ABSTRACT

Nonpharmacologic therapies play an important role in the prevention and treatment of migraine and tension-type headache, especially given the number of identified triggers of headache. Because the concept of headache triggers implies a behavioral component, identifying triggers may provide treatment opportunities using nonpharmacologic methods. Specific behavioral therapies are recognized and recommended by the US Headache Consortium guidelines with Grade A evidence, and their use as adjunctive therapy to preventive pharmacotherapy for additional improvement is recommended with Grade B evidence. A growing body of empiric studies shows that behavioral therapy offers similar benefits to migraine and tension-type headache sufferers as preventive drug therapy. Nonpharmacologic strategies are an important option for the substantial minority of patients who do not tolerate, cannot take, or do not wish to take drug therapy. The University of Mississippi Medical Center (UMC) has founded a Head Pain Center comprising headache specialists from the neurology, psychology, and psychiatry fields. Patients attending the center are offered an array of pharmacologic and nonpharmacologic therapies, including cost-effective behavior therapies that can be learned and practiced in part in the patient's home. This article reviews the behavior therapies available for migraine and tension-type headache management and the data to support their use and introduces the Head Pain Center program at the UMC.


A wide choice of pharmacotherapies is available for treatment of acute migraine and prophylactic management of migraine and other primary headache disorders. For the majority of patients, these medicines, if taken correctly, can provide significant if not complete pain relief from the cephalalgia. A substantial minority of patients remain, however, for whom pharmacotherapy has been an ineffective or suboptimal option or for whom drugs are not an option at all. It is for these patients that the research into nonpharmacologic therapy is under way.

Nonpharmacologic therapies for headache disorders may be well suited for several types of patients, as outlined in Table 1. For example, pathophysiologic-based reasons may include patients who do not tolerate the pharmacotherapeutic options available, patients who have medical contraindications for drug treatments, or those who have an inadequate response to drug treatment. Patient-specific contraindications may include preference for nonpharmacologic interventions, inability to afford expensive drug interventions, and significant life stress or deficient stress-coping skills (this group can benefit especially from behavior therapy). Clinical reasons include pregnancy, planned pregnancy, or nursing, as well as a his-
tory of frequent or excessive use of analgesic or other acute medications.

**Behavioral Factors and Psychiatric Comorbidity**

Behavior therapy for headache management is effective because of the numerous identified headache triggers (Table 2), nearly all of which have an important behavioral component. These triggers can precipitate or exacerbate a headache but also provide an opportunity to intervene nonpharmacologically to avoid headache onset. Most non-drug therapies, especially behavior therapies, are focused on preventing onset of new symptoms.

Figure 1 shows an oversimplified model of behavior in headache, which has been useful for patient education. Some patients are resistant to receiving nonpharmacologic therapies, in part because of the perception that the physician who prescribes or recommends these types of therapies may be minimizing the problem (ie, “it’s all in your head”). It is worthwhile to explain (using the diagram) that headaches may be caused in part by stress or that stress contributes to (along with environmental triggers) the pathophysiologic changes that cause head pain. This can be a useful heuristic tool for patients to help explain why they may want to consider nonpharmacologic therapy, which can intervene in any of the boxes shown in the figure (ie, stress, physiologic changes, or headache). For example, relaxation training and biofeedback therapy work directly on headache-related physiology. Stress management targets the stress that can cause headache-related physiologic pain, and others, such as yoga, visualization, or massage, can minimize the disability of headache.

Headache is not a psychiatric illness—it is important to remind patients of this point. Specific psychiatric disorders, however, appear to be comorbid with migraine and tension-type headache, including depression, anxiety, and bipolar disorder. Patients often have some minor emotional distress, but most patients do not merit a psychiatric diagnosis. They may be severely disabled on a bad headache day, but are able to participate socially and professionally on other days. As a result, it is important not to “over-label” the emotional pathology and communicate to the patient that the emotional distress is most likely a consequence rather than a cause of pain. Conversely, it is important to identify and address significant psychopathology, because if left untreated, it can impinge the ability to treat headache.

When headache patients present with significant psychopathology, consider adding behavior therapy. It is important to realize that behavioral psychotherapy does not necessarily indicate formal psychotherapy sessions. Brief, focused behavior therapy looking at the factors that exacerbate or trigger headache may be all that is needed. Some patients may not be open to discussing mental health issues or psychiatric illness (and therefore not open to psychotherapy), but starting treatment with a low-dose psychotropic medication

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**Table 1. Characteristics of Headache Sufferers Who May Be Suited for Nonpharmacologic Therapies**

- Poor tolerance of drug treatment
- Medical contraindications for drug treatment
- Inadequate response to drug treatment
- Preference for nonpharmacologic intervention
- Pregnancy, planned pregnancy, or nursing
- History of frequent or excessive use of analgesic or other acute medications
- Significant life stress or deficient stress-coping skills

**Table 2. Headache Triggers**

- Lack of food—fasting, insufficient food, delayed meals
- Specific foods—aged cheese, alcohol, chocolate, nuts
- Sleep—excessive sleep, insufficient sleep
- Ovarian hormones—menstrual, oral contraceptives, pregnancy, menopausal
- Environment—heat, cold, lights, noise, smoke, odors, fumes
- Exercise
- Allergy, smoking
- Stress—during stress, after stress (ie, let-down headache)
that is appropriate for both psychopathology and headache may be an initial treatment opportunity. Also, behavior therapies targeted specifically for headache, such as biofeedback and relaxation training, are more acceptable and nonthreatening to patients who hold negative views of psychotherapy. It also offers an opportunity for the neurologist and patient to build a therapeutic relationship so other issues may be addressed as the patient gains trust.

**Behavior Therapies**

There are 4 types of behavior therapies most commonly used in the United States and for which the best empirical support is available: relaxation training, biofeedback, combined biofeedback and relaxation training, and stress-management training/cognitive-behavior therapy. Relaxation training often consists of progressive relaxation training (alternately tensing and relaxing selected muscle groups throughout the body), autogenic training (the use of self-instructions of warmth and heaviness to promote a state of deep relaxation), and meditation. Biofeedback can be in the form of electromyographic (EMG) or thermal biofeedback. For stress management or cognitive-behavior therapy, a relaxation training and biofeedback component is built into those interventions.

It may be obvious, but it is also important to remember that behavior therapy differs from traditional medical treatment in several important ways. First, there is less emphasis on physical procedures applied to the patient by others and more emphasis on patient involvement and personal responsibility, for their own headaches and their own healthcare. Also, behavioral and social factors as a function of the treatment are used to not only prevent the symptoms of headache, but also to help reduce disability and associated impairment.

Behavior treatments are also recognized and supported by the American Academy of Neurology and the other member organizations of the US Headache Treatment Guideline Consortium. The guidelines focus on 4 areas of migraine and headache management: diagnosis and neuroimaging, acute treatment, preventive treatment, and behavioral and physical treatment.\(^5\) Funded by the Agency for Healthcare Research and Quality, the consortium analyzed 355 articles on behavior therapy, of which 70 were con-
trolled trials. Of these 70, 39 were prospective, randomized trials aimed at preventing migraine attacks and met all requirements for inclusion in a meta-analysis.

During analysis, 2 outcome measures were used: effect size (ie, standardized difference between group means) and percentage improvement (ie, percentage change in headache index scores from pre- to posttreatment, taking into account headache frequency and severity), weighted by sample size. In the few instances when headache index was not reported, headache frequency scores were used. As shown in Figure 2, control groups showed less than 10% improvement rate. The behavior interventions offer a 35% to 50% improvement, and all were statistically better than the control conditions using percentage improvement as a metric, suggesting at least modest efficacy. Regarding effect size, relaxation training, temperature biofeedback plus relaxation training, EMG biofeedback, and cognitive-behavior therapy were all statistically better than control in improving headache.

The US Headache Consortium recommendations state that relaxation training, temperature biofeedback plus relaxation training, EMG biofeedback, and cognitive-behavior therapy may be considered as treatment options for prevention of migraine, based on Grade A evidence. Grade B evidence supports combination therapy of behavior therapy plus preventive drug therapy to achieve additional improvement. "Specific recommendations regarding which of these to use for specific patients cannot be made."

As we continue to explore different combinations of behavior and pharmacotherapy, how do the behavior therapies compare with drug therapies? Meta-analyses of clinical trials comparing 2 common migraine pharmacoprophylactic agents (propranolol and flunarizine) with thermal biofeedback plus relaxation vs placebo groups reveal that all interventions were better than controls (using a variety of improvement indices) and that behavior treatment offered comparable results to pharmacotherapy (Figure 3). Figure 4 shows similar analysis for tension-type headache, comparing behavior treatments with amitriptyline. The results show a 20% placebo effect with significant improvement in effect size of all behavior treatments evaluated as well as amitriptyline, and comparable results between behavior and drug therapy.
NEW METHODS FOR ALTERNATIVE THERAPIES

Traditional psychotherapy involves 10 to 12 sessions for a complete treatment series. In the studies shown in Figures 3 and 4, the average number of treatment sessions was 11. Many patients cannot subscribe to a 10- to 12-session treatment program because of cost, time off from work, or the commitment. Treatment at a specialty center may also necessitate travel, in some cases long distances, for patients in less populated areas.

As a result, there is growing interest in making behavior therapy more cost and time effective, as well as more accessible. These efforts are motivated in part by increasing healthcare costs, stricter standards by third-party payors, and limited access to healthcare professionals as well as the patient constraints and preferences mentioned above.

Some new approaches include group therapy and minimal therapist contact (ie, home-based treatment). Group therapy is advantageous for patients who may feel they suffer alone and helps with cost issues, although time remains an important investment. Home-based treatments for migraine and tension-type headache have been under development for about 10 years. The therapy components are similar to clinic-based programs, with fewer clinic visits required (3 vs 11, both over a 2-month period) and the use of manuals, audiotapes, and structured homework exercises to guide home practice. Periodic telephone contacts between the patient and therapist are scheduled. Practice in the patient’s home is important because patients need to learn to relax in their own environment, with their usual daily distractions and stresses. Their personal environment is where patients need to develop stress-management skills. Patients at the Head Pain Clinic indicate they tend to prefer the minimal contact, not only for the expense but also because it is less disruptive. Meta-analysis of home-based treatments indicate comparable benefit with clinic-based treatments—about 40% to 50% improvement (Figure 5).11,12

A sizable amount of evidence indicates that, at least among those who respond to treatment initially, the benefits of behavior treatment for recurrent headache endure well over time. The longest of the published follow-up studies showed treatment gains were well maintained at 7 years posttreatment. Research has demonstrated these treatment gains are maintained regardless of whether treatment sessions (ie, booster sessions) are provided. Blanchard et al reported that 78% of tension-type headache sufferers and 91% of migraine sufferers remained significantly improved 5 years following behavior treatment.13

The Head Pain Center at the University of Mississippi Medical Center (UMC), founded in 1986, offers a unique program of behavior treatment for headache sufferers. The Head Pain Center staff consists of faculty and residents from both the Department of Psychiatry and the Department of Neurology at UMC. Directors of the Head Pain Center are headache specialists, and center services include comprehensive evaluation, pharmacologic and nonpharmacologic therapy, relaxation and biofeedback training, cognitive-behavior therapy/stress-management training, and home-based treatment. The Head Pain Center is most widely recognized for its development of cost-effective strategies for implementing nonpharmacologic therapy for headache sufferers, and interventions developed at UMC are employed at many headache specialty centers nationwide.

Whereas most neurologists do not have available to them a formal program such as that offered at the

Figure 5. Meta-analysis of Clinic-Based vs Minimal Contact Behavioral Treatment

Wait-list control is a “no treatment control” condition in which the control patients self-monitor their headache activity but receive no treatment during the study interval. Data from Rains et al11; Penzien et al.12
 UM C Head Pain Center, it may be worthwhile developing a partnership or collaboration with a behavior therapist in your geographic area who specializes in headache and/or any of the behavior therapy techniques discussed here. More information on the UM C Head Pain Program can found at http://psych.umc.edu/head_pain_center.htm.

**CONCLUSION**

Behavior interventions for migraine and tension-type headache prevention are efficacious, can be effectively administered in a variety of formats and settings, and are essentially absent of negative side effects. The benefits achieved also endure over time. Much remains to be learned about which type of patients benefit from which type of treatment (pharmacologic, behavior, combination) and the importance of treatment-sequencing effects (ie, any possible differences in outcome based on the order of administration of the interventions). Current research focuses on increasing the cost effectiveness of behavior therapies and ways to incorporate them into the primary care setting, where most headaches are treated.14

**REFERENCES**


