The Effects of Thermal Biofeedback and Autogenic Training of Cardiovascular Reactivity: The Joint USSR-USA Behavioral Hypertension Treatment Project

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Cardiovascular reactivity (heart rate, systolic, and diastolic BP) to mental arithmetic and cold pressor were measured before and after treatment as part of the cross-cultural (USSR and USA) evaluation of thermal biofeedback and autogenic training (in comparison with self-relaxation) as treatments for mild hypertension in unmedicated males. There were no statistically reliable decreases in cardiovascular reactivity from before to after treatment. However, downward shifts in basal levels of systolic and diastolic BP at post-treatment led treated patients to have lower stress-induced levels of BP.

Descriptor Key Words: thermal biofeedback; autogenic training; USSR; cross-cultural comparisons; hypertension; cardiovascular reactivity.

Cardiovascular reactivity (CVR) has, in recent years, emerged as a topic of great interest (Krantz & Manuck, 1984; Matthews et al., 1986) since it may

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be both an independent marker, or risk factor, for the later development of coronary heart disease (CHD) and a part of the final common pathway to CHD for other known CHD risk factors.

A parallel development has been the growing use of the so-called stress management techniques (McCaffrey & Blanchard, 1985), such as relaxation training and various forms of biofeedback, as treatments for essential hypertension and their endorsement (Subcommittee on Nonpharmacological Therapy, 1986) as one of several nonpharmacological approaches to the treatment of essential hypertension. Implicit within the stress management approaches to hypertension (McCaffrey & Blanchard, 1985) is the idea that the successful application will involve a reduction in the reactivity of blood pressure (BP) to various environmental stressors.

Despite these related and parallel developments, relatively little research has appeared on the effects of stress management on CVR and on BP reactivity in particular. Jacob and Chesney (1986) have provided a comprehensive review of this literature. They note that most of the studies involved short-term (1 to 4 sessions) training of normal, nonhypertensive volunteers and produced equivocal results.

One of the earliest, and also possibly the best, studies of stress management applied to hypertensive patients was reported by Patel in 1975. She randomly assigned 32 hypertensive patients to either a 6-week multicomponent treatment or a no-treatment control. Patients in the active treatment group were seen twice per week and received instruction in yogic relaxation and meditation as well as biofeedback of GSR, frontal EMG, and EEG alpha. Reactivity was measured by recording maximum rise in systolic and diastolic BP (SBP and DBP) as well as recovery time to two separate stressors, cold pressor and exercise. The treated group showed significant within-group reductions on every measure of reactivity and significantly greater reductions than the control group on all measures except SBP rise to exercise.

We have been investigating a relatively new stress management technique, thermal biofeedback, as treatment for essential hypertension. The procedure, developed by Green, Green, and Norris (1979), involves teaching patients, with the aid of temperature feedback, to warm the hands and the feet. In an earlier study (Blanchard, McCoy, Musso, et al., 1986) we found thermal biofeedback to be superior to progressive muscle relaxation (PMR) in allowing medicated hypertensives to successfully discontinue a second-stage (sympatholytic) medication while BP remained under control.

An investigation of reactivity within that overall study (Blanchard, McCoy, Wittrock, et al., 1988) revealed only modest effects overall but a general superiority of PMR to thermal biofeedback in reducing reactivity. In the most straightforward comparison (reactivity measurements on patients on two drugs before and after treatment with PMR or thermal biofeedback), there were basal shifts (downward) in SBP and heart rate (HR) for the