EFFECT OF BRAHMARI PRANAYAMA ON VISUAL REACTION TIME

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ABSTRACT

BACKGROUND

Patanjali, foremost exponent of Yoga, described pranayama as gradual unforced cessation of breathing. Pranayama or control of prana or life force yields heartbeat, pulse and mind control. Brahmari Pranayama (BP) is a pranayama the humming sound of a flying wasp is mimicked. That slow pace pranayama influence the heart rate and blood pressure through the parasympathetic dominance had been reported.

MATERIAL AND METHODS

The subject was instructed to sit straight with spine erect. The subject was instructed to put the left hand lightly over the tragus of the left ear, and the thumb of the right hand lightly on the tragus of the right ear. (Tragus is the fleshly cartilaginous prominence in front of the opening or hole in the ear.) They were asked to place the index finger of each hand over the outer corners of closed eyelids, the middle fingers on the side of the nose, near nostrils, fourth fingers above and little fingers below the corners the mouth. The subject was asked to chant aum producing or imitating a sound like buzzing bee or wasp while exhaling through nasal cavity keeping mouth closed but keeping the attention at point between eyebrows. Online reaction time was taken before and after BP.

RESULTS

Reaction times decreased from 0.39784 ± 0.15 to 0.28406 ± 0.09 at p value of 0.0005.

CONCLUSION

Brahmari Pranayama gives unparalleled command over mind and enables to focus the mind quickly in the most intense way on any object of thought-intellectual, physical or spiritual. Brahmari helps soothe and rest the nerves and brings the most helpful physiological bodily conditions. Businessmen or artists and students in school, college must know the art of using all powers of focusing attention upon a single point in order to succeed in their respective vocation.

KEYWORDS

Brahmari Pranayam, Reaction Times, Om Sound.

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INTRODUCTION

Few people understand the meaning of the word concentration; fewer still actually know how to concentrate. Concentration is the gateway to heaven. Concentration means to gather the attention at one point. Attention in like a search light, when its beam is spread over a vast area, its power to focus on a particular object becomes weak, but focused on one thing at a time, it becomes powerful. Great men are men of concentration. They put their whole mind on one thing at a time.[1]

Concentration is measured by an online reaction time test. Reaction speed is the ability to quick motor response to definite stimulus while the time that elapses between the sensory stimulation and motor reaction time is called reaction time.[2]

Patanjali, foremost exponent of Yoga, described pranayama as gradual unforced cessation of breathing.

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Pranayama or control of prana or life force yields heartbeat, pulse and mind control.[3] We wanted to scientifically study how the age old technique of Brahmari Pranayama helps improve concentration. The Sanskrit word Bhramar means wasp as in this Pranayama the humming sound of a flying wasp is mimicked. That slow pace pranayama influence the heart rate and blood pressure through the parasympathetic dominance had been reported.[4] However very few studies have scientifically investigated the beneficial effect of Brahmari Pranayam on concentration.

Our study is designed to observe the effect of Brahmari Pranayama on visual reaction time.

MATERIALS AND METHODS

The subject was instructed to sit straight with spine erect. The subject was instructed to put the left hand lightly over the tragus of the left ear, and the thumb of the right hand lightly on the tragus of the right ear. (Tragus is the fleshly cartilaginous prominence in front of the opening or hole in the ear.)

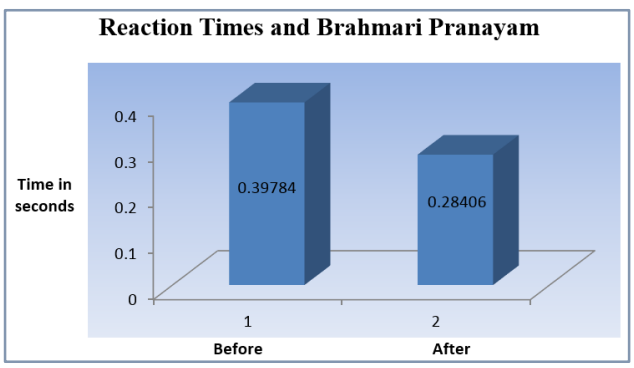
They were asked to place the index finger of each hand over the outer corners of closed eyelids, the middle fingers on the side of the nose, near nostrils, fourth fingers above and little fingers below the corners the mouth.

The subject was asked to chant aum producing or imitating a sound like buzzing bee or wasp while exhaling through nasal cavity keeping mouth closed but keeping the attention at point between eyebrows.

This study was done in Santosh Medical College, Ghaziabad. They were 31 healthy subjects. Baseline record of Visual reaction time test was taken online.[5] It consists of a traffic light signal of red, yellow and green. The subject is instructed to click on a button to begin when ready. He has to wait for the stop light to turn green, and click immediately when it does so. The average of five responses was taken as a reading. Units are seconds.

Online reaction time was taken after the subject performed Brahmari Pranayama.

RESULTS



N=31	Before	After	P value
Mean ± SD	0.39784 ± 0.15	0.28406 ± 0.09	0.0005

The reaction times decreased after Brahmari Pranayama at a statistical significance p value of 0.0005.

There were 19 males and 12 female subjects who participated in the study. In both reaction times decreased and they both benefitted by Brahmari Pranayama. Their concentration improved.

It was also observed that subjects in middle age had a higher baseline reaction time than teenagers, as they responded more slowly to the stimulus. This may be due to age.

After Brahmari pranayama the middle aged subject's reaction decreased markedly. The change was highly significant. Due to age related changes in concentration, it is suggested that these subjects need to practice Brahmari Pranayama regularly.

DISCUSSION

Man receives his sensations through the sensory nerves, and reacts through the motor nerves. That sensation is received by the brain through sensory nerves, and is reacted upon by the motor nerves as the arm twitches to press the mouse button. Brahmari Pranayama prevents sensations from being registered in the brain and distractions from disturbing the attention.

Only when the attention is free from sensations, thoughts and memory thoughts can one focus the attention at one thing at a time in this case the green light[6]. Brahamari Pranayama helps to withdraw life energy from the senses and re-channel it to the centers of higher awareness in the spine and brain.[7]

Brahmari Pranayama is a technique of Pratyahara or mental interiorization, in which the mind withdraws from the senses. Concentration is seen by a decrease in visual reaction time.

All vibrations produce sound. The finer vibrations of all pervading Cosmic Sound of Aum roam the Universe, in ether. By chanting Aum during Brahmari one attunes to the Cosmic sound. Pranava (or Aum) in the Upanishad is described as continuous, like the smooth flowing oil, long peal of gong,sound, unutterable ever, inspiring, he who knows that, knows Veda or all Truth to be known.[8]

The point between eyebrows is the will center. The medulla and the spot between the eyebrows are infact negative and positive poles, of center of intelligent life force. The medulla has centers for vasomotor control of heart, respiratory centers of neural regulation. By focusing the eyes on the point between eyebrows helps improve concentration. The subject can throw the attention at will on the object of concentration for example the changing light in the online reaction time of our study.[9][10]

Bhramari Pranayama techniques form an important component of yoga. It maintains a slow rhythmic pattern of breathing using both nostrils. Thus produces a balancing effect on the ANS. Short kumbhak or breath holding increases O2 consumption while long kumbhak decreases O2 consumption.[11] The breathing process is directly connected to the brain and CNS and it is one of the most vital processes in the body system. It also has some connection with hypothalamus which controls emotional responses. It transforms perception into cognitive experiences. Secretion of neurotransmitter is also under its control. If we breathe erratically impulses travel quickly to this Centre and creates disturbed responses. As a result the level of GABA and serotonin is decreased which results anxiety.[11]

As Bhramari pranayama is a type of slow pace breathing exercise, it stimulates the parasympathetic system. Earlier studies also reported that Bhramari pranayama produced gamma wave indicating parasympathetic dominance.[12] Pranayama increases frequency and duration of inhibitory

neural impulses by activating stretch receptors of the lungs during above tidal volume inhalation as in Hering-Breuer reflex.[13] Inhibitory impulses, produced by slowly adapting receptors in the lungs during inflation.[14] play a role in controlling typically autonomic functions such as systemic vascular resistance and heart rate.[15] Inhibitory current synchronizes rhythmic cellular activity between the cardiopulmonary center.[16] and the central nervous system.[17] Inhibitory current regulates excitability of nervous tissue and is known to elicit synchronization of neural elements, which typically is indicative of a state of relaxation.[18,19] Synchronization within the hypothalamus and the brainstem.[20] is likely responsible for inducing the parasympathetic response[21] during breathing exercises. Vibration of the nasal/laryngeal mucous membrane during exhalation along with the humming of "O-UMmmma" caused reflex apnoea by switching off inspiratory center which causes bradycardia through chemoreceptor sinu-aortic mechanism.[22] During prolonged voluntary expiration intra-thoracic pressure increases and blood from the lungs is squeezed into the heart leading to an increase in stroke volume; baro-receptors in carotid sinus experiences more pressure and discharge more.

The increased baroreceptor discharge inhibit the tonic discharge of the vasoconstrictor nerves and excites the vagus innervations of the heart producing vasodilatation, a drop in

blood pressure and bradycardia.[23] Most of the volunteers felt calmness of mind, a sense of well-being, and some felt sleepy, thus supporting parasympathetic stimulation. This may be the effect of increased melatonin production after a regimen of slow breathing pranayamic exercises.[24] Slow pranayamic breathing was also reported to elicit alpha waves, indicating a parasympathetic dominance.[25] and may be the cause of the sleepy feeling. One of the most active components of BP is humming sound which we suppose playing key role in producing results. The brainwave phenomena and sound wave are different things but their interaction is very common experience in daily life, e.g. a child sleeps on hearing lullaby by his/her mother. The clinical importance of humming sound has been investigated in many recent research reports. It has been shown that humming through nasal airways improves Nitric Oxide (NO) ventilation which is good for clearing and maintaining good health of sinus.[26],[27]

CONCLUSION

Brahmari Pranayama gives unparalleled command over mind and enables to focus the mind quickly in the most intense way on any object of thought-intellectual, physical or spiritual.

Brahmari helps soothe and rest the nerves and brings the most helpful physiological bodily conditions. Businessmen or artists and students in school, college must know the art of using all powers of focusing attention upon a single point in order to succeed in their respective vocation.

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