Sleep
Dr. John Bergman
The Definition of Sleep

Sleep is a naturally recurring state of mind characterized by altered consciousness, relatively inhibited sensory activity, inhibition of nearly all voluntary muscles, and reduced interactions with surroundings.

Macmillan Dictionary

After 50 years of research

"As far as I know, the only reason we need to sleep that is really, really solid is because we get sleepy."

William C. Dement, Founder of Stanford University's Sleep Research Center
Sleep Deprivation

One of the Most Common and Most Effective Tortures in the World
Short-term Sleep Deprivation:
• Causes the release of stress hormones
• Elevates LDL Cholesterol
• Elevates Blood Sugar
• Reduces Blood supply to the gut

Sleep Deprivation on a long-term:
• Debilitating both physically and mentally
• Weakens immune system
• Higher disease rates
Lack of Sleep

- Has a cumulative effect on your body
- Weakens your immune system
- Aggravates chronic pain
- Impairs your physical and mental performance
- Raises your blood pressure
- Alters hormone levels and metabolism
- Can lead to brain shrinkage
- Prematurely ages you
Lack of Sleep Increases risk of:

- cardiovascular disease
- Diabetes
- Cancer
- Obesity
- Memory loss
- Alzheimer’s disease
- Parkinson’s

- Multiple sclerosis
- Gastrointestinal disorders
- Kidney disease
- Dementia
- Stomach ulcers
- Constipation
- Depression and other
Sleepless in America

• 50-70 million Americans suffer from sleep deprivation
• Over 9 million Americans take prescription sleeping pills

• 2001 = 29 million Rx’s for sleeping pills
• 2005 = 43 million Rx’s for sleeping pills
• 2006 = 47 million Rx’s for sleeping pills
• 2010 = 60 million Rx’s for sleeping pills
The Business of Sleep

In 2011:

Sales of Ambien = $2.8 billion
Sales of Lunesta = $912 million

Sepracor (makers of Lunesta)
• spent $215 million in one year on marketing to doctors.
• That same year Lunesta generated $329 million in sales.
Sleeping Pill users

• 35% increased risk of Cancer
• Died 4.6 times more often (on average) than patients who avoided sleeping pills
• Suicide, accidental overdose and cancer are not the most common ways in which sleeping pills kill

Daniel F. Kripke, M.D

www.darksideofsleepingpills.com
Drugs that Affect Sleep
• Beta-blockers, ACE inhibitors and Diuretics
• Appetite-suppressing drugs
• Antacids
• High blood pressure meds
• ADD and ADHD Drugs
• Over-the-counter cold medications
• Corticosteroids
• Analgesics
• Sedative medications used to induce sleep
• Antihistamines such as diphenhydramine (Benadryl)
• Over-the-counter sleeping medications
• Asthma drugs = bronchodilators
Insomnia

• Difficulty falling asleep or staying asleep
• The most common sleep problem
• Affects 10-15% of the population
• Chronic insomnia = 2-3 times greater risk of dying
• Typical Insomniacs spend more time in bed (Up to 14 hours)

Causes of Insomnia:
• Stress
• Poor sleep environment
• Inconsistent sleep schedule
• Excessive stimulation before bedtime
• Sedentary Lifestyle
Solutions for Insomnia

• Reduce all stressors
• Improve your sleep environment
• Keep a regular sleep schedule
• Restrict your sleep (6 hours per night)
• Avoid excessive stimulation
• Exercise regularly
• Emotional Freedom Technique
Obstructive Sleep Apnea

• Major pauses in breathing during sleep
• **Disrupts normal progression of sleep**
• Oxygen level drop causing an abrupt awakening
• People with Sleep Apnea usually aren’t aware of their problem
• **Linked to Memory Loss**

- Risk factors include:
  • Chronic fatigue
  • Old age
  • Obesity
  • snoring
Breathing during Sleep

- Diaphragmatic breathing is controlled by the Autonomic Nervous system
- Generates a suction pressure
- Muscles around airway relax during sleep causing airway to collapse and block intake of oxygen
- Snoring is a vibration of the tissues of the upper airways
Solutions for Sleep Apnea

• Stimulate the nerves that supply the lungs (Chiropractic care)
• Lose Weight: weight loss of only 10% is enough to improve quality of sleep
• No alcohol, tobacco, or sedatives: relax the muscles of the throat
• Sleep on your side
• Elevate your head 4-6 inches
• Maintain regular hours of sleep
Why is Sleep so important?

- Increased rate of Wound healing
- Activates your Immune system
- Maintains emotional balance
- Increases efficiency of Antioxidant mechanisms
- Increased waste Clearance of the Brain
- Your brain restores its supply of ATP (energy)
- Secretion of growth hormone
- Increases clarity and retention of memory
- Supports higher level cognitive functions
- Prevents many Degenerative Diseases
Circadian Rhythm

• Coordinates your biology with the changes in the **day-night cycle**
• Promotes daily sleep at night
• Industrialization and artificial light
  • have altered sleep habits in the last 100 years
• Clock is reset as the body senses environmental time cues
  • The Primary cue is Light

A healthy adult entrained to the sun will fall asleep a few hours after sunset, experience body temperature minimum at 6am and wake up a few hours after sunrise.
Sleep Stages

• Non-REM Sleep (3 Stages)
• REM Sleep

• Sleep occurs in 90 minute periods = Ultradian Sleep Cycle
• This cycle repeats 4-5 times throughout the night
Non-REM: Non-Rapid Eye Movement

- Accounts for **80% of all sleep**
- The process of your body slowing down
- Body temp, breathing rate, heart rate, and energy decrease
- Brain waves get slower and bigger

- During non-REM the brain uses less energy
  - allows the brain to restores it supply of ATP (energy)
- **Parasympathetic Nervous System Dominance**
NREM Stage 1

• Beginning sleep stage = 5-10% of total sleep in adults
• “Relaxed Wakefulness”
• Light sleep, drowsy sleep

• Transition into Stage 1 can include **hypnic jerks**
  • Involuntary twitches causing a person to awaken suddenly
  • Sometimes accompanied by a falling sensation
NREM Stage 2

- 45-55% of total sleep in adults
- Sleeper becomes harder to awaken
- Conscious awareness of the external environment disappears
- K-Complex waveform
  - Suppress arousal in response to stimuli
  - Aids in sleep-based memory consolidation
NREM Stage 3

Slow Wave Sleep (SWS)
- The deepest stage of Non-REM
- Highest arousal thresholds (can’t be woken easily)

15-25% of total sleep in adults

- Thought to be the most restful form of sleep
- A person will usually feel “groggy” when awoken from Stage 3
- Sleep Inertia: The phenomenon of feeling groggy upon awakening
Parasomnias

• Commonly occur in Stage 3 of Non-REM sleep
• Common in children
• Affects function and quality of sleep
• Caught between stages of falling asleep and waking from sleep
• Largely caused by a disruption of the Autonomic Nervous System

“...it has been found through several experiments that low levels of stage 3 sleep are found in about 40-50% of acute and chronic schizophrenics who typically portray abnormal non-rapid eye movement sleep...”

Archives of General Psychiatry
Parasomnias

- Somnabulism (sleep walking)
- Somniloquy (sleep talking)
- Sleep eating
- Nightmares or night terrors
- Sleep paralysis
- Sexsomnia (sleep sex)
- Night terrors
- Nocturnal enuresis
REM- Rapid Eye Movement

• 4-5 periods of REM are achieved during a normal night of sleep
• Thoughts include hallucinatory and bizarre content
• The amount of REM can vary depending on age
  • Newborns spend over 80% of their sleep in REM
  • Average adults spend only 20-25% of sleep in REM

The On and Off Switch
• There is an abundance of the neurotransmitter Acetylcholine
  • This activates REM ON neurons
• There must be an absence of monoamine neurotransmitters:
  • Histamine, serotonin, dopamine, adrenaline, melatonin, and norepinephrine
  • Serotonin and noradrenaline actually switch REM neurons OFF
Cortisol

• Hormone involved in the **Stress Response**
• Aids in the process of awakening
• Levels peak in the early morning (around 8am)
• Lowest level between midnight-4am
Cortisol

Factors increasing cortisol levels
- Infections
- Caffeine
- Sleep deprivation
- Intense Aerobic exercise
- Calorie restriction
- Chemical, physical, emotional stress

Factors reducing cortisol levels
- Magnesium supplementation
- Omega-3’s
- Sufficient Sleep
- Reducing stressors
- Laughing
- Regular Exercise
Melatonin

• A hormone that anticipates the daily onset of darkness
• Used to reset the circadian clock
• Does Not cause sleepiness
• Melatonin production decreases with age

• Exposure to even small amounts of light can suppress melatonin secretion
  • **Blue light** has the strongest effect
Natural Sources of Melatonin

• Cherries
• Bananas
• Pineapples
• Oranges
• Grapes
• Plums
• Olive oil
• Wine and Beer
Blue light

• Can boost attention, reaction time and mood during the day
• Can disrupt the circadian rhythm during the evening
• Suppresses secretion of melatonin

Blue light exposure starts to negatively affect you after sunset.
Solutions for Blue Light

• Use dim **red lights** for night lights
• Red light has the least amount of power to shift circadian rhythm and suppress melatonin
• Avoid looking at bright screens **2-3 hours before bed**
• Blue light blocking glasses or goggles

• Exposure to **Sunlight or full spectrum fluorescent bulbs**
  • Increases melatonin levels naturally
• Exposure to at least **30 minutes** of Sunlight per day
• boosts your body’s ability to sleep at night and improves your mood and alertness during daylight.
Light is the Key

“A mere eight lux—a level of brightness exceeded by most table lamps and about twice that of a night light—has an effect on Sleep”

Stephen Lockley, Harvard sleep researcher.

“Light at night throws the body’s biological clock-the circadian rhythm-out of whack”

“Research shows that it may contribute to the causation of cancer, diabetes, heart disease, and obesity.”

Harvard Medical School
Do’s and Don’ts to Achieve Deep Sleep

DON’Ts:
- No Stimulating or stressful activities before bedtime
- No stimulants like caffeine
- No Dark Chocolate: can contain high levels of caffeine
- No Alcohol: disrupts REM
- Avoid spicy foods before bed
- Avoid blue light exposure 2-3 hours before bedtime
- No fluids within 2 hours of bedtime
- Avoid grains and sugars
- No work 2-3 hours before bed
- Reduce or eliminate all medication
Do’s and Don’ts to Achieve Deep Sleep

DO:
• Stimulate the Parasympathetic Nervous System (Chiropractic Care)
• Keep a regular sleep schedule and be consistent
• Establish a routine:
  • meditation, deep breathing, aromatherapy, etc
• Improve your sleep environment: No noise, No light
• Exercise regularly
• Room temp no higher than 70 degrees F
• Eliminate EMF’s (electro-magnetic fields)
• Eliminate alarm clocks if you can
Do’s and Don’ts to Achieve Deep Sleep

DO:
• Reserve your bed for sleeping
• Eat a High protein snack several hours before bed:
  • provides tryptophan needed for melatonin and serotonin
• Eat a Small piece of fruit
  • helps tryptophan to cross blood-brain barrier
• Hot bath before bed
• Wear an eye mask to block out light
• Listen to relaxing Audio or white noise
• Journal your thoughts before bed
• Read for 30 minutes before bed
The 5 Keys to Health and Healing

- Proper nerve supply
- Regular Exercise
- Proper Nutrition
- Sufficient Rest
- Prayer and Meditation
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