

SCIENTIFIC RESEARCH SUMMARY

Research Findings: The Transcendental Meditation Program and Health

Introduction

During the past 30 years, more than 600 scientific research studies validating the benefits of the Transcendental Meditation® technique have been conducted in over 30 countries at 210 independent research institutions and universities, including Harvard, Stanford, and UCLA Medical School. This fact sheet provides an overview of physiological effects, a summary of recent research, and references confirming benefits for individual and public health resulting from the practice of the TM® technique.

Overview: Physiological Effects of the TM Technique

The original research on the physiological correlates of the TM technique was published in *Science*, the *American Journal of Physiology*, and *Scientific American* in 1970–1972. This research found that the TM technique produces a physiological state of restful alertness, distinct from ordinary waking, dreaming, and deep sleep. During practice of the TM technique, the physiology becomes deeply rested, as indicated by significant reductions in respiration, minute ventilation, tidal volume, and blood lactate, and significant increases in basal skin resistance (an index of relaxation). At the same time, the physiology is alert rather than asleep, as indicated by an increased abundance of alpha waves in the EEG. These initial physiological findings led researchers to investigate the effects of TM practice on health.

Recently Published Research Funded by the National Institutes of Health

Reduced Blood Pressure (*American Journal of Hypertension*, 2008)

This meta-analysis evaluated nine randomized, controlled trials using the Transcendental Meditation technique as the primary intervention for hypertensive patients. The practice of the TM technique was associated with approximate reductions of 4.7 mm systolic blood pressure and 3.2 mm diastolic blood pressure. The findings reinforce an earlier study that found the Transcendental Meditation technique produces a statistically significant reduction in high blood pressure that was not found with other forms of relaxation, meditation, biofeedback, or stress management.

Reduced Heart Failure (*Ethnicity & Disease*, Winter 2007)

The Transcendental Meditation technique was found to significantly decrease the severity of congestive heart failure, in a randomized, controlled study conducted by researchers at the University of Pennsylvania School of Medicine. Heart function improved significantly in the meditating group compared to controls that followed a health education program. The TM group also showed improvements in quality of life measurements, including depression, and had fewer rehospitalizations.

Decreased Reactivity to Pain (*NeuroReport*, August 2006)

This controlled study used functional magnetic resonance imaging (fMRI) to study the brain's reactivity to pain in those practicing the TM technique and in control subjects. Researchers at UC Irvine studied 24 healthy adults (average age: 56-58 years). The subjects practicing the TM technique showed 40% to 50% less brain activity in certain regions in response to the pain as compared to the control subjects. Following the initial experimental period, control subjects were then taught the TM technique and were retested after 5 months

of twice daily TM practice. Brain scans showed 40% to 50% less brain activity in response to the pain, compared with their first scans five months earlier.

Decreased Metabolic Syndrome (*JAMA's Archives of Internal Medicine*, June 2006)

This randomized, placebo-controlled, 16 week clinical study involved 103 subjects with stable coronary heart disease (CHD). The study found that subjects practicing the TM technique experienced decreased "metabolic syndrome"-- a cluster of heart disease and diabetes risk factors, such as excess body weight, high blood pressure, high blood sugar and high cholesterol levels--as compared with a control group receiving health education. These beneficial health effects were achieved without changes in body weight, medication or psychosocial variables. These results suggest that TM modulates the physiological response to stress and significantly improves CHD risk factors.

Extended Longevity (*American Journal of Cardiology*, May 2005)

This study was a first-of-its-kind long-term, randomized trial. It evaluated the death rates of 202 men and women, average age 71, who had mildly elevated blood pressure. Subjects in the study participated in the Transcendental Meditation program; behavioral techniques, such as mindfulness or progressive muscle relaxation; or health education. The study tracked subjects for up to 18 years. The study found that the Transcendental Meditation technique reduced death rates by 23%.

Reduced BP and Reduced Use of Hypertensive Medication (*American Journal of Hypertension*, January 2005)

This long-term, clinical trial evaluated 150 men and women, average age 49, with stage I hypertension (average blood pressure 142/95 mm Hg). Blood pressure in the Transcendental Meditation group reduced by nearly 6 mm diastolic pressure and 3 mm systolic pressure. In contrast, blood pressure in the progressive muscle relaxation group and conventional health education classes reduced by 3 mm diastolic pressure and no change in systolic pressure. Use of hypertensive medication was also found to significantly decrease in the TM group in comparison to controls.

Reduced BP in At-risk Teens (*American Journal of Hypertension*, April, 2004)

This \$1.5M, four year, randomized, controlled study found that adolescents at risk for heart disease experienced decreased blood pressure as a result of the daily practice of Transcendental Meditation.

Reduced Atherosclerosis (*American Journal of Cardiology*, April 2002)

This study found that older Americans with multiple risk factors for cardiovascular disease substantially reduced atherosclerosis through a multi-modality treatment program derived from a traditional system of natural medicine that included the daily practice of the Transcendental Meditation technique. In the study 57 seniors were randomly assigned into 3 treatment groups. After one year, carotid intima-media thickness (IMT) decreased significantly more in the subjects who were randomly assigned to the TM group.

Reduced Thickening of Coronary Arteries (*Stroke*, March 2000)

A study found that the daily practice of the TM technique reduced the thickening of coronary arteries in hypertensive adults, thereby decreasing the risk of heart attack and stroke. After 6 to 9 months, carotid intima-media thickness decreased in the TM group as compared to matched control subjects. This reduction was similar to that achieved by lipid-lowering drugs and extensive lifestyle changes.

Reduced Constriction of Blood Vessels (*Psychosomatic Medicine*, Jan 1999)

A study of middle-aged adults reported that the TM technique reduced blood pressure by reducing constriction of the blood vessels (vasoconstriction), thereby decreasing the risk of heart disease. A separately published study on adolescents with high normal blood pressure found that randomly assigned subjects who practiced the TM technique exhibited greater

decreases in resting blood pressure, vascular resistance, and stress reactivity from pre-to post-treatment, compared to controls.

Reduced Myocardial Ischemia (*American Journal of Cardiology*, May 1996)

Study found that the TM program significantly reduced myocardial ischemia in coronary artery disease patients after eight months of practice.

Reduced Blood Pressure: Comparisons with Other Procedures (*Hypertension—the American Heart Association's journal—November 1995 and August 1996*)

Clinical studies of older African Americans found that the TM program was: 1) as effective as anti-hypertensive drugs in reducing blood pressure, 2) twice as effective as progressive muscle relaxation in lowering hypertension, and, 3) significantly effective in reducing blood pressure for both men and women in all five major risk categories including obesity, high alcohol use, low exercise levels, psychological stress and high salt intake.

Other Published Research Related to Health

Part I: Effects During the Practice of the *TM* Technique

Physiological Indicators of Deep Rest

- References: 1. *American Psychologist* 42 (1987): 879–881.
2. *Science* 167 (1970): 1751–1754.
3. *American Journal of Physiology* 221 (1971): 795–799.

Increased EEG Coherence

- References: 1. *Proceedings of the San Diego Biomedical Symposium* 15 (1976).
2. *Psychosomatic Medicine* 46 (1984): 267–276.

Increased Blood Flow to the Brain

- References: 1. *American Journal of Physiology* 235(1)(1978): R89–R92.
2. *Psychophysiology* 13 (1976): 168.
3. *The Physiologist* 21 (1978): 60.

Increased Muscle Relaxation

- References: 1. *Electroencephalography and Clinical Neurophysiology* 35 (1973): 143–151.
2. *Psychopathométrie* 4 (1978): 437–438.

Decreased Stress Hormone (Plasma Cortisol)

- References: 1. *Hormones and Behavior* 10(1)(1978): 54–60.
2. *Journal of Biomedicine* 1 (1980): 73–88.
3. *Clinical and Experimental Pharmacology and Physiology* 7 (1980): 75–76.

Part II: Effects in Daily Life after the Practice of the *TM* Technique

Decreased Hospitalization and Doctor Visits

- References: 1. *Psychosomatic Medicine* 49 (1987): 493–507.
2. *American Journal of Health Promotion*, (1996).

Decreased Blood Pressure in Hypertensive Subjects

- References: 1. *Hypertension* 26 (1995): 820–827.
2. *Journal of Personality and Social Psychology* 57 (1989): 950–964.
3. *Psychosomatic Medicine* 37 (1975): 86 / 45 (1983): 41–46
4. *Harefuah* [the Journal of the Israel Medical Association] 95(1)(1978): 1–2.
5. *Circulation* 45 and 46 (1972): 516.

Decreased Serum Cholesterol Levels

- References: 1. *Journal of Human Stress* 5(4)(1979): 24–27.
2. *Journal of Biomedicine* 1 (1980): 73–88.
3. *Harefuah* [the Journal of the Israel Medical Association] 95 (1978): 1–2.

Decreased Severity of Symptoms of Bronchial Asthma

- References: 1. *Respiration* 32 (1975): 74–80.
2. *Respiratory Therapy: The Journal of Inhalation Technology* 3 (1973): 79–80.
3. *Clinical Research* 49 (1973): 278.

Decreased Insomnia

- References: 1. *The New Zealand Family Physician* 9 (1982): 62–65.
2. *Journal of Counseling and Development* 64 (1986): 212–215.
3. *Japanese Journal of Public Health* 37 (1990): 729.

Healthier Response to Stress

- References: 1. *Psychosomatic Medicine* 35 (1973): 341–349.
2. *Journal of Counseling and Development* 64 (1986): 212–215.
3. *Psychosomatic Medicine* 49 (1987): 212–213.
4. *Journal of Psychosomatic Research* 33 (1989): 29–33.

Faster Recovery From Stress

- References: 1. *Psychosomatic Medicine* 35 (1973): 341–349.
2. *International Journal of Neuroscience* 46 (1989): 77–86.

Faster Reflex Responses

- Reference: *Perceptual and Motor Skills* 50 (1980): 1103–1106.

Increased Stability of the Autonomic Nervous System

- References: 1. *Psychosomatic Medicine* 35 (1973): 341–349.
2. *Psychosomatic Medicine* 44 (1982): 133–153.

Lower Baseline Levels of Heart Rate, Respiration Rate, Plasma Lactate, and Spontaneous Skin Resistance Responses

- References: 1. *American Psychologist* 42 (1987): 879–881.
2. *L'Encéphale* [The Brain] 10 (1984): 139–144.

Reversal of the Aging Process

- References: 1. *International Journal of Neuroscience* 16 (1982): 53–58.
2. *Journal of Personality and Social Psychology* 57 (1989): 950–964.
3. *Journal of Behavioral Medicine* (1986): 327–334.
4. *Journal of Clinical Psychology* 42 (1986): 161–164.

Improved Physiological Stability During Task Performance

- Reference: *Anxiety, Stress, and Coping: An International Journal*. 6 (1993): 245–262.

Increased Efficiency of Information Transfer in the Brain

- References: 1. *Motivation, Motor and Sensory Processes of the Brain, Progress in Brain Research* 54 (1980): 447–453.
2. *International Journal of Neuroscience* 10 (1980): 165–170.
3. *Psychophysiology* 26 (1989): 529.
4. *Zeitschrift für Elektroenzephalographie und Elektromyographie EEG-EMG* 7 (1976): 99–103.

Part III: Effects on Individual and Public Health of Practice of the *TM* Technique

Improvements in Post-Traumatic Adjustment Problems

- Reference: *Journal of Counseling and Development* 64 (1986): 212–215.

Decreased Drug Abuse

- References: 1. *American Journal of Psychiatry* 131 (1974): 60–63.
2. *Alcohol Treatment Quarterly* 11 (1994): 13–87.
3. *International Journal of the Addictions* 12 (1977): 729–754. / 26 (1991): 293–325.
4. *Bulletin of the Society of Psychologists in Addictive Behaviors* 2 (1983): 28–33.
5. *Journal of Counseling and Development* 64 (1986): 212–215.
6. *Zeitschrift für Klinische Psychologie* [Journal for Clinical Psychology] 7 (1978): 235–255.

Decreased Alcohol Use

- References: 1. *International Journal of the Addictions* 12 (1977): 729–754. / 26 (1991): 293–325.
2. *Bulletin of the Society of Psychologists in Addictive Behaviors* 2 (1983): 28–33.
3. *Alcoholism Treatment Quarterly* 11 (1994): 13–87.

Decreased Smoking

- References: 1. *American Journal of Psychiatry* 132 (1975): 942–945.
2. *International Journal of the Addictions* 12 (1977): 729–754. / 26 (1991): 293–325.
3. *Bulletin of the Society of Psychologists in Addictive Behaviors* 2 (1983): 28–33.
4. *Journal of Counseling and Development* 64 (1986): 212–215.

5. *Alcoholism Treatment Quarterly* 11 (1994): 13-87.

Increased Tolerance

Reference: *The Journal of Psychology* 99 (1978): 121-127.

Decreased Hostility

References: *Criminal Justice and Behavior* 5 (1978): 3-20. / 6 (1979): 13-21.