



Sleep, Nutrition, and Lymphedema/Lipedema

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Disclosure Information

- Meeting:
 - 2019 NLN Conference
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- Speaker:
 - Chuck Ehrlich:
 - Ownership interest in Lymph Notes, publisher of the **Lymphedema and Lipedema Nutrition Guide** and other books
- Not discussing off label or investigational drugs.

Sleep Effects Everything

- Sleep supports every major physiological system including:
 - Immune, metabolic, thermoregulatory, endocrine, and cardiovascular function [Irwin, 2015]; and
 - Numerous cognitive and affective neural processes, such as learning and memory, emotional regulation, attention, motivation, decision making, and motor control [Walker 2009]
- Many mental health issues are bi-directionally linked to sleep disorders including:
 - Depression, anxiety, post-traumatic stress disorder (PTSD),
 - Bipolar disorder,
 - Schizophrenia,
 - Alcoholism and other substance abuse disorders [Krystal 2012]

Sleep and Brain Lymphatics

- Glymphatic system clears beta-amyloid and other waste products from the brain into the lymphatic system.
 - Glymphatic combines “glia”—a type of brain cell of which the astrocyte is one example—and “lymphatic,” referencing this newly discovered function of the brain's glial cells. [Nedergaard 2016]
- Glymphatic system activity increases greatly during sleep
 - Brain shrinks, interstitial space increases, CSF fluid flows increase
- Sleep issues reduce glymphatic activity and increase the risk of Alzheimer’s and other diseases linked to toxic plaque. [Bredesen 2014]
- Glymphatic dysfunction is a feature of natural brain aging and CNS diseases including Alzheimer’s disease, TBI, ischemic and hemorrhagic stroke, and type 2 diabetes. [Plog 2018]

Sleep and Chronic Pain

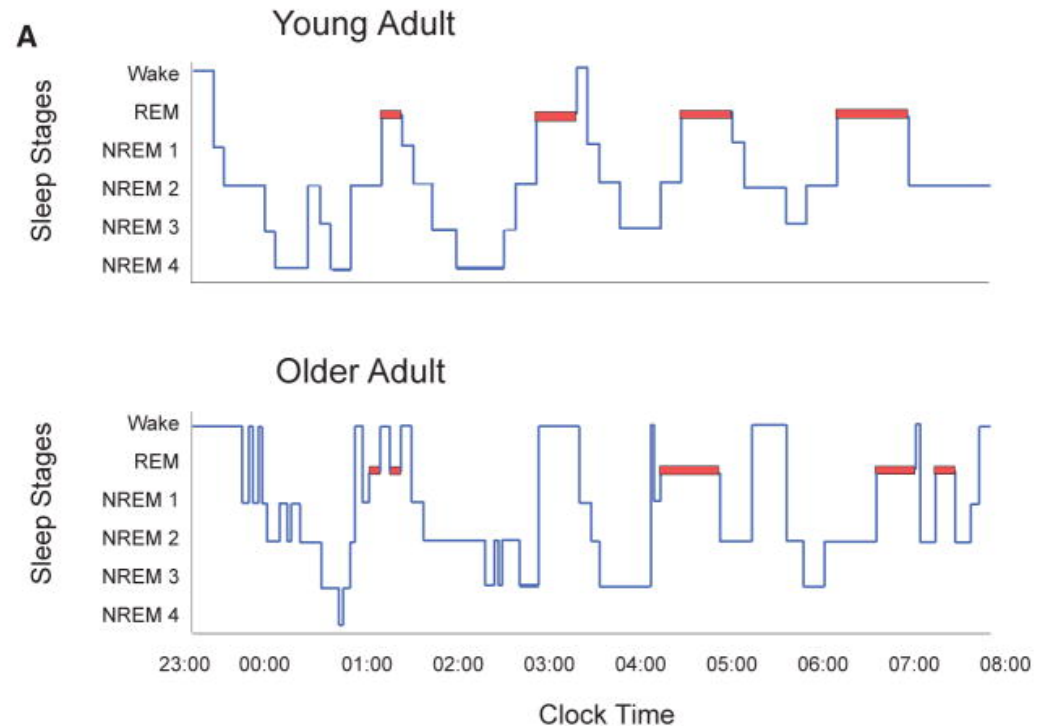
- Self-reinforcing relationship between chronic pain and sleep:
 - Sleep can be affected by chronic pain
 - Sleep can also modulate the perception of pain
- Short sleep or REM sleep disruption increase pain sensitivity
 - Sleep loss increases the experience of pain
 - Even modest changes in sleep quality (increases and decreases) determine consequential day-to-day changes in experienced pain. [Krause 2018]
- Pain medications can impact sleep patterns and raise apnea risk:
 - Opioid-associated sleep changes may reduce analgesic effects
 - Non-steroidal anti-inflammatories are sleep neutral or sleep promoting
 - Antidepressants can change sleep patterns [Bohra 2014]
- Melatonin supplements can have analgesic benefits (see below)

Sleep and Melatonin

- Melatonin is a hormone and neurotransmitter
 - Produced in the pineal gland and found in foods
- Darkness increases melatonin levels, initiating the sleep cycle
- Melatonin is also:
 - Anti-inflammatory affecting multiple aspects of the inflammatory cascade
 - Analgesic effective in reducing chronic pain [Zhu 2017]
 - An activator of brown-fat that also improves lipid levels [Halpern 2019]
- Low melatonin levels can cause sleep issues:
 - Melatonin levels change with age, decrease ~41-60 years old
 - Decrease from light exposure at night and/or the use of β -blocker drugs
 - Melatonin deficiency is linked to weight gain in postmenopausal women [Walecka-Kapica E 2015]

Sleep Adequacy

- People do best with 7-9 hours of sleep per night
 - Including 2 AM- 4 AM
- Healthy sleep includes multiple stages:
 - Rapid eye movement (REM)
 - Non-rapid eye movement (NREM 1-4)

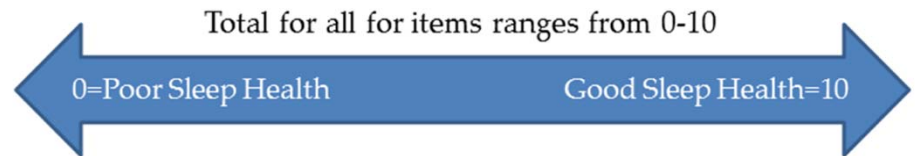


[Mander, BA 2018]

Sleep dimensions:

- **Satisfaction:** Are you satisfied with your sleep?
- **Alertness:** Do you stay awake all day without dozing?
- **Timing:** Are you asleep (or trying to sleep) between 2:00 a.m. and 4:00 a.m.?
- **Efficiency:** Do you spend less than 30 minutes awake at night? (This includes the time it takes to fall asleep and awakenings from sleep.)
- **Duration:** Do you sleep between 6 and 8 hours per day?

Are you SATED?



		Rarely/ Never (0)	Sometimes (1)	Always (2)
<u>S</u> atisfaction	Are you satisfied with your sleep?			
<u>A</u> lertness	Do you stay awake all day without dozing?			
<u>T</u> iming	Are you asleep (or trying to sleep) between 2:00 a.m. and 4:00 a.m.?			
<u>E</u> fficiency	Do you spend less than 30 minutes awake at night? (This includes the time it takes to fall asleep and awakenings from sleep.)			
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Adapted from [Buysse, D 2014] www.ncbi.nlm.nih.gov/pmc/articles/PMC3902880/

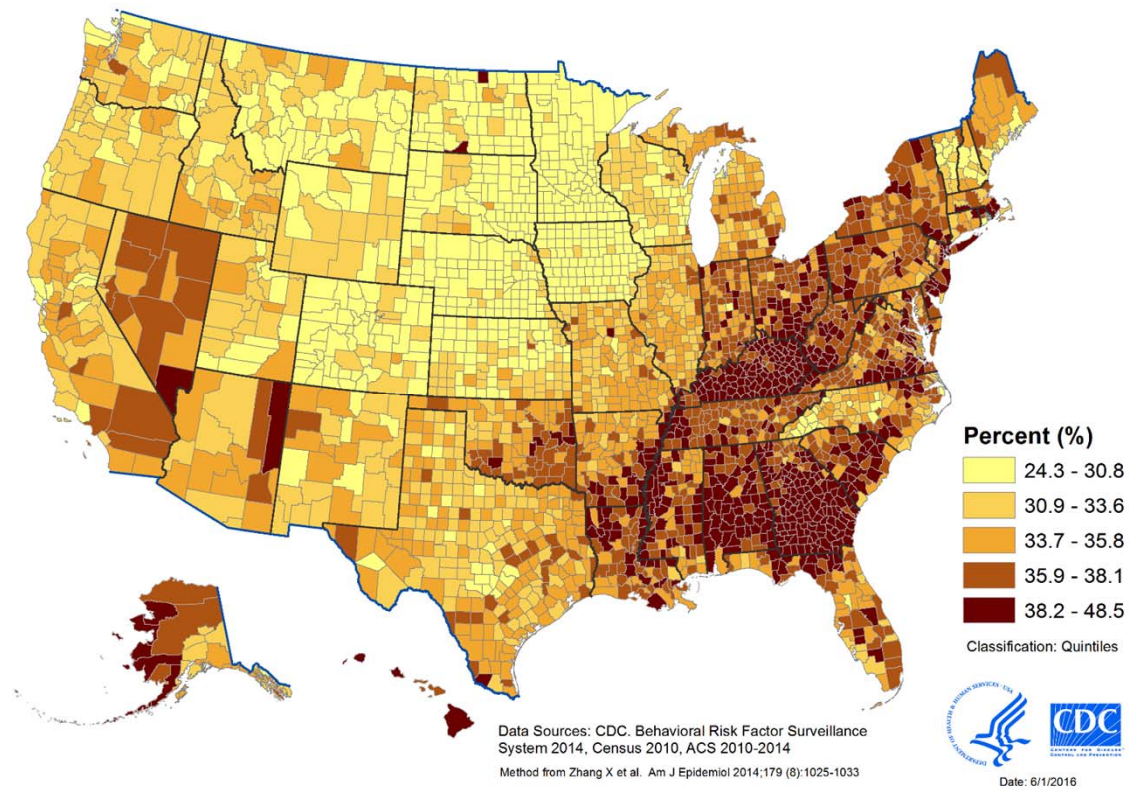
Sleep Issues and Lymphedema Risks

- Sleep issues are associated with many lymphedema risk factors. For example:
 - Obesity, metabolic syndrome, diabetes
 - Chronic venous insufficiency, congestive heart failure
 - Breast cancer: 58.9% of women reported poor sleep quality prior to treatment
 - Depression and symptoms of menopause were independent predictors of poor sleep quality. [Mansano-Schlosser 2017]

How Sleep Issues Affect Lymphedema

- Obesity (next slide), metabolic syndrome, and diabetes are all linked to sleep issues
 - Increase risk of lymphedema and lymphedema complications
 - Promote gut dysbiosis and overgrowth of gram-negative bacteria
 - Produce endotoxins or lipopolysaccharides (LPS) that stop the pumping action of the lymphatics and make vessels leaky
- Non-Alcoholic Fatty Liver Disease risk is increased by sleep issues [Marin-Alejandre, B A 2019]
 - Liver disease greatly increases lymph output from the liver, overloading the central lymphatics

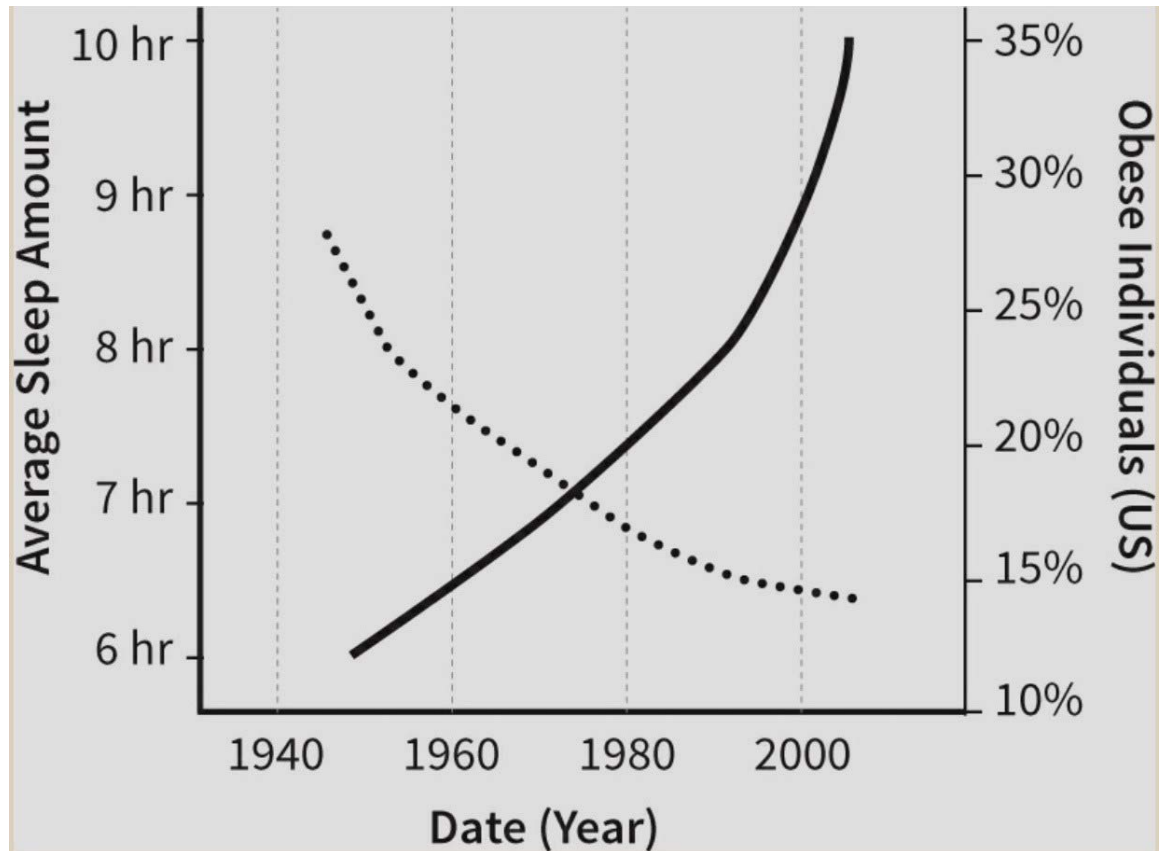
Prevalence of Short Sleep (<7 hours)



Short Sleep and Obesity

- Sleep Loss and Obesity
 - Obesity increases as Average Sleep Amount decreased

Walker, Matthew. *Why We Sleep: Unlocking the Power of Sleep and Dreams* (p. 177). Scribner 2018.



Sleep Issues Increase Obesity

- Increases appetite, craving for carbohydrates, comfort foods
 - “desire for weight-gain promoting high-calorie foods” [Greer 2013]
- Slows metabolism
- Promotes fat storage, stops fat release
- Decreases energy level and desire/ability to exercise

Obesity Increases Sleep Issues

- Many ways, for example:
 - Gut microbes and obesity-related gut dysbiosis:
 - Shapes the architecture of sleep and stress reactivity of the hypothalamic-pituitary-adrenal axis.
 - Influences memory, mood, and cognition
 - Are clinically relevant to a range of disorders, including alcoholism, chronic fatigue syndrome, fibromyalgia, and restless legs syndrome. [Galland 2014]
 - Obstructive Sleep Apnea (OSA)
 - Fat/fluid accumulation that impairs breathing, triggering snoring and repeated awakenings that interrupt sleep
 - Congestive heart failure also increases OSA [Carlisle 2017] and LE risk
 - Obesity and NAFLD reduce the desire and ability to exercise
 - Restless Leg Syndrome (RLS) may be caused by gut dysbiosis [Blum 2019]

Sleep and Lipedema

- Sleep issues are common in lipedema and other fat disorders
- For example:
 - Convenience sample of Dr. Iker's patients: N= 11, all female with lipedema, one post-liposuction
 - Average SATED score: 3.5 on 0-10 scale
 - Do you sleep between 6 and 8 hours per day?
 - 7 Rarely/Never
 - 4 Sometimes
 - Sample of 51 patients [Herbst 2015]
 - Difficulty sleeping Stage 1: 80%, Stage 2: 64.3%, Stage 3: 45.5%
 - Nocturia Stage 1 : 75%, Stage 2: 55%, Stage 3: 66.7%

Sleep Issues and Lipedema

- Increases the risk of obesity
- Obstructive Sleep Apnea is common in later stages:
 - Stage 2: 14.8%, Stage 3: 40% [Herbst 2015]
- Lipedema often includes pain from multiple sources:
 - Lipedema pain (painful fat)
 - Abdominal pain from GI issues
 - Headaches
 - Joint and muscle pain from orthopedic issues/hypermobility

Recommendation for Better Sleep

- Make sleep a priority, schedule 7-9 hours/day in bed
- Practice good sleep hygiene, see Your Guide to Healthy Sleep www.nhlbi.nih.gov/health-topics/all-publications-and-resources/your-guide-healthy-sleep
 - Bedroom cool, dark, quiet
 - Avoid bright lights, eating, activity before bed
- Get treatment for obstructive sleep apnea, if needed
- If insomnia is an issue:
 - Cognitive behavioral therapy for insomnia (CBT-I) works
 - ‘Sleeping pills’ do not provide beneficial sleep

Recommendations for Better Sleep

- Improve nutrition
 - Follow the recommended eating pattern from **Lymphedema and Lipedema Nutrition Guide**
 - Other specific nutrition and meal timing recommendations below
 - Consider melatonin supplements
 - Jet lag or insomnia: 3 mg time release, take 30 minutes before bed
 - Lipedema: some doctors use higher doses for anti-inflammatory effects
- Avoid long periods of immobility: ‘sitting is the new smoking’
- Increase activity and exercise
 - Affects sleep, gut microbiome, energy, etc.

Recommended Eating Pattern

- Eat primarily:
 - Whole foods, mostly plants, many varieties/colors of vegetables and fruits
 - Fermented foods, especially kefir and yogurt, daily
 - Use herbs and spices to provide your favorite flavors.
- Starve lymphedema and lipedema by:
 - Minimizing sugars (especially fructose), refined carbohydrates (especially grains containing gluten), and chemically modified fats.
 - Limiting animal products and high-salt foods.
 - Avoiding dairy (other than kefir and yogurt) appears to help lipedema.
- Whole foods are best
 - Prepared foods contain added sugar, salt, soy, unhealthy fats, undesirable food additives and preservatives

Food Choices that Influence Sleep

- Sugar-sweetened beverages should be avoided
 - Associated with short sleep [Prather AA, 2016]
- Caffeine should be limited in quantity and timing (morning)
- Alcohol interferes with healthy sleep and should be avoided
- Eating vegetables is associated with higher melatonin levels
 - Highest quartile of vegetable intake had 16% higher urinary melatonin levels relative to the lowest quartile. [Nagata C, 2005]

Minerals that Influence Sleep

- Monitor levels and increase foods or supplements, if needed:
 - Zinc acts as a sleep modulator. Supplements or food sources (oysters, seafood, yeast extract) can increase sleep duration and quality, especially in the elderly [Cherasse 2017]
 - Iron deficiency and non-iron-deficient anemia can contribute to sleep issues [Chen-Edinboro 2017]
 - Magnesium supplementation may help with insomnia [Abbasi 2012]

Recommendations for Meal Timing

- Meal timing affects health in many ways:
 - Fasting overnight for 12+ hours helps reduce the risk of diabetes, cardiovascular disease, and cancer [Marinac 2015]
 - Eat 2-3 meals/day on a routine schedule (not grazing)
 - Avoid eating within 2-3 hours before bedtime, if possible
 - Avoid eating during the night

Resources

- **Your Guide to Healthy Sleep** from NIH
 - <https://www.nhlbi.nih.gov/health-topics/all-publications-and-resources/your-guide-healthy-sleep>
- **Why We Sleep: Unlocking the Power of Sleep and Dreams** by Matthew Walker. Scribner 2018.
- **Lymphedema and Lipedema Nutrition Guide** by Ehrlich, Iker, et al. Lymph Notes 2016

Questions?

- Contact Chuck Ehrlich:
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- www.LymphNotes.com/nutrition.php