

Yoga meditation: A path to holistic health and healing

Abstract

The word meditation is derived from a Latin word 'mādi' which means "to heal". Meditation can certainly be considered as a great healing process - spiritual, mental, and emotional - with proven benefits to physical well-being. In the current communication, an attempt has been made to explain some of these benefits and provide science based evidence to explain them. Meditation develops our ability to maintain inner peace at all times in our actions and thereby achieve the best physical and mental health. With psychosomatic ailments, meditation provides the vital element that modern therapies lack. During Yogic breathing, some of the oxygen generates •OH free radicals according to the Haber Weiss process, which immediately react with glucose molecules to oxidize them. Some of these oxidation products are very useful, such as gluconic acid, which removes some undesirable metals from the body. Additionally, glucuronic acid is another product, and it is part of the natural detoxification process found in the body. It removes harmful toxins and is used in the treatment of prostate cancer. Another product, D-glucuronate, has been shown to decrease lung, skin, liver, breast, and colon cancers by 60%. The product Calcium-D-glucuronate lowers cholesterol by 12%, LDL by 28%, and triglycerides by 43%. Lastly, D-glucono 1,4 lactone, with further reactions with •OH, is converted to D-glucaro 1,4 lactone and is a powerful liver detoxifier. Meditation boosts intelligence, IQ score, and increases the gray matter of the brain. The relaxation response decreases breathing rate and oxygen consumption by 20%. It lowers heart rate and brings blood pressure to normal levels. During meditation alpha waves of the brain are generated. This brings relaxation and serenity of mind, helping people to better cope with stress. According to the British Heart Foundation, 15 minutes of meditation a day can reduce the risk of death, heart attack and stroke by 48%. According to Dr. Dean Ornish, meditation can help in reversing heart disease. Meditation has the power to change our negativity of mind and reshape our thoughts into a more positive direction to improve our mental well-being.

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What is Meditation?

"Meditation is the royal path to freedom, a mysterious ladder which reaches from earth to heaven, from darkness to light, and from mortality to immortality"

– Swami Sivananda¹

Meditation is a state of consciousness that can only be understood through direct experience and intuition. Meditation reduces stress - every part of the body, every single cell, comes to rest. Meditation keeps the body youthful and prevents early aging. The experience of oneness, happiness, and harmony which can be achieved through meditation, creates new patterns of thinking. Negative tendencies are overcome and the mind becomes more stable. Meditation helps one to develop a dynamic personality, powerful speech, serenity, and great mental strength.

Meditation works upon the nervous system and the physiological processes of the meditator, which brings increased physical strength and poise to their daily life. Meditation is a general term applied to the methods of steadying, quieting or opening up the mind for the purpose of altering the state of consciousness.² During meditation, the distractions of the world around us disappear, and the parasympathetic nervous system gently brings a sense of relaxation and equanimity of mind. It slows down the heartbeat, respiratory rate and relaxes the internal organs, lowering the blood pressure and reducing anxiety and depression. Yoga meditation provides glowing health, increased energy and stamina, a shapelier body, relaxation, improved concentration, and peace of mind. The meditators also feel more buoyant and youthful. Swami Vishnu-Devannada³ writes:

"Through regular meditation, the mind becomes clear and the motives pure. The subconscious mind releases hidden knowledge

that allows a better understanding of oneself and our relationship to the world. The limited personality slowly dissolves into an expanded consciousness. Ultimately, the super-conscious or intuitive forces are released, leading to a life of wisdom and peace."

Stress and Meditation

Our life is full of stress and tension. We are always worried, nervous and unable to relax even in bed and therefore take relaxation pills, pep pills and tranquilizers or any other medicine for temporary relief which finally results in many unpleasant and damaging side effects. Then why not try Yoga's way? Yoga is often known to succeed when medicine has failed. Proper breathing is basically linked to relaxation, emotion and body health.

"Yoga is a holistic science of well-being that brings healing from within. The three layered approach of yoga therapy - relaxing the muscles, slowing the breathing rate, and calming the mind - restores inner harmony and counteracts stress that underlies many common diseases."

– Vivekananda Yoga Therapy and Research Foundation⁴

According to the National Institute of Health⁵

"Scientific evidence shows that yoga supports stress management, mental health, mindfulness, healthy eating, weight loss and quality sleep".

What is stress?

According to the World Health Organization⁶ stress can be defined as -

"Any type of change that causes physical, emotional or psychological strain. Stress is the body's response to anything that requires action."

Stress is a feeling of physical and emotional tension⁵. It can come from any event or thought that makes you frustrated, angry, or nervous.

“Stress is your body’s way of responding to any kind of demand or threat. When you sense danger whether it is real or imagined - the body defenses kick into high gear in a rapid automatic process known as the “fight or flight” reaction or the stress response. The stress response is the body’s way of protecting us.”- (<https://www.helpguide.org>)⁷

Stress can manifest⁷ as fear, worry, inability to relax, increased heart rate, difficulty in breathing, disturbance in sleeping pattern, difficulty in concentrating, worsening of pre-existing health conditions (physical and mental), and increased use of alcohol, tobacco and other drugs. Under normal conditions our mental, emotional and physical health should return to normal once the stressful event has passed.

There are two main types of stress⁵ –

- * **Acute Stress:** This stress comes for a short time and goes away. It is felt when sudden brakes are applied or when we get down from a steep slope. It also occurs when we do something exciting or new.
- * **Chronic Stress:** This stress lasts for a longer period of time. Any stress which lasts for weeks or months is chronic stress. It is felt when we have a financial problem, an unhappy marriage or relationship or troubles at work. If it is left unmanaged it may create serious health problems. Chronic stress may lead to long term health problems such as –

- Depression
- Anxiety
- Panic attacks
- Sadness

Such people with chronic stress manage it with some unhealthy behaviors as –

- Drinking alcohol too much
- Gambling
- Overeating
- Smoking
- Using drugs such as relaxation pills

During stressful periods, rapid breathing sends more oxygen around the body which makes it harder for asthma patients to breathe. Faster breathing can lead to hyperventilation and panic attacks. In this way, these people worsen and damage their health, further leading to increased incidence of –

- Heart disease
- Heart attack
- High blood pressure
- Insomnia
- Headaches
- Stroke
- Cancer
- Suicide
- Violent behavior
- Diabetes/high blood sugar

- Depression
- Anxiety

Yoga meditation provides an answer to the problems of stress

There has been some strong scientific evidence to show that yoga meditation can act as an effective antidote to stress. Laboratory studies by Dr. Herbert Benson, well known cardiologist and professor at Harvard Medical School and founder of the Benson-Henry Institute for Mind Body Medicine who worked for over three decades on the health benefits of meditation, have shown that yoga meditation produces what Dr. Benson refers to as the relaxation response. According to Dr. Benson,^{8,9} stress evokes fight-or-flight response. It increases energy metabolism, heart rate, blood pressure, and the rate of breathing. It also triggers the secretion of adrenaline and noradrenaline, but because of a lack of sleep and exercise, the body cannot use these hormones appropriately. Unused adrenaline puts us at increased risk for a number of diseases and conditions such as anxiety, depression, insomnia, heart attack, stroke, bowel disorders, and infertility. He further said that there is a response opposite to the stress response known as the relaxation response, a physiological set of changes that counteracts the stress response. One of the best ways to bring forth the relaxation response is with meditation.

What is the relaxation response?

The relaxation response is a physical state of deep relaxation in which your body releases chemicals that slow down your breathing and heart rate. This brings healthy blood back to important organs, especially the brain.¹⁰

It decreases breathing rate and oxygen consumption by about 20% and lowers heart rate by approximately 3 beats per minute. It shows a marked decrease in blood pressure in meditators whose levels have been higher than normal. A fall in the levels of blood lactate was observed. Blood lactate is known to be linked with attacks of anxiety. During meditation, Alpha waves of the brain, which are associated with mental relaxation, are produced. This brings relaxation and serenity of mind, and people are better able to cope with their stress.

The stress response, also known as the fight or flight response, is the body’s reaction to any demanding situation. During the stress response, our bodies might show some signs such as shallow breathing, fast heart rate, sweaty palms, muscle tension, dry mouth, nausea, abdominal pain, diarrhea or constipation.

The differences between the relaxation response and the stress response are given in the following Figure 1:¹¹

Relaxation Response	Stress Response
↓ Heart rate slows	↑ Heart rate increases
↓ Blood Pressure lowers	↑ Blood Pressure rises
↓ Blood Lactate Levels reduce	↑ Cholesterol Levels go up
↑ Immune System improves	↓ Immune System is less effective
↑ Sense of Well-being increases	↑ Anxiety increases
↑ Sleep improves	↑ Depression more prevalent
↑ Normal Libido	↑ Sleep Disorders increase
↓ Brain Wave Patterns slow	↓ Libido decreases
↑ Digestion improves	↑ Irritability increases
	↓ Digestion works less effectively

Figure 1 Relaxation and stress response.

Yoga meditation and diabetes control

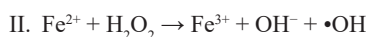
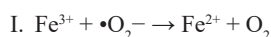
If we are feeling stressed, our body releases stress hormones like cortisol and adrenaline. This should give our body an energy boost for a fight or flight response, but these hormones actually make it more difficult for insulin to work properly, which is known as insulin resistance. As the energy cannot get into our cells, our blood sugar levels rise. If stress does not go away, it can keep blood sugar levels high and put us at risk for diabetes complications.¹²

During times of stress, individuals with diabetes may have more difficulty controlling their blood sugars. When stressed, the body prepares itself by ensuring that enough sugar or energy is readily available. Insulin levels fall, glucagon and epinephrine levels rise and more glucose is released from the liver. At the same time, growth hormone and cortisol levels rise, which causes body tissues (muscles and fat) to be less sensitive to insulin. As a result, more glucose is available in the bloodstream.¹³ However, if meditation is done it may reduce the stress levels and consequently the risk of diabetes. Doing meditation along with pranayama (kapal bhati or bhastrika) is more useful as it may further oxidize glucose, lowering the blood glucose levels as well as oxidizing it to some extremely useful health products.

Our digestive system breaks down our food into several nutrients including a sugar called glucose. It is then absorbed into the bloodstream and enters the cells with the help of a hormone called insulin. Glucose enters the blood from the liver or intestine. Insulin enters the bloodstream from the pancreas. Insulin binds to a cell that needs energy and opens the cell to glucose to enter. Sometimes our body makes insufficient or no insulin, or the body cells do not respond in the right way to the insulin in the blood. This means glucose has trouble entering the cells and hence remains in blood. This builds up to higher and harmful levels of glucose in the bloodstream and is called hyperglycemia and can result in diabetes over a long period of time. These high levels of glucose damage the blood vessels and lead to the complications of heart attack, stroke, kidney damage, blindness, nerve damage, and risk of limb loss (amputation).¹³ It should be remembered that during pranayama exercises the vital capacity of the lungs goes up to 3800 ml² which supplies a high quantity of oxygen. Oxygen is carried to the cells through the blood. If the blood has high contents of glucose, then it is partly oxidized depending on the available quantity of oxygen in the blood. This reduces the risk for diabetes as it lowers the glucose levels in the blood.¹⁴

Bhastrika and kapalbhati are rapid cleansing processes and the oxygen intake within the body during these pranayamas is 12.0% to 18.5% higher than normal breathing.¹⁵ This consumed oxygen is partially converted to OH free radical by the Haber-Weiss reaction (modified by Fenton) which oxidizes the glucose.

The Haber-Weiss reaction is kinetically slow but is catalyzed by dissolved iron ions which are obtained from red blood cells in the body. The reaction can be expressed by the following equation:



Glucose .OH reaction

OH free radicals are highly reactive oxidizing agents. They are also very short lived (half-life of approximately 10 nanoseconds). Because of its reactivity it immediately removes electrons from any molecule in its path, turning that molecule into a free radical and so propagating a chain reaction. Hydroxyl radicals can react with all

types of macromolecules such as carbohydrates, nucleic acids, lipids, and amino acids. The oxidation of glucose by OH free radicals results in two possible paths:

- Oxidation of terminal group
- C-C change

The free radical nature of the reaction

The oxidation of glucose by $\bullet\text{OH}$ radicals were studied in detail.^{16,17} The reaction was found to follow first order w.r.t. $\bullet\text{OH}$ and a fractional order of 0.2 w.r.t. glucose, indicating that one molecule of glucose can be oxidized by 5 molecules of oxygen. This can probably be achieved through pranayama. Further, it was found that increasing the surface area of the reaction vessel increases the rate constant of the reaction. The fractional order of the reaction and increases in rate constant with surface area indicate the radical chain nature of the reaction.

The formula of glucose and its isomeric forms appear as shown below:

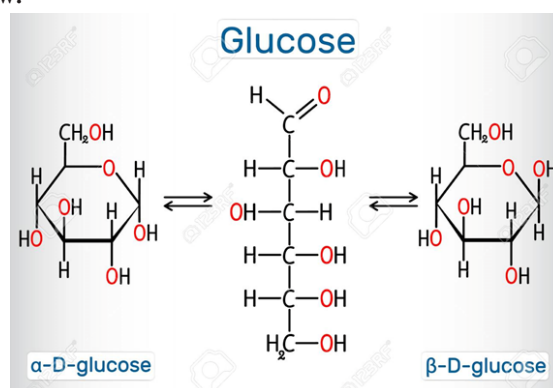


Figure 2 Glucose structure.

In path 1, which was listed above, the oxidation of glucose by $\bullet\text{OH}$ free radical takes place at the terminal groups $-\text{CHO}$ and $-\text{CH}_2\text{OH}$ to form gluconic acid and glucuronic acid. The oxidation of primary alcohols by $\bullet\text{OH}$ free radicals is known to proceed by way of an aldehyde,¹⁹ but unless the alcohol is in excess, the oxidation proceeds further to the carboxylic acid. These results clearly show that oxidation of D-glucose by $\bullet\text{OH}$ free radicals is not confined to one group and oxidation of the aldehyde as well as primary alcohol group occurs concurrently. There is also oxidative cleavage of the C-C bond giving rise to volatile compounds of low molecular weight such as formaldehyde and formic acid. The reaction as a whole is very complicated. Several chain mechanisms and rate laws were proposed to explain the overall reaction and products of the reaction. The detailed chemical aspects of this reaction are beyond the scope of this article but can be read elsewhere.^{16,17,19}

The products of terminal oxidation process were identified as:

Terminal oxidation products

- Gluconic acid
- Glucuronic acid
- Glucaric acid
- D-glucono-1,4-lactone

Volatile fractions

- Formaldehyde
- Formic acid

The reaction products were identified qualitatively by using the techniques of thin layer chromatography, column chromatography, spectrophotometry, spot analysis and mixed melting point. Formaldehyde and formic acid were estimated quantitatively using spectrophotometry and simple titration methods.¹⁶

Properties of glucose .OH free radical reaction products

Gluconic acid

It is a mild acid, neither caustic nor corrosive. It is a non-toxic and biodegradable organic acid of great interest. Gluconic acid and its derivatives are used in the formation of pharmaceuticals, cosmetics, and food products as additives or buffer salts.²⁰ Aqueous solutions of gluconic acid contain glucono delta lactone which chelates metal ions and forms stable complexes. In alkaline solutions, it exhibits strong chelating activity towards calcium, iron, aluminum, copper, and other heavy metals, and removes some undesirable and unwanted metals from the body.

Glucuronic acid

It is formed when the primary alcohol group in the glucose molecule is oxidized to the carboxylate group. Its formation takes place in the liver of all animals including humans. The main function of this acid is to combine with drugs, toxins, and hormones, either to carry them to different parts of the body or eliminate them. Glucuronic acid also assists in biosynthesis of ascorbic acid in the body. Since glucuronic acid is part of the natural detoxification process in the body, it removes harmful toxins and is used in the treatment of prostate cancer.²¹

Glucaric acid

Is a sugar acid derived from D-glucose in which both aldehydic carbon atom and the carbon atom bearing the primary hydroxyl group are oxidized to carboxylic acid groups.²²

D-Glucono 1-4 lactone

“D-glucono 1,4 lactone is delta lactone in which a hydroxy group in position 6 has been oxidized to the corresponding carboxylic acid. It is a conjugate of a glucono- 1,4-lactone”.

- [National Center for Biotechnology information, National Library of Medicine pubmed. ncbi-nih.gov/compound/D-glucaro-1,4-lactone]

Calcium D-glucarate

It is a chemical which is similar to naturally occurring chemical called glucaric acid. Glucaric acid is found in our bodies as well as in fruits and vegetables. Calcium D-glucarate is made by combining glucaric acid with calcium to make supplements that people use for medicine.²³ It enhances the glucuronidation, a process by which the body rids itself of potentially dangerous carcinogens and other harmful chemicals.

According to Dr. Thomas Slaga,²⁴ the President/CEO and the chair of the Center for Cancer Causation and Prevention at the AMC Cancer Center in Denver, “calcium D-glucarate is a substance that aids in glucuronidation, which is one of the body’s major detoxification systems for eliminating both foreign chemicals and androgenous chemicals such as steroids and sterols. Glucuronidation is a reaction where a toxin is made water-soluble so that it can be more easily excreted in the urine or bile. Calcium-D glucarate inhibits the detoxification reversing enzyme Beta-Glucuronidase and it inhibits the ‘bad enzyme’ in the detoxification process”. He further said D-glucarate has been shown to decrease lung, skin, liver, breast, and colon cancers by 60% or more.

Metabolism

In presence of stomach acid, d-glucaric acid is metabolized to D-glucaro-1,4- lactone (30 % of ingested glucaric acid), D-glucaro-6, 3-lactone (30% of ingested glucaric acid), remaining D-glucaric acid. Glucuronidation is the liver’s normal process of attaching a glucuronic acid molecule to harmful substances to detoxify and eliminate them from the body²⁴. During liver detoxification certain hormones and various toxins undergo glucuronidation and are excreted through the bile or urine. Ca-D-glucarate’s detoxifying and chemopreventive properties enable it to enhance glucuronidation²⁵ and allow the harmful compounds to be excreted. However, beta-glucuronidase enzyme has the capability to unbind these toxins which are reabsorbed and thus their excretion is stopped. D-glucaro 1,4-lactone (one of the metabolites of D-glucaric acid) has the ability to prevent this activity of B-glucuronidase and increase the excretion of toxic compounds.

Lipid lowering

Calcium-D-Glucarate lowers cholesterol by 12%, LDL by 28%, and triglyceride by 43% in humans.²⁵ CDG decreases stress on the liver which lowers our need for cholesterol, specifically LDL. When meditation is done it combats stress and therefore no additional stress hormones are formed in the system and there is no chance for glucose to increase in the blood. This helps in controlling diabetes.

Type 2 diabetes is strongly linked to heredity and lifestyle factors such as obesity, lack of exercise, and poor eating habits

What is obesity?

Obesity is generally caused by eating too much and moving too little.²⁶ If you consume high amounts of energy, particularly fats and sugars, but do not burn off the energy through exercise and physical activity, much of the surplus energy will be stored by the body as fat. This makes the body obese.

What are fats?

Chemically fats are a type of lipid consisting of triesters of glycerol and fatty acids known as triglycerides. They are mostly soluble in organic solvents and largely insoluble in water. Most naturally occurring fatty acids have an unbranched chain of an even number of carbon atoms, from 4 to 28. Triglycerides are esters of fatty acids and glycerol; a general equation for the formation of a triglyceride is shown below.²⁷

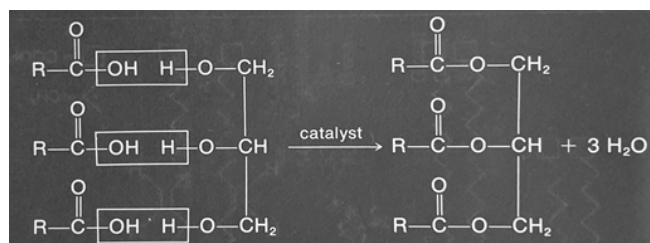


Figure 3 Triglyceride Formation.²⁷

When the fatty acids residues, or R groups, are the same, the triglyceride is known as a simple triglyceride. When the triglyceride contains two or three different R groups, it is called a mixed triglyceride. Fats are complex mixtures of simple and mixed triglycerides that exist in the solid form at room temperature. Triglycerides are hydrolyzed in the presence of acids or lipases.²⁷ During the process of hydrolysis, the acids are reformed in the system, which are attacked by hydroxyl

radicals to decarboxylate them.²⁵ According to the Haber-Weiss process²⁸ the hydroxyl radicals are formed which attack the carboxyl group in the acid and decarboxylate it.²⁹ This dissolves obesity and reduces type II diabetes. The hydrolysis reaction is shown below:

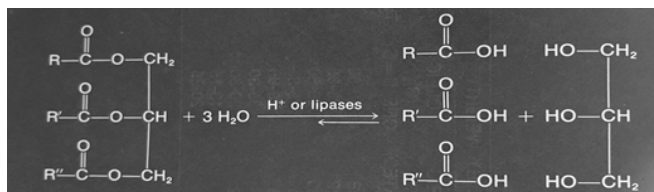
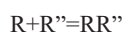
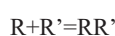


Figure 4 Hydrolysis of triglycerides.²⁷



The residue acid groups dimerize to form the following dimers:



Which are removed to some other part of the body or excreted via bile. When fatty acids are decomposed, obesity will be dissolved, controlling type II diabetes.

During the Kapalbhathi or Bhastrika Pranayama, the lung capacity is raised to 3800ml and oxygen is available in abundance in the body. The superoxides are converted to hydroxyl radicals by the Haber-Weiss process²⁸ and react with fatty acids to decarboxylate them.²⁹ This decomposes the fat which finally reduces obesity and helps in lowering type 2 diabetes.

Meditation boosts intelligence, IQ value, and increases the gray matter of the brain

Meditation enhances intelligence in different ways. It helps to make both brain hemispheres work together, boosts memory, increases brain size, and increases emotional intelligence. Some of the reasons for meditation to create an environment for intellectual growth and learning are described below:³⁰

- * Meditation has been proven to synchronize both brain hemispheres allowing much faster neural communication and much greater processing power. When the logical left brain and creative right brain begin working in harmony, problem solving becomes easy, creativity multiplies, deep thinking becomes the standard, and focus and concentration magnify. ‘Whole brain synchronization’ is consistently shown in highly successful people and can be achieved through meditation.
- * Meditation increases brain size by taking advantage of neuroplasticity, which increases the neural gray matter thickness of certain brain regions. Meditation makes the brain bigger, smarter and faster.
- * Meditation enhances beneficial brainwave patterns by guiding your brainwaves into the most beneficial frequencies: alpha, theta and delta. During meditation, the brain produces alpha and theta waves. Alpha waves are linked with a state of relaxation, which produces peace and serenity of mind and are good for anxiety, depression, stress, panic attacks and happiness and confidence. Theta waves are connected with advanced problem solving, super creativity, intuition, inspiration, lower cortisol, deep relaxation, and better sleep and emotional intelligence

- * Meditation boosts insight and intuition.
- * Meditation improves both long and short term memory capacity.
- * Meditation advances emotional intelligence (EQ). Regular meditation increases EQ, which is the ability to tune into and listen to emotions and regulate emotional responses in a calm and thoughtful manner.

In a study the brains of 17 people were examined after 8 weeks of participating in a meditation program. Brain scans showed an increase in gray matter responsible for learning, memory, and emotional regulation.³¹ Additionally, 2016 study from researchers at Carnegie Mellon University demonstrated how mindfulness meditation can improve concentration and decision making power.

‘Using the latest MRI brain imaging technology, a landmark 2000 Harvard study found that in both the short and long term meditation practitioners naturally and beneficially increased the neural mass (gray matter) of the brain regions associated with long and short term memory, focused attention, deep thought, and overall brain power while simultaneously quieting the electrical activity within the regions associated with anxiety, depression, fear, and anger. Needless to say, the implications of being able to build a better brain through meditation are immense.’

- Eco Institute.³²

Siegfried Othmer, former President of the neurofeedback division of the Association for Applied Psycho-Physiology and Biofeedback, found that participants who meditated showed an average increase in IQ of around 23%.³³

Meditation lowers the risk of coronary heart disease and has the potential to reverse it

Chest pain from coronary heart disease (CHD) accounts for more than 8 million emergency department visits every year in the United States, emphasizing the need for cardiovascular (CV) interventions to help reduce this high number: Meditation – a state of contemplation, concentration, and reflection – has the potential to help decrease cardiovascular disease (CVD).³⁴

Living with health conditions – such as heart disease – can be stressful at times, so having techniques to handle that can be particularly useful to people with heart conditions. There is no evidence to suggest that stress causes coronary heart disease or heart attacks. But if you have coronary heart disease and experience feelings of anxiety or are under lots of stress, it may bring on symptoms like angina. According to the British Heart Foundation:³⁵

‘15 minutes of meditation a day reduced the risk of death, heart attack, and stroke by 48%’

Satish Sivasankaran, M.D, while training at Yale said that volunteers taking six weeks of yoga meditation programs improved blood vessel function by 17%. He further said yoga and meditation are often recommended as a way to relieve stress.³⁶

Meditation reverses heart disease: Dean Ornish, MD, Cardiologist, healthcare reformer, founder and president of the non-profit Preventative Medicine at University of California San Francisco, is the first clinician to offer documented proof that heart disease can be halted or even reversed simply by changing lifestyle, such as by following a regular program of exercise, meditation, diet changes and more. Dr. Ornish’s program has yielded amazing results. Participants reduced or discontinued medications, they learned how to lower

blood pressure through meditation, their chest pain diminished or disappeared, they felt more energetic, happy and calm, and blockages in the coronary artery were reduced. The practice of meditation helped patients to reduce stress and lower blood pressure.

Meditation can lower anxiety and depression

Positivity of mind

One way meditation can help relieve depression and anxiety is by changing our way of thinking. During meditation it is natural for our thoughts to wander and sometimes those thoughts can be negative. The negativity of the mind makes us agitated and restless. Our actions are disturbed and become unbalanced. Thoughts of worry and fear are destructive. Thoughts of depression, failure, weakness, darkness, doubts etc... are all negative thoughts and should always be avoided. They are very dangerous and destroy the harmony, efficiency, vitality and vigor within us. A mind full of evil thoughts acts as a magnet to attract like thoughts from others and thus intensify the original evil. The opposite thoughts of cheerfulness, joy and courage heal and soothe. They increase our mental power and improve our efficiency. The negative thoughts enhance anxiety and depression while positivity of mind helps relieve them. Positive thinking develops higher emotions like courage, love, and contentment, which substitute negative impulses like fear, anger, jealousy or impatience. Numerous studies have shown that the positive impact of meditation on mental and physical well-being has the potential to reduce anxiety and depression. Therefore, we should only entertain thoughts that are useful and helpful. Useful thoughts are the stepping stones to our spiritual growth and progress. All thoughts of a destructive nature, such as thoughts of jealousy, hatred and selfishness, and thoughts that bring disharmony and discord to our mind should be replaced by good, loving, constructive, divine thoughts which bring strength and positivity. We must develop right thinking in which every thought must bring peace and solace to everyone around us. As we think, so we become. As our thoughts are, so is our life.

Power of thoughts

As you think, so you become. As your thoughts are, so must be your life. Therefore, it is essential to improve our thinking. We should learn to see positivity of mind in every action. Thoughts are very powerful. Thoughts can heal diseases and have the power to change the mentality of a person. Thoughts are subtle matters. They consist of powerful energy, which once created have the ability to influence not only our life but the life of others too, "A thought is not just a thought, it is a living force." Swami Sivananda says "A good positive thought is thrice blessed. Firstly it benefits the thinker, secondly it benefits the person about whom it is entertained, and lastly it benefits all of society by improving the general mental atmosphere. A negative thought, on the other hand, is thrice cursed. Firstly it harms the thinker, secondly it harms its object, and lastly it harms all humanity by violating the whole mental atmosphere." We should learn to see positive energy everywhere. Purity of thoughts is extremely important as it helps us to see better, taste better, and think better. The purity of actions is defined in Bhagavad Gita is as follows –

"Action performed as duty, without attachment, without love or hate, without desire for fruit, is called pure"

– *Bhagavad Gita (XVIII - 23)*

Actions and possessions in themselves do not bring us happiness but our attachment to them brings worry and anxiety to our mind. Thoughts have tremendous power. Thoughts can heal diseases.

Thoughts can change the mentality of a person. Thoughts can do anything. Thoughts are the silent bricks that build our life. They can do wonders. They can change the destiny of a person. Swami Sivananda writes –

"Man sows a thought and reaps an action.

He sows an action and reaps a habit. He sows a habit and reaps a character.

He sows a characters and reaps a destiny"

"Man has made his own destiny by his own thinking and acting. He can change his destiny. He is the master of his own destiny. There is no doubt of this. By right thinking and strong exertion, He can become the master of his destiny."

– Swami Sivananda

One of the great practices to make the mind more positive is to loosen our desires. Desires by themselves are harmless, but they become stronger when they combine with the power of imagination or thought. Desire generally begets desire in an endless cycle which creates restlessness and greed in the mind. If the desires are not satisfied they cause frustration and greed in the mind. An unsatisfied desire can cause anger and frustration and lead to disharmony and enmity and create feelings of anxiety and depression.³ Swami Sivananda further states:

"One of the greatest techniques for strengthening positive thinking is the practice of thinking opposite.

We habituate the mind to comparing and learn to separate negative thoughts and positive ones.

For example, hatred ceases not by hatred, but by love."

– *Patanjali yoga sutra II-34, page 73*

Effect of positive thinking on physical and emotional health

Positive qualities such as truthfulness and earnestness are the best sources to enhance physical and emotional strength. A healthy body creates a healthy mind. In turn, healthy thoughts and emotions help to maintain a healthy body, while negative ones breed illness. Fits of hot temper, intense passion, bitter jealousy and corroding anxiety may cause damage to our brain cells and release toxic chemicals in our blood stream that drains away vitality and induces premature aging.³⁷ Happiness, cheerfulness, laughter and serenity of mind are the tonics for the body. They boost blood circulation and increase happiness hormones called endorphins which can counteract several psychological and emotional diseases like anxiety, depression and stress.

Meditation relieves pain

Meditation helps boost health and well-being. It helps to relieve stress, reduce anxiety and improve self-awareness. Along with improving mental health, meditation also supports physical health. It has the potential to reduce chronic pain and give natural relief. Meditation can relieve chronic pain by triggering the release of endorphins, our body's natural pain killer.³⁸ Chronic pain is physically and psychologically stressful and its constant discomfort can lead to anger and frustration with yourself and others. By definition chronic pain is pain that lasts for longer than 6 months. While physicians can help in providing treatment for physical aspects of chronic pain, psychologists help to manage its mental and emotional aspects.

Meditation may relieve chronic pain and depression. Research shows that meditation uses neural pathways to make the brain less sensitive to pain and increases the use of the brain's own pain reducing opioids.³⁹

Research on pain management found that participants who meditated actively reported a 32% reduction in pain intensity and a 33% reduction in pain unpleasantness.³⁹

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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References

- Meditation, Sivananda Yoga Europe. 2023.
- Hewitt James. The Complete Yoga Book. Leopold books, UK: 1995.
- Swami Vishnu-Devnanda. The Sivananda Companion to Meditation. The Sivananda Yoga Vedanta Center. Simon and Schuster: 2003.
- Robin Monro, Nagarathna, Negendra; Yoga for Common Ailments, Published by Simon and Schuster Inc. New York: 1990.
- Stress and your health: MedlinePlus Medical Encyclopedia.
- World Health Organization (W.H.O).
- Stress symptoms, signs and causes. 2023.
- Herbert Benson MD, Miriam Z. Kilipper. Relaxation response. Harper Collins: 2009.
- Jeanie Lerche Davis. Meditation Balances the Body's Systems.
- Mass General Hospital.
- Create And Thrive. 5 techniques to reduce stress and relax.
- Stress and diabetes.
- University of California, San Francisco. Diabetes Education Online.
- Vasudeva WC. Yogic breathing for highest protection to life: a brief overview. current innovations in disease and health research. 2023;3:93–129.
- Behnan KY. Yoga: a scientific evaluation. Macmillan; New York: 1937.
- Vasudeva WC. The Oxidation of D(+) Glucose and some Polyhydric Alcohols by Peroxydisulphate. Ph.D. Thesis, Department of Chemistry, University of Khartoum, Sudan. 1969.
- Vasudeva WC, Taha MI, Wasif S. A Kinetic and stoichiometric study of the reaction between Glucose and Peroxydisulphate, *J.Inorganic & Nuclear Chemistry*. 1972;34(10):3159.
- Taha MI, Vasudeva WC, Wasif S. Oxidation of D-Glucose by Peroxydisulphate. *Carbohydrate Res*. 1966;2:175–177.
- Bartlett PD, Cotman JD. *Journal of American Chemical Society*. 1949;71:1419.
- Glucuronic Acid. National Center for Biotechnology Information.
- What is Glucuronic Acid? The Health Board.
- Glucaric acid. National Center for Biotechnology Information.
- Calcium d-glucarate: Overview, uses, side effects, precautions, interactions, dosing and reviews.
- Slaga T. 2015.
- Calcium-D-glucarate. *Alternative Medicine Review*. 2002;7(4)336–339.
- Obesity. NHS.
- Triglycerides. CK12-Foundation.
- Haber F, Weiss J. Uber die katalyse hydroperoxydes on the catalysis of hydroperoxide. *Naturwissenschaften*. 1932;20(51):948–950.
- Vasudeva WC. An Electron Spin Resonance Study of Reactions of Carboxylic Acids with the Sulphate Radical Anions. *Journal of Chemical Society*. Perkin Transactions II. 1975.
- Devi R, Rathore M. (2021). Implementation of Yoga in education as a strategy for enhancing student's educational achievements. *International Journal of Interdisciplinary Research*. 2021.
- Heger E. Insider. 7 benefits of meditation and how it can affect your brain. 2020.
- Super Memory: How to Improve Brain Power & IQ Big Time. EOC institute.
- Meditation: Boost Your Memory and IQ. Corporate Finance Institute.
- Ray IB. Meditation and coronary heart disease: a review of the current clinical evidence. *The Ochsner Journal*. 2014.
- Can meditation help people with heart disease? BHF.
- Peck P, Nazario B. Yoga gets hearts healthy. 2004.
- The Sivananda Beginner's Guide to Yoga. The Sivananda Yoga Center. Published by Gaia Books, 2006.
- Meditation for Pain Relief: How it Works and 3 Types to Try. Psych Central.
- Coping with chronic pain. American Psychological Association.