

**Sustained Maximal Inspiration, Breath Holding Time And Peak Flow Rate
Responses To Pranayama Practices Among
SCHOOLLEVELSUPER SENIOR PLAYERS**

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Abstract

The purpose of the present study was to find out the effect of pranayama practices on selected lung functions among the schoollevel super senior players. The study was conducted on 30 super senior players. They were divided into two equal groups. Group -A underwent twelve weeks of intensive pranayama practices, Group -B is control group did not undergo any type of training other than the regular sports activities. The most important lung functions like Sustained maximal inspiration (SMI), breath holding time (BRI) and peak flow rate (PFR) were measured before and after the treatment by using the scientific and reliable equipment's. The data were analyzed by the statistical techniques ANOVA and ANCOVA for interpretation. The Pranayama techniques had significant ($p < 0.05$) effect on the selected lung functions. Key Word Pranayama, Sustained maximal inspiration, Peak flow.

Introduction

Competition is a fundamental feature of any sports and games. During competition the individual player's physiological functions are taxed severely. Thus the physiological stress depending in the nature of the sport, the tactics, which employed and the level of fitness of the players concerned. Many researchers have attempted to outline the typical profiles of top competitors and the fitness requirements for success at a high level. It is evident that genetic and structural factors are important in many sports. On the other hand most of the sports a high standard of training is essential and inherited predispositions need to be nurtured for sporting potential to be realized. Generally the sports training aims to improve the fitness and skills.

Individuals endowed with the possibility to obtain a high oxygen uptake need to compliment this with rigorous training in order to achieve maximal performance. For any endurance, sports and games the players must develop the ability to sustain a high fractional utilization of their maximal oxygen uptake. Definitely, it will enhance their physiological functions as whole in the body. Now they become physiologically more efficient in performing their physical activity.

We are very much aware that the competitive level in sports performances is progressively increasing day by day in all kinds of sports events. To meet out the crucial challenges, one has to identify and exploit the available human resource. Also, the talents have to be shaped properly in the right direction through the relevant training programmes.

Yoga

The ancient Indian discipline yoga provides a stable and sustaining body system for our sports persons. Yogic techniques and practices aim at selective as well as wholesome shaping of human body and mind. In this study the only the pranayama practice is taken into account as a treatment variable.

Pranayama

Breath is a life force for the human being. It is believed that the lung functions play a vital role in most of the sports activities. Pranayama is a sub-set of the yogic practices. Pranayama is a yogic exercise in respiration. Respiration consists of the alternate expansion and contraction of the thorax, by means of which air is drawn into or expelled from the lungs. Inspiration is a forced muscular effort performed by three distinct sets of muscles. In inspiration the chest cavities made broader, longer and deeper.

Our ancestors the Rishis and Saints have observed that the breathing process is the base of any living being. On the basis of their observations the life span of the living beings are measured by their breathing rate. It has been identified that the breathing rate and life span is inversely proportional to each other. Thus if we reduce our breathing rate we can postpone our life to a longer period. Pranayama helps to reduce the breathing rate. In Pranayama by strenuous

training of the lungs & nervous system, breathing can be made more efficient by changing its rate, depth and quality.

Istvan WCPP Head Coach pointed out that the pulmonary ventilation training improves the efficiency of the breathing by means of

- i) Increase the capillary density surrounding the alveoli, therefore, increased blood flow resulting in a greater diffusion capacity for oxygen.
- ii) Improves the ability to sustain high level of ventilation,
- iii) Increase the maximum amount of air that can breathe per minute,
- iv) The capacity for aerobic resynthesis of ATP is also enhanced,
- v) The increased tidal volume reduces the frequency of breathing.

Objective of the Study

The main objective of the study is to find out the effect of pranayama practices on the sustained maximal inspiration (SMI), breath holding time (BHT) and peak flow rate (PFR) among school level super senior players.

Methodology

To achieve this purpose the investigator has selected 30 School level players on random sample technique from the Nadar Saraswathi hr.sec.school. Theni. The selected Subjects (players) have been divided into two equal groups namely: experimental group (Group A) and control group (Group-B).

The treatment of the selected pranayama techniques listed in Table - I have been given only to the experimental group alone for weekly 5 days viz. Monday to Friday. Saturday and Sunday was rest. The treatment has been given to them for nine weeks besides their regular sports training. These pranayama practices have been practiced only in the morning between 7 am. To 8 a.m. The Control Group was permitted to do their regular sports training alone.

TABLE -1; Pranayama Course (35- minutes)

Sl. No.	NAME	Breathing Nature	DURATION
1.	NadiSuddhi	Alternate Nostril Breath **	6— minutes (each) Total —42min
2.	Bhastrika	Bellows Breath	
3.	Ujjayi	Victorious Breath	
4.	NadiSothana	Alternate Nostril Breath	
5.	Sitali	Cooling Breath	
6.	Sitakari	Cooling Breath	
7.	Bhramari	Bee Breath	

** - without Kumbaka phase

From the physical point of view, a proper balance among the nadis ensures health, strength, peace and longevity. Pranayama's have seasonal effective in its technique of practice. Pratheepa (2008) mentioned that the selection of pranayama, for the practice schedule should be based on the seasonal requirements. During practice the three phases, inhalation, holding the breath and exhalation to be observed was advocated at the rest of the treatment period 12 weeks.

Data Collection

Initial and final data on the sustained maximal inspiration (SMI), breath holding time (BHT) and peak flow rate (PFR) among college men players were recorded for both group – A and Group - B.

- Incentive spirometer is used to find out the sustained maximal inspiration (SMI), which is made in California by Hudson Respiratory Care Inc.
- Breath holding time (BHT) capacity is measured by using electronic stop watch in one hundred seconds accuracy.
- Peak flow rate (PFR) was assessed with help of peak flow meter which is made in Ireland by Vital graph Ireland Ltd.

Analysis of Data

To evolve concrete evidence, ANOVA and ANCOVA (analysis of covariance) statistics tool have been applied to extract the significant difference if any, among the experimental and control groups as suggested by Clark and Clarke (1972).

TABLE -2: COMPUTATION OF ANOVA OF EXPERIMENTAL GROUP AND CONTROL GROUP ON SMI, BHT, & PFR

		SOURCE	Sum of Squares	DF	Mean Square	F
SUSTAINED MAXIMAL INSPIRATION (S MI)	INITIAL	Between Groups	28830.100	1	28830.100	1.03
		Within Groups	793506.767	28	28339.624	
	FINAL	Between Groups	125453.333	1	125453.333	5.95
		Within Groups	590293.333	28	21081.905	
BREATH HOLDING TIME (B H T)	INITIAL	Between Groups	100.834	1	100.834	0.66
		Within Groups	4350.134	28	155.363	
	FINAL	Between Groups	790.534	1	790.534	6.81
		Within Groups	3257.334	28	116.334	
PEAK FLOW RATE(P F R) INITIAL	INITIAL	Between Groups	10083.333	1	10081.333	1.41
		Within Groups	200653.333	28	7166.190	
	FINAL	Between Groups	44083.400	1	44083.400	7.10
		Within Groups	174186.67	28	6220.96	

From the table - 2, it can be seen that the computed F-ratio of 1.03 (SMI), 0.66 (BHT) and 1.41 (PFR) for the Initial test means among the experimental group and the control groups were insignificant ($P > 0.05$) at 0.05 level of confidence with the degrees of freedom being 1,28; it clearly indicated that the random assignments of groups were quite successful.

Further, it revealed that the calculated F-ratio of 5.95 (SMI), 6.81(BHT) and 7.10 (IPFR) for the final test means among the experimental group and the control groups were significant ($p < 0.05$) at 0.05 level of confidence with the degrees of freedom being 1, 28. This showed that the treatment of Pranayama practice have made the significant difference in the mean values among the groups. Hence, the ANCOVA technique was employed to find out the difference between the adjusted posttest means was significant or not.

**TABLE-3: COMPUTATION OF ANALYSIS OF COVARIANCE (ANCOVA) OF
EXPERIMENTAL GROUP AND CONTROL GROUP ON SMI, BHT & PFR**

	SOURCE	Sum of Squares	DF	Mean Square	F
SUSTAINED MAXIMAL INSPIRATION (S MI)	Between Groups	4397.367	1	43979.366	26.16
	Within Groups	45378.036	27	1680.667	
BREATH HOLDING TIME (B H T)	Between Groups	378.543	1	378.542	54.63
	Within Groups	187.059	27	6.927	
PEAK FLOW RATE(P F R) INITIAL	Between Groups	13322.019	1	13322.018	51.77
	Within Groups	6946.211	27	257.266	

As the primary aim of analysis of covariance, the adjusting the initial means with final means and testing the adjusted means was done. F - Ratio obtained (via: Table-3) from testing the adjusted means of 26.16 (sustained maximal inspiration -SMI), 54.63 (breath holding time - BHT) and 57.77 (peak flow rate - PFR) were high in compare with the required table F-ratio of 4.20 at .05 level of confidence with the degrees of freedom being 1.26. Hence the chosen variables for the study is well significant at (p 0.05) at 0.05 level.

Discussions and Findings

Pranayama is the practice of breathing exercise with scientific three phases namely Puraka (inhalation), Kumbaka (holding the air in the lungs) and Rechaka (exhalation) in a progressive manner works on the breathing mechanism centrally and the effects spread to the periphery too.

Mainly the lungs, intercostal muscles, diaphragm and ribs are highly exercised during the Pranayama practices. Thus it enhances the sustained maximal inspiration (SMI), breath holding time (BHT) and peak flow rate (PFR) among School level super senior players significantly at (p 0.05) at 0.05 level.

Conclusions

Within the limitations of the study, the results revealed that there was a significant improvement in the chosen lung functions due to pranayama practice. It was concluded that inclusion of pranayama practices, besides their regular sports training would definitely enhance the School level super senior player's lung functions to a marked extent.

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