

## ORIGINAL ARTICLE

## EFFECT OF SUDARSHAN KRIYA YOGA ON AUDITORY &amp; VISUAL REACTION TIME IN MEDICAL STUDENTS

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## ABSTRACT

**Background:** Yoga was found to cause a better improvement in the health of the individuals with and without ailments. Audio-visual reaction time is important indicator in cause better improvement in reaction time. Hence, this study intended to show its utility as a short course for improving the reaction time.

**Aim and objective :** To find out effect of Sudarshankriya yoga on audio-visual reaction time in medical students by recording the audio-visual reaction time in medical students before & after Sudarshan kriya yoga practical for one month.

**Material and Methods:** The present study was conducted on 60 practical students, who came voluntarily as subjects for the project. Their age ranged between 18 to 20 years. Audio-visual reaction time measured by apparatus designed by Anand Agencies Pune.

**Results:** In present study there was significant ( $p < 0.001$ ) decrease in visual reaction time (from 270.21 +/- 6.20 to 224.81 +/- 5.76 millisecond) as well as auditory RT (from 194.18 +/- 6.00 to 157.33 +/- 4.85 millisecond).

**Conclusion:** A short course of Sudarshan kriya yoga has a beneficial effect on the audio-visual reaction time & used as a tool for improving the reaction time.

**Keywords:** Auditory reaction time, Visual reaction time, Sudarshan kriya yoga, Medical student.

## INTRODUCTION

Since centuries many sages & rishis have recommended the practice of yoga, meditation & pranayama to prevent or minimize our reaction to stress. More recently Sudarshan kriya has been introduced by Satguru Sri Ravishankar in 1982. Sudarshan kriya (in shankrit su= right, darshan=vision, kriya= purifying action) is a unique rhythmical breathing process. These processes strengthen the parasympathetic tone, increase the threshold of our responses to stress & prepare our minds to be more receptive toward the day to day stresses & react accordingly without much restlessness & thus we can prevent much of the damage to our body & mind.<sup>1</sup>

Reaction time (RT) is one of the easiest methods of assessing the sensory and motor performance of an individual. Reaction time is the time interval between the onset of stimulus and the beginning of movement response.<sup>2</sup> Reaction time is a useful index to study the ability of central nervous system. Better reaction time means better performance in surgeons,

sports personnel and other skilled workers.<sup>3</sup> Most commonly used tests were auditory reaction time, visual reaction time. Yoga enhances physical and emotional health and increases the performance of personnel. Shortening of audio-visual reaction time after pranayam training signifies greater arousal, improved concentration & faster responsiveness.<sup>4</sup>

Audio-visual reaction time is used in the experimental physiology to assess the sensory-motor performance. It is the time interval between the onset of a signal & the beginning of a response.<sup>5</sup> Audio-visual reaction time is the index of the processing ability of the central nervous system. This test has physiological as well as clinical significance, which is a prerequisite for sports, precision surgeons & other professionals too.<sup>6</sup>

Yoga is an ancient science & an art of exercise which is associated with a set of principles & practices which are designed to promote the health & the well being through the integration of the body, breath & the mind. Its components include Aasnas(postures), pranayama(voluntary breath regulation &

dhyana)(meditation). Yoga is commonly called as a mind-body therapy & it has often been claimed that it can enhance one's ability to focus the attention, improve the cognitive abilities, decrease the stress & increase & improve the organ system's strength suppleness CNS. It has been reported that yoga training improves the human performance, which includes the CNS processing.<sup>7</sup> Madanmohan et al & Malathi et al have reported that yoga training produces significant reduction in reaction time.

The present study was conducted to find out effect of Sudarshan kriya yoga on audio-visual reaction time in medical students.

## METHODOLOGY

The study was carried out in the department of Physiology, Government medical college, Latur. The permission was obtained from institutional ethical committee. Sixty male healthy medical students who were right handed aged between 18 to 20 years. They had a clinically normal hearing & vision. The selected subjects were not practicing any exercise, sports or yoga. Smokers, alcoholics & the subjects with any chronic illnesses like hypertension or diabetes were excluded. The selected subjects were told in detail about the study protocol & a written informed consent was taken from them.

The subjects were examined & detail personal history, family history & general medical examination was conducted. The pulse, height, weight & blood pressure was recorded.

Sudarshan kriya is a rthymical cyclical breathing. It consist of slow, medium & fast cycles of breathing practiced for a total session of 35 minutes without any relaxation in between. At the end of this process subjects were asked to remain in yoga nidra(tranquil state) for about 10 minutes. Sudarshan kriya was taught by a trained & certified instructor as a 20-22 hours programme & typically five to six sessions of two & half or three hours following the course, home practice consists of 3 stage: 1. Ujjayi pranayama 2. Bhastrika and 3. Om kar meditation which is followed by the Sudarshankriya.

In the present study sample size of 60 was considered. Only those cases were selected who were free from any systemic diseases and who have not done the sudarshan kriya technique before. The audio-visual reaction time was obtained before the practice of sudarshan kriya. After 90 days of practicing sudarshan kriya regularly again audio-visual reaction time was obtained. Comparision was done between before & after readings. We choose wider parameters for analysis of reaction time task which included audio-visual low & high frequency

sound stimuli & visual reaction time for red, green & indigo light stimuli.

The auditory & visual reaction time was measured by 'Response Analyzer' by 'Yantra shilpa' system which measure response time in millisecond. As soon as the stimuli was perceived by the subject, they responded by pressing the response switch. The instrument with two buttons one for start which was handled by the examiner for delivering the stimulus & second one stop button for the participant after perceiving the stimuli. For the ART stimulus delivered through a head phone of a capacity 1000Hz. For the VRT stimulus delivered through a glowing bulb. The start & stop button were connected to computer which record the time in msecond. After familiarizing the subject with the instrument, three readings for each parameter were noted. The average of these three readings was taken. The standard test was applied to determine statistical significance.

**Statistical Analysis:** The data were expressed as mean  $\pm$  standard deviation and were analyzed using Graphpad prism software version 5.01. Paired t-test was used to compare the parameters between case and control group. p-Value of <0.05 indicated as significant difference.

## RESULTS

Table I shows significant decrease ( $P < 0.001$ ) in response in visual reaction time in before & after the sudarshan kriya yoga.

**Table 1: Visual Reaction Time**

Phases	Mean	SD	p Value
Before Pranayam	270.21	6.20	< 0.001
After Pranayam	224.81	5.76	

Table 2 also shows significant decrease ( $P < 0.001$ ) in response in auditory reaction time in before & after the Sudarshan kriya yoga.

**Table 2: Auditory Reaction Time**

Phases	Mean	SD	p Value
Before Pranayam	194.18	6	< 0.001
After Pranayam	157.33	4.85	

## DISCUSSION

In present study there was significant ( $p < 0.001$ ) decrease in visual reaction time (from 270.21  $\pm$  6.20(SE) to 224.81  $\pm$  5.76 ms) as well as auditory RT (from 194.18  $\pm$  6.00 to 157.33  $\pm$  4.85 ms). Similar results shown by Manjunath et al & Telles S found enhanced spatial & temporal characteristics which likely improves visual reaction.<sup>8,9</sup>

Malathi Parulkar (1989) reported reduction in auditory & visual reaction time after yoga training and Madanmohan et al (1992) also reported that yoga practice for 12 weeks results in significant reduction in visual & auditory reaction times in the normal adult male volunteers.<sup>4,5</sup>

Jansi Rani N & Sridevi documented that practice of yoga reduces anxiety & increases alertness & attention which can improve the subjects performance in the reaction time experiment.<sup>7,10</sup>

The link between mind & the body has been scientifically related. The role of limbic system of the brain in regulating the homeostatic condition in the body by influencing the visceral mechanism through the automatic nervous outflow & endocrine secretions are now well known. The proper conditioning of the nervous system can maintain the normal homeostasis. The process of mental relaxation may thus be expected to produce such conditioning.<sup>11,12</sup>

A single photon Emission computed Tomography study demonstrated that the yoga training program increased the cerebral blood flow & that the changes in particular appear to have a greater impact on the right hemispheric function particularly in the frontal lobe.<sup>13</sup>

Yoga is involved in restoring the under activities of the parasympathetic nervous system & GABA systems. This restoration may be partly through the stimulation vagal nervous.<sup>14</sup>

## CONCLUSION

It can be concluded here, that, long-term regular practice of Sudarshan Kriya Yoga improves health and well-being of an individual and enhances the reaction times.

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