

Consequences of Resolute Suryanamaskar on Rational Breath Holding Ability of Swimmers

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ABSTRACT

The destination of the study was to regulate Consequences of resolute Suryanamaskar on rational Breath Holding ability of swimmers at Dr. B.R. Ambedkar International Aquatic Complex, Pirappancode, Thiruvananthapuram. The subjects for this study were selected from the Dr. B.R. Ambedkar International Aquatic Complex, Pirappancode, Thiruvananthapuram. A total of 20 male subjects were selected and used as one practice group. Resolute Suryanamaskar was considered the Independent Variable and Rational Breath Holding Capacity was considered the Dependent Variable. The test was for Rational Breath Holding Capacity. The Repeated Measures Design was used for this study. Only one group of 20 participants was created. Tests were administered in equal intervals of two weeks. The tests started four weeks prior to the Resolute Suryanamaskar (DSN) treatment and took place every two weeks thereafter, for a total of, three times. Tests took place every two weeks during the treatment and after the completion of the treatment, they were continued for the following four-week period. To determine the consequences of Resolute Suryanamaskar on physiological and anthropometric variables of selected Dr. B.R. Ambedkar International Aquatic Complex, Pirappancode, Thiruvananthapuram, one way ANOVA was used at .05 level of significance. In relation to Rational Breath Holding Capacity, a significant ($p < .05$) effect of Resolute Suryanamaskar was found.

Keywords: Suryanamaskar, Breath holding, Swimmers

INTRODUCTION

The rehearse of Suryanamaskar as a complete and perfect compounded blend of body movement, breathing and concentration is used in many Indian schools and ashrams since it was considered by the ancients of India to be a form of kriya (purification), or body oblation, which would give an abundance of health, vitality and spiritual upliftment (Bhattacharya, 2007; Douillard, 1994). The routine differs greatly with regards to the recommended pace of movement, number of repetitions, sequence of asanas and the emotional approach (whether ritual or physical exercise) (Kansal, 1996). In ritual form, the movements are accomplished very slowly with devotion and mantra repetition and the central pose is the Ashtanga Namaskar (Pattabhi Jois, 2005). The exercise version

requires a high number of repetitions, often more than 200, to be performed quickly, *i.e.* less than 20 seconds per round.

Some sources identified seventeen distinct Suryanamaskar routines while other sources mention even the number of forty. Over the years these sequences of asanas were renamed and now one can find such names as Chandra Namaskar, Guru Namaskar, etc. They differ with regards to the body movements used, but the main idea of the original Suryanamaskar remains intact (Patel, 2004; Satyananda, 2006).

Suryanamaskar (SN) is a yogic practice generally done at sunrise and usually consists of twelve asanas (postures) which are performed in a pre-established sequence. Each and every movement of the body should be coordinated with respiration (Christensen, 2000;

Freeman, 2007). The mind should be focused on the breathing process. The sequence of postures used for the experiment was the traditional style popularly called the Rishikesh series, based on the work of the Kaivalyadhama Institute (Lonavla) and the Bihar School of Yoga (Munger) (Gharote and Gharote, 1999; Gharote *et al.*, 2006; Gore, 1980; Bijlani *et al.*, 1995).

In addition to the above definition, Dynamic Suryanamaskar (DSN) requires that the speed of one round of Suryanamaskar is performed in 12 seconds, making approximately 40 rounds of Suryanamaskar. Usually during one session several hundred rounds are performed (Kansal, 1996).

Objective of the study:

The objective of the study was to determine the effects of Resolute Suryanamaskar on the rational Breath Holding Capacity of selected Dr. B.R. Ambedkar International Aquatic Complex, Pirappancode, Thiruvananthapuram.

METHODOLOGY

Subjects:

The subjects for this study were selected from the Dr. B.R. Ambedkar International Aquatic Complex, Pirappancode, Thiruvananthapuram. A total of 20 male subjects were selected and used as one practicing group.

Variables:

Resolute Suryanamaskar (sun salutations) was considered as Independent Variable and rational Breath Holding Capacity was considered as Dependent Variable.

Test for Rational Breath Holding Capacity:

Rational Breath Holding Capacity was measured during holding of the breath after full inhalation and the result was recorded in seconds. To measure the rational breath holding capacity, subjects were instructed to place the nose clip on tightly. They were asked to inhale through the mouth to maximum capacity. As soon as the subjects inhaled and closed the mouth, the stopwatch was started. As soon as the subject opened the mouth to exhale, the stopwatch was stopped and the time given by it was recorded in seconds as the score of rational breath holding capacity.

Experimental Design:

The Repeated Measures Design was used for this

study. Only one group of 20 participants was created. Tests were administered in equal intervals of two weeks. The tests started four weeks prior to the Resolute Suryanamaskar (RSN) treatment and took place every two weeks, for three times. Thereafter, tests took place every two weeks during the treatment and after the completion of the treatment, they were continued for the following four-week period.

Data	1	2	3	4	5	6	7	8
	Pre-Treatment		Treatment Starts		Treatment period		Post-Treatment	
Time (Weeks)	-4	-2	0	+2	+4	+6	+8	+10

Experimental treatment (Resolute Suryanamaskar (sun salutations) Practice):

All subjects were assembled at Shivaji Hall (gymnasium and a weight training hall) at Dr. B.R. Ambedkar International Aquatic Complex, Pirappancode, Thiruvananthapuram and were briefed on the general destination and requirements of Suryanamaskar practice (SN), as well as on the specific destination and requirements of the Resolute Suryanamaskar practice (RSN).

Subjects were administered the Resolute Suryanamaskar practice in addition to regular participation in all other activities as scheduled by Dr. B.R. Ambedkar International Aquatic Complex, Pirappancode, Thiruvananthapuram.

Resolute Suryanamaskar training was carried out for a period of six weeks, six times per week. The scheduled time of the practice lasted for 45 minutes between 6:30 a.m. and 7:15 a.m. Each and every practice period was concluded with five minutes of Shavasana (relaxation posture).

Each day of the first week, Resolute Suryanamaskar practice was demonstrated to the group by the research scholar and the most important points were reviewed several times. Afterwards, a review of the most important points and common mistakes was conducted once per week. Individual correction of Resolute Suryanamaskar practice was conducted every day on an ongoing basis. Additionally, a number of stretching exercises were taught in order to facilitate better and more accurate execution of the individual asanas which are part of the Resolute Suryanamaskar cycle.

Statistical analysis:

To regulate the effect of Resolute Suryanamaskar on rational breath holding ability variable of selected Dr. B.R. Ambedkar International Aquatic Complex, Pirappancode, Thiruvananthapuram, One Way ANOVA was used at .05 level of significance.

RESULTS AND DISCUSSION**Table 1 : Mean and Standard Deviation of Eight Different Trials in Rational Breath Holding Capacity**

Trail	Mean	Standard Deviation
1	58.8000	16.82604
2	58.8500	13.16405
3	54.7000	12.20052
4	63.9000	18.12500
5	69.6000	15.11848
6	70.4000	17.31261
7	74.2000	21.73428
8	69.7000	17.50218

From the Table 2 that the computed value of F in relation to the rational Breath Holding ability is greater than the required F (7,152) to be significant at the 0.05 level of significance. Since the F-value was found to be significant, the Least Significant Difference (L.S.D.) Post Hoc Test was applied for inter-group comparison.

Table 2 : Analysis of Variance of Rational Breath Holding Capacity in Eight Different

	Sum of Square	Df	Mean Square	F	Sig.
Between Groups	6812.194	7	973.171	3.474	.002
Within Groups	42574.750	152	280.097		

The mean difference is significant at the .05 level.

1. There is no significant difference between Trial 1 and Trial 3. This shows that no improvement took place in Rational Breath Holding ability before the start of the treatment. 1 and Trial 2, Trial 1 and Trial 3, and Trial 2

2. There is significant difference between Trial 3 and Trial 5 and Trial 3 and Trial 6. This shows that the treatment proved to be effective in the improvement of Rational Breath Holding ability.

3. There are no significant differences between Trial 3 and Trial 4, Trial 4 and Trial 5 and Trial 5 and Trial 6. This indicates that the short duration (two weeks) of the treatment does not result in any Rational Breath

Table 3 : Least Significant Difference Post Hoc Test for Comparison of the Means of the Trials of the Consequences of Resolute Surya namaskar on rational Breath Holding Capacity

Paired Means		Mean Difference (I-J)	Sig.
I	J		
Trial 1	Trial 2	-.05000	.992
	Trial 3	4.10000	.440
	Trial 4	-5.10000	.337
	Trial 5	-10.80000(*)	.043
	Trial 6	-11.60000(*)	.030
	Trial 7	-15.40000(*)	.004
	Trial 8	-10.90000(*)	.041
Trial 2	Trial 3	4.15000	.434
	Trial 4	-5.05000	.341
	Trial 5	-10.75000(*)	.044
	Trial 6	-11.55000(*)	.031
	Trial 7	-15.35000(*)	.004
	Trial 8	-10.85000(*)	.042
Trial 3	Trial 4	-9.20000	.084
	Trial 5	-14.90000(*)	.006
	Trial 6	-15.70000(*)	.003
	Trial 7	-19.50000(*)	.000
	Trial 8	-15.00000(*)	.005
Trial 4	Trial 5	-5.70000	.053
	Trial 6	-6.50000	.283
	Trial 7	-10.30000	.053
	Trial 8	-5.80000	.275
Trial 5	Trial 6	-.80000	.880
	Trial 7	-4.60000	.386
	Trial 8	-.10000	.985
Trial 6	Trial 7	-3.80000	.474
	Trial 8	.70000	.895
Trial 7	Trial 8	4.50000	.397

Holding ability effect.

4. There is significant difference between Trial 3 and Trial 5 and Trial 3 and Trial 6. This indicates that in the beginning at least two intervals (two weeks each) together are sufficient to bring change in Rational Breath Holding ability.

5. There are no significant differences between Trial 6 and Trial 7, Trial 7 and Trial 8 and between Trial 6 and Trial 8. This shows that there is no delayed effect after the completion of the treatment 3 (Table 3).

Discussion:

Joshi *et al.* (1992) and Makwana *et al.* (1988) have confirmed and summarized in their separate studies that the physiological changes associated with yoga training caused improvements in ventilatory functions of the lungs,

including a prolongation of breath holding ability. That finding along with the vital ability increase and differential chest circumference increase in statistically significant manner leads to the conclusion that yoga training has a strong effect on our respiratory system and ventilatory functions (Michelis, 2005; Sokal and Rohlf, 1995). This study supports the study conducted by Joshi *et al.* (1992) and Makwana *et al.* (1988) Negative breath holding capacity showed a significant increase in this study after the application of Resolute Suryanamaskar, The Post Hoc Least Significant Difference Test in relation to Rational breath holding capacity: shows that the short duration of only two weeks of the treatment was not effective enough to bring about any significant difference, while a significant difference was noted after at least four weeks of treatment (Mean Difference = -14,90 and -15,70). The study also shows there was no delayed effect after the end of the treatment.

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