Blood Volume Pulse Biofeedback in the Treatment of Migraine Headache: A Controlled Evaluation

Janel Gauthier, Julien Doyon, Renée Lacroix, and Michel Drolet
Laval University

In order to evaluate the specific effects of blood volume pulse (BVP) biofeedback in the treatment of migraine headaches, 21 female migraine patients were randomly assigned to one of three experimental conditions: temporal artery constriction feedback, temporal artery dilation feedback, or waiting list. Biofeedback training consisted of 15 sessions over an 8-week period. All patients completed 5 weeks of daily self-monitoring of headache activity and medication before and after treatment. Results showed that constriction and dilation biofeedback were equally effective in controlling migraines and produced greater benefits than the waiting-list condition. No significant relationships were found between therapeutic gains and BVP self-regulation skills. However, further analyses revealed that changes in headache activity and medication were associated with changes in vasomotor variability. The current rationale for the use of BVP biofeedback in the treatment of migraine is questioned and a new one is proposed.

Descriptor Key Words: blood volume pulse; biofeedback; self-regulation; migraine; vascular headache; temporal artery; vasoconstriction; vasodilation.

1This research was supported by grants to the first author from the Quebec Ministry of Education and the Quebec Ministry of Social Affairs. The technical assistance of Langis Boulé and Michel Vinette is gratefully acknowledged. The authors are also indebted to Drs. Albert Bandura, Michael Feuerstein, and Patrick McGrath for their helpful comments on an earlier version of the manuscript.

2Address all correspondence to Dr. Janel Gauthier, School of Psychology, Laval University, Ste-Foy, Quebec, Canada G1K 7P4.
In recent years, a new biofeedback strategy has evolved that is based upon the hypothesized neurovascular mechanism of migraine. It is referred to as Blood Volume Pulse (BVP) biofeedback. This technique attempts to teach the individual with migraine to voluntarily constrict the extracranial temporal artery, and thus to mimic the action of the ergotamine derivatives that are traditionally used in the pharmacological treatment of migraine headaches. These pharmacological agents initiate a transient vasoconstriction of the extracranial arteries, thus aborting the vasodilation associated with the head pain. While recent research has shown the temporal artery constriction feedback procedure to be clinically useful (Bild & Adams, 1980; Feuerstein, Adams, & Beiman, 1976; Feuerstein & Adams, 1977; Friar & Beatty, 1976; Sturgis, Tollison, & Adams, 1978; Sturgis & Adams, 1979), the specific effects of this treatment modality have yet to be systematically evaluated by using temporal artery dilation feedback as a control procedure.

The purpose of the present study was to evaluate the differential effects of temporal artery constriction and dilation feedback on migraine headaches. It was hypothesized that decreases in migraine activity would be related only to constriction training and that the magnitude of relief in head pain would be a function of the level of ability to voluntarily constrict the temporal artery.

**METHOD**

**Subjects**

Research participants were recruited from the general community by means of advertisements requesting female volunteers to participate in a biofeedback training study to control migraine headaches. Each volunteer was interviewed for possible inclusion in the study, using a semistructured interview schedule adapted from Blanchard, Theobald, Williamson, Silver, and Brown (1978). The data from these interviews for the patients included in the study are presented in Table I.

Twenty-one patients were accepted into the study on the basis of various inclusion and exclusion criteria, which included those used by Blanchard et al. (1978). Specifically, to be included in the study, individuals had to report a minimum of two migraines monthly for a minimum of 2 years and meet three of the following criteria: (a) unilateral and throbbing headaches, (b) nausea and vomiting accompanying headaches, (c) headaches preceded by prodromes, (d) positive family history of similar headaches, and (e) independent diagnosis of migraine by a neurologist.