

## EFFECT OF SANTHI KRIYA ON CERTAIN PSYCHOPHYSIOLOGICAL PARAMETERS : A PRELIMINARY STUDY

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( Received on April 24, 1991 )

**Abstract :** *Santhi Kriya* is a mixture of combined yogic practices of breathing and relaxation. Preliminary attempts were made to determine the effect of *Santhi Kriya* on certain psychophysiological parameters. Eight healthy male volunteers of the age group  $25.9 \pm 3$  (SD) years were subjected to *Santi Kriya* practice daily for 50 minutes for 30 days. The volunteer's body weight, blood pressure, oral temperature, pulse rate, respiration, ECG and EEG were recorded before and after the practice on the 1st day and subsequently on 10th, 20th and 30th day of their practice. They were also given a perceptual acuity test to know their cognitive level on the 1st day and also at the end of the study i.e., on the 30th day. Results indicate a gradual and significant decrease in the body weight from 1st to 30th day ( $P < 0.001$ ) and an increase in alpha activity of the brain ( $P < 0.001$ ) during the course of 30 days of *Santhi Kriya* practice. Increase of alpha activity both in occipital and pre-frontal areas of both the hemispheres of the brain denotes an increase of calmness. This study also revealed that *Santhi Kriya* practice increases oral temperature by  $3^{\circ}\text{F}$  and decreases respiratory rate significantly ( $P < 0.05$ ) on all practice days. Other parameters were not found to be altered significantly. It is concluded that the *Santhi Kriya* practice for 30 days reduces body weight and increases calmness.

Key words : dahara vidya so-hum

### INTRODUCTION

Although reports of much scientific work is available on various yoga and meditation techniques, only very few yogic practices described in our ancient scriptures were subjected to scientific study. Such studies are essential to know the scientific value of our ancient culture of yoga. *Dahara Vidya* is one among those mentioned in ancient scriptures. It is described in the first part of 8th chapter of Chandogya (1). Ganapathimuni, the disciple of Ramana Maharshi also explained in detail *Dahara Vidya* in his treatise *Dasamaha Vidyas* (2). As per descriptions given in the *Chandogya* (1) and *Dasamaha Vidyas* (2), the ancient sages developed and practiced *Dahara Vidya* in order to achieve highest goal of human life. According to Yogacharya Ramarao (3), *Dahara Vidya* is a natural phenomenon which is useful for merging the individual self with universal self.

Yogacharya Ramarao, Santhi Ashram, Visakhapatnam had identified the richness of *Dahara Vidya*. He practiced and perfected it for several years in his ashram; and technically streamlined it as *Santhi Kriya* (3).

Available literature on yogic studies reveal that combined yogic practices bring about a considerable improvement in cardio-respiratory functions, adrenocortical functions and a number of metabolic adjustments in addition to remarkable psychological and neurophysiological improvements (4, 5, 6). *Santhi Kriya* is also a mixture of combined practice of breathing and relaxation techniques in stand-erect and *savasana* postures. The claims of the *Santhi Kriya* are that practicing it reduces body weight, increases body strength and also enables one to attain calmness of mind, spiritual happiness and *samadhi* (3). Therefore, a preliminary study was proposed to see the efficacy of *Santhi Kriya* because it is a technically streamlined version of our ancient scripture *Dahara Vidya*.

### METHODS

Yogacharya Ramarao (3) who streamlined *Dahara Vidya* into *Santhi Kriya* claims the involvement of various systems of the body during its practice. Hence, a number of parameters were assessed in this study to discern its effects. These include body weight, blood pressure, oral temperature, pulse rate, respiration, electrocardiogram (ECG), electroencepha-

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logram (EEG) and perceptual acuity. The perceptual acuity test (7) was proposed to know the effect of *Santhi Kriya* on cognitive functioning.

**Subjects :** Initially twenty healthy male student volunteers were recruited for this *Santhi Kriya* training programme at the Institute for Yoga and Consciousness, Andhra University. Eight of the twenty volunteers recruited, had regularly attended to *Santhi Kriya* practice for full 30 days period and also for all the data collection sessions. Therefore, the sample of the study was reduced to eight. The mean age of the subjects was  $25.9 \pm 3.0$  (SD) years and weight  $57.2 \pm 5.6$  (SD) kg. We got the assurance that none of the volunteers were under any type of physical stress or strain or addicted to drugs or suffering from any type of ill health or disease. All were advised to have uniform light vegetarian diet known as *satvik diet*.

***Santhi Kriya technique in brief :*** In brief, *Santhi Kriya* practice is divided into three stages all of which last for 50 minutes. The first stage consists of normal inhalation and exhalation breathing practices in stand-erect postures (*thadasana* and *trikonasana*) and sitting posture together for 10 minutes. In the second stage, the mind is attached to the breath which will be achieved by chanting "SO" while inhalation and "HUM" while exhalation in *savasana* posture for 10 minutes. During this stage, initial breath rate is to be slow; in the middle it is to be rapid (as fast as possible) : and in the end again it is to be slow. The third stage is *Dahara Vidya* (1, 2) for 30 minutes. This stage consists again of four parts. The first part is relaxation as in *savasana*. Second part is to apply the mind to the physical body. The third part is rotating the awareness on sense organs starting from eyes—nose—tongue—ears and to skin. The last part amounts to moving the mind on six psychic *chakras* of *kundalini* in ascending and descending orders. Yogacharya Ramarao's details of the *Santhi Kriya* reported earlier (3) were followed in this study.

**Procedure :** Because the study involved large number of parameters to be tested only 3 volunteers were taken up per day. Each was subjected to the practice of *Santhi Kriya* daily for 50 minutes during 6 to 7 AM for 30 days. Physiological data were collected before and after the practice of *Santhi Kriya*

on 1st, 10th, 20th and 30th day of the practice whereas psychological data were collected on 1st and 30th day. Physiological measures covered body weight, pulse rate, oral temperature, blood pressure, respiration, ECG and EEG. The psychological measure, perceptual acuity test covered a 30-item set of geometric forms and illusions used in cross-cultural study of cognitive functioning which was designed by Gough and Gurk (7).

Data on body weight, pulse rate, oral temperature and blood pressure were collected manually and separately whereas respiration, ECG and EEG were recorded on a 10 channel EEG-polyrite machine simultaneously. ECG was obtained from lead-II and EEG from pre-frontal and occipital areas of both the hemispheres of the brain. In addition, EEG activity from each area was further analyzed into its alpha, beta, theta and delta components using a frequency analyzer. Alpha index was calculated from EEG tracings of each area of both hemispheres of brain (8) which is helpful to know the level of calmness. Alpha index means the percentage of time occupied by alpha waves in 100 seconds (8). Statistical analysis of the data was done using Students 't' test and Rank Order Correlation test.

## RESULTS AND DISCUSSION

A slight decrease in body weight is found after practice when compared to the body weight before practice of *Santhi Kriya* in all the volunteers on all the experimental days (on 1st, 10th, 20th and 30th day) of the study (Table I). There is also a gradual reduction in body weight from  $57.2 \pm 5.6$  (SD) kg (1st day-before practice) to  $52.0 \pm$  (SD) kg (30th day--before practice) which is statistically significant ( $P < 0.001$ ) (Table I).

TABLE I : Effect of *Santhi Kriya* practice on body weight (kg).

Day	Body weight with <i>Santhi Kriya</i> Practice (n=8)		P value
	Before Practice	After Practice	
1st	Mean $\pm$ SD $57.2 \pm 5.6$	Mean $\pm$ SD $56.9 \pm 5.6$	<0.9
10th	$56.0 \pm 5.7$	$55.5 \pm 5.7$	<0.9
20th	$54.5 \pm 5.6$	$53.9 \pm 5.6$	<0.9
30th	$52.0 \pm 5.6^{**}$	$51.8 \pm 5.6^{**}$	<0.9

\*\*P value is highly significant ( $P < 0.001$ ) when compared to the body weight of 1st day.

The oral temperature before practice session on the 1st day is  $95 \pm 2.0^\circ$  (SD) F and after *Santhi Kriya* practice on the same day was  $98 \pm 2.0^\circ$  (SD) F. A similar trend has been found on 10th, 20th and 30th

day of the study. Therefore, it is noted that the *Santhi Kriya* increases oral temperature by  $3^\circ$ F; contrary to the expectation of reduction in temperature. Increase in the temperature of deeper parts of the body and skin

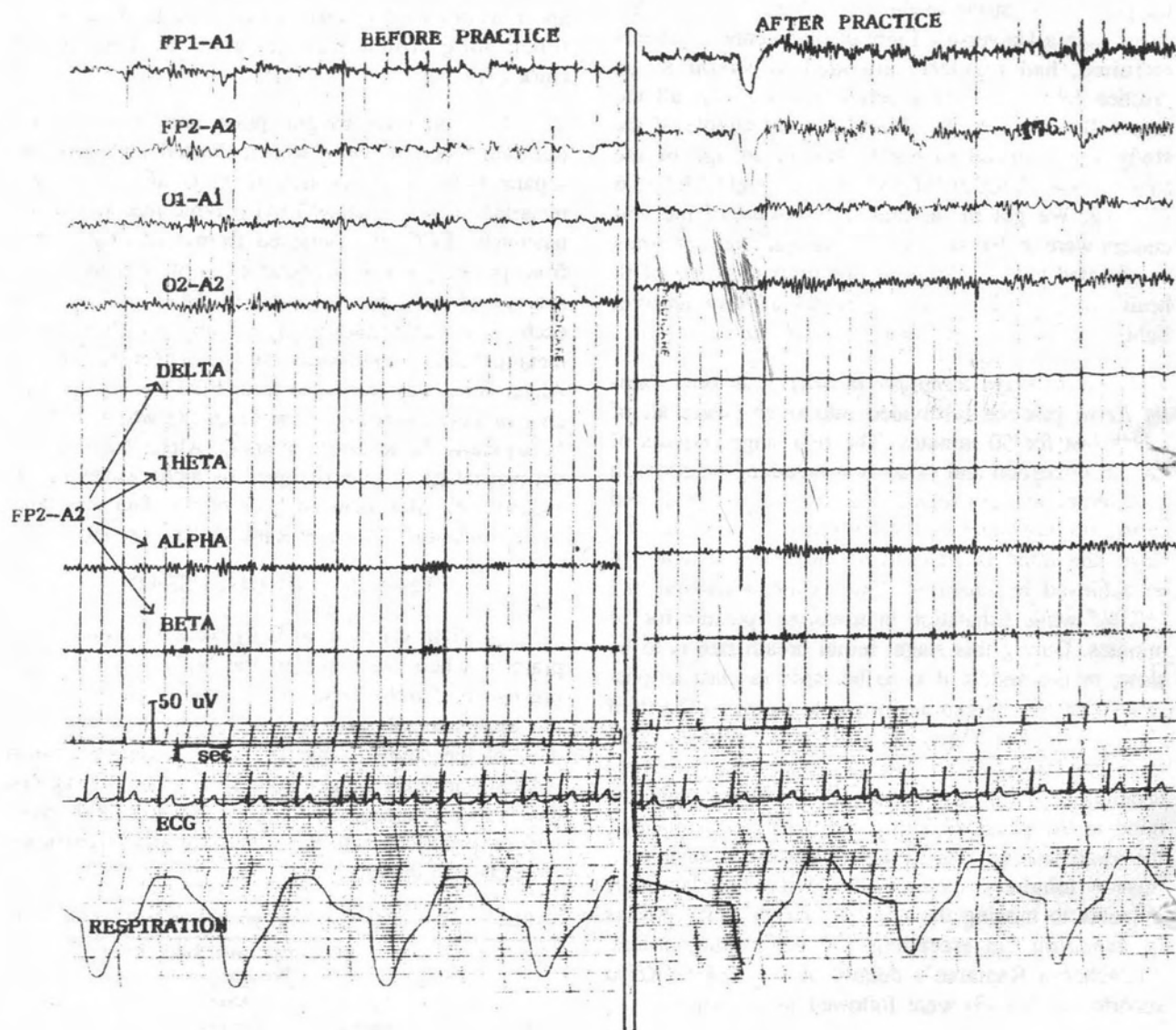


Fig. 1 : EEG, ECG and respiration tracings of volunteers before and after *Santhi Kriya* practice on 1st day of the study. FP1-A1 is the EEG lead of pre-frontal area of the left hemisphere, FP2-A2 is the EEG lead of pre-frontal area of the right hemisphere, O<sub>1</sub>-A<sub>1</sub> is the EEG lead of occipital area of the left hemisphere and O<sub>2</sub>-A<sub>2</sub> is the EEG lead of occipital area of the right hemisphere of the brain. FP2-A2 is analyzed and showed into its alpha, beta, theta and delta components. EEG and ECG tracings before and after *Santhi Kriya* practice shows normal. Respiratory tracing shows as very slight decrease in respiratory rate and amplitude after practice when compared to the before practice.

have been observed as a result of practice of assuming certain yogic postures and pranayama (9). Further, Green and associates (10) reported the case of a *hatha yogi*, with many years of yoga training, who could

voluntarily vary the temperature of two parts of his palm by 10°F and *tum-mo* yoga practitioners also found increased body temperature (11). Hence, increase of oral temperature in the present

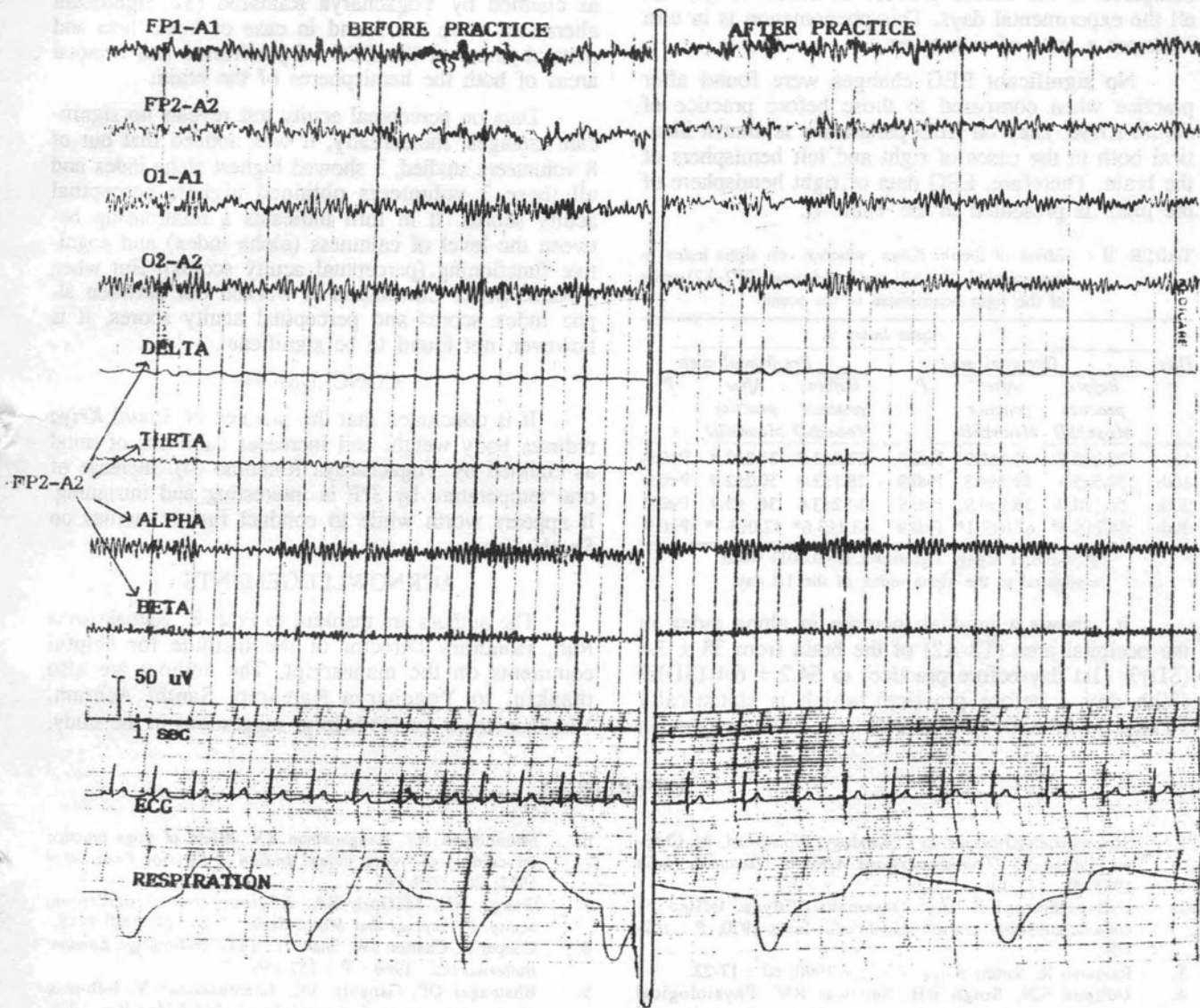


Fig. 2 : EEG, ECG and Respiration tracings of volunteers before and after *Santhi Kriya* practice on 30th day of the study. Compare the alpha activity of the FP2-A2 shown in Fig. 1 with that of Fig. 2 and note the alpha abundance on the 30th day of the study. Respiratory tracing shows decreased respiratory rate and also amplitude after practice when compared to the before practice.

study may be due to the practice of *Dahara Vidya* which is the vital and last part of the *Santhi Kriya*.

Blood pressure, pulse rate and ECG were unaltered. Fig. 1 and 2 shows decrease in the respiratory rate ( $P < 0.05$ ) and also a slight decrease in the amplitude of the respiratory rhythm after practice when compared to the before practice of *Santhi Kriya* on all the experimental days. This phenomenon in turn indicates a state of relaxation.

No significant EEG changes were found after practice when compared to those before practice of *Santhi Kriya*. Data on EEG parameters is almost identical both in the cases of right and left hemispheres of the brain. Therefore, EEG data of right hemisphere of the brain is presented in the Table II.

TABLE- II : Effect of Santhi Kriya practice on alpha index in the occipital (O2-A2) and pre-frontal (FP2-A2) areas of the right hemisphere of the brain.

Day	Alpha Index %					
	Occipital area			Pre-frontal area		
	Before practice Mean±SD	After practice Mean±SD	P	Before practice Mean±SD	After practice Mean±SD	P
1st	38.0±3.8	41.1±3.9	P<0.9	22.0±2.5	21.3±2.4	P<0.9
10th	50.5±5.9	49.4±4.8	P<0.9	28.1±3.0	30.2±2.9	P<0.9
20th	56.1±3.7	58.9±4.9	P<0.9	34.2±3.6	36. ±3.9	P<0.9
30th	64.2±6.4*	67.0±7.1*	P<0.9	43.1±3.6*	42.0±3.7*	P<0.9

\*P Value is highly significant ( $P < 0.001$ ) when compared to the alpha index of the 1st day.

It shows a gradual increase in alpha index in the occipital area (T2-A2) of the brain from  $38 \pm 3.8$  (SD)% (1st day—before practice) to  $64.2 \pm 6.4$  (SD)% (30th day— before practice) which is statistically significant ( $P < 0.001$ ). Table II and EEG tracings in

Fig. 1 and 2 shows a substantial and gradual increase in alpha activity in the pre-frontal area (FP2-A2) of the brain from  $22 \pm 2.5$  (SD)% (1st day—before practice) to  $43.1 \pm 3.6$  (SD)% (30th day—before practice) which is also statistically significant ( $P < 0.001$ ). Increase of alpha activity both in occipital and pre-frontal areas of the brain denotes a state of calmness as claimed by Yogacharya Ramarao (3). Significant alterations were not found in case of beta, theta and delta rhythms of the EEG of pre-frontal and occipital areas of both the hemispheres of the brain.

Data on perceptual acuity test reveals no significant changes. Incidentally, it was noticed that out of 8 volunteers studied, 3 showed highest alpha index and all these 3 volunteers obtained highest perceptual acuity scores. It in turn indicates a relationship between the level of calmness (alpha index) and cognitive functioning (perceptual acuity scores). But when a Rank Order Correlation is worked out between alpha index scores and perceptual acuity scores, it is however, not found to be significant.

#### CONCLUSION

It is concluded that the practice of *Santhi Kriya* reduces body weight and increases calmness of mind as claimed by Yogacharya Ramarao (4). Increase of oral temperature by  $3^{\circ}\text{F}$  is interesting and intriguing. It appears worth while to conduct further studies on *Santhi Kriya*.

#### ACKNOWLEDGEMENTS

The authors are thankful to Prof. K. Ramakrishna Rao, Honorary Director of the institute for helpful comments on the manuscript. The authors are also thankful to Yogacharya Ramarao, Santhi Ashram, Visakhapatnam for his helpful suggestions in the study.

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