



Physiological Aging

Sheila Patel, MD



Science of Aging

- Natural process of senescence – encoded in DNA
 - Age-related changes begin around age 30
 - A progressive process that involves changes in every organ system of the body
 - Body function is less efficient
 - Apoptosis – normal process of cell death, genetically programmed into every cell
- Chronological age/Biological age/Psychological age
- Ayurveda – aging is a disease of dryness (Vata accumulation) and deficiency of rasa (nourishment) and ojas (immune health)
 - Studies have shown that proper hydration can slow down aging
- Longevity – a long duration of individual life; living to our full potential (?120 yrs)
 - Life span vs health span – duration vs quality of life

Pathogenesis – ‘Disease creation’

- Allopathic medicine – disease is caused by one or more broad mechanisms:
 - Genetic abnormalities
 - Infection by microorganisms
 - Chemicals/Radiation
 - Physical Trauma
 - Degeneration (aging)
- Ayurveda – internal and external
 - Issues with Prana, Tejas/Agni, Ojas
 - Imbalance of doshas
 - Lack of quality sleep, movement, food
 - Ayurveda and Yoga – afflictions of the mind (kleshas) – can lead to disease



Aging and Body Systems

- Nervous System
 - Motor control diminishes; conduction of nerve impulses decrease; less neurons; amyloid plaque formation
 - Can result in taking longer to carry out actions, more prone to falls; poorer control of autonomic reflexes; loss of memory
- Senses
 - Diminished perception; hair cells in inner ear become damaged, stiffening of the lens, diminished taste and smell; touch sensation impaired or heightened
 - Can result in hearing and vision impairment, food tastes bland, increased pain
- Respiratory System
 - Less mucus produced; stiffening of rib cage; decline in respiratory reflexes
 - Can result in increased risk of infections, reduced respiratory volume, less able to respond to changes in blood gas levels
- Cardiovascular System
 - Stiffening of blood vessel walls; reduction in cardiac function and efficiency (pumping of heart)
 - Can result in increased BP, reduction in cardiac output and reserve; arterial rupture

Aging and Body Systems

- Endocrine System
 - Decline in pancreatic, adrenal, thyroid function; reduced melatonin
 - Can result in increased risk of diabetes, thyroid dz, weight issues, increased anxiety/reduced resilience to stress; challenges with sleep
- Digestive System
 - Loss of teeth; reduced movement of gut (peristalsis); decline in liver mass
 - Can result in difficulty eating, digesting; constipation; increased risk of drug toxicity
- Urinary System
 - Fewer kidney cells; less efficient filtration
 - Can result in less ability to regulate fluids; more prone to dehydration and overload
- Resistance and Immunity
 - Immunity declines - increases risk of infection; longer healing times
- Musculoskeletal System
 - Thinning of bones; loss of muscle mass; stiffening of connective tissue
 - Can result in increased risk of fracture; stiff joints; sarcopenia/falls
- Reproductive System
 - Decrease in hormone production – fertility affected; body changes (skin/hair/brain/muscle, etc)

Lifestyle for Longevity – Healthy Aging “Ayurveda Amritanam” In Modern Science: Blue Zones

Need health in the following areas:

- Nutrition
- Movement
- Sleep

- Emotional regulation
- Stress management
- Social connection



Nutrition

- Plant-based diet: Mediterranean/Blue Zone diet

- Beans/lentils/tofu
- Nuts
- Whole grains
- Olive oil
- Vegetables
- Limit meat, eggs, dairy
- Avoid highly processed foods
- Eat natural, locally grown foods
- Eating moderate portion sizes

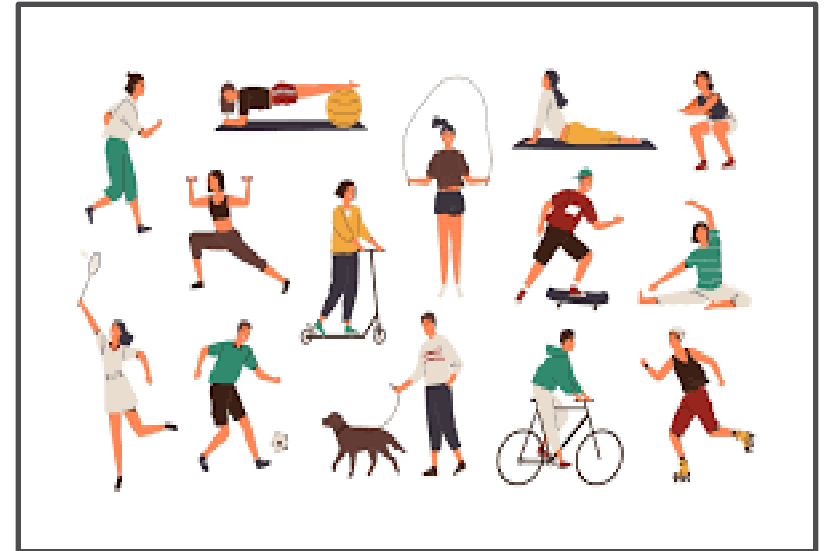


- Ayurveda

- To support digestion, eat warm, cooked foods with savory spices

Movement

- Regular movement
 - Walk for a few minutes after meals to aid digestion and regulate blood sugar
 - Weight bearing/strength training to increase bone and muscle mass
 - Moderate activity to raise HR, about 150 min/week
- Ayurveda
 - Sushruta was 1st physician documented to prescribe physical activity; moderate activity taking into account age, body type/dosha, diet, terrain, etc
 - Yoga can be used for flexibility, cardio, and strength training



Sleep



- Regular sleep/wake cycle as important as amount slept
- For brain health and to reduce morbidity and mortality, between 7-8 hours/night – sleep science
 - Less than 6 hours or more than 10 hours increase risk for disease/death
- Blue Zones prioritize sleep and napping; typically 7-9n hr/night (sometimes 8-10)
 - Tend to go to sleep and wake with the sun; in sync with nature

Tips for restful sleep:

- Move during the day
- Good evening routine –dim lights, limit overstimulation of senses (TV, computer, challenging conversations, etc)
- Don't eat within 2 hrs of bedtime
- Do calming breathing before bed
- Abhyanga/self-massage with warm oil – esp on bottom of feet/scalp/ears
- Calming aromatherapy like lavender, rose.
- Neti if congestion

Emotions/Mental health

There are many aspects to Emotions and the mind.

- Mental Health – broad term that includes how we think
 - Clear thinking, ability to process information
- Emotional Health – included in mental health
 - Ability to manage and express feelings

Improving mental and emotional health:

- Restorative sleep
- Emotional release processes
- Stress management
- Connection
- Spiritual contemplation/reflection



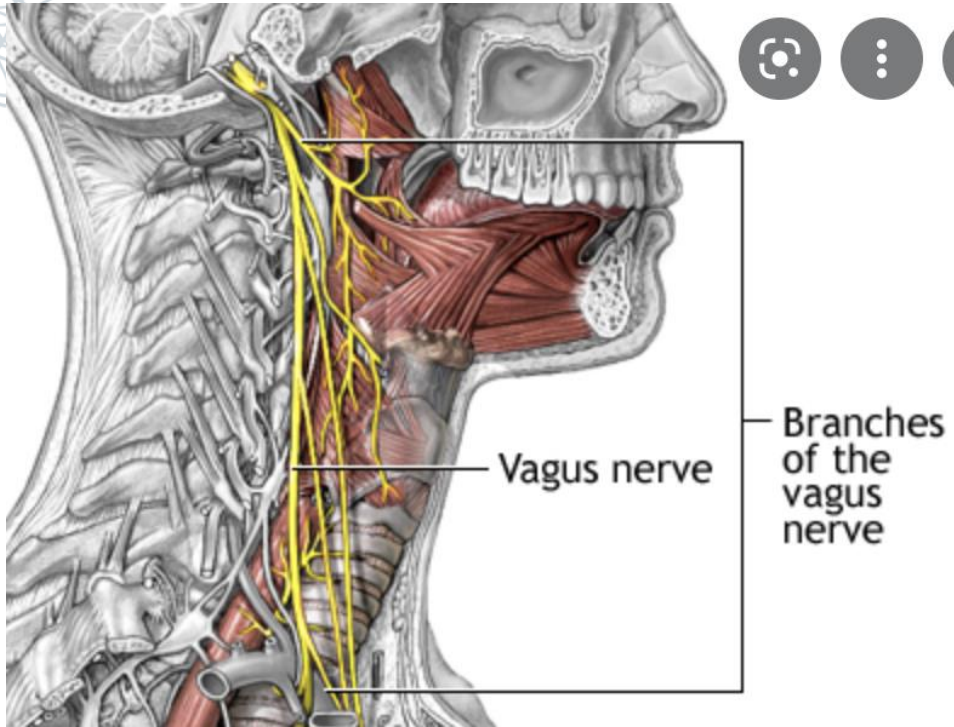
Stress management

Inducing the relaxation response

- Meditation
 - Reduces the usual effects of aging on the brain; promotes neuroplasticity with improves memory, cognition, emotional regulation
 - Reduces perception of pain
- Exercise
- Yoga – improves volume of hippocampus (area of the brain associated with memory); calms nervous system
- Pranayama – calms nervous system
- Journaling
- Other relaxation practices that calm the nervous system



What happens to the nervous system when we chant?



When we vibrate the throat or ears, we balance and tone the vagus nerve which creates a sense of calm.

People with higher vagal tone practice more compassionate behavior.

Vagal nerve stimulation is being used to treat depression, anxiety, epilepsy.

Bhramari/Ujayyi Pranayam



How to tone the vagal nerve

Using vocal cords:

Breathe through your nose rather than your mouth, which allows the vagus nerve to be stimulated; breathing through your mouth inhibits vagal activity.

Sing, hum, chant

Laugh

Gargle

Other methods:

Self-massage –especially the outside of the ears and around the ears and neck

Connection

- Shared meals
- Social circles that support healthy behavior
- Friendship and social connections provide intellectual stimulation and emotional support – loneliness increases risk of dementia, chronic disease, and death
- Connection can create purpose – associated with lower risk of mortality
- Can include feeling a connection to nature/divine/higher self





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