

Yoga & The Heart: Review

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1. Introduction

“Those who are temperate in eating and sleeping, work and recreation, will come to the end of sorrow through yoga and meditation.” –Bhagavad Gita.

As defined by Patanjali, “Yogas chitta vritti nirodha” (“Yoga is the neutralization of the vortices of feeling.”). Yoga literally means “union”, philosophical, spiritual, religious, spiritual, mental, emotional and physical. The word yoga, from the Sanskrit word yuj, means to yoke or bind, and is often interpreted as “union” or a method of discipline. A male who practices yoga is called a yogi, a female practitioner, a yogini.

There are eight limbs of yoga: the yamas (restraints), niyamas (observances), asana (postures), pranayama (breathing), pratyahara (withdrawal of senses), dharana (concentration), dhyani (meditation), and samadhi (absorption). Most people practicing yoga are engaged in the third limb, asana, which is a program of physical postures designed to purify the body and provide the physical strength and stamina required for long periods of meditation.

Hatha yoga refers to a set of physical exercises (known as asanas or postures), and sequences of asanas, designed to align your skin, muscles, and bones. The postures are also designed to open the many channels of the body—especially the main channel, the spine—so that energy can flow freely.

Hatha is also translated as ha meaning “sun” and tha meaning “moon.” This refers to the balance of masculine aspects—active, hot, sun—and feminine aspects—receptive, cool, moon—within all of us. Hatha yoga is a path toward creating balance and uniting opposites. In our physical bodies we develop a balance of strength and flexibility. We also learn to balance our effort and surrender in each pose.

2. History and Origin of Yoga

Yoga was developed and well described about 5000 years ago in India. The term “yoga,” however, is found in ancient India’s earliest known scripts — the Vedas. They date from the Vedic period, which began in 1500 BCE. Composed in Vedic Sanskrit, the Vedas are the oldest writings of Hinduism and Sanskrit literature. During the medieval era (500-1500 AD), different schools of yoga emerged. Bhakti yoga is a spiritual pathway within Hinduism that appeared during this time, a type of yoga that focused on living through love and devotion toward God.

Yoga’s popularity in the West can be attributed to Swami Vivekananda, a Hindu monk and philosopher who toured Europe and the U.S. in the 1890s to spread knowledge about Hinduism among intellectuals.

Hatha yoga as a practice was recognized in the U.S. in the 1930s and 40s, and finally reached a peak in the 60s, when Hindu spirituality became far more popular among young Americans. Numerous Indian teachers of yoga taught classes in the U.S., and in the 1980s it became even more popular due to the first health benefits being reported when yoga was seen as a practice with purely physical benefits, something that can improve your heart health and fitness.

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In 21st century, the popularity of yoga in the U.S. has increased throughout the decades, rising from 4 million in 2001 to 20 million in 2011. Since then, plenty of scientific studies have shown the health benefits of reducing high blood pressure, depression, chronic pain, and anxiety. It also improves cardiac function, muscle strength, and circulation.

In the western countries, it is mostly equated with Hatha yoga, a comprehensive system of postures and breathing techniques; however there are various additional kinds of yogas: Karma yoga, Bhakti yoga, Gyan yoga and Raja yoga.

Karma Yoga: The path of karma yoga is yoga through action. For the karma yogi, the spirit in which they act is more important than the service itself. They must act without desire for reward. According to karma yogis, all other activities stir up more waves of likes and dislikes in the heart.

2.1. Bhakti yoga

Bhakti yoga is the yoga of devotion. The bhakti yogi thinks of the Divine first in personal, human terms: as Father, Mother, Friend, or Beloved. Such a personal view helps them to awaken and direct love towards the Divine. They eventually see and love the Divine in all forms. It is not what we love, but how we love, that is important if our devotion is to lead us to enlightenment. Sectarian differences only create more waves of likes and dislikes; they do not result in yoga or union.

2.2. Gyana Yoga

Gyana yoga is the yoga of Self-study. It is not only a particular path to union, but also points out the direction all our thinking should take. It is based on the concept of “non-dualism”, that is: we already are the Divine or Higher Self, we just need to realize it.

2.3. Raja yoga

Raja yoga or “royal yoga” views human nature as a kingdom composed of many psychological tendencies and physical attributes, all of which require considerate attention. The main focus of Raja Yoga is meditation and similar techniques with the goal being yoga, or union.

3. Yoga and Effects on Diseases

“I do yoga so that I can stay flexible enough to kick my own arse if necessary.” – Betsy Cañas Garmon.

Various studies have shown yoga to have an immediate down-regulating effects on both the SNS (sympathetic nervous system) and HPA (hypothalamus-pituitary-adrenal) axis response to stress. The studies show that yoga decreases levels of salivary cortisol [1], blood glucose [2] as well as plasma renin levels, and 24-hour urine nor-epinephrine and epinephrine levels [3]. Yoga

has been shown to significantly reduce heart rate and systolic and diastolic blood pressure [4]. The literature does indicate that yoga may reverse the negative impact of stress on the immune system by increasing levels of immunoglobulin A [5] as well as natural killer cells [6]. Yoga has been found to decrease markers of inflammation e.g. high sensitivity C-reactive protein as well as inflammatory cytokines such as interleukin-6 [7] and lymphocyte-1B [8,9].

There are studies done and also on going in terms of the effects of yoga on cardiovascular diseases, metabolic syndrome, cancers, anxiety, diabetes and children.

Yoga appears to be equal or superior to aerobic exercise in relieving some symptoms of diabetes [10], multiple sclerosis [11], menopause [12], schizophrenia [13] and renal diseases [14]. It is no surprise that the exercise could be helpful in diabetics as this has been shown to be having insulin-like effects on blood glucose levels [15].

There are multiple studies showing the positive effects of yoga on depression, anxiety, and schizophrenia [16,17]. Similarly encouraging positive data have been noted in women with symptoms related to menstruation, pregnancy and menopause [18].

4. Yoga and The Heart

Three well-known facts that public in general is fully aware of: exercise is essential for heart health; heart disease is the number one cause of death in men and women throughout the world; and heart disease is largely avoidable.

These three facts can be connected with and can be helped by what we call, Yoga!

Yoga and Coronary Artery Disease/Cardiac Risk Factors:

When it comes to heart disease/ coronary artery disease, we always look up at and take care of lifestyle factors (e.g.

blood pressure, lipid profile, diabetes, tobacco smoking etc) and going forward, I think in the future, we should also incorporate Yoga into these cardiac risk factors.

There was an extensive meta-analysis reported [19] with a total of 1404 studies on yoga (2768 participants) – 37 were direct comparisons of yoga to either no exercise, or traditional aerobic exercise. Compared to non-exercisers, those who practiced yoga sustained significant improvement in cardiac risk factors. On average, people practicing yoga lost 2.35 kg of body weight, lowered their blood pressure by 5 mm/Hg, and improved their lipid profile by reducing LDL and increasing HDL! In nine studies, yoga practice was comparable to aerobic exercise for weight loss, blood pressure and cholesterol measures! However we must keep in mind

that these studies are small and their methodologies are different.

Another review/meta-analysis of 11 trials (800 participants) has shown that yoga may have favorable effects on diastolic blood pressure, HDL cholesterol and triglycerides, and uncertain effects on LDL cholesterol. However again the authors recommended that these results should be considered as exploratory and interpreted with caution [20].

The American Heart Association (AHA) reports that yoga can “help lower blood pressure, increase lung capacity, improve respiratory function and heart rate, and boost circulation and muscle tone [21].” The AHA notes that yoga doesn’t “count” toward its recommended 150 minutes of moderate to vigorous aerobic activity every week (roughly 30 minutes five days a week). However, more and more research [19] is now showing that practicing yoga can have the same effect on reducing cardiovascular risk factors as other forms of exercise, like brisk walking or biking.

Another review of 81 studies concluded that the effects of yoga and traditional aerobic exercise seem to indicate that, in both healthy and diseased populations, yoga may be as effective as or better than exercise at improving a variety of health-related outcome measures. Future clinical trials are needed to examine the distinctions between exercise and yoga, particularly how the two modalities may differ in their effects on the Sympathetic Nervous System (SNS) and Hypothalamic-Pituitary-Adrenal (HPA) axis. Additional studies using rigorous methodologies are needed to examine the health benefits of the various types of yoga [21].

The studies have reported that yoga has an immediate desirable and calming down effect on the SNS/HPA axis response to stress. While the precise mechanism of action has not been determined, it has been hypothesized that some yoga exercises may cause direct vagal stimulation thereby causing a shift toward parasympathetic nervous system dominance [22]. Various yoga techniques have shown significant reductions in low-frequency Heart Rate Variability (HRV)—a sign of sympathetic nervous system activation [23].

On the other hand, yoga and aerobic exercise interventions may produce differing results as to how the two differ in their effects upon the SNS and HPA axis. Different levels of intensity of exercise have been shown to affect the HPA axis response to acute stress differently. Low-intensity exercise repeatedly has been shown to lower cortisol levels [24] while intense exercise leads to proportional increases in cortisol [25]. The critical level of intensity that leads to release of cortisol is approximately 60% VO₂max, with the greater the exercise intensity, the greater the cortisol release. Perhaps this explains why yoga, involving slow and often non-strenuous activities, positively affects the HPA axis response to stress. Exercise stimulates the SNS, raising plasma

epinephrine and nor-epinephrine [26] while yoga has been shown to lower sympathetic stimulation, significantly lowering levels of plasma nor-epinephrine and epinephrine [27]. Exercise is a well-known key component in cardiac rehabilitation. Yoga, when added to the components of usual cardiac care in randomized trials, has been shown to be significantly better than usual cardiac care at reducing markers of inflammation [13], improving blood lipid levels [28] and in reducing the number of revascularization procedures [13].

4.1. Yoga and arrhythmia: Brain-heart continuum

Can yoga affect the arrhythmia? This question was addressed to some extent by a study published in 2013 [29] which concluded that the practice of yoga improved symptoms and arrhythmia burden, reduced anxiety and depression, and improved quality of life in patients with atrial fibrillation. The authors recommended yoga to be incorporated in comprehensive atrial fibrillation management strategies.

Another study was analyzed that conducted the effects of a yoga intervention on 55 individuals (12.7% women, 92.7% Caucasian, mean age of 66.3 years), who had received an ICD (Implantable Cardioverter Defibrillator) for life-threatening arrhythmia.

Yoga group participants attended 8, weekly, 80-minute sessions that included yoga postures, breathing exercises, relaxation and meditation. The yoga and treatment as usual control groups also received “standard medical care” during the intervention.

Yoga group participants reported fewer nonfatal “device-treated ventricular events” compared to controls as well as lower reported shock anxiety at the end of the study [30].

It is obvious by now that both Yoga and aerobic exercise work to improve heart health. How about combining the two and look for the outcome? This has been studied and presented at the 8th Emirates Cardiac Society Congress in collaboration with the American College of Cardiology Middle East Conference October 19-21, 2017 in Dubai [31]. The study comprised of 750 patients who had previously been diagnosed with coronary heart disease. One group of 225 patients participated in aerobic exercise, another group of 240 patients participated in Indian yoga, and a third group of 285 participated in both yoga and aerobic exercise. Each group did three, six-month sessions of yoga and/or aerobic exercise.

The aerobic exercise only and yoga only groups showed similar reductions in blood pressure, total cholesterol, triglycerides, and LDL, weight and waist circumference. However, the combined yoga and aerobic exercise group showed a two times greater reduction compared to the other groups. Significant improvement was shown in left ventricular ejection fraction, diastolic function

and exercise capacity.

4.2. Yoga and heart failure

Can yoga improve the quality of life and other outcome measures in patients in heart failure?

In patients with heart failure, sympathetic nervous system is mostly exacerbated. That is why a beta-blocker is a class I indication in these patients and the question can be raised: "Can we use yoga as a beta-blocker?"

This issue has been addressed with at least two randomized controlled trials looking at the effects of a yoga intervention on 59 patients (42.5-52.6% women, median age 52.8 years) with chronic heart failure. These two studies included predominantly African American (95%) participants (2.5% Caucasian and 2.5% Asian) [30].

Both of these studies included Hatha yoga interventions of 60-70 minutes in duration, twice per week over 8 or 8-10 weeks (total 16 sessions). The yoga groups and no-intervention control group participants continued to receive "standard medical care" in both studies.

These studies suggested significant group differences in exercise time and maximum oxygen consumption (V_{O2} max: a measure of aerobic fitness). No significant differences in mortality or quality of life were detected, and neither study indicated any adverse events in the yoga group. However these are obviously very small trials and further research needs to be conducted in this arena as well.

Yoga and Chronic Inflammation: Yoga as an anti-inflammatory Rx! Chronic inflammation is being considered an underlying pathological process for many diseases including now coronary artery disease!

Now there are several studies showing that a regular yoga practice

- Brings down the levels of stress hormones that promote inflammation.
- Lowers the levels of a number of pro-inflammatory molecules in the body and brings down inflammation that is beneficial in conditions like arthritis.
- Reduces a subset of pro-inflammatory molecules called cytokines thereby relieving severe pain seen in diseases like fibromyalgia.
- Inhibits inflammation that in turn weakens and even kills cancerous cells in people with cancer.

A study at Ohio State University in Columbus divided 50 women with an average age of 41 into two groups: new to yoga and experts. They measured their inflammatory markers: adiponectin

and leptin after yoga training sessions as per the protocol and found that women who were new to yoga had higher levels of nearly all the pro-inflammatory molecules tested and a much greater inflammatory response to the stressful tasks than women who were experts, suggesting that yoga may help to tune down the stress responses [32]. Similarly caregivers who could have high level of stress and stress-related inflammation may benefit from yoga sessions as demonstrated by a study with a change in the response of 68 anti-inflammatory genes, leading to a global decrease in inflammation.

5. Summary

On December 2014, The United Nations General Assembly marked June 21 International Yoga Day, an annual celebration to incorporate yoga and meditation more into humanity all over the world. As the Dalai Lama notes: "If every 8-year-old in the world is taught meditation, we will eliminate violence from the world within one generation."

Ancient traditions saw the heart as the seat of our emotions, while contemporary culture is largely considering it as the organ that pumps life-giving blood throughout the body. We mostly now see the brain, with its firing neurons and moving neurotransmitters, as the place where thoughts and emotions originate. On the other hand, modern science is coming to understand cardiovascular impacts on emotion, such as the strong connections between anxiety and breath rate, pulse, and body temperature—all of which are closely tied to the condition of the heart.

It is all great news that nearly all of the heart disease is preventable and much of it is reversible by your lifestyle modifications including.

- Meditation for 20 minutes
- Early sleeping and rising
- Yoga/exercises in moderation and
- Deep breathing techniques (Pranayama).

We can conclude this article by an expression from BKS Iyengar, "Yoga teaches us to cure what need not be endured and endure what cannot be cured."

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