

A Review on Technique For Proper Biochemistry of Body Metabolism Through Vagus Nerve

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ABSTRACT

Control of mood, immune response, digestion, and heart rate are the main functions of the vagus nerve which represents the main component of the parasympathetic nervous system. It also establishes the connections between the brain and the gastrointestinal tract and sends information about the state of the inner organs to the brain *via* afferent fibers (1). Alternate Medicinal Treatments that target the vagus nerve increase the vagal tone and inhibit cytokine production. Both are important mechanism of resiliency. The stimulation of vagal afferent fibers in the gut influences monoaminergic brain systems in the brain stem that play crucial roles in major psychiatric conditions, such as mood and anxiety disorders.(1).Since, the vagal tone is correlated with capacity to regulate stress responses and can be influenced by breathing, its increase through meditation and yoga likely contribute to resilience and the mitigation of mood and anxiety symptoms.(1). There are many environmental factors that have been associated with impaired Vagal Activity including stress, excessive adrenaline and hormone secretion, over stimulation from television/film/video games, diet and lack of exercise. Interestingly, brain wave rhythms measured during and after Sudarshan Kriya (SK Practices) are similar to those of babies that are very natural and innate, stress free(2). There is preliminary evidence that vagus nerve stimulation is a promising add-on treatment for treatment-refractory depression, posttraumatic stress disorder, and inflammatory bowel disease(1).

KEYWORDS : Vagus Nerve, Body Metabolism, SK&P

INTRODUCTION

Vagus Nerve establishes one of the connections between the brain and the gastrointestinal tract and sends information about the state of the inner organs to the brain *via* afferent fibers. In this review article, we discuss various functions of the vagus nerve which make it an attractive target in treating psychiatric and gastrointestinal disorders (1). Endogenic Factors and Exogenic Factors both types of factors are responsible for creating happiness swings in human body. Endogenic factors are Biological, ethical, cognitive and personality associated while exogenic factors includes behavioral, socio-cultural, and related with life events. Among all endogenic factors, biological sub-factors are the significant predictors of happiness. Neuroscience studies showed that some part of brain (e.g. amygdala, hippocamp and limbic system) and neurotransmitters (e.g. dopamine, serotonin, oxytocin and endorphin) play a role in control of happiness (3). All these 4 neurotransmitters are responsible for happy mood swings in human being and hence are named as happiness hormones. Serotonin and Oxytocin secreted from pituitary gland plays a dominating

role in controlling happiness. The role of cortisol and adrenaline secreted from adrenal gland is responsible for stress or unhappiness. Large number of studies have been carried out for relief on Insomnia and stress, since last few decades. Sudarshan Kriya and its accompanying breathing techniques were found to give an extreme relief from Insomnia to the persons who practiced it regularly. Many studies have demonstrated about 67-73% success rate in relief from insomnia, regardless of the severity of depression. These results are experienced rapidly, often within 3-4 weeks. It was observed that, there was rapid uniform relief from depression with SKY practices, unlike any conventional treatments. The results were found to be independent upon time period for how long a person was being suffering from clinical depression or the degree to which brain dysfunctioning related with dopamine secretions was found in the depressed individual. Sudarshan Kriya is a natural rhythmic breathing technique which releases stress, tensions, and depression and also brings an effective control on emotions simultaneously by minimizing stress hormone, Cortisol level in blood. Present study focuses on effects of Sudarshan Kriya on Depression. This study aimed to consider biological factors that underlie happiness with Vagus Nerve Stimulation. Amygdala, hippocamp and limbic system (these specific parts of the brain,) and some specific neurotransmitters (e.g. dopamine, serotonin, oxytocin and endorphin) play a role in control of happiness as reported in the neuroscience studies. According to Ashby F. G Et al, (4) Limbic system that is placed in the central area of brain has the most influence on identifying the form of emotions. Increasing in metabolism of limbic system leads to depression in individuals. Further Ashby et. Al states that studies has revealed that positive and negative moods affected by brain chemical in several ways. Two of the most important neuro-transmitters that involved in mood are dopamine and serotonin. Positive mood and negative mood mediated by dopamine and serotonin levels. Perhaps the most influential neurochemical theory of positive mood is presented by Ashby et al. (4). The two main elements of their theory are that: (i) positive mood is associated with (but not necessarily caused by) increased levels of dopamine in the brain and (ii) some of the changes in cognition observed in positive mood are due to the increased dopamine levels associated with positive mood. Tension and stress are being pulled out from every cell of human body, right from childhood. A process called Sudarshan Kriya, founded by the spiritual leader Sri Sri Ravi Shankar, is a rhythmic breathing technique which releases stress, tensions, depression and also brings an effective control on emotions. It is an unique and the only tool which helps in directly controlling emotions through rhythmic breathing. Rhythmic breathing is a unique method for balancing the autonomic nervous system and influencing psychological and stress-related disorders. The word Sudarshan means proper vision and Kriya means a purifying action. Through the action of our breath we get a proper vision of who we really are. There is a rhythm in the nature, like seasons come and go in time. Like that there is a rhythm in human body, in thoughts, in emotions, in breath and in our being too. Sudarshan Kriya helps in experiencing rhythm of a Being and through the rhythms of the breath different seven levels of existence of human being gets harmonize. Harmonising all systems of the human body rhythmatically, is the main effect caused by SK, through which stress gets released. Depression is being spreading and increasing day by day and in developed countries like Europe, U.S.A, U.K its percentage is near about 40-45% which is increasing and becoming alarming to human health. Sudarshan Kriya and its accompanying practices (SK&P), are time-honored stress management/health promotion techniques whose health benefits are being validated by modern medical science. Various studies have documented great and significant relief from depression in individual persons, who practiced Sudarshan Kriya regularly(4-9). These studies have demonstrated more than 70%

success rate in relief from depression that too within 3-4 weeks.(10,11). There is uniform rapid relief from depression with SKY practices regardless of period of suffering of patient or degree to which dysfunctioning of brain occurs. Founder Sri Sri Ravi Shankar states that, during the process infusion of maximum amount of oxygen to every cell is observed, which helps in the release of neuropeptides that regularize Abnormal Brain Wave patterns in patients suffering from neural disorders. As it directly effects in better metabolism, increased amounts of oxygen allows the release of emotions which are creating burden and stress. The mind- body intervention seeks to distress the mind and accordingly eliminate the ailments(12). Medical science is nowadays validating many of ancient health practices like Yoga, Pranayaam as well as practices from traditional cultures worldwide. SKY is a novel and ultimate practice that is undergoing extensive research. It has been reported to be quite effective for treatments in all stress related ailments , anxiety, depression, and even in cardiac treatments. It has also been reported as an effective tool for rehabilitation of criminal offenders.

The main aim of the present study is thus to study the effects of SKY on Vagus Nerve Stimulation, the nerve which is connected to both motor and sensory functions in the sinuses and esophagus. Vagus nerve stimulation (VNS) sends **regular, mild pulses of electrical energy to the brain** via the vagus nerve, through a device that is similar to a pacemaker.

METHOD OF DATA COLLECTION:

The researcher has collected data based on secondary data.

ANALYSIS OF DATA:

The theory behind this technique is that SKY allows a stress free , and a pleasant mind so that chemical messengers are produced which travels from nervous system to the immune system, to produce a healthy body and mind. Scientific studies suggest connections between body and the mind implying that emotional state and thought processes affect brain, endocrine system and also the immune system. A new discipline has emerged based on these concepts called as Psychoneuroimmunology or body- mind medicine. Perception of stress leads to restlessness, anxiety, irritability or aggressive behavior and/or a state of panic, in extreme cases, even addiction to tobacco, alcohol and/or drugs. Negative emotions surface in the form of hatred/dislike, jealousy, greed, possessiveness, lust, arrogance and anger. Further, inter-personal relationships are adversely affected, work out-put decreases and power of concentration wanes. Efficiency goes down and memory weakens. Most of us are afraid to acknowledge our negativity and so we begin finding fault with others. We start complaining, which adds further to our stress; a vicious cycle begins. Body too is affected by stress. Pulse increases, heart pounds and we start perspiring hands become cold and clammy. This is caused by the release of several hormones, chemicals and cytokines from our endocrine glands and immune cells, which are activated in response to the perception of stress. While the body can adapt to acute stress and does not suffer much damage, exposure or perception of repeated stressful situations (chronic stress) leads to irreversible physiological changes, resulting in diseased states like high blood

pressure, diabetes, heart attacks, asthma, gastrointestinal ulcers, viral infections, migraine/non-specific headaches etc. The main purpose of SK is to provide people from all layers of society, with practical and effective tools , derived from ancient practices on science of breath, to alleviate stress, improve health and increase wellness. Sudarshan Kriya is a Sanskrit word for healing breath, which incorporates specific and cyclic natural rhythms of breath to release stress and bring the mind to the present moment.

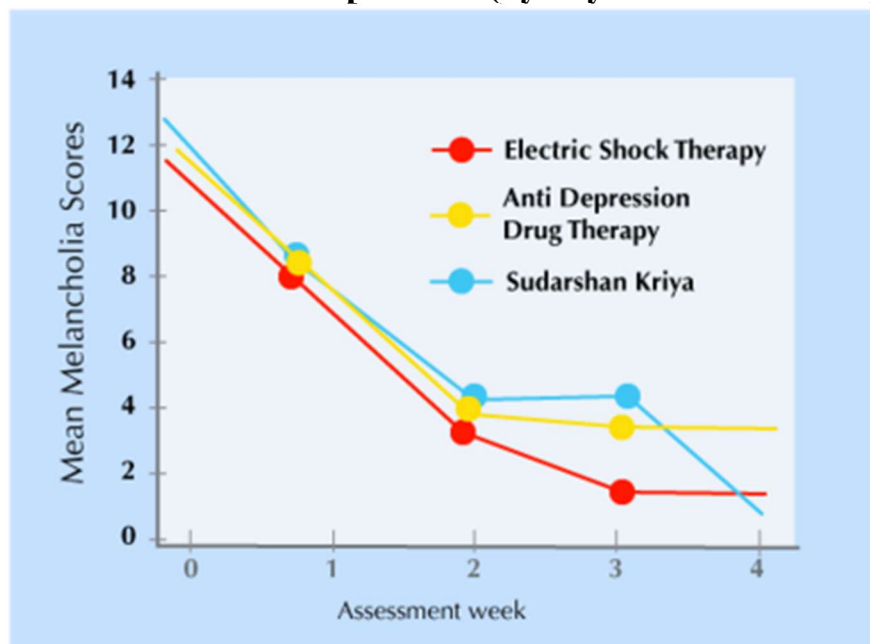
EFFECTS OF SK&P ON CORTISOL; A STRESS HORMONE RESPONSIBLE FOR DEPRESSION.

CORTISOL AND NOR- ADRENALINE: Cortisol is a stress hormone and it's a steroid hormone produced within the adrenal gland. It is released in response to stress and low blood glucose concentration. As such it functions to increase blood sugar through gluconeogenesis, to suppress the immune system and to aid in the metabolism of fat, protein and carbohydrates. It also decreases bone formation. Cortisol is a Stress Hormone which is harmful to body while Nor-Adrenaline is a useful Hormone for body. When Cortisol is released in blood, due to stresses, Nor-Adrenaline (NA) or Nor-epinephrine level gets badly affected. NA is synthesized and released by Central Nervous System. It is used as a neurotransmitter by sympathetic ganglia. The general function of NA is to mobilize the brain and body for action. Vedhmrthachar A, et al; studied Antidepressant efficacy and hormonal effects of Sudarshan Kriya in alcohol dependant individuals and found out that SK practices are effectively useful for dealcoholisation of addicted patients. Agte V. V and K. Tarwadi done studies on SK as Alternative and Complimentary therapies for treating Type 2 Diabetes. Sharma H, et al has carried out comparative studies between regular practitioners of SK and non practitioners and concluded that SK practitioners exhibit better anti-oxidant status and blood lactate levels. Similar studies were carried out at NIMHANS,Bangalore, which concluded that SK&P indeed leads to relaxation, and was further confirmed by the measurement of blood Cortisol ,a stress hormone, in 21 healthy individuals of 35-40 years of age. Regular practitioners of SK had very lower, negligible level of Cortisol in the blood at the base line indicating that they are less stressed and there was further fall during Kriya. Among beginners, fall was greater during SK as compared to when they were listening to music, confirming that SK and P was indeed more relaxing than listening to classical music also. Katzamam M.A. et al, found out that SK relieves anxiety and depression, while Seppala E.M, Descilo et al, and Martin A, have studied Post Traumatic Stress Disorder and symptoms, and

reduced stress levels were found out by Kjellgre A, Agte V. V, and Kharya C. Seppala E. M also found that Plasma Prolactin, a well being hormone which is believed to be a key factor in producing depression relief, increased significantly after the very first SK& P session.

Nag Venkatesha Murthy conducted studies on 15 patients with dysthymia and 15 patients with major depression. In this study one group of patients received low pretreatment P300 event related potential(ERP) amplitude, which were similar to earlier reports which obtained for patients with antidepressant medications and ECT that is electroconvulsive therapy. Thus no difference was occurred for those participants who received the pretreatment P300 amplitude. This demonstrated and proved there is a uniform response to SKY and it can be implemented as an alternative medicine over depression and a useful therapy on depression. This study also revealed that it requires minimum three weeks regular practice of SKY to get antidepressant effects.

Effect on Chronic depression (dysthymia melancholia)



Effective as Anti –Depressant Medication (artoflivingresearch)

Effects of Sudarshan Kriya was also studied on 46 outdoor patients of dysthymia. Following daily use of SKY continuously for 90 days along with avoiding medications, these patients have shown elevated levels of plasma prolactin. Brown has concluded that acute prolactin release

reduces fear and anxiety in animal models, which has proved efficiency of SKY in its biological and therapeutic use for patients of dysthymia. It was found that many patients were able to discontinue or reduce their dosage of antidepressant medication if they continued to practice SKY everyday regularly as yogic breathing is found to be a unique method for balancing central and autonomic nervous system and accordingly influencing psychological and stress related disorders.

SKY was compared with ECT, and imipramine by Janakiramaiah, on 45 hospitalised patients with severe melancholic depressive patients. The results were assessed by Beck Depression Inventory scale. According to this scale, ECT was the most effective treatment with SKY and imipramine having about equal effects. Despite the small size, all three treatments did show a significant effect. SKY & P has shown significant decrease in diastolic Blood pressure, serum urea and plasma MDA the oxidative stress markers in the mild hypertensives. Scientists in the west have been studying the effect of various forms of breathing exercises on our mental and physical health for many years and Yogis from India have been emphasizing a variety of techniques featuring the breath for thousands of years so this is nothing new, but what is new about the Sudarshan Kriya is just how it works. Of all the various functions of our autonomic nervous systems, from heart beat, perspiration, hormonal release, gastrointestinal operation, neurotransmitter secretion, etc., the breath stands alone as the only subsystem the conscious mind can put into 'manual override' and so it is through manipulation of the breath that we can recalibrate the entire system.

EFFECTS OF SK&P ON EEG:

In a comprehensive yogic breathing programme a controlled pilot trial was taken by Kjellgren. A, et al. According to which, the P300 ERP EEG brain wave pattern and NREM brain wave pattern, which measure electrical brainwave activity and are abnormal in many depressed people, returned to the normal range by 90 days. At NIMHANS, Janakiramaiah, N, and Gangadhar B.N., et al, studied therapeutic efficacy of Sudarshan Kriya in dysthymic disorder. EEG changes were recorded on 19 practitioners with 15 controls to study the long term effects of SK&P. Significant increase in beta-activity was observed in the left frontal occipital and midline regions among Sudarshan Kriya practitioners compared to controls (p less than 0.05). Bhatia M., et al studied electrophysiological of SK on EEG, BAER, P300 study. Neurologists interpreted these findings as indicative of heightened alertness. An open label intervention study was undertaken by Agate Vaishali, et al on 26 mild hypertensive & 26 apparently healthy adults of age about 30-60y, for effect of SKY practice for 2 months as complimentary therapy. It was found that there is a considerable decrease in diastolic blood pressure ($P < 0.01$), Serum urea ($P < 0.01$) and Plasma MDA as Oxidative Stress Markers ($P < 0.05$)

in case of hypertensive. In maximum number of samples, values above normal range of parameters got lowered while those within normal range remained unaltered.

CONCLUSIONS:

According to Huppert F A; “The emotion circuitry of the brain is complex, involving primarily structures in the prefrontal cortex, amygdale, hippocampus, anterior cingulated cortex, and insular cortex. These structures normally work together to process and generate emotional information and emotional behavior. Research has particularly focused on the prefrontal cortex which, unlike most other brain regions involved in emotion processing, shows asymmetric activation in relation to positive and negative emotions”...Rhythmic breathing is a unique method for balancing the autonomic nervous system and influencing psychologic and stress-related disorders. Many studies demonstrate effects of systematic rhythmic breathing on brain function and physiologic parameters. Sudarshan Kriya yoga (SKY), a sequence of specific rhythmic breathing technique which can alleviate anxiety, depression, everyday stress, post-traumatic stress, and stress-related medical illnesses (32). Since ancient times, breathing techniques are often recommended for relaxation and stress management. Sudarshan Kriya is a type of controlled cyclical breathing technique accepted worldwide as it is taught by a nonprofit organization in India. People from more than 157 countries has taken lessons of it. It is the breath which forms a controlling bridge between body and mind and the emotions too. Breath sorts out imbalances in the mind and body. When the mind and emotions becomes controlled it becomes very easy to achieve balances in behavior and activities. Controlled and relaxed mind only can spread positivity in the society. This forms the basis behind SK practices. With the regular practice of SKY&P, one can experience flow of positive emotions, replacing anger, greed, frustrations and jealousy. The body feels relaxed, mind calmer and thus healthier and younger. EEG, blood cortisol and blood lactate levels reflect a state relaxation, yet alertness. Increase in Nor-Adrenaline level and decrease in Cortisol level in the blood, proves utility of SK&P. Increase in NK cells and antioxidant enzymes suggests that regular practice might prevent many diseases including infections and possibly even cancer. Remission from depression is experienced rapidly. It can be concluded here that this systematic rhythmic breathing technique, Sudarshan Kriya cures the root cause of depression which is a consequence of deeply accumulated stress. Substantial relief from depression was observed in three weeks. It has shown 73% success rate in sustained remission from depression regardless of severity. Fall in Cholesterol and blood pressure, can prevent cardiac disease and depression is cured in 80% of cases. In addition to this, it is cost effective, equivalently effective as drug therapies and has no side effects. It's a self administered, self empowering technique. Thus, even though further studies on detailed mechanisms are needed, available data so far serves to validate the subjective claims of a healthier body, calmer mind and balanced emotions.. Mechanisms contributing to a state of calm alertness include increased parasympathetic drive, calming of stress response systems, neuroendocrine release of hormones oxytocin, serotonin, dopamine and endorphins, and thalamic generators(32). This model has thus heuristic value, research implications, and clinical applications. There are many environmental factors that have been associated with impaired Vagal Activity

including stress, excessive adrenaline and hormone secretion, over stimulation from television/film/video games, diet and lack of exercise. Interestingly, brain wave rhythms measured during and after SK&P are similar to those of babies. One of the foremost research experts on the effects of Vagal nerve stimulation through SK&P is Stephen Porges, PhD. Dr. Porges (2) postulates that the different rhythms of breath in SK&P may stimulate different diameter fibers of the vagus nerve. This makes SK&P unique and likely to have a much wider range of applications and effects than the currently available electronic vagus nerve stimulator. Independent research has shown that Sudarshan Kriya and accompanying practices significantly stimulates vagus nerve and thus enhance well being, health and peace of mind.

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