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The impact of abbreviated progressive muscle relaxation on salivary cortisol

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Abstract

The purpose of this study was to examine whether acute relaxation training, conducted on two separate occasions, would be associated with reliable reductions in subjective and physiological indices of stress. Forty-six experimental subjects were led through Abbreviated Progressive Relaxation Training (APRT) exercises during two laboratory sessions spaced exactly 1 week apart. Fifteen control subjects experienced two laboratory sessions where they sat quietly for an equal amount of time. Results indicated that a brief relaxation exercise led to experimental subjects having significantly lower levels of post-intervention heart rate, state anxiety, perceived stress, and salivary cortisol than control subjects, as well as increased levels of self-report levels of relaxation. The results of this study may have implications for the use of relaxation training in enhancing immune function. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

Previous research has shown that psychological stress has a deleterious effect on the immune system. More specifically, as stress levels increase, more and more of the body's stress hormone, cortisol, is produced. This overabundance of cortisol in turn harms the immune system by destroying one of the system's primary types of

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cells, the T-cells (Hall et al., 1996). Immunoenhancement is a relatively new field concerned with increasing immune system functioning. One theory in this emerging field suggests that reducing cortisol levels can in turn reverse the negative effects of cortisol on the cells of the immune system (Kropiunigg, 1993). The purpose of the present study was to determine whether level of salivary cortisol could be reduced by means of a relaxation technique.

Only four published studies that used salivary cortisol as a dependent variable have been done in the field of neuro-immune modulation, and these have yielded inconsistent results. In two studies, different relaxation techniques such as Benson's relaxation response (Benson, 1975), guided visualization, back massage, lying quietly with eyes closed, and viewing a humorous film either did not affect or actually increased salivary cortisol levels (Green and Green, 1987; Hubert et al., 1993). In the remaining two studies, however, it was shown that practicing Tai Chi reliably reduced levels of salivary cortisol (Jin, 1989, 1992).

In terms of physiological indices of relaxation training, heart rate has been reliably and consistently used as a dependent measure in progressive relaxation studies for the past 60 years (King, 1980 for a review), and its popularity as a physiological measure of relaxation remains today (Anshel, 1995; Hall and Whitehouse, 1998; Norton et al., 1997). Similarly, vasomotor activity has been used in conjunction with heart rate to determine the effects of progressive muscle relaxation since the 1940s (Page, 1947), and the two have continued to be paired in recent studies (Herman and Blanchard, 1998).

The major premise of this study was to correct for some methodological limitations of prior studies in order to more definitively answer the question of whether cortisol could be reduced by relaxation. It was believed that clearer conclusions could be drawn when confounding issues were controlled for. These included using saliva (as opposed to plasma or urine) as a less invasive collection method for obtaining cortisol, limiting laboratory sessions to the early morning hours when cortisol levels are the most stable, restricting subjects' use of cortisol-altering substances prior to the laboratory session, delivering a clinically and empirically supported relaxation technique in a standardized manner, and using self-report and physiological measures to corroborate immunological findings. One additional strength of this study included the use of a control group.

The present study consisted of experimental subjects attending two laboratory sessions scheduled exactly 1 week apart. The experimenter obtained self-report, physiological, and endocrinological dependent variables from the subjects both immediately before and after the relaxation or control intervention (20 min of Abbreviated Progressive Relaxation (APRT) (Bernstein and Borkovec, 1973) or quietly sitting). Experimental subjects only were given tapes of the APRT exercises to practice at home each day between their two laboratory sessions. All subjects returned a week later for a second laboratory session that was identical to the first.

APRT, a shortened version of Jacobsen's (1939) original Progressive Muscle Relaxation technique, involves tensing and relaxing 16 different muscle groups. This brief relaxation strategy has become a standard feature of clinical training (Turner et al., 1992; Masters et al., 1987), and was found to have an effect size that compares favorably with estimates obtained in other meta-analyses of psychological

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