

## A REVIEW ON PSYCHO-PHYSIOLOGIC EFFECTS OF HATHA YOGA

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### ABSTRACT

*Yoga has grown in popularity as a form of exercise and fitness training in Western countries, but it is still seen as fashionable, as shown by a Time magazine cover article on "The Power of Yoga" in April 2001. Yoga seeks to free a human being from the dualism (body–mind) conflicts that exist in all living things, as well as the impact of the gunas, universal energy characteristics that are present in all physical things, via its practices. Yoga needs to be more acknowledged by the medical profession as a complementary treatment to traditional medicine. An increasing number of research studies over the past ten years have demonstrated that Hatha Yoga may increase strength and flexibility, as well as aid regulate physiological factors like blood pressure, respiration, and heart rate, as well as metabolic rate, to improve total exercise capacity. This study summarizes medically supported evidence on the health advantages of yoga for both healthy individuals and those with musculoskeletal and cardiovascular illness.*

**KEYWORDS:** *Asthma; Blood Oxygenation; Blood Pressure Regulation; Breathing; Cardiovascular Disease; Cardiovascular Function; Carpal Tunnel Syndrome; Chronic Bronchitis, Hatha Yoga*

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### 1. INTRODUCTION

The Sanskrit root yug, which meaning "union," is the source of the term "yoga." Yoga, in a spiritual sense, refers to the mind's connection with the universe's divine intellect. (Universal energy contains three characteristics, known as gunas, that exist in balance: Sattva [purity], Rajas [activity, passion, change], and Tamas [darkness, immobility].) Simply said, a yoga practitioner learns to work as a partner with the forces and processes of life, rather than in conflict and discomfort with their own nature.

Hatha Yoga, for example, is focused on the understanding, development, and balancing of psychophysical forces in the body, and therefore may be referred to as "psychophysical yoga." The body, man's physical portion; the mind, man's subtle part; and the ingredient that connects the body and mind in a unique manner, the breath, are the three primary elements utilized in

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Hatha Yoga to achieve its goals. Hatha Yoga has distinct methods for each of these aspects. It includes asanas (“postures”), kriyas (“actions”), mudras (“seals”), bandhas (“locks”), and methods for complete and conscious bodily relaxation for the physical component, or body. Although kriyas, mudras, and bandhas are just a minor component of yoga practice, their ability to enhance awareness and consciousness should not be overlooked.

A kriya is an action or effort that directs energy movement up and down the spine, transforming the meditator's state of being until spiritual realization occurs; a mudra is a gesture or seal, a body movement that holds energy or concentrates awareness; and a bandha is an energy lock that uses muscular constriction to concentrate awareness. Because of their distinct advantages, each of these methods is examined individually. Hatha Yoga focuses on particular areas of the body, subtle forms, or abstract concepts for the mental or subtle component. Finally, Hatha Yoga has created a number of specialized methods known as pranayamas for the connection between the body and the mind that is breathing. (Physiologically, pranayama entails breath control [inhalation, expiration, and suspension] that strengthens respiratory muscles and improves ventilation.) These are methods for bringing the prana (“energy”) contained in the breath to life.

Prana is the term used in yoga to refer to the universe's whole life-energy. As a result, in Hatha Yoga, prana is absorbed by the breath, which is done via breathing. The way we breathe generates energy vibrations that have an impact on our whole existence. In the practical meaning of Hatha Yoga, understanding and regulating breathing will regulate energy flow. The mind will monitor and manage the whole cleansing process via its powers of contemplation, judgment, and willpower [1]. They have a positive impact on the human body's four main systems: movement (through the musculoskeletal system), oxygen supply (via the cardiopulmonary system), and neurological and endocrine control (by the nervous and endocrine control systems). As a result, the psychophysiologic benefits of Hatha Yoga, as explored in this review of the available medical research, are based on a natural combination of body, mind, and breath control.

### *1.1. Musculoskeletal Status: Hatha Yoga Effects:*

Arthritis and other musculoskeletal diseases (such as spondylarthropathies, systemic lupus erythematosus, scleroderma, polymyalgia, fibromyalgia, and low-back pain) are the main cause of disability in those 65 and older, as well as a frequent source of impairment linked to work (Lawrence et al., 1998). Although the majority of illnesses are self-limiting and respond to basic treatments, some individuals have severe and complicated issues for which prompt treatment is critical to a positive result. The type of joint-associated pain, including its severity, distribution, and site of origin, affects the course of therapy and follow-up in most instances. The utility of Hatha Yoga as a therapy for musculoskeletal problems of the hand and wrist was examined in the following controlled trials.

Patients with hand osteoarthritis were randomly allocated to either yoga methods, overseen by the same teacher once a week for eight weeks, or no treatment (control group). Pain and discomfort, strength, mobility, joint circumference, and hand function were all measured throughout the research. In terms of pain during exercise, tenderness, and finger range of motion, the yoga-treated group outperformed the control group considerably. Yoga methods were also preferred by other improvement trends, giving alleviation from hand OA.

The following yoga poses were utilized to relieve symptoms of OA of the hands and carpal-tunnel syndrome: Dandasana, UrdhvaHastasana, Parsvottanasana, Garudasana, Bharadvajasana, Tadasana, half Uttanasana, Virabhadrasana (arms only), PSYCHO-PHYSIOLOGIC EFFECTS OF YOG Physical therapists have modified them to assist with the problems associated with repeated, repetitive movements. The commenters pointed out some of the flaws in research on carpal-tunnel syndrome in a series of letters to the editor after the publication of the latter piece. They cited, for example, the small number of subjects per group, the dubious use of a splint as an adequate control intervention, the clinical significance of "categorical data" (i.e., plus or minus for symptom presence), and the observation that simple improvements in standing and sitting posture may, by themselves, relieve potential repetitive motion effects. Despite these reservations, the commenters largely praised the intriguing and hopeful nature of the findings, emphasizing the need for bigger, multicenter investigations including more objective nerve conduction testing [2]–[4].

## *1.2. Cardiopulmonary Status: Hatha Yoga Effects:*

Hatha Yoga has been proven in published research to enhance baseline cardiopulmonary state in healthy, normal individuals. The researchers next used standardized spirometric methods to assess lung function and contrasted yoga posture instruction in participants over time in a series of experiments.

Breath control exercises alone were shown to enhance some, but not all, parameters of ventilation in early trials. For example, during yoga breath-control activities, lung function was measured in 75 men and females with an average age of 18.5 years. They reported significant increases in forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1), peak expiratory flow rate (PEFR), and maximum voluntary ventilation (MVV) after 6 weeks of practice, as well as a significant decrease in breathing frequency (fB) and a significant lengthening of breath-holding time.

Other studies have shown that practicing yoga postures alone or in combination with other yoga methods improves lung function. In ten healthy males aged 25 to 37, an energetic Hatha Yoga position (Virasana or Warrior pose) was compared to chair-sitting and a resting, supine posture (Savasana). In comparison to either the chair-sitting or resting postures, the active posture produced a hypermetabolic state, as shown by increased minute ventilation, heart rate (HR), and oxygen consumption (V.O2) [5]–[7]. The same authors observed the same findings in a comparable research comparing an active sitting posture (Siddhasana) to chair-sitting and supine rest, suggesting that the yoga "activity" rather than the bodily "posture" was essential for cardiovascular "training."

## *1.3. Effects Of Hatha yoga On Obstructive Airway Disease:*

The benefits of enhanced lung function and breathing training by Hatha Yoga on the clinical state of patients with chronic bronchitis and asthma were investigated in the following series of research [8]–[10].

### *1.3.1. Bronchitis (chronic):*

Patients (n 5 15) who received yoga treatment for four weeks, which included breath control and eight different kinds of asanas, showed improvement in shortness of breath and lung function

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measures. The patients, who were 48 to 75 years old (58.9  $\pm$  11.1 years), received a baseline evaluation of their chronic bronchitis history, which included spirometry, drug strategy, and activity tolerance. For one week, they were taught yoga and breathing methods (e.g., Vajrasana, Simhasana, Sarvangasana, Chakrasana, Matsyasana) and were encouraged to practice everyday with follow-up yoga sessions each week. Throughout the research, all patients continued to take their medications. After the second and fourth weeks of yoga activities, the clinical state and pulmonary function were reevaluated. FEV1 and PEFr had both improved significantly by the second week. There were substantial improvements in VC and PEFr by the fourth week, as well as a patient-reported, perceptual reduction in shortness of breath. The quantity of medicine taken remained same. However, this was just a preliminary research, with only a few individuals assessed over a short period of time. Unfortunately, no additional research on the potential advantages of yoga for chronic obstructive pulmonary disease have been published, and it is difficult to make any conclusions based on just one published study in this patient group.

### *1.3.2. Asthma:*

In controlled clinical trials, the use of an integrated approach to yoga therapy has been proven to be helpful in the therapeutic treatment of asthma. When compared to an age-, gender-, and clinically matched control group, a 65-minute daily yoga practice for 2 weeks reduced PEFr, medication usage, and asthma episode frequency in 53 patients. Asanas (yoga exercises and postures for 25 minutes), breath control (slow, deep breathing for 10 minutes), meditation (slow mental chanting for 15 minutes), and a devotional session were all part of the daily program. Following a comparable training regimen consisting of asanas, breath control, and meditation, 570 individuals with asthma demonstrated overall substantial improvement in PEFr after a long-term, follow-up (3 to 54 months) prospective research. Patients who practiced yoga the most often and intensely saw the most improvement: about 70% of them were able to decrease their asthma medication.

In a randomized, double-blind, placebo-controlled crossover study, the effects of two pranayama yoga breathing exercises on lung function, airway reactivity, respiratory symptoms, and medication usage were evaluated in 18 individuals with moderate asthma. Because conducting a double-blind research on the potential benefits of yoga methods is typically challenging, this study is unusual in the health effects literature. The participants were taught pranayama breathing using a Pink City lung (PCL; Pulmotech, Jaipur, India) exerciser that could be utilized with a matching placebo breathing equipment in this research. Through the use of chosen breathing apertures and a one-way valve, the PCL device enforces slow breathing and a 1:2 inspiration-to-expiration ratio; the placebo device had the same appearance but contained a hidden, unvalved aperture that did not impose breathing limitations.

Following a baseline evaluation phase, the participants practiced calm deep breathing for 15 minutes, twice a day, over two consecutive 2-week periods, randomly rotating the breathing devices. The PCL device improved measured lung function measures (FEV1, FVC, PEFr), symptom ratings, and medication usage, although the improvements were modest and not statistically significant. The dosage of histamine needed to induce a 20% reduction in FEV1, a provocative airway test widely used to evaluate lung responsiveness to nonspecific bronchoconstrictors, increased statistically significantly. The results suggest that pranyama-like breathing may help people with moderate asthma improve their overall health.

The ability to do regular day-to-day activity is essential for asthma sufferers, but the result is subjective and difficult to quantify. Two early studies documented the positive impact of different yoga activities on one's quality of life. The effects of daily yoga activities, mainly breath control and postures, on 41 individuals with proven asthma during a 6- to 8-week period. Although the authors observed a general improvement in asthma symptoms, objective lung function measures indicated improvement in some, but not all, of the patients, with some even showing a decrease in function. Yoga treatment had a comparable overall impact on exercise capacity in 46 asthmatic individuals. In a 12-minute walking test, a modified Harvard step test, and a more subjective exercise tolerance index, the patients improved. However, it remained unclear if the benefits were partly attributable to a placebo effect. The placebo effect in complicated intervention comparison studies is discussed.

In the more recent research (after 1995), breath-control and relaxation methods have been found to improve some, but not all, measures of lung function (e.g., PEFr, MVV, FEV1, and FVC), reduce medication use, and enhance exercise tolerance in both children and adults with asthma. The effects unique to a particular relaxation method are further complicated by the large heterogeneity in the subject population, dubious compliance in the yoga therapy groups, and possibly negative results in some individuals. More research is required to better understand the mechanisms of response to yoga intervention and to see whether it is therapeutically beneficial for asthma patients.

#### *1.4. Hypertension: effects of hatha yoga:*

Because of its great frequency and link to an elevated risk of cardiovascular disease, high blood pressure is another important health issue in the United States and other industrialized nations. Interventions such as lifestyle modification and pharmacologic therapy have been demonstrated in clinical studies to result in significant decreases in blood pressure, similar to those seen in individuals with CAD. Long-term advantages of blood pressure management have also been shown in the general population. For example, in the well-known Framingham Heart Study, higher rates of antihypertensive drug usage were linked to lower rates of hypertension (defined as a blood pressure of 160/100 mm Hg). These results indicate that rising antihypertensive drug usage may account for some of the significant decrease in CVD mortality seen in the United States since the late 1960s. The aim of antihypertensive therapy is to avoid the main cardiovascular consequences of excessive blood pressure (e.g., CAD, stroke, congestive heart failure). Similarly, lifestyle modifications such as appropriate exercise and relaxation, alone or in combination with prescription medications, may be beneficial.

The benefit of whole body relaxation poses, particularly Savasana, was explored in early research on yoga intervention for hypertension. The authors observed BP reductions that were comparable to medication treatment or biofeedback control; however, the trials only used a limited number of participants, and there were no intervention control groups. More recent trials were well-controlled and included a sufficient number of participants.

## **2. DISCUSSION**

Hatha Yoga definitely offers extra advantages for cardiopulmonary endurance in healthy individuals, as well as potential benefits in certain patients with cardiopulmonary illness and patients with cardiovascular disease, via body and breath control, including relaxing methods.

Enhanced lung capacity, greater oxygen supply, reduced V. O<sub>2</sub> and respiration rate, and a lower resting heart rate are all clinical indicators of improved exercise capacity. There are many physiological variables at play.

Increased vascularization, increased intramuscular oxygen and glycogen stores, increased oxidative enzymes, or increased numbers of mitochondria may all contribute to increased skeletal muscle oxidative capacity and decreased glycogen utilization as a result of the intense stretching and muscle conditioning associated with achieving and holding yoga postures. Furthermore, in animal models, passive muscle stretching for as little as 30 minutes per day has been linked to enhanced muscle development and contractile strength.

The gradual increase in lung capacity (e.g., FEV<sub>1</sub>, FVC) associated with well-practiced yoga breathing recruits usually unventilated lung and aids in better matching ventilation to perfusion, resulting in increased oxygen supply to highly metabolic tissues (e.g., muscle). Intermittent deep lung inflations or sighs have been proposed as a technique for lung volume recruitment in the past, particularly in patients with acute respiratory distress syndrome. Variable tidal volume ventilation has also been found to enhance oxygenation in animal models of acute lung damage.

Slow breathing rates associated with yoga breathing have been shown to significantly reduce the chemoreflex response to hypoxia, most likely due to improved oxygen delivery to tissues and possibly as a result of acquired hypoxia tolerance (e.g., increased CO<sub>2</sub>) caused by a change in the chemoreflex threshold. Yoga breathing while practicing postures, particularly relaxation poses (such as Savasana), has also been proven to substantially reduce the physiological consequences of stress (i.e., increased HR, fB, and BP). Some of these physiological advantages may be self-controlled (psychologic); nevertheless, there is evidence that yoga breathing practices have an impact on the autonomic nerve system in healthy individuals.

### 3. CONCLUSION

Yoga is an ancient body, mind, and spirit discipline that has been Westernized and practiced for its health advantages, much as alternative medicinal (herbal) therapies, as a supplement to more traditional medical care. Hatha Yoga utilizes stretching and develops muscle strength and flexibility by holding static physical postures (asanas). As a result, it is likely to be helpful for certain musculoskeletal disorders. In fact, two small trials of yoga in osteoarthritis of the hand and carpal tunnel syndrome found that participants had less discomfort than those in control groups. Hatha Yoga has shown some modest help in various musculoskeletal-related pain treatment, including back pain and the management of multiple sclerosis, when combined with breath control, which adds additional neuromuscular benefits. Yoga poses have been used in most sports programs across Western cultures for many years to both prevent and cure musculoskeletal problems, thus these new results should come as no surprise. Anecdotal studies from non-Western cultures, where local people have adopted yoga posture naturally for sitting and sleeping, find very few musculoskeletal issues (e.g., lower back pain and joint stiffness).

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