REHAB SUMMIT

507: Mindfulness, Sleep, & Circadian Rhythms – How They Optimize Physical & Cognitive Recovery

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507: Mindfulness, Sleep, & Circadian Rhythms – How They Optimize Physical & Cognitive Recovery

Cindi Lockhart, RDN, LD, IFNCP

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Non-financial: Cindi Lockhart is a member of Academy of Nutrition and Dietetics; Dietitians in Integrative & Functional Medicine; and Institute for Functional Medicine.

Session 507:

Mindfulness, Sleep, & Circadian Rhythms – How they Optimize Recovery

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Learning Objectives

1. Identify the prevalence of and what entails disrupted sleep, stress management, and alignment to circadian rhythms
2. Articulate the health benefits (including improving physical recovery) and risks of adequate sleep and mindfulness, as well as the importance of aligning one's lifestyle habits to natural circadian rhythms.
3. Determine a customized and systemized approach to optimizing sleep, stress management and circadian rhythms.

Keep an Open Mind

- The body is a **whole, interconnected system** vs segregated parts
- **Nutrition is a science, which continues to evolve**
  - Important to stay current in the evidence
- **Symptoms are common but not normal**
  - Symptoms are a sign that something deeper is off
- **N of 1** – each individual is biochemically unique & what works for one may not for the other
  - A 'one size fits all' approach doesn't work

Don't Forget Experience

EVIDENCE BASED

N OF 1

CLINICAL PRACTICE

Oxidative Stress & Inflammation

Oxidative Stress

- ***Imbalance between production of free radicals & ability to counteract or detoxify (neutralize) them***
  - Free radical = O2 containing molecule, missing 1+ electrons, resulting in high reactivity with other molecules
    - Interacts with cells like DNA, protein, or lipids in attempt to 'steal' an electron to help it stabilize – this destabilizes the original cell, leading to a chain reaction

Inflammation

- Central component of innate (non-specific) immunity
- WBC's enter blood or tissue/s to protect against an invader (i.e. bacteria or virus)
  - Blood flow to area increases - LOCAL
- **Purpose** = eliminate toxic agent/s + repair damaged tissue
- **Acute or chronic**
  - ***Acute*** – short lived | resolves in hours or days
  - ***Chronic*** – long lived | lasts months or years after initial trigger

2 Underlying Causes of Chronic Disease

Inflammation - Causes

- Stress & inadequate sleep
- Diet – nutrient deficiencies | food sensitivities
- Gut dysfunction
- Hormone imbalances
- Exercise – too little OR too much
- Injury
- Toxins | smoking
- Infection | viruses

Oxidative Stress - Causes

- Excess calories | obesity
- High fat, sugar diets
- Pesticides & chemicals
- Infections – bacteria | viruses | yeast
- Pollution
- Tobacco & alcohol
- Radiation & excess UV exposure
- Medications
- Emotional stress

Signs of Oxidative Stress

- Fatigue
- Brain fog | poor memory
- Muscle and/or joint pain
- Wrinkles
- Gray hair
- Reduced vision
- Headaches
- Increased risk for infections

Signs of Inflammation – Acute

- Pain
- Redness
- Immobility | Loss of function
- Swelling
- Heat

Health Consequences

Oxidative Stress

- Neurodegenerative diseases
- Cancer
- Chronic fatigue
- Heart & blood vessel disorders
- Inflammatory diseases

Inflammation – Chronic low-grade

- Heart disease | Stroke
- Cancer
- Respiratory disease | Asthma
- Alzheimers
- Diabetes
- Autoimmune diseases
- Arthritis + pain
- Sarcopenia

Sarcopenia

- **Loss of muscle mass & function -** common with aging & progression of various chronic diseases
  - Present in 5-13% individuals aged 60-70 & 11-50% aged >80
  - Reduces rehab treatment efficacy
  - Increases risk of falls & fractures
  - Reduces quality of life

Sleep

Sleep Benefits

- **Critical part of the daily routine**
  - Spend 1/3 of the day sleeping, or at least we should be
- **Quality sleep + duration of sleep + sleeping at the right time of day** ALL essential for optimal health & wellness
- **Neutralize cellular damage** created from daily stressors during sleep

Sleep Benefits

- **Affects almost every tissue & system in the body**
  - ***Brain*** –
    - Detoxifies via brain's lymphatic system
    - Forms new pathways to support learning & memory (neurogenesis)
  - ***Heart*** –
    - Healing & repair of heart & blood vessels
  - ***Lungs***
  - ***Metabolism***
  - ***Immunity***
  - ***Endocrine***
  - ***Nervous system***

Recommended Sleep Pattern

- **7-8 hrs <u>per night</u>**
- Between **9 pm – 8 am**
- **U Shape risk**:
  - Those who consistently ***sleep <7 hrs/night*** are more likely to die early
  - Those who ***sleep 10-11 hours/night*** also more likely to die early
  - Women more sensitive to changes in sleep patterns than men

Disrupted Sleep – Health Risks

- Impairs glucose metabolism – diabetes risk
- Impairs protein synthesis – negatively impacts training adaptations & recovery due to muscle breakdown/atrophy
- Increased appetite – obesity risk
  - Ghrelin (hunger hormone) increases
  - Leptin (satiety hormone) decreases
- Increases catabolic & reduces anabolic hormones - stressor
- Affects risk factors for inflammation –
  - ↑ CRP-hs & IL-6
- Cardiovascular disease & Hypertension
- Depression
- Dementia – brain creates mis-shaped proteins that causes brain cell death

Chronic shortened sleep times make take years to manifest as disease

Sleep Stages

- **3 'quiet' sleep stages**
  - ***N1 – drowsiness***
    - Body temp drops, muscles relax, eyes move slowly side to side
    - Can easily be jarred awake
  - ***N2 – light sleep***
    - 1st stage of true sleep
    - Heart rate & respiration slows
    - Eyes are still
  - ***N3 – deep sleep***
    - Less responsive to external stimuli
    - Blood pressure and pulse lowers
    - Difficult to be awakened
    - Most prevalent 1st ½ of night

Sleep Stages

- **1 'active' sleep stage**
  - ***REM – dream state*** (learning & memory – cognitive function)
    - Body is still
    - Mind is racing
    - Process emotions
    - Eyes dart back and forth
    - Blood pressure rises
    - Heart rate & breathing increase
- ***Go through 3-5 cycles of REM during sleep, every 90-120 minutes***
  - 1st time lasts only minutes
  - Time increases over the night, longest in last ½ of sleep window

Sleep Stages

- **Each transition from quiet to REM sleep = one sleep cycle**
  - Go through 3-5 cycles per night
  - Need 7-8 'consecutive' hours sleep / night for optimal health
  - Reduce sleep by 90 min = cut out a full sleep cycle & disrupt circadian rhythm
  - ***Critical 4 hour window 10P – 2A*** (or 1st 4 hours of sleep), pay back sleep debt
  - Next 3 hours, nurture brain & body

Sleep debt

- **Difference between hours of sleep you DO get vs what you SHOULD be getting**
  - Example: get 6.5 hrs sleep = 30 min sleep debt
  - Next night, your body repays the sleep debt first
    - Example: get 7 hrs the 2nd night is really just 6.5 hrs due to making up sleep debt from 1st night
    - Daytime naps is one way to repay debt – keep short
      - Don't offer same health benefits as night-time sleep
  - ***Can't make up for debt on weekend*** by sleeping 12+ hours – disrupts circadian rhythm

Sleep Disorders - Insomnia

- **Chronic insomnia** –10-50% adults (~1 in 3)
  - Most common sleep disorder in adults
    - Difficulty falling asleep, staying asleep, and/or early morning awakening at least 3 nights/wk for ≥ 3 months
    - More common in older adults, females, those with medical & mental health issues – separated, divorced, widowed; also with alcohol & hypnotic usage
      - Anxiety/depression & insomnia found to be bi-directional
  - Unrecognized | Underdiagnosed
  - Health consequences
    - Depression
    - Impaired work performance
    - Decreased quality of life

Insomnia Sub-Types

- > 60% met criteria for insomnia sub-types lasting ≥ 6 months
- **Sub-types:**
  - **SOL = sleep onset latency**
    - ≥ 30 min to fall asleep ≥ 3x/wk for 1 month
    - Most common among younger adults
  - **WASO = wake after sleep onset**
    - Wakefulness ≥ 30 min between periods of sleep ≥ 3x/wk for 1 month
  - **EMA = early morning awakening**
    - Early morning awakening > 30 min ≥ 3x/wk for 1 month

Sleep Hygiene

- **Consistent bedtime schedule** – even on weekends (social jet lag)
  - < 1 hour difference
- **Regular exercise** – ideally before 6 pm
  - Prevent ↑ cortisol
- **Avoid caffeine, nicotine, and alcohol late** in day
  - 1 C coffee can last as long as 8 hrs
- **Tech free zone** – 1-2 hours before bed
  - Read a physical book or magazine – 'light' material & no iPad, device
  - Warm Epsom salt bath
  - Mindfulness practice
- **Room cool, dark, and free of electronics**
  - Temp < 70 degrees (mid 60's)
  - Room darkening shades | eye mask
- **Ear plugs or white noise**

Sleep Hygiene

- **Last meal of day (includes night-time snack & beverages) 3 hrs before bed**
  - Late eating prevents getting into deep sleep
- **Spend time outdoors during the day**
- **Limit alcohol close to bedtime**
  - Dehydrating which causes waking during the night - disrupted sleep
  - Better to have earlier in night
    - 2-4 hrs before bed
- **Melatonin?**
  - 60 yr old produces 1/3 – 1/2 melatonin of 10 yr old
  - May help on front end - falling asleep
    - Take 30-60 min before bedtime
    - Safe | supports immunity

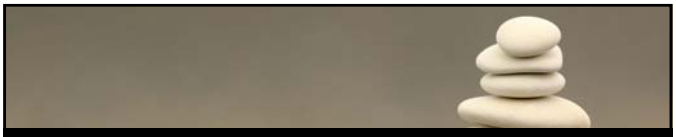
Sleep Hygiene

Filters for Devices

- ***Blue light filters for phones/computers/iPads***
  - Iris – 7 days free trial ($15)
  - F.lux
- ***Filter for TV***
  - Drift TV – small box connects to TV via HDMI input
- ***Blue blocker (amber) glasses (***$10 – several $100's) – ideal after dinner time
  - Wear all day – disrupts circadian rhythm & mood

Sleep Trackers

- **Smart technology** –
  - Apps, bedside monitors, wearable devices
  - Collect & assess data on sleep duration & quality
  - Some sleep related & some more activity related

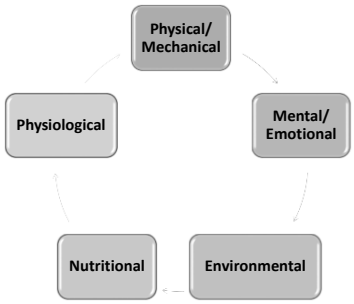


Stress & Mindfulness

Prevalence of Stress

- **Definition**: the feeling experienced when one perceives demands exceed resources (personal and social) to manage it
  - Perception & response to stressor
- **77% people regularly experience physical symptoms**
  - Fatigue, headache, upset stomach, muscle tension
- **73% people regularly experience psychological symptoms**
  - Irritability, anger, nervousness
- **48% have insomnia related to stress**
- **75-90% primary care visits in the US** related to stress' impact on health

Sources of Stress



Sources

- **Physical / Mechanical**
  - Undertraining - sedentary
  - Overtraining
  - Injury | poor posture
  - Lack of sleep
- **Mental/Emotional**
  - Relationships (marriage/divorce/argument)
  - Death of loved one
  - Fear
  - Negative attitude
  - Job demands | overcommitted
  - Finances

Sources

- **Environmental:**
  - Toxins/chemicals/pesticides
  - Drugs/medications
  - Alcohol | Tobacco
  - Unclean air, too much UV sunlight
  - EMF exposure
- **Nutritional:**
  - Fast foods, processed foods, conventionally raised or produced
  - Restricted diet (calories, macronutrients)
  - High sugar, alcohol, caffeine intake
  - Unfiltered water

Sources

- **Physiological:**
  - Illness, infection (acute or chronic)
  - Virus (HPV, EBV, etc)
  - Allergies (food or environmental)
  - Healing wounds
  - Hormone imbalances
    - i.e. low estrogen stimulates cortisol production

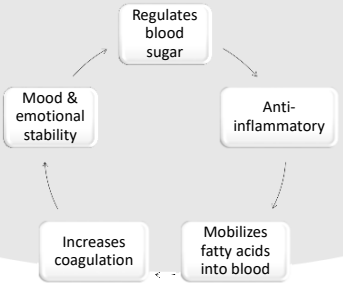
Stressor vs Response to Stress

- **Stressors** – many go undetected or can't be omitted from one's life
- **Fight or Flight** – body prepares for 'fight or flight' whether we need to or not
  - Cortisol increases
  - Blood sugar & insulin increase to drive fuel into muscles
  - Don't need to fight or flee?
    - Excess cortisol is catabolic – tissues & immunity break down
    - Excess glucose/insulin – fat storage – cardiometabolic & obesity risk

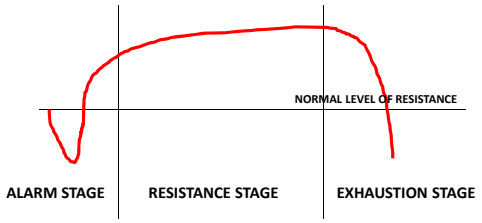
In most situations, we can't 'control' the stressor, but we can control our response

Role of Cortisol

Problem = Body not set up for repeated hits



General Adaptation Syndrome – Selye



Like leaving the lights on 24/7 – bulb will eventually burn out.

Cortisol

Common Symptoms of Imbalance – Catabolic

High – Hypercortisolism	Low - Hypocortisolism
• Nervousness | Irritability • Anxiety • Insomnia • High blood pressure • Elevated blood sugar • Sugar cravings • Difficulty concentrating • Weight gain - belly & buffalo hump • Muscle break down	• Apathy • Fatigue • Hypersomnia • Low blood pressure • Low blood sugr • Salt cravings • Lightheaded on rising

Cortisol

Common Health Conditions of Imbalance

Overactive HPA activity	Underactive HPA activity
• Irritable bowel syndrome • Hypothyroidism • Hashimotos thyroiditis • Type 2 diabetes • Anxiety • Osteoporosis • Immune suppression	• Chronic fatigue syndrome • Fibromyalgia • PTSD • Depression

Recommendations for Stress Management

We can't always control the stressor but we can control our response to it

Exercise - ↑ endorphins, mood & ↓ anxiety, insomnia

- Regular activity without 'overtraining'
- Strength training – higher resistance | less reps (larger muscle groups | compound movements)
- Cardio – low/moderate intensity or intervals (HIIT) vs. long sustained (< 30 min duration)
- Incorporate recovery-based as well – gentle yoga, Tai Chi, Qi Gong
- Getting into nature - ↓ physical & psychological stress levels

Getting into Nature – other benefits

- **Helps align circadian rhythms with sun exposure**
- **Strive for 30-60 minutes outdoors without sunglasses**
  - Takes ≥ 10,000 lux of light to activate melanopsin to re-boot brain
  - Sunny day = 20,000-80,000 lux | Cloudy day = 12,000-18,000 lux
  - With sunglasses, 80% lux is lost
  - Indoors = 2,000-5,000 lux

Sleep – anabolic time to recover from catabolic stress & cortisol

- 7-8 hours sleep | 8 if overstressed & not recovering
- ≤ 6 hrs/night x 7 nights raised cortisol levels 50-80%
- Repair & recovery (anabolic) during sleep opposes catabolic effects of stress & cortisol during the day
- Consistent bedtime between 9 P – 8 A (match circadian rhythm)
- Room cool, dark, free of electronics (AND clocks if have insomnia)
- Bedtime routine – *'tech free zone before bed' | calming*

Mindfulness – the mind is stronger than the physical body

- Training your 'mind' on a regular basis – an **INTENTIONAL** practice
- Find activity you enjoy & will do: meditation, deep breathing, guided imagery, etc
- Also: music, laughter, social support + daily pleasure break
- Do at time of day most beneficial: AM before stressful day at work/school | mid-day with stress at work/school | PM if sleep challenged

Mindfulness for Pain & Function

- **Review of 233 RCT's summarize**:
  - Cognitive behavior therapy, mindfulness, & mind-body practices most consistently improved function (fibromyalgia) and/or pain (chronic low back) beyond the normal course of therapy for specific chronic pain conditions
- **RCT regarding 8 wk pre-surgery MBSR** (Mindfulness Based Stress Reduction) program for total joint arthroplasty vs 'treatment as usual' showed greater improvements in knee pain & function at 12 mos post-op

Circadian Rhythm

Circadian Rhythm

- **What it is:**
  - Daily oscillations driven by a master clock (brain) and peripheral clocks (organs and tissues), interconnected by regulatory feedback loops
  - 24 hour long 'natural rhythm' cycle
  - Regulates both mind & body processes
- **What it does:**
  - Regulates many rhythmic body processes:
    - Body temp & blood pressure & heart rate
    - Metabolism & energy expenditure
    - Sleep / Wake cycle
    - Hormonal secretion –
      - Cortisol/temp/BP high in AM
      - Melatonin high & temp/BP low in EVE

Master Clock

- **SCN (suprachiasmatic nucleus) – hypothalamus**
  - Command center for hunger/satiety, sleep, fluid balance, stress response
  - ***Most sensitive to light***
    - Light-sensing protein in retina = melanopsin
    - 1st light of day resets Master clock
    - Most sensitive to blue light waves – sends message to brain it's daytime no matter what time it really is – impacts melatonin production & sleep at night
  - Indirectly connected to pituitary, adrenals, thyroid, gonads, & pineal gland – affects hormone balance & sleep
    - When reset by light, also resets all glandular clocks

Peripheral Clocks

- Liver, heart, kidneys, endocrine glans, gut, muscle and fat tissue clocks create circadian rhythm through a combo of the SCN and environmental cues (most predominantly food)
  - Control timing of digestion, nutrient uptake / metabolism, hormonal & metabolite regulation, appetite, and physical activity
- **Peripheral clocks synchronize for 3 major 'health-related' rhythms:**
  - Nutrition
  - Exercise
  - Sleep
  - When 1 rhythm disrupted, the others get disrupted too – poor health

Peripheral Clocks

- Align with 24 hr cycle through signals sent via the master clock
  - Entrained by the master clock (indirectly light) + **food cues.**
    - Timed nutrients entrain peripheral clocks & help maintain circadian rhythms
      - Controls diurnal rhythm of intestinal microbiome abundance
      - Timed feedings shift circadian phases of clock genes
      - Irregular timed feedings may alter circadian rhythms in peripheral tissues
      - 1st bite of food in the day resets peripheral clocks

Non-Light Factors Impacting Circadian Rhythm

- Exercise
- Food & Feeding times
- Sleep/wake cycles
- Hormonal levels
- Medications

Chrono-Nutrition: Eating & Circadian Rhythm

Importance in energy balance & cardiometabolic health

- **Humans are a diurnal species**
  - Light stimulates wakefulness & feeding
  - Darkness stimulates sleep & fasting
- **Misalignment between feed/fast, day/night, & sleep/wake cycles** disrupts synchronization of metabolic processes - contributes to obesity & metabolic disease
  - ↑risk with skipped breakfast & late night eating
  - Isocaloric diets with 50% calories at breakfast & 14% at dinner had 11# greater wt loss over 12 wks in overweight women
    - Also associated with improved FBS, insulin, and triglycerides
- **TEF significantly higher in the AM relative to the EVE**
  - Up to 2.5x higher

Chrono-Nutrition

- **Erratic breakfast time** confuses organs & can negatively impact their function
- **Late dinner time** affects organ function & sleep
  - Takes ~2 hours to digest, absorb, and utilize nutrients from meal (motility)
  - Slower digestion time later in day vs strongest earlier in day
- **Coffee can stay in system up to 10 hrs**, so if disrupted sleep – NO coffee/caffeine after noon

Eating & Circadian Rhythm: GI Function

We are not just what we eat, but what we digest, absorb & use

- **Saliva production is circadian**
  - Up to 10x more productive in daytime compared to nighttime
  - Neutralizes stomach acid
    - Eat too late at night – increase stomach acid – reflux over night
- **Stomach acid production occurs with each meal/snack**
  - Highest before bed, ~8-10 pm
  - Production 2x at night vs day after same meal eaten
- **Small intestine digestion slows at night**
  - Gut motility (moving food through intestines to colon for elimination) fastest during day & slowest at night
  - Gentle activity, standing/walking, best after dinner to support motility

Microbiome & Circadian Rhythm

- **Microbiome – changes throughout the day**
  - Microbiome you go to bed with is different than what you wake up with
  - Each type of bacteria has different functions in body
  - **GOAL** – support bacteria diversity with diversity of diet (plants)
  - Poor sleep/'jet lag' effects creates disrupted microbiome that increases risk for obesity and metabolic disease

Exercise & Circadian Rhythm

- Skeletal muscle regulated by clock activity
- Exercise can restore mis-aligned circadian rhythms
  - Studies show moderate diurnal aerobic exercise promotes circadian alignment similiar to that seen with light stimulus
- Circadian misalignment results in skeletal muscle dysfunction +
  - Decreased glucose tolerance
  - Increased risk for diabetes, CVD, and cancer
- When light cues implemented WITH exercise cues, circadian rhythm alignment occurred much faster than WITHOUT exercise
  - Affects cardiovascular health

Exercise & Circadian Rhythm

- **With exercise**:
  - Night time cortisol levels lower
  - Melatonin production higher – improved sleep quality
- **Optimal diurnal exercise times & skeletal muscle performance vary based on chronotype**
  - Early chronotype – exercise in the AM
  - Late chronotype – exercise late afternoon/early evening
- **Aligned circadian clock helps increase slow-twitch muscle fibers** –
  - Endurance performance

Exercise & Circadian Rhythm

- **AM exercise**
  - Outdoors in bright daylight (no sunglasses), helps synchronize brain clock
  - No sunglasses – reduce light exposure to retina 7-15 fold
- **PM exercise**
  - Best done at dusk or later afternoon, 3-6 pm
  - Time muscle tone rises – good for strength training
  - Motor coordination, blood flow, and & muscle repair peaks at this time of day
- **EVE exercise – after dinner (NOT recommended)**
  - Late night exercise can increase cortisol to morning levels & affect sleep
- **Exercise in general**:
  - Stimulates NEW brain cell production
  - Repairs damaged brain cells

Chronotype

- **Natural propensity to sleep at a particular time**
  - 'Night owl vs morning lark'
- **Types:**
  - Early – 14% population
  - Intermediate – 70% population
  - Late – 16% population
- Genetic with cultural & environmental factors playing a role

Sleep & Circadian Rhythm

- **Sleep is one of the best synchronizing signals for circadian rhythm**
  - Timing
  - Quantity
  - Current + past habits (late nights, shift work, insomnia)
- **Sleep disruptions**
  - Every hour awake during the day, need 20-30 min sleep that night
  - Every hour awake past midnight, disrupts circadian rhythm
  - Waking up late disrupts eating pattern + circadian rhythm
- **Changes with age**: 40-70% elderly affected by chronic sleep disruption due to circadian misalignment
  - Decreases day time functionality – increased risk of falls
  - Decreases cognitive performance

Symptoms of Circadian Disruption

- Daytime sleepiness
- Sleep disturbances
- Decreased cognitive performance – learning & memory
- Irritability
- Anxiety, depression
- GI complaints

Sources of Circadian Disruption

- **Jet lag** – travel across multiple time zones
  - Takes circadian clock ~1 day to adjust to each hour of time-zone shift
- **Shift work & night work** – USED to be biggest culprit
  - Single night shift affects cognitive functioning up to a week
- **Staying up late on weekends or occasions** –
  - Same as flying across few time zones
  - 'Social jet lag'
- **Connectivity / devices** – CURRENT biggest culprit –
  - 'Digital jet lag'
- **Early or late chronotypes**
- **Seasons** – more dark/less light & vice versa

Health Risks of Chronic Circadian Disruption

- **Cancer** – up to 60% risk for breast cancer with night workers
- **Autoimmune disease** | immunologic conditions
- **Metabolic-inflammatory disorders** (cardiovascular, diabetes, obesity)
- **Reproductive conditions**
- **GI disease**
- **Psychiatric conditions**

Make take years to manifest as disease/disorder

Tactics for Aligning with Circadian Rhythm

Adjust work schedule and/or travel if able

Adjust feeding schedule*

Eat at same time each day – one of the most powerful ways to maintain a strong circadian rhythm

- Esp for breakfast & dinner
- Finish dinner by 7 pm (2-3 hours before bedtime)

Tactics for Aligning with Circadian Rhythm

Eating Pattern

Time Restricted Eating

12 hours - 10% eat ≤ 12 hours & 50% eat ≥ 15 hrs

10 hours - inflammation, detoxification, brain health, sleep, motor coordination & energy

8 hours – weight & fat loss

Autophagy

Body's 'garbage disposal' – recycle damaged cell parts & remove or use to build new parts

More active several hrs after last meal of day & slows when we eat again

Timing

1st sip of tea/coffee or bite of food starts TRE

Best to eat earlier in the day as insulin response strongest the 1st ½ of the day

Tactics for Aligning with Circadian Rhythm

- **Light***
  - Sun exposure soon after awaken
  - Limit exposure to artificial light, especially at night
- **Exercise**
  - Before 6 pm
  - Outdoors, earlier in day, if able
- **Sleep**
  - Bright light therapy in the evening vs morning can impact different sleep disorders (night owl vs morning lark)
  - Naps may be beneficial if traveling over multiple time zones
  - ? Melatonin at night

Circadian Rhythm & Light

- **Avg person spends >87% time indoors**
- **All cells have clocks that turn on with light (AM) and start to turn off/down with dark (EVE)**
  - AM sunlight – blue light spectrum
  - PM sunlight – yellow/orange/red spectrum
- **Light bulbs** –
  - LED (bright white) earlier in day
  - LED (warm white) or amber lights later in day
  - Tunable LED lights – brighten in AM & dim to orange glow at night
  - Fluorescent worst

Living in opposition to circadian rhythm can also increase risk for disease

Client Assessment

Client Assessment

- Current sleep habits & quality
- Current stress levels & intentional mindfulness practice
- Current alignment to circadian rhythms
  - Work/school – shift/timing
  - Sleep – timing/quality + environment
  - Nutrition - timing
  - Exercise – type + timing
  - Travel – across time zones

Customized Approach

Customized & Systemized Approach

Individual needs vs gaps

Readiness to change

Where to start

How to progress

Systemized Approach …Needs vs Gaps

1. **Determine 'weakest link'** = sleep, management of stress, circadian rhythm disruption

1. **Prioritize lifestyle habits**
   1. Sleep – *timing & duration (can't out eat poor sleep)*
   2. Nutrition – *timing (can't out run poor diet)*
   3. Exercise – *timing + is their current program stressing them out?*
   4. Stress Management – *not less important, but harder to incorporate for most*

But First….

- **Assess client's readiness | ability to change**
  - In general
  - For each specific lifestyle change

  **Start where they are ready to start & layer on as they can handle.

- **For specific behavior changes, do they prefer to**:
  - Go slow | 'dipping their toes'
  - Go fast | 'dive in'

Importance & Readiness to Change

How ***important*** is it for you to _____ ?

Scale 1-10 (commitment to change in order to achieve goal/s)

How ***confident*** do you feel if you decided to _____, that you could do it?

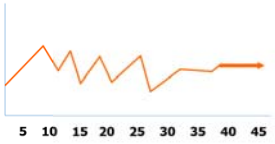
Scale 1-10 (readiness to make behavior change)

Readiness to Change

- ***If <u>not</u> at an 8 or 9,***
  - "Why are you at a _____ and not a zero?"
  - "What would it take for you to go from a _____ to an 8 or 9?"
- ***Why to strive for an 8 or 9***
  - Less than that, at risk for failure
  - Want a stretch goal/not too easy – need to challenge to grow

Behavior Change – Its Not a Straight Line

- **It takes 45 days to make a successful behavior change**
- Get stronger with each 'speedbump' – grow & learn



Plus…It Takes a Team

- **For a client to be successful, they need a team of well-rounded support**:
  - Medical
  - Nutritional - RD
  - Fitness – PT/DPT
  - Behavioral and/or Psychological
  - Family & Friends

Lifestyle Program

- **Sleep hygiene**
- **Mindfulness Training**: different tactics
  - Find one that is enjoyable to your client that they find mentally and physically beneficial
- **Circadian alignmen**t
  - Meal timing
  - Exercise timing
  - Sleep timing

Practical Application – Case Study

Case Study: History

JP is a middle school principal

- **57 yo Male** :
  - ***OA of knees & shoulder + spinal stenosis***
    - Gets quarterly cortisone injections
    - Taking NSAIDs (Aleve, Advil, Ibu) 'like candy' for many yrs (8x/day)
    - Unable to get shoulder surgery due to BMI
    - Also had 2 foot surgeries over past 3 yrs
  - ***HTN*** – on losartan/HCTZ
    - Broke L leg 10 yrs ago & has a metal pin inserted
    - Knee surgery 2 yrs ago
  - ***Morbid obesity at 218% IBW*** – 362# at 5'10"
    - Did LA weight loss in past with 150# weight loss x 1 yr then re-gained all weight back
  - ***GERD & fatigue & insomnia***

Other Pertinent Info

- **Trigger for seeking out help** – dealing with pain & hit rock bottom | on medical leave from work | wants to be around & functional for his family
- **SOB**
  - Always breathing hard at school, in meetings, & at home
  - After walking 50 ft, SOB, pale, sweating, low back seizes – staff in fear he would have a heart attack
  - Couldn't do household chores like mowing
- **Birth**
  - Born vaginally | bottle fed (microbiome)
- **GI Health**
  - Chronic constipation
  - Unable to have a BM unless he took a 'fiber' 2x/day

Labs & Assessments

- **Labs**:
  - CRP-hs 1.5 = high
  - Glucose 124 = high
  - HbA1c 5.8% = pre-diabetes
  - Chol 179
  - LDL 102
  - HDL 38 = low
  - Triglycerides 193 = high
  - Homocysteine 11.0 = high
  - Testosterone, total 132 = low (240-950)
  - Testosterone, free 2.91 = low (4.7-24.4)
- **Assessment**:
  - Insulin Resistance with BP, Glu, HDL, Trigs, waist circum

Current Diet

- **Diet** – *Dealt with pain via food*
  - Eat out 25-50% time at fast food
  - Diet Mountain Dew daily, several cans + >8C water; no ETOH
  - Erratic eating patterns, late night eating, overeat & emotionally eat, addicted to sugar
- **Meals**
  - Breakfast – protein shake, banana OR 2 eggs, turkey sausage, 2 toast, fruit
  - Lunch – ham/turkey sandwich, carrots/celery, apple or orange, chips or crackers
  - Dinner – spaghetti with ground turkey, salad
  - Snacks (2x/day) – fruit, almonds, V8 fusion, grahams, cookies

Current Stress & Sleep

- **Stress** – high due to health & work
  - Likes to workout as his management for stress
- **Sleep** – poor x 3 yrs!
  - <6 hrs/night
  - Hard falling asleep, sleep ~2 hrs, up to urinate, go to chair to sleep ~2 hrs, up to urinate, back to bed ~2 hrs
  - Wake unrefreshed
  - Almost fall asleep on drive into work
  - Bed 10P & Up for day 4:15A
  - Watches TV from 6-10P
  - Sleep study done = sleep apnea & got mask
    - Can only wear ~2-3 hrs max before he pulls it off at night

Current Exercise

- Physical Therapy exercises
- Bike 3x/wk for ~20 min
- Free weights 2x/wk for ~60 min
  - Trains with his son, who is a personal trainer
  - Limited shoulder movements

Goals

1. **Weight loss**
2. **Management of stress**
3. **Be able to function for family**
   1. Walk with wife again
   2. Household chores
   3. Play with & be around long time for his granddaughter – his 'pride & joy'

Prioritized Lifestyle Plan

Where would you start? What would you suggest?

- Sleep
- Nutrition
- Stress Management
- Exercise

What we Did

1. **Sleep** – sleep hygiene
   - 1 hr 'tech free' zone before bedtime
     - Calming activity during this time
   - Assure in bed minimum of 7 hrs
   - Environment cool & dark
2. **Nutrition** – Elimination Diet
   - Focus on glycemic balance: blood sugar 'stabilizers' at all meals – protein, healthy fats, & fiber via colorful plants
   - Omit processed carbs & diet mountain dew
   - Increase water to 100 oz

What we Did

3. **Mindfulness** –
   - Start with practice before sleep: Yoga Nidra
   - At work, take time for self over lunch – shut door, turn off devices & focus on eating lunch and deep breathing
4. **Exercise** –
   - Focus on steps per day as stamina improves
   - Continue with strength training, as tolerated, for hormonal impact + cardio/HIIT later in program

Results – after 8 months work

- Lost 102#
- **Labs -** glucose ↓ 114, HbA1c ↓ 5.3%, Trigs ↓ 123, HDL ↑ 44
- **Diet** - Still following anti-inflammatory diet with 'new' foods added each week for diversity & color; getting 100+ oz water in
- **Sleep** - Getting 7-8.5 hrs sleep – no CPAP
- **Stress** – Still high due to school/work commitments & 2.5 hr commute
- **Exercise** - Average 9400 steps/day
  - Getting only ~1-2 formal workouts/week due to late nights with school events
  - Did 1st 3 mile walk for MS

Results - after 1 year, 8 months work

Work in Progress

- Slow weight re-gain from 9 mos – current
  - Stable for ~6 mos now at 84# down
- **Stress** – new job in prison school with hefty workload, marital concerns, some depression
- **Diet** – Mediterranean flare with focus on colorful plants, fiber, healthy fats
  - TRE of 10 hrs
  - Down to 2 diet sodas on weekend
- **Sleep** – unable to wear CPAP mask due to allergies
  - Still prioritizing at 7-8 hrs & has stayed in bed for > a year now
- **Exercise** – 10-11K+ steps daily
  - Limited workouts since COVID & gyms closing
  - With re-opening, 4 workouts/week

Wins

- Able to do a 5K and 8K group walk
  - Despite docs saying they don't know how he even walks with his knees
- Back to mowing his yard
- Rode his 1st ever amusement park ride
- Able to walk stairs to lake at summer cabin & boat
- Plays with grandchildren – now has his 2nd granddaughter
- BP improved to point he could reduce meds by 50%

Summary & Conclusions

Summary & Conclusions

Sleep

Consistent routine 7 nights/wk from 9P – 8A for 7-8 hours

Bedroom environment: cool, dark, free of electronics

Tech free zone 1-2 hours before bed

Filters for devices and/or amber bulbs or glasses

Mindfulness

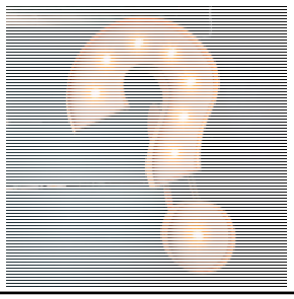
Intentional daily practice

Find something you enjoy – mindfulness, recovery-based activity, nature

Summary & Conclusions

- **Circadian Rhythm Alignment**
  - Consistent meal times
  - Dinner 2-3 hours before bedtime
  - TRE - Start with 12 hr & ↓ by an hour/week to 8-10 hours
  - Natural sunlight (get outdoors) earlier in the day
  - Exercise by 6 pm – follow chronotype
  - LED lights, device filters, glasses especially at nighttime

Q & A



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- An evaluation link will also be available on RehabSummit.com

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