

# UTILITY OF BUDDHIST MEDITATION TO OVERCOME PHYSICAL INFIRMITY AND MENTAL DISORDERS BASED ON MODERN NEUROSCIENCE RESEARCHES

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## INTRODUCTION

Buddhist Meditation practices mainly focus to train the mind for overcoming the suffering, problems, especially negative forces in emotions that create mental unrest, unhappiness, fear, and frustration etc. which brings more problems and suffering. The negative emotions bring not only mental unrest, but also it is detrimental to physical health. The positive states of the mind bring inner strength, mental fortitude and, due to that beneficial to the physical health. The modern neuroscientist also explore about the brain mechanisms pertain of attention and emotion. Neuron system is the most complex organ system in the body. Neurons are cells specialized for communication. The neurons send information one neuron to another as electrical signals. These cells have the ability to communicate with other types of cells. The neuron electrically excitable cells that receives, processes and transmits information through electrical and chemical signals. The transmission occurs via synapses. Mainly neurons system consists with two components, the central nervous system and the peripheral nervous system.<sup>1</sup>

Buddhist traditional Meditation practices associate with some philosophical and metaphysical concepts also. Therefore scientific

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1. Wade, Nicholas.1999. p 234

research about the Meditation practices must distinguish the empirical aspects of the Buddhist teaching and other aspect of the Meditation practices. Neurologists prove the simple Meditation practices can make observable changes in the human neuron system.

## BUDDHIST MEDITATION AND NEUROSCIENCE RESEARCHES

The Pali term *bhāvanā* has been translated into English as Meditation. The term *bhāvanā* has derived from the term “*bhāva*” which gives the meanings such as “emotion,” “sentiment,” and “state of mind.” The Pali term *bhāvanā* literally means “development,” “cultivating,” and “producing.” Pali Text Society’s Pali-English Dictionary has given the meaning for term *bhāvanā*, as producing, dwelling on something, putting one’s thoughts to, application, developing by means of thought or meditation, cultivation by mind, culture<sup>2</sup>. The English term Meditation derived from the Latin term “*meditari*.” considering the state of consciousness in which the individual eliminates environmental stimuli from awareness. So that, the mind has a single focus for the relaxation and relief from stress. A wide variety of techniques are used to clear the mind of stressful outside interface.

Mosby’s medical Dictionary define Meditation as a practice of concentrated focus upon a sound, object, visualization, the breath, movement, or attention order to awareness of the present moment, reduce the stress, promote relaxation, and enhance personal and spiritual growth. Medical Dictionary for the Health Professions and Nursing defines Meditation as; any mental activity intended to keep the practitioner’s attention in the present; has been used for several thousand years to balance physical, emotional, and mental states; sometimes employed as part of overall therapy for diverse medical conditions (e.g. providing pain relief, lowering blood pressure)

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2. See Sutta - See on term Dhs. trsl 261 (240); Expos. I. 217 (DhsA. 163); Cp.d. 207 n. 2. Cp. pari, vi, sam.Vin. I, 294 (indriya); D. III, 219 (three: kāya, citta, paññā), 221, 225, 285, 291; S. I, 48; Dh. 73, 301; J. I, 196 (mettā); III, 45 (id.); Nd 143 (saññā); Nett 91 (samatha-vipassanā); Vbh. 12, 16 sq.99, 325; Vism. 130 (karaṇa, bhāvanā, rakkhaṇa; here bh. bringing out, keeping in existence), 314 (karuṇā), 317 (upekkhā); Miln. 25 (maṇuṇjati); Sdhp. 15, 216, 233, 451.

Buddhist meditations divide into two categories as *samatha* and *vipassana* meditations. Pali Text Society's Pali-English Dictionary imply *Samatha* as, Calm, quietude of heart, tranquility, serenity and cessation of the *Saṅkhāras*<sup>3</sup>. The Pali Term *Vipassanā* translated to English as "insight," "clear seeing." The Prefix "Vi" means special and the root "pas" means see. The term *Vipassnā* means "seeing deeply." It define as,

"Looking into something with clarity and precision, seeing each component as distinct and separate, and piercing all the way through so as to perceive the most fundamental reality of that thing<sup>4</sup>."

The synonym for term *Vipassanā* is "*paccakkha*"; gives the means such as "before the eyes" or "direct experiential perception." It rejects the knowledge derived from reasoning or arguments. In Tibatian Buddhism Pali term *Vipassanā* use as "*ihagthong*." The term *ihag* means "higher," "superior," "greater," the term "*thong*" means "view," or "to see." Thus, *ihagthong* gives the meaning "superior seeing," "great vission," "supreme wisdom," "superior manner of seeing," and "seeing that which the essential nature is." It refers to insight into the *tilakkhaṇa* or three marks of existence such as impermanence, suffering, or unsatisfactoriness, and realization of non-self. (*aniccatā, dukkhatā, anattatā*).

The *Sabbāsava Sutta* and the *Satipaṭṭhāna Sutta* mainly explain the way of free from all kind of unsatisfactoriness, unhappiness and unpleasantness. All the problems come to human beings according to Buddhism not mainly due to the external world. Buddhism emphasize that human mind is the main object which pertaining to suffer and happiness. *Sabbāsava Sutta* in *Majjhima-Nikāya* Buddha says,

"Monks, I will teach you the method of restraining the mind from all the desire or cankers."

Then the Buddha proclaimed impotent of wise attention. "*Yo niso manasikāra*." When people live with wise attention new defilements

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3. PTS. M. I, 33; A. I, 61, 95; II, 140; III, 86 sq. (ceto), 116 sq. , 449; IV, 360; V, 99; D. III, 54, 213, 273; DhA. II, 177; S. IV, 362; Dhs. 11, 15, 54.

4. Gunaratana, Henepola. 2011, P. 21

will not enter into the mind. The defilements exist in the mind can see clearly through wise attention and it is easy to eradicate from the mind. Buddhist meditation prescribe regard to the human temperaments or *carita*. The term *carita* derived from the “*car+ta*” which gives the meanings such as behavior, temperaments or the perfuming of charity. Pāli *canon* use another synonyms “*cariya*” which gives the meaning behavior, practice, habit, familiarity, and temperament. According to the *Visuddhimagga*, *carita* means personal nature (*pakati*), and idiosyncrasy (*ussanna*) etc. There are six temperaments.

*Rāga carita* - greedy temperaments.

Psychic phenomena related to greedy temperaments are Deceit (*māyā*), hypocrisy (*sāṭheyya*), excessive wish (*mahicchātā*), evil wish (*pāpicchatā*), discontentment (*asantuṭṭhi*), persuasion (*saṅga*) avariciousness (*tintina*), discourteous living (*asabhāgavutti*), tedium (*arati*), apathy (*tandi*), restlessness (*viṅambhita*), after meal drowsiness (*bhattasammado*), sluggishness (*satasolinattam*), guile (*kuhanā*), insinuating talk (*lapanā*), and seeking profit by profit. (*lābena lābaṃ nijiginsanatā*)

Abnormal Behaviors: Harming to others, Killing animals, Stealing, Sexual misconduct, taking intoxicant, frequently watching drama, wandering the streets at inappropriate times, associate with evil companions.

Treatment (Meditation): *Nilakasiṇa* (Blue kasiṇa), The ten Loathsome Objects (*asubha-kammaṭṭhāna*) Bloated corpse, Livid corpse, Festering corpse, Corpse cut open, Gnawed corpse, Scattered corpse, Hacked and scattered corpse, Bleeding corpse, Worm-infested corpse and Skeleton. And *Kayaḡatāsati*. (contemplation on body)

*Dosa Carita* - Anger Temperaments.

Psychic phenomena related to anger temperaments are anger (*kodha*), grudge (*upanāha*), ingratitude (*makkha*), disparaging (*palāsa*), jealousy (*issā*), meanness (*macchariya*), contumacy (*dovacassata*), and having evil friends (*pāpamittā*).

Abnormal Behaviors: Harming to others, Killing animals,

uncontrolled senses, self-mortification, malevolence, disobedient, Associate with evil companions, and engaged with war.

Treatment (Meditation): *Nīla Kasīṇa* (blue *kasīṇa*), *Pīṭa kasīṇa* (Yellow *kasīṇa*), *Lohita kasīṇa* (red *kasīṇa*), *Odāta kasīṇa* (White *kasīṇa*), The four sublime abodes (*Brahma vihāra*); Loving-kindness meditation (*mettā bhāvanā*), Compassion meditation (*karuṇā bhāvaā*), meditation of sympathetic joy (*muditā bhāvanā*), and meditation of Equanimity (*upekkhā bhāvanā*).

#### *Moha Carita* - Dull Temperaments

Psychic phenomena related to dull temperaments are sloth (*thīna*), restlessness (*uddaccha*), remorse (*kukkucca*), doubt (*vicikicchā*), dogma (*adanaggāhi*), difficulty in renouncing (*duppaṭinissaggitā*), un-mindfulness (*muttahasacca*), and absence of awareness (*asampajañña*).

Abnormal Behaviors: frivolous talk, false speech, talkative, laziness, confuse, admiring the evil doer, insulting to wise, delight on should not delight, non-delight on should delight, no his own opinion, and does not like to eliminate wrong views.

Treatment (Meditation): simple mediation practices such as *Ānāpānasati Bhāvanā* (mindfulness on breath).

#### *Saddhā carita* - faithful temperaments.

Psychic phenomena related to faithful temperaments are free generosity (*muttacāga*), desire to see a Noble person (*ariyānadassana kāmatā*), desire to hear doctrine of the Noble person (*saddhammaṃ sotukāmatā*), great gladness (*pāmojjabahulatā*), ingenuousness (*asaṭṭa hatā*), honesty (*amāyāvitā*), and faith in things of faith (*pasādanīyesuṭhānesu pasādo*), are frequently arising whole mental phenomena in faithful temperaments.

Behaviors: they have benevolence activities. Only they have improve their qualities. Patient, wisely talking, compassion, loving-kindness, like share knowledge, clean, gentle, generosity, not a opportunist, beloved to father, mother, sisters, brothers, wife and husband, faithful to religion, admiring other's good qualities, like to development, practice the equanimity, doesn't like give pain to others, like to calm environment, like to read books, and have wide vision.

However there is a chance to cheat them due to *amūlikā saddhā*.

Meditation: *Dasa Anussati* (ten recollections): Recollection of the Buddha, Recollection of the *Dhamma*, Recollection of the *Saṅgha*, Recollection of Virtue, Recollection of Generosity, Recollection of Divine Beings, Recollection of Death, Recollection of the Body, Recollection of Breathing, and Recollection of Peace.

*Buddhi Carita* - Intelligence temperaments.

Psychic phenomena related to intelligence temperaments; the person is easy to be admonished (*savacassatā*), possession of good friends (*kalyāna mittatā*), has moderation in diet (*bojane amattaññutā*), devotes to wakefulness and has sense of urgency at eight grounds for the sense of urgency (*saṃveganīyesu ṭhanesu saṃvego*), and practices wisely by means of sense of urgency (*saṃviggassaca yoniso padhānaṃ*)

Behaviors: keen knowledge, inheritably wise, improve the intellectual capacity, wise, easily understand, benevolence behaviors, associate with the good companions, mindful, have good memory power, and no indulge in foods. They have only develop their good qualities.

Mediation: *maraṇānussati bhāvanā* (recollection of death), *āhārepaṭikūla saññā* (Repulsiveness of Food), and *catudhātu-vavaṭṭhāna* (Analysis of the Four Elements).

*Vitakka Carita* - Speculative temperaments.

Psychic phenomena related to speculative temperaments; talkativeness (*bhassabahulata*), sociability (*ganaramatā*), boredom with devotion to the profitable (*rattindumayana*), and flaming by day (*divapajjalana*).

Abnormal Behaviors: Talkative, Frequenting public spectacle, does not like to meritorious deeds, live in dream world, constantly change the opinion, believe others, everything without any order, and like to dwell in impure environment.

Treatments: *Ānāpānasati* meditation, blue *Kasiṇa*.

IBMT did the experiment using two different groups of students. One group of students practiced the Meditation while

other practice relaxation. Before 5 days two groups were similar by, behavioural, endocrine, and immune. After 5 days Meditation training, control group showed significant improvement of attention and positive mood. They showed reduced of cortisol and secretion hormones, which pertaining to reducing the stress and increased immune reactivity. The scientists used new technologies such as physiological reaction in heart rate, respiratory amplitude and rate, skin conductance response (SCR), and brain imaging to monitor autonomic nervous system.

The Meditated group showed higher levels of self-regulation than relaxation group. The anterior cingulate cortex (ACC) and prefrontal cortex (PFC) of the brain show mechanism of self-regulation of attention and emotion. During the training, activity of the ACC and PFC increased more in the Meditation group than relaxation group.

Furthermore, scientists showed Meditation affiliated by physical changes such as oxygen consumption, heart rate, skin resistance etc. Especially the function of autonomic neuron system, including heart rate, skin resistance and conductance, respiratory amplitude rate and EEG frequencies. The Meditation group shows an increase of autonomic neuron system, especially parasympathetic neuron system than others. The Meditated group shows greater EEG power in the midline theta wave and the frontal midline theta rhythm will be positively correlated with high-frequency of heart rate. Major chemicals inside the brain that affect neural activity. Primary neurotransmitters and its effect to the body,

1. Glutamate - excites receiving neurons
2. GABA (Gama amino-butyrac acid) - inhibits receiving neurons.

The main Neuromodulators (influence the neurotransmitters);

1. Serotonin - regulate mood, sleep, and digestion.  
Antidepressants increasing
2. Dopamine - involved with rewards and attention.
3. Norepinephrine - alerts and arouses

4. Acetylcholine - Promotes wakefulness and learning
5. Opioids - buffer stress, provide soothing, reduce pain, produce pleasure
6. Oxytocin - promotes nurturing behaviours toward children and bonding couples. Associate with blissful closeness and love.
7. Vasopressin - supports pair bonding. It may promote aggressiveness toward sexual rivals.
8. Cortisol - released by the adrenal glands during the stress response.
9. Estrogen - affect libido, mood, and memory

In human brain contains 100 billion neurons and 1000 synapses on each. If the person stuck on certain thoughts, he has problem with cingulate system. If trouble in focusing his attention, he has problem in Prefrontal cortex prescription. If increase the anxiety, the problem is in basal ganglia system. If it is difficult to connect meaningfully with others, the problem is in the deep limbic system. If cannot tame the temper, the problem is in the temporal lobes. According to estimate, human body can sense some 20 million bites of information per second. While conscious mind it is about 40 bits of information per second. The compassion and happiness for the infant helpful to enlargement of the brain during first few weeks.

John Denninger, a psychiatrist at Harvard Medical School, show how Meditation practices affect genes and brain activity. His latest work show how Meditation can switch on and off some genes linked to stress and immune function. Meditation makes free of all the neurotic behavior that results from the existence of a tortured. The Meditation certainly is the way to cure such neurosis and unhealthy emotional states.

The mind is immaterial. It is co-occurs and interrelated with material neural activity. What flows through the mind sculpts your brain. It makes physical changes such as,

1. Alterations brain waves
2. Consumption of oxygen and glucose

3. Ebbs and flows of neurochemicals
4. Increased blood/nutrient flow to active regions.
5. Altered epigenetics.
6. Increasing the excitability of active neurons.
7. Strengthening existing synapses.
8. Building new synapses; thickening cortex
9. Neuronal “pruning”
10. Thickness and strengthens the anterior (frontal) cingulate cortex and insula. Those area involved with controlled attention, empathy, and compassion. The Meditation can improve these functions.
11. Less cortical thinning with aging
12. Increase activation of the left frontal regions, which lifts moods.
13. Increases the power and reach of fast, gamma brainwaves.
14. Decreased stress-related cortisol
15. Stronger immune system<sup>5</sup>

The activity in the frontal region of the brain reflects a person’s emotional state. Especially right frontal areas marks the fleeting positive mood. The negative emotions fade more quickly in people by more left-frontal activities. The Meditation on compassion showed greater shift toward left-frontal activation.

With the support of His Holiness Dalai Lama, Richard Davidson, a neuroscientist at the University of Wisconsin started an experiments on effects of Meditation on the brain. His results explained that long-term, or short-term practice of Meditation affect in different levels of activity in brain regions related to qualities such as attention, anxiety, depression, fear, and anger. He show body it-self has ability of healing.

Many doctors prescribing Meditation for blood pressure,

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5. Rick Hanson, 2011 p. 26

angina, and asthma breathe easier, relieve insomnia and stress. The experiments describe that deep relaxation changes our bodies on a genetic level. The researchers at Harvard Medical School discovered that, “disease-fighting genes” were active in long-term practitioners of Meditation more than others. They found genes that protect from affections such as pain, infertility, high blood pressure arthritis, stronger immunity, healthier hormone levels and lower blood pressure. The hypnotherapist at London’s Body Mind Medicine Centre report on their experiment and says,

“After two months, their bodies began to change, the genes that help fight inflammation, kill diseased cells and protect the body from cancer. All began to active.”

Fifteen minutes of Meditation can produce following health benefits,

1. Increased immunity - Researches at the Ohio State University found that Meditation increased immunity in recovering cancer patients. When it practices daily, reduce the risk of breast cancer recurrence. A month of mediation exercises boost natural killer cells, and giving them resistance to tumors and to viruses. Scientists at the University of Wisconsin reported meditators also showed a significant increase in immunity to the flu.
2. Increased Fertility – A research at the University of Western Australia found that women are more likely to conceive during periods when they are relaxed rather than stressed. A research at Trakya University, in Turkey, also found that stress reduces sperm count and motility, relaxation also boost male fertility.
3. Lowers the blood pressure - Harvard Medical School and British Medical Journal report that Meditation lowered blood pressure by making the body less responsive to stress hormones.
4. Anti-inflammatory - The researchers at Emory University in the US say that Stress leads to inflammation, a state linked to heart disease, arthritis, asthma and skin conditions such as psoriasis, say Meditation can help prevent and treat such symptoms.

5. Relieves irritable bowel syndrome - The researchers at the State University of New York recommended Meditation twice a day as an effective treatment to irritable bowel syndrome.
6. Reduce the physical pain, anxiety and stress - A study published in *Psychotherapy and Psychosomatics* showed sustained benefits over a three year period in a group of women who had taken an eight-week course in Meditation.
7. Helps lower blood sugar- Researchers at Cedars-Sinai Medical Center in Los Angeles showed that patients were able to lower their blood pressure, blood sugar and insulin by practicing Meditation.
8. Donald K. Swearer has said: Meditation is also promoted in Thailand as a treatment for patients with AIDS. Beginning in 1989, a team of psychologists, social workers and nurses utilized Meditation techniques as part of a hospital training program to help care workers who treat HIV and drug dependent patients.

Meditation more helpful for various health problems such as anxiety, pain, depression, stress, insomnia etc. (Physical or emotional symptoms that may be associated with chronic illnesses (such as heart disease, HIV/AIDS, and cancer) and their treatment.) Researches in 210 institutes including Harvard, and UCLA Medical School, in 33 countries show benefits of Meditation.

1. Reduced High Blood Pressure and Death Rates - *American Journal of Cardiology*
2. Reduced High Blood Pressure and Reduced Hypertension - *American Journal of Hypertension*
3. Reduced Atherosclerosis - *American Journal of Cardiology*
4. Reduced Thickening of Coronary Arteries - *The American Heart Association's Stroke*
5. Reduced Blood Pressure - *International Journal of Neuroscience*
6. Slowing of Aging - *International Journal of Neuroscience*

7. Reduced Hospitalization Rates - American Journal of Managed Care
8. Increased Creativity - Journal of Creative Behavior
9. Decreased Anxiety - Journal of Clinical Psychology
10. Reduced Alcohol Abuse - American Journal of Psychiatry
11. Increased Productivity - Academy of Management Journal
12. Reduced Blood Pressure: Comparisons with Other Procedures - The American Heart Association's Hypertension

## CONCLUSION

In first two years every single neuron has 2500 synapses and at age three grow into 15000 synapses per neuron. In average adult has half that number of synapses. The reason is some connections are strengthened while eliminated and some connections never used and die. It is known as synaptic pruning. The Meditation practices influence to the human neuron system and body functions. Scientists investigate use of effective, preventative, and non-pharmacological options to treat the mental illnesses. The Meditation practices important to regulate emotions, mood, and stress. Short time period meditation practice makes people calm, less stressed, and relax. 20 minutes of Meditation leads to physical changes such as reduced blood pressure, lower the heart rate, deeper and calmer breathing, lower risk of heart attack, and treatment for chronic and acute pain.

Four days of Meditation show reduced of unpleasantness and intensity of the pain. The Meditation increases the function of the left hemisphere, orbito-frontal cortex and hippocampus regions which linked with positive mood, immune functions. While aging the people thins the cortex of the brain and it can be cause for dementia. Scientific experiments show around one hour Meditation for six years increased the cortical thickness.

Neurobiologist believed human brain grow during infancy and childhood until 1960. The brain plasticity means brain's ability of changing and adapt as a result of experiences. Modern neurobiologists believe the brain continues to create new neural pathways and learn new information and create new memories according to

neuron plasticity. The plasticity occur during the lifetime but more predominant during specific life ages. The plasticity involves brain cells other than neurons including glial and vascular cells. The plasticity occurs due to learning, experiences, memory formation, or damage to the brain. The environment and genetics influence to it.

