



Ayurvedic Medicine: Concepts, Diagnostics, and Treatment

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Need for New Knowledge & Approaches

Epidemic of Chronic Disease driving increased healthcare costs

- 6 in 10 adult Americans with chronic diseases, increasing at a rate of 0.5 to 1% per year
- Chronic conditions account for 90% of healthcare spending in the US (\$3.7 trillion annually)
- \$4.1 trillion total annual healthcare expenditure in 2021, an increase of 9.7% over the previous year
- Estimated 75% of current health care spending is attributable to unhealthy lifestyle behaviors-all potentially modifiable

1. CDC National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP, 2022). <https://www.cdc.gov/chronicdisease/index.htm>

2. Wu SY et al. Projection of chronic illness prevalence and cost inflation. RAND Health, Santa Monica, CA; 2000. 2. Buckley PT. Medical Economics 2010 Nov 19; 87(22):60-70.

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Chronic Disorders and Lifestyle

"Our current health care system is primarily geared toward returning people to living unhealthy lifestyles, not to changing those lifestyles."

Buckley PT. *Medical Economics* 2010 Nov 19; 87(22):60-70.



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Emerging Paradigm: Systems Medicine

- Systems approach- holistic, global and integrative
- Proactive medicine (P4 medicine):
 - Predictive
 - Preventive
 - Personalized
 - Participatory
- Ayurveda exemplifies all these features

N Biotechnol. 2012 Sep 15;29(6):613-24. doi:10.1016/j.nbt.2012.03.004. Epub 2012 Mar 18

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Paradigm Shift

Conventional Medicine

- Reductionistic
- Disease-oriented
- Treatment-oriented
- Matter-based

Integrative/Ayurvedic Medicine

- Holistic (balance)
- Health-oriented
- Prevention-oriented
- Consciousness-based

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Ayurveda: Key Factors Addressed in Prevention and Treatment of Chronic Disease

- Personalized Medicine: constitutional typing
- Pulse diagnosis (a tool for personalization)
- Diet: food as medicine (epigenetics)
- Digestion/gut health: cornerstone in maintaining health
- Lifestyle medicine and chronobiology
- Physiological purification/detoxification
- Herbal preparations: therapeutic and rejuvenative (*Rasayanas*)
- Mind-Body medicine: meditation, stress-reduction, and development of consciousness.

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Ayurveda

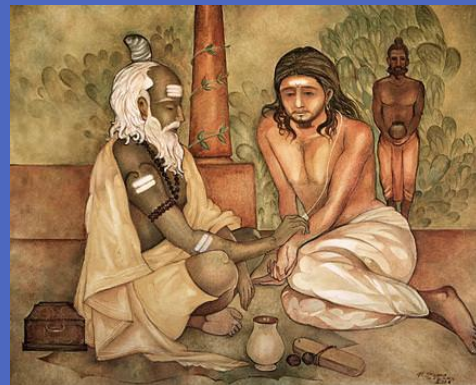
- Ayurveda is the world's oldest system of natural medicine
- Its main focus is prevention of disease and promotion of positive health
- Health as a state of positive wellness
- Ayurveda teaches how to live life in harmony with natural law:
 - to enliven the body's internal self-repair and balancing mechanisms
 - to prevent disease and create health and healing from within

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Ayurveda

Traditional Medical System of India

- Ayurveda = Science of Life
- Oldest continuously practiced medical system
- Oldest extant medical texts: Charaka, Sushruta, Vagbhatta



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Ayurveda

Traditional Medical System of India

- Underwent a period of decline during British Colonial Rule
- From the 18th century to the mid-20th century, Ayurveda practice was initially dismissed, then discouraged, and ultimately outlawed



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Resurgence of Ayurveda

- Official Indian government support began in 1948
- WHO recognition
- Establishment of 100+ Ayurvedic medical colleges with standardized curriculum
- Ministry of AYUSH established in 1995/2003
- Growing popularity in the West
- Maharishi Ayurveda: modern formulation of Ayurveda in accord with the classical texts

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Definitions of Health

- Conventional modern:
"Health is the absence of disease."
- World Health Organization:
"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

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Ayurvedic Definition of a Healthy Individual

One whose:

- Governing mechanisms (*doshas*) are in balance
- Digestion is balanced
- Tissues and excretory systems are functioning normally
- And whose mind, senses, and self are filled with pleasantness (bliss),

Such a one is called a healthy individual.

-Sushruta Samhita, Su. 15.38

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Case Study (Part 1)

- 74-year old Caucasian male
- Goals: “Healthy aging—want to avoid my father’s fate”
- Family history: Father died age 77, hemorrhagic CVA; hypertensive, late onset DM type 2, abdominal obesity. Mother died age 95, complications of hip fx. Brother alive at age 70 with HBP and chronic back problems.
- Complaints: Hyperlipidemia x 30 years. Lipid panel 1/2021: TC 255, LDL 178, HDL 49, TGs 155. A1C 5.9 (nl 4.8-5.6). Paroxysmal atrial fibrillation, onset 9/2018. Episodes occurring q5-10 weeks; duration 8-12 hours with prn anti-arrhythmic med’s. Tendency toward constipation, irregular BMs.

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Case Study (continued)

- PEx (1/2021): BP 117/68, P74 regular; height 68 inches, weight 165#, BMI 25.1 (borderline overweight), with increased abdominal girth (waist circ 38 inches). Remainder of exam, including heart & lungs, negative.
- Personal history: long-term interest in Ayurveda and meditation (TM practice x 45 years). Lacto-ovo-vegetarian diet x 35 years. Daily exercise: yoga 10 min and brisk walk 20-30 min. Daily Ayurvedic herbal “rasayana” (Amrit Kalash).
- Cardiology evaluation: Normal EKG, negative treadmill stress test, normal echocardiogram. Coronary calcium CT scoring: zero (zero percentile). HS-CRP 0.8 (low). Trial of statin (1/2021): TC 162, LDL 88, HDL 48, TGs 131. But associated fatigue and mild malaise, and frequency of Afib episodes increased (q 5 weeks). Statin D/C’d 6/2021.

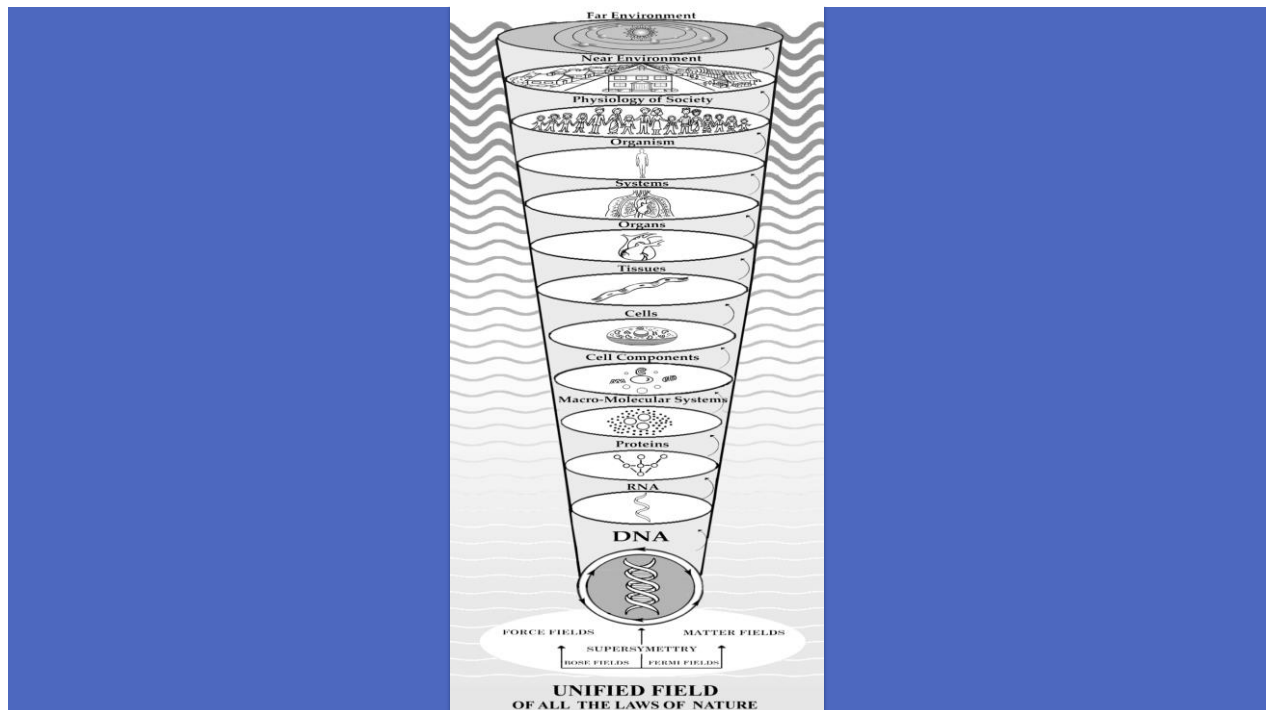
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Ayurveda Core Principle #1: The Body's Inner Intelligence

- The body has an inner intelligence that underlies all physiological structure and function ("biological memory").
- The purpose of all prevention and treatment approaches is to enliven the body's inner intelligence, to promote homeostatic and self-repair mechanisms

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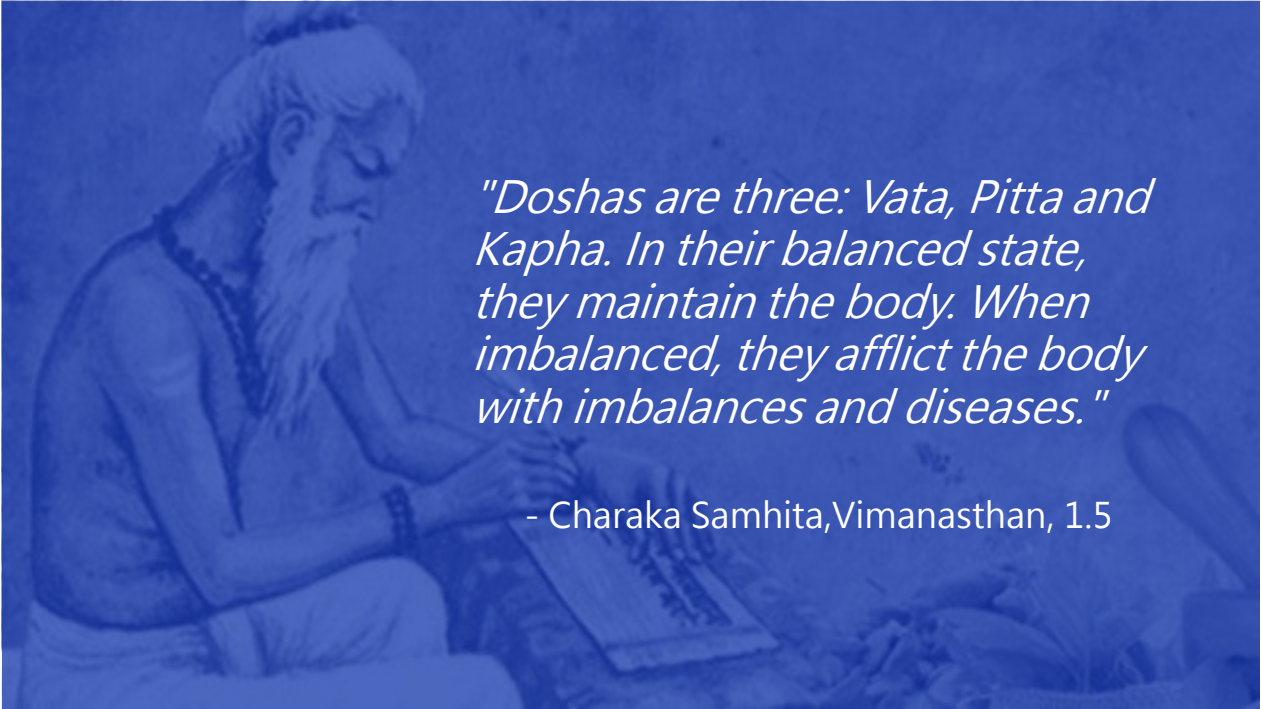
Ayurveda Core Principle #2: Constitutional Typing (Predictive, Personalized)

Recent studies have correlated *Ayurvedic* constitution classification with specific groups of genes and physiological functions in the body:

- Genome-wide SNP (single nucleotide polymorphism) variations
- SNP variations in specific genes: *HLA-DRB1*, *CYP2C19*, *EGLN1*
- Inflammatory and oxidative stress-related genes
- DNA methylation signature variations (epigenetic mechanisms)

Govindaraj P, Nizamuddin S, et al. Genome-wide analysis correlates Ayurveda Prakriti. *Nature Scientific Reports* 5, Article number: 15786 (2015); doi:10.1038/srep15786.
 Prasher B, et al. Whole genome expression and biochemical correlates of extreme constitutional types defined in Ayurveda. *Journal of Translational Medicine* 2008;6:48.
 Patwardhan B, et al. Ayurvedic Genomics: Establishing a Genetic Basis for Mind–Body Typologies. *The Journal of Alternative and Complementary Medicine*. June 2008, 14(5): 571-576.
 Rotti H, et al. DNA methylation analysis of phenotype specific stratified Indian population. *J. Transl. Med.* 2015, 13, 151.

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"Doshas are three: Vata, Pitta and Kapha. In their balanced state, they maintain the body. When imbalanced, they afflict the body with imbalances and diseases."

- Charaka Samhita, Vimanasthan, 1.5

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The Three Doshas

Diagnosis and treatment in terms of the degree of balance/imbalance of 3 fundamental governing mechanisms (3 "supra-systems")

Vata



Pitta



Kapha



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Vata dosha

The fundamental principle of **movement**

- circulation
- communication
- regulation of changing systems (e.g. neurohormonal systems)

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Pitta dosha

The fundamental principle of transformation

- digestion
- gut health
- metabolism

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Kapha dosha

The fundamental principle of substance and structure

- all fluid balance
- all material structure

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Constitutional Type: Biological Individuality

*"Since constitutional type underlies an individual's predisposition to disease as well as response to treatment, it is imperative in Ayurvedic practice to identify the type of a patient before treatment."*¹

1. Govindaraj P, Nizamuddin S, et al. Genome-wide analysis correlates Ayurveda Prakriti. *Nature Scientific Reports* 5, Article number: 15786 (2015); doi:10.1038/srep15786.

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Vata



Pitta



Kapha

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Ten Basic Constitutional Types

Monodoshic: Vata, Pitta, and Kapha

Bidoshic: Vata-Pitta, Pitta-Vata,
Vata-Kapha, Kapha-Vata,
Pitta-Kapha, and Kapha-Pitta

Tridoshic: Vata-Pitta-Kapha

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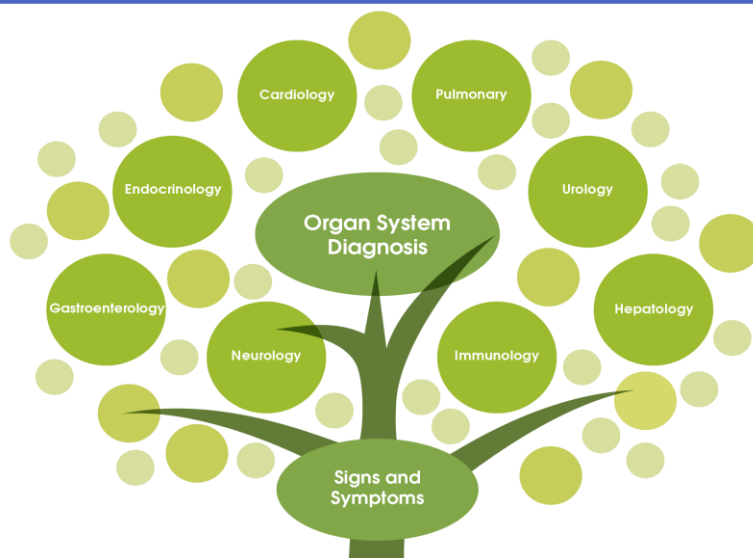
Core Clinical Imbalances: Ayurveda

- **Vata:** excitation, over-stimulation, irregularity, dryness, degeneration, neurohormonal imbalances (sleep, reproductive cycles, excess sympathetic tone, etc.)
- **Pitta:** heat, inflammation, liquefaction, abscess formation
- **Kapha:** excess weight, fat, stones, atheroma, amyloid, mucus congestion, growths (cysts, etc.)

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Take the Dosha Quiz

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The Fundamental Organizing Systems and Core Clinical Imbalances

Assimilation
Digestion, Absorption, Microbiota/GI, Respiration
Defense and Repair
Immune system, Inflammatory processes, Infection and microbiota

Energy
Energy regulation, Mitochondrial function
Biotransformation and Elimination
Toxicity, Detoxification
Communication
Endocrine, Neurotransmitters, Immune messengers, Cognition

Transport
Cardiovascular, Lymphatic systems
Structural Integrity
From the subcellular membranes to the musculoskeletal system

Antecedents, Triggers, and Mediators

Mental, Emotional, Spiritual Influences • Genetic Predisposition • Experiences, Attitudes, Beliefs

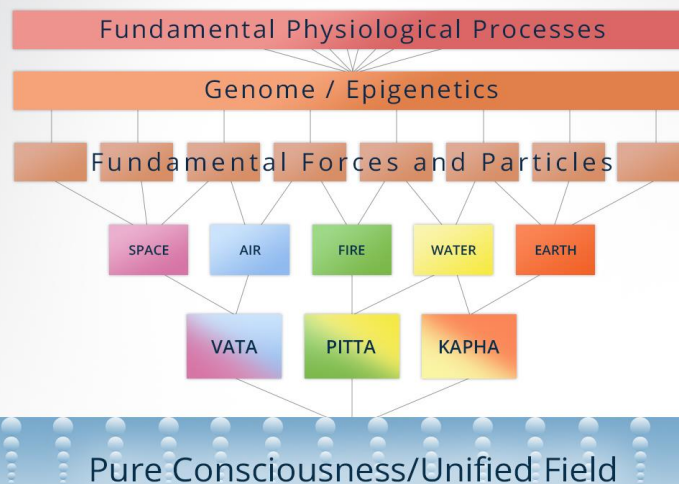
Sleep & Relaxation
Exercise/Movement
Nutrition/Hydration
Stress/Resilience
Relationships/Networks
Trauma
Micro-organisms
Environmental Pollutants

Personalizing Lifestyle and Environmental Factors

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Root Dynamics of Physiological Processes



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Approach to Assessment

A specialized Ayurvedic clinical interview, physical examination, and pulse diagnosis

Pulse Diagnosis
(*nadi vigyan*)



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How patient assessment is taught

- Training in the traditional Ayurvedic diagnostic approach: clinical interview, observation, and physical examination of the patient ("3-fold")
- Training in the fundamentals of pulse diagnosis: systematic approach, 16-hour module
- How to diagnose constitutional type and patterns of imbalance
- How to match diet, spices, herbs, lifestyle recommendations, detox, etc. to body type and imbalance

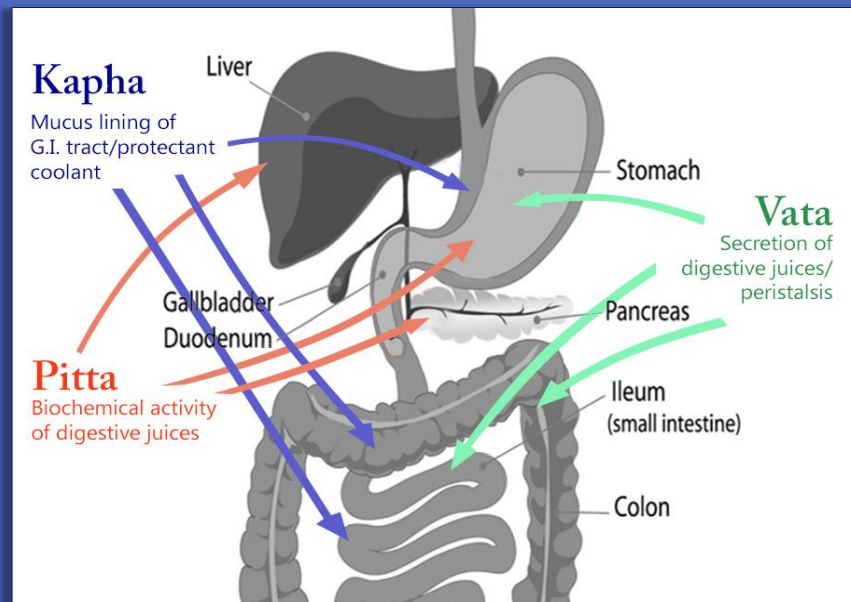
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Ayurveda Core Principle #3: Digestion as Key to Systemic Wellness

"The idea that disruptions in gut function might be implicated in systemic disease is an ancient one. From an Ayurvedic text comes a definition of health as profound as any modern one..."

- Leo Galland, MD. *Gastrointestinal Dysregulation: Connections to Chronic Disease*.
Institute for Functional Medicine Monograph (2008).

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Digestion: Key to Health or Disease



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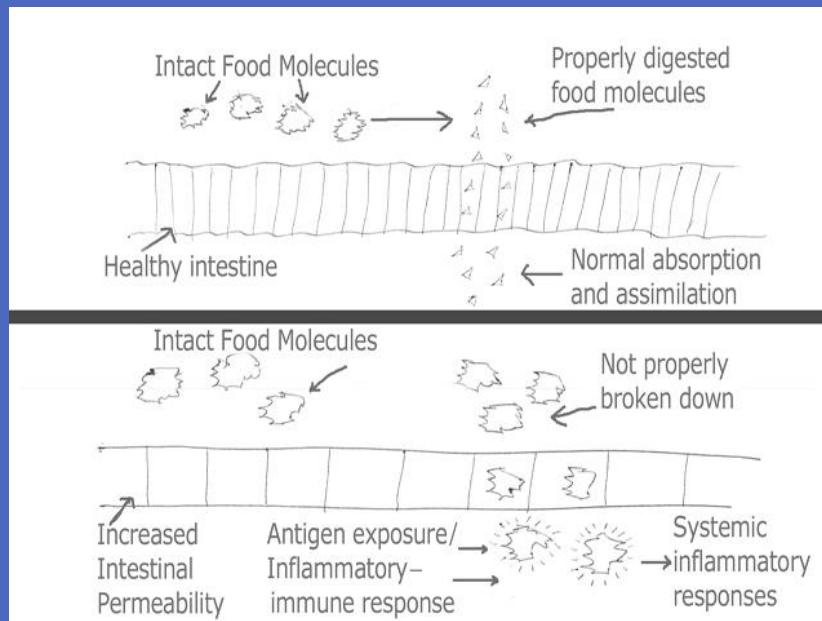
Digestive Imbalance Correlations with Modern Digestive Science

1. Imbalanced digestion (disruption of enzymatic activity)
2. Partially digested food molecules: *Ama*
3. Antigen-immune reactions in GI mucosa
4. Increased intestinal permeability (leaky gut)
5. Absorption of GI-generated immune complexes and inflammatory mediators
6. Systemic inflammation

Farhadi A et al. Intestinal barrier: An interface between health and disease. *J Gastroenterol Hepatol*. 2003; 18(5).

Galland L, Lafferty H. *Gastrointestinal Dysregulation: Connections to Chronic Disease. A Functional Medicine Monograph*. The Institute for Functional Medicine, 2008.

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Ayurveda Core Principle #4: Food as Medicine

*"Without proper diet, medicine is of no use.
With proper diet, medicine is of no need."*

-Traditional Ayurvedic aphorism

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Nutrigenomics

- The field of nutrigenomics studies how food or nutrients can influence the expression of genes in the body
- Here we see a scientific parallel with the ancient Ayurvedic principle that food is medicine

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Personalization of Diet

- Ideally diet should be personalized according to the individual's body constitution and imbalances
- However, there are general dietary principles that apply to all types
- Favor fresh food, freshly prepared—to maximize healing property (*prana* or *sattva*)
- Digestion is key: food quantity and quality should allow for maximum digestibility

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General Dietary Recommendations

- Favor fresh foods, freshly prepared - avoid packaged/highly processed foods, and leftovers or reheated foods (to the extent possible)
- Favor whole foods - avoid refined foods
- Avoid cold foods and beverages
- Proper use of dietary spices
- Eat as low down on the food chain as possible. A lacto-vegetarian diet is preferable. Poultry and fish are better than red meats (better to have them at lunch than supper).

Crowe FL, et al. Risk of hospitalization or death from ischemic heart disease among British vegetarians and nonvegetarians: results from the EPIC-Oxford cohort study. *Am J Clin Nutr*. 2013 Mar;97(3):597-603.

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Dietary Use of Spices

- Natural medicinals that aid digestion and metabolism; they are abundant in phytonutrients
- They are documented to have numerous health benefits: anti-inflammatory, anti-cancer, cardio-protective, anti-diabetes.
- A variety of spices should be included in the diet on a daily basis
- Average American diet does not include sufficient amount or variety of spices
- Premier spices: ginger, cumin, turmeric, coriander, fennel, cinnamon, black pepper, fenugreek, cardamom, mustard seeds, saffron, basil.

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Top Behaviors for Good Digestion

- Regular mealtimes, around the same time each day: breakfast, lunch, supper and (optional) afternoon snack.
- Take enough time to eat, avoid rushing meals:
 - Eat in a quiet, settled atmosphere with settled mind
 - Chew food well - digestion begins in the mouth
 - Take a few minutes to sit quietly after eating
- Eat to about $\frac{3}{4}$ of capacity; satisfied but not feeling "full"
- Make lunch the main meal of the day

Jakubowicz D, et al. High caloric intake at breakfast vs. dinner differentially influences weight loss. *Obesity*, 2013 Jul 2.

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Ayurveda Core Principle #5: Timing of Behaviors (Lifestyle Medicine)



Promoting health through behavior in
harmony with the cycles of Nature

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Chronobiology & Chronotherapeutics

Chronobiology describes the effects of time on living systems, particularly the effect of biological rhythms on health and treatment.

Chronobiology supports the Ayurvedic concepts of dosha cycles and daily and seasonal health routines.

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Lifestyle Medicine: Key Points

- Daily Routine: Maintain a regular routine
- Regular mealtimes
- Regular bedtime and arising time
- Regular bowel movements, morning preferred
- Early bedtime (10 p.m. is best) and arising time (by 6 a.m. if possible)
- Make lunch the main meal; supper lighter.
- Daily routine: include meditation, exercise (e.g., morning brisk walk), yoga asanas

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Ayurvedic Lifestyle Principles: Chronotherapeutics

1. Main meal at lunch
2. Bedtime by 10 PM
3. Exercise in Kapha time: 6-10 am

Garaulet M, et al. Timing of food intake. *International Journal of Obesity* (2013); 37:604-611.
 Zarrinpar A., et al. Daily Eating Patterns and Their Impact on Health and Disease. *Trends Endocrinol. Metab.* 2016, 27, 69–83.
 Asarnow L, McGlinchey E, Harvey A. *J Adolescent Health* (2014); 54:350- 356, UC Berkeley, CA
 Fairbrother K, et al. Effects of exercise timing. *Vascular Health and Risk Management* (2014);10:691-698;

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Timing of food intake predicts weight loss effectiveness

- 420 subjects, 20 week weight loss program
- 50%:50% late vs. early main meal eaters (main meal before or after 3 PM)
- Equivalent caloric intake
- Significantly less weight loss, slower loss if main meal after 3 PM
- *Conclusion: Novel weight loss strategies should incorporate the timing of food.*

Garaulet M, et al. Timing of food intake predicts weight loss effectiveness. *International Journal of Obesity* (2013); 37:604-611.

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Bedtime Matters

Not Just Sleep Quantity

- Cross section 2,700 adolescents, Grades 7-12
- Bedtime *and* total sleep time
- Outcomes:
 - Total Sleep Time was *not* related to GPA or emotional distress
 - Late school year bedtime (>11:15 pm) associated with worse educational outcomes and emotional distress, even 6-8 years later.
 - Late summer bedtime was highly related to emotional distress (not to GPA).

J Adolescent Health, 54, (2014) 350-6, Asarnow, Lauren, McGlinchey E, Harvey A UC Berkeley, CA

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Ayurveda Core Principle #6:

Mind-Body Balance

- *"Direct contact with the least excited state of awareness (Atma) is the most powerful means of promoting health."*
- *"Complete transcending (of mental activity) is the best among the sources of health and happiness."*

- Charaka Samhita
(oldest text of Ayurveda)



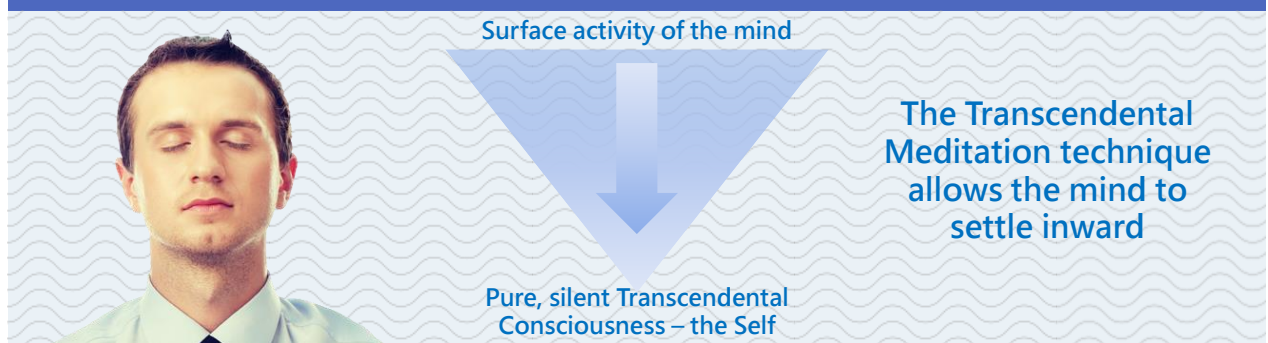
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Transcendental Meditation

- Simple, effortless practice
- Transcending: does not involve concentration, contemplation, or mindfulness
- Scientifically validated:
 - Over 400 published peer-reviewed research studies
 - NIH/DoD grant support: over \$35 million

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The Transcendental Meditation Technique



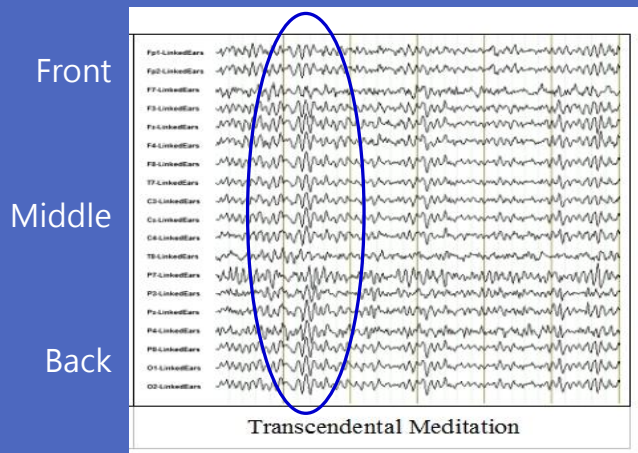
“Yogas chitta-vrtti-nirodhah”

- Patanjali Yoga-Sutra, 1.2
250 BC

“Yoga is the least excited state of consciousness; pure consciousness”

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EEG Coherence during TM



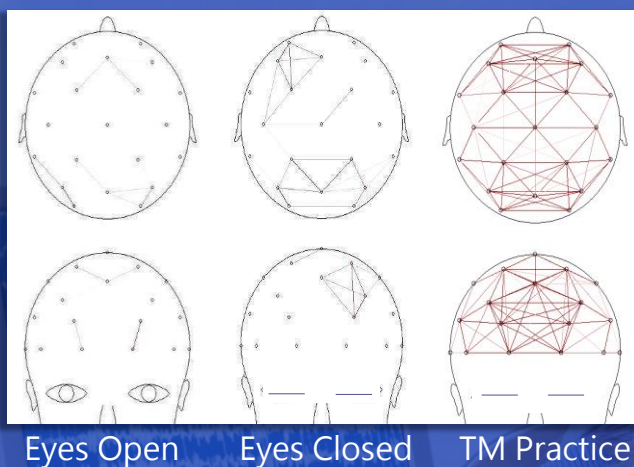
Raw EEG tracings during TM practice from 19 tracings from the front, middle and back of the brain over 8 seconds.

Note the global alpha bursts across all brain areas during Transcendental Meditation practice.

Travis et al, 2009

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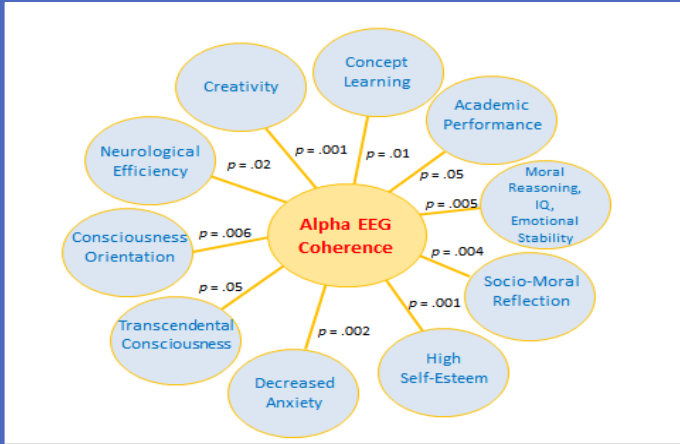
TM Increases Alpha1 EEG Coherence



References: International Journal of Psychophysiology, 116, 1519-38 (2006); Biological Psychology, 61, 293-319 (2002); Consciousness and Cognition, 8(3), 302-18 (1999); Electroencephalography and Clinical Neurophysiology, 35 (1973); International Journal of Neuroscience 14: 147-151, 1981.

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TM Increases EEG Coherence, Reflecting Integration of Brain Function

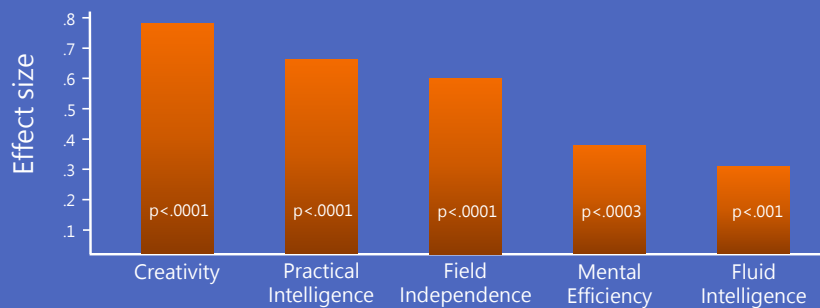


International Journal of Neuroscience 13 (1981):211-217, 15 (1981):151-157, 116 (2006): 1519-38 *Journal of Moral Education* 12, no. 3 (1983): 166-73



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Increased General Cognitive Ability through the Transcendental Meditation technique



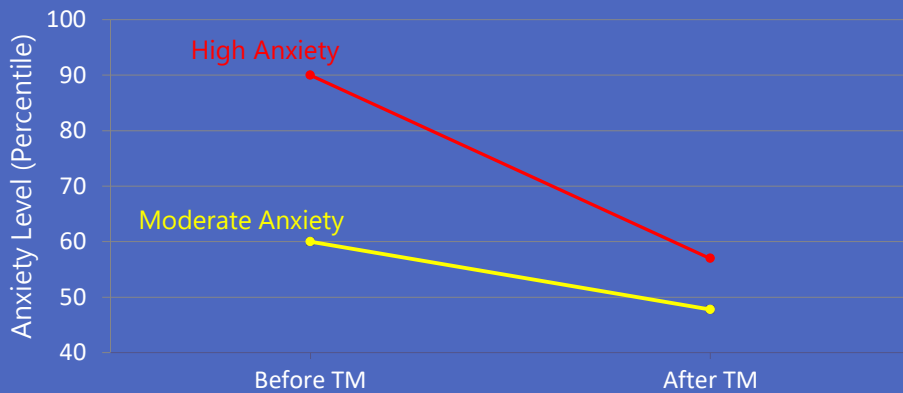
Three randomized controlled studies among secondary school and vocational school students found that, in contrast to controls, those who learned the Transcendental Meditation technique showed significant improvement in five measures of intellectual functioning; they also showed decreased anxiety.

Reference: Intelligence 29 (2001): 419–440. *Intelligence* is considered the top ranking journal in its field.

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Effects of TM on Trait Anxiety Meta-Analysis of 16 RCTs



Orme-Johnson DW, Barnes V. Effects of the Transcendental Meditation Technique on Trait Anxiety: a Meta-Analysis of Randomized Controlled Trials. *Journal of Alternative and Complementary Medicine* 20 (2013): 330-341.

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From the American Heart Association

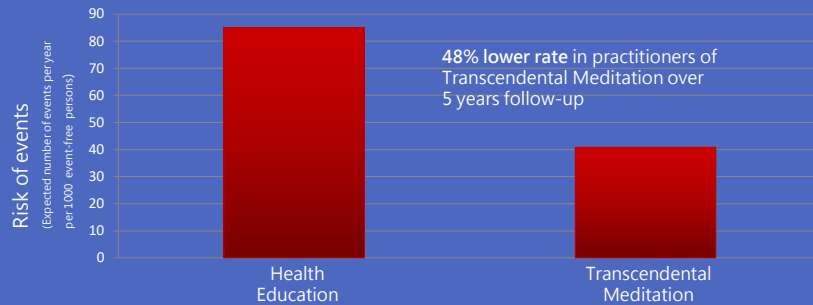
“TM may be considered in clinical practice to lower BP. Because of many negative studies or mixed results and a paucity of available trials, all other meditation techniques (including MBSR) received a *Class III, no benefit, Level of Evidence C* Recommendation. Thus, other meditation techniques are not recommended in clinical practice to lower BP at this time.”



Reference. Brook RD, et al. Beyond medications and diet: Alternative approaches to lowering blood pressure—A scientific statement from the American Heart Association. *Hypertension: Journal of the American Heart Association*, 2013;61(6):1360-83.

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Decreased Heart Attacks, Strokes, and Death through the Transcendental Meditation technique



Schneider RH, Grim CE, Rainforth MV, et al. Stress reduction in the secondary prevention of cardiovascular disease: randomized controlled trial of Transcendental Meditation and health education in Blacks. *Circulation: Cardiovascular Quality and Outcomes*. 5:750-758, 2012

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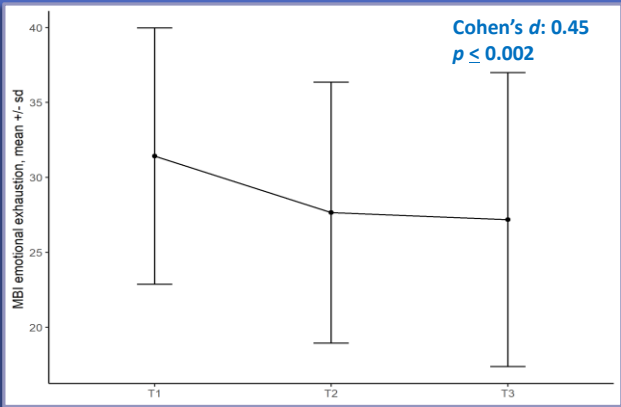
HEAL THE HEALERS NOW

"HEAL THE HEALERS NOW"
New Initiative to Provide Meditation to US Medical Providers Battling COVID-19

NEW THIS MORNING
EASING STRESS & ANXIETY
BEING MORE MINDFUL IN THE AGE OF CORONAVIRUS

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Effects Of TM At Baseline, 1 And 3-month Follow-ups On Clinician Burnout And Psychological Well-being

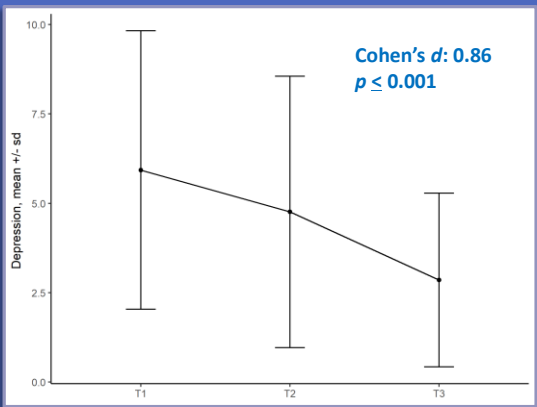


MBI Emotional Exhaustion

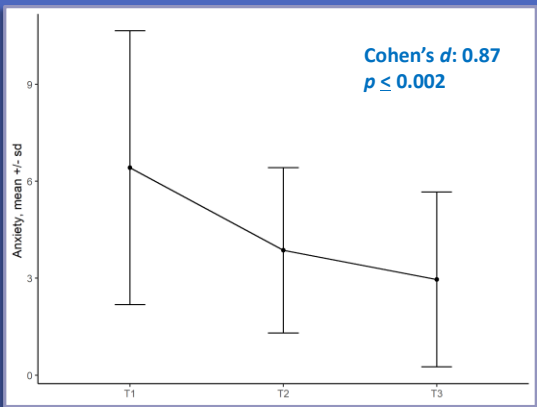
Emergency Medicine Department, Brigham & Women's Hospital, Harvard Medical School, 2021

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Effects Of TM At Baseline, 1 And 3-month Follow-ups On Clinician Burnout And Psychological Well-being



Depression

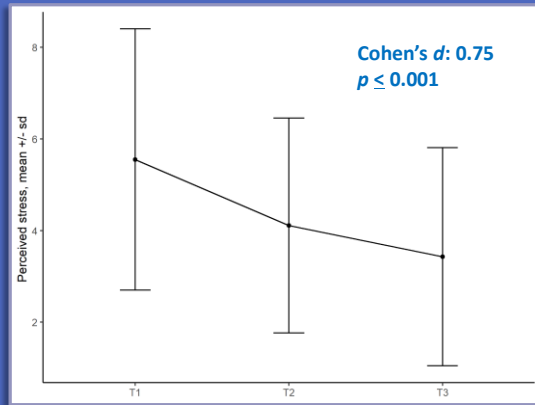


Anxiety

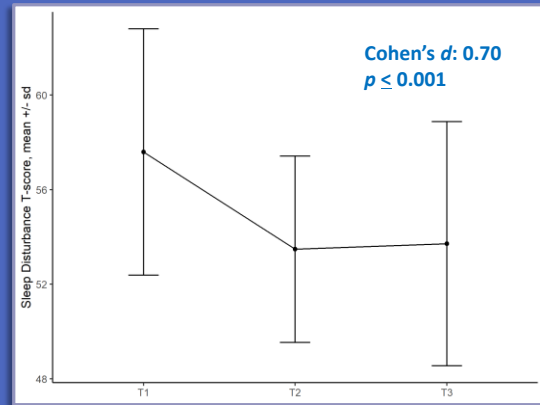
Emergency Medicine Department, Brigham & Women's Hospital, Harvard Medical School, 2021

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Effects Of TM At Baseline, 1 And 3-month Follow-ups On Clinician Burnout And Psychological Well-being



Perceived Stress



Sleep Disturbance

Emergency Medicine Department, Brigham & Women's Hospital, Harvard Medical School, 2021

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Brigham and Women's Hospital Study Feasibility and Acceptability

- Complied with instruction regimen: **90%**
- Regular TM home practice: **85%**
- Recommend TM to a friend: **Yes 93%**
- TM helpful during Covid: **Yes 93%**
- TM adds to overall well-being: **Yes 90%, Maybe 10%**
- Plan to continue regular TM practice: **Yes 80%, Maybe 20%**

Azizoddin D, Kvarternik N, et al. Heal the Healers: A pilot study evaluating the feasibility, acceptability, and exploratory efficacy of a Transcendental Meditation intervention for emergency clinicians during the coronavirus disease 2019 pandemic. *JACEP Open* 2021;2(6):e12619.

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Case Study (Part 2)

- Ayurveda exam: Prakriti (constitution) Vata-Pitta, Vikriti (imbalance) Vata (Apana)
- Ayurveda/integrative medicine regimen instituted 9/2021:
 - Vata balancing diet, lacto-ovo vegetarian, decrease CHOs, increase proteins and fats
 - Intermittent fasting: 9 hour eating window, 10 am to 7 pm
 - Follow all general AV diet, digestion, and daily routine points
 - Continue daily TM practice and brisk walking
 - Continue daily Amrit Kalash. Add Vata balancing preparations: Dashamula and Arjuna arishtas (syrups)
 - Bedtime: milk decoction with castor oil ½ tsp, turmeric, ginger and ashwagandha powders ¼ tsp. Triphala 2 grams

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Case Study (continued)

- Ayurveda/integrative medicine regimen (added 1/15/22):
 - CholestePure 2 cap's daily (1 gm: berberine, bergamot, phytosterols)
 - Algae Omega 2 caps daily (715 mg Omega-3)
 - Ground flax & chia seeds, 1-2 TBSP daily
- Interim changes (as of 4/18/22):
 - Weight down to 158#, BMI 24 (normal), waist circumference 36.5 inches. BP 112/64.
 - Lipids: TC 215, LDL 148, HDL 48, TGs 119. A1C 5.7.
 - Afib episode frequency decreased to q 10 weeks
 - Improvement in overall energy, sleep quality and duration.

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Questions?

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Ayurveda Core Principle #7: Physiological Purification (Detoxification)

- Metabolic impurities accumulate as a result of ongoing imbalances in diet, digestion, lifestyle
- Metabolic impurities are intrinsic to the pathogenesis of the majority of chronic disorders
- Detoxification is an important aspect of both prevention and treatment of chronic disease

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Ayurvedic Physiological Purification (*Panchakarma*)

- Removes:
 - endogenous toxins: metabolic impurities arising poor diet, digestion, lifestyle, stress, etc.
 - Exogenous toxins, e.g., from pollutants in soil, water, and air
- Multiple applications:
 - Prevention
 - Rejuvenation
 - Treatment of chronic diseases



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Physiological Purification Therapy (Panchakarma)

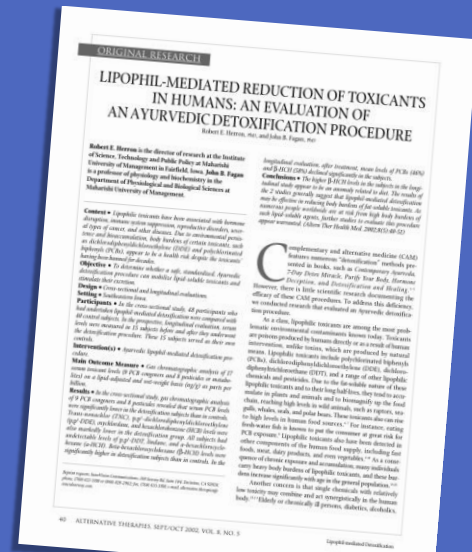
- After a 5-day purification program, total cholesterol fell acutely and HDL cholesterol rose significantly
- Lipid peroxides and blood pressure also decreased, anxiety measures improved, and VIP, a coronary vasodilator, rose 80%

Sharma H et al. Complementary Medicine International. 1996; 3:17-28)

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LIPOPHIL-MEDIATED REDUCTION OF TOXICANTS IN HUMANS: AN EVALUATION OF AN AYURVEDIC DETOXIFICATION PROCEDURE

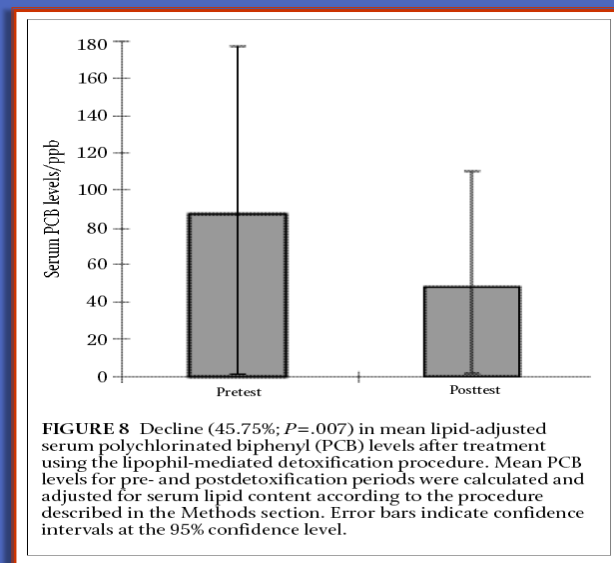
Robert E. Herron, PhD and John B. Fagan, PhD
Alternative Therapies, Sept/Oct 2002, Vol. 8, No. 5



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Lipophil-mediated
reduction of toxicants
through Ayurvedic
detoxification



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