

Chapter 48

Psychological and Behavioral Treatments of Migraines

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Over the past three decades, several widely used behavioral interventions for migraine headache have been shown to be effective (1–6). In most instances these interventions emphasize prevention of headache episodes as opposed to aborting acute headache. Although behavioral modalities can be highly effective as monotherapy, they are more commonly used in conjunction with pharmacologic management.

Behavioral interventions are particularly well suited for headache patients with (a) poor tolerance of pharmacologic treatments; (b) contraindications for medications; (c) insufficient response to pharmacologic treatments; (d) patient preference for nonpharmacologic treatment; (e) pregnancy, planned pregnancy, or nursing; (f) history of frequent or excessive use of analgesic or other acute medications that can aggravate headache problems (or decreased responsiveness to other pharmacotherapies), and (g) significant stress or deficient stress-coping skills. However, many patients who benefit from psychological and behavioral treatment have no psychological or behavioral deficiencies. The long-term goals of behavioral headache therapies include (a) reduced frequency and severity of headache; (b) reduced headache-related disability; (c) reduced reliance on poorly tolerated or unwanted pharmacotherapies; (d) enhanced personal control of headache; and (e) reduced headache-related distress and psychological symptoms.

The most extensively researched and most frequently used interventions fall into three categories: relaxation training, biofeedback (often administered in conjunction with relaxation training), and stress-management training (cognitive-behavioral therapy). The resources necessary for implementation of these therapies (e.g., trained clinicians, biofeedback equipment) are not always readily available. To facilitate dissemination of these interventions, the World Health Organization has released the monograph *Self-management of Recurrent Headache* as a part of their series of behavioral science learning modules for

the health professions. The monograph presents a “low-tech” approach to behavioral headache therapy that can be readily implemented by generalist healthcare providers with minimal resources (2).

RELAXATION TRAINING

The therapeutic value of relaxation training has been recognized for over 100 years (7,8). During the past three decades, three types of relaxation training have become widely accepted as a standard treatment for headache: (a) progressive muscle relaxation—alternately tensing and relaxing selected muscle groups throughout the body (9–12); (b) autogenic training—the use of self-instructions of warmth and heaviness to promote a state of deep relaxation (13); and (c) meditation or passive relaxation—use of a silently repeated word or sound to promote mental calm and relaxation (14). The development of relaxation skills presumably enables headache sufferers to exert greater control over headache-related physiologic responses and, more generally, to lower sympathetic arousal. Relaxation training may also provide a retreat from daily stressors as well as assist patients to gain a sense of mastery or self-control over their symptoms. A relaxation training protocol may consist of 10 or more treatment sessions, with many clinicians using fewer sessions when treating uncomplicated headache conditions. During treatment, patients typically are instructed to practice relaxation daily at home, with audiotapes provided to facilitate practice.

BIOFEEDBACK TRAINING

The two types of biofeedback training most often employed in the treatment of recurrent headaches are hand warming or thermal biofeedback—feedback of skin

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temperature from a finger—and electromyographic (EMG) biofeedback—feedback of electrical activity from muscles of the forehead, scalp, neck and sometimes the upper body (1,15). Other types of biofeedback training (e.g., cephalic vasomotor, electrodermal) are more challenging to administer and are not widely used with headache. Biofeedback training for headache is commonly administered in conjunction with relaxation training either concurrently or sequentially, and may require a dozen or more treatment sessions. As with relaxation training, patients typically are instructed to practice self-regulation skills at home daily during treatment.

STRESS MANAGEMENT TRAINING AND COGNITIVE-BEHAVIORAL THERAPY

The rationale for cognitive-behavioral therapy or stress-management training in headache management derives from the observation that the way individuals cope with everyday stressors can precipitate, exacerbate, or maintain headaches and increase headache-related disability and distress (16–18). Cognitive-behavioral therapy focuses on the cognitive and affective components of headache, and it is typically administered in conjunction with relaxation or biofeedback training that focuses on the physiologic components of headache.

Cognitive-behavioral interventions alert patients to the role of cognitions in stress responses and the relationships between stress, coping, and headache. Patients are taught to identify the specific psychological or behavioral factors that trigger or aggravate their headaches, and to employ more effective strategies for coping with headache-related stress. By assisting patients to more effectively manage stress, cognitive-behavioral therapy can limit the disability, anxiety, and depression that often afflicts patients with more frequent and severe headaches. Cognitive-behavioral therapy for headache commonly requires from 3 to 12 or more treatment sessions. Clearly, greater psychotherapeutic skill is required to administer cognitive-behavioral therapy than to administer relaxation training or biofeedback training.

Effectiveness of Behavioral Treatments

A number of meta-analytic reviews have summarized the empirical evidence examining the effectiveness of behavioral interventions for migraine (19–22). The most recent was an exhaustive review by Goslin et al. (23) undertaken with support from the Agency for Healthcare Research and Quality (AHRQ) and employing highly conservative study inclusion criteria. The literature search

identified 355 articles describing behavioral and physical treatments for migraine, of which 70 reported controlled clinical trials of behavioral treatments for migraine in adults. The 39 prospective and randomized trials that met all of the stringent research design and data extraction requirements yielded 60 treatment groups in the following categories: relaxation training, temperature biofeedback training, temperature biofeedback plus relaxation training, EMG biofeedback training, cognitive-behavioral therapy (stress-management training), cognitive-behavioral therapy plus temperature biofeedback, wait list control, and other controls. Treatment outcome data were calculated using two metrics: summary effect size estimates and mean percentage headache improvement from pre- to posttreatment. These behavioral interventions yielded 32 to 49% reductions in migraine versus 5% reduction for no-treatment controls (Fig. 48-1). The effect size estimates indicated that relaxation training, thermal biofeedback combined with relaxation training, EMG biofeedback, and cognitive-behavioral therapy were all statistically more effective than wait list control.

The AHRQ-sponsored meta-analysis (23) is the only empirical review of the migraine literature to employ highly selective study inclusion criteria. Each of the earlier meta-analyses were broadly inclusive of all available research (19–22). Findings of the other meta-analyses nevertheless closely parallel the AHRQ review indicating that

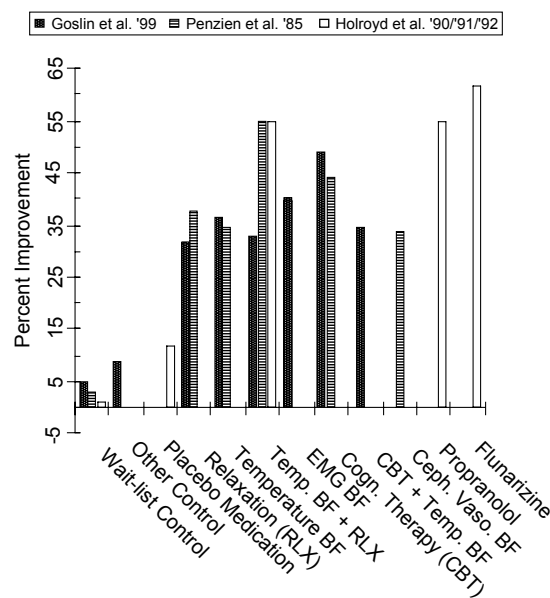


FIGURE 48-1. Results of three meta-analyses of behavioral and pharmacological treatments for migraine: percent improvement scores by treatment condition. Abbreviations: RLX, relaxation training; BF, biofeedback; EMG, electromyographic; CBT, cognitive-behavioral treatment; Ceph. Vaso BF, cephalic vasomotor biofeedback.

behavioral treatments for migraine headache are effective (35 to 55% improvement), and all treatments are more effective than control conditions (see Fig. 48-1).

There is a sizeable amount of evidence indicating that, at least among those who respond initially, the effects of behavioral treatments endure over time, with the longest follow-up occurring 7 years posttreatment (22,24). For example, Blanchard et al. (25) found that 91% of migraine headache sufferers remained significantly improved 5 years after completing behavioral headache treatment.

An evidence-based practice guideline based on AHRQ technical reviews of the evidence has now been forwarded by a multidisciplinary consortium (U.S. Headache Consortium) (26,27). The organizations comprising the consortium included the American Academy of Family Physicians, American Academy of Neurology, American Headache Society, and the American College of Physicians, among others. The Consortium's recommendations pertaining to behavioral interventions for migraine are (a) relaxation training, thermal biofeedback combined with relaxation training, EMG biofeedback, and cognitive-behavioral therapy may be considered as treatment options for prevention of migraine (Grade A Evidence), and (b) behavioral therapy may be combined with preventive drug therapy to achieve added clinical improvement for migraine (Grade B Evidence) (28).

ALTERNATE TREATMENT FORMATS FOR BEHAVIORAL INTERVENTIONS

In the 1980s, researchers became increasingly aware of drawbacks to intensive clinic-based and individually administered behavioral treatment delivery models and began to consider issues of cost and efficiency. Minimal therapist contact treatments, group treatment, and some novel mass communication treatment formats have emerged to increase accessibility or reduce costs of behavioral treatments.

Minimal Therapist Contact Treatment

In a minimal-contact or "home-based" intervention, self-regulation skills are introduced in the clinic, but training primarily occurs at home with the patient guided in part by printed materials and audiotapes. Consequently, only three or four clinic sessions may be necessary when behavioral techniques are delivered via this format versus the eight or more weekly clinic sessions required for the standard clinic-based format. Three meta-analyses of minimal-contact behavioral interventions for headache have consistently demonstrated the utility of this approach, indicating that for many patients such treatments can be

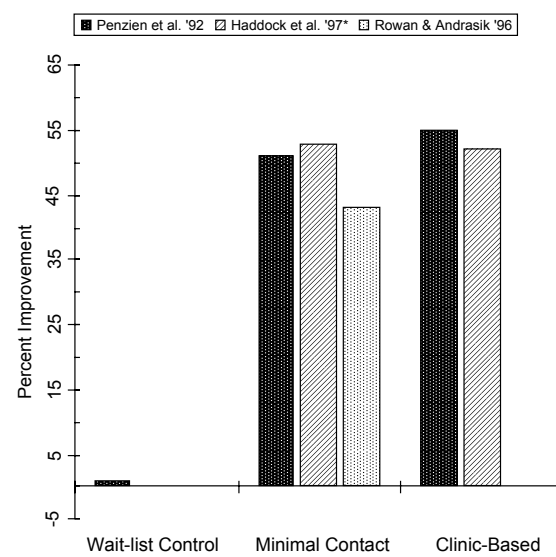


FIGURE 48-2. Results of three meta-analyses of clinic versus minimal contact treatments for migraine: percent improvement scores by treatment and control condition.

as effective as those delivered in a clinic setting (6,29,30) (Fig. 48-2).

Group Treatment

In clinical practice, behavioral interventions for headache often are administered in small groups (rather than individually). Although the literature addressing the group treatment format is relatively limited (31), one meta-analysis identified 10 studies where behavioral treatments were administered in a group format (30). The 53% improvement associated with the group format was similar to that reported when the same interventions were individually administered. Where patient flow is adequate, group rather than individual administration of treatment allows the cost of treatment to be reduced and professional time to be efficiently allocated.

Internet and Mass Communications Treatments

Several groups are developing headache treatments that utilize the Internet and other media; such treatment delivery models may ultimately provide access to large numbers of patients in a cost-effective manner and may help to overcome the limitations of strictly self-help approaches (32,33). Should a sufficiently large number of people access such programs and attain even a modest level of benefit, this approach could have a substantial impact on headache from a public health perspective. Challenges for these types of approaches include ensuring adequate medical evaluation and follow-up, managing emergencies and crises, and

resolving practice issues across state, national, and international licensing boundaries.

BEHAVIORAL MANAGEMENT OF PEDIATRIC MIGRAINE

The treatment of childhood and adolescent migraine has not been as widely investigated as that of adult migraine. This is probably the case because severe migraine in children does not appear to be as common as in adults, and children's pain has historically been ignored. Although migraine can emerge at an early age, there is a sharp increase in the number of migraine sufferers in adolescence (see Chapter 3). Thus, almost all trials have included adolescents as the majority of participants.

Psychological and behavioral techniques may be particularly useful in children and adolescents. A recent meta-analysis of the biofeedback literature demonstrated a marked therapeutic response (percent headache improvement) to temperature and EMG biofeedback among children with headache improvement significantly greater than that observed among adults (34) (Fig. 48-3). The age range across pediatric studies included in the meta-analysis was 7 to 19 years with headache improvement across pediatric studies averaging 62 and 81% for temperature and EMG biofeedback, respectively.

The evidence suggests that relaxation treatment, temperature biofeedback, and cognitive therapy are all effective (34–37). At this time, there is no evidence that one ap-

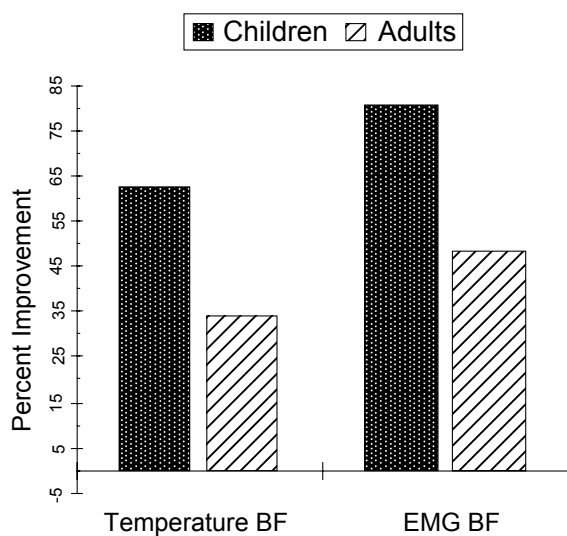


FIGURE 48-3. Results of meta-analyses of temperature and EMG biofeedback treatments for headache: percent improvement scores in children versus adults. *Abbreviations:* Temp. BF, temperature or thermal biofeedback; EMG BF, electromyographic biofeedback.

proach is superior to another. One randomized trial (38) found that the addition of a simple parental component discouraging sick role behavior and encouraging healthy behavior to standard biofeedback significantly improved outcome. Although no direct treatment comparisons of adolescents and adults have been conducted, behavioral and psychological treatment of adolescents appears to be at least as effective and probably superior to that of adults.

Comparing behavioral and pharmacologic treatments, a meta-analysis of the pediatric literature found thermal biofeedback training (either when administered alone or when combined with relaxation training) and propranolol yielded similar improvements in pediatric migraine (39). Improvements reported with thermal biofeedback training were more significant than improvements reported with either serotonergic drugs (a heterogeneous group that included amitriptyline, trazodone, cyproheptadine, pizotifen, and tryptophan) or calcium channel blockers (flunarizine or nimodipine). Unfortunately, this meta-analysis was limited by the small number of available trials of any sort with pediatric migraine. The one study to directly compare behavior therapy and prophylactic drug therapy in children (6 to 12 years of age) found that combined relaxation and self-hypnosis training (five treatment sessions) yielded significantly better results than did propranolol (3 mg/kg per day), which failed to produce better results than placebo. Additional studies comparing drug and behavioral therapies in pediatric migraine are needed.

The responsiveness of pediatric migraine to behavioral treatments may be particularly noteworthy because there is much less evidence for the effectiveness of medications in pediatric than in adult migraine. For example, a recent Cochrane review on pharmacologic prevention of migraine (40) found only two trials that met basic methodologic criteria. Reviewed trials, including 11 different prophylactic medications, yielded evidence of efficacy for only propranolol and flunarizine (one study each) in pediatric migraine. Similarly, a systematic review of abortive medications (41) found only four studies of triptans for pediatric migraine; only nasal sumatriptan was found effective. A comprehensive analysis of pharmacologic treatment of pediatric migraine is presented elsewhere in this volume.

BEHAVIORAL MANAGEMENT VERSUS PHARMACOTHERAPY

The comparative efficacy of pharmacologic versus behavioral therapies for adult migraine has only rarely been assessed (42–46). However, meta-analyses demonstrate virtually identical improvement in migraine when comparing propranolol (arguably the preventive pharmacologic therapy most widely employed in the United States and among the most effective for migraine; 32 trials), flunarizine

(a calcium-channel blocker widely used for migraine prophylaxis in Canada and Europe; 31 trials), and combined relaxation and biofeedback training (35 trials) (21,47,48) (see Fig. 48-1). The average patient receiving propranolol, flunarizine or behavioral interventions showed greater than a 50% improvement in migraine, whereas the average patient receiving a placebo pill for migraine showed only a 12% improvement (49) (see Fig. 48-1). This suggests that the best of the prophylactic medications and behavioral therapies may be equally viable treatment options, although the two treatment modalities are likely to have differing advantages and disadvantages within particular subgroups of patients.

Combined propranolol plus relaxation/thermal biofeedback therapy has proven highly effective in controlling recurrent migraines in two trials yielding more than a 70% reduction in migraine activity on average (44,50). In one trial conducted at a headache specialty center, the combined treatment proved only slightly more effective than propranolol, which in turn was more effective than relaxation/biofeedback training alone (44). This suggests that prophylactic drug therapy may be a necessary component of treatment in the tertiary population. The second smaller trial, conducted with patients more similar to those seen in a primary care setting, also found the combined treatment more effective than relaxation/biofeedback training alone (50). Notably, two thirds of the patients who received propranolol and relaxation/biofeedback training in this study were able to effectively control migraines with only a low dose of propranolol (60 mg/d). This raises the possibility that combined therapy may enable patients with less severe migraines to control their headaches with low-dose prophylactic therapy.

BEHAVIORAL TREATMENTS: EFFECTIVE BUT INACCESSIBLE TO AVERAGE HEADACHE SUFFERERS

Despite strong empirical support, even the well-established behavioral treatments are not readily accessible to the average headache sufferer. In fact, at present only the most treatment-refractory patients tend to be referred for behavioral treatments. In addition, experienced clinicians trained to administer behavioral headache treatments (often mental health professionals) may be in short supply. The rationale for and value of behavioral treatments for headache is often poorly articulated, and some continue to perceive any referral for behavioral or "psychological" services to be stigmatizing.

In a cost-conscious healthcare environment, cost effectiveness often is more important than overall effectiveness for widespread implementation of any given intervention. Studies evaluating cost of headache care have determined that while "standard" clinic-based behavioral interven-

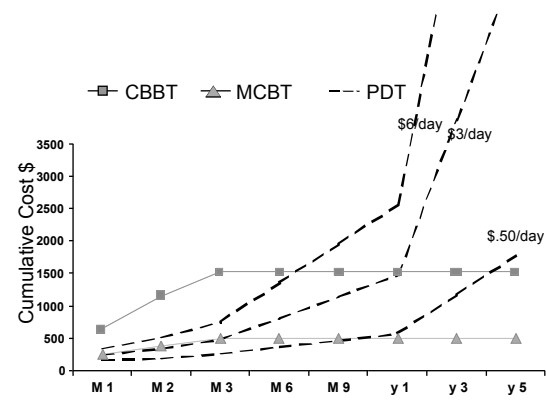


FIGURE 48-4. Cost comparisons for clinic-based behavioral treatment, minimal-contact behavioral treatment and low-, moderate-, and expensive-priced prophylactic medications. CBBT, clinic-based behavioral treatment; MCBT, minimal-contact behavioral treatment; PDT, prophylactic drug treatment; M, month; Y, year.

tions are relatively costly, minimal-contact formats with fewer clinic visits are much less costly (51) (Fig. 48-4). Indeed, minimal-contact approaches are the least expensive treatment option after 1 year, compared to clinic-based behavioral treatment as well as compared to low, moderately, and expensive priced prophylactic medications. Within 5 years, as the cost of prophylactic medications continue to accrue while the cost of clinic-based and minimal-contact interventions remains fixed, the behavioral interventions in either format are less costly than any long-term prophylactic medication treatment. Thus, minimal-contact interventions are cost competitive with inexpensive preventive headache medications within 1 year and both minimal-contact and clinic-based behavioral treatments are the least costly preventive intervention for headache in the long run (by year 5). Unfortunately, even the modest cost of minimal therapist contact behavioral therapies can prove prohibitive for patients when these services are not reimbursed by third-party payers (many health insurance policies or programs do not adequately cover "psychological" services).

FUTURE DIRECTIONS: INTEGRATION OF BEHAVIORAL INTERVENTIONS INTO MAINSTREAM CARE

Certainly, the efforts described to develop more cost-effective and accessible behavioral treatments should continue. However, in the next decade behavioral interventions should increasingly focus on training patients to perform headache self-management skills complementary with either behavioral and pharmacologic

TABLE 48-1 Self-Management Skills for Chronic Headache

- Patients accept that headache is a chronic but treatable condition.
- Acquire basic understanding of their own headache disorder and its treatment.
- Actively participate in the control and management of their headaches.
- Identify individual headache triggers.
- Be able to articulate strategies for avoiding, reducing, or managing headache triggers.
- Follow a prescribed written treatment plan.
- Recognize headache onset and engage the appropriate behavioral and pharmacologic treatment.
- Correctly use medications, including acute analgesic, abortive, and prophylactic medications according to prescribed optimal dose and schedule.
- Understand the phenomena of medication-overuse headache and limit medications as prescribed to eliminate risk for this headache complication.
- Use medical resources appropriately for routine and acute care.
- Monitor headache-related outcomes as agreed upon necessary to evaluate response to intervention.
- Identify barriers to compliance with the treatment plan.

Adapted from: Penzien DB, Rains JC, Lipchik GL, et al. Behavioral interventions for tension-type headache: overview of current therapies and recommendation for a self-management model for chronic headache. *Curr Pain Headache Rep.* 2004;8:489-499.

treatments. Such headache-management skills are conceptually akin to disease management models (Table 48-1). Self-management of headache would support and facilitate use of the empirically established pharmacologic and behavioral treatments described, but would optimize the patient-physician collaboration, treatment compliance, patient education and lifestyle (52).

BEHAVIORAL SELF-MANAGEMENT OF HEADACHE: A CHRONIC DISEASE MANAGEMENT APPROACH

Although not yet well developed, migraine and other forms of chronic headache are excellent candidates for disease management. Elements of self-management have been applied in health maintenance organizations (HMO), a multidisciplinary inpatient program, and a psychologically oriented intervention not integrated into medical practice. A representative HMO-based program (53) reported outcome of a "disease management" intervention on direct medical costs related to headache. Eligible patients included those overusing triptan medications, requiring emergency department visits for headache, or physician referred. The "headache class" was led by a nurse practitioner working with headache patients in small groups, and emphasized education of headache pathophysiol-

ogy, triggers, and so on, with additional focus on medication overuse. Patients also participated in individual consultation with the nurse practitioner or physician. Six months postintervention, a decrease was observed in physician office and emergency room visits, with the greatest decrease among patients with high utilization prior to the intervention. Cost savings were consistent with other studies in HMO settings (54,55). Similar programs have also reported decreased headache frequency among patients, increased patient satisfaction with headache care, decreased emergency room visits for headache, improvements in measures of disability and functional status (54,55), and decreased prescriptions for narcotics (55).

An intensive psychologist-administered self-management program within an inpatient multidisciplinary headache treatment setting was evaluated by Lake et al. (56). Data from 100 inpatients (average hospital stay 8.5 days) with severe chronic daily headache described as treatment refractory, underwent individualized behavioral treatments (e.g., relaxation, biofeedback), health promotion skills (e.g., sleep regulation, smoking cessation, exercise), psychotherapy, and pharmacotherapy. Family participation was encouraged. Minimum 50% headache improvement was reported for 75% of patients along with decreased medication use. Improvements were also observed in measures of depression, sleep disturbance, work, and functional status. A second study of the program confirmed outcome (57).

An intensive outpatient behavioral intervention included components of problem analysis, self-recording, self-monitoring, goal setting, and self-control skill acquisition and application (58). Using a sequential "dismantling" research design to isolate the contributions of individual treatment components, each additional treatment component added sequentially to headache improvement. At 3 months posttreatment, the small subgroup receiving all phases of the intervention achieved an 83.2% improvement. Unfortunately, although highly effective, these more intensive interventions are not readily adapted to the primary care setting.

FACILITATION OF MEDICATION COMPLIANCE

Behavioral interventions may facilitate use of prescribed medications. Holroyd et al. (59) improved adherence with the abortive medication, ergotamine. Patients who received a brief adherence intervention and telephone follow-up attempted to abort 70% of migraine attacks and showed clinically significant reductions in migraine activity (40% reduction). In contrast, control patients who received standard care attempted to abort only about 40% of their migraine attacks and showed smaller reductions

in migraine activity (26% reduction). These results suggest that interventions to facilitate the effective use of prescribed medications deserve attention. For many patients, brief interventions that successfully improve adherence with existing medical regimens might yield greater benefits than will new pharmacologic agents.

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