

SESSION 3 MEDITATION AND HOMEOSTASIS

Meditation Balances the Body's Systems

The mind, heart, and body can improve with regular meditation.

Most Americans aren't raised to sit and say "Om." But meditation has gained millions of converts, helping them ease chronic pain, anxiety, stress, improve heart health, boost mood and immunity, and resolve pregnancy problems.

Any condition that's caused or worsened by stress can be alleviated through meditation, says cardiologist Herbert Benson, MD, well known for three decades of research into the health effects of meditation. He is the founder of the Mind/Body Institute at Harvard Medical School's Beth Israel Deaconess Medical Center.

"The relaxation response [from meditation] helps decrease metabolism, lowers blood pressure, and improves heart rate, breathing, and brain waves," Benson says. Tension and tightness seep from muscles as the body receives a quiet message to relax.

There's scientific evidence showing how meditation works. In people who are meditating, brain scans called MRI have shown an increase in activity in areas that control metabolism and heart rate. Other studies on Buddhist monks have shown that meditation produces long-lasting changes in the brain activity in areas involved in attention, working memory, learning, and conscious perception.

The soothing power of repetition is at the heart of meditation. Focusing on the breath, ignoring thoughts, and repeating a word or phrase - a mantra - creates the biological response of relaxation, Stan Chapman, PhD, a psychologist in the Center for Pain Medicine at Emory Healthcare in Atlanta, tells WebMD.

"Meditation is not difficult to learn," Chapman tells WebMD. "You don't need to see a therapist 40 times to learn it. But like tennis, it's a skill. You need to practice. In time, people develop the ability to produce these meditative, very relaxed states very quickly. When they meditate several times during the day, they become more relaxed during the entire day."

Some research on meditation's benefits:

Heart Health: Countless studies have looked at meditation and heart health. Regular practice has been shown to significantly help [high blood pressure](#) over the long term, according to government-sponsored studies conducted at the College of Maharishi Vedic Medicine in Fairfield, Iowa. Among those studies, one showed significant lowering of blood pressure and heart rate in black adults.

Also, a study in the *American Journal of Hypertension* showed that teenagers who meditated for 15 minutes twice a day for four months were able to lower their blood pressure a few points.

Immune Booster: Meditation also helps ward off illness and infections. In one study testing immune function, flu shots were given to volunteers who had meditated for eight weeks and to people who didn't meditate. Blood tests taken later showed the meditation group had higher levels of antibodies produced against the flu virus, according to the study in *Psychosomatic Medicine*.

Women's Health: [Premenstrual syndrome](#) (PMS), infertility problems, and even [breastfeeding](#) can be improved when women meditate regularly. In one study, PMS symptoms subsided by 58% when women meditated. Another study found that hot flashes were less intense among meditating women.

Women struggling with infertility had much less anxiety, depression, and fatigue following a 10-week meditation program (along with exercise and nutrition changes); 34% became pregnant within six months. Also, new mothers who meditated on images of milk flowing from their breasts were able to more than double their production of milk.

Introduction

Meditation is a mind-body practice in [complementary and alternative medicine](#) (CAM). There are many types of meditation, most of which originated in ancient religious and spiritual traditions. Generally, a person who is meditating uses certain techniques, such as a specific posture, focused attention, and an open attitude toward distractions. Meditation may be practiced for many reasons, such as to increase calmness and physical relaxation, to improve psychological balance, to cope with illness, or to enhance overall health and well-being. This Backgrounder provides a general introduction to meditation and suggests some resources for more information.

Key Points

- People practice meditation for a number of health-related purposes.
- It is not fully known what changes occur in the body during meditation; whether they influence health; and, if so, how. Research is under way to find out more about meditation's effects, how it works, and diseases and conditions for which it may be most helpful.
- Tell your health care providers about any complementary and alternative practices you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.

Overview

The term *meditation* refers to a group of techniques, such as mantra meditation, relaxation response, [mindfulness meditation](#), and Zen Buddhist meditation. Most meditative techniques started in Eastern religious or spiritual traditions. These techniques have been used by many different cultures throughout the world for thousands of years. Today, many people use meditation outside of its traditional religious or cultural settings, for health and well-being.

In meditation, a person learns to focus attention. Some forms of meditation instruct the practitioner to become mindful of thoughts, feelings, and sensations and to observe them in a nonjudgmental way. This practice is believed to result in a state of greater calmness and physical relaxation, and psychological balance. Practicing meditation can change how a person relates to the flow of emotions and thoughts.

Most types of meditation have four elements in common:

- **A quiet location.** Meditation is usually practiced in a quiet place with as few distractions as possible. This can be particularly helpful for beginners.
- **A specific, comfortable posture.** Depending on the type being practiced, meditation can be done while sitting, lying down, standing, walking, or in other positions.
- **A focus of attention.** Focusing one's attention is usually a part of meditation. For example, the meditator may focus on a mantra (a specially chosen word or set of words), an object, or the sensations of the breath. Some forms of meditation involve paying attention to whatever is the dominant content of consciousness.
- **An open attitude.** Having an open attitude during meditation means letting distractions come and go naturally without judging them. When the attention goes to distracting or wandering thoughts, they are not suppressed; instead, the meditator gently brings attention back to the focus. In some types of meditation, the meditator learns to “observe” thoughts and emotions while meditating.

Meditation used as CAM is a type of [mind-body medicine](#). Generally, mind-body medicine focuses on:

- The interactions among the brain/mind, the rest of the body, and behavior.
- The ways in which emotional, mental, social, spiritual, and behavioral factors can directly affect health.

Uses of Meditation for Health in the United States

A 2007 national Government survey that asked about CAM use in a sample of 23,393 U.S. adults found that 9.4 percent of respondents (representing more than 20 million people) had used meditation in the past 12 months—compared with 7.6 percent of respondents (representing more than 15 million people) in a similar survey conducted in 2002. The 2007 survey also asked about CAM use in a sample of 9,417 children; 1 percent (representing 725,000 children) had used meditation in the past 12 months.

People use meditation for various health problems, such as:

- Anxiety
- Pain
- Depression
- Stress
- Insomnia
- Physical or emotional symptoms that may be associated with chronic illnesses (such as heart disease, HIV/AIDS, and cancer) and their treatment.

Meditation is also used for overall wellness.

Examples of Meditation Practices

Mindfulness meditation and Transcendental Meditation (also known as TM) are two common forms of meditation. NCCAM-sponsored research projects are studying both types of meditation.

Mindfulness meditation is an essential component of Buddhism. In one common form of mindfulness meditation, the meditator is taught to bring attention to the sensation of the flow of the breath in and out of the body. The meditator learns to focus attention on what is being experienced, without reacting to or judging it. This is seen as helping the meditator learn to experience thoughts and emotions in normal daily life with greater balance and acceptance.

The TM technique is derived from Hindu traditions. It uses a mantra (a word, sound, or phrase repeated silently) to prevent distracting thoughts from entering the mind. The goal of TM is to achieve a state of relaxed awareness.

How Meditation Might Work

Practicing meditation has been shown to induce some changes in the body. By learning more about what goes on in the body during meditation, researchers hope to be able to identify diseases or conditions for which meditation might be useful.

Some types of meditation might work by affecting the autonomic (involuntary) nervous system. This system regulates many organs and muscles, controlling functions such as heartbeat, sweating, breathing, and digestion. It has two major parts:

- The **sympathetic nervous system** helps mobilize the body for action. When a person is under stress, it produces the “fight-or-flight response”: the heart rate and breathing rate go up and blood vessels narrow (restricting the flow of blood).
- The **parasympathetic nervous system** causes the heart rate and breathing rate to slow down, the blood vessels to dilate (improving blood flow), and the flow of digestive juices increases.

It is thought that some types of meditation might work by reducing activity in the sympathetic nervous system and increasing activity in the parasympathetic nervous system.

In one area of research, scientists are using sophisticated tools to determine whether meditation is associated with significant changes in brain function. A number of researchers believe that these changes account for many of meditation's effects.

It is also possible that practicing meditation may work by improving the mind's ability to pay attention. Since attention is involved in performing everyday tasks and regulating mood, meditation might lead to other benefits.

A 2007 NCCAM-funded review of the scientific literature found some evidence suggesting that meditation is associated with potentially beneficial health effects. However, the overall evidence was inconclusive. The reviewers concluded that future research needs to be more rigorous before firm conclusions can be drawn.

Side Effects and Risks

Meditation is considered to be safe for healthy people. There have been rare reports that meditation could cause or worsen symptoms in people who have certain psychiatric problems, but this question has not been fully researched. People with physical limitations may not be able to participate in certain meditative practices involving physical movement. Individuals with existing

mental or physical health conditions should speak with their health care providers prior to starting a meditative practice and make their meditation instructor aware of their condition.

If You Are Thinking About Using Meditation Practices

- Do not use meditation as a replacement for conventional care or as a reason to postpone seeing a doctor about a medical problem.
- Ask about the training and experience of the meditation instructor you are considering.
- Look for published research studies on meditation for the health condition in which you are interested.
- Tell all your health care providers about any complementary and alternative practices you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care. For tips about talking with your health care providers about

NCCAM-Supported Research

Some recent NCCAM-supported studies have been investigating meditation for:

- Relieving stress in caregivers for elderly patients with dementia
- Reducing the frequency and intensity of hot flashes in menopausal women
- Relieving symptoms of chronic back pain
- Improving attention-related abilities (alerting, focusing, and prioritizing)
- Relieving asthma symptoms.

Health Conditions That Are Benefited By Meditation

Drug Addiction

The Transcendental Meditation technique has proven to be a successful coping strategy in helping to deal with drug addiction," a useful tool in psycho-neuro-immunology (PNI) by helping to control the immune system, and an effective manager of stress and pain.

Prolonging Life Expectancy

A strong link has also been established between the practice of TM and longevity. Only two factors have been scientifically determined to actually

extend life: caloric restriction and lowering of the body's core temperature. Meditation has been shown to lower core body temperature.

Stress Control

Most of the people who get on meditation do so because of its beneficial effects on stress. Stress refers to any or all the various pressures experienced in life. These can stem from work, family, illness, or environment and can contribute to such conditions as anxiety, hypertension, and heart disease. How an individual sees things and how he or she handles them makes a big difference in terms of how much stress he or she experiences.

Research has shown that hormones and other biochemical compounds in the blood indicative of stress tend to decrease during TM practice. These changes also stabilize over time, so that a person is actually less stressed biochemically during daily activity.

This reduction of stress translates directly into a reduction of anxiety and tension. Literally dozens of studies have shown this.

Pain Management:

Chronic pain can systematically erode the quality of life. Although great strides are being made in traditional medicine to treat recurring pain, treatment is rarely as simple as prescribing medication or surgery.

Anxiety decreases the threshold for pain and pain causes anxiety. The result is a vicious cycle. Compared with people who feel relaxed, those under stress experience pain more intensely and become even more stressed, which aggravates their pain. Meditation breaks this cycle.

Childbirth preparation classes routinely teach pregnant women deep breathing exercises to minimize the pain and anxiety of labor. Few call it breath meditation, but that's what it is.

Meditative techniques are also a key element in the Arthritis self-help Course at Stanford University. More than 100,000 people with arthritis have taken the 12-hour course and learned meditation-style relaxation exercises as part of a comprehensive self-care program. Graduates report a 15 to 20 percent reduction in pain.

In one study overseen by Dr. Kabat-Zinn, 72 percent of the patients with chronic pain conditions achieved at least a 33 percent reduction after participating in an eight-week period of mindful meditation, while 61 percent of the pain

patients achieved at least a 50 percent reduction. Additionally, these people perceived their bodies as being 30 percent less problematic, suggesting an overall improvement in self-esteem and positive views regarding their bodies.

Meditation may not eliminate pain, but it helps people cope more effectively.

Cancer and Other Chronic Illness

Meditation and other approaches to deep relaxation help center people so they can figure out how they'd like to handle the illness and proceed with life. Dr. Ainslie Meares, an Australian psychiatrist who uses meditation with cancer patients, studied seventy-three patients who had attended at least twenty - sessions of intensive meditation, and wrote: "Nearly all such patients can expect significant reduction of anxiety and depression, together with much less discomfort and pain. There is reason to expect a 10 percent chance of quite remarkable slowing of the rate of growth of the tumor, and a 50 percent chance of greatly improved quality of life."

Heart disease.

Meditation is a key component of Ornish therapy, the only treatment scientifically proven to reverse heart disease.

High blood pressure.

As soon as Dr. Benson learned that TM reliably reduced blood pressure in meditators, he taught the relaxation response to 36 people with moderately elevated blood pressure. After several weeks of practice, their average blood pressure declined significantly, reducing their risk of stroke and heart attack.

Infertility

Couples dealing with infertility may become depressed, anxious and angry. To help them cope, Alice D. Domar, Ph.D., a psychologist at the Mind/Body Medical Institute, taught the relaxation response to one group of infertile couples. Compared with a similar group of infertile couples who did not learn deep relaxation, the meditators experienced less distress-and were more likely to get pregnant.

Psoriasis:

This disease causes scaly red patches on the skin. A pilot study at Dr. Kabat-Zinn's clinic suggests that compared with the skin patches of people with psoriasis who

receive only standard medical therapy, the skin patches of those who also meditate clear up more quickly.

Respiratory crises

Asthma, emphysema and chronic obstructive pulmonary disease (COPD) all restrict breathing and raise fears of suffocation, which in turn makes breathing even more difficult. Studies at Dr. Kabat-Zinn's clinic show that when people with these respiratory conditions learn breath meditation, they have fewer respiratory crises.

Premenstrual Syndrome (PMS), Tension Headaches

Meditation can ease physical complaints such as premenstrual syndrome (PMS), tension headaches and other common health problems.

Meditation gives people a psychological buffer so that life's hectic pace doesn't knock them out. Practicing meditation is like taking a vacation once or twice a day. When you nurture yourself, you accrue tremendous spin-off benefits.

For example, when you are under high stress, it can worsen symptoms of PMS because stress can cause the muscle tension associated with PMS complaints such as fatigue, soreness and aching. On the other hand, when you meditate regularly, you dramatically reduce your body's response to stress, and that can ease the discomfort associated with PMS. The results may not be apparent for several months. You will probably need to meditate regularly for several months before your body responds positively.

Irritable Bowel Syndrome, Ulcers, and Insomnia

Meditation can also improve irritable bowel syndrome, ulcers, and insomnia, among other stress-related conditions. Eighty percent of the people who use meditation to relieve insomnia are successful.

Meditation can help prevent or treat stress-related complaints such as anxiety, headaches and bone, muscle and joint problems. Meditation also provides an inner sense of clarity and calm, and that, in itself, may help ward off certain illnesses.

Fibromyalgia

According to one study, meditation may relieve the discomfort of fibromyalgia, a condition that causes fatigue and intensely painful "trigger points." When 77 men and women with fibromyalgia followed a ten-week stress-reduction

program using meditation, all reported that their symptoms improved. And half described their improvements as "moderate to marked.

Team of researchers led by Associate Professor Maria Kozhevnikov from the Department of Psychology at the National University of Singapore (NUS) Faculty of Arts and Social Sciences showed, for the first time, that it is possible for core body temperature to be controlled by the brain. The scientists found that core body temperature increases can be achieved using certain meditation techniques (g-tummo) which could help in boosting immunity to fight infectious diseases or immunodeficiency.

Published in science journal *PLOS ONE* in March 2013, the study documented reliable core body temperature increases for the first time in Tibetan nuns practising g-tummo meditation. Previous studies on g-tummo meditators showed only increases in peripheral body temperature in the fingers and toes. The g-tummo meditative practice controls "inner energy" and is considered by Tibetan practitioners as one of the most sacred spiritual practices in the region. Monasteries maintaining g-tummo traditions are very rare and are mostly located in the remote areas of eastern Tibet.

The researchers collected data during the unique ceremony in Tibet, where nuns were able to raise their core body temperature and dry up wet sheets wrapped around their bodies in the cold Himalayan weather (-25 degree Celsius) while meditating. Using electroencephalography (EEG) recordings and temperature measures, the team observed increases in core body temperature up to 38.3 degree Celsius. A second study was conducted with Western participants who used a breathing technique of the g-tummo meditative practice and they were also able to increase their core body temperature, within limits.

Applications of the research findings

The findings from the study showed that specific aspects of the meditation techniques can be used by non-meditators to regulate their body temperature through breathing and mental imagery. The techniques could potentially allow practitioners to adapt to and function in cold environments, improve resistance to infections, boost cognitive performance by speeding up response time and reduce performance problems associated with decreased body temperature. The two aspects of g-tummo meditation that lead to temperature increases are "vase breath" and concentrative visualisation. "Vase breath" is a specific breathing technique which causes thermogenesis, which is a process of heat production. The other technique, concentrative visualisation, involves focusing on a mental imagery of flames along the spinal cord in order to prevent heat losses. Both techniques work in conjunction leading to elevated temperatures up to the moderate fever zone.

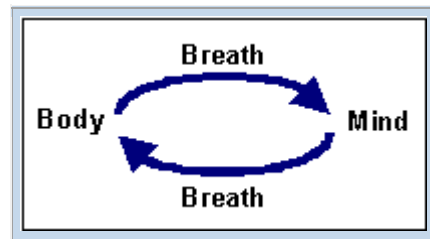
Assoc Prof Kozhevnikov explained, "Practicing vase breathing alone is a safe technique to regulate core body temperature in a normal range. The

participants whom I taught this technique to were able to elevate their body temperature, within limits, and reported feeling more energized and focused. With further research, non-Tibetan meditators could use vase breathing to improve their health and regulate cognitive performance."

Further research into controlling body temperature

Assoc Prof Kozhevnikov will continue to explore the effects of guided imagery on neurocognitive and physiological aspects. She is currently training a group of people to regulate their body temperature using vase breathing, which has potential applications in the field of medicine. Furthermore, the use of guided mental imagery in conjunction with vase breathing may lead to higher body temperature increases and better health

Preparation for meditation: In Yoga Meditation, breath training is essential preparation for deep meditation and samadhi, on the path to Self-Realization. Breath is the bridge between the body and the mind. Regulate breath, and the body and mind will follow.



Brief descriptions: Below are brief descriptions of a broad range of breathing practices. These outlines give general descriptions, and are not intended to be complete instructions in doing the practices. To do the practices, it is important to have personal training, not merely relying on written words. **Practices are known by different names:** To avoid confusion, it is useful to note that the collective practice, of which breathing and pranayama practices are considered a part, may be known by different names when used by different modern teachers. This is particularly true with the practices dealing with the spinal energy and the vigorous practices. The breathing and pranayama practices may be known collectively, or considered to be part of **pranayama** alone, **hatha Yoga, raja Yoga, kundalini Yoga, kriya Yoga, tantra**, or simply **Yoga**. Other systems will use the practices as part of a modern trademarked or brand name Yoga practice, such as those containing either a Sanskrit word or a man's name.

Basics of breath

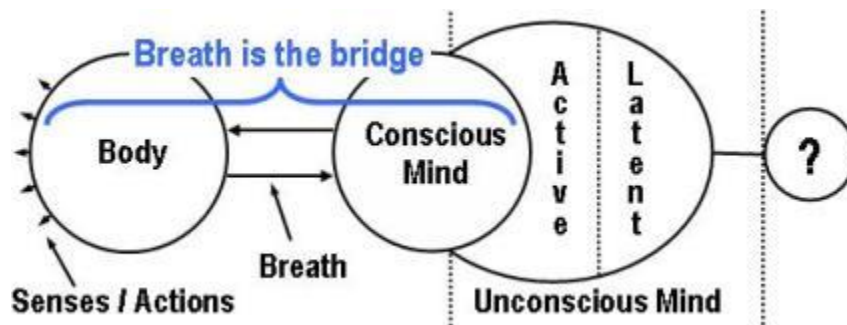
Remember to build the foundation: First, you establish the basics of breathing. If you will quickly scan the topics listed in this section, immediately below, you will see that they are not so much breathing *techniques* as they are methods of establishing basic breath

awareness, and elimination of irregularities. With breath training, one of the biggest mistakes is to skip the foundation, and go directly into the techniques themselves.

The science of breath
begins with awareness,
and *ends* with awareness.

It begins and ends with awareness: Breath awareness is so important that, in a sense, you can say that the whole science of breath begins with awareness, and ends with awareness. Everything else, in the middle, is preparation for awareness.

The finest bridge between body and mind: Breath is a bridge between the body and the mind. When trying to meditate it is extremely common to have tension in the muscles and noisy thoughts in the mind. The nervous system is the arbiter between the tense body and the noisy mind. One of the best ways to regulate that nervous system, and in turn the body and mind, is through the breath. This has been known by the Yogis for thousands of years, and has also come to be widely known in recent years by the modern medical and psychological community.



Value of Soham and breath: One of the finest, easiest, and most direct ways to train the breath, and in turn, regulate the nervous system, relax the body, and quiet the mind is through Soham mantra practiced at a steady, slow speed, with exhalation somewhat longer in duration than the inhalation.

Fatigue—

Fatigue Fighters: 6 Quick Ways to Boost Energy **Energy Boost #3: Take breaks**

Multitasking is viewed as the way to get a lot done quickly. But taking a short break and doing absolutely nothing for a few minutes can help you overcome fatigue and actually get more done in the course of a day, says Jon Gordon, a Florida-based consultant who advises corporations and athletes on how to stay energized. One short break of 5 or 10 minutes or even less can boost your energy immediately, and making break time a habit can keep your energy up long-term, he says.

"If you take short breaks throughout the day, you will have more overall accomplishments," says Gordon, author of *The Energy Bus*.

Human performance studies show he's right. In one conducted at Louisiana State University and published in *Computers and Industrial Engineering*, researchers compared three different work-rest schedules for workers who used the computer. The schedule that allowed for briefer, more frequent breaks was best in terms of fighting fatigue and increasing productivity.

The researchers found that workers who took four breaks per hour, usually just 30 seconds each, followed by a 14-minute break after two hours of sitting at the computer, reported higher performance and worked faster and more accurately than their co-workers.

Energy Boost #4: Get moving

For an instant energy boost, drop out of your busy life for 10 minutes and hit the road, or the hallways of your office. "Walking is an energizer," says Gordon. Even a 10-minute walk can help you overcome feelings of fatigue.

And yes, it works better than a sugar infusion. In a study published two decades ago but still often-quoted, Robert Thayer, PhD, a professor at California State University, Long Beach, compared the energizing effects on 12 different days when 18 people either ate a candy bar or walked briskly for 10 minutes. Walking was the better bet. Walking increased energy for two hours. The sugar snack initially boosted energy, but after an hour, participants were more tired and had less energy.

Energy Boost #5: Take 5 and meditate

Numerous studies have demonstrated the fatigue-fighting effects of meditation, but there's no need to light candles, sit cross-legged, or learn a mantra. Mini-meditation can work wonders, says Judith Orloff, MD, an assistant clinical professor of psychiatry at the University of California Los Angeles and author of *Positive Energy*.

"A three-minute meditation is a way to calm yourself down and stop rushing," she says. "You can replenish yourself. You can take control of your energy."

Orloff suggests getting the day off to a positive start with a mini-meditation while you're still in bed, then continuing with short meditation breaks throughout the day. Any quiet place in your home or office will do, Orloff says. You can even use the office bathroom for an instant energy boost.

"Close your eyes, and take a few deep breaths," Orloff says. "Begin to relax your body. When thoughts come, think of them like clouds in the sky. Let them float by. Visualize a positive thing: a sunset, the beach in Hawaii."

