

Effect of Suryanamaskar practice on speed of movement and vital capacity

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Abstract. The purpose of this study was to assess the effect of suryanamaskar practice on speed of movement and vital capacity. A group of 24 university girls (mean \pm SD: age 21.45 ± 1.55 years, height 1.67 ± 0.036 m, body mass 62.00 ± 3.39 kg) volunteered to participate in this study. They were randomly assigned into suryanamaskar (S) and control (C) groups, n = 12 each. The S group was subjected to 5 week practice consisting of 12 asanas; the control group participated in the routine yoga training. The 5 week suryanamaskar practice brought about significant improvements in speed of movement and vital capacity. None of the variable significantly improved in Group C. The suryanamaskar practice may be recommended to improve speed of movement and vital capacity and may contribute to enhance concentration based performance and voluntary control of breathing.

Key words: *Suryanamaskar, speed of movement, vital capacity.*

Introduction

Suryanamaskar relevance and versatility make it one of the most useful and complete methods to bring about health and vigour while at the same time preparing an adept for the deeper processes of yoga.

It is based on three elements: rhythm, energy and form. Form is evident in the twelve postures which are always performed in the same sequence (1). Yoga is believed to be 4000 to 8000 years old with its origins in the Indus valley civilization in the north-western part of India.

The word yoga, meaning “unity or oneness” was derived from the Sanskrit word “yuj” which means “to join”. Yoga was first mentioned in Rig Veda, the oldest sacred text of Brahmanism, which formed the basis of modern day Hinduism in approximately 1500 B.C.E. In the Upanishads (800-500 B.C.E.), yoga was thought of as a way of life that would allow an individual to achieve liberation from suffering (2).

With increasing scientific research in yoga, its therapeutic aspects are also being explored. Suryanamaskar – The salutation to the God Sun is also a part of Indian traditional yogic practices. Each cycle of suryanamaskar is a sequence of certain ‘asanas’ performed along with ‘pranayama’.

The sequence of asanas is such that each asana is complimentary to the next (3).

During Suryanamaskar, muscles of the entire body experience stretch and pressure alternately and therefore it is said to give more benefits with less expenditure of time (4). Through practicing various body postures (asana) and breathing techniques (pranayama), it is believed that one can obtain a sound physical body as well as a calm and peaceful mind.

Regular practice of a variety of yoga techniques have been shown to lower heart rate and blood pressure in various populations. In recent years, it has become more apparent that people need techniques to help them cope with the everyday stressors of modern life (5, 6, 7).

Since time is often seen as a limiting factor when exercising, a daily practice of suryanamaskar (salute to the sun) can be the perfect solution for time-challenged individuals. Surya Namaskara is a series of 12 physical postures made up of a variety of forward and backward bends.

The series of movements stretch the spinal column and upper and lower body through their full range of motion, massaging, toning and stimulating vital organs by alternately flexing the body forwards and backwards (2).

It builds upper body strength through the inherent weight bearing positions, especially in the arms and shoulders, throughout the series. The simulated push-up movement and upper body weight bearing positions in the series may help to develop muscular strength and endurance in the pectoral, triceps, as well as the muscles of the trunk. (8, 6). The series gives such a profound stretch to the body that it is considered to be a complete yoga practice by itself. Suryanamaskar has a deep effect in detoxifying the organs through oxygenation and has a deeper relaxing effect. It reduces stress, rejuvenates us and improves circulation (8).

It is claimed that suryanamaskar practice gives benefits of both- asana and pranayama and improves general health and fitness. Hence, the present study was undertaken to study effects of suryanamaskar practice on speed of movement and vital capacity.

Material and Methods

Subjects: The researcher utilized the experimental method on a sample of (24) university girls (Mean \pm SD: age 21.45 ± 1.55 years, height 1.67 ± 0.036 m, body mass 62.00 ± 3.39 kg). The study was approved by the ethics committee of Directorate of Sport in Guru Nanak Dev University, Amritsar, Punjab, India. All participants were informed about the study aim and methodology as well as about the possibility of immediate acceptance at any time of the experimentation. Subjects agreed to the above conditions in writing.

They were randomly assigned into suryanamaskar (S) and control (C) groups, $n = 12$ each. The S group was subjected to 5- week practice consisting of 12 asanas; the control group participated in the routine yoga training

Table I. Subjects' Demographics

Variable	Group	
	Training Group (N=12)	Control group (N=12)
	Mean \pm SD	Mean \pm SD
Age (years)	21.66 ± 1.77	21.25 ± 1.35
Body mass (kg)	62.25 ± 2.73	62.00 ± 4.06
Body height (m)	1.67 ± 0.042	1.67 ± 0.030

Methodology. The Nelson's speed of movement test was used to measure the combined reaction and movement speed of hands. The Nelson's test consists of stopping a rod-shaped timer upon a command. In the starting position, the palms are on the table 30 cm apart (Fig. 1A) and upon command

“ready” the subject claps hands gliding them on the table (Fig. 1B) thus stopping the timer. The procedure is repeated 20 times, 5 lowest and 5 highest results being discarded.

The reliability coefficient for university students was found to be 0.75.



Figure 1. Illustration of the Nelson's speed of movement test: A – Starting position; B – End position.

Vital capacity (VC) measured in liters by using spirometer. The subject was asked to breathe normally through the mouthpiece of spirometer. It was made sure that the nose clips were on.

Subjects filled their lung as much as possible. As soon as the subjects had their lungs fully inflated, they belled all the air out as fast as they can. The best of 3 vital capacity maneuvers were taken.

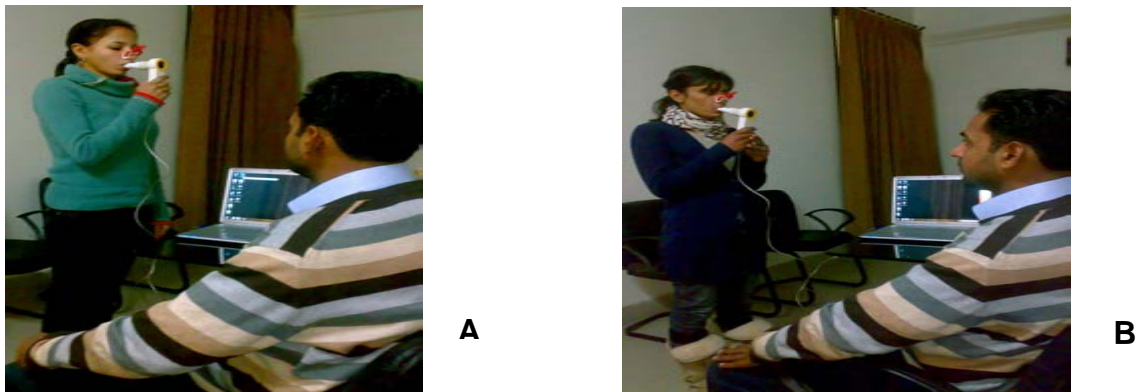


Figure 2. Illustration of the vital capacity of test: A – Starting position; B – End position.

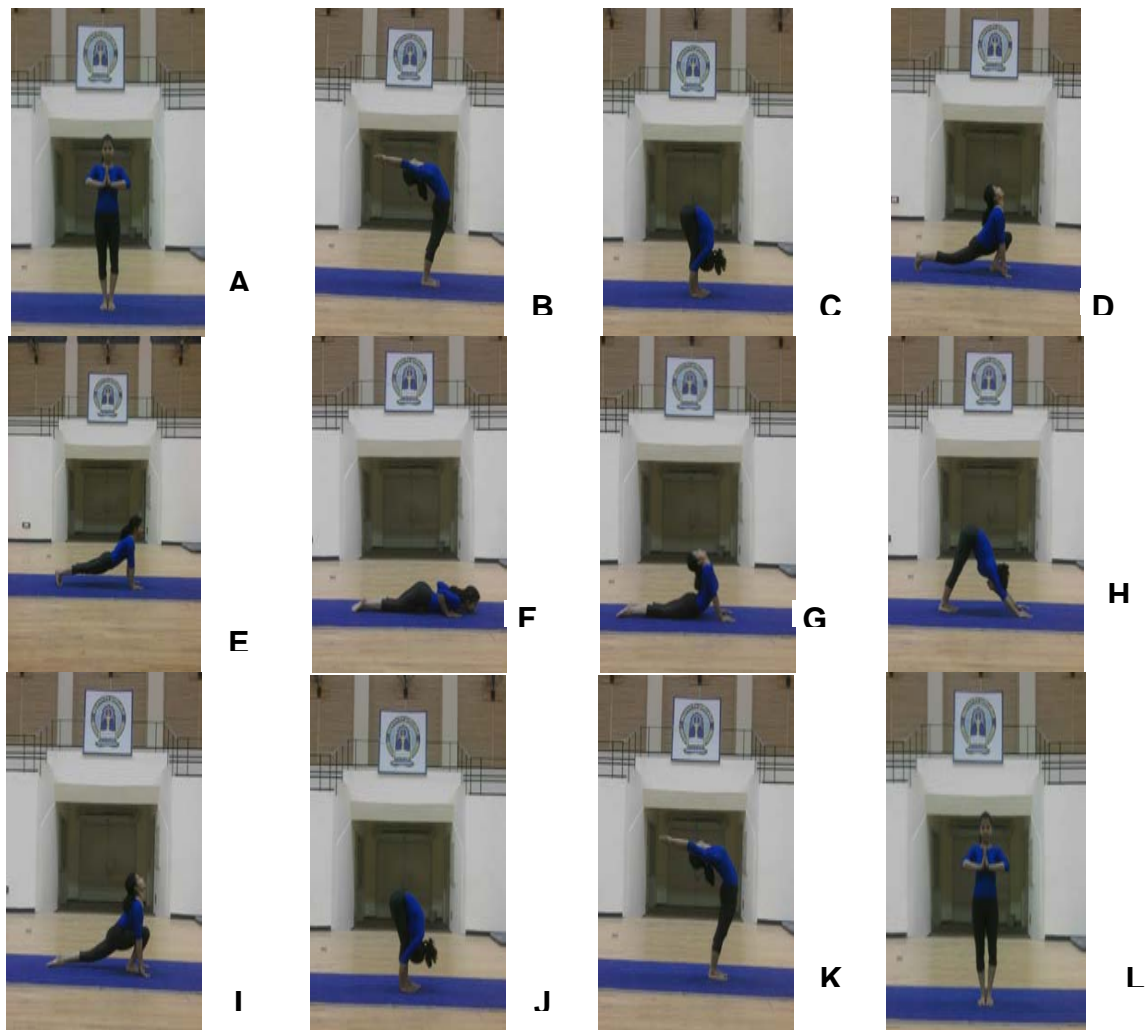


Figure 3. The 12 poses of suryanamaskar

Statistical Analysis. A Paired (samples) t-test was used in data analysis. The level of $p \leq 0.05$ was considered significant.

Results

The results of speed of movement and vital capacity tests in the suryanamaskar and control groups are presented in Table II.

Table II shows that the mean of speed of movement of pre-test and post-test of suryanamaskar group was 2.00 and 1.62 respectively, whereas the mean of pre-test and post-test of control group was 2.07 and 1.74. The t value in case of suryanamaskar was 3.545 and for control group it was 1.715. The critical value of t at 95% probability level in suryanamaskar group is much lower (1.761) than the observed value of t (3.545*).

Table II. Mean values (\pm SD) speed of movement and vital capacity in suryanamaskar and control groups (n = 12 each) before (pre) and after (post) 5 weeks of training

GROUP	VARIABLE	PRE-TEST	POST-TEST	T-VALUE	P-VALUE
	Speed of Movement				
Suryanamaskar Control		2.00 \pm 0.23	1.62 \pm 0.39	3.545*	P = 0.0032
		2.07 \pm 0.33	1.74 \pm 0.59	1.715	P = 0.1084
Suryanamaskar Control	Vital Capacity	3.29 \pm 0.27	3.56 \pm 0.31	2.918*	P = 0.0112
		3.30 \pm 0.24	3.38 \pm 0.43	0.618	P = 0.5468

The data does suggest that the differences between pre-test and post-test of speed of movement in suryanamaskar group are significant. The mean of vital capacity of pre-test and post-test of suryanamaskar group was 3.29 and 3.56 respectively, whereas the mean of pre-test and post-test of control group was 3.30 and 3.38. The t value in case of suryanamaskar was 2.918 and for control group it was 0.618. The critical value of t at 95% probability level in suryanamaskar group is much lower (1.761) than the observed value of t (2.918*). The data does suggest that the differences between pre-test and post-test of vital capacity in suryanamaskar group are significant.

Discussion Yoga asanas are psychophysical practices to culture body and mind. Physiological responses to physical training, including yoga, have been well studied by many investigators (10). Yoga, a method of learning that aims to attain the unity of mind, body, and spirit through exercise, breathing and meditation may be expected to positively influence many physiological functions including respiration and kinaesthetic perception (11-13). Suryanamaskar is a part of yogic practices and is believed to be an all-round exercise. Suryanamaskar is a series of twelve physical postures. These alternating backward and forward bending postures flex and stretch the spinal column through their

maximum range giving a profound stretch to the whole body. In this study, the 5-week of suryanamaskar practice showed significant improvement in speed of movement and vital capacity.

Our findings are supported by those of Anand Balayogi Bhavanani et al. who reported that suryanamaskar has positive physiological benefits as evidenced by changes in pulmonary function, respiratory pressures, handgrip strength and endurance, and resting cardiovascular parameters. In conclusion, the suryanamaskar practice may be recommended to improve speed of movement and vital capacity and may contribute to enhance concentration based performance and voluntary control of breathing.

Acknowledgements. Authors would like to thank department of Physical Education and Sports (AT) Guru Nanak Dev University, Amritsar (Punjab) for providing assistance in collecting the relevant information for undertaking quality research.

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Received: 01 April 2012

Accepted: 30 May 2012