for insomnia, the evidence is similarly positive. Both MBSR and a modified 8-week MBSR plus CBT-I program entitled "Mindfulness Based Therapy for Insomnia" (MBTI) have been shown to be associated with decreased sleep latency and total wake time (time awake at night) as well as increased total sleep time (time asleep at night). ³³ A 2016 systematic review of 18 studies related to mindfulness-based interventions for insomnia supported the hypothesis that mindfulness training may have a healthy influence on sleep quality. In fact, this type of intervention was shown to decrease insomnia severity and sleep disturbance in not only healthy individuals, but also those with chronic disease and older adults. ²⁹

Meditation involves focusing one's awareness in a non-judgmental, non-striving way, on the present moment. This may be supported by the use of a mantra, the breath, or something else that brings the mind repeatedly back to the present moment. This focused attention reduces activation of multiple neural pathways in the brain, allowing for more efficient transition into sleep.

MBSR was compared to pharmacotherapy in the treatment of chronic primary insomnia in a randomized controlled trial (RCT) involving 30 study participants who were stratified by gender and then randomized in a ratio of 2:1 to either an eight-week MBSR intervention or pharmacotherapy (eszopiclone 3 milligrams nightly for eight weeks). Validated self-report measures such as the PSQI sleep diaries and the Insomnia Severity Index (ISI) as well as objective validated surrogates for sleep (wrist actigraphy) were used. A follow up subjective assessment was performed at five months. All study participants met criteria for diagnosis of insomnia. All sleep measures improved significantly (p<0.05) in both groups when baseline measures were compared to those taken at eight weeks post-intervention. However, the MBSR group was more likely to no longer have insomnia at the conclusion of the eight weeks and at five months than the pharmacotherapy group. Participants assigned to the MBSR group were much more satisfied with their treatment at five months as well.³⁴

Finally, MBSR has been compared to CBT-I in a group of cancer patients with insomnia. The study was a randomized, partially-blinded trial involving 111 study participants. Sleep diaries and actigraphy were used to measure the primary outcome measures, which included sleep onset latency, time awake after sleep onset, total sleep time, and sleep efficiency. Secondary

School of Medicine and Public Health

outcomes included self-rated sleep quality, sleep beliefs, mood, and stress. CBT-I was better than MBSR in the primary outcome measures, both immediately and at the conclusion of the eight-week programs, but the differences were not significant statistically (p<0.35). At three-month follow-up, MBSR was equivalent to CBT-I. Both groups experienced reduced stress and mood disturbance (p<0.001). Although the authors conclude that CBT-I is superior to MBSR in the treatment of insomnia, another interpretation of the data would suggest that the interventions are roughly equal.³⁵ This is important, because MBSR may be more available than CBT-I.

In summary, it would appear that multiple mindfulness-based interventions are valuable in the treatment of insomnia and that mindfulness can be an important part of a PHP. For more information, as well as tools that can be used in practice, check out "<u>Mindful Awareness</u>" and "<u>Mind and Emotions.</u>"



Mindful Awareness Moment

Mindfulness Sleep Induction Technique

The majority of sleep onset insomnia is due to the intrusive thoughts of a racing mind. The next time you have trouble initiating sleep, give this a try:

Begin with abdominal breathing.

- Place one hand on your chest and the other on your abdomen. When you take a deep breath, the hand on the abdomen should rise higher than the one on the chest. This insures that the diaphragm is expanding, pulling air into the bases of the lungs. (Once you have this mastered, you do not have to use your hands).
- Take a slow deep breath in through your nose for a count of 3-4, and exhale slowly through your mouth for a count of 6-7. (Your exhalation should be twice as long as your inhalation). This diaphragmatic breathing stimulates the vagus nerve, which enhances the "relaxation response" Allow your thoughts to focus on your counting or the breath as the air gently enters and leaves your nose and mouth.
- If your mind wanders, gently bring your attention back to your breath.
- Repeat the cycle for a total of 8 breaths.
- After each 8-breath cycle, change your body position in bed and repeat for another 8 breaths.

It is rare that a person will complete 4 cycles of breathing and body position changes before falling asleep.

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School of Medicin and Public Health



According to the Academy of Guided Imagery, the term "guided imagery" refers to "a wide variety of techniques, including simple visualization and direct suggestion using imagery, metaphor and storytelling, fantasy exploration and game playing, dream interpretation, drawing, and active imagination where elements of the unconscious are invited to appear as images that can communicate with the conscious mind." ³⁶ For insomnia, it is often used to help a person relax more deeply. Since behavioral hyperarousal is a key contributor to the development and perpetuation of chronic insomnia, developing a greater capacity for relaxation can be helpful in improving sleep.

Guided imagery has proven useful as a self-care modality for improving sleep. In a study of 41 people with insomnia, subjects were randomized to one of three conditions: 1) no instructions, 2) general distraction, and 3) specific imagery distraction. The imagery distraction group rated their sleep onset latency as significantly shorter than the general distraction (p<0.05) or no instruction group p<0.01).³⁷

Guided imagery audio programs are commercially available on CD and in MP3 form and can be utilized in a wide variety of settings to good effect. Guided imagery has been widely utilized within DOD and VHA to address posttraumatic stress in troops returning from deployment. It has been shown to be effective and widely accepted, and it is now a part of the "List I" group of complementary and integrative health (CIH) approaches that will be covered by VA (for what indications and how often is not yet clear).

Imagery rehearsal therapy (IRT) is widely used as treatment for disabling nightmares in the setting of PTSD.³⁸ IRT helps practitioners to create detailed nonfrightening outcomes within common, recurrent nightmares. This therapy has been shown to be as effective as prazosin for decreasing nightmares, and when IRT is combined with CBT-I, studies have shown even greater treatment outcomes related to sleep quality and posttraumatic stress symptoms. ³⁹ Under the direction of a trained therapist, the emotional impact of disturbing dream content can be dissipated.⁴⁰

Guided imagery also has been shown to be effective in managing symptoms of fatigue. Patients with thyroid cancer undergoing radioactive iodine therapy listened to a guided imagery CD once daily for 4 weeks. When compared with the control group, symptoms of fatigue were found to be significantly decreased.⁴¹ Similarly, patients with multiple sclerosis were found to have decreased fatigue with the use of guided imagery.⁴²

In summary, guided imagery for sleep and posttraumatic stress can be an effective therapeutic approach to include in a PHP.

Breathwork

Conscious manipulation of breathing is a powerful psychophysiological intervention. It improves the balance between the sympathetic and parasympathetic nervous systems, and it reduces behavioral hyperarousal.⁴³ One study showed that by practicing breathing at a rate of 6 breaths per minute for 20 minutes prior to going to sleep, participants were able to decrease sleep latency and number of awakenings, while increasing sleep efficiency. ⁴⁴ Other key components to therapeutic breathing that have been shown to activate the parasympathetic nervous system

School of Medicin and Public Health

and thus support easeful sleep include practicing abdominal breathing, as well as maintaining an inhale-to-exhale ratio of 1-to-2.⁴⁵

Refer to "Breathing" for more information.

Yoga Nidra

iRest® Yoga Nidra (Integrative Restoration Institute <u>www.iRest.us</u>) is a secularized practice of yogic meditation. The practice involves the invocation of deep relaxation, attention training, the development of self-management tools, and learning to proactively engage emotions, thoughts, joy, and awareness.

iRest was initially piloted at Walter Reed Army Medical Center and is now widely available in military and VHA facilities. iRest has applications as a complementary approach in the treatment of PTSD, traumatic brain injury (TBI), chronic pain, chemical dependency, depression, anxiety, and sleep-related issues including insomnia, as well as for enhancing well-being and resiliency⁴⁶. Large-scale trials of iRest are not yet available, but small case series have been presented. iRest has been embraced by the Veteran and military community.⁴⁷ The U.S. Army Surgeon General and the Defense Centers of Excellence (DCoE) recommend iRest for the management of chronic pain and PTSD in military and Veteran settings.

A pilot study of the effect of iRest® Yoga Nidra on sleep complaints and daytime sleepiness in clinicians in a military medical center demonstrated a trend toward improvements in waking somnolence, as measured by the Epworth Scale. It was also well-accepted.⁴⁸ Additional studies, utilizing wrist actigraphy to measure sleep parameters, are underway.⁴⁸

iRest includes many aspects of rational-emotive and cognitive behavioral therapy, which are helpful for those experiencing sleep disorders and insomnia, including deep relaxation, stimulus control, and paradoxical intention. iRest can form a foundation for self-care management for a variety of stress-related problems including insomnia and chronic pain. iRest is highly suitable for delivery in a group setting. Refer to the <u>www.irest.us</u> website for more information.

Mind-Body Bridging

A pilot study of a brief mind-body intervention in people with posttraumatic stress disorder (PTSD) and sleep disturbance evaluated 63 veterans with self-reported sleep disturbance. Study participants received Mind-Body Bridging (MBB) or an active sleep education (sleep hygiene) control. MBB is a novel and emerging form of awareness training that teaches various awareness skills to help the individual calm the mind and relax the body. In addition, MBB teaches a person to become aware of mind-body states that are characterized by a heightened state of self-centeredness, including rumination, contraction of awareness, and body tension. Interventions were conducted in two sessions, once per week. Multiple patient-reported outcomes were used. Sleep disturbance decreased in both groups. MBB performed significantly better not only in terms of sleep, but in terms of PTSD symptoms, which remained unchanged in the sleep hygiene group. Overall mindfulness increased in MBB, while it remained unchanged in the control.⁴⁹

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School of Medicin and Public Health



Foods can have significant impact on quality of rest. The "rules" of sleep hygiene (discussed in the "Surroundings" section above) also include recommendations related to type and timing of food and drink consumption. Examples include eating a light bedtime snack to avoid going to bed hungry. In addition, being intentional about caffeine, alcohol and nicotine consumption throughout the day also plays an important role in maintaining a healthy resting pattern. ¹²

Caffeine has objective effects on sleep onset and sleep quality even in individuals without sleep complaints.⁵⁰ Caffeine half-life usually increases with age,⁵¹ so amounts that may have been tolerated early in life may result in insomnia later.

Alcohol is often consumed in the evening in an attempt to self-medicate for insomnia. Although alcohol may result in a more rapid sleep onset, this comes at a cost of increased sleep disruption in the second half of the night. With repeated exposure to alcohol at bedtime, the sleep-promoting effect may wane while the sleep disruption in the second half of the night worsens.⁵² This gradually results in hypersomnolence during waking hours.

Certain types of food and drink we consume may also lead to physical conditions with poor sleep as a secondary outcome. For example, many foods, such as chocolate, tomatoes, onions, fats, and alcohol, can reduce lower esophageal sphincter pressure and contribute to nocturnal gastroesophageal reflux, delaying sleep onset, and triggering awakenings.^{53,54}. Being overweight or obese is linked to sleep apnea.

Melatonin increases the tone of the lower esophageal sphincter. It makes intuitive sense that a hormone that leads to better sleep would also reduce reflux when the body becomes supine for sleeping.^{55,56}

Drawing attention to the impact of foods, caffeine, and alcohol is an important component of building a PHP that promotes healthy sleep.

Spirit and Soul

Honoring one's self by reflective writing can have meaningful benefits and can be helpful in developing a PHP. Setting aside a few minutes each evening to record personal observations, worries, joys, and pleasures can ease the burden of "racing thoughts" that interfere with sleep onset. Refer to "Therapeutic Journaling" for more information.

Recharge

Although recharging requires a healthy sleep-wake cycle, it does not stop there. It also requires that we take breaks from our work routine. For more ideas on how to incorporate short and long breaks Refer to "Taking Breaks: When to Start Moving, and When to Stop".

With a good night's sleep and appropriate use of breaks, it is easier to explore our personal work-life balance and keep fine-tuning it. For more information, refer to "<u>Work-Life Integration:</u> <u>Tips and Resources</u>."

School of Medicin and Public Health

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References

- 1. Horne JA, Moore VJ. Sleep EEG effects of exercise with and without additional body cooling. *Electroencephalogr Clin Neurophysiol.* 1985;60(1):33-38.
- 2. Ohayon MM, Carskadon MA, Guilleminault C, Vitiello MV. Meta-analysis of quantitative sleep parameters from childhood to old age in healthy individuals: developing normative sleep values across the human lifespan. *Sleep*. 2004;27(7):1255-1273.
- 3. Yang PY, Ho KH, Chen HC, Chien MY. Exercise training improves sleep quality in middle-aged and older adults with sleep problems: a systematic review. *J Physiother*. 2012;58(3):157-163.
- 4. Montgomery P, Dennis J. Physical exercise for sleep problems in adults aged 60+. *Cochrane Database Syst Rev.* 2002(4):Cd003404.
- 5. King AC, Oman RF, Brassington GS, Bliwise DL, Haskell WL. Moderate-intensity exercise and selfrated quality of sleep in older adults. A randomized controlled trial. *JAMA*. 1997;277(1):32-37.
- 6. Gubelmann C, Heinzer R, Haba-Rubio J, Vollenweider P, Marques-Vidal P. Physical activity is associated with higher sleep efficiency in the general population: The CoLaus study. *Sleep*. 2018;41(7).
- 7. Raman G, Zhang Y, Minichiello VJ, D'Ambrosio CM, Wang C. Tai Chi improves sleep quality in healthy adults and patients with chronic conditions: A systematic review and meta-analysis. *J Sleep Disord Ther.* 2013;2(6).
- 8. Jiang YH, Tan C, Yuan S. Baduanjin exercise for insomnia: A systematic review and meta-analysis. Behav Sleep Med. 2017:1-13.
- 9. Khalsa SB. Treatment of chronic insomnia with yoga: a preliminary study with sleep-wake diaries. *Appl Psychophysiol Biofeedback.* 2004;29(4):269-278.
- 10. Chen KM, Chen MH, Chao HC, Hung HM, Lin HS, Li CH. Sleep quality, depression state, and health status of older adults after silver yoga exercises: cluster randomized trial. *Int J Nurs Stud.* 2009;46(2):154-163.
- 11. Cao H, Pan X, Li H, Liu J. Acupuncture for treatment of insomnia: a systematic review of randomized controlled trials. *J Altern Complement Med.* 2009;15(11):1171-1186.
- 12. Stepanski EJ, Wyatt JK. Use of sleep hygiene in the treatment of insomnia. *Sleep Med Rev.* 2003;7(3):215-225.
- 13. Riemann D. Sleep hygiene, insomnia and mental health. J Sleep Res. 2018;27(1):3.
- Regel SJ, Tinguely G, Schuderer J, et al. Pulsed radio-frequency electromagnetic fields: dosedependent effects on sleep, the sleep EEG and cognitive performance. *J Sleep Res.* 2007;16(3):253-258.
- Lambrozo J, Touitou Y, Dab W. Exploring the EMF-Melatonin Connection: A Review of the Possible Effects of 50/60-Hz Electric and Magnetic Fields on Melatonin Secretion. *Int J Occup Environ Health*. 1996;2(1):37-47.

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 Gooley JJ, Chamberlain K, Smith KA, et al. Exposure to room light before bedtime suppresses melatonin onset and shortens melatonin duration in humans. *J Clin Endocrinol Metab.* 2011;96(3):E463-472.

- 17. Aoki H, Ozeki Y, Yamada N. Hypersensitivity of melatonin suppression in response to light in patients with delayed sleep phase syndrome. *Chronobiol Int.* 2001;18(2):263-271.
- Cajochen C, Munch M, Kobialka S, et al. High sensitivity of human melatonin, alertness, thermoregulation, and heart rate to short wavelength light. *J Clin Endocrinol Metab.* 2005;90(3):1311-1316.
- Hysing M, Pallesen S, Stormark KM, Jakobsen R, Lundervold AJ, Sivertsen B. Sleep and use of electronic devices in adolescence: Results from a large population-based study. *BMJ open*. 2015;5(1):e006748.
- 20. Bhat S, Pinto-Zipp G, Upadhyay H, Polos PG. "To sleep, perchance to tweet": In-bed electronic social media use and its associations with insomnia, daytime sleepiness, mood, and sleep duration in adults. *Sleep health.* 2018;4(2):166-173.
- Lam RW, Levitt AJ, Levitan RD, et al. Efficacy of bright light treatment, fluoxetine, and the combination in patients with nonseasonal major depressive disorder: A randomized clinical trial. *JAMA psychiatry*. 2016;73(1):56-63.
- 22. Chiu HL, Chan PT, Chu H, et al. Effectiveness of light therapy in cognitively impaired persons: A metaanalysis of randomized controlled trials. *J Am Geriatr Soc.* 2017;65(10):2227-2234.
- 23. Morgenthaler T, Kramer M, Alessi C, et al. Practice parameters for the psychological and behavioral treatment of insomnia: an update. An american academy of sleep medicine report. *Sleep*. 2006;29(11):1415-1419.
- 24. Mitchell MD, Gehrman P, Perlis M, Umscheid CA. Comparative effectiveness of cognitive behavioral therapy for insomnia: a systematic review. *BMC Fam Pract.* 2012;13:40.
- 25. Friedrich A, Schlarb AA. Let's talk about sleep: A systematic review of psychological interventions to improve sleep in college students. *J Sleep Res.* 2018;27(1):4-22.
- Ye YY, Zhang YF, Chen J, et al. Internet-Based Cognitive Behavioral Therapy for Insomnia (ICBT-i) improves comorbid anxiety and depression: A meta-analysis of randomized controlled trials. *PLoS One.* 2015;10(11):e0142258.
- 27. Kabat-Zinn J. Wherever You Go, There You Are: Mindfulness Meditation in Everyday Life. New York: Hyperion; 1994.
- 28. Lau WKW, Leung MK, Wing YK, Lee TMC. Potential mechanisms of mindfulness in improving sleep and distress. *Mindfulness (N Y)*. 2018;9(2):547-555.
- 29. Garland SN, Zhou ES, Gonzalez BD, Rodriguez N. The quest for mindful sleep: A critical synthesis of the impact of mindfulness-based interventions for insomnia. *Curr Sleep Med Rep.* 2016;2(3):142-151.
- Black DS, O'Reilly GA, Olmstead R, Breen EC, Irwin MR. Mindfulness meditation and improvement in sleep quality and daytime impairment among older adults with sleep disturbances: A randomized clinical trial. *JAMA Intern Med.* 2015;175(4):494-501.
- 31. Janssen M, Heerkens Y, Kuijer W, van der Heijden B, Engels J. Effects of mindfulness-based stress reduction on employees' mental health: A systematic review. *PLoS One.* 2018;13(1):e0191332.
- 32. Christodoulou G, Black DS. Mindfulness-based interventions and sleep among cancer survivors: A critical analysis of randomized controlled trials. *Curr Oncol Rep.* 2017;19(9):60.
- 33. Martires J, Zeidler M. The value of mindfulness meditation in the treatment of insomnia. *Curr Opin Pulm Med.* 2015;21(6):547-552.
- 34. Gross CR, Kreitzer MJ, Reilly-Spong M, et al. Mindfulness-based stress reduction versus pharmacotherapy for chronic primary insomnia: a randomized controlled clinical trial. *Explore (NY)*. 2011;7(2):76-87.
- 35. Garland SN, Carlson LE, Stephens AJ, Antle MC, Samuels C, Campbell TS. Mindfulness-based stress reduction compared with cognitive behavioral therapy for the treatment of insomnia comorbid with cancer: a randomized, partially blinded, noninferiority trial. *J Clin Oncol.* 2014;32(5):449-457.
- 36. Academy For Guided Imagery. Power of Imagery. 2017; http://acadgi.com/about_sitemap/power_of_guided_imagery/. Accessed November 26, 2019.
- 37. Harvey AG, Payne S. The management of unwanted pre-sleep thoughts in insomnia: distraction with imagery versus general distraction. *Behav Res Ther.* 2002;40(3):267-277.

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- 38. Caldwell BA, Redeker N. Sleep and trauma: an overview. *Issues Ment Health Nurs.* 2005;26(7):721-738.
- 39. Seda G, Sanchez-Ortuno MM, Welsh CH, Halbower AC, Edinger JD. Comparative meta-analysis of prazosin and imagery rehearsal therapy for nightmare frequency, sleep quality, and posttraumatic stress. *J Clin Sleep Med.* 2015;11(1):11-22.
- 40. Morin CM, Azrin NH. Stimulus control and imagery training in treating sleep-maintenance insomnia. *J Consult Clin Psychol.* 1987;55(2):260-262.
- 41. Lee MH, Kim DH, Yu HS. The effect of guided imagery on stress and fatigue in patients with thyroid cancer undergoing radioactive iodine therapy. *Evid Based Complement Alternat Med.* 2013;2013:130324.
- 42. Case LK, Jackson P, Kinkel R, Mills PJ. Guided imagery improves mood, fatigue, and quality of life in individuals with multiple sclerosis: an exploratory efficacy trial of healing light guided imagery. *J Evid Based Integr Med.* 2018;23:2515690x17748744.
- 43. Brown RP, Gerbarg PL, Muench F. Breathing practices for treatment of psychiatric and stress-related medical conditions. *Psychiatr Clin North Am.* 2013;36(1):121-140.
- 44. Tsai HJ, Kuo TB, Lee GS, Yang CC. Efficacy of paced breathing for insomnia: enhances vagal activity and improves sleep quality. *Psychophysiology*. 2015;52(3):388-396.
- 45. Rakel D. Integrative Medicine. 4th ed. Philadelphia, PA: Elsevier; 2017.
- 46. Livingston E, Collette-Merrill K. Effectiveness of integrative restoration (iRest) Yoga Nidra on mindfulness, sleep, and pain in health care workers. *Holist Nurs Pract.* 2018;32(3):160-166.
- 47. Pence P, Katz L, Huffman C, Cojucar G. iRest® Yoga Nidra: A pilot study to treat Women Veterans. Integrative Restoration Institute website. Available at: http://www.irest.us/sites/default/files/Long Beach VA MST Study.pdf. Accessed July 21, 2014.
- 48. Bingham M, Peacock W, Fritts M, Walter J. Effects of Integrative Restoration (iRest®) on Sleep, Perceived Stress and Resilience in Military Medical Center Healthcare Providers: A Pilot Study. Poster: presented at 1st International Association of Yoga Therapists (IAYT) Symposium on Yoga Research; October 1-3 2010; Honesdale, PA.
- 49. Nakamura Y, Lipschitz DL, Landward R, Kuhn R, West G. Two sessions of sleep-focused mind-body bridging improve self-reported symptoms of sleep and PTSD in veterans: A pilot randomized controlled trial. *J Psychosom Res.* 2011;70(4):335-345.
- 50. Landolt HP, Retey JV, Tonz K, et al. Caffeine attenuates waking and sleep electroencephalographic markers of sleep homeostasis in humans. *Neuropsychopharmacology*. 2004;29(10):1933-1939.
- 51. Tanaka E. In vivo age-related changes in hepatic drug-oxidizing capacity in humans. *J Clin Pharm Ther.* 1998;23(4):247-255.
- 52. Roehrs T, Roth T. Sleep, sleepiness, sleep disorders and alcohol use and abuse. *Sleep Med Rev.* 2001;5(4):287-297.
- 53. Lee KJ. Nocturnal gastroesophageal reflux: assessment and clinical implications. *J Neurogastroenterol Motil.* 2011;17(2):105-107.
- 54. Castell DO. Diet and the lower esophageal sphincter. Am J Clin Nutr. 1975;28(11):1296-1298.
- 55. de Oliveira Torres JDF, de Souza Pereira R. Which is the best choice for gastroesophageal disorders: Melatonin or proton pump inhibitors? *World J Gastrointest Pharmacol Ther.* 2010;1(5):102.
- 56. Lahiri S, Singh P, Singh S, Rasheed N, Palit G, Pant KK. Melatonin protects against experimental reflux esophagitis. *J Pineal Res.* 2009;46(2):207-213.

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