



Hypnos and Thanatos, *Sleep and His Half-Brother Death* by John William Waterhouse, 1874.

Sleep, Chronic Pain, and Inflammation: Integrative Approaches to Psychoimmunology

Ashwin Mehta MD MPH

Assistant Professor of Clinical Medicine

University of Miami, Miller School of Medicine

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Presenter Disclosure Information

- Ashwin Mehta, MD MPH
- Sleep, Chronic Pain, and Inflammation:
Integrative Approaches to Psychoimmunology
- FINANCIAL DISCLOSURE:
 - No relevant financial relationships exist
- UNLABELED/UNAPPROVED USES
DISCLOSURE:
 - None

Audience Response Question:

- Among those experiencing chronic pain, what percentage report poor sleep?
- A) 25%
- B) 33%
- C) 50%
- D) 66%
- E) 75%

Audience Response Question:

- According to the National Sleep Foundation, 2/3 (66%) of those experiencing chronic pain report poor sleep.

Audience Response Question:

- Which of the following neuropeptides are a link between poor sleep, low mood, and chronic pain?
- A) serotonin
- B) substance P
- C) glutamate
- D) gamma-aminobutyric acid (GABA)
- E) all of the above

Audience Response Question:

- Which of the following integrative medicine modalities have demonstrated promising evidence towards increasing total sleep time:
 - A) Yoga
 - B) Acupuncture
 - C) Lavender oil
 - D) Tai Chi
 - E) all of the above

Goals:

- Introduction to integrative sleep medicine
- Prevalence of sleep concerns
- Links between sleep, mood, and chronic pain
- Pathways of inflammation
- Screening and evaluation of sleep complaints
- Promising integrative approaches to help achieve restful sleep

Serenity

Contentment

Unmindfulness

Peace



Oblivion

Surrender

Wellness

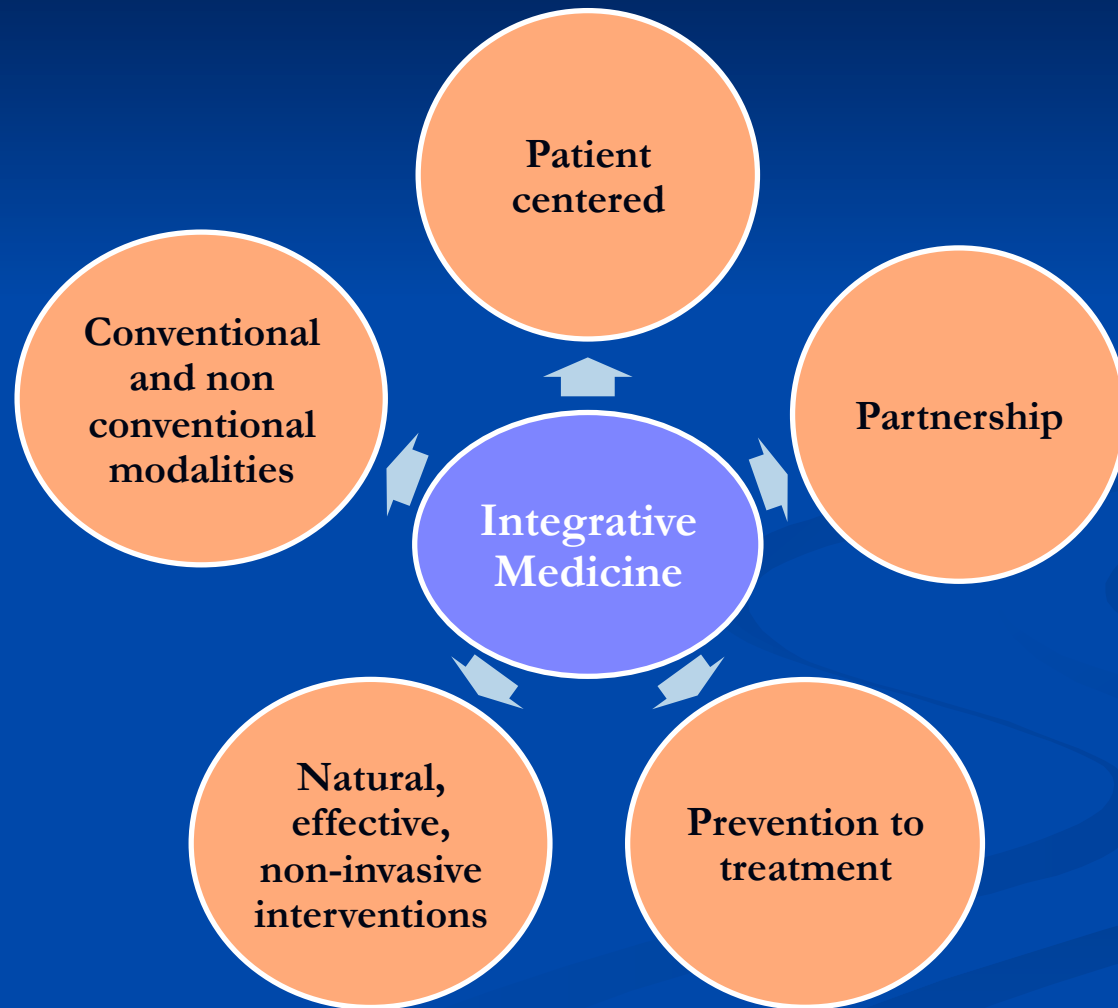
Tranquility

Forgetting



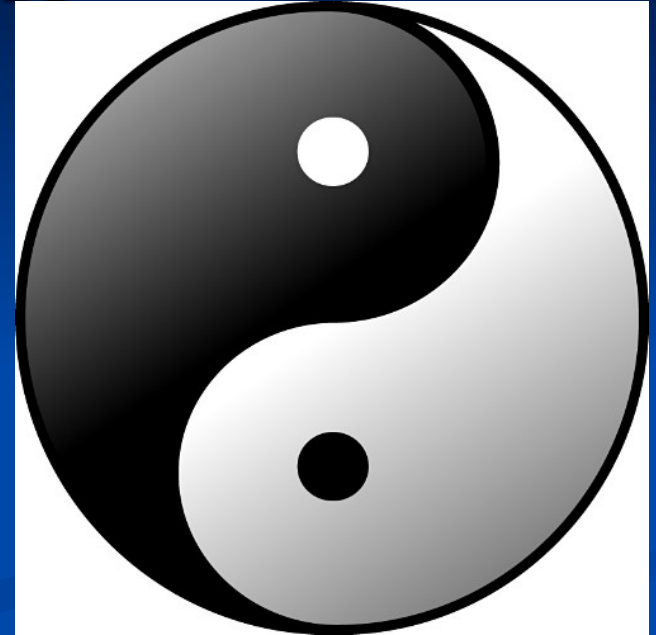
Sleep is a natural and innate process that is inherent to our physiology.

Integrative Medicine



Sleep Medicine

- Sleep is a multidimensional process
 - “A four movement symphony”
 - Stage 1, 2, 3, and REM
- Multidisciplinary field
- Growing science
- Behavior-based, not an organ based science



“Sleep medicine focuses on the clinical assessment, physiologic testing, diagnosis, management and prevention of sleep and circadian rhythm disorders. Sleep specialists treat patients of any age and use multidisciplinary approaches”

- American Academy of Sleep Medicine

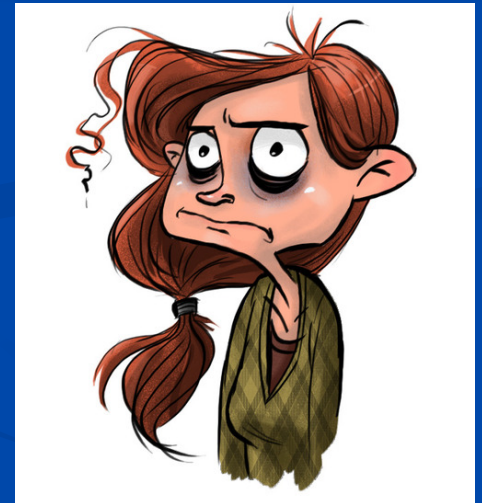
Common Sleep Concerns

- Insomnia – a society of poor sleep hygiene 20% ¹
- Obstructive sleep apnea 26% in the general population, 70% if obese ²
- Restless limb syndrome
- REM behavior disorder
- Narcolepsy



Insomnia

- Difficulty falling asleep (>30 min three times a week for a month).
- Precipitating factor “worrying about personal problems” (62.3%), “stress” (52.1%)¹
- Perpetuating factor - Stimulus control
- Focus on sleep hygiene - CBT
- Sleep logs – sleep deprivation
- Magnesium, Valerian, Lavender, Meditation, Melatonin, Yoga, Acupuncture



Lavender oil for insomnia

- A multi-center, double-blind, randomized study of the Lavener oil preparation Silexan in comparison to Lorazepam for generalized anxiety disorder
- Self-rating Anxiety Scale, SF 36, Penn State Worry Questionnaire (n = 78)
- Sleep diaries demonstrated sleep latency was shortened and total sleep time prolonged in the lavender oil group
- No daytime sedating effects noted

Yoga for insomnia in pregnant women

- Effects of mindful yoga on sleep in pregnant women: a pilot study.
- 15 healthy, nulliparous women in their second or third trimesters attended weekly mindfulness meditation and prenatal Hatha yoga classes for 7 weeks.
- Actigraphy
- Women who began the intervention in the 2nd trimester had significantly fewer awakenings, less wake time during the night and less perceived sleep disturbance than at baseline

Yoga for chronic insomnia

- Treatment of Chronic Insomnia with Yoga: A Preliminary Study with Sleep-Wake Diaries
- 8-week intervention: abdominal breathing, Kundalini Yoga style, meditation
- For the 20 participants completing the protocol, statistically significant improvements were observed in sleep efficiency, total sleep time, total wake time, sleep onset latency, and wake time after sleep onset.
- Women > Men (18:2)

Khalsa, *Applied Psychophysiology and Biofeedback*; Dec 2004.



Yoga for sleep in the elderly

- Effects of yoga on sleep quality and depression in elders in assisted living facilities.
- 55 participants underwent a 6-month yoga exercise program – 3 times per week, 70 min.
- Pittsburg Sleep Quality Index
- After 6 months of performing yoga exercises, participants' overall sleep quality had significantly improved whereas depression, sleep disturbances, and daytime dysfunction had decreased significantly ($p < .05$)

Yoga – a proposed mechanism of action

- Subjective sleep quality and hormonal modulation in long term yoga practitioners
- PSQI, ACTH, cortisol, DHEA-S performed on 16 practitioners and 10 controls
- Lower PSQI scores and higher cortisol levels
- Long term yoga practice is associated with better subjective sleep quality and a modulatory effect on cortisol levels

Valerian for sleep disturbances in older adults

- Elderly people tend to have progressively diminishing total sleep time and shorter periods of slow wave sleep (stage 3)
- Mild subjective improvements in sleep have been noted in the elderly population, when Valerian was used for two weeks or more
- Studies have also observed increased slow wave sleep with Valerian use
- Lack of standardization of the Valerian extract used was a significant methodological limitation of these studies

Meditation as an adjunct to CBT

- Impact of mindfulness-based stress reduction (MBSR) on sleep, mood, stress and fatigue symptoms in cancer outpatients
- 8 weeks of mindfulness meditation in a group of 63 cancer patients
- Overall sleep disturbance significantly reduced and participants reported that their sleep quality had improved

Acupuncture for Sleep

- The long-term effects of auricular therapy using magnetic pearls on elderly with insomnia.
- 3 week randomized, single blind placebo-controlled study using wrist actigraphy to objectively evaluate sleep parameters
- Statistically significant improvements in sleep latency and sleep efficiency were observed, with an overall increase of ~ 35 min in the total sleep time

Tai Chi for Improving Sleep

- Randomized controlled trial – tai chi compared to a low impact exercise regimen
- 118 men and women ages 60-92
- 60 minutes, 3 sessions/week, 24 weeks
- PSQI, ESS, SF-12 and physical performance measures
- Decreased sleep onset latency (18 min), longer overall sleep duration (48 min)
- Tai chi appears to be an effective approach to sleep enhancement for elderly individuals

Fibromyalgia and sleep

- Fibromyalgia pain and substance P decrease and sleep improves after massage therapy
- 24 patients randomized to massage or relaxation therapy – 30 minute sessions twice weekly X 5 weeks
- Both groups showed decrease in anxiety and depressed mood
- Massage therapy group decreased substance P and experienced longer total sleep times

Biochemistry of sleep

- Substance P, glutamate (pronociceptive)
- GABA – alpha 2 delta receptors of Ca channels
- Serotonin – Dorsal raphe nucleus

Obstructive Sleep Apnea

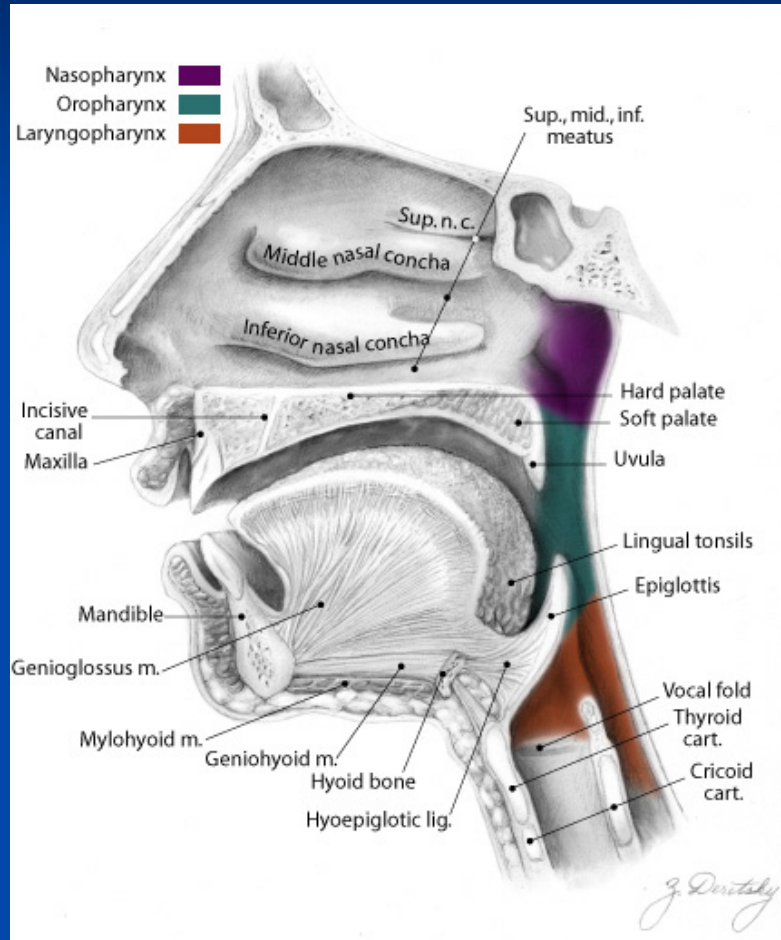
- Apnea/Hypopnea index > 5 per hour
- Increased sympathetic tone, catecholamine surge, laryngeal edema, left ventricular strain.
- Chronically elevated, pro-inflammatory mediators of cardiovascular risk (IL-1, IL-6, CRP, Leptin)
- WEIGHT LOSS (5 kg wt loss results in decrease of AHI by 2).

Predisposing conditions to Sleep Apnea

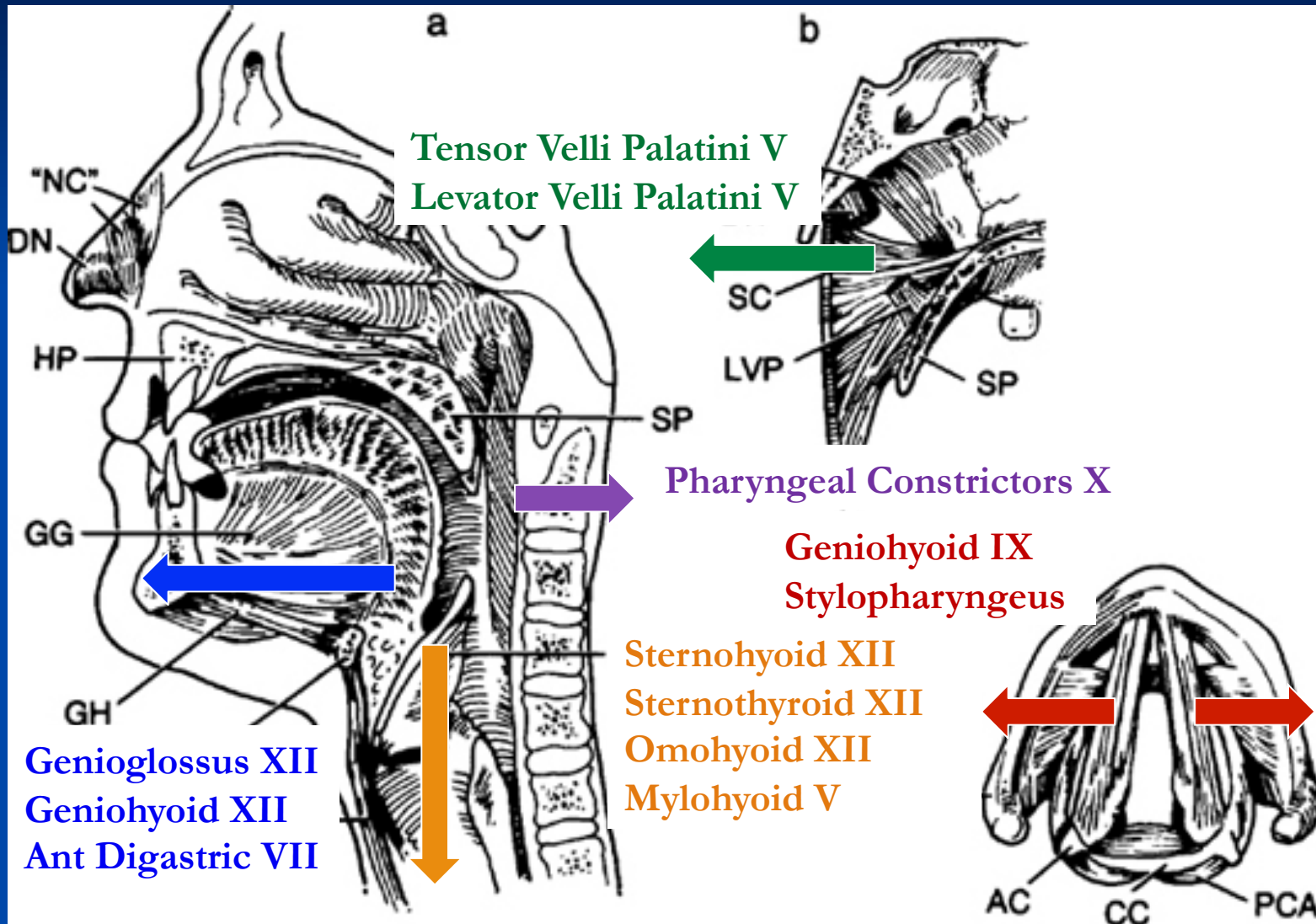
- Obesity
- Age
- Gender
- Neck circumference
- Nasal obstruction
- Pharyngeal obstruction
- Laryngeal obstruction
- Craniofacial abnormalities

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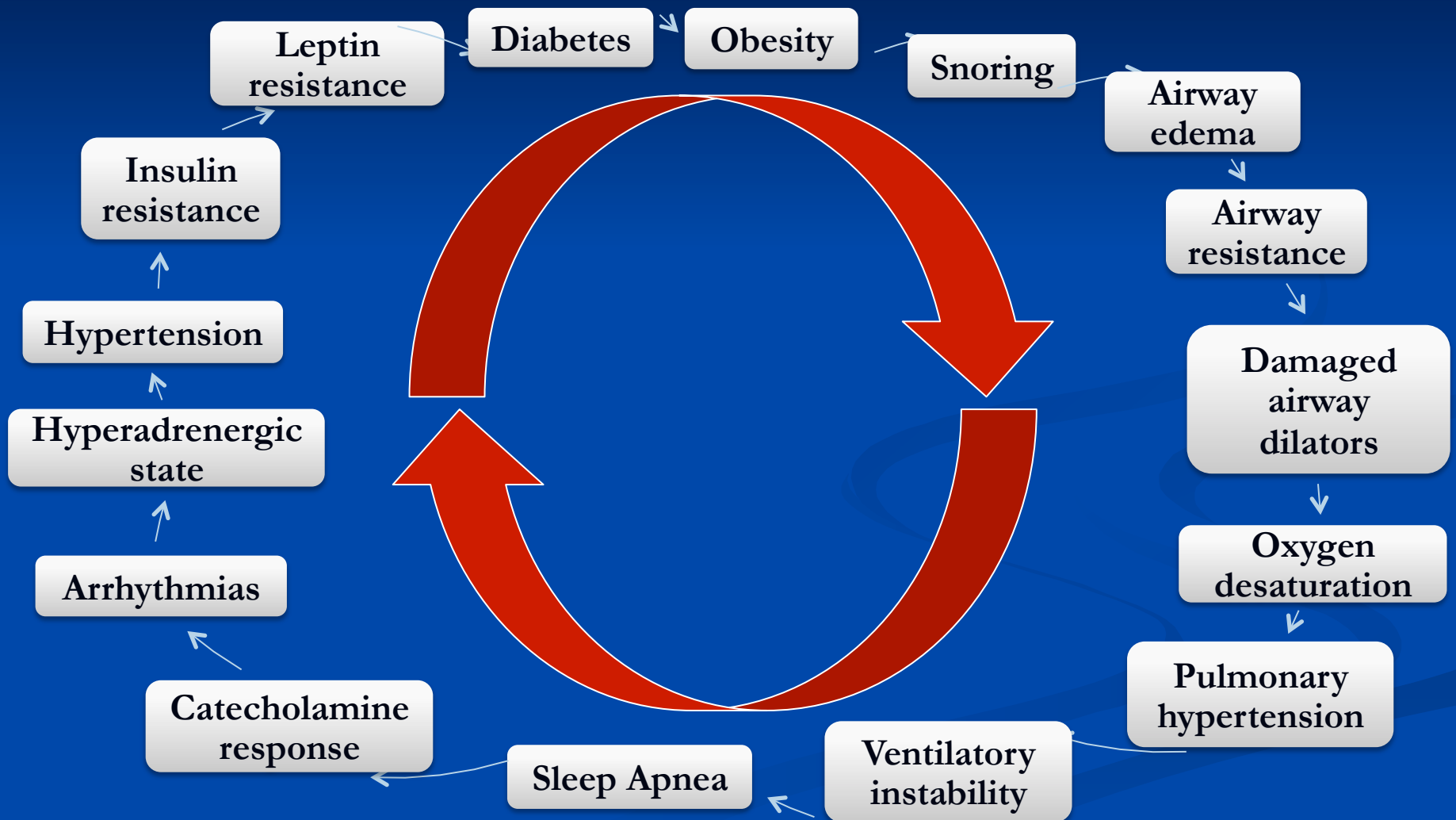
- Endocrine and metabolic causes
- Neuromuscular disorders
- Menopausal status
- Connective tissue disorders
- Genetic predisposition
- Alcohol, sedatives, smoking
- Medications and anesthesia



Mechanisms of Obstruction



Cycle of Obstructive Sleep Apnea



Screening

- Diet, exercise... and sleep!
- STOP-BANG – snoring, tiredness, observed apneas, HTN, BMI > 30, Age, Neck circ, Gender
- Chronic fatigue, non-refreshing sleep, depression, stroke, CHF, adult ADHD
- Chronic pain – substance P



Future Directions

- Applications in cancer – chronic pain, fatigue, sleep disturbances
- Cardiovascular disease – inflammation and oxidation

What's a Didgeridoo?

- Didgeridoo playing as an alternative treatment for obstructive sleep apnoea syndrome: randomized controlled trial
- Evaluated the effects of didgeridoo playing on daytime sleepiness and other sleep outcomes
- Reduced airway collapsibility from practicing 6 days a week for 25 minutes
- PSQI, Epworth, SF 36 in 25 patients with moderate OSA
- AHI and daytime sleepiness improved significantly

Obstructive sleep apnea

- Risk of sleep apnea in orchestra members
- Cross sectional survey of 1,111 orchestra members who underwent an internet based survey that included the Berlin questionnaire
- Playing a wind instrument was not associated with lower risk of OSA when gender and BMI were adjusted for

Future Directions

- Mindfulness based relaxation
- Creative visualization
- Guided imagery
- Breathing
- Meditation
- Ayurveda

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Summary

- Sleep disturbances are common
- Integrative medicine modalities can be used to address some sleep complaints in certain populations
- Lifestyle modification is at the core of addressing sleep concerns
- More research needs to be done on sleep and how to use integrative medicine treatments effectively