

# The Effect Of Hath Yogic Techniques On Pulmonary Functions In Cricket Players

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## ABSTRACT

### Introduction:

Before we start the research, we should understand the Purpose of Pulmonary Function Testing and the benefits of efficiency enhancement of pulmonary function.

Pulmonary Function Testing has been a major step forward in assessing the functional status of the lungs as it relates to:

1. How much air volume can be moved in and out of the lungs
2. How fast the air in the lungs can be moved in and out
3. How stiff are the lungs and chest wall - a question about compliance
4. The diffusion characteristics of the membrane through which the gas moves (determined by special tests)
5. How the lungs respond to chest physical therapy procedures

“Hathyogic practices” can be used as a tool to control our stress, as well as enhancement of lung capacity, whether it is easy to use with less effort and expenses and it has no side effects. Then why shouldn't we use?

**Aim:** So, the purpose of this study is “To assess the effect of selective Hath yogic practices on Pulmonary functions in cricket players”.

**Methods:** For this study we had selected randomly 50 cricket players with age ranging between 18 to 32 years of age. Practicing 37 minute/ day yogic intervention particularly and only those students were considered who were willing to participate in such type of practices. The students are male and almost equal in the term of education, socio economic status and nature of job. Then at the initiation of practice 0<sup>th</sup> day pre-data was collected by the research team on spirometry And at the end of session on 30<sup>th</sup> day of intervention post data was taken.

**Result:** According to obtained data we are surprised that there was statistically significant difference at 0.01 level was found between pre-and post conditions in the level of F.V.C., P.E.F.R. & M.V.V. This indicates towards effectiveness of hath yogic practices in enhancement of the level of Lung capacity among cricket players.

**Key words:** - Pulmonary function test, yogic practices, F.V.C., P.E.F.R. & M.V.V...

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# The Effect Of Hath Yogic Techniques On Pulmonary Functions In Cricket Players

## Introduction:

Lung capacity is a basic requirement to perform the best in a particular outdoor game, as we all are well known about the demerits of decreased lung capacity, which can lead a person to death as well. In hath yoga there were many techniques as described for the enhancement of lung capacity on a higher level, which is most essential part of the outdoor games which requires a higher level of energy, and according to modern anatomy and physiology of energy production by the living cells is based on aerobic combustion. But in outdoor games like cricket which requires a high level of energy, if anyone with low lung capacity plays the game resulting more fatigue with less results.

**Sharma, Sanjay** (2015) "Allopathy includes traditional anti-anxiety drugs such as benzodiazepines, and newer options like antidepressants and beta-blockers. These medications can be very effective, but they shouldn't be thought of as a cure"[1]

**Verma, S** (2016) We all are well known to breathing practices which is also known as Pranayama, "Pranayama's is a yogic breathing technique which is known to improve the physical and mental well-being. When we start talking about physical well-being, it is our prime duty to assess the efficacy of yoga practices on vital lung capacity but the traditional medical system had no concrete strategy for the complete cure the stress in mental health of human being and lung capacity in physical health. [2]

before starting the measurement of lung capacity we need to recognize the Purpose of Pulmonary Function Testing which is as follows:

**Pulmonary Function Testing has been a major step forward in assessing the functional status of the lungs as it relates to:**

1. How much air volume can be moved in and out of the lungs
2. How fast the air in the lungs can be moved in and out
3. How stiff are the lungs and chest wall - a question about compliance
4. The diffusion characteristics of the membrane through which the gas moves (determined by special tests)
5. How the lungs respond to chest physical therapy procedures

**Pulmonary Function Tests are used for the following reasons :**

1. Screening for the presence of obstructive and restrictive diseases
2. Evaluating the patient prior to surgery - this is especially true of patients who :
  - a. have a history of smoking, cough or wheezing
  - b. are known to have pulmonary disease
  - c. are obese (as in pathologically obese)
  - d. are older than 60-65 years of age
  - e. will be under anesthesia for a lengthy period of time
  - f. are undergoing an abdominal or a thoracic operation

Note : A vital capacity is an important preoperative assessment tool. Significant reductions in vital capacity (less than 20 cc/Kg of ideal body weight) indicates that the patient is at a higher risk for postoperative respiratory complications. This is because vital capacity reflects the patient's ability to take a deep breath, to cough, and to clear the airways of excess secretions.

3. Evaluating the patient's condition for weaning from a ventilator. If the patient on a ventilator can demonstrate a vital capacity (VC) of 10 - 15 ml/Kg of body weight, it is generally thought that there is enough ventilatory reserve to permit (try) weaning and extubation.
4. Documenting the progression of pulmonary disease - restrictive or obstructive
5. Documenting the effectiveness of therapeutic intervention[3]

## II. Equipment

The primary instrument used in pulmonary function testing is the spirometer. It is designed to measure changes in volume and can only measure lung volume compartments that exchange gas with the atmosphere. Spirometers with electronic signal outputs (pneumotaches) also measure flow (volume per unit of time). A device is usually always attached to the spirometer which measures the movement of gas in and out of the chest and is referred to as a spirograph. Sometimes the spirograph is replaced by a printer like the unit used in this laboratory. The resulting tracing is called a Spiro gram. Many computerized systems have complex spirographs or printouts that show the predicted values next to the observed values (the values actually measured). The unit will have in memory all of the prediction tables for males and females across all age groups. In sophisticated spirometers, there may be special tables of normal values programmed into the machine for selection when Blacks, children or other groups are being tested who may vary from the normal PFT tables established for Caucasian adults.

## III. "Normal Values"

Over the last several decades much research has been undertaken to determine what are the normal values for lung volumes and lung capacities. This has made spirometry very

useful since now we know that we can compare the patient's PFT results with those measured on thousands and thousands of "normal" adults. By having tables of normal values, it is then easy to compare the severity of the disease process or the rate of recovery taking place in the patient's lungs. There are a few variables such as age, gender and body size which have an impact on the lung function of one individual compared to another.

- **Age:** As a person ages, the natural elasticity of the lungs decreases. This translates into smaller and smaller lung volumes and capacities as we age. When determining whether or not your patient has normal PFT findings, it would be important to compare the patient with the PFT results of a normal person of the same age and gender.
- **Gender:** Usually the lung volumes and capacities of males are larger than the lung volumes and capacities of females. Even when males and females are matched for height and weight, males have larger lungs than females. Because of this gender-dependent lung size difference, different normal tables must be used for males and females.
- **Body Height & Size:** Body size has a tremendous effect on PFT values. A small man will have a smaller PFT result than a man of the same age who is much larger. Normal tables account for this variable by giving predicted PFT data for males or females of a certain age and height. Sometimes as people age they begin to increase their body mass by increasing their body fat to lean body mass ratio. If they become too obese, the abdominal mass prevents the diaphragm from descending as far as it could and the PFT results will demonstrate a smaller measured PFT outcome than expected - i.e. the observed (measured) values are actually

smaller than the predicted values (predicted values from the normal tables).

- **Race:** Race affects PFT values. Blacks, Hispanics and Native Americans have different PFT results compared to Caucasians. Therefore, a clinician must use a race appropriate table to compare the patient's measured pulmonary function against the results of the normal table written for that patient's racial group. Other factors such as environmental factors and altitude may have an affect on PFT results but the degree of effect on PFT is not clearly understood at this time.[4]

#### IV. Terminology and Definitions

**FVC** - Forced Vital Capacity - after the patient has taken in the deepest possible breath, this is the volume of air which can be forcibly and maximally exhaled out of the lungs until no more can be expired. FVC is usually expressed in units called liters. This PFT value is critically important in the diagnosis of obstructive and restrictive diseases.

**PEFR**- Peak Expiratory Flow Rate - this is maximum flow rate achieved by the patient during the forced vital capacity maneuver beginning after full inspiration and starting and ending with maximal expiration - it can either be measured in L/sec or L/min - this is a useful measure to see if the treatment is improving obstructive diseases like bronchoconstriction secondary to asthma.

**MVV** - Maximal Voluntary Ventilation - this value is determined by having the patient breathe in and out as rapidly and fully as possible for 12 -15 seconds - the total volume of air moved during the test can be expressed as L/sec or L/min - this test parameter reflects the status of the respiratory muscles, compliance of the thorax-lung complex, and airway resistance. Surgeons like this test value because it is a quick and easy way to assess the strength of the

patient's pulmonary musculature prior to surgery - a poor performance on this test suggests that the patient may have pulmonary problems postoperatively due to muscle weakness. MVV can therefore be viewed as a measure of respiratory muscle strength. One major cautionary note is that this test is effort dependant and therefore can be a poor predictor of true pulmonary strength and compliance.[5]

#### V. What Can A PFT Be Used For ?

Pulmonary function abnormalities can be grouped into two main categories : obstructive and restrictive defects. This grouping of defects is based on the fact that the routine spirogram measures two basic components - air flow and volume of air out of the lungs. Generally the idea is that if flow is impeded, the defect is obstructive and if volume is reduced, a restrictive defect may be the reason for the pulmonary disorder.

##### Obstructed Airflow

The patency (dilatation or openness) is estimated by measuring the flow of air as the patient exhales as hard and as fast as possible. Flow through the tubular passageways of the lung can be reduced for a number of reasons:

- narrowing of the airways due to bronchial smooth muscle contraction as is the case in asthma
- narrowing of the airways due to inflammation and swelling of bronchial mucosa and the hypertrophy and hyperplasia of bronchial glands as is the case in bronchitis
- material inside the bronchial passageways physically obstructing the flow of air as is the case in excessive mucus plugging, inhalation of foreign objects or the presence of pushing and invasive tumors
- destruction of lung tissue with the loss of elasticity and hence the loss of the

external support of the airways as is the case in emphysema

- external compression of the airways by tumors and trauma

### **Restricted Airflow**

"Restriction" in lung disorders always means a decrease in lung volumes. This term can be applied with confidence to patients whose total lung capacity has been measured and found to be significantly reduced. Total lung capacity is the volume of air in the lungs when the patient has taken a full inspiration. You cannot measure TLC by spirometry because air remains in the lungs at the end of a maximal exhalation - i.e. the residual volume or RV. The TLC is therefore the summation of FVC + RV. Scientists are taking advantage of new technologies to see exactly what goes on inside the brains of Nada Yoga practitioners. The neuroscientists hypothesize that regular meditation actually alters the way the brain is wired, and that these changes could be at the heart of claims that meditation can improve health and well-being. But the rigors of the scientific method might never have been applied to studying the practice of meditation. Modern psychology as well as yogic philosophy believes in three kinds of tension – muscular tensions, emotional tensions and mental tensions - which can be progressively released through the systematic and regular practice of Yoga and Meditation. Muscular tension results from nervous and endocrinal imbalances. It manifests in the form of stiffness and rigidity in the physical body. In the practice of Meditation the body is progressively relaxed, which in turn releases the accumulated muscular tensions. Psychologists tell that music works on a very subtle subconscious level. In particular they refer to the beat, or rhythm, of the music. They point to the fact that before birth we felt safe, warm and secure within the womb, and the most reassuring sound was that

of the mother's heart beat. The slow, rhythmic pulse of relaxing music may reflect the feelings first enjoyed when our lives were stress and anxiety-free. Thus we can withdraw for a while from the causes of our stress and anxiety to an imaginary place of refuge and safety. [5]

The scientific nature of the yogic practices was first revealed when Late Swami Kavalayanandaji started his scientific research in the field of yoga in 1942. The research findings could remove several misconceptions about yoga and removed the mystical sheath over it. He showed that a logical and scientific explanation could be possible for traditionally described technique on various practices. [6]

Today yoga is popular not so much as a system of philosophy but as a system of practical discipline. The applications of yogic techniques are considered for the benefit of health and cure of certain diseases, like aggression management or for enhancing stamina of individual in different fields as well as physiological problems. [7]

#### **Objective: -**

To assess the Effect of Selective Hath yogic practices on F.V.C., P.E.F.R. & M.V.V. among Cricket players.

#### **Sample: -**

The total sample of 50 Cricket players ranging in age from 18 to 32 years was selected from the Post-graduate students of district haridwar, uttarakhand, (India). This sample consists of 50 Cricket players in experimental group. A purposive sample was done to select the sample. Pretest and posttest was administered to assess the effectiveness of yogic practices.

People who are selected for this study had already been signed the consent form for being a part of this type of study.

#### **Criteria for selection of sample: -**

In order to study the effect of yogic practices on stress of urban college Students, the primary criteria for the selection of the subjects are only those students were considered who were willing to participate in yoga practices, also physically fit and not taking any kind of medication.

The intervention program of yogic practices was given to the experimental group. Participants assigned to the group and they performed the selected yogic intervention in group early in the morning at 6:30 A.M. for thirty seven (37) minutes for just 30 days including Sundays and holidays. The intervention schedules are as shown in given table.

**Intervention Schedules: -**

S. No.	Yogic interventions	Round/day	Duration
1.	Gayatri Mantra Chanting	3 round / day	02 min
2.	Sun Salutation	5 round/ day	10 min
3.	Kapalbhati Pranayama	60 stroke/ min	05 min
4.	Suryabhedipranayam	15 round / day	05 min
5.	Bhastrikapranayam	05 round/ day	05 min
6.	Relaxation/Yognidra	1 round / day	10 min
Total			37 min/ day

**Design: -**

Single group pre-post research design was used in this present study, at the beginning of this study pre-data were collected and tabulated and after 30 days post data were collected, data was analyzed to see if there is a significant difference between them as a result of the selective yogic intervention or not.

is designed to measure changes in volume and can only measure lung volume compartments that exchange gas with the atmosphere.

**Statistical analysis: -**

Obtained data were tabulated and analyzed. the initial value of 0<sup>th</sup> day for stress were compared with final value obtained on 30<sup>th</sup> day of intervention. Paired t-test was used for the statistical analysis with the help of SPSS ver. 23.

**Tools: -**

The primary instrument used in pulmonary function testing is the spirometer. It

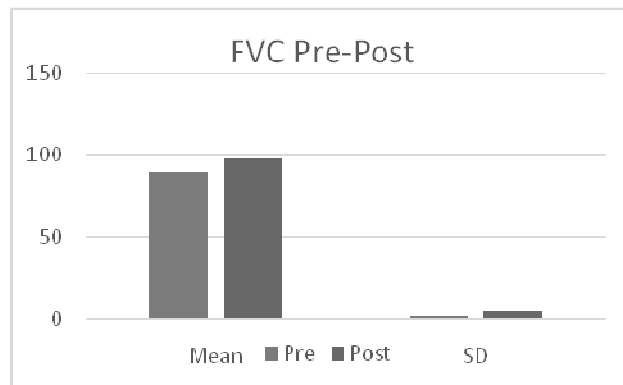
**FVC**

**Paired Samples Statistics**

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 pre	89.2976	50	1.61230	.22801
post	97.3930	50	1.17850	.16666

**Paired Samples Test**

	Paired Differences					t	df	Sig. (1-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 pre - post	8.09	.63	.09	8.27	7.91	9.61	49	.01



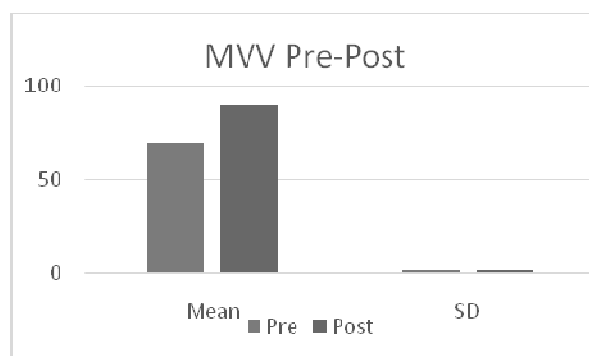
**MVV**

**Paired Samples Statistics**

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 pre	68.9320	50	1.18588	.16771
post	89.6462	50	1.03967	.14703

**Paired Samples Test**

	Paired Differences					t	df	Sig. (1-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 pre - post	20.71	.514	.072	20.56	20.86	28.58	49	.01



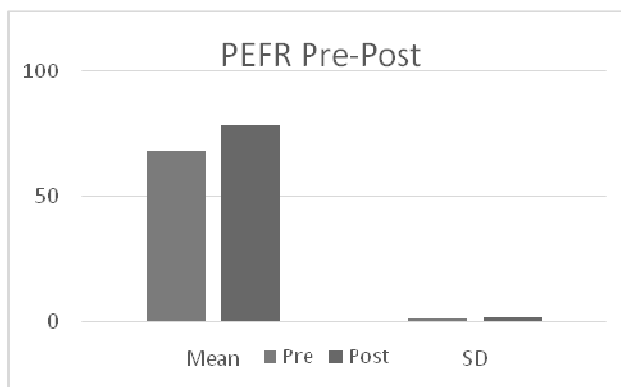
**PEFR**

**Paired Samples Statistics**

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 pre	67.9418	50	.95344	.13484
post	77.9874	50	1.26121	.17836

### Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 pre - post	10.04	.43	.06	10.17	9.92	12.0	49	.01



#### Result: -

The mean & standard error of mean (M±SD) of pretest and posttest on level of **FVC** of the experimental group were consecutively found to be 89.29±1.61 and 97.39±1.17. and obtained t-value is 9.61 which is significant at 0.01 level of significance.

The mean & standard error of mean (M±SD) of pretest and posttest on level of **MVV** of the experimental group were consecutively found to be 68.93±1.18 and 89.64±1.03. and obtained t-value is 28.58 which is significant at 0.01 level of significance.

The mean & standard error of mean (M±SD) of pretest and posttest on level of **PEFR** of the experimental group were consecutively found to be 67.94±0.94 and 77.98±1.26. and obtained t-value is 12.01 which is significant at 0.01 level of significance.

#### Conclusion: -

The results of this present study reveal that the regular practices of above mentioned hath yogic practices helps to enhancement of the FCV, MVV, PEFR level of male cricket

players. all these aspects affect the efficiency of lung capacity and physiological health of an individual. Healthy citizen makes mentally healthy society than this will lead to the society for the development.

In other way, different yogis start the principle of yoga that the blockage in the Pranic passage is known as disease so during the practice of yoga actually we are trying to clear the blockage which exist in the way of vital energy/prana. once a person clears the blockage he definitely get rid of disease. [7,8] “Pranayama induces calmness and tranquility in several ways it clears all the Pranic passage of any blockage, due to the presence of toxins- it equalizes the flow of prana in the ida and pingla network of nadis. it purifies the blood system of all toxins. the purifying action of hath yogic practices on the brain cells enhances the capacity of the brain centers, allowing them to function at their optimum capacity” [9,10]

So, it can be concluded as the practices of selective Hath yogic practices is calming down the body and enhancing the players vital capacity to perform as well.



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