

Complementary and Alternative Approaches to the Treatment of Tension-Type Headache

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Abstract While pharmacotherapy with nonsteroidal anti-inflammatories (NSAIDs) and tricyclic antidepressants comprises the traditional treatment of tension-type headaches (TTH), the use of other therapeutic approaches in combination with medications can increase the success of treatment. Patients with comorbid mood disorders and frequent headaches may particularly benefit from some nonpharmacologic approaches. This review focuses on complementary and alternative approaches to tension-type headache treatment, including psychological therapies, acupuncture, and physical treatments. The current evidence indicates that EMG biofeedback (BFB) is effective in the treatment of TTH, and cognitive behavioral therapy and relaxation training may also be beneficial. Physical therapy and acupuncture may be considered in patients with frequent TTH, but the scientific basis is limited.

Keywords Complementary treatment · Alternative treatment · Nonpharmacologic treatment · Tension-type headache · Psychological treatment · Physical treatment · Biofeedback · Acupuncture · Cognitive behavioral therapy · Nutraceuticals

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Introduction

When used in combination with traditional medications, nonpharmacologic treatment can increase the success of tension-type headache treatment. While the improvement in headache frequency and intensity resulting from behavioral therapies generally appears more gradually than that seen from pharmacologic treatment, the effect is maintained for longer periods of time, even up to several years [1]. An important benefit of many of these therapies is that once learned, they can be practiced at home and later used in stressful situations. Some forms of therapy are even available as home-based treatment in the form of audiotapes or CDs accompanied by a manual. In fact, self-regulated, home-based treatment with little face-to-face contact with a therapist has been shown to be equivalent or superior to clinic-based therapy [2, 3], and is cost-effective.

Since the publication of our original article in 2008, the case for including complementary and alternative therapies in the comprehensive treatment of TTH has been bolstered by guidelines from the European Federation of Neurological Societies (EFNS), which state that non-pharmacological modalities should always be considered, although the scientific evidence is limited [4•]. In this review, psychological therapies such as biofeedback (BFB), relaxation training, and cognitive behavioral therapy (CBT) will be discussed. Acupuncture, physical treatments, and nutraceuticals will also be addressed.

Psychological Treatment

In general, psychological therapy refers to biofeedback, relaxation training, and cognitive behavioral therapy. Although anyone can benefit from these therapies, they may be most helpful for those patients in whom pharmacological options are limited, such as children and the elderly. While

psychological therapy has not yet been well-studied in these groups, some evidence suggests that older adults might benefit from this type of treatment, particularly CBT [5, 6], and relaxation training may be effective in treating juvenile tension-type headache [7, 8].

Psychological therapies may be more effective in preventing the transformation of episodic to chronic TTH than in managing chronic TTH [9••] so the appropriate referrals should be made when TTH is in the episodic stage. Several factors are predictive of the success of psychological therapies in TTH patients. Excessive use of acute medications such as analgesics and ergotamines are associated with less therapeutic efficacy than for those patients who do not overuse these medications. Daily continuous headache and high scores on psychological tests that evaluate for psychiatric disorders are other variables that may predict a limited response to behavioral therapy [9••]. These patients, who are at higher risk of relapse, may benefit from booster therapeutic sessions [9••].

Electromyography (EMG) Biofeedback Therapy

In this form of therapy, patients are given continuous information regarding the degree of tension in one or more pericranial muscles, with the goal of teaching them to assess and control the tension on their own. Electrodes are usually placed on the frontalis muscle, but the temporalis, trapezii, and multiple sites have been used as well. During training, feedback can be given in auditory form (via clicks varying in rate) or visual form (via bars varying in length). Auditory feedback is more popular, and allows patients the added benefit of closing their eyes during training [8]. Training is done over the course of 5 to 25 sessions. In addition to office-based training, patients are usually given instructions for practicing these skills at home on a daily basis. Biofeedback is often combined with relaxation training.

The efficacy of BFB in TTH was supported by a 2008 meta-analysis [10], which evaluated 53 outcome studies with a total of over 400 patients, and found a significant medium-to-large effect size that was stable over an average follow-up period of 15 months. Superior effect sizes for BFB were found when compared to psychological placebo and relaxation therapies. While the largest improvements were shown in headache frequency, significant effects were also seen for muscle tension, self-efficacy, symptoms of anxiety and depression, and analgesic medication consumption.

Combining BFB with relaxation training increased treatment efficacy, with a particularly marked effect in children and adolescents. In addition, courses of BFB treatment were short and cost-effective, taking place over an average of 11 sessions.

Subsequently, a comprehensive efficacy review [11•] provided efficacy recommendations for BFB in the treatment of TTH (as well as migraine). These recommendations were based on criteria established by the Association for Applied Psychophysiology and Biofeedback (AAPB) and the International Society for Neurofeedback and Research (ISNR) [12]. The available evidence for TTH indicated that BFB can be supported as an efficacious and specific treatment option, and a Level 5 efficacy recommendation was given. This is the highest level of evidence according to the AAPB/ISNR criteria, granted in cases where Level 4 evidence has been established and additional superior treatment results in comparison to credible sham therapy or alternative bona fide treatments have been shown.

Relaxation training

The goal of relaxation therapy is to enhance the awareness of tense and relaxed muscles, and such training has become part of conventional treatment for TTH [2]. In doing so, patients become more conscious of their posture and the way they sit, stand, walk, and sleep. While techniques are usually learned in a dark, quiet setting, they are eventually applied to everyday aspects of work and leisure [13].

The two forms of relaxation training that are most widely used are progressive relaxation training (PRT) and autogenic training. PRT, which is used more commonly, promotes the recognition of tension and relaxation in the course of daily life [9••]. Usually fewer than 10 sessions are needed to complete a course of treatment [9••]. Patients are trained to sequentially tense and then relax groups of muscles throughout the body. Initially 16 muscle groups are involved, and as treatment proceeds, muscle groups are progressively combined to result in four groups at the end of therapy. After this initial stage of treatment, patients learn relaxation by recall, cue-controlled relaxation, and differential relaxation (in which relaxation of muscles not required for current activities is maintained).

Schultz and Luthe [14] developed another form of relaxation training, referred to as autogenic training. The basic concept of autogenic training is the achievement of relaxation of the body through relaxation of the mind, using visual imagery and body awareness. Autosuggestion is central to the training, in which mental and somatic function are concurrently regulated by passive concentration on formulas such as “my forehead is cool.” Although Schultz and Luthe suggested 13 to 30 treatment sessions, most researchers and clinicians use fewer [9••].

A 2009 analysis of randomized studies comparing relaxation therapy with waiting list conditions found inconsistent results [15]. However, the EFNS guidelines authors have suggested that relaxation treatment may be particularly helpful for tense patients [4], and others have observed that a

familiarity with PRT predicts a good outcome from a multidisciplinary headache treatment program [16].

Cognitive Behavioral Therapy

Cognitive behavioral therapy (CBT) is a form of treatment that addresses the relationships between stress, coping, and headaches, and the role of cognition on these relationships. Patients are taught to identify and challenge dysfunctional thoughts and the beliefs that give rise to these thoughts. Often, patients are also taught pain management strategies such as imagery training and attention-diversion training. Dietary interventions, lifestyle modification, and contingency management are generally provided where relevant [9•, 17, 18].

CBT is probably most effective in cases where there are significant psychological or environmental problems, such as chronic work stress, mood disorders, or adjustment problems that worsen headaches or prevent headache patients from successfully implementing self-regulation skills. While CBT can decrease TTH activity by 40–50 % or more [19, 20], it is most effective when used with biofeedback or relaxation training, especially in patients with higher stress levels, psychiatric co-morbidities, or poor coping [9•, 21].

Combining Psychological Therapy with Pharmacotherapy

Integrating medical management with psychological treatment can result in more effective treatment of TTH, and an early study even suggested that psychological treatment alone may be superior to medical treatment alone [22]. One study comparing amitriptyline and CBT in TTH showed that both types of treatment significantly reduced headache activity [23]. Another study [24], in which patients were divided in groups receiving an antidepressant (amitriptyline or nortriptyline), placebo, CBT plus placebo or CBT plus an antidepressant, showed that the three treatment groups had similar improvements in headache activity and quality of life, but those patients who received CBT plus an antidepressant were more likely to have a >50 % reduction in TTH activity than those receiving either treatment alone. Combining antidepressants with psychological therapy may be most beneficial in patients with unremitting TTH or concurrent mood disorders [25].

Acupuncture

Studies on acupuncture in headache have been limited by small sample sizes and the inherent difficulties in performing sham procedures in control groups. In some studies, sham acupuncture is conducted by inserting needles at sites far from traditional acupuncture points, but this has been associated

with beneficial effects as well [26]. Amongst the randomized controlled trials that have been conducted, uniformity in selected acupuncture points and overall treatment course have been lacking.

A 2009 Cochrane review of acupuncture in the treatment of TTH [27•] included 11 trials with 2317 participants. These trials varied considerably in term of patient characteristics and methodology. Two trials included only episodic TTH patients, two comprised only patients with CTTH, and 7 included both forms. Results of two large-scale studies showed that adding acupuncture to routine care or to acute treatment only reduces the short-term (3 months) frequency and intensity of headaches. Longer-term effects were not investigated. Acupuncture was compared with several different sham interventions in six trials, which collectively showed a small but significant reduction of headache frequency for true acupuncture as compared to sham procedures, over a 6-month period of time. The remaining trials compared acupuncture with physiotherapy, massage, or exercise, but acupuncture was not found to be superior to any of the control groups. For some outcomes better results were suggested in the control groups but these findings were difficult to interpret because of methodological or reporting issues. The authors concluded that acupuncture “could be a valuable non-pharmacological tool in patients with frequent episodic or chronic tension-type headaches.”

Physiotherapy and Other Physical Treatments

The rationale for physiotherapy (massage, passive stretching, positioning, ergonomic instruction, transcutaneous electrical nerve stimulation, and heat or cold application) in the treatment of pain is based on the assessment and treatment of biomechanical dysfunction which occurs as a result of stress or strain on the musculoskeletal system [13]. For primary headache disorders such as TTH, which are considered to be centrally mediated, the approach is not quite straightforward as the musculoskeletal system is not believed to play a primary pathophysiological role. The focus of physiotherapy in TTH is therefore to decrease or minimize chronic nociceptive input into the central nervous system [13].

When assessing a TTH patient for physiotherapy, the history should address any musculoskeletal pain triggers and any compensatory mechanisms the patient may have devised to reduce the associated pain. On physical exam, tenderness of the pericranial muscles on manual palpation is a common finding in TTH [28–33] and probably represents central sensitization of these tissues [34, 35]. Myofascial trigger points, which are tender nodules located within muscle tissue, are likely to be peripherally mediated and are associated with a pattern of referred pain [13]. Increased

cervical muscle tone, which may be a result of poor posture or anxiety, may contribute to pericranial muscle tension because of the contiguous relationship between the shoulder, neck, and scalp muscles [36].

Although many forms of physical treatments have been advocated in the treatment of TTH, such as physiotherapy (massage, passive stretching, positioning, ergonomic instruction, transcutaneous electrical nerve stimulation (TENS), heat or cold application), exercise, and cervical spinal manipulations, none have proven long-term efficacy, either alone or in combination. Furthermore, analyses of physical treatments in headache are limited by several factors, including inconsistencies in the definitions of treatments such as physical therapy, chiropractic, or osteopathic manipulations, as well as a heterogeneity in the interventions and patient populations that have been studied. In addition, many of the published case series and controlled studies are of low quality.

Though some reviews of chiropractic manipulation in TTH [37–39] have suggested a trend towards benefit, recent evidence-based guidelines of chiropractic maneuvers in the treatment of headache [40] stated that evidence for the use of spinal manipulation as an isolated intervention for TTH patients is equivocal. However, low-load craniocervical mobilization may be beneficial for longer term management of patients with episodic or chronic tension-type headaches. Other reviews of manual therapies [41], physiotherapy and spinal manipulation [42] in TTH revealed insufficient evidence regarding their efficacy, though some studies have suggested that physical therapy may be most effective in women and patients with CTTH [43–47].

Overall, these physical treatments are most beneficial when integrated into a multimodal treatment plan including exercise, stretching, and ergonomics training for both the home and the workplace. TTH patients who express an interest in physiotherapy are more likely to benefit from active strategies such as exercise than passive ones such as massage and heat or cold application [13]. The Mayo Clinic recommends regular aerobic exercise as well as yoga, stretching, posture improvement and massage to help in reducing the frequency and severity of tension-type headaches [48]. Yoga has been associated with stress reduction and improvements in coping with fatigue, depression and pain in distressed women [49], and one study [50] even suggested that yoga-based management was more effective than pharmacotherapy in the treatment of chronic tension-type headache.

Nutraceuticals

Patients often express an interest in vitamins and supplements in the treatment of their headache disorder. While

studies of nutraceuticals such as butterbur, magnesium, riboflavin, CoQ10, and MIG-99 (feverfew) have demonstrated varying degrees of efficacy for migraine [51], there have been not been any studies evaluating their use in TTH. However, peppermint and eucalyptus oil preparations may have some use in TTH treatment. One small (n=32), double-blind, placebo-controlled, randomized cross-over study [52] evaluated the effects of these preparations on neurophysiological, psychological and experimental algometric measures after the application of test preparations to the forehead and temples. A combination of peppermint oil and ethanol resulted in a significant analgesic effect with a reduction in sensitivity to headache. Although the combination of peppermint oil, eucalyptus oil and ethanol did not have a significant analgesic effect, an increase in cognitive performance as well as a muscle-relaxing and mentally relaxing effect were noted. Later, the effect of a peppermint oil preparation on TTH was studied in another randomized, placebo-controlled double-blind crossover study (n=41), in which headaches were treated with oral medication (1,000 mg of acetaminophen or placebo) and the application of an oil preparation (peppermint oil or placebo solution) to the forehead and temples [53]. The peppermint oil solution significantly decreased headache intensity after 15 minutes ($p<0.01$) compared to placebo, and this effect was maintained over the one hour observation period. In addition the peppermint oil preparation was shown to be as effective as acetaminophen. There have been no further studies of peppermint oil or eucalyptus oil preparations in the treatment of TTH, but additional research may be warranted given the results of these initial trials.

Conclusion

Nonpharmacologic therapies should be combined with traditional medications in a comprehensive treatment plan to reduce TTH activity. The best evidence exists for BFB, while CBT and relaxation therapy may also be effective in the treatment of TTH. Encouraging patients to learn these techniques can provide them with skills they can use on a long-term basis, and also engenders a sense of control over a potentially debilitating disorder. Though acupuncture and physical treatments may be helpful in some subsets of TTH patients, the evidence supporting their efficacy is limited. Future studies of CAM treatment options for TTH and other headaches disorders should apply the exacting methodology used in studying pharmacological therapies, and aim to identify which patients would most benefit from these approaches.

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- Of major importance

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