WHAT IS MEDITATION?

Meditation is commonly defined to be a state of single-minded concentration. Concentration being focused restfully on a particular thing or focal point; hence the term ‘restful alertness.’ It is often used loosely to describe activities such as relaxation techniques, concentration exercises, contemplation, reflection and guided imagery. Meditation however, is more than just physical relaxation for it engages the mind as well as relaxing the body. It is often regarded as a heightened state of conscious awareness - a state of mind such as a state of inner peace, of stillness or silence, of union, of oneness. What differentiates meditation from the state of being awake or asleep is the conscious awareness of being profoundly still and involves ‘waking up’ or ‘tuning in’ the mind; it is a state where we let go of the ‘doing’ of the normal waking state, and settle into a state of simply ‘being.’

The researcher John Kabat-Zinn describes meditation as a ‘way of being’ by helping a person go more deeply into themselves beyond all the surface physical sensations and mental activity. The hallmark of meditation being this state of inner stillness or silence. In this state of stillness we learn to detach from our endless stream of mental activity, reducing the emotive force of it, and eventually ‘transcending’ it by becoming the observer. In this way meditation can also be seen as an exercise in enhancing autonomy, self control or effective action. Similarly it can also be seen as an exercise in self knowledge or even spiritualism.

It was for this purpose that meditation was derived in Asian cultures many thousands of years ago. They directed the use of meditation and yoga at the attainment of a ‘unique state of spontaneous, psychological integration.’ Modern psychologists have described this state as ‘individuation’ or ‘self-actualisation’ and it has traditionally been termed ‘self-realisation.’

HOW DOES MEDITATION WORK?

The ‘Sahaja Yoga Hypothesis’ is that meditation triggers a rebalancing process within the autonomic system (a complex system of nerves that governs the function of all the organs of our body) thereby allowing our natural healing process to revitalise and rejuvenate diseased organs. According to this hypothesis, imbalance in this system is the cause of both physiological and psychological illness.

The balancing of the autonomic nervous system occurs via the seven chakras, or subtle energy centres within our body, each of which govern specific sets of organs, and aspects of our psychology and spirituality. Imbalanced function of these chakras results in abnormal function of any aspect of our being (physical, mental or spiritual) that relates to the imbalanced centre.

Meditation is a specific process that awakens the ‘kundalini’ (an innate, nurturing energy), causing it to rise from its base at the sacrum bone piercing each of the seven chakras, thereby nourishing and rejuvenating them, and bringing each of them into

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balance and alignment. As the kundalini reaches the brain and the chakras within it, mental tensions are neutralised. An inner state of mental calm is established. This inner silence becomes a source of inner peace that neutralises the stresses of everyday life, enhancing creativity, productivity, and self-satisfaction.

**PHYSIOLOGICAL AND PSYCHOLOGICAL CHANGES IN MEDITATION**

Recently scientific research has been establishing how meditation works. A new area of medicine known as psychoneuroimmunology (or mind/body medicine) is demonstrating how our state of mind powerfully affects our state of being. Science is now beginning to unravel some of the mystery surrounding meditation, and we are now beginning to be able to observe and understand the physiological changes taking place in the minds and bodies of meditators. Meditation is characterised physiologically as a wakeful hypometabolic state of parasympathetic dominance analogous to other hypometabolic conditions such as sleep, hypnosis and the torpor of hibernation. Meditation, however, represents a special case of the hypometabolic state. The body appears to move into a state analogous to many, but not all, aspects of deep sleep, while consciousness remains responsive and alert.

Physiological evidence, shows that, indeed, sleep and meditation are not the same. Electroencephalographic (EEG) recordings are quite different in the waking state, in sleep and in meditation. Studies suggest that alpha (8-12 Hz) and theta (4-8 Hz) activity is predominant in meditation, whereas delta (1-4 Hz) activity predominates in deep sleep, and beta (13-26 Hz) predominates in the waking state. There is also greater coherence of alpha waves across the cortex in the meditative state. Theta wave activity is indicative of dreaming (or rapid eye movement or REM sleep), however alpha wave activity is the predominant of these two in meditation. Alpha wave activity is associated with relaxation. It is also more closely associated with a state of wakeful alertness, where one’s state of consciousness is characterised as empty of any particular content but nevertheless active and alert above the threshold of awareness. Slightly contrary to this suggestion that the alpha state more closely resembles the state of wakeful alertness, were the results from one study, which had meditators signal when they had definitely entered into this state of wakeful or thoughtless awareness. Widespread alpha wave activity occurred initially, however, as the meditators signalled they had entered into the state of mental silence or ‘thoughtless awareness’ theta wave activity became focused specifically in the front and top of the brain in the midline. Precisely at the time that the theta wave activity became prominent, the meditators reported that they experienced a state of complete mental silence and ‘oneness’ with the present moment.

Of further note with this study was the focus of the theta activity at the front and top of the head, both in the midline. This suggests that structures deep within the brain, possibly the limbic system, are being activated. The limbic system is responsible for many aspects of our subjective experiences, such as emotion and mood, so it is no

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surprise that meditation, which is traditionally associated with blissful states, might involve this part of the brain.
Of final note with this study, is that the subject group investigated was only very small, so the reported results need further investigation before they can be considered to be extremely valid.
In the hypometabolic state induced by meditation the following changes occur⁶:
  * catecholamine (adrenaline, noradrenaline) levels drop
  * reduction in cortisol levels
  * galvanic skin resistance increases markedly (low skin resistance is an accurate marker of the stress response).
  * cerebral blood profusion increases
  * respiration rate and minute volume decrease significantly without significant change in pO2 & pCO2.
  * decreased vascular resistance
  * lowered O2 and CO2 consumption and metabolic rate (well below that achieved in sleep)
  * marked decline in blood lactate (which is a metabolite of anaerobic respiration and is high in stressful situations.
  * reduced blood pressure and pulse rate⁷

The above pattern of changes is so consistent it is now called the 'relaxation response.' Meditation is a very potent way of eliciting this relaxation response. It is also often evident in many forms of prayer and contemplation across cultures.
Although it is generally conceded that a wakeful hypometabolic state of increased parasympathetic dominance characterises almost all forms of meditation in their initial stages, advanced meditators who have been meditating for years or even decades show marked differences in both their physiological response and their ability to control their own physiology compared with meditators who have only been practising a short time.⁴

The prominent feature found in advanced meditators as the voluntary control of internal states was that they displayed sympathetic nervous system control in the presence of parasympathetic dominance. This was discovered by the finding of increased plasma adrenaline in advanced meditators, in the presence of decreased heart rate and acute and marked decline of adrenocortical activity.
Other differences between advanced and novice meditators include markedly increased hypometabolism in advanced meditators; significantly decreased sensitivity to ambient CO2, and increased episodes of respiratory suspension which are highly correlated with subjective reports of what is called in yoga the experience of pure consciousness.

Dramatic increases of phenylanaline (an amino acid used in depression as it is a precursor to tyrosine which is an excitatory neurotransmitter) and urinary metabolites of serotonin (which influences moods and sleep and is antidepressant, helps induce

sleep and relieves pain) are also noted in advanced meditators. Also thyroid simulating hormone has also been noted to decrease chronically and acutely in advanced meditators. Several studies have corroborated this phenomenon in advanced meditators of sympathetic control in the presence of parasympathetic dominance. In these studies the advanced meditation practitioners have gained phenomenal control over normally involuntary bodily processes. In one such study Tibetan monks were able to generate such body heat during meditation that they could dry wet sheets on their backs in freezing weather. In another study in the laboratory, an Indian yogi lowered his metabolism so much that he was able to remain in an airtight box for 10 hours with no ill-effects or signs of tachycardia or hyperpnoea. In another intriguing study a Yogi Satyamurti (70 y.o.) remained in a small underground pit, sealed from the top, for 8 days. He was physically restricted by recording wires. For the first 29 hours of his 8-day stay Satyamurti exhibited a marked tachycardia of 250 beats/min. For the next 6.5 days the electrocardiogram (ECG) results showed no heartbeat whatsoever. ‘The experimenters at first thought he had died.’ Half an hour before he was due to leave the pit his heart rate returned to normal. In addition Satyamurti was able to maintain his body temperature at a level approximately level to the temperature in the pit (34.8 deg Celsius). This is a behaviour displayed by many hibernating animals. In a final study Tibetan Buddhist monks were found to be able to raise their resting metabolism (VO2) up to 61%, and lower it down to 64%. This reduction from rest was the largest ever recorded. The point of illustrating these cases is that ‘deep relaxation appears to be the entryway into meditation, but in advanced stages refined control over involuntary processes becomes possible, in which systems can be either activated or inactivated.’

MEDITATION AND STRESS

A great deal of attention has been paid in recent years to the role of stress in health and particularly in disease. The amount of research being conducted in this area is on the increase. Stress has been recognised as a contributor to, or direct cause of many illnesses. In acute situations, stress can be a natural and appropriate physiological response to an exceptional circumstance. This is often recognised as the ‘fight or flight’ response. However, as soon as the stressful stimulus disappears or dissipates, the physiology of the person should return to normal, with the event being left mentally in the past. This is not always the case. Hans Seyle first identified the stress response as the general adaptation syndrome as a means of explaining the way in which psychological stress translates into physical disease. Stress is postulated to induce psycho-hormonal changes. In acute situations, as mentioned above, the response is functional; but in the chronic situation the organism continues to adapt successfully to ever-increasing levels of stress in the environment until the point of exhaustion, resulting in debilitation of bodily systems and, ultimately, death.

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In the chronic situation above, the stress is inappropriate as the nature of the stressor is invariably a by-product of thought; we must actually think about the events for them to produce stress. These thoughts being either of past experiences or of events we anticipate will occur in the future. One common denominator is that neither stressor is actually real - the past no longer exists and the future hasn’t occurred yet. As far as the body is concerned, it does not distinguish between what is a real stressor and what is a perceived or imagined one.

The effects of prolonged and excessive psychological stress on the body involves every system. Psychoneuroimmunology has told us that stress can negatively affect our immune system and susceptibility to infection. In one study⁹ 394 people had their levels of stress measured and were then inoculated directly to five different cold viruses. The results demonstrated that the likelihood of actually getting a cold seemed to be directly proportional to the level of stress, which the host was experiencing at the time.

In another study, it was found that profound immune suppression in medical students over the exam period. In particular there was lowered natural killer (NK) cell activity, a 90% reduction in gamma interferon and lowered response of T cell lymphocytes.¹⁰ Also the immune-suppression in those going through marital separation is proportional to the amount of negative emotion or difficulty the person experiences in letting go.¹¹

It is also well known that stress can increase blood pressure. Other less well-known effects of chronic stress include:

- slowing wound healing¹¹
- increasing genetic mutations¹² and decreasing repair.¹³
- effects on genetic expression which can predispose to problems as diverse as addictive behaviours,¹⁴ cardiovascular reactivity,¹⁵ depression¹⁶ and schizophrenia (¹⁷).

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¹⁶ Lopez J, Chalmers D, Little K et al. ‘Regulation of serotonin 1A, glucocorticoid and mineralocorticoid in rat and human hippocampus. Implications for the neurobiology of depression.’ Biol Psychiatry 1998; 43: 547-573.
One study recently demonstrated that a woman placed under considerable stress, particularly during the first trimester of pregnancy, will have a 2.8 times increased risk of her offspring developing schizophrenia (18).

THE EFFECTS OF STRESS REDUCTION AND MEDITATION

The relaxation response or the state of restful or wakeful awareness that occurs in meditation helps to reverse many of the physiological and psychological effects of stress by undoing many of the harmful affects of inappropriate stress. The hypometabolic state of parasympathetic dominance resets the internal metabolic functioning to a state of rest, rather than a constant readiness and perceptual over-reaction, and helps to counter the excessive demands placed on the mind and body by chronic stress. Also the inner silence created in the ‘wakeful or thoughtless awareness’ state of meditation helps to bring about (over time via constant practise) a naturally stress-free environment.

Prior to listing many of the physiological and psychological benefits of meditation and stress reduction (following), some interesting studies on the role and efficacy of meditation in stress reduction (one in a working population and one in laboratory conditions) will be discussed.

The first study looked at the efficacy of meditation and stress reduction techniques for the management of stress in an organisational setting. Employees selected for stress learned either one of two meditation techniques, a progressive relaxation technique, or were put in a waiting list control group. After 5.5 months, both the meditation and progressive relaxation groups showed clinical improvement in self reported symptoms of stress, but only the meditation groups showed significantly more symptom reduction than the control group (no relaxation/meditation training). Also the meditation groups had a 78% compliance rate at 5.5 months with treatment effect seen whether subjects practiced their techniques frequently or occasionally. (56)

Another study looked at stress in a laboratory setting (57). Whilst the mechanisms by which stress leads to poor health are largely unknown, high basal cortisol produced by chronic stress and low cortisol response to acute stressors has been suggested as a result of studies in animals. This study compared changes in baseline levels and acute responses to laboratory stressors for cortisol (and three other hormones - TSH, GH and testosterone) in a group trained in meditation with a control group that received stress education. After a 4 month intervention, the meditation group displayed decreased basal cortisol and average cortisol levels, which was not seen in the control group. The meditation group also showed increased cortisol responsiveness to acute stressors compared to the control group. The above results supported previous data suggesting that repeated practice of meditation reverses the effects of chronic stress significant for health.

PHYSIOLOGICAL BENEFITS OF STRESS REDUCTION

In addition to the physiological changes that occur (mentioned previously) as a result of the hypometabolic state produced by the relaxation response seen in meditation, following are further physiological benefits that have been made evident by research into meditation and stress reduction:
• reduction in serum cholesterol, more than would be accounted for by diet alone (19)

• lowered serum levels of lipid peroxides, which are associated with free radical damage to cell membranes. (20)

• changes in EEG patterns associated with the state of restful alertness including an increase in alpha and theta waves and EEG coherence (coordination of EEG waves).

• a reduction in epileptic seizure frequency (21)

• changes in neurotransmitter profile including high serotonin production as seen in recovery from depression (22)

• increased night-time plasma melatonin levels (useful in insomnia and resetting biological rhythms, and has anti-tumour effects) (26)

• reduced TSH and T3 levels (23)

• significant decreases in reaction time (7) and improved reflex response (24)

• improvement in perceptiveness of hearing and other senses (25)

• reduced calcium loss and risk of osteoporosis (probably related to a reduction in cortisol)

• improved immune function. Of note is that stress reduction stimulates an under active immune system due to chronic stress, whilst it reduces an over-active immune system as may be seen in auto-immune and inflammatory conditions. For example, in a study of patients with early stage malignant melanoma (27), following a six month stress management intervention (in addition to the usual surgical management) patients displayed significantly better immune function than the control group and, as a consequence, showed a halving of the recurrence and much lower death rates. Alternatively, in a chronic inflammatory disease such as asthma which involves an over-active immune system, patients who received a two week yoga training program demonstrated significantly less attacks per week, improved scores for drug treatment and improved respiratory function tests (28).

• excellent benefits as an adjunct to therapy for a variety of illnesses including the following:

* cardiovascular disease. In one study (29), patients with cerebrovascular disease (CVD) were divided into either a group which took up 20 minutes of transcendental meditation twice each day, or a group that had a CVD health education program aimed at lowering risk factors and were also encouraged to spend 20 minutes per day in relaxing activities other than meditation. Over a 6-9 month follow up the meditation
group showed reductions in arterial wall thickness that would translate to reductions of risk of acute myocardial infarction of 11% and of stroke of 15%. The improvements were not attributable to changes in other cardiovascular risk factors. Alternatively the other (control) group showed a slight advance in their disease (based on arterial wall thickness).

In the Ornish study (30) a significant improvement in both coronary heart disease (CHD) and quality of life was shown by an intervention group who were given a comprehensive lifestyle program (including group support, meditation, yoga, a low fat vegetarian diet and moderate exercise) in addition to their medical treatment, when compared to a control group who received conventional medical treatment only (most of whose CHD deteriorated). Ironically the costs of the lifestyle program were vastly less than for bypass surgery despite the results being much superior.

* irritable bowel syndrome (31)

* cancer - see study on malignant melanoma above (27). Another study showed in women with metastatic breast cancer a doubling of survival time from the time of entry into the study if the women were given group support and taught simple relaxation and self-hypnosis techniques as a part of their management (32).

* chronic pain (33)(34)

* diabetes (35)

* fibromyalgia (36)

* asthma - see study above (28). A study performed at the Royal Hospital for Women in Sydney (3) compared the sahaja yoga meditation technique to a simple relaxation technique as an adjunct to treatment for patients whose asthma was so severe it did not properly respond even to maximum levels of medication. The results showed that while both groups did appear to bring about improvements in the way patients felt, the meditation also showed improvements in the severity of the disease process itself.

• Reduced frequency of menopausal hot flushes. A study found 9 out of 10 women who enrolled in an eight week meditation program reported at least 50% reduction in the frequency of their hot flushes. Six of these women had a 65-70% improvement in their hot flushes, which after eight weeks of meditation treatment, is comparable to that seen in conventional HRT treatment. In addition, standard measures of quality of life and symptom profiles showed similar degrees of improvement (3). It should be noted however, that the authors did emphasize that larger, randomised, controlled trials need to be carried out to more conclusively validate the above results.

• Reduced medical care utilization and health care costs. A field study compared 5 years of medical insurance utilization statistics of 2000 regular meditators with 600,000 non-meditators (37). The findings suggested that in every disease category (17 in total) there were significant reductions in illness, for example an 87% reduction in heart disease and in diseases for the nervous system, 55% reduction in tumours, and 30% reduction in both mental disorders and all infectious diseases. On the weight of such evidence insurance companies in the USA and Europe are beginning to offer up to 30% reductions on life insurance premiums for people who practice an approved form of meditation regularly.
• Effects on ageing - increased longevity. One study investigated the effects of meditation process on ageing using a standard test of biological aging (utilising auditory threshold, near point vision, and systolic blood pressure as variables). Results found that the mean biological age for a control group was 2.2 years younger than that for the general population, whilst it was 5.0 and 12.0 years younger for intervention groups of short and long term meditators respectively (mean age of the study population = 53 years). The difference between groups was still significant after covarying for a diet factor. Also, there was a significant correlation between length of time practicing meditation and biological age (38).

Another study found higher improvements on variables relating to age related decline for meditation treatment groups than for relaxation treatment or no treatment groups (mean study population age = 81). Also, after 3 years survival rate was much higher for these meditation groups than the other groups (39).

PSYCHOLOGICAL BENEFITS OF MEDITATION AND STRESS REDUCTION

A study worthy of note in this area attempted to rigorously map the psychological effects of Zen meditation among experienced practitioners. Analyses revealed that in comparison to a control group, experienced meditators are less likely to believe in God, more likely to believe in Inner Wisdom, and more likely to display the relaxation dispositions Mental Quiet, Mental Relaxation, and Timeless/Boundless/Infinite. Pre- and post-session analyses revealed that meditators showed greater increments in the relaxation states Mental Quiet, Love and Thankfulness, as well as reduced Worry. (55)

• decreased anxiety (40). One study using a group mindfulness meditation training program on patients diagnosed with generalised anxiety disorder or panic disorder, found in 20 of 22 subjects, significant reductions in anxiety and depression scores after a 3 month follow up period; and reduced number of subjects experiencing panic symptoms (41). A 3 year follow up analysis of this study also showed maintenance of the gains made in the original study; and ongoing compliance with the meditation practice was also demonstrated in the majority of subjects at 3 years (42).

• decreased depression and hopelessness (41)(42)(43) - also as indicated by elevation of serotonin.

• as an adjunct to a happiness enhancement program (43)

• happiness tends to be less conditional (1b)

• more optimism (1b)

• greater self awareness and self-actualisation (44)

• improved coping capabilities (45) and better sense of control (54)
• reduced reliance on drugs, prescribed and non-prescribed, or alcohol (46). This study reviewed 24 studies on the benefits of meditation in treating and preventing misuse of chemical substances. Taken together, the studies indicate that meditation ‘simultaneously addresses several factors underlying chemical dependence, providing not only immediate relief from distress but also long-range improvements in well-being, self-esteem, personal empowerment, and other areas of psychophysiological health.’

• improved sleep; more restful, less insomnia, and in time less sleep needed (1b) - aided by increased night time plasma melatonin levels.

• reduced aggression and criminal tendency (47)

• improved I.Q. and learning capabilities, including the aged and intellectually impaired (1b). One study found that when other factors were held constant (i.e. age, sex, education, and duration of practice of meditation) a few months practice of meditation significantly predicted higher performance on perceptual-motor speed tests and tests on non-verbal intelligence (48).

• greater efficiency and output at work (1b)

• better time management (1b)

• improved concentration and memory (49)(50)

• reduction in personality disorders and ability to change undesired personality traits (51)

• reduction in coronary prone behaviour - reduced time urgency and impatience and hostility resulting from enforced waiting (52)

• reduced anger (53)

• increased occurrence of spiritual experiences (54)

5 DIFFERENT TYPES OF MEDITATION

1. progressive muscle relaxation.
2. concentrating on the breath
3. mantra meditation
4. mindfulness meditation
5. visualisation

NB: the first four techniques are aimed at achieving stillness and silence ‘beneath the mental activity’ whereas the fifth is more directly aimed at ‘reconditioning’ the mind.

Most meditation techniques will rely on the attention being focused or rested on something and in the process learning to not struggle with, but let go of, unnecessary and distracting mental activity. The quality of your meditation can only be judged based on your own previous experience, and there will be some days where you have very deep meditations where your mind is very still, yet on other days your mind will be cluttered with activity. It is important not to get uptight or try to hard on these days.
Simply knowing that the quality of the meditations will fluctuate over time will help you to relax and just observe your thoughts during the busier sessions. Combining different types of meditation in each meditation session can be very effective. For example, on a day where the mind is very calm mindfulness meditation is excellent and often effortless. Yet, if the mind is very busy during a particular session, then it may be easier to focus on the breath or use a mantra on the in breath and out-breath to settle the mind. You can then either try going back to mindfulness meditation, or simply spend the rest of the session focusing on the breath or repeating a mantra.

It is also very useful to lead into a meditation session using a relaxation process such as deep muscle relaxation. This allows you to go to a very deep place before you start practicing mindfulness or mantra repetition.

The different forms of meditation suit different people. Dr Craig Hassed sums it up beautifully by saying that the best form of meditation is the one you practice! As with most skills, the quality of your meditation will increase the more regularly you practice and the longer you have been practicing. As mentioned above, the only reference you need in order to judge the quality of your practice is your own experience. It is important not to get too goal or success oriented with your meditation. Just practice it. If you keep it simple it will improve.

Likewise it is important not to compare your meditation with that of others. As meditation experiences can only be reported by the individual experiencing them, there will be great variation in what is reported. Some people naturally have a lot of visual experiences in their mind during meditation, others will not. That doesn’t matter. Meditation is not about how many ‘experiences’ you may or may not have. The whole point of meditation is in achieving stillness. The more you practice, the more you will achieve this. Profound visions, or insights etc. may occur, but they are not the goal of meditation and it is important not to try to elicit ‘experiences’ every time you meditate, as you will often end up very frustrated. If they occur, good. If they don’t, that’s good also. Just keep practicing and trying to achieve silence and stillness.

When you first learn how to meditate, just sit for whatever time you feel comfortable. 15 minutes twice a day is excellent. You will be able to meditate comfortably for longer periods of time the more you practice. As with all other aspects of meditation let this develop at your own pace.

Regular short pauses at other times during the day can help to reinforce the meditation practice. Even if it is only a couple of deep breaths at your desk, this is often enough to help punctuate the day and help to break the build up of tension and mental activity.

It is also often very useful to meditate with a group occasionally, for example once or twice a week (or whatever you can achieve). Not only is it a very powerful experience, it also gives you exposure to feedback and to hear of different techniques etc. It is important however, as mentioned previously, to only use feedback etc. for your own learning, not as a means of comparison of yourself against others.