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Original article

AGILITY, SPEED, ENDURANCE AND POWER: IMPACT OF PRANAYAMA PRACTICES ON SEDENTARY MALES

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Abstract

Aim. The ancient Indian science of Yoga makes use of voluntary regulation of the breathing to make respiration rhythmic, and to calm the mind. This practice is called Pranayama. It is believed that Pranayama practices can do a lot on the different physical, physiological, and psychological components of human body and thus can affect the performance of bio- motor variables to a great extent..

For the *purpose* of study, fortysedentary males were randomly selected as the subjects who were divided into two groups (Group 1 and Group 2).

Methods. Group I(N=20) underwent Pranayama Practices and Group II (N=20) acted as Control group. They were given their respective training programs for a duration of twelve weeks with a schedule of three days per week.

Results. Pre test and Post test data for selected bio- motor variables were taken to analyze the differences if any. The collected data were analyzed by using dependent 't'-test to find out significant improvements.

Conclusion. After careful analysis of the available data ,it could see thatthe experimental group had significantly improved on the performance of dependent bio- motor variables Speed, Explosive Power, Cardio Respiratory Endurance, and Agility.

Key words: Yoga, Pranayama, Explosive power, Cardio respiratory Endurance, Agility.

Introduction

The ancient Indian science of Yoga makes use of voluntary regulation of the breathing to make respiration rhythmic, and to calm the mind. This practice is called Pranayama. Pranayama is a Sanskrit word meaning "restraint of the prana or breath". The word is composed of two Sanskrit words, Prana, life force, or vital energy, particularly, the breath, and "ayama", to suspend or restrain. It is often translated as control of the life force (prana). These Yogic practices provide an opportunity to study the effects of selective nostril breathing carried on effortlessly for prolonged periods. Pranayama means control of breath and it involves three main phases which is much more important to keep strength of respiratory system and thus a whole of human body. These are best practiced in the early hours of the morning or after sunset.

The Prayama practice makes use of the diaphragm fully by drawing into the lowest and largest part of the lungs. Due to the regular practice of the Pranayama, breathing is so simple and so obvious that we often take it for granted ignoring the power it has to affect body, mind and spirit. With each inhale we bring oxygen into the body and spark the transformation of nutrients into fuel. Each exhale purges the body of carbon dioxide, a toxic waste. Breathing also affects our state of mind

(Cooper et al ,2003). It can make us excited or calm, tense or relaxed. It can make our thinking confused or clear. What is more, in the yogic tradition, air is the primary source of prana or life force, a psycho-physio-spiritual force that permeates the universe (Danucalov MA et al, 2008). During breathing for Pranayama, inhalation (puraka) stimulates the system and fills the lungs with fresh air. According to Madanmohan et al,(2004), retention (kumbhaka) raises the internal temperature and plays an important part in increasing the absorption of oxygen. Exhalation (rechaka) causes the diaphragm to return to the original position and air full of toxins and impurities is forced out by the contraction of inter-costal muscles. These are the main components leading to Pranayama which massage the abdominal muscles and tone up the working of various organs of the body. Due to the proper functions of these organs, vital energy flows to all the systems. KhanamA et al (1996) in his study reveals that the success of Pranayama depends on proper ratios. Researchers like Brown and Gerbarg (2005) claim that yogic breathing is a unique method for balancing the autonomic nervous system and influencing psychological and stress-related disorders. One part of their report presented a neurophysiologic theory of the effects of Sudarshan Kriya Yoga (SKY) and another part reviewed clinical studies, their own clinical observations, and guidelines for the safe and

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effective use of yoga breath techniques in a wide range of clinical conditions. Although more clinical studies are needed to document the benefits of programs that combine pranayama (yogic breathing) asanas (yoga postures), and meditation, there is sufficient evidence to consider Sudarshan Kriya Yoga to be a beneficial, low-risk, low-cost adjunct to the treatment of stress, anxiety, post-traumatic stress disorder (PTSD), depression, stress-related medical illnesses, substance abuse, and rehabilitation of criminal offenders. SKY has been used as a public health intervention to alleviate PTSD in survivors of mass disasters. Nagarathna et al (1985) have proved that Yogic exercises are effective for bronchial asthma. It is believed that Pranayama practices can do a lot on the different physical, physiological and psychological components of human body and thus can affect the performance of bio motor variables to a great extent.

Significance of the study

The study will be significant by giving new trends to coaches and physical educators to train their athletes and players based on new concepts of Pranayama practices to improve their performance.

The study would provide new horizons to Physical Educators and Coaches in research training.

Methodology

For the purpose of the study, 40 sedentary males who not used to undergo any kind of physical activity and training were selected at random. The average age, height and weight of students were 21, 173 and 75kg respectively. They were categorized into two groups; viz (1) Experimental Group and (2) Control Group. Group I underwent Pranayama Practices and Group II acted as Control (n=20). The selected bio motor variables were Speed, Explosive Power, Cardio Respiratory Endurance, and Agility. As per the available literature, the following standardized tests were used to collect relevant data on the selected dependent variables and they are 50 M run for speed, standing broad jump for explosive power, Cooper's run/walk test for cardio respiratory endurance, and Shuttle run for agility.

All the measurements in this study were taken by the investigator with the assistance of senior colleagues and had a number of practice sessions in the correct testing procedure. The tester's reliability was established by test and re-test methods.

Training program: - During the training period, the experimental groups underwent

their respective training programs. Group-I underwent Pranayama Practices, for all three days per week for twelve weeks. The duration of training session in all the days was between fifty five to sixty minutes approximately which included warming up and limbering down. The time slot for the program was early morning during the first few weeks. This time period is considered as best for yoga practices as suggested from many yogic experts from ancient times.

Collection of the data :- The data on Speed was assessed by 50 Meters Run, Explosive Power was assessed by Standing Broad Jump, Cardio Respiratory Endurance was assessed by Coopers 12 Minutes Run/Walk Test, and Agility was assessed by Shuttle Run Test. Pre test data were collected two days before the training programme and post test data were collected immediately after twelve weeks of training session.

The collected data were analyzed by using dependent 't'-test to find out significant improvements. Analysis of covariance (ANCOVA) was used to determine the differences, if any, among the adjusted post-test means. Whenever 'F'-ratio for adjusted post-test mean was found to be significant, the Scheffe's test was applied as post-hoc test to determine the paired mean differences. The level of significance was fixed at .05 level of confidence for all the cases.

Results and Discussion

By fulfilling all the requirements, the data was collected. All the subjects were tested prior to and immediately after the experimental period on the selected dependent variables.

The data obtained from the Experimental groups before and after the experimental period were statistically carried out with dependent 't'-test and Analysis of covariance (ANCOVA). Whenever the 'F' ratio for adjusted post-test means was found to be significant, the Scheffe's test was applied as post-hoc test to determine the paired mean differences. The level of confidence was fixed at .05 level for all the cases. The influence of independent variables on each criterion variable was carried out and presented below:

The analyzed dependent 't'-test on the data obtained for Speed of the subjects in the Pre-test and Post-test of Experimental Groups and Control Group have been carried out and presented in Table 1.

Results

Table 1

't'-test analysis on Speed

	Pranayama Practices Group – (I)	Control Group – (I)
Pre- test mean	7.66	7.68
Post-test mean	7.36	7.67
't'-test	3.69*	0.07

* *Significant at .05 level.*

(Table value required for significance at .05 level for 't'-test with df 14 is 2.15)

From Table I the dependent 't' test values between the pre and post test means of, Pranayama Practices Group and Control Group are found to be 3.69 and 0.07 respectively. Since the obtained 't'-test values of Experimental group is greater than the table value 2.15 with df 14 at .05 level of confidence, it is concluded that, Pranayama Practices Group had

registered significant improvement in performance of Speed.

The analyzed dependent 't'-test on the data obtained for Explosive Power of the subjects in the Pre-test and Post-test of Experimental Groups and Control Group have been carried out and presented in Table 2

Table 2

	Pranayama Practices Group – (I)	Control Group – (I)
Pre- test mean	2.18	2.17
Post-test mean	2.37	2.18
't'-test	2.77*	0.09

* *Significant at .05 level.*

(Table value required for significance at .05 level for 't'-test with df 14 is 2.15)

From Table 2 the dependent 't' test values between the pre and post-test means of, Pranayama Practices Group and Control Group are found to be, 2.77 and 0.09 respectively. Since the obtained 't'-test values of Experimental group is greater than the table value 2.15 with df 14 at .05 level of confidence, it is concluded that Pranayama Practices Group had

registered significant improvement in performance of Explosive Power.

The Analyzed dependent 't'-test on the data obtained for Cardio Respiratory Endurance of the subjects in the Pre-test and Post-test of Experimental Groups and Control Group have been performed and presented in Table 3

Table 3

	Pranayama Practices Group – (I)	Control Group – (I)
Pre- test mean	2054.67	2049.33
Post-test mean	2274	2046.67
't'-test	3.48*	0.05

* Significant at .05 level. (Table value for significance at .05 level for 't'-test with df 14 is 2.15)

Since the obtained 't'-test values of Experimental group(3.48) is greater than the table value 2.15 with df 14 at .05 level of confidence, it is concluded that Pranayama Practices Group had registered significant improvement in performance of cardio respiratory endurance.

The analysis of dependent't'-test on the data obtained for Agility of the subjects in the Pre-test and Post-test of Experimental and Control Groups have been performed are presented in Table 4

Table 4

	Pranayama Practices (I)	Group – Control	Group – (I)
Pre- test mean	10.66		10.50
Post-test mean	10.32		10.53
't'-test	3.04*		0.24

* Significant at .05 level.

(Table value required for significance at .05 level for 't'-test with df 14 is 2.15)

From Table 4 the dependent 't' test values between the pre and post-test means of, Pranayama Practices Group and Control Group are found to be, 3.04 and 0.24 respectively. Since the obtained 't'-test values of Experimental groups are greater than the table value 2.15 with df 14 at .05 level of confidence, it is concluded that Pranayama Practices Group had registered significant improvement in performance of agility.

Conclusions

It is concluded that there is a significant influence of Prayama practices on the performance of dependant variables viz, Speed, Explosive power, Cardio respiratory endurance and Agility. Therefore, different modalities in Pranayama like nadeeshodhana Pranayama, kapaalabhathitechniques ,shouchya pranayaama, etc may have its own effects on the physiological functions of human body.

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