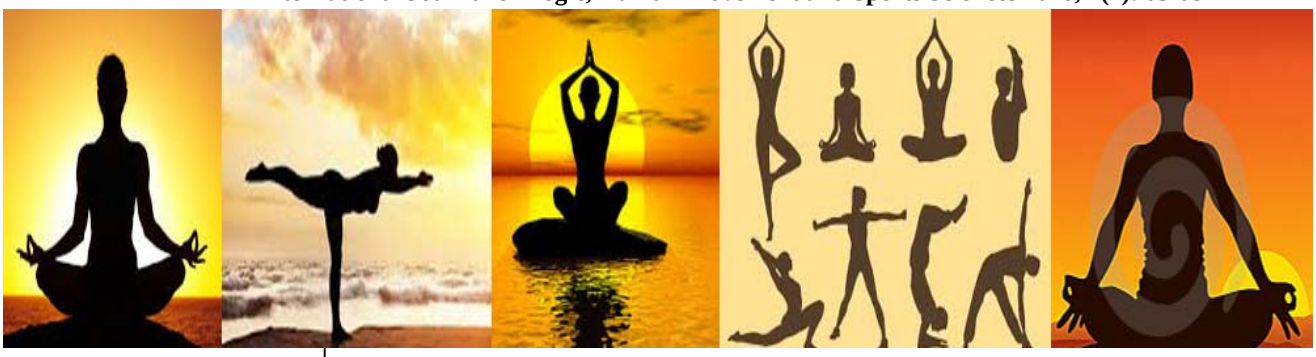
International Journal of Yogic, Human Movement and Sports Sciences 2016; 1(1): 05-08



ISSN: 2456-4419
Impact Factor: (RJIF): 5.18
Yoga 2016; 1(1): 05-08

www.theyogicjournal.com
Received: 02-05-2016
Accepted: 03-06-2016

Dr. AS Borman
Assistant Professor
Department of Physical Education Seva Bharati Mahavidyalaya, Kapgari Paschim Medinipur, West Bengal, India

Dr. Deba Prasad Sahu
Head, Dept. of Physical Education Mahishadal Girls' College, West Bengal, India

Dr. Binod Choudary
Head, Dept. of Physical Education Seva Bharati Mahavidyalaya, Kapgari Paschim Medinipur, West Bengal, India

Correspondence
Dr. AS Borman
Assistant Professor
Department of Physical Education Seva Bharati Mahavidyalaya, Kapgari Paschim Medinipur, West Bengal, India

Effect of yogic asana on hand grip strength in school boys

Dr. AS Borman, Dr. Deba Prasad Sahu and Dr. Binod Choudary

Abstract
Background: Evidence suggested that multiple intervention of yogic technique may improve physical fitness. But there was no such study on the effect of yogic asana alone and its impact on hand grip strength.
Aim: The aim of this study was to determine the effect of regular practice of yogic asana on hand grip strength.
Materials and Methods: Randomly chosen 15 residential male students (12 ± 1 years) were participated in this study. They regularly practiced only yogic asana for 1 to 1.5 hour per day, 6 days per week, for 4 weeks with a progressive load method. The hand grip strength was assessed by hand grip dynamometer (Grip Dynamometer, Takei Scientific Instrument Co. Ltd. Japan, Product Code T.K.K 540). In the present study the measurements were done at the baseline (before onset of training) and after 4 weeks of asana training. An independent t - test was done for analyzing the data. Simple percentage also calculated from the mean value to see the quantitative changes of the asana training.
Results: After 4 weeks, yoga group showed improvement in left hand grip strength (.063%) and in right hand grip strength (.061%) but not significantly.
Conclusion: Yogic asana alone may elicit a positive improvement in the hand grip strength.

Keywords: Yogic asana, hand grip, strength

Introduction
In hatha yogic culture we get a strong reference of asana to start the development of physical body and prepare oneself for higher yogic practices in future. There was strong evidence that multiple intervention of yoga such as yogic posture (asana) with breathing exercise (pranayama) and relaxation technique can improved physical fitness components. An increase in motor speed for repetitive finger movements following yoga training is reported [1]. A significant improvement in performance in a mirror tracing task at the end of a one month training programme that means hand eye coordination and concentration is developed [2]. Balance and agility increased significantly after yogic training is also reported [3]. For young adults, a short term yoga programme can improve balance substantially [4]. Yoga education has a positive effect on general health perception and balance [5]. But there is no study on yogic posture (asana) alone and its impact on hand grip strength. With this background, the aim of the present study was to determine whether the regular practice of yogic posture alone can improve hand grip strength.

Methods:
Subjects: On the basis of all the available literature the researcher selected school going children as the population of the present study. To avoid the physiological difference the researcher eliminated girl students from this study. Due to the academic pressure of class IX & X only the VI, VII and VIII classes' male students were selected as subject for this study. Fifteen residential male students of Daranda Chandi Mata Vidyalaya, Bolpur, West Bengal, India were participated in this study. They were not acquainted with any yogic programme before. Ethical guidelines were followed in this research; individual's subject consent and permission from school authority (headmaster and hostel super) were taken accordingly. On the basis of inclusion and exclusion criteria total 15 subjects were selected randomly for this study. The mean age of the subject was 12 ± 1 years.

Design of the study: This is an experimental, prospective randomized control trial study. In this study only one group namely yogic asana group (experimental) were participated and they stayed in the school hostel and their diet pattern, life style were not different in nature. Before introducing of yogic asana training initial data (baseline) was recorded. After completion of 4 weeks of regular asana practice (6 days / week) again post test measurement was done.

Training protocol: The experimental group had an hour practice of surya namaskar and 16 yogic asana (posture) in the initial day but the total time was increased up to 1.5 hour gradually by increasing repetitions and duration (time) of the yogic asanas (posture) in a progressive load method after completion of every week. They practice 6 days per week (Sunday closed) for total 4 weeks in the common room of the school hostel. Suryanamaskar, Utthita padmasana, salvasana, utkatasana, baisistasana, janu sirsasana, ardha chakrasana, dandasana, dhanurasana, padahastasana, mayurasana, ardha matsyendrasana, virabhadrasana, vajrasana, natarajasana, and savasana were practiced with maintaining an order, duration and intensity. (Table no.1A and 1B).

Assessment criteria: Strength is the ability to overcome resistance or to act against resistance (Hardayal Singh, 1991). Maximal contraction power of the muscles is known as muscular strength. The muscular strength is usually measured with respect to individual group of muscles acting together. Muscular strength is tested with the help of dynamometers and/or tension-meters which measure the amount of force exerted in a single effort by a particular group of muscles. The reliable and valid evaluation of hand strength provides an objective index of general upper body strength. The power grip is the result of forceful flexion of all fingers joint with the maximum voluntary force that the subject is able to exert under normal bio-kinetic conditions. The synergistic action of flexor and extensor muscles and the interplay of muscle group is an important factor in the strength of resulting grip. Many factors influences the strength of the grip, including muscles strength, hand dominance, fatigue, time of day, age, nutritional status, restricted motion and pain.

Test: Muscular strength (Roger's strength test item)

Purpose: To measure grip strength of left and right hand.

Facilities and equipments: Hand grip dynamometer (Grip Dynamometer, Takei Scientific Instruments Co. Ltd. Japan, Product Code T.K.K 540) and chalk powder.

Procedure

(i) Researcher illustrated the use of the instrument to the participant prior to testing.
(ii) The participants should be in a standing position, arms at their side, not touching their body, keep elbow bent slightly. Administer the test on the dominant and non dominant hand. The subject to be the tested holds the dynamometer in the hand to be tested, with the arm at right angles and the elbow by the side of the body. The handle of the dynamometer is adjusted if required the base should rest on first metacarpal (heel of the palm) while the handle should rest on the middle of four fingers. The subject squeezes the dynamometer with maximum isometric effort which is maintained for about five seconds. No other body movements allowed.
(iii) Ask the participants to squeeze the dynamometer with as much force as possible, being careful to squeeze only once for each measurement.
(iv) Three trials should be made with a pause of about 10 - 20 seconds between each trail to avoid the effect of muscle fatigue.
(v) Recorded the result of each trail to be nearest kilogram. If the difference in the score was within 3 kilograms the test was complete. If difference between two measures was more than 3 kilograms then repeated the test once more after a rest period. Use the best 3 measurements (i.e. the highest three) in data report and mean of the 3 measurements recorded. (Picture no. 1)

Instructions: 1. Before griping the handle of dynamometer should use chalk powder as necessary otherwise it may slip. 2. Do not squeeze with support of any other body parts.

Picture no. 1: Hand grip strength measurement instrument.

Scoring: Six trails for left hand grip strength were recorded and best three were taken and average of those was the final score. For right hand grip strength same procedure has been done.

Testing personnel: Researcher conducting the test and one assistant recorded it. (Nelson and Johnson, 1982)

Statistical analysis: Independent t - test was done for analyzing data. Simple percentage was also calculated from the mean value to see the quantitative changes in variables. Level of significance at .05 was determined.

Results: Yoga group showed a significant improvement after 4 weeks yogic posture practice in strength ($p<0.05$). (Figure no.- 1 and table no.-1)

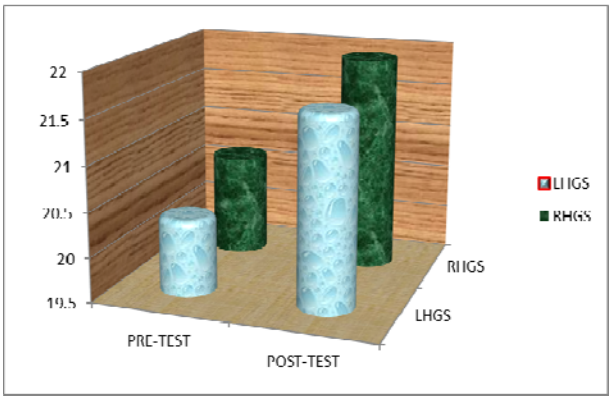


Fig 1: Mean of Left Hand Grip Strength and Right Hand Grip Strength

Table 1: Mean and Standard Deviation

Variables	Pre - Test	Post - Post	T - Value
Left Hand Grip Strength	20.35 ± 7.0877	21.64 ± 6.8392	0.4541
Right Hand Grip Strength	20.64 ± 7.6459	21.91 ± 7.6707	0.5073

Discussion: In this study, 4 weeks practice of yogic posture significantly improved left and right hand grip strength. We did not found any study that analyzed the effect of only yogic

posture on grip strength. Most of the studies combined with other yogic technique (pranayama, meditation etc.) and exercise. This may be the first time randomized trial on effect of yogic posture on health related physical fitness. The metabolic cost of hatha yoga was reported 2-4 k.cal./minutes. Energy expenditure of asana was 1003 k.cal./week (450minutes/week) was reported. In the present study, first week subjects practice 36 minutes/week (60 minutes × 6 days) and energy expenditure was 302 k.cal./week and in the final week the expenditure was increased up to 1204.2 k.cal/week (540 minutes/ week) as calculated on the basis of previous report[30]. . Scientist have shown that yoga training (multiple intervention) improves the cardiac recovery index, cardiovascular endurance and anaerobic power and decreased blood pressure either at rest or during exercise. Some multidisciplinary studies reported increased vo2 max. Yoga in long duration affect hypothalamus and beings about decrease in the systolic and diastolic blood pressure through its influence on vasomotor centre, which leads to reduction in sympathetic tone and peripheral resistance. Reports suggested that yoga reduces sympathetic tone, increases parasympathetic tone and improves cardio vegal function. Hemodynamic effect of yoga training was to increase the stroke volume through the arterial baroreflex mechanism. Yoga training improves thermoregulatory efficiency, respiratory muscle's strength and endurance. Suryanamaskar(Combination of 12 asana) is increased vegal tone (40) reduces basal metabolic rate and resting O2 consumption. Also there are some reports suryanamaskar increase vo2 max due to reduction of O2 consumption in resting condition and greater utilization at cellular level and improves cardio pulmonary efficiency in healthy adolescence. In our study we have followed a progressive training load method (Singh, 1991) which is very effective for general fitness and sports performance development. The intensity (time) and repetition of asana gradually increased up to 4 weeks. The researchers could not find any study which scientifically applying progressive training load for the improvement of physical fitness through yogic asana. From the present study, it may be concluded that yogic asana alone bring a positive improvement in the hand grip strength.

Conclusion: From the present study, it may be concluded that yogic asana may bring a positive improvement in the hand grip strength.

References

1. Bhutkar Pratima M *et al.* Effect of Suryanamaskar Practice on Cardio-respiratory Fitness Parameters: A Pilot Study. Al Ameen J Med Sci. 2008; 1 (2): 126-129.
2. Madanmohan *et al.* Effect of six weeks yoga training on weight loss following step test, respiratory pressures, handgrip strength and handgrip endurance in young healthy subjects. Indian J Physiol Pharmacol. 2008; 52(2):164-170.
3. Telles Shirley, Dash Manoj, Naveen K.V. Effect of yoga on musculoskeletal discomfort and motor functions in professional computer users. Work. 2009; 33:297-306.
4. Telles Shirley *et al.* An evaluation of the ability to voluntarily reduce the heart rate after a month of yoga practice. Integrative Physiological and Behavioral science. 2004; 39(2):119-125.
5. Raghuraj P, Telles Shirley. Muscle power, dexterity skill and visual perception in community home girls trained in yoga or sports and in regular school girls. Indian J Physiol Pharmacol. 1997; 41(4):409-415.
6. Gail A *et al.* Yoga for women with hyperkyphosis: Results of a Pilot Study. American journal of Public Health, October, 2002, 92(10).
7. Ades Philip A *et al*. Resistance training increases total daily energy expenditure in disabled older women with coronary heart disease. J Appl Physiol. Dec. 2004; 98:1280-1285.
8. Chaya MS *et al.* The effect of long term combined yoga practice on the basal metabolic rate of healthy adults. BMC Complementary and Alternative Medicine. 2006; 6:28.
9. Puymbroeck PV, Payne LL, Hsieh PC. A Phase I Feasibility Study of Yoga on the Physical Health and Coping of Informal Caregivers, *eCAM*, 2007: 4(4)519-529.
10. Hagins M, Moore W, Rundle A. Does practicing hatha yoga satisfy recommendations for intensity of physical activity which improves and maintains health and cardiovascular fitness? BMC Complementary and alternative Medicine. 2007; 7:40.
11. Elavsky Steriani, McAuley Edward. Personality, Menopausal Symptoms, and Physical Activity Outcomes in Middle-Aged Women, Pers Individ Dif. 2009; 46(2):123-128.
12. Jimenez AR *et al*. Cardiovascular and metabolic effects of intensive Hatha Yoga training in middle-aged and older women from northern Mexico, International Journal of Yoga, 2009, 2.
13. Tuzun S *et al.* Yoga might be an alternative training for the quality of life and balance in postmenopausal osteoporosis, EUR J Phys Rehabil Med. 2010; 46:69-72.
14. Dash M, Telles S. Improvement in hand grip strength in normal volunteers and rheumatoid arthritis in patients following yoga training, Indian Journal of Physiology and Pharmacology. 2001; 45(3):355-560.
15. Modanmohan *et al.* Modulation of Cardiovascular Response to Exercise by Yoga Training, Indian j Physiol Pharmacol. 2004, 48(4):461-465.
16. Sinha B *et al.* Energy cost and cardiorespiratory changes during the practice of suriya namaskar, Indian J Physiol Pharmacol. 2004: 18(2):184-190.
17. Bharshankar JR *et al.* Effect of yoga on cardiovascular system in subjects above 40 years, Indian j Physiol Pharmacol. 2003; 47(2):202-206.
18. Vijayalakshmi P *et al.* Modulation of stress induced by isometric handgrip test in hypertensive patients following yogic relaxation training, Indian J Physiol Pharmacol. 2004; 48(1):59-64.
19. Godoy DV *et al.* Yoga versus aerobic activity: effects on spirometry results and maximal inspiratory pressure, J. bras. Pneumol. Sao Paulo Mar./ apr. 2006, 32(2).
20. Madanmohan *et al.* Effect of six weeks of shavasan training on spectral measures of short-term heart rate variability in young healthy volunteers, Indian J Physiol Pharmacol. 2004; 48(3):370-373.
21. Khattab Kerstin *et al.* Iyengar Yoga Increases Cardiac Parasympathetic Nervous Modulation among Healthy Yoga Practitioners, *eCAM* 2007; 4(4)511-517.
22. Flegal KE *et al.* Adherence to yoga and exercise interventions in a 6- month clinical trail, BMC Complementary and Alterative Medicine. 2007; 7:37.
23. Telles Shirley *et al.* Effect of one month yoga training program on performance in a mirror-tracing task, Indian J Physiol Pharmacol. 2006; 50(2):187-190.

24. Prakash Shivesh, Meshram Sushant, Ramtekkar Ujjwal, Athletes, yogis and individuals with sedentary lifestyles; Do their lung functions differ? Indian J Physiol Pharmacol. 2007; 51(1):76-80.
25. Kulkarni DD, Bera TK. Yogic exercises and health- a psycho-neuro immunological approach, Indian J Physiol Pharmacol. 2009; 53(1):3-15.
26. Siri WL. Gross Composition of the Body, Advances in Biological and Medical Physica, (J.H. Lawrence and C.A. Tobias, eds.), New York; Academic Press, 1956.
27. Sloan AW. Estimation of Body Fat in Young Men, Journal of Applied Physilogy. 1967; 23:311-315.
28. Jhonson BL, Nelson JK. Practical Measurement for Evaluation in Physical Education. 3rd Ed., Surjeet Publications, Delhi, 1982.
29. Kansal DK. Test and Measurement in sports and Physical Education, 1st Ed., D.V.S. Publications, Kalkaji, New Delhi-110019, 1996.
30. Barrow HM, McGee R. A Practical Approach to Measurement in Physical Education, 3rd Ed, Lea and Febiger, Philadelphia, U.S.A., 1979.