

## Effects of selected meditative *asanas* on kinaesthetic perception and speed of movement

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### Summary

*Study aim:* To assess the effects of selected meditative *asanas* on kinesthetic perception and movement speed.

*Material and methods:* Thirty randomly selected male students aged 18 – 24 years volunteered to participate in the study. They were randomly assigned into two groups: A (meditative) and B (control). The Nelson's movement speed and reaction test and horizontal space test (to assess the kinaesthetic ability to determine specific positions along the horizontal line) were applied. The subjects from Group A were subjected to 8-week training of meditative *asanas* which included *Padmasana*, *Siddhasana*, *Sukhasana*, *Vajrasana* and *Ushtrasana*.

*Results:* The kinaesthetic perception and movement speed significantly ( $p < 0.001$ ) improved (by nearly 10%) in Group A compared with the control one.

*Conclusions:* Training *asanas* may be recommended to improve concentration-based performance.

**Key words:** Asanas – Meditation – Kinaesthetic perception – Movement speed

### Introduction

The Innumerable Postures in yoga (*Asanas*), as referred by Goraksa Nath in 10th century, are positions which are held still and last from a few seconds to a few hours. The *asanas* (physical positions) can be progressively achieved or mastered in 4 levels which involve stability; the next level is to feel comfort in that position. After having attained steadiness and comfort, the muscles are progressively relaxed and, finally, the mind can be easily focused on the object of meditation and higher stages of experience can be realised. Three types of *asanas* are discerned: the meditative, relaxing and cultural postures. The meditative postures are ordinarily used for the practice of meditation and *pranayama*. The yogi aims at holding the meditative *asana* for long periods of time (up to several hours) to enable prolonged sessions of *pranayama* and meditation in perfect stillness and comfort. Eventually the yogi transcends the *asana*, not feeling his body, and focusing on the inner, subtle aspects of the practices. Meditative *asanas* are cross-legged, stable sitting postures enabling meditation, aiming at training the body in keeping motionless. Certain yoga *asanas*, if practiced regularly, are known to have beneficial effects on

human body. These yoga practices might be interacting with various somatic and neuro-endocrine mechanisms bringing about therapeutic effects [8].

The overall performance is known to be improved by practicing yoga techniques [12] and their effects on physical functions were reported [4]. Yoga practices can also be used as psycho-physiological stimuli to increase the secretion of melatonin which, in turn, might be responsible for perceived well-being [6]. Meditative *asanas* are used to stabilise the body for advanced practices of *pranayama* and meditation, but with the phenomenal and ever increasing popularity of meditative *asanas* in the past few years there is a surprising lack of research on this particular discipline. This prompted us to undertake this study with the aim to assess the effects of selected meditative *asanas* on kinaesthetic perception and speed of movement of hands.

### Material and Methods

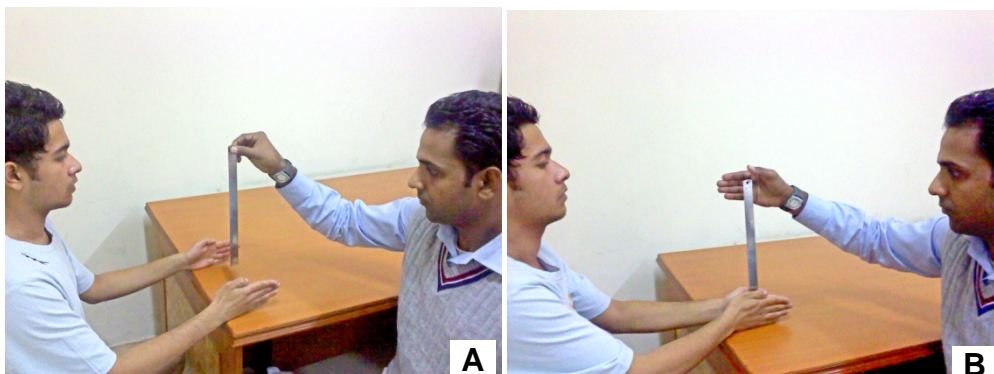
*Subjects:* Thirty randomly selected male students of the D.A.V. Institute of Engineering and Technology in Jalandhar (Punjab, India), aged 18 – 24 years, volunteered to participate in the study. They were randomly

assigned into two groups: A (experimental) and B (control). The subjects from Group A were subjected to an 8-week meditative *asanas* training programme. This lasted 8 weeks and consisted of daily sessions, lasting 90 min each, which included 5 positions: *Padmasana*, *Siddhasana*, *Sukhasana*, *Vajrasana* and *Ushtrasana* (Fig. 2).

**Methodology:** The Nelson's speed of movement test [1] was used to measure the combined reaction and movement speed of hands. The horizontal space test [2]

was used to measure the kinaesthetic ability to determine specific positions along horizontal line.

The Nelson's test consists of stopping a rod-shaped timer upon a command. In the starting position, the hands 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 college students was found to be 0.75.



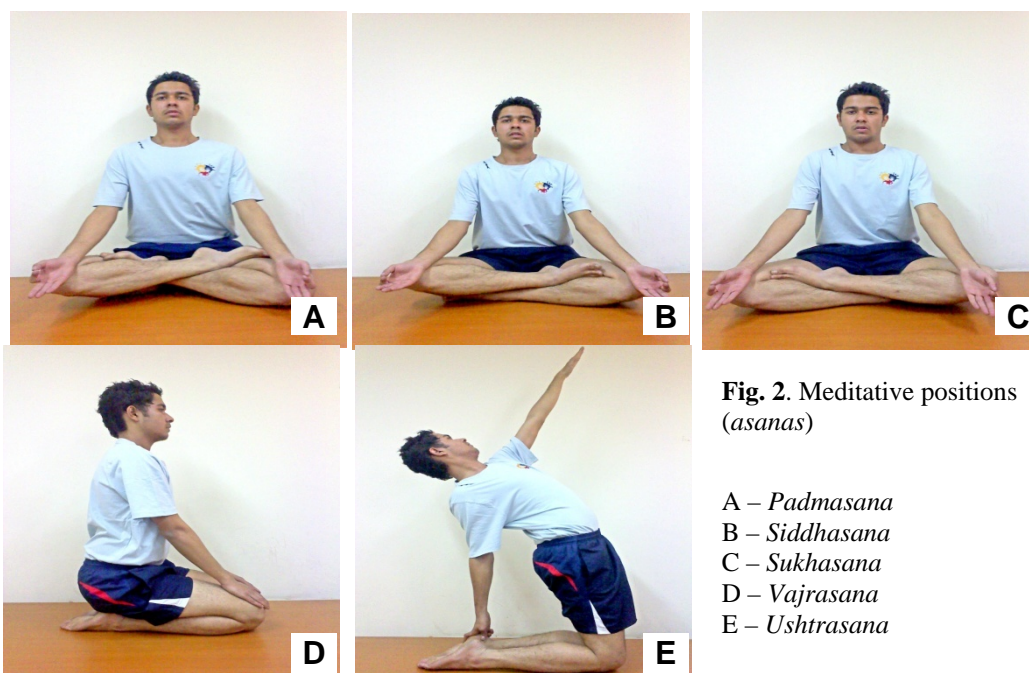
**Fig. 1.** Illustration of the Nelson's speed of movement test: A – Starting position; B – End position

The horizontal space test consists of touching, blindfolded, a point, told by the instructor, on the yardstick fixed horizontally at the eye level, after having seen and memorised its position. Three attempts are made, mean value of the deviations (in cm) being the test result.

The meditative group was subjected to 8-week training in meditative postures (*asanas*) consisting of daily

sessions lasting 90 min each. The *asanas* included the following positions: *Padmasana*, *Siddhasana*, *Sukhasana*, *Vajrasana* and *Ushtrasana* (Fig. 2).

The between-group differences were assessed using the Student's *t*-test for dependent data [13]. The level of  $p \leq 0.05$  was considered significant.



**Fig. 2.** Meditative positions (*asanas*)

- A – *Padmasana*
- B – *Siddhasana*
- C – *Sukhasana*
- D – *Vajrasana*
- E – *Ushtrasana*

## Results

The results of kinaesthetic perception and speed of movement tests in the meditative and control groups are presented in Table 1. Significant ( $p < 0.001$ ) improvements by nearly 10% in both tests were noted in the meditative group subjected to 8-week training in *asanas*. No significant changes over that 8-week period were noted in the control group, not subjected to any training.

**Table 1.** Mean values ( $\pm$ SD) of kinaesthetic perception and speed of movement tests in meditative and control groups ( $n = 15$  each) before (Pre) and after (Post) 8 weeks of training *asanas* (meditative group only)

Group	Pre	Post
Kinaesthetic perception		
Meditative	1.97 $\pm$ 0.27	1.78 $\pm$ 0.14***
Control	1.84 $\pm$ 0.34	1.81 $\pm$ 0.34
Speed of movement		
Meditative	8.84 $\pm$ 0.46	9.70 $\pm$ 0.38***
Control	8.72 $\pm$ 0.51	8.77 $\pm$ 0.53

\*\*\* Significantly ( $p < 0.001$ ) different from the respective 'Pre' value

## Discussion

Yoga *asanas* are psychophysical practices to culture body and mind. Yoga practices are known to significantly improve health status, and reduce stress and anxiety [5]. Meditative *asanas* or poses establish such physiological conditions in the body that the mind ceases to be disturbed by any stimuli received from the body and selectively increases the respiratory sensation [14]. Meditative *asanas* also help balancing and harmonising the basic structure of the human mind, which makes them therapeutically useful. Yoga training increases the frequency and duration of inhibitory neural impulses by activating pulmonary stretch receptors during the above-tidal volume inhalation which bring about withdrawal of the sympathetic tone in skeletal muscle blood vessels [9]. Madanmohan *et al.* [11] reported a significant increase in maximal work output and a significant increase in oxygen consumption per unit work after yoga training.

In this study, the 8-week of meditative *asanas* training programme showed significant improvement in kinaesthetic perception and speed of movement. These findings are supported by other reports. Telles *et al.* [10] reported that after only 10 days of practicing *asanas* significantly improved static motor performance (eye-hand co-ordination). Hatha-yoga exercises provided regular functioning of principal bodily functions

thus fostering a psychophysical balance; moreover, transcendental meditation increased aerobic metabolism, counteracting anaerobic metabolism which was related to mental distress [7]. Yoga *asanas* were also shown to improve flexibility and health perception [3].

Summing up, the 8-week training programme of meditative *asanas* had significant effect on kinaesthetic perception and speed of movement. Thus, such meditative training may be recommended to improve concentration-based performance.

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