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EFFECT OF YOGASANAS ON THE VISUAL AND AUDITORY REACTION TIME

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Summary : Visual and auditory reaction time (VRT, ART) was studied in 83 healthy male subjects of 30-40 years of age who had never practiced yogasanas before. These subjects were divided into two groups viz. Group A whose VRT and ART was determined after 1 hr. yogasanas and Group B whose ART and VRT was determined after 6 weeks yogasanas training programme. VRT and ART showed a significant reduction in Group A ($P<.05$) and Group B ($P<.001$).

Key words : visual reaction time auditory reaction time yogasanas

INTRODUCTION

Yogasanas and Pranayama are claimed to have beneficial effects on the body such as improving the functions of different systems of the body including performance of the CNS. (1,2) They also bring an equipoise between psychic and somatic aspects of bodily functions (3,4). All yogic exercise are confined to a minimum of motion involved with everything done at slow tempo (isokinetic and isometric) which is the opposite of gymnastic, Swedish drills, all of which emphasize on speed and rhythm. (5). The study of reaction time (RT) spans more than a century and provides an indirect index of the processing capability of the CNS and also a simple means of determining sensorimotor performances(6). Thus, the RT is a means of relating physical measure of mental events. It is known that a number of indices of physical fitness is affected by yogasanas (5) and since RT can provide a quantitative measurement of this beneficial effect of yogasanas, this study was undertaken to study the immediate effect of yoga and 6 weeks training programme in yoga on VRT and ART.

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MATERIAL AND METHODS

83 normal healthy male subjects in the age group of 30-45 yrs. who had never practiced yoga before were selected for the study. All of them were non-smokers. VRT and ART were measured at 6 am. in the laboratory under similar environmental conditions using the RT apparatus described earlier by Malathi, Parulkar (7)

These subjects were divided into two groups of non-trainess (Group A) consisting of 41 subjects and trainess (Group B) consisting of 42 subjects. Control basal ART and VRT (I in Figs. 1 and 2) of Group A was recorded. These subjects then underwent yogasanas for 1 hr for 1 day following which VRT and ART were again recorded (II in Figs. 1 and 2).

Similarly, control basel VRT and ART of Group B (Trainees) was recorded (III in Figs 1 and 2). These subjects then underwent yogasana training programme for 1 hr daily for 6 weeks. VRT and ART was again measured in these subjects after the training (IV in Figs 1 and 2 and after undergoing yogasanas for 1 hr. (V in Figs 1 and 2).

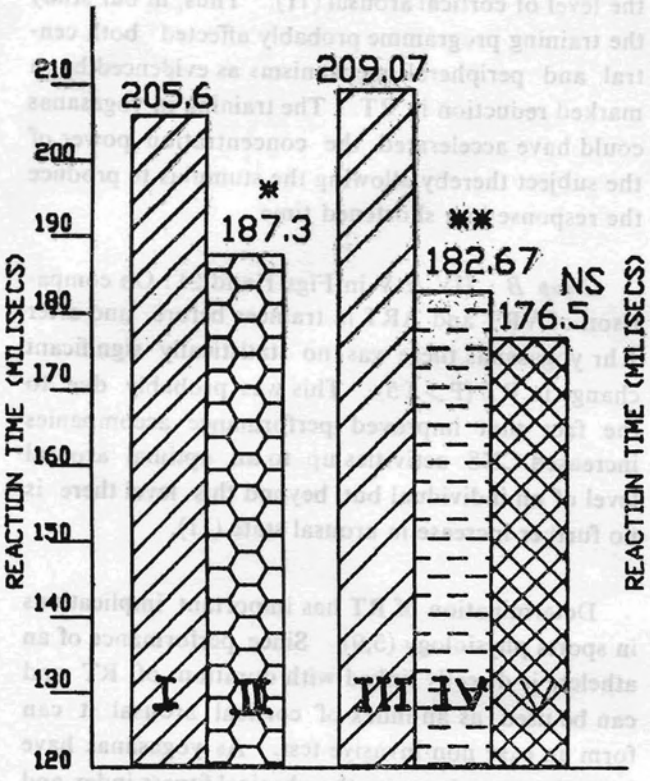

Fig. 1. Visual Reaction Time

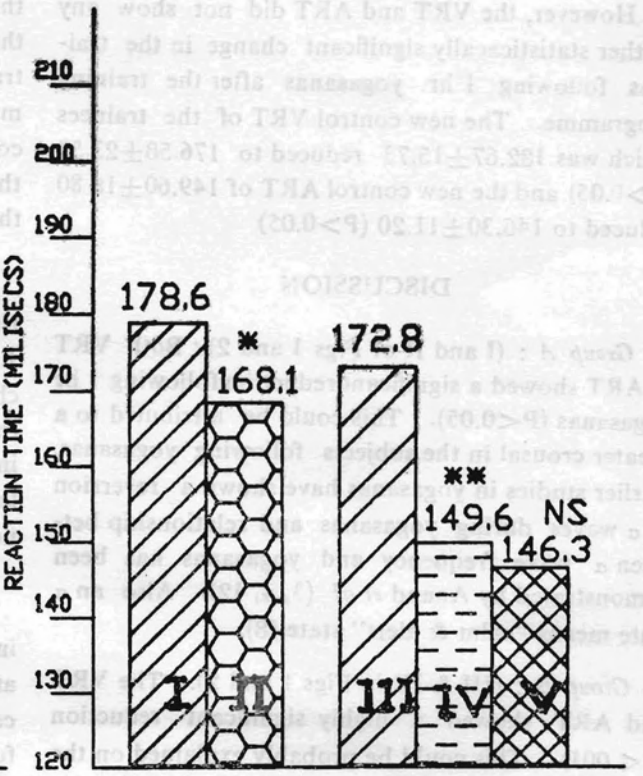

Fig. 2. Audity Reaction Time

* P<0.05
** P<0.001
NS Not Significant

I. Control value for Group A
II. Reaction time after 1 hr. Yoga for Group A
III. Control valve before training in Yoga for Group B
IV. Reaction time after training completion for Group B
V. Reaction time after 1 hr. Yoga for trained Group B

Comparative Study of Group A and Group B for VRT and ART

The various asanas performed by both groups were Pranayama of 15 mins followed by Padmasanas, Yogmudra, Gomukhasana, Bhujangasana, Sarvangasana, Halasana, Paschimothasna, Bhadrasana, Anantasana, Veerabhadrasana, Vrikshasana, Vatayanasana, Trikosnasana and Savasana.

RESULTS

Group A : The control VRT of 205.6 m.sec± 38.79 reduced to 178.36±30.30 and the control ART of 178.60±21.34 similarly decreased to 168.12± 19.80. The reductions were statistically significant ($P<0.05$).

Group B : The control VRT of 209.07±32.25 reduced to 182.67 15.73 and control ART of 172.80 22.62 reduced to 149.60±18.80 when measured immediately following 6 week training programme. The fall in ART and VRT were highly significant ($P<0.001$)

However, the VRT and ART did not show any further statisticacally significant change in the trainess following 1 hr. yogasanas after the training programme. The new control VRT of the trainees which was 182.67±15.73 reduced to 176.58±23.58 ($P>0.05$) and the new control ART of 149.60±18.80 reduced to 146.30±11.20 ($P>0.05$)

DISCUSSION

Group A : (I and II of Figs 1 and 2) : Both VRT & ART showed a significant reduction following 1 hr yogasanas ($P<0.05$). This could be attributed to a greater crousal in the subjects following yogasanas. Earlier studies in yogasanas have shown a reversion to α waves during yogasanas and relationship between α wave frequency and yogasanas has been demonstrated by Anand *et al* (3, 4, 12). Also an α state means "calm & alert" state (8).

Group B : (III & IV in Figs 1 and 2). The VRT and ART showed a highly significant reduction ($P<.001$). This could be probably explained on the fact that it was due to an increase in the muscle tone. An increase in the muscle tone has been shown after a short term yogic training programme (9). Also, RT has been shown to be facilitated by reasonable degree of initial muscle tension (10). Currently, muscle tension tends to be regarded as an index of the level of cortical arousal (11). Thus, in our study the training programme probably affected both central and peripheral mechanisms as evidenced by a marked reduction in RT. The training in yogasanas could have accelerated the concentration power of the subject thereby allowing the stumulus to produce the response in a shortened time.

Group B : (IV & V in Figs 1 and 2) : On comparison of VRT and ART in trainees before and after 1 hr yogasanas there was no statistically significant change in RT ($P>.05$). This was probably due to the fact that improved performance accompanies increased CNS activities up to an optimal arousal level of an individual but beyond this level there is no further increase in arousal state (11).

Determination of RT has important implications in sports physiology (5,9). Since performance of an athelete is directly linked with duration of RT and can be used as an index of cortical arousal it can form an easy non-invasive test. As yogasanas have been shown to increase the physical fitness index and is also correlated with reduction in RT, this test could be used to screen a large population for physical fitness. Determination of RT could provide an objective method of determining the benefit of yogic practice.

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