

## Original Article

# Effects of Pranayama on Short Term Memory (Visual & Verbal)

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### Abstract

**Aim and Objective :** Our aim is to evaluate changes in short term memory (verbal and visual) after a practice of Pranayama only, for duration of 40 days in two sessions a day of 20 minutes each. Also to see if there is a change, is it verbal or visual memory which shows a significant improvement.

**Materials and Method :** This study was conducted in the Physiology Department Yoga Center on 17 volunteer subjects (age 18 years to 20 years). Pranayama training was given to them for one week and were asked to practice the same in two sessions, one at 6 am in the morning and the second at 4 pm in the evening everyday under observation, for 40 days. During the course these individuals were subjected to various memory assessment before and after Pranayama training.

**Observations :** The results showed Benton Visual Retention Test which evaluate the short term visual memory has shown a highly significant improvement in the scores after the Pranayama session.

**Results :** Our results shows that there is a definite improvement in short term memory mainly in visual memory though there was not any changes in their auditory memory.

**Conclusion :** Pranayama is recommended for all the medical students during their study period to improve their performance.

**Key words :** Blender Gestolt Test, Benten Visual Retention Test, Reys Complex Figure Test, Paragraph Repetition Test, Paired Associate Learning.

**Y**oga is well known for its contribution towards maintenance of normal health since the Vedic period. The term 'Yoga' is derived from Sanskrit word 'Yug' which literally means a union of body and mind. Yoga includes Asanas, Pranayamas, Mudras and Nandanusadhana. Prayanam is practice in sitting position and is very complex act. In this practitioner inhales and exhales air slowly, deeply and completely and also stop breathing intermittently every minutes.

When we breadth in, O<sub>2</sub> is extracted from air and is transferred to blood from alveoli of lungs. In blood O<sub>2</sub> combines with Hemoglobin and is transported to various organs and get released their according to the need of cells in organ. Brain requires more Oxygen than any other organ and any reason for lack of Oxygen result in loss of mental balance, concentration and control over emotions.

**Yoga is one of the mean by which memory can be**

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### Editor's Comment :

- It is for education of Society so as to use Deep Breathing Exercise for better Mental & Physical Health.
- Many psychological test has been done elaborate the result.
- Visual memory & verbal both increases by Deep Breathing Exercise.
- Do follow the advice for better development of whole self.

enhanced. As observed by Yogacharya Vishwa. V Yoga Vidyapeeth Nasik<sup>1</sup> that Omkar Chanting produce vibration in the spinal cord that increase memory and concentration. Murphy and Punovan<sup>2</sup> have received that behavioural effects, cognitive ability, concentration, attention and memory shown to improve with Meditation and Yoga practice.

Shirly Telles<sup>4</sup> demonstrate that people between age of 18 to 45 years have shown improved reversal ability, eye hand co-ordination and accuracy on one month Yoga practice. Naveen<sup>5</sup> proved in 108 children aged between 10 to 17 years have improved verbal and spatial memory on Yogic practice. These studies have proved that short term memory has improved on Yoga practice even for a short period.

### MATERIAL AND METHOD

This study was conducted in the Yoga Center of our Medical College Physiology Department. This project was approved by the Institutional Ethics Committee.

A code was provided to the subjects to keep their identity closed. Their achievement scores were not disclosed to anywhere. Result of our scores were used only for this research. This study was conducted on 17 young healthy MBBS students of either gender having good general physical condition with age group of 18 to 20 years with average Body Mass Index with their written consent.

Student with the history of Hypertension, Smoking, Alcohol intake, Chronic lung and Cardiovascular disease or any one a Sports person or practicing Yoga we are not included in the study.

Students were given at the 1 week of project the Pranayama training. They were asked to practice the same in two session one at 6:00 AM morning and second at 4:00 PM in the evening everyday under observation for next 40 days for 20 minutes session each. They were subjected to memory assessment before and after Pranayam training. The memory test for verbal and visual memory used before and after Pranayam training course were Bender Gestalt Test, Benton Visual Retention Test, Rey Osterrieth Complex Figure, Paragraph Repetitions and Paired Associated Learning. The data was analysed by T-test using statistical software package.

## OBSERVATIONS

Table 1 shows that after 40 days of Pranayama training the out come of the score in Bendergestolt Test is not statistically significant ( $p=0.21$ ) though there have been an increase in the scores from  $6.12\pm1.21$  to  $6.76\pm1.43$ .

Table 2 shows comparing the scores of the pre with the post test it is seen that the difference is highly significant in Benton Visual retention test ( $p = 0.001$ ).

From Table 3 in REYS TEST it is observed that after pranayama the number in “above average” category

Table 1 — Comparison of Pre & Post Test score in Bendergestolt Test

N=17	Mean	STD Deviation	Paired t-test
Pre-Test	6.12	1.21	$t = 1.33$
Post Test	6.76	1.43	$P = 0.20$ Not Significant

Table 2 — Comparison of Pre & Post Test score in Benton Visual Retention Test

N=17	Mean	STD Deviation	Paired t-test
Pre-Test	6.06	1.43	$t = 5.49$
Post Test	8.41	0.87	$P = 0.001$ Highly Significant

has increased from 4-12 ie, there is a significant change in post test performance when compared to the pre-test.

The Table 4 has shown that after 40 days of Pranayama training there is no significant change in scores in the Recall Immediate Test ( $p = 0.78$ ) which is a test to evaluate verbal memory.

While comparing the scores in the paired associate learning it is found that though there is no statistical significance ( $p=0.12$ ) there is a marked difference in the values between the pre and post scores (Table 5).

## DISCUSSION

The short term memory both visual and verbal was evaluated in 17 young health volunteers undergoing MBBS course in Stanley Medical College of age 17-21 years after a practice in Pranayama (both nostrils open ) for 6 weeks.

On analysis of our results it was observed that in:

Bender Gestalt Test, a test to evaluate spatial or visual memory though the scores between the pre and post test values were not significant there has been an increase in the score values.

In Benton Visual Retention test which again evaluate the short term visual memory has shown a highly significant improvement in the scores after the Pranayama session.

The third test performed to evaluate the spatial memory is the Reys Osterrieth Complex Figure Test. The judgement is done as belonging to and below average, average and average depending on the

Table 3 — Comparison of Pre & Post Test score in Reys Test

Reys	Below Average	Average	Above Average
Pre-Test	13	0	4
Post Test	0	5	12

Table 4 — Comparison of Pre & Post Test score in Recall Immediate Test

N=17	Mean	STD Deviation	Paired t-test
Pre-Test	26.18	4.76	$t = 0.29$
Post Test	25.65	5.04	$P = 0.78$ Not Significant

Table 5 — Comparison of Pre & Post Test score in Paired Associate Learning

N=17	Mean	STD Deviation	Paired t-test
Pre-Test	11.88	3.39	$t = 1.45$
Post Test	13.14	1.36	$P = 0.17$ Not Significant

performance. The more number of students fell into the above average performers after the Pranayama session [From 3(pre) to 12(post)].

In the above three test the visual spatial and constructional abilities are all considered together as the candidate draws designs immediately from memory and these are related to the right hemisphere. It has been shown that subjects concentrating on 2 attributes of a visual stimulus show activation of the right angular cortex. Therefore the right hemisphere is superior to the left. In discriminating the spatial patterns milner hemisphere specialization<sup>7</sup> and hemisphere function in sorbon<sup>8</sup>.

Naveen, *et al*<sup>5</sup> in their study on memory with Pranayama have also documented in improvement in spatial memory. Manjunath NK and Shirly Telles<sup>4</sup> of Swami Vivekananda Yoga Research Foundation in their study on spatial memory after Yogasana (90 minutes per day) with Pranayama and Meditation (60 minutes per day for 10 days along with listening to meaningful stories and devotional sessions found an improvement compared with the controls who did not undergo such sessions. Our test results with verbal memory either Recall Immediate Test or the paired associate learning did not show a change which was statistically insignificant.

The study mentioned earlier have also reported not a significant change in the verbal memory.

Nagrathna, *et al*<sup>6</sup> in their study have worked as a larger group (108) of subjects belonging to 11-16 years best have found an improvement unusual and not in verbal memory. Our results therefore resemble those of the above studies.

Medical students from the first to the final year of their study through their study internship are exposed to extreme large load of study material and the effort given by them is almost 12 hours per day the students have a high anxiety state due to lack of sleep and inability to match the demand and effort. They have little time for extra-curricular activities and their learning includes observational skills (in the form of signs presented by patient) though psychomotor and analytical skills are also very important.

Pranayama is a simple technique which can be practiced for a short duration and no special infrastructure facilities are necessary for the practice. Improving the visual memory with such sessions a medical student can better his / her observational skills during their study period.

Any form of Yoga whether the Asanas, Pranayama, or Meditation are already known to reduce the level of anxiety.

A medical student should be recommended to practice Pranayama every day to improve his/her performance and allay his/her anxiety during his/her study period.

## CONCLUSION

Short term memory (visual and verbal) were evaluated on 17 young healthy MBBS students of age between 17-21 years after 6 weeks of pranayama practice.

Our results shows that there is a definite improvement in short term memory though there was not any changes in their auditory memory.

Pranayama is recommended for all the medical students during their study period to improve their performance. An evaluation of the performance in the clinical subject after Pranayama needs to be carried out to confirm our statement.

**Ethical Clearance :** This study was approved by Institutional Ethics Committee.

**Source of Support :** Nil.

**Conflict of Interest :** None.

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