



RESEARCH ARTICLE

SINGLE BOUT ENDURANCE EXERCISE ON PERCEPTION

*Aminul Hoque and Samiran Mondal

Exercise and Sports Physiology Laboratory, Department of Physical Education,
Visva-Bharati University, Santiniketan-731235, West Bengal, India

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ABSTRACT

Background: Perception is a process of recognizing and interpreting environmental event. It is very important in many professions. Scientists are suggested regular participation in endurance exercise may improve perception. But the data of single bout endurance exercise effect on perception is very limited.

Aim: The aim of this study was to find out effect of single bout endurance exercise on perception.

Methods: Seven healthy male willing students (aged between 21-23 years) from APC College, Newbarrackpore, West Bengal were selected as the subject for this study. Depth perception was measured with Howard –Dolman Apparatus and Visual perception was measured with Muller-Lyer Apparatus. The average of 5 trials of each test was used for analysis. Ten minutes slow continuous running was conducted as a single bout endurance exercise intervention for this study. The data was recorded prior to pre and after post exercise.

Results: Depth perception score of pre and post exercise recording was 3.88 ± 0.32 mm and 3.24 ± 0.18 mm respectively, and the percentage of reduction was 16.34%. In visual perception subjective reading assessment, pre and post exercise recording was 14.10 ± 0.90 cm and 14.08 ± 0.33 cm, and the percentage of change was ignorable (0.20%). In degree of illusion (dI) assessment of visual perception, pre and post exercise recording was 1.89 ± 0.91 cm and 1.92 ± 0.33 cm and the percentage of increase was negligible 1.21%.

Interpretation: Reduction in depth perception score (improvement) may be due to the single bout endurance exercise effect on information processing, neurotransmitter function, and allocation of attention and memory. Whereas, no visual perception changes may be due to the less impact on retinal and cortical factors.

Conclusions: Acute endurance exercise plays an important role in improving depth perception and has potential applications especially in those occupations and performance requiring good depth perceptual sensitivity, judgment of distance and direction.

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INTRODUCTION

Maintenance of brain health throughout the life should be an important public health goal. Perception is an important aspect of brain function. Perception can be explained in various ways like depth perception and visual perception, etc. Depth perception is an ability to judge the direction and distance of an object related to oneself. This process of reacting quickly and accurately requires knowledge where the object is located in three dimension space. Whereas, visual perception describes the relationship between visual processing and encoding and retrieval of the resulting neuronal representations. All the sensory information goes inside the central nervous system and

*Corresponding author: Aminul Hoque,
Exercise and Sports Physiology Laboratory, Department of Physical
Education, Visva-Bharati University, Santiniketan-731235, West
Bengal, India.

reaches to the sensory cortex. From there the elimination, processing of thought and sharing the information with the other related areas, then the ultimate order comes from frontal cortex, reach to the motor cortex and one responds in his own style. All these internal mechanism are involved in the perception. Perception is essential to carry out diverse daily activities and specially sports performance. Brain activity has been proposed to be important in examining perceptual response to acute bouts of exercise (Nybo and Nielson 2001; Petruzzello *et al.*, 2006). Attempts have been made by many authors to find out the influence of yoga on sensory perception (Telles 2005; Manjunath 1999; Raghuraj 1997). Many researches on meditation and perception were also conducted (Brown 1977; Brown and Engler 1980; Brown, Forte and Dysart 1984). It has also been shown that processing of sensory information at the thalamic level is facilitated during the practice of pranayama (Telles 1992). Influenced with all above the study, the present research group was keen to find out the

relationship between single bout exercise with perception. Thus the purpose of this study was to observe effect of single bout endurance on perception.

MATERIALS AND METHODS

Subjects

After screening, total seven (N=7) college level male students (aged between 21-23 years) from (APC) College, New Barrackpore, Kolakta-131, West Bengal were participated in this study.

Study Location

This study was conducted in APC college area, NewBarrackpore. Kolkata-131, West Bengal, India. Data was recorded at APC College Physical Education Department and exercise sessions (endurance exercise) were conducted at the college ground.

Exercise Protocol

For this study single bout endurance exercise was selected. In exercise session, initial five minutes during which participants actively warmed up by performing slow jogging, jumping, stretching and rotational exercises. Then the subjects started ten minutes continuous running with moderate intensity

Variable Measured

Depth Perception

Howard- Dolman apparatus was used for measuring depth perception performance of the subjects. This apparatus was designed and manufactured by Anand Agency, 1433/A, Shukrawar Peth, Pune-411002, Maharashtra, India. In this test, participants were asked to adjust the central moveable rod accurately between the two stationary rods on either side by viewing the rods through an aperture (4.0cm×8.1cm).

Scoring

The distance between two rods was measured in millimeter (mm). The average of 5 values was used for analysis.

Visual Perception

Muller –Lyer apparatus was used for measuring visual perception performance of the subjects. This apparatus was designed, manufactured and supplied by the Anand Agency1433/A, Shukrawar Peth, Pune-411002, Maharashtra, India. The Muller-Lyer lines are used to assess geometric optical illusion. The Muller Lyer Lines are of equal length, appear as unequal by the two different types of arrows drawn at both ends of the line: close-ended arrows making an acute angle or open-ended arrows making obtuse angle with the shaft. One line is fixed with close ended arrows at either end giving it an illusory shorter appearance. In contrast, the length of the line on the other side could be varied. The line which has open-ended arrows at either end appears as longer lines.

Scoring

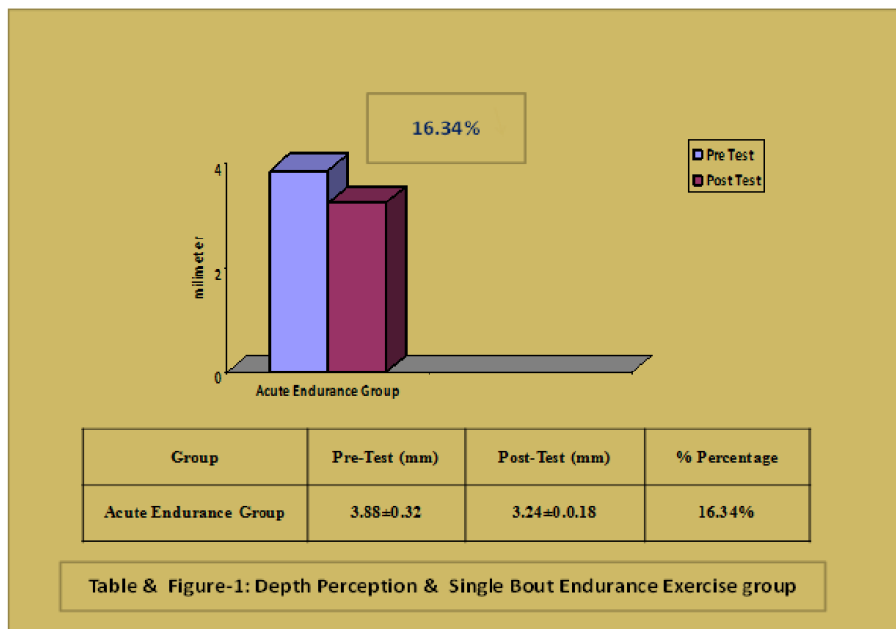
The exact position at which the subject perceives, recorded as subjective reading (SR). The difference between the subjective reading and the reading at which the line are actually of equal length will be recorded as the degree of illusion (dI).Each subject was assessed with 5 trials and average of 5 values was used for analysis.

Statistical Analysis

In the present study the mean and standard deviation (SD) was used for data analysis and then percentage (%) was calculated from the mean value to see the quantitative changes after exercise effect.

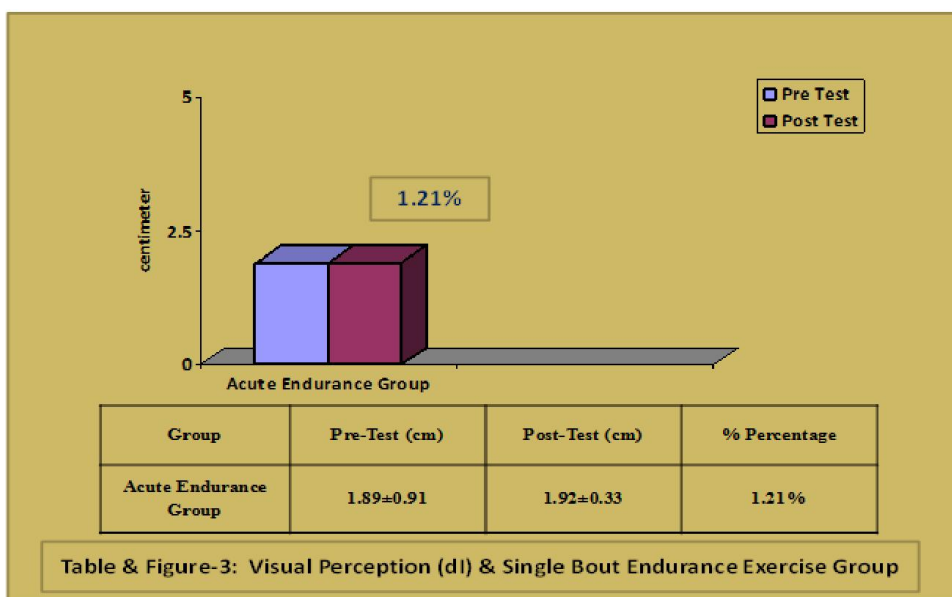
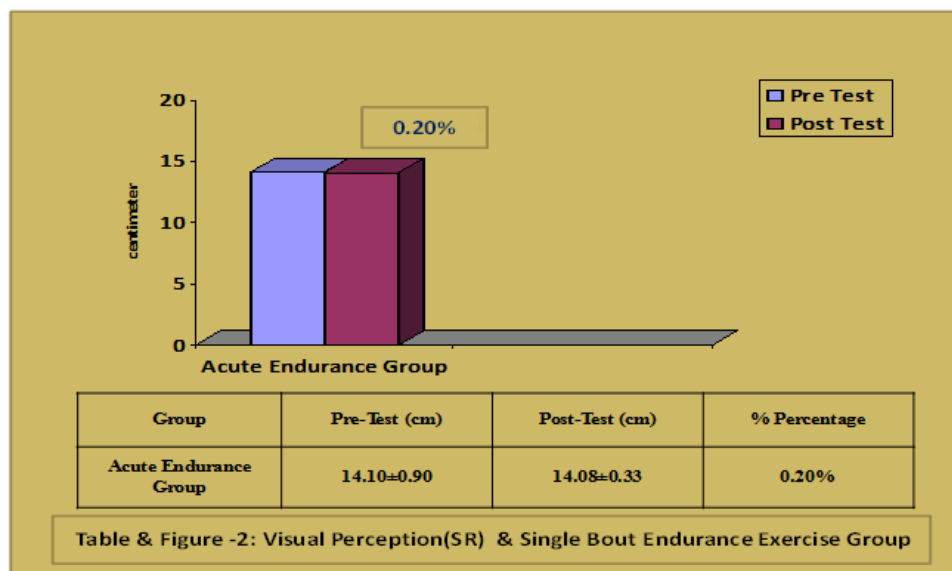
Results

For depth perception assessment, pre and post exercise recording was (3.88±0.32) mm and (3.24±0.18) mm respectively, and the percentage of reduction was (16.34%) (Graph & Table 1). Here to mention, decrease in scores means better the depth perception performance.



On the other side, visual perception was measure by two ways: subjective recording (SR) and degree of illusion (dI). Subjective recording in visual perception after single bout endurance exercise decrease by 0.20% (Table and Figure-2). Whereas degree of illusions (dI) in visual perception after single bout endurance exercise increased by 1.21% (Table and Figure-3). In subjective reading, higher score is better where as in degree of illusion lower score is good.

cardiovascular exercise may facilitate the allocation of attentional and memory resources (Donchin and Coles 1998); aerobic exercise causes an increase in brain regional blood flow (Nybo 2001; Orlandi 1996). On the other hand, results showed no such changes, both in subjective reading (SR) and degree of illusions (dI) of visual perception after single bout aerobic exercise. Visuospatial perception which is right hemisphere function (Benton, Varney and Hamsher 1978) did not change



DISCUSSION

The present study showed that subjects who were performed single bout endurance exercise have reduced the distance between two metal rods in depth perception test. As the other stimulus and sensations were cut off carrying out both initial and final test under constant illumination and in a sound and light control room, definitely endurance exercise played an important role in improving the depth perception performance. This changes best be explained as effects on information processing (Magnie 2000, Nakamura 1999); acute

after acute endurance exercise. This result may be explained as the acute aerobic exercise may create less impact on retinal and cortical factors. Other reason may be, as the visual perception related with cognitive judgment which may not be influenced by the single bout endurance exercise.

Conclusion

In conclusion, the present study demonstrated that single bout endurance exercise plays important role in improving depth perception and has potential applications especially in those occupations and performance requiring good depth perceptual

sensitivity, judgement of distance and direction. The absence of change in visual spatial judgement following acute endurance exercise needs further investigation.

Acknowledgement

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