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Effect of Bhastrika and Kapalbhathi on selected physiological variables among children of cricket academy: A comparative analysis

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Abstract

The present study aimed at comparing the effect of Bhastrika and Kapalbhathi Pranayama on selected Physiological Variables of cricket nursery children. The study was conducted on 21 male students aged ranges from 14-18 years of cricket academy of Gwalior (mean and SD of age respectively 20 ± 2 as the scores were normally distributed). The subjects were divided into 3 groups (two experimental and one control groups). The data were collected on the subjects on selected physiological variables before and after the training of pranayama of six weeks. The vital capacity, force vital capacity and breath holding capacity were measured by win spirometry and stopwatch. The tests were administered before pranayama training of Bhastrika and Kapalbhathi group separately and again tested after training of Pranayama from all the groups. The ANCOVA test was employed as statistical analysis to compare the mean at 5% level of significance. Finally, significant difference was shown vital capacity significantly higher in Bhastrika Pranayama group than the Kapalbhathi and control group. But force vital capacity and breath holding capacity have not shown any significant difference in both Bhastrika and Kapalbhathi groups than control group. It mean force vital capacity and breath holding capacity are not influenced by the six weeks practice of Bhastrika pranayama and Kapalbhathi Kaiya while Bhastrika practice involve the force full involvement and contribution of the respiratory muscles and tissue.

Keywords: Bhastrika pranayama, Kapalbhathi, vital capacity, pranayama

Introduction

In simple words related to the modern era yoga is an art of living. It is the technique to calculate the systematic parameter of your life with fully control. Yoga has been played an abundant role as therapy in the management of lifestyle diseases. Earlier it has been reported that yoga and slow pranayamic breathing are beneficial for the treatment of cardiopulmonary diseases, autonomic nervous system imbalances, and psychological or stress-related disorders as one of the best relaxation techniques.

Prana means breath and ayama is lengthening or widening through control. The agency of the breath was used to access the pranic field, to attain balance in the body by getting control over autonomic nervous system and control of the mind. Different types of pranayama techniques are adopted resulting different physiologic responses. Kapalbhathi pranayama was found to cause autonomic activation results in increased blood pressure and heart rate whereas nadi shodhana pranayama act as parasympathetic activation.

In Bhastrika pranayama, inhalation and exhalation are equal and are the result of systematic and equal lung movement. Most of the studies have shown the effect of different regular pranayama practices for a period a time (eg. 1 month, 2 month, 3 month) on both Bhastrika and Kapalbhathi pranayama and found significant effects on various psychological and physiological variables including cardio-respiratory parameter, blood glucose stress related parameters. But research scholar have gone through very few evidences on the comparative effect of Bhastrika and Kapalbhathi. In this present study comparative effect of Bhastrika pranayama and Kapalbhathi has been examined on physiological parameters and hypothesized that there would be significant difference between Bhastrika pranayama and Kapalbhathi.

Methods and Materials

Subjects: 21 Students were selected as subject for this study. The subjects were randomly selected on cricket players from Gwalior cricket Academy and randomly divided into 3 groups (7 each) two experimental and one control group.

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Variables and Design of the study

Recording were made on separately before and after the training from all the groups on selected physiological variables. The study was done on Vital Capacity, Breath Holding Capacity and Force vital capacity.

Training protocol

The subjects were given Bhastrika pranayama and Kapalbhathi to Experimental group 1 and 2 respectively five days in a week for 30 minutes for 6 weeks. The subjects were instructed to perform first from right nostril then left and from both the nostril progressively for Bhastrika and Kapalbhathi both the practices. The subjects were directed to sit in firm soft position with back straight and relaxed shoulder for the whole duration of the practice and performed Bhastrika and Kapalbhathi for first for 5 sets of 50 strokes with 10 seconds rest between each set with medium pace. No training was given to control group.

Test administration

The subjects were asked to sit in comfortable position at morning before cricket practice and Vital Capacity, Breath Holding Capacity and Force vital capacity were tested. Vital Capacity, Breath Holding Capacity and Force vital capacity were tested with the help of spirometer (win spirometry) and watch respectively. Vital capacity and force vital capacity were measured by win spirometer. It was measured in Lilter. Breath holding was measured manually by observing the breath using stop watch.

Statistical test

To determine the significant difference in means of vital capacity and breath holding capacity and force vital capacity between the control and experimental group ANCOVA test was employed at 5% level of significance as control and experimental group were tested pre and post training.

Results

Results shown that p- value related to *F* statistics of effect of training group. 207 is not significant ($p > 0.05$) that the there is no significant effect of pranayama training on Breath Holding Capacity. Significant ($p < 0.05$) effect was found between Bhastrika and kalpbhati on Vital Capacity. Table 5. Shows the pair-wise comparison of the mean of vital capacity between experimental, control groups as the treatment effect was significant. VC significantly increased in Bhastrika group than Kapalbhathi and control group. Vital capacity also increased significantly in Kapalbhathi group than control group. So, it can be said that Bhastrika pranayama has more effective in increasing the vital capacity than Kapalbhathi. No significant ($p > 0.05$) effect of pranayama training on Forced Vital Capacity. Descriptive statistics are shown in table 1, 3 and 5.

Table 1: Descriptive Statistics of Breath Holding Capacity

Treatment group	Mean	Std. Deviation	N
Kapalbhathi	47.4943	4.89328	7
Bhastrika	44.8971	4.76529	7
Control	45.0443	7.63694	7
Total	45.8119	5.74302	21

Table 2: ANCOVA table of between subject effects on breath holding capacity

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	573.522 ^a	3	191.174	37.736	.000
Intercept	6.429	1	6.429	1.269	.276
PRE_TEST	543.727	1	543.727	107.327	.000
GROUP	17.560	2	8.780	1.733	.207
Error	86.123	17	5.066		
Total	44732.988	21			
Corrected Total	659.645	20			

a. R Squared = .869 (Adjusted R Squared = .846)

Table 3: Descriptive Statistics of vital capacity

Treatment Group	Mean	Std. Deviation	N
KAPALBHATHI	2.4743	.25488	7
BHASTRIKA	2.6100	.24474	7
CONTROL	2.4629	.17670	7
Total	2.5157	.22697	21

Table 4: ANCOVA table of between subject effects on vital capacity

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1.017 ^a	3	.339	431.424	.000
Intercept	4.547E-005	1	4.547	.058	.813
Pretest	.923	1	.923	1174.894	.000
Group	.010	2	.005	6.074	.010
Error	.013	17	.001		
Total	133.935	21			
Corrected Total	1.030	20			

a. R Squared = .987 (Adjusted R Squared = .985)

Table 5: Descriptive Statistics of forced vital capacity

Treatment Group	Mean	Std. Deviation	N
Kapalbhathi	2.5729	.26986	7
Bhastrika	2.7100	.25891	7
Control	2.5957	.25928	7
Total	2.6262	.25672	21

Table 6: ANCOVA Table of between Subject Effect on forced vital capacity

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1.290 ^a	3	.430	263.682	.000
Intercept	.009	1	.009	5.543	.031
PRE_TEST	1.215	1	1.215	744.711	.000
GROUP	.010	2	.005	3.074	.073
Error	.028	17	.002		
Total	146.152	21			
Corrected Total	1.318	20			

a. R Squared = .979 (Adjusted R Squared = .975)

Discussion

Results shown that vital capacity significantly higher in Bhastrika Pranayama group than the Kapalbhathi and control group. That means the Bhastrika pranayama intervention was effective in increasing the vital capacity than Kapalbhathi and control group. This results may be influenced by the following fact that Bhastrika practice involve the force full involvement and contribution of the respiratory muscles and tissue.

But force vital capacity and breath holding capacity have not shown any significant difference in both Bhastrika and Kapalbhathi groups than control group it mean force vital capacity and breathe holding capacity are not influenced by the six weeks practice of Bhastrika pranayama and Kapalbhathi Kaiya.

But previous study shown The Percentage change in the Breath holding time in Young healthy study groups was found to be significantly. This indicates that there was a significant increase in Breath holding time after pranayama in young healthy subjects in study group for eight weeks as compared to that of control group (Manaspur S. *et al.* (2011) [6]. In compare to the above mentioned review the present study was held for six weeks which was no efficient time for the better result hence the result was not significant.

The Vital Capacity indicates of an individual maximum ability to exhale air followed by a forceful maximum inspiration. Pranayama a forcefully dynamic movement is involved, as a quick expansion and contraction of rib cage is done during Pranayama must have influence the dimension of thoracic cavity and hence for that reason a significant increase in vital capacity was observed after the experimental period of six weeks (Chowdhary B, 2019) [3].

According to different authors view Pranayama practices helps to enhancement of the FCV level of male cricket players. All these aspects affect the efficiency of lung capacity and physiological health of an individual. Bhastrika pranayama that found significant on forced vital capacity (Kumar A. *et al.* (2017) [5]. But due to irregularity of the subjects the results was not significant in this present study forced vital capacity and breathe holding capacity. The reason may be reason may be responsible due to COVID-19 pandemic the subjects were relatively irregular for the training sessions. The time period for the present study was less for the better results and due to irregular and less period of training session the results were ineffective. Also it could be stated that six weeks training was not sufficient for increasing the breath holding capacity and forced vital capacity. It may take more take training duration practice of pranayama for significant changes.

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