

Chapter 10

MEDITATION, RELAXATION and BIO-FEEDBACK

The word “meditation” is derived from the Latin *meditor* meaning to “think over”, “contemplate”, “reflect”, “practise” or “study”. These ideas have all percolated into the various shades of its meanings in English. It is the sense of exercising the mind in devotional thoughts or contemplation with which we are concerned in this chapter. Thus, meditation is an inner experience which cannot be observed objectively or easily described but which for many people has transformed the quality of their lives.

Meditative practices have undoubtedly existed for thousands of years. Broadly speaking, meditation is sustained self-reflection. Meditation has frequently but not necessarily been part of religious practice. Moreover, although we often think of meditation as having Eastern origins, both Christianity and Judaism have their own traditions of meditation.

Most forms of meditation involve sitting quietly and either repeating a word, controlling breathing, focussing on an object, or visualising a white light. On the other hand, some types of meditation require loud chanting, singing, whirling or wild dancing. The result may be an altered state of consciousness, variously described as “self-awareness”, “enlightenment”, “expanded consciousness”, “union with God”, “annihilation of self” and so on, depending upon the background of the meditator.

Some believe that there are many approaches to meditation and that the individual should choose the one that suits him or her best. Conversely, some meditative schools claim that their particular practice is the only way and that all others are ineffectual, if not diabolical.

Hindu meditation - yoga

The Hinduism of India is perhaps the world’s oldest surviving religion and is the one in which meditation is most prominent. The ancient scriptures of the Hindus, the *Vedas*, contain detailed descriptions of many forms of meditation. A *guru*, or teacher, may gather disciples and train them in his way.

Yoga is a Sanskrit word derived from the same source as our word “yoke”. It means union and implies unity of the individual with Ultimate Reality. According to yoga philosophy, body, mind and spirit cannot be separated. Yoga has been defined as a “higher consciousness” achieved through a fully rested and relaxed body and a fully awake and relaxed mind. It encompasses a spectrum of disciplines ranging from exercises

Table 1. Techniques used in various forms of yoga.

· <i>pranayama</i>	breathing
· <i>dhyana</i>	inner concentration
· <i>hatha yoga</i>	body awareness
· <i>laya yoga</i>	visualisation
· <i>swadhyaya</i>	chanting
· <i>japa</i>	word repetition
· <i>suriyanamaskar</i>	exercises
· <i>sithilikarana vyayama</i>	loosening exercises
· <i>yogasanas</i>	postures
· <i>asanas and mudras</i>	postures
· <i>tapasya</i>	pain control
· <i>seva</i>	charity
· <i>satkarmas</i>	cleansing techniques involving internal washes
· <i>shavasana</i>	relaxation

at one end to meditation at the other. These various forms of yoga are different ways of approaching the same spiritual objective and practitioners of the art are termed *yogi*. The major methods used in yoga are summarised in Table 1.

- *Hatha Yoga*. This system involves meditation, exercises and posturing. The postures are called *asanas* that are meant to strengthen muscles and nerves and keep the spine flexible while *mudras* are claimed to keep glands working properly. Examples of posturing include the lotus position, shoulder stand, bow pose, cobra pose and toe grab. A Western variant on this general theme is the “Alexander technique” described by Frederick Alexander, born in Tasmania in 1869, which relies on the supposed correct posturing of the head in relation to the spine.
- *Breathing techniques (pranayama)*. Various breathing exercises are said to be associated with expulsion of impurities during exhalation and the drawing in of “universal energy and knowledge” during inhalation.
- *Transcendental meditation*. This popular form of yoga, which involves mantra meditation, was introduced to the USA and Europe by Maharishi (meaning “great sage”) Mahesh Yogi but its origins are ancient. He was born in India around the time of the First World War. He became a disciple of the Swami Brahmanand Saraswati (also known as Guru Dev, meaning “divine teacher”) then began his mission in the late 1960’s. Transcendental meditation, often simply referred to as TM, was embraced, albeit temporarily by the pop singing group, the Beatles, and by a number of movie stars. A major impetus to the spread of TM in the West was provided by scientific

studies of physiological changes occurring during TM (see later). TM has become a business. After a couple of introductory lectures, the aspiring novice pays a fee and is seen by an instructor who chants a ceremony then provides the student with a *mantra*, or secret word. After being given the mantra, the student is instructed to close his eyes and repeat the word over and over. This meditation is repeated twice daily for 15-20 minutes at a time in a quiet, comfortable place.

- *Hare Krishna*. Members of this sect, the International Society for Krishna Consciousness, wear colourful Indian clothes, shave their heads except for a pigtail and chant privately 1728 times every day the following words: "Hare Krishna, Hare Krishna, Krishna Krishna, Hare Hare, Hare Rama Hare Rama, Rama Rama, Hare Hare". They also chant the same words loudly in public then give way to clapping and dancing about. This repetition of the sacred name, *Krishna*, representing the godhead, is said to have beneficial effects on both those chanting and those listening to the chant. This movement was brought to the United States in 1965 by a 70-year old Indian scholar, Maharishi Prabhapada.

Chinese and Japanese forms of meditation

- *Zen*. Zen is an outgrowth of Japanese Buddhism which became popular in the USA in the 1960's when a number of *roshis*, or masters of Zen, visited that country. Zen is the most austere of the various forms of meditation. It involves sitting in a very particular and often painful way. The full lotus position is characterised by sitting on the floor with both legs crossed and the feet resting on the opposite thighs. The back is held absolutely straight, head erect, eyes open, and hands cradled in the lap with thumbs touching. Meditators usually count breaths, up to 10, then start all over again, or occupy the mind with a non-rational question (*koan*) such as "What is the sound of one hand clapping?". One just sits and accepts the world as it is.
- *Aikido*. Aikido is a Japanese martial art similar to wrestling but in which the aim is not really to overcome the opponent but to use that person's self-defence to exploit *ki*, the "life force". In a nutshell, it is believed that by alternately throwing and being thrown, the practitioner expands his spirit, increasing his ability to both give and receive.
- *T'ai Chi*. T'ai chi has been described as "meditation in motion". It is an ancient Chinese practice which can be regarded as a civilian version of martial arts such as *kung fu*. The ritual involved consists of a succession of flowing, circular movements, each of which has a symbolic interpretation and emphasis is laid upon the psychological or psychic elements involved.

Meditation in Christianity, Judaism, and Islam

Meditation has been a regular part of the life of many Christians, especially monks, in times past and has been undertaken in many ways. It may involve the repetition of a single word such as “God” or “love”, or a short prayer such as “Lord Jesus Christ, have mercy on me”, perhaps in conjunction with feeling the beads of a rosary, contemplation of a portion of scripture, or focussing on an icon.

Among Protestant groups today, perhaps the purest form of meditation occurs among Quakers who sit in silent meditation until the spirit moves one of them to make a statement to the assembled group.

In the case of Jews, ritual rocking back and forth while reading and re-reading the Torah or chanting prayers are forms of meditation.

Perhaps the most dramatic manner of meditation in Islam is *sufism* in which holy men (*sufis*) put themselves into a transcendental state by whirling and dancing for hours on end.

Relaxation

Many years ago, a physiologist named Walter Cannon described the “fright, fight or flight” response in which stress causes a release of the hormone adrenaline from the adrenal glands and stimulation of the autonomic nervous system so that the heart races, the blood pressure is raised and sweating occurs. The opposite of this is called the relaxation response. A Harvard cardiologist, Herbert Benson, studied this response and wrote a book¹ about it. He believed that the response could be elicited by a combination of four elements (Table 2), and suggested that these measures should be practised for 10-20 minutes once or twice daily.² The similarity of this procedure to other forms of meditation is obvious.

Progressive relaxation refers to a programme of relaxation based upon systematically tensing then relaxing muscle groups in sequence. This method was described in a book³ in 1929 by an American doctor, Edmund Jacobson, who found that it relieved his own insomnia.

¹Benson H. *The relaxation response*. William Morrow, New York, 1975

²Benson H. Systemic hypertension and the relaxation responses. *New England Journal of Medicine* 296: 1152-155, 1977

³Jacobson E. *Progressive relaxation*. University of Chicago Press, 1929

Table 2. The four major elements required to elicit a relaxation response.

- a quiet environment
- a comfortable position and muscle relaxation
- a mental device such as a word or phrase that is repeated over and over again while concentrating on breathing
- the adoption of a passive “let it happen” attitude

Biofeedback

Biofeedback was developed by medical scientists in the USA in the 1960's as a means of monitoring and aiding progress in muscular and mental relaxation. Electronic instruments are used to measure objectively and display various physiological effects such as blood pressure, pulse rate, respiratory rate, muscle activity and even brainwave rhythms. This gives the meditators feedback or information as to the effectiveness of their relaxation techniques.

Physiological effects of meditation

Western scepticism about meditation received a rude jolt when an article⁴ entitled “Physiological effects of transcendental meditation” appeared in the prestigious United States journal *Science* in 1970. Dr Robert Wallace, from the department of physiology at the Center for Health Sciences in Los Angeles, California, a recent convert to the practice of transcendental meditation, reported his studies of 15 normal university students who had practised meditation for between six months and three years. This report was consolidated when two years later he and Dr Herbert Benson of the Boston City Hospital described an extended study of 36 subjects. A raft of physiological parameters was measured before, during and after meditation, the subjects being at rest for the whole period.⁵

Breathing

Oxygen consumption began to fall within five minutes of beginning meditation reaching a maximal fall of about 20%, remained low during meditation, then returned to normal after finishing meditation (Figure 1). The elimination of carbon dioxide from the lungs fell in the same proportion as the fall in oxygen consumption, so that the ratio between the two

⁴Wallace RK. *Science* 167: 1751-1754, 1970

⁵Wallace RK, Benson H. The physiology of meditation. *Scientific American* 226: 85-90, 1972

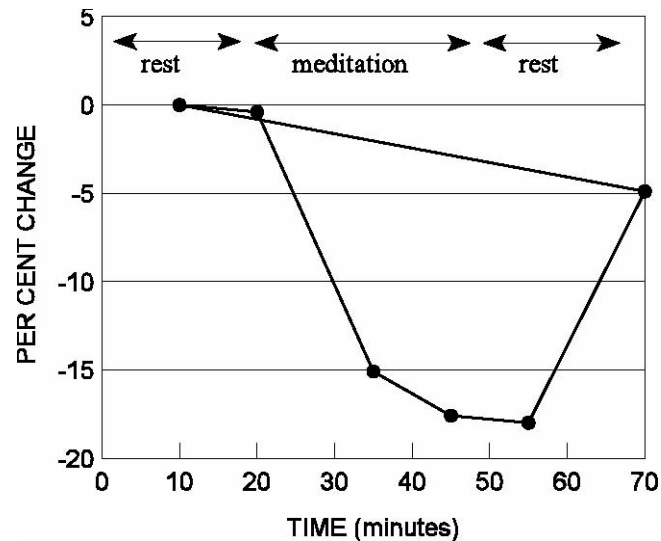


Figure 1. Per cent change in oxygen consumption while at rest, before, during and after meditation (from Wallace⁴).

(known technically as the respiratory quotient) remained unchanged; this indicates a reduction in the metabolic rate, that is, the speed with which chemical processes occur in the body. These changes were associated with a fall in the amount of air blown in and out of the lungs as measured by the number of litres of air exchanged per minute (technically called the minute volume); it fell from 7.56 litres per minute just before meditation to a low of 5.25 litres per minute during meditation.

Cardiovascular effects

The heart rate fell by an average of 5 beats per minute during meditation (the normal is around 70 beats per minute). The blood pressure fell to a low level during the quiet premeditation period and remained at that level during meditation. The level of lactic acid in the blood fell during meditation (Figure 2) at a rate three times faster than occurs during ordinary rest, thus indicating that metabolism in the absence of oxygen was reduced.

Skin resistance

Some investigators believe that the resistance of skin to the flow of electricity through it reflects anxiety levels. A low level represents increased anxiety and *vice versa*, possibly

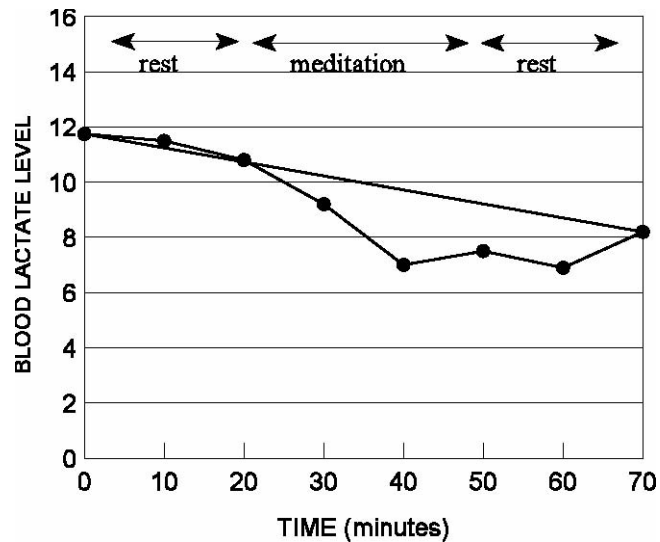


Figure 2. Changes in blood lactic acid level (100 mg/ml) while at rest before during and after meditation (from Wallace and Benson⁵).

because the skin is more moist when one is anxious. Resistance can be measured by applying electrodes to the skin and connecting them to an electrical meter. Skin resistance increased markedly at the onset of meditation then returned to normal after meditation (Figure 3).

Brain waves

When a person closes his eyes and becomes relaxed, the brain waves change their character and there is an increase in the number of what are called alpha waves. When the eyes are opened again, the amount of alpha activity falls rapidly. During meditation, alpha wave activity continues for most of the time and thus is similar to what is seen at rest with the eyes closed but not meditating.

Summary

These changes are different to those seen during sleep in which the fall in the metabolic rate is delayed by several hours, the increase in skin resistance is less marked, and slow delta brain waves are seen. Similarly, these findings are different to those observed during hypnotic sleep. Wallace concluded that

“physiologically, the state produced by transcendental meditation seems to be distinct from commonly encountered states of consciousness, such as wakefulness, sleep, and

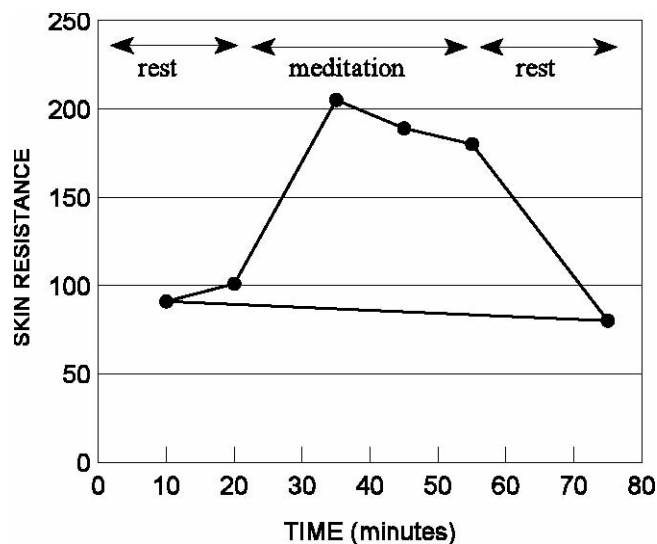


Figure 3. Changes in skin resistance (measured in kilohms) while at rest before, during and after meditation (from Wallace⁴).

dreaming, and from altered states of consciousness, such as hypnosis and autosuggestion.”

Subsequently, he and Benson described meditation as inducing a “wakeful, hypometabolic state”. Precisely how these changes are brought about is unclear. Meditation presumably works by somehow affecting the autonomic (unconscious) nervous system which supplies and affects all the tissues, especially the blood vessels.

Does meditation lower high blood pressure?

High blood pressure is the one of the most common of the chronic diseases that afflict Western populations. Hypertension is generally classified under two broad headings. The first is called essential hypertension because the cause is not known; this is by far and away the most common type. Secondary hypertension is caused by some other condition such as kidney disease.

It is not easy to decide when there is hypertension because the blood pressure varies with age and there is a tremendous range of blood pressures in the normal population. It is commonly said, for example, that the upper limit of normal for a young person is a blood pressure of 140/90.

What do these numbers mean? When blood pressure is measured, a cuff is usually applied around the upper arm and is pumped up to occlude the arteries underneath. As

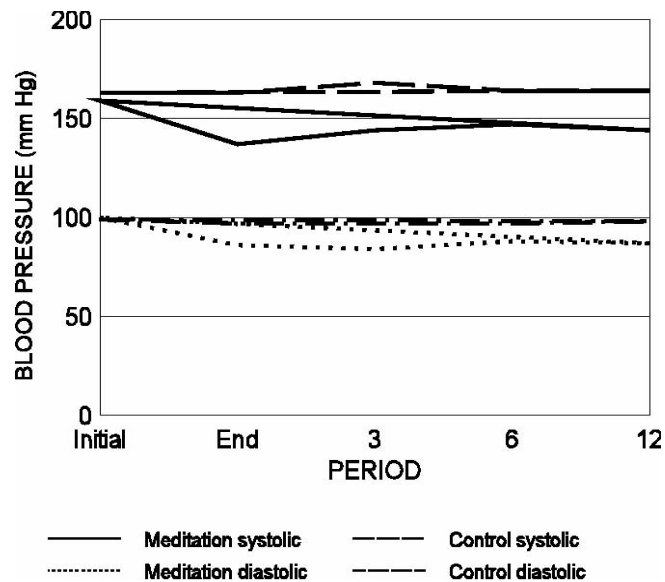


Figure 4. Systolic and diastolic blood pressures in a group of patients undergoing relaxation therapy by yoga meditation and biofeedback and in a control group of hypertensive subjects initially, at the end of a 3 month treatment period, and at follow-up after 3, 6 and 12 months.

the pressure in the cuff is gradually reduced, the point is eventually reached when the pulse can first be felt or, if a stethoscope is being used, the sound of blood rushing through the artery can first be heard. This is known as the systolic blood pressure and is the first of the numbers given. As the pressure in the cuff continues to fall, the character of the sound heard through the stethoscope continues to change. When it suddenly muffles or disappears, this is the diastolic blood pressure and is the second of the numbers given. The diastolic blood pressure is in fact the better predictor of the likelihood of complications of hypertension.

What are these complications? If left untreated for months or years, a number of problems may develop. These include heart failure because there is too much work for the heart to do in pumping against the high pressure, heart attacks as the heart muscle has insufficient blood reaching it through the coronary arteries, strokes since the blood vessels in the brain burst under the great pressure, or renal failure because the blood vessels in the kidneys become blocked.

The usual way of treating high blood pressure is by taking hypotensive agents, that is blood-pressure-lowering pills, each day. In Australia, for example, with a population of

nearly 20 million, over 1 million people are on hypotensive therapy. A non-pharmacological way of treating this condition would be an enormous boon, both from the point of view of the money saved, and in avoidance of side-effects due to the drugs. It is in this setting that various forms of meditation have been tried as a means of controlling hypertension.

One of the earliest studies was reported in *The Lancet* in 1973 by Dr Chandra Patel, a general practitioner in London, England in a paper⁶ entitled "Yoga and biofeedback in the management of hypertension". In this preliminary investigation, she claimed that when relaxation was induced by using yoga with biofeedback, there was a significant reduction in blood pressure.

Two years later, Dr Patel published another study in which 20 patients with hypertension were treated by relaxation and compared with a control group of age- and sex-matched hypertensive subjects. Patients undergoing relaxation therapy were seen three times a week for half an hour for the first three months. They were then followed at monthly intervals for the next 12 months during which period they practised once or twice daily meditation for 20 minutes each time. The control subjects merely lay on a couch at each interview. She reported her results in a paper⁷ entitled "12 month follow-up of yoga and biofeedback in the management of hypertension". There was a significant fall in both systolic and diastolic blood pressures in the group practising meditation (Figure 4). Furthermore, there was a 43% fall in drug requirements for the patients using meditation compared with an increase of 6% in the control group.

Later that year, Dr Patel together with WRS North from the epidemiology unit of Northwick Park Hospital in London reported another study⁸ called "Randomised controlled trial of yoga and biofeedback in the management of hypertension". Patients were assigned to receive either yoga with biofeedback or general relaxation as a placebo. The average blood pressure in the control group fell from 169/101 to 160/96 while in the group undergoing meditation, it fell from 168/100 to 141/84. Subsequently, the control group was taught yoga relaxation and the blood pressure in this group then fell to 146/86 mm Hg.

Meanwhile, in 1974, Dr Herbert Benson and his colleagues from the Harvard Medical School had reported two studies of the effects of TM. The first of these studies examined the effects of transcendental meditation in 22 patients with borderline hypertension who were not taking any medication.⁹ The patients were observed for a six week period during which their blood pressures averaged 146.5/94.6. TM was then practised for 25 weeks with blood pressures being measured at random times during the

⁶Patel C. *The Lancet* ii: 1053-1055, 1973

⁷Patel C. *The Lancet* i: 62-64, 1975

⁸Patel C, North WRS. *The Lancet* ii: 93-95, 1975

⁹Benson H, Rosner BA, Marzetta BR, Klemchuk HM. Decreased blood pressure in borderline hypertensive subjects who practiced meditation. *Journal of Chronic Diseases* 27: 163-169, 1974

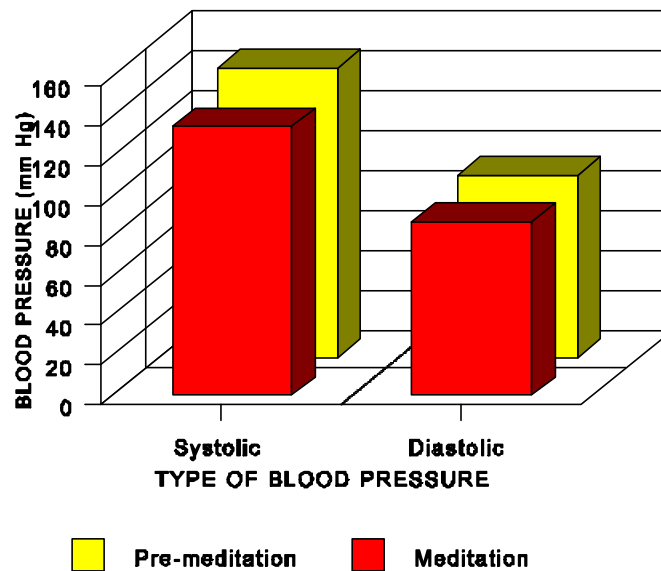


Figure 5. Systolic and diastolic blood pressures before and after 20 weeks of meditation with relaxation.

day but not during meditation; the average blood pressures fell to 139.5/90.8, a small but significant reduction.

Their second study appeared in the pages of *The Lancet* in a paper¹⁰ headed “Decreased blood-pressure in pharmacologically treated hypertensive patients who regularly elicited the relaxation response”. Again, 14 subjects had their blood pressures measured for six weeks before beginning meditation, then for 20 weeks during which hypotensive drugs were not altered. The blood pressures fell by an average of 10.6/4.9 mm Hg (Figure 5). Benson and his colleagues concluded that “the use of the relaxation response may influence the economics of the therapy of hypertension since it is practised at no cost other than time”. These seminal studies were followed over the next couple of decades by a number of similar investigations. The results of these various studies are summarised in Table 3. The majority of investigators^{11,12,13,14,15,16} showed a drop in both

¹⁰Benson H, Rosner BA, Marzetta BR, Klemchuk HM. *The Lancet* i: 289-291, 1974

¹¹Blackwell B, Hanenson I, Bloomfield S *et al.* Transcendental meditation in hypertension: individual response patterns. *The Lancet* i: 223-224, 1976

¹²Stone RA, De Leo J. Psychotherapeutic control of hypertension. *New England Journal of Medicine* 294: 80-84, 1976

¹³Patel C, Marmot MG, Terry DJ. Controlled trial of biofeedback-aided behavioural methods in reducing mild hypertension. *British Medical Journal* 282: 2005-2008, 1981

¹⁴Sundar S, Agrawal SK, Singh VP, Bhattacharya SK, Udupa KN, Vaisch SK. Role of yoga in

systolic and diastolic blood pressures although some authors found either minimal effects^{17,18} or no effect¹⁹ with relaxation.

Perhaps somewhat disturbing is the fact that a high proportion of the studies showing a positive effect of relaxation were conducted by Dr Patel. Dr Sundar and his colleagues¹⁴ showed that the quite marked effect induced by shavasana progressive relaxation dissipated if yoga was stopped but the effectiveness persisted for 1.5-3 years in subjects who continued to meditate. Similar observations were made by Dr Patel and her colleagues¹⁵ who followed patients for four years. Furthermore, the latter investigators showed that subjects who persisted with meditation for four years had less attacks of angina, less fatal heart attacks, and less abnormalities of the electrocardiograph.

Although Little and co-workers¹⁷ found no significant effects of relaxation on hypertension in pregnant women, there was a marked reduction in the need to admit patients to hospital if they were practising relaxation: there were only 10 admissions for the 36 meditating patients compared with 16 admissions for the 24 control subjects.

Conclusion

What does all this mean? Although there is considerable variability in the reported results, there does seem to be an overall indication that the various forms of meditation and relaxation do lower both systolic and diastolic blood pressures by a few millimetres of mercury (Table 3). Is this of any value? It is known that the complications of hypertension increase progressively as blood pressure rises, so it is likely that any reduction in blood pressure is useful. Furthermore, it is free and largely devoid of side-effects.

Is meditation of value in heart disease?

This is not a subject that has been studied well. In an investigation of 21 patients with disease of the coronary arteries, Dr JW Zamorra and his colleagues thought that transcendental meditation had a small benefit in terms of ability to tolerate exercise and

management of essential hypertension. *Acta Cardiologica* 39: 203-208, 1984

¹⁵Patel C, Marmot MG, Terry DJ, Carruthers M, Hunt B, Patel M. Trial of relaxation in reducing coronary risk: four year follow up. *British Medical Journal* 290: 1103-1106, 1985

¹⁶Patel C, Marmot M. Can general practitioners use training in relaxation and management of stress to reduce mild hypertension? *British Medical Journal* 296: 21-24, 1988

¹⁷Little BC, Hayworth J, Benson P *et al.* Treatment of hypertension by relaxation and biofeedback. *The Lancet* ii: 865-867, 1984

¹⁸Jacob RG, Shapiro AP, Reeves RA *et al.* Relaxation therapy for hypertension: comparison of effects with concomitant placebo, diuretic and β blocker. *Archives of Internal Medicine* 146: 2335-2340, 1986

¹⁹van Montfrans GA, Karemaker JM, Wieling W, Dunning AJ. Relaxation therapy and continuous ambulatory blood pressure in mild hypertension: a controlled study. *British Medical Journal* 300: 1368-1372, 1990

Table 3. Other studies reporting change in blood pressure induced by various types of meditation. Most studies had both meditation and control subjects.

Authors	Number (meditat. /control)	Intervention	Follow-up	Fall in blood pressure	
				systolic	diastolic
Blackwell ¹¹	7/-	TM	9 months	7.7	5.6
Stone ¹²	21/5	Buddhist breathing meditation	6 months	10.1	12.2
Patel ¹³	48/40	meditation + biofeedback	8 months	11.0	8.8
Sundar ¹⁴	20/-	shavasana progressive relaxation	6 months	14.0	12.3
Little ¹⁷	36/24	relaxation ±biofeedback	2 months	0.5	2.2
Patel ¹⁵	86/75	relaxation	4 years	6.7	6.8
Jacob ¹⁸	30/-	progressive muscle relaxation	6 weeks	3.4	1.5
Patel ¹⁶	49/54	relaxation + biofeedback	1 year	12.0	4.1
Montfrans ¹⁹	18/17	hatha yoga	1 year	-0.3	-0.7

various other measures.²⁰ This small but suggestive study needs further investigation with a much larger group of patients.

Can meditation help relieve asthma?

Asthma is a common affliction of the lungs in which the sufferer wheezes and is short of breath. The pathological basis for asthma has been described in the chapter on acupuncture.

²⁰Zamarra JW, Schneider RH, Besseghini I *et al.* Usefulness of transcendental meditation in the treatment of patients with coronary heart disease. *American Journal of Cardiology* 77: 867-870, 1996

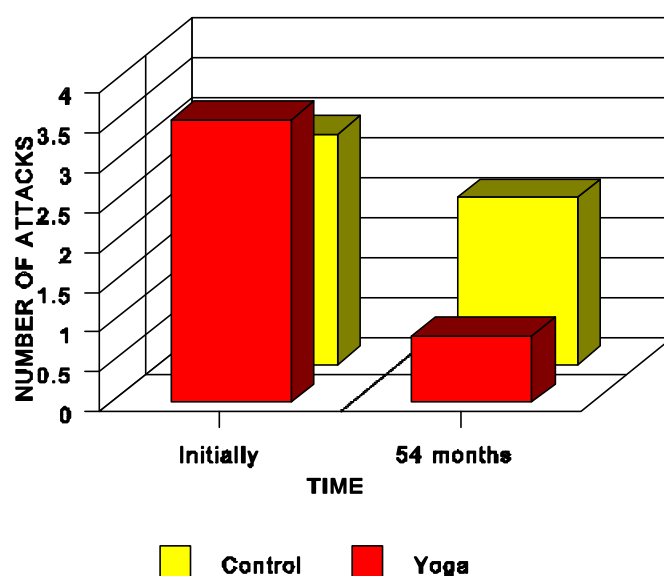


Figure 6. Number of attacks per week of asthma in patients who practised yoga or in a control group of patients, initially and after 54 months of yoga.

The effects of yoga in asthma were studied by Drs R Nagarathna and HR Nagendra of the Vivekananda Kendra Yoga Therapy and Research Centre at Malleswaram in Bangalore, India. Fifty three patients underwent training for two weeks in an integrated set of yoga exercises including breathing exercises, suriyanamaskar, yogasana, pranayama, dhyana and devotions which were then practised for 65 minutes each day. They then compared the outcome over the next 54 months in control subjects who did not practise yoga. All subjects kept a diary.

Their results were reported in a contribution²¹ entitled "Yoga for bronchial asthma: a controlled study". Twenty five patients dropped out of the study over the 54 months. In those remaining, there was a marked reduction in the number of attacks of asthma per week (Figure 6). Likewise, patients who practised yoga used less drugs for treating asthma.

These encouraging results were explored further by Dr Virendra Singh and colleagues from the respiratory unit at the City Hospital, Nottingham in England. They were particularly interested in pranayama which has four objectives: a stepwise reduction in the rate of breathing, a duration of expiration twice that of inspiration, breath-holding at the

²¹Nagarathna R, Nagendra HR. *British Medical Journal* 291: 1077-1079, 1985

end of inspiration that lasts twice as long as the length of expiration, and mental concentration on breathing. The investigators were able to use a machine called a "Pink City lung exerciser" which can, if so desired, impose the first two of these conditions without the subject being aware of it. They therefore conducted a study of 18 asthmatics in a double-blind controlled cross-over trial in which neither the patient nor the doctor knew whether these ventilating conditions were being imposed. After a one week period for baseline assessment, each patient practised breathing through either the exerciser or a placebo device for 15 minutes twice a day for two weeks then used the alternate device for two weeks. The patients' symptoms were scored, the amount of inhaler used to relieve chest tightness noted and the ability to blow air were measured objectively with a machine.

The authors reported their results in a paper²² called "Effects of yoga breathing exercises (pranayama) on airway reactivity in patients with bronchial asthma". Although the various parameters improved when the exerciser was used as compared with the placebo device, the improvement was not sufficient to be statistically significant. However, if asthma was induced artificially by inhalation of a drug called histamine, more histamine was required in subjects during pranayama breathing. They concluded that ventilatory exercises for the control of asthma should be explored further.

Taken together, these two studies suggest that there may be a slight improvement in asthma in patients who practise yoga.

Does meditation cause regression of cancer?

Cancer is a very emotive word that elicits fear in us all. Cancer develops when for largely unknown reasons, some cells in the body multiply in an unrestrained fashion. At first they are just present at one location; this is called the primary tumour. Sometimes they spread throughout the body via the bloodstream or little channels in the tissues called lymphatics; these are secondary tumours.

Dr Ainslie Meares, a psychiatrist in Melbourne, Australia was intrigued by the possibility that meditation may modify cancer, perhaps by influencing the immune or endocrine systems. He described a patient, a 49 year old woman with advanced breast cancer, who improved significantly after intensive meditation and, in a preliminary communication²³ to the *Medical Journal of Australia*, solicited more such patients in order to study this question further.

In the following year, he reported²⁴ that it was now 18 months since he had first seen

²²Singh V, Wisniewski A, Britton J, Tattersfield A. *The Lancet* 335: 1381-1383, 1990

²³Meares A. Regression of cancer after intensive meditation. *Medical Journal of Australia* 11: 184, 1976

²⁴Meares A. Atavistic regression as a factor in the remission of cancer. *Medical Journal of Australia* ii: 132-133, 1977

this patient and that she felt well and had put on 11 kg in weight and attributed this to “atavistic regression”, i.e. entering a primitive state. However, two months later he indicated²⁵ that the patient had died. Over the next several years, he reported a case each of bone cancer²⁶, Hodgkin’s disease²⁷, cancer of the rectum²⁸ and breast cancer²⁹, all of whom responded to meditation. He then reviewed 73 patients with various forms of cancer and claimed that meditation resulted in less anxiety, depression, discomfort and pain, better tolerance of chemotherapy and radiotherapy, improved quality of life, and perhaps slowing of the spread of cancer and chance of recurrence as well as sometimes regression, but did not provide any definitive evidence to support these claims.³⁰ He believed that psychiatric factors may interact with chemical, viral and radiational causes of cancer.³¹

No-one else seems to have taken up Dr Meares’ ideas, or at least to validate them, in the medical literature, and his data are hardly encouraging. Nevertheless, non-medical individuals have written books popularising the use of meditation in cancer. For example, Ian Gawler, a veterinary surgeon with his own cancer in mind, wrote a book called “You can conquer cancer”. In reviewing this book, Dr RM Lowenthal, an oncologist (cancer specialist), wrote:

“Critical examination of these beliefs finds evidence in their support to be lacking... Because his ideas are making such an impact on the day-to-day treatment of cancer in this country, Gawler owes it to the community to justify, with evidence, his claims that by meditation patients with cancer may be enabled to achieve a cure of their disease in a way that is unattainable with orthodox medical treatment alone”³²

While meditation may help patients lead more fulfilling lives and assist in dealing with their illness, unfortunately there is no dramatic evidence of its efficacy. Worse, many proponents of meditation actively attempt to dissuade patients from accepting orthodox medical or surgical treatment which may be life-saving.

²⁵Meares A. Regression of cancer after intensive meditation followed by death. *Medical Journal of Australia* ii: 374-375, 1977

²⁶Meares A. Regression of osteogenic sarcoma metastases associated with intensive meditation. *Medical Journal of Australia* 11: 433, 1978

²⁷Meares A. Meditation: a psychological approach to cancer treatment. *Practitioner* 222: 119, 1979

²⁸Meares A. Regression of cancer of the rectum after intensive meditation. *Medical Journal of Australia* ii: 539-540, 1979

²⁹Meares A. Regression of recurrence of carcinoma of the breast at mastectomy site associated with intensive meditation. *Australian Family Physician* 10: 218-219, 1980

³⁰Meares A. What can the cancer patient expect from intensive meditation? *Australian Family Physician* 9: 322-325, 1980

³¹Meares A. Cancer, psychosomatic illness, and hysteria. *The Lancet* ii: 1037, 1981

³²Lowenthal RM. Can cancer be cured by meditation and “natural therapy”? A critical review of the book “You can cure cancer” by Ian Gawler. *Medical Journal of Australia* 151: 710-715, 1989

Table 4. Number of hot flushes per 24 hours before and after treatment in women who received either paced respiration, muscle relaxation or control feedback.

	hot flushes per 24 hours		
	paced respiration	muscle relaxation	alpha wave feedback
pre-treatment	15.7	14.2	10.3
post-treatment	9.6	13.6	12.0

Does relaxation relieve menopausal hot flushes?

The most common symptom of the menopause, and one that affects the majority of women, is hot flushes. This problem is usually treated by hormone replacement (i.e. taking pills containing hormones to simulate the menstrual cycle) but there may be some risk to this, particularly in women who have an increased risk of cancer. An alternative approach is the use of progressive muscle relaxation and breathing exercises.

The value of these interventions was assessed by Drs Robert Freedman and Suzanne Woodward of the Lafayette Clinic and department of psychiatry at Wayne State University in Detroit, Michigan in the United States. They studied 33 women who had frequent menopausal hot flushes and randomly assigned them to receive either training in muscle relaxation, paced respiration (breathing exercises), or had visual electroencephalographic (brain-wave) feedback monitoring alpha waves as a placebo control. Paced respiration involved twice weekly sessions of one hour during which patients breathed at the rate of 6-8 cycles per minute and increased the amplitude of abdominal breathing. They measured the frequency of hot flushes by having the women wear a monitor for 24 hours that measured the conductance of electricity of skin over the breastbone; this is a reliable method for measuring hot flushes.

They reported their results in an article³³ entitled "Behavioral treatment of menopausal hot flushes: evaluation by ambulatory monitoring". There was a significant reduction in the number of hot flushes in patients who used paced respiration but not in those who practised muscle relaxation or alpha wave feedback (Table 4). A reasonable conclusion was that breathing training may be a useful alternative in women who cannot tolerate or do not wish to have hormonal replacement therapy.

³³Freedman RR, Woodward S. *American Journal of Obstetrics and Gynecology* 167: 436-439, 1992

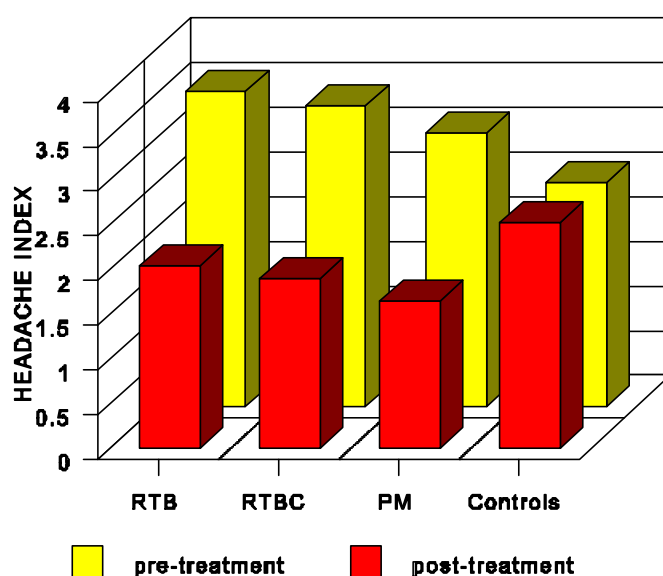


Figure 7. Headache index (frequency and severity) in patients who received relaxation with thermal biofeedback (RTB), the same plus cognitive therapy (RTBC), pseudomeditation (PM) or no specific therapy (controls), before and after therapy.

Can meditation prevent migraine headaches?

Many people are afflicted with migraine. It often begins in childhood with a “bilious stomach” with the child complaining of nausea and vomiting. In adult life, this stage often persists and may be associated with blurred vision but is usually succeeded by a severe throbbing headache, classically affecting one side of the head or the other. All attempts to relieve migrainous headache or to prevent attacks are most worthwhile. It is believed that these symptoms may be due to first constriction then widening of the blood vessels in the brain.

Dr Edward Blanchard and his colleagues from the center for stress and anxiety disorders of the State University of New York at Albany, New York in the United States decided to study the effects of biofeedback in patients with migraine. They divided 116 patients into four groups. The first group was trained in progressive muscle relaxation with biofeedback (RTB) using hand warming; this was given in groups twice weekly for eight weeks for 35-70 minutes per session, and in addition, each participant practised at home for 20 minutes each day. The second group (RTBC) also practised relaxation with biofeedback, but in addition, were given “cognitive therapy” related to how to cope with

stressful situations. The third group practised “pseudomeditation” (PM), that is, body awareness training and mental imaging while in an *unrelaxed* posture. The last group (controls) undertook no special measures. All patients kept a record of their activities, headaches and drug consumption in a diary. A “headache index” was derived and the amount of medication taken was counted. After eight weeks of the intervention, headaches for the next four weeks were analysed.

The authors reported their findings in a paper³⁴ entitled “A controlled evaluation of thermal biofeedback and thermal biofeedback combined with cognitive therapy in the treatment of vascular headache”. There was a significant reduction of 40-50% in all groups that had one of the three interventions compared with no significant change in the control group (Figure 7). Likewise, there was a similar reduction in drug consumption in these three groups while drug consumption remained unchanged in the control group. The authors made no great claims for their strategies but their results do suggest that relaxation and meditation may indeed be helpful in reducing the severity and frequency of migraine.

Do meditation and relaxation relieve anxiety?

We have all experienced anxiety in greater or lesser degree. Sometimes, anxiety becomes pathological, that is, excessive and inappropriate to the circumstances. Many doctors advise their patients to “relax!”, knowing this to be easier said than done and having little idea how to teach their patients to relax.

Muscle relaxation, biofeedback and meditation have all been proposed and practised as methods of relieving anxiety.³⁵ In 1989, Kenneth Eppley from Stanford University in California, USA, together with two colleagues, reported a meta-analysis, that is, a major statistical review of the relevant literature, in which they assessed the effects of various methods in reducing anxiety. Their findings can be found in a paper³⁶ described as “Differential effects of relaxation techniques on trait anxiety: a meta-analysis”. The most marked reduction was seen in transcendental meditation (Table 5). However, the authors noted that this did not prove that differences among the various treatments were responsible for the result. They canvassed various possible confounding factors such as the behaviour of the volunteers, and sampling and experimental bias. On 08 January 2004 Nevertheless, they concluded that “the weight of the evidence from our database appears to suggest that the TM technique and/or the way in which it is taught ... produces larger effects than other meditation and relaxation procedures”. Finally, they remarked

³⁴Blanchard ER, Appelbaum KA, Radnitz CL *et al.* *Journal of Consulting and Clinical Psychology* 58: 216-224, 1990

³⁵Goldberg RJ. Anxiety reduction by self-regulation: theory, practice and evaluation. *Annals of Internal Medicine* 96: 483-487, 1982

³⁶Eppley KR, Abrams AJ, Shear K. *Journal of Clinical Psychology* 45: 957-974, 1989

Table 5. Per cent reduction in anxiety by various forms of meditation, relaxation and biofeedback.

	per cent reduction in anxiety
transcendental meditation	70
other meditation	28
progressive relaxation	38
other relaxation	40
biofeedback	30

that “the findings of the present study give grounds for optimism that at least some current treatment procedures can effectively reduce trait anxiety”.

Subsequent studies have supported these conclusions by demonstrating the benefits of relaxation therapy in children and adolescents with adjustment disorder and depression³⁷, meditation and relaxation in adults with anxiety³⁸, and of meditation and relaxation in the elderly with anxiety and depression³⁹.

Can meditation help drug abusers?

Substance abuse, whether of cigarettes, alcohol or illicit drugs, is a frequent and often devastating problem. Dr Paul Gelderloos and colleagues from the department of psychology at the Maharishi International University in Fairfield, Iowa in the United States⁴⁰ reviewed studies published in the literature which concerned the effectiveness of transcendental meditation in preventing or treating substance abuse.

They found 24 studies reported before 1991 among non-institutionalised abusers, participants in treatment programmes, and prisoners with histories of heavy use. They claimed that all studies showed positive effects of TM but conceded that it was sometimes

³⁷Platania-Solazzo A, Field TM, Blank J, Seligman F, Kuhn C, Schanberg S, Saab P. Relaxation therapy reduces anxiety in child and adolescent patients. *Acta Paedopsychiatrica* 55: 115-120, 1992

³⁸Kabat-Zinn J, Massion AO, Kristeller J, Peterson LG, Fletcher KE, Pbert L et al. Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *American Journal of Psychiatry* 149: 936-943, 1992

³⁹Deberry S, Davis S, Reinhard KE. A comparison of meditation-relaxation and cognitive, behavioral techniques for reducing anxiety and depression a geriatric population. *Journal of Geriatrics* 22:231-247, 1989

⁴⁰Gelderloos P, Walton KG, Orme-Johnson DW, Alexander CN. Effectiveness of the transcendental meditation program in preventing and treating substance misuse: a review. *International Journal of the Addictions* 26: 293-325, 1991

not possible to exclude self-selection and bias. Few of these studies randomly assigned drug abusers to receive TM or a placebo. Rather, results in patients practising TM were generally compared with those found in “matched controls”.

The two most tantalising studies are unfortunately not available in the general literature. Bounouar⁴¹, from Maharishi University, apparently studied 925 transcendental meditation participants and 6145 controls who attended an introductory lecture on the subject. He stated that 81% of those who meditated twice daily quit smoking or decreased cigarette consumption after 20 months compared with rates of 55% in irregular meditators and only 33% of control subjects who did not meditate.

Taub⁴² randomly assigned 120 skid-row alcoholics in Washington, DC to treatment with TM, standard treatment, or relaxation. After 18 months, 65% of TM subjects were reported to be completely abstinent from alcohol compared with only 25% of those receiving standard treatment.

Gelderloot and colleagues concluded that these studies indicated that TM provides “not only immediate relief from distress but also long-range improvements in well-being, self-esteem, personal empowerment, and other areas of psychophysiological health”. Would that it did. In my view, the jury is still out.

Does meditation have an effect on intellectual retardation?

Intellectual retardation of children and adults is a not uncommon affliction. Dr K Uma and colleagues from the Viveskanandra Kendra Yoga Research Foundation in Bangalore, India decided to investigate the efficacy of yoga therapy in mental retardation. They studied 90 children, aged from 6-16 years, with mild, moderate and severe retardation; the intelligence quotients (IQ) ranged from 20-70. The children were divided into equivalent yoga therapy or control groups. Children in the yoga group were taught pranayama, sithilikarana vyayama, yogasanas, shavasana and meditation for one hour every week for one year, at which time the IQ, mental ages, and social ages were measured again by a psychologist who did not know what treatment had been given.

They reported their results in a paper⁴³ headed “The integrated approach of yoga: a therapeutic tool for mentally retarded children: a one-year controlled study”. All three parameters improved slightly in the group given yoga (Table 6). Improvement occurred with all degrees of severity but was most marked in the moderately retarded group. The authors concluded that their study showed “the efficacy of yoga as an effective therapeutic

⁴¹Bounouar AR. The transcendental meditation technique: a new approach for smoking cessation programs. Doctoral dissertation, Maharishi International University, Fairfield, Iowa, USA, 1989

⁴²Taub E. Comprehensive progress report. Rehabilitation Center for Alcoholics, Occoquan, Virginia, USA, 1978

⁴³Uma K, Nagendara HR, Nagarathna R, Vaidehi S, Seethalakshmi R. *Journal of Mental Deficiency Research* 33: 415-421, 1989

Table 6. Changes in intelligence quotient, mental age and social maturity age after one year in mentally retarded children treated with yoga compared with control children.

		control	yoga
intelligence quotient	before	44.3	46.6
	after	47.0	57.5
mental age	before	4.34	4.47
	after	4.56	5.68
social maturity age	before	6.8	7.1
	after	6.7	7.6

tool in the management of mentally retarded children". There may indeed be a small effect but it by no means returns children to normal.

Does meditation reverse dementia and prolong life?

At the other end of the age range, another devastating problem is dementia due to Alzheimer's disease. This is estimated to afflict one third of people aged 85 years or more and is characterised by loss of memory and ultimately ability to care for oneself.

Since meditation may alter consciousness and perhaps improve thinking, Charles Alexander from Maharishi International University in Fairfield, Iowa and colleagues from several institutions decided to determine whether transcendental meditation would extend human life and reverse age-related decline in mindfulness, i.e. the proper functioning of the mind. They randomly assigned 73 residents with a mean age of 81 years from eight nursing homes to receive either no treatment, TM, "mindfulness training in active decision making", or a mental relaxation programme.

They reported their findings in a paper⁴⁴ called "Transcendental meditation, mindfulness and longevity: an experimental study with the elderly". There was little change among the various groups as assessed by a dementia screening test, nor was there much alteration in mood after three months. Interestingly though, survival was greatest three years later in the group given TM (Figure 8). This fascinating finding clearly awaits another study with a larger number of patients to confirm or refute the suggestion that TM

⁴⁴Alexander CN, Chandler HM, Langer EJ, Newman RJ, Davies JL. *Journal of Personality and Social Psychology* 57: 950-964

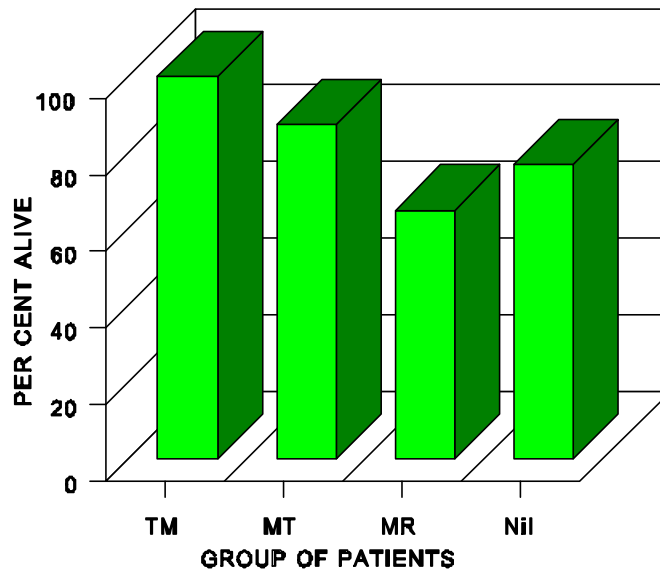


Figure 8. Survival after 3 years in groups of patients given either transcendental meditation, “mindfulness training”, mental relaxation or no intervention at all.

prolongs life.

Awaiting judgement

Proponents of meditation and biofeedback claim that these techniques are likely to be valuable for the treatment of stress-related or psychosomatic (mind-body) disorders in particular. This seems a reasonable hypothesis since, if meditation influences anything, it should affect the brain and its functions. However, it is well to remember that opinions as to what conditions are psychosomatic in origin have changed over time. Some conditions once thought to be psycho-somatic such as peptic ulcers are now known to be organic in origin (in this case, a bacterial infection). Many illnesses that fall into this general category have now been formally examined but a number of conditions for which effectiveness is claimed remain to be investigated (Table 7).

Are there any complications of meditation and relaxation?

Meditation and relaxation have been practised by countless people and are remarkably free of side-effects. However, there have been a few reports of complications, generally

Table 7. Conditions for which efficacy of meditation and biofeedback is claimed (+) in a range of books^{45,46,47,48} on alternative medicine. Diseases marked in bold have been formally tested and are described in this chapter.

	Fulder	Inglis	Readers' Digest	Stanway
alcohol addiction				+
anxiety	+	+		+
asthma	+			
backache		+		
cancer	+	+		
childbirth				+
cigarette smoking				+
circulation disorders			+	
dementia				
headaches	+	+	+	+
heart disease		+		+
high blood pressure	+	+	+	+
insomnia	+		+	+
menopausal hot flushes				
migraine	+	+	+	+
obesity				+
pain	+		+	
Raynaud's syndrome	+		+	+
stammering				+
stress	+	+		
stroke		+		
tics				+

arising in people who have practised more severe physical forms of yoga.

- *Glaucoma*. A 29 year old man went to the department of ophthalmology at Virginia University in Charlottesville, Virginia in the USA to get new glasses. Examination revealed that he had early glaucoma (increased pressure of fluid in the eye which can

⁴⁵Fulder S. *The handbook of complementary medicine*. Oxford University Press, Oxford, 1988

⁴⁶Inglis B, West R. *The alternative health guide*. Michael Joseph, London, 1983

⁴⁷*The Reader's Digest guide to alternative medicine*. Reader's Digest, Sydney, 1992

⁴⁸Stanway, A. *Alternative medicine: a guide to natural therapies*. Chancellor Press, 1986

lead to blindness). It transpired that he had been practising yoga for years and included standing on his head for 20 minutes each day. The ophthalmologists measured his eye pressure in various postures and found that it increased greatly in the head-standing position. The patient then gave up head-standing, with a good result.⁴⁹

- *Blood clots in the eye.* A 60 year old man complained of purple-blue nodules in his conjunctivae (whites of the eyes). He had been standing on his head for 5-10 minutes ten times a day for the previous ten years. The lesions were removed surgically and examination under the microscope revealed that they were clots in blood-vessels brought on by the pressure of head-standing⁵⁰
- *Lotus neuropathy.* A 38 year old college professor who had been meditating for 10-15 years and had sat in the lotus position for 30 minutes each day. One month prior to presentation, he fell asleep while in this position for 2-3 hours. Next morning he noticed tingling then numbness in his right thigh. Examination revealed loss of sensation in that area and nerve conduction studies showed that the relevant nerve was not functioning.⁵¹ In a similar paper⁵², footdrop (inability to lift the foot) was described in another patient sitting in a modified lotus position.
- *Epilepsy.* In a study of electroencephalographic (brainwave) changes in patients who meditate, one subject was found who had brain wave changes as are seen in epilepsy. Subsequent enquiries among epileptics who meditated revealed an increased frequency of grand mal seizures (fits).⁵³
- *Schizophrenia.* Three patients who had a past history of schizophrenia have been described⁵⁴ as having acute psychotic reactions in which they exhibited bizarre behaviour when attending a retreat for intensive meditation over a number of days.

Conclusions

Meditation and relaxation in their various forms do seem to have something going for them

⁴⁹Rice R, Allen RC. Yoga in glaucoma. *American Journal of Ophthalmology* 100: 738-739, 1986?

⁵⁰Margo CE, Rowda J, Barletta J. Bilateral conjunctival varix thromboses associated with habitual headstanding. *American Journal of Ophthalmology* 113: 726-727, 1992

⁵¹Mattio TG, Nishida T, Minieka MM. Lotus neuropathy: report of a case. *Neurology* 42: 1636, 1992

⁵²Vogel CM, Albin R, Albers JW. Lotus footdrop: sciatic neuropathy in the thigh. *Neurology* 41: 605-606, 1991

⁵³Donalson SR, Fenwick PBC. Effects of meditation. *American Journal of Psychiatry* 139: 1217, 1982

⁵⁴Walsh R, Roche L. Precipitation of acute psychotic episodes by intensive meditation in individuals with a history of schizophrenia. *American Journal of Psychiatry* 136: 1085-1086, 1979

in a number of clinical situations. These include disorders of the brain such as anxiety and perhaps even a minor benefit in intellectual retardation and dementia. The other areas in which meditation and relaxation seem to have some benefit are conditions in which the body may be affected by the autonomic (subconscious) nervous system. Helpful effects have been found in hypertension, migrainous headaches, menopausal hot flushes, and perhaps in asthma. There is no convincing evidence that meditation and relaxation affect the ultimate outcome in cancer. If meditation makes a person feel good and is prepared to spend the time that is required, then it is worth doing. It is a question of:

Mind over matter"