IMMEDIATE EFFECTS OF TWO RELAXATION TECHNIQUES ON HEALTHY VOLUNTEERS

SUSHILKUMAR S. KHEMKA*, NAGENDRA H. RAMA RAO AND RAGHURAM NAGARATHNA

*Swami Vivekananda Yoga Anusanthana Samsthana,
Eknath Bhavan, 19, Gavipuram Circle,
Bangalore – 560 019*

Abstract : This controlled study compared immediate effects of two relaxation techniques on state anxiety and sustained attention in healthy subjects. 86 volunteers (56 men and 30 women) were divided into two groups: the first 43 volunteers (age range 18 to 64) practiced 20 minutes of yoga-based Deep Relaxation Technique (DRT), while the second group of 43 volunteers (same age range), practiced 20 minutes Supine Rest (SR). State anxiety was assessed using the State Trait Anxiety Inventory (STAI A-State), and sustained attention was assessed using the Six Letter Cancellation (SLC) and Digit Letter Substitution (DLS) tests. All tests were administered immediately before, and immediately after, practice. A significant reduction in State Anxiety score (P<0.001) was observed for the group practicing DRT, but not for the group practicing SR. For the sustained attention tests, however, there were significant increases in scores by both DRT and SR groups (P<0.001). The results suggest that both interventions improve attention, but that only DRT reduces State Anxiety.

Key words : yoga   relaxation
              anxiety   sustained attention

INTRODUCTION

The goal of Yoga practice is relaxation even while working with one-pointed attention i.e. freedom from muscular, mental and emotional tensions (1). State Anxiety produces tension, so this study investigated the ability of a Yoga-based "Deep Relaxation Technique" (DRT) to reduce State Anxiety and improve attention, in comparison to supine rest (SR).

Some confusion currently seems to exist about meditation and relaxation techniques' ability to reduce anxiety. In a recent editorial, Esposito (2) opines that both work equally well, in marked contrast to the classic findings of Eppley et al. (3) that different techniques produce different effects on trait anxiety.

Previous studies of State Anxiety include two on guided imagery relaxation techniques, one of which found reduced anxiety and depression (4), and the other, using Donovan's RGI Script (5), found reduced state

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*Corresponding Author : Fax : 91-80-26608645; E-mail : hariomsushil@gmail.com

anxiety on all three administrations (6).

Schenfere (7) compared progressive relaxation and classical music on measures of attention, relaxation and stress responses, finding decreased physiological arousal and heart rate. In another study of attention, Rutschman (8) found relaxation and 'receptive meditation' equally effective in improving performance on a divided attention task.

DRT involves guided instructions. A similar technique has previously been found more effective than supine rest in reducing physiological arousal (9). Similarly, heart rate and blood pressure return to baseline sooner after exercise when subjects are given guided relaxation than while supine or seated (10).

The deep relaxation technique is one of the most powerful tools in controlling a number of diseases caused by tension such as hypertension and insomnia (11). It is also very helpful for calming down the mind leading to meditation. Both guided relaxation and supine rest reduce physiological arousal, though the first produces changes in a larger number of autonomic measures (12).

Taken together, these studies suggest that DRT may be more effective than supine rest in reducing State Anxiety and in improving attention measures, neither of which have previously been investigated using it. To investigate this we conducted the present study.

'State Anxiety', as measured by Spielberger's State Trait Anxiety Inventory (STAI A-State), reflects transitory emotional states fluctuating over time, and varying in intensity. These are characterized by consciously perceived feelings of tension and apprehension, together with heightened autonomic activity i.e. physiological arousal (13).

The Six Letter Cancellation (SLC) (14) and Digit Letter Substitution (DLS) (15) tests require visual selectivity and repetitive motor response. They assess selective, focused sustained attention, visual scanning, activation and inhibition of rapid responses. A test of similar design to the DLS has been successfully used in an Indian population, confirming its validity to study immediate effects (15). These two tests were selected as the standard tests of attention.

METHODS

Subjects

The 86 subjects, consisting of 56 male and 30 female volunteers from a group who had completed a one-month residential yoga course at SVYASA, Bangalore, were divided into two groups of 43: (i) Deep Relaxation Technique (DRT), and (ii) Supine Rest (SR). All were reportedly healthy and on no medication. The aims and methods of the study were explained; all gave their informed consent. Ages ranged from 18 to 64 for both groups, mean ages being 30.14 and 28.35 respectively.

Design

The two groups of 43 subjects were assessed immediately before and after

intervention sessions. The first group was guided through a 20 minute DRT session on one day, while the second group practised supine rest for an equal time period next day.

Intervention

DRT is performed with eyes closed, in five, slowly practiced relaxation phases, guided by an audio tape (11).

I. Relax each specific part of the body from the tip of the toes to the waist, followed by chanting 'A'.

II. Relax each body part from the waist to the neck, followed by chanting 'U'.

III. Relax head and neck, followed by chanting 'M', the last part of' A-U-M'.

IV. Let the body collapse on the ground with a feeling of 'letting go', chanting the whole word, 'AUM' (16).

V. Let oneself feel apart from the physical body, aware of expansion, and merging with a limitless space like the sky.

Supine Rest (SR): the subject lies supine, with legs apart, hands, palms up, away from the sides of the body, eyes closed; no instructions are given.

Assessment

The STAI-A State test comprises four statements describing four different kinds of feeling. Subjects state how often they experience that feeling: almost never, sometimes, often, or almost always.

The SLC test specifies six target letters to be cancelled on a test worksheet, consisting of 22 rows by 14 columns of randomly arranged letters (14). Subjects have to cancel as many target letters as possible in the 90 second test time. Similarly, the DLS test gives a 'Key' specifying the digits 1–9 paired with letters of the alphabet. The test sheet consists of 12 rows by 8 columns of randomly arranged digits (15). Subjects have to substitute as many target digits as possible in the 90 second test time.

Data analysis

Statistical analysis was performed using SPSS-16. For our two groups, pre-post, design, all variables were analyzed using repeated measures analysis of variance, which is equivalent to an independent samples t test for comparison of the two groups and also equivalent to paired samples t tests for pre post comparisons of results of each group.

RESULTS

The Shapiro-Wilk test of normality showed that the data were normally distributed. Results are summarized in Table I.

STAI A - State (SAS) anxiety task

The DRT group showed a significant (P<0.001) decrease in state anxiety score. The decrease of 2.43% shown by the SR control group is not significant (Table I). Differences between these two change scores (post-pre) are significant (P<0.001) between the two groups.

TABLE I : Comparison of deep relaxation techniques and supine rest : summary of results.

Test	Deep relaxation technique				Supine test			
	Mean	S D	Signif.	% Change	Mean	S D	Signif.	% Change
SAS	Pre 8.3	2.48	<0.001	17.73	7.98	2.1	0.395	2.43
	Post 7.05	2.27			7.79	2.08		
SLC	Pre 34.42	9.9	<0.001	24.78	37.84	9.85	<0.001	10.62
	Post 42.95	12.69			41.86	10.67		
DLS	Pre 53.53	14.75	<0.001	15.99	58.49	10.06	<0.001	9.75
	Post 62.09	15.12			64.19	11.39		

SAS=Stai A State, SLC=Six Letter Cancellation, DLS=Digit Letter Substitution test.
Table I Caption: Table I summarizes mean values and standard deviations (pre- and post- practice),
P values, and percentage change in values for each test on both groups.

Six Letter Cancellation (SLC) task

Both DRT and SR groups showed a significant (P<0.001) increase in scores (Table I). Differences in change scores (post-pre) between the two groups are also significant (P<0.008).

Digit Letter Substitution (DLS) task

Both DRT and SR groups showed a significant (P<0.001) increase in scores (Table I). The differences between the two groups' (post-pre) scores are not significant.

DISCUSSION

STAI-State scores have a direct interpretation: high scores mean higher state anxiety, low scores mean lower state anxiety. The findings of this study are unequivocal: the deep relaxation technique produces an immediate reduction of State Anxiety, whereas any reduction by supine rest is, by comparison, insignificant. The hypothesis that this would be the case, framed in the introduction, was therefore

upheld. Indeed, it was strongly implied by previous research. Anxiety reduction had been produced by guided imagery script (4, 6). Also autonomic measures related to anxiety were reduced by guided relaxation: physiological arousal (12), heart rate and skin conductance (10), oxygen consumption and respiration (17).

In contrast, the measures of sustained attention, the Six Letter Cancellation and Digit Letter Substitution tests were improved by both DRT and SR, though the latter seemed to produce a distinctly smaller effect. The question now arises as to the possible relationship between the findings on anxiety and those on sustained attention.

Previous work has also observed improvements in sustained attention as a result of yoga-based interventions (18), and suggested that this may be due to anxiety reduction, resulting in decreased distraction (19). The results of the three measures reported in present study show that while anxiety reduction may have an effect, it is by no means the whole story. Significant

improvements on the two sustained attention tests took place for the SR group for which any state anxiety reduction was tiny and failed to reach significance.

If anxiety reduction is responsible for some of the improvement on the sustained attention tests, its upper limit can be no more than the difference between the observed improvements by the two groups (Table I), i.e. about (14/25) or 56% for SLC, and (6/16) = 37.5% for DLS, with a mean of about 47%, subject to appropriate statistical uncertainties.

The question of how supine rest improves sustained attention remains a question for future research, whether it is simply due to increased mental energy, or if there are other significant factors. One possibility is physiological arousal (17, 20). Both supine rest and deep relaxation reduce physiological arousal, the former less effectively. But that result suggests that increased calmness may assist test performance, since the pressure of a timed test (the 90 second limit) may be handled more effectively.

In summary: only the deep relaxation technique was found to reduce state anxiety, whereas both DRT and supine rest improved sustained attention, the former apparently being more effective in this regard. The observed anxiety reduction would seem to account for no more than about 50% of the improvement in the sustained attention tests. Although differences between DRT and SR groups in improvements on the DLS test were observed, a large group is needed to establish significance.

ACKNOWLEDGEMENTS

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