

Practice of Meditation: a Physiological Approach



Medical Science

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ABSTRACT

Yoga techniques include the practice of physical postures, regulation of respiration with a number of breathing techniques, meditation techniques and relaxation techniques. Meditation is a specific state of consciousness featured by deep relaxation and internalized attention. Meditation forms the sixth and seventh stages of the eight limbs of yoga described by the sage Patanjali. While meditation is relaxing, in yoga therapy it has a deeper significance. It silences the surface activity of the mind, there by allowing the person to look deeper within which illuminates the deeper and higher realities of existence.

Introduction

Man leaps in to higher states of consciousness and learn to stay, and act tuned to these states. Yoga often refers to these subtle layers or casual states of our mind. Yoga is one of the six systems of Indian Philosophy known as Shatdarshanas. Sage Patanjali compiled the essential features and principles of yoga. According to Patanjali yoga is conscious process of gaining mastery over the mind. Yoga has been described as “the union of mind, body, and spirit,” which addresses physical, mental, intellectual, emotional, and spiritual dimensions towards an overall harmonious state of being.

The core of sage Patanjali’s Yoga sutra is an eight limbed path that forms the structural framework for yoga practice. Upon practicing all eight limbs of the path it becomes self-evident that no one element is elevated over another in a hierarchical order. Each is part of a holistic focus which eventually brings completeness to the individual as they find their connectivity to the divine. Because we are all uniquely individual a person can emphasize one branch and then move on to another as they round out their understanding.

The eight limbs or steps to yoga are as follows:

1. Yama : Universal morality
2. Niyama : Personal observances
3. Asanas : Body postures
4. Pranayama : Control of breath
5. Pratyahara : Control of the senses
6. Dharana : Concentration and cultivating inner perceptual awareness
7. Dhyana : Meditation on the ultimate principle
8. Samadhi : Union with the principle

Dhyana means meditation or perfect contemplation. It involves concentration upon a point of focus with the intention of knowing the truth about it. The concept holds that when one focuses their mind in concentration on an object the mind is transformed into the shape of the object. Hence, when one focuses on the ultimate, they become more reflective of it and they know their true nature. “His body, breath, senses, mind, reason and ego are all integrated in the object of his contemplation, the Universal Spirit.”

Meditation has been described as training in awareness which, over long periods produces definite changes in perception, attention, and cognition (Brown, 1977). During meditation the consciousness is further unified by combining clear insights into distinctions between objects and between the subtle layers of perception. We learn to differentiate between the mind of the perceiver, the means of perception, and the objects perceived, between words, their meanings, and ideas, and between all the levels of evolution of nature.

Meditation is a specific state of consciousness featured by deep relaxation and internalized attention (Murata et al 2004). How-

ever, it may not be possible for everyone to begin their practice of yoga with meditation. Meditation in fact, forms the sixth and seventh stages of the eight limbs described by the sage Patanjali (Taimini 1986). While many practitioners do learn meditation directly, others find it easier to pass through the other stages, learning yoga postures -asanas and regulated breathing- pranayamas first (Nagendra & Nagarathna, 1997). For those who find it difficult to commence the practice of meditation there are two possible risks. Some people may find that they feel drowsy and even fall asleep other people may have a series of thoughts rushing through their minds preventing them getting into a meditative state. For this reason a technique of ‘moving meditation’, which combines the practice of yoga postures with guided meditation was devised, called cyclic meditation, which is conducive to getting into a meditative state. This technique has its origin in an ancient Indian text, Mandukya upanishat (Chinmayananda, 1984). Cyclic meditation does induce a quiet state of mind, which is compatible with the description of meditation or effortless expansion according to Sage Patanjali.

Patanjali’s yoga sutras, (chapter 3: verse 2) states that “Tatra pratyayakatanata dhyanam”. This means that the uninterrupted flow of the mind towards the object chosen for meditation is dhyana (Taimini, 1986). Indeed, all meditations irrespective of the strategies involved are believed to help reach this state. There are several strategies in meditation. These include breath awareness, awareness of internal sensations, directing the attention to a mantra, and keeping the eyes open with the gaze fixed on the object of meditation, among other methods.

Earlier studies on meditation have shown that during the practice there were physiological changes which are suggestive of both alertness and rest (Telles, & Desiraju, 1993). This has led to an interest whether the practice of meditation would improve the performance in the tasks requiring attentiveness and vigilance. However, attentiveness requires increased sympathetic nervous system (Telles et al, 2007). Hence, it would appear that meditation and performance in attentional tasks may not be compatible.

Based on changes in oxygen consumption, carbon dioxide elimination, breath rate and the Electro Encephelo Gram (EEG), the practice of Transcendental meditation was reported to induce a wakeful hypo-metabolic physiologic state (Wallace, 1970). Similarly, a decrease in oxygen consumption occurred following meditation on a meaningful syllable, ‘OM’ which was accompanied by decrease in cutaneous blood flow suggesting an increase in sympathetic vasomotor tone. This suggested that meditation on ‘OM’ produces a state of alertful rest (Telles et al, 1995).

Meditation is a specific consciousness state in which deep relaxation and increased internalized attention co-exist (Murata et al, 2004). A study of Electro Encephelo Gram coherence, heart rate variability and trait anxiety in Zen meditation showed that lower trait anxiety more readily induces meditation with a predominance of internalized attention, while higher trait anxiety

more readily induces meditation with a predominance of relaxation. In another study on Zen meditation both sympathetic and parasympathetic indices were increased during the appearance of frontal midline theta rhythm compared with control periods (Kubota et al, 2001). The theta rhythm is recognized as distinct theta activity which reflects mental concentration as well as a meditative state or relief from anxiety. Hence meditation appears to bring about a relaxed state with heightened internalized attention and concentration. The effect of meditation on attention to external objects was seen when the effects of transcendent experiences, described to occur during the practice of Transcendental meditation, were studied on the contingent negative variation amplitude, rebound, and distraction effects. Contingent negative variation is an event-related potential occurring between a warning stimulus and an imperative stimulus requiring a response. Late contingent negative variation amplitudes were largest in meditators who had transcendent experiences daily. Since late contingent negative variation reflects proactive preparatory processes including mobilization of motor, perceptual, cognitive, and attentional resources, to suggest that transcendent experiences could enhance cortical responses and executive functioning. (Throll, 1982)

These results suggest that meditation may be associated with greater mental calmness compared to yoga postures. It is worth noting that traditional yoga text Mandukya upanishat, says that it may also sometimes be desirable to stimulate the mind. In a state of mental inactivity awaken the mind, when agitated, calm it; between these two states realize the possible abilities of the mind. If the mind has reached a state of perfect equilibrium, do not disturb it again. For most persons routinely, the mental state is somewhere between the extremes, inactive or agitated. Hence a combination of awakening and calming practices may be better suited to reach a balanced and relaxed state. (Chinmayananda, 1984)

Mechanism of meditation

When mind becomes one with the object, it silences the surface activity of the mind, thereby allowing to look deeper within. Significant reduction in heart rate but increase in peripheral vascular resistance indicating physiologically relaxed state but increased mental alertness of alpha waves in Electro Encephelogram. The Autonomic Nervous System is linked to hypothalamus in the brain, which in turn controlled by the limbic system,

the centre concerned with emotions and feelings. Hypothalamus feeds its information into the endocrine glands and Autonomic Nervous System. Meditation directly effects and calms the hypothalamus by calming emotional controls and Autonomic Nervous System. Endocrine gland that is chiefly involved in adaptation to stress is the adrenal gland. The secretion of thyroid gland also comes into picture. These hormones can bring about wide spread changes similar to sympathetic stimulation. When stressful situation arise one can maintain balance of Autonomic Nervous System, this gives the best view of stress and allows one to cope up in the most relaxed way.

The physiological effects of meditation were described by Benson's group as the relaxation response (Benson 1976). The components of relaxation response, which may be easily anticipated in terms of a shift in autonomic balance in favor of the parasympathetic division. They are decrease in heart rate, decrease in respiratory rate, decrease in oxygen consumption, decrease in blood pressure if the basal blood pressure is high, increase in percent time spent in alpha rhythm in Electro Encephelogram, decrease in muscle tension and decrease in blood lactate level. In the modern world meditation is often looked upon as a relaxation technique to be used for treating stress and stress related disorders. While meditation is relaxing, in yoga it has a deeper significance. It silences the surface activity of the mind, there by allowing the person to look deeper within which illuminates the deeper and higher realities of existence. (Bijlani 2004)

Most meditation procedures involve diaphragmatic breathing, which is the act of breathing deeply into the lungs by flexing the diaphragm rather than the rib cage. Diaphragmatic breathing is relaxing and therapeutic, reduces stress and is a fundamental procedure of asana, pranayama, Zen meditation, transcendental meditation and other meditation practices. (Daniele et al, 2009)

Conclusion

Effect of meditation Physiologically is relaxing the body and mind and in yoga therapy it has a deeper significance. It silences the surface activity of the mind, there by allowing the person to look deeper within which illuminates the deeper and higher realities of existence.

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