



EFFECT OF PRANAYAMA ON VISUAL REACTION TIME IN YOUNG ADULTS

Shanmughavadivu. R

Professor And Hod, Department Of Physiology, Coimbatore Medical College, Civil Aerodrome Post, Coimbatore – 641014

Durai Arasan. R*

Postgraduate, Department Of Physiology, Coimbatore Medical College, Civil Aerodrome Post, Coimbatore – 641014 *Corresponding Author

ABSTRACT **BACKGROUND:** Pranayama is a breathing practice in which one controls his/her own breathing. This is a part of yoga practice and has multiple health benefits. Reaction time is the time between presentation of stimulus and appearance of appropriate voluntary response in a subject.

METHODOLOGY: The study was conducted in 100 M.B.B.S. students in the age range of 18-23 years using reaction time software.

RESULTS: The visual reaction time value before Pranayama was 282.86 ± 16.20 ms and after Pranayama practice was 252.56 ± 18.12 ms. This is statistically significant with a p-value < 0.001 .

CONCLUSION: Regular practice of Pranayama results in reduced reaction time which indicates an improved attention span.

KEYWORDS : Pranayama, Visual Reaction Time (vrt), Stimulus, Response

INTRODUCTION:

Pranayama consists of the breathing techniques which are related to the control of breath or the respiratory process. Pranayama popularly known as 'yogic breathing', involves a conscious manipulation of our breathing pattern. The health of the respiratory system depends upon the quality as well as the quantity of air inhaled by the person. It also depends on the rhythm and completeness of the breathing. Through pranayama, a practitioner brings about a regularity in the respiratory and cardiovascular functions which in turn influence the functions of other systems in the body which results in a healthy body, emotional stability and peace of mind. Pranayama has three phases known as puraka, rechaka and kumbhaka. Puraka is controlled inhalation; rechaka is controlled exhalation and kumbhaka is controlled retention of breath. Initially, the exhalation (Rechaka) may be a little more prolonged in comparison to inhalation (Puraka). As we practice regularly, 1:2 ratio is reached in natural manner. There are many types of pranayama practices.¹ Each has its own technique and benefits. In this study the pranayama method used is Anuloma-viloma Pranayama.

ANULOMA-VILOMA PRANAYAMA (ALTERNATE NOSTRIL BREATHING):

Anuloma means 'towards' and Viloma means 'reverse'. It is called Anuloma-viloma because alternate nostrils are used for each inhalation and exhalation. One inhales through the left nostril and then exhales through the right nostril, then the order is reversed by inhaling through the right nostril, and exhaling through the left nostril. This pranayama is also called Nadi-shodhana pranayama, if it is performed with kumbhaka (holding the breath).²

STEPS OF PERFORMING ANULOMA-VILOMA PRANAYAMA:

1. Sit in the position of Padmasana or in any other comfortable meditative posture.
2. Keep the body erect and place the hands on the respective knees.
3. Raise the right hand and place the right thumb on the right nostril and close it.
4. Inhale slowly through the left nostril.
5. Close the left nostril by the ring finger and the little finger and exhale slowly through the right nostril.
6. Again inhale through the right nostril.
7. Close the right nostril with thumb and exhale through the left nostril. This is one round of Anuloma-viloma.
8. Repeat it 10 times.

REACTION TIME:

Human body responds to a number of external environmental stimuli of different modalities. Human body gives a desired and purposeful voluntary response to stimulus. There is a certain time period between application of stimulus and appropriate motor response. There are various sensory modalities and human body responds to various stimuli with different speed. This plays an important role in everyday life. Reaction time is defined as interval of time between presentation

of stimulus and appearance of appropriate voluntary response in a subject. Visual reaction time (VRT) is the time required to respond to a visual stimulus. Reaction time becomes an important component of information processing as it indexes speed of stimulus processing and response programming.³ Reaction time is one of the important physiological parameter which gives information how fast and quickly a person responds.

Reaction time has two components.

1. Mental processing time: It is the time required for the responder to perceive the stimulus, identify and analyse the stimulus and decide the proper motor response.
2. Movement time: It is the time required to perform the movement after selection of the response.

Luce and Welford described three types of reaction time.

1. Simple reaction time: Here there is one stimulus and one response.
2. Recognition reaction time: Here there are some stimuli that should be responded to and others that should not be responded to.
3. Choice reaction time: Here, there are multiple stimulus and multiple responses.

Visual reaction time, which is being tested, belongs to simple reaction time category. By the practice of motor movements, muscular coordination and speed of movement can be improved which would improve movement time. Long lasting improvement in performing skilled motor movements can be achieved by training and retraining and repeated practicing.⁴

This study aims at evaluating the effect of pranayama on visual reaction time.

METHODOLOGY:

After obtaining ethics committee clearance, 100 students who were willing to participate were selected for the study. The students were in the age range 18 – 23 years. Students with history of smoking, respiratory illness, skeletal abnormalities, diabetes mellitus, hypertension, psychiatric illness were excluded. Written and informed consent was obtained from the students. Measurement of visual reaction time was done prior to onset of pranayama practice by INQUISIT software. Students were taught pranayama by a yoga specialist. Subjects were asked to do pranayama both in morning and evening for at least 15 minutes for a period of 6 weeks. After 6 weeks visual reaction time was recorded for the subjects. The obtained data was analysed using SPSS software and paired student t-test was done to find statistical significance.

RESULTS:

Table 1: Mean value & standard deviation of Visual Reaction Time before & after pranayama practice

S. no.	Phase	Mean	Standard deviation	t-test	p-value
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1	Before Pranayama	282.86	16.20	10.52	P<0.001*
2	After Pranayama	252.56	18.12		

*P<0.05 considered statistically significant.

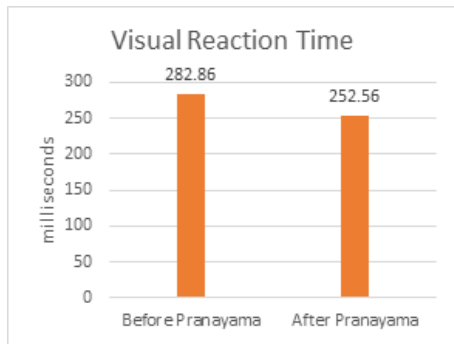


Image 1: VRT before and after Pranayama

DISCUSSION:

This study compares the visual reaction time values before and after Pranayama practice. The visual reaction time value before Pranayama was 282.86 ± 16.20 ms and after Pranayama practice was 252.56 ± 18.12 ms. This is statistically significant with a p-value < 0.001. This result shows that there is a significant improvement in visual reaction time values following the practice of Pranayama.

A study done by Dr.S.B.Jore et al. studied the effect of pranayama training on audio-visual reaction time. The study was conducted on M.B.B.S. students in the age group 19 – 22 years (30 males and 31 females). The pranayama practice was done for a period of 12 weeks on the study subjects. Both the visual and auditory reaction times were shown to be decreased by the study results. The study attributed the effects of pranayama on reaction time could be due to greater cortical arousal & faster rate of information processing, improved concentration power, ability to ignore external stimuli i.e. less distractibility and Improved memory.⁵

A study done by Madanmohan et al. studied the effect of slow and fast pranayama on reaction time. The study was conducted on 30 healthy volunteers. The pranayama practice was done for 6-week duration. The results showed that the reaction time showed statistically significant decrease. Also the respiratory muscle endurance was also increased in the study subjects. The study states that Pranayama practice reduces heart rate and blood pressure. This may result in deep psychosomatic relaxation which results in decreased reaction time.⁶

A study done by Sivagami et al. studied the beneficial effects of Pranayama on reaction time. The study group consists of 60 young healthy people in the age group 17-24 years. They were trained for 30 minutes a day in the evening for six days per week for 6 weeks. Visual reaction time was recorded both before and after the practice. The reaction time was reduced significantly following Pranayama practice. The study suggests that, decrease in visual reaction time in pranayama trained person could be due to an improvement in sensorimotor performance and central nervous system processing ability. This in turn could be due to an improved concentration power and ability to ignore extraneous stimuli.⁷

CONCLUSION:

Yoga practice has many health benefits which have been proven by many studies done earlier. Pranayama, being a part of yoga, has its own benefits. Regular Pranayama practice even for a short time has shown significantly improved reaction time in young adult individuals in this study. This implies a positive correlation of breathing practice with concentration, neuromuscular coordination, impulse processing and alertness. Hence regular practice of Pranayama can be advocated as a necessary lifestyle modification to cope up with both the physical and mental stress in daily life.

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