

## RESEARCH ARTICLE

### TREATMENT OF MIGRAINE: HOW EFFECTIVE IS BIOFEEDBACK ASSISTED RELAXATION TRAINING?

M. Janbozorgi Ph.D<sup>1</sup>,  
S. Rajezi MSc<sup>2</sup>,  
S. Sadr MD<sup>3</sup>

1. Assistant Professor of Clinical Psychology, Shahid Beheshti University of Medical Sciences  
2. Master of Science of Clinical Psychology, Shahid Beheshti University of Medical Sciences  
3. Assistant Professor of Psychiatry, Shahid Beheshti University of Medical Sciences  
Corresponding Author:  
M. Janbozorgi MD  
Tel: +98 21 7755 1023  
Fax: + 98 21 7755 1023  
E-mail: Janbozorgi@sbm.ac.ir

#### Abstract:

##### Objective

Behavioral interventions such as relaxation training and biofeedback are some of the most effective interventions for management of migraine headaches. In this study we evaluated the utility of biofeedback-assisted progressive muscle relaxation training (PRT) in the treatment of migraine.

##### Materials and Methods

In this prospective study, twenty patients (12-18 years old) with a confirmed diagnosis of migraine headache, admitted to the Talie counseling center between March 2005 and December 2005, were evaluated; they were randomly assigned into an experimental group receiving biofeedback-assisted PRT and a control group in waiting list. All patients recorded the intensity of the headache and its frequency and duration before and 12 weeks after the treatment.

##### Results

The data was analyzed using Independent sample t-test for mean differences. In the biofeedback-assisted progressive muscle relaxation trained group, a statistically and clinically significant decrease was detected in intensity ( $p < 0.001$ ; mean difference 31.7; SD=1.86), frequency (mean difference = 4.4; SD = 1.58), and duration (mean difference 3.55; SD=1.32) of headaches

##### Conclusion

It can be concluded that biofeedback-assisted progressive muscle relaxation training is a successful form of therapy in treatment of migraine.

**Key words:** Migraine, Biofeedback, Muscle relaxation training

#### Introduction

Migraine is a common disease and the most common cause of vascular headache. Ascertaining the optimum treatment for those afflicted by this disorder is often a problem in clinical practice since the condition is often debilitating and may prove refractory to therapy (1). Pharmacological agents have traditionally been employed in the treatment of headaches (2-4).

Over the last thirty years or so, behavioral interventions (chiefly relaxation, biofeedback, and stress management) have become standard strategies for the management of migraine (5). Procedures such as progressive relaxation, self hypnosis, and guided imagery used for relaxation therapies.

An apparatus to demonstrate physiological effects is usually used in biofeedback techniques (6). In a significant number of patients, pain has been known to decrease, following treatment using behavioral or non-pharmacological therapies (7).

Following the efficacy of biofeedback, demonstrated by Budzynski et al, two effective treatments, biofeedback training and relaxation therapies have become known for their efficacy in the management of chronic tension headaches. (8). Chronic headaches have been associated with psychosocial elements, like major life events and frequently occurring problems that increase the stress and depression caused by such headaches (9). Biofeedback-assisted relaxation is believed to have positive effects on enhancing patients' abilities reduce sympathetic neural activity, hereby reducing anxiety and depression (1). A number of review articles (10-17) have demonstrated that between 35% and 90% of tension headache sufferers are significantly improved, both statistically (significant pre-post group differences) and clinically (50% or greater reduction in headache activity) through either of these techniques, with an average improvement of approximately 50%.

As compared to prophylactic drug therapy (18,19), placebo (19,20), or waiting list/control groups (21), studies overall have produced favorable results for relaxation treatment. Most studies find that there is no difference in outcomes, between the two interventions; both have been shown to be significantly superior to placebo (22). There is some evidence that a sizeable portion of patients who have proved refractory to relaxation therapy improve to clinically significant levels with the addition of biofeedback (23,24). Relaxation treatment has mainly been administered in a group format producing results as a favorable results as in individual-based approach (25). The goal of this study was to determine the effects of biofeedback-assisted relaxation (progressive relaxation training based on Jacobson techniques) on migraine headache pain.

### Materials and Methods

Twenty cases with the confirmed diagnosis of migraine headache volunteered to participate in the study. Patients were recruited among the patients attending the Talie counseling center (a private center) in Tehran, Iran, and some were also referred by neurologists and psychiatrists. Subjects were randomly assigned into two groups of experimental (n=10) and waiting list/ control (n=10). All patients in the experimental group had been trained with Galvanic Skin Response (GSR) biofeedback and

progressive muscle relaxation training (PRT) exercises, while the patients in the waiting list/control group did not receive any training. All training was provided following the completion of pre-test and post-test data in the subjects of the control group. All patients were taking medication and many had tried several types of medicines. Any patients with histories of anemia, structural abnormalities or severe medical or psychiatric illnesses were excluded. The location of headache activity (e.g., frontal or upper trapezius) was not considered at all important in the selection of the subjects).

The intensity, frequency, and duration of the headaches and medication used (prescription and over the counter) were recorded 14 days prior to randomization (pretest) and 14 days after the treatment or control (post-test); also, physiological and psychological assessments were performed for all patients. They were all asked to rate the headache on a scale ranging from no headache (0) to intense, incapacitating headache (100) after each PRT exercise. A brief medical history questionnaire on headache history, past treatment, other physical problems, and general health habits was also completed.

**Treatment:** The patients in the experimental group underwent 12 sessions of GSR biofeedback over a 12-week period. All patients were given an audiotape and typed instructions on PRT exercises that they were to practice at home twice a day for 30 minutes (weeks 1 to 3), 20 minutes (weeks 4 to 5), and 15 minutes (weeks 6 to 10) until reassessed and a relaxation diary in which to record their daily exercises. Patients used an audiotape with instructions to maximally contract major muscle groups, moving from the feet up to the head, to experience the sensation of the contraction and then the subsequent relaxation or decreased intensity of muscle tension. The relaxation tape used in this study was obtained from the Talie counselling center.

Biofeedback training was begun in the second or third treatment session. Biofeedback sessions were scheduled once a week or after each PRT exercise, depending on the subject's availability. Sessions were held in quiet, dimly lit rooms where patients sat in comfortable reclining chairs.

**Statistical analysis:** Statistical analysis was performed by independent sample t-test. P-values less than 0.05 were considered statistically significant.

**Results**

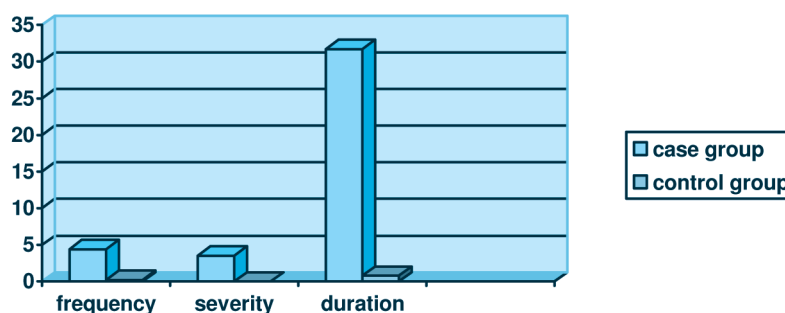
Of the subjects, 30% were men; mean age of the patients was 32.5 years (SD= 11.0) and subjects reported a history of an average medication usage of 5 years (SD= 6.1) with a mean of 3.3 headaches per week (SD= 2.9). Table I shows the mean scores of promotion, obtained from the frequency, duration, and intensity of the migraine headaches, showing a significant improvement in the mean score of frequency (4.4), duration (3.55), and severity (31.7) of migraine in the patients of the case group, not significantly different from scores the controls. Figure 1 shows the frequency, duration, and severity of mean differences in the case and control groups.

As seen in table 1, a significant change was confirmed in the post-test, showing that patients of the study group had a significant reduction in their migraine pain intensity. According to Table 1, the mean frequency variation in pretest and post-test shows a significant difference ( $t= 8.57$ ;  $p< 0.001$ ). Mean score of duration decrease significantly for the patients in the case group compared to the control group ( $t= 5.41$ ;  $p< 0.0001$ ). Mean score of severity declined significantly in the case group, as well ( $t= 6.63$ ;  $p< 0.001$ ).

Table 1: Mean scores of promotion, obtained from the frequency, duration, and intensity Of the case and control group

Factors	Groups	Differences (post – pre)		t-value	p- value
		Mean of promotion	SD		
Frequency 0--7	Case group	4.4	1.58	8.57	p< 0.001
	Control group	0.2	1.62		
Duration 0--24	Case group	3.55	1.32	5.41	p< 0.001
	Control group	0.00	15.24		
Intensity 0--100	Case group	31.7	1.86	6.63	p< 0.001
	Control group	-0.8	6.65		

Figure 1: Frequency, duration and severity of mean differences (promotion) in the case and control groups



## Discussion

Our results are in accordance with our preliminary assumption that biofeedback-assisted progressive muscle relaxation training is very effective in the management of migraine. There seems to be a strong association between biofeedback assisted relaxation therapy and a reduction in headaches experienced. The results indicate that overall headache activity, intensity, frequency, and duration, were significantly altered after treatment. These findings were consistent with those of some of our previous studies which report that biofeedback and/or relaxation training might reduce headache activity in patients (1,5,7,8, 26-34).

We observed significant reduction in frequency, severity, and duration of the headache activity in our study group. Therefore, it has been clearly demonstrated that the patients who had had sessions of biofeedback assisted relaxation therapy reported a more impressive reduction in headache experience over time in comparison with those in the control group.

However, there were some limitations in the present study including the small sample size, relatively high abandonment of the trainers, and the reporting of changes in headaches and symptoms, which was based on the patients' own perception.

The changes observed in the study group and the subjective feelings of the patients support the effectiveness of our interventions. This report shows the effectiveness of biofeedback-assisted relaxation therapy on the successful management of the migraine attack. A combination of biofeedback therapy and relaxation techniques clearly results in a reduction in headache experience, as well as a reduction in associated symptoms. It is, however, evident that these findings should be explored more in the future investigations.

## Conclusion

Considering the effectiveness of biofeedback assisted relaxation therapy in managing migraine sufferers, and reducing the associated symptoms to improve the general sense of the patient's well being, it is recommended that biofeedback-assisted relaxation therapy be used routinely for migraine management.

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