Biofeedback as a Treatment of Headache

Policy Number: 2.01.29
Origination: 7/2008
Last Review: 7/2018
Next Review: 7/2019

Policy
Blue Cross and Blue Shield of Kansas City (Blue KC) may provide coverage for biofeedback as a treatment of headache when it is determined to be medically necessary because the criteria shown below are met.

Biofeedback and biofeedback devices are specifically excluded under many benefit plans. In addition, biofeedback and biofeedback devices may be considered behavioral training and education/training in nature, and such services are specifically excluded under many benefit plans.

When Policy Topic is covered
Biofeedback may be considered medically necessary as part of the overall treatment plan for migraine and tension-type headache.

When Policy Topic is not covered
Biofeedback for the treatment of cluster headache is investigational.

Unsupervised home use of biofeedback for treatment of headache is not medically necessary.

Considerations
Biofeedback may require 10 to 20 office-based sessions of 30 to 60 minutes each.

Description of Procedure or Service

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<th>Populations</th>
<th>Interventions of interest are:</th>
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<td>Biofeedback</td>
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<td>Relevant outcomes include:</td>
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<td>Individuals:</td>
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Biofeedback is a technique intended to teach patients self-regulation of certain physiologic processes not normally considered to be under voluntary control. Biofeedback is frequently used in conjunction with other therapies (e.g., relaxation, behavioral management, medication) to reduce the severity and/or frequency of headaches.

For individuals who have migraine or tension-type headache who receive biofeedback, the evidence includes randomized controlled trials and systematic reviews of these trials. Relevant outcomes are symptoms, functional outcomes, and quality of life. The literature, which includes meta-analyses of a large number of controlled and uncontrolled studies, has suggested that this treatment can reduce the frequency and/or severity of migraine and tension-type headaches. Biofeedback, along with other psychologic and behavioral techniques (e.g., relaxation training) may be particularly useful for children, pregnant women, and other adults who are not able to take medications. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have cluster headache who receive biofeedback, the evidence includes case reports and small case series. Relevant outcomes are symptoms, functional outcomes, and quality of life. No controlled trials were identified on biofeedback for cluster headache. The evidence is insufficient to determine the effects of the technology on health outcomes.

Clinical input and physician specialty society recommendations have strongly supported the use of biofeedback to treat migraine and tension-type headaches when included in a comprehensive treatment program.

**Background**

Biofeedback involves the feedback of a variety of types of information not normally available to the patient, followed by a concerted effort on the part of the patient to use this feedback to help alter the physiological process in some specific way. Biofeedback training is done either in individual or group sessions, alone, or in combination with other behavioral therapies designed to teach relaxation. A typical program consists of 10 to 20 training sessions of 30 minutes each. Training sessions are performed in a quiet, non-arousing environment. Subjects are instructed to use mental techniques to affect the physiologic variable monitored, and feedback is provided for successful alteration of the physiologic parameter. This feedback may be signals such as lights or tone, verbal praise, or other auditory or visual stimuli.

The various forms of biofeedback differ mainly in the nature of the disease or disorder under treatment, the biologic variable that the individual attempts to control, and the information that is fed back to the individual. Biofeedback techniques include peripheral skin temperature feedback, blood-volume-pulse feedback (vasoconstriction and dilation), vasoconstriction training (temporalis artery), and electromyographic (EMG) biofeedback; these may be used alone or in conjunction with other therapies (e.g., relaxation, behavioral management,
medication). In general, EMG biofeedback is used to treat tension headaches. With this procedure electrodes are attached to the temporal muscles and the patient attempts to reduce muscle tension. Feedback on achievement of a decrease in muscle tension is provided to the individual, reinforcing those activities (behaviors or thoughts) that are effective. Thermal biofeedback is commonly used for migraine headaches. In this technique a temperature sensor is placed on the finger, and the subject is taught to increase peripheral vasodilation by providing feedback on skin temperature, an effect that is mediated through sympathetic activity. The pulse amplitude recorded from the superficial temporal artery has also been used to provide feedback. Temporal pulse amplitude biofeedback has been used to treat both chronic tension type headaches and migraine headaches.

**Regulatory Status**
A variety of biofeedback devices are cleared for marketing through the U. S. Food and Drug Administration (FDA) 510(k) process. These devices are designated by the FDA as class II with special controls and are exempt from the premarket notification requirements. The FDA defines a biofeedback device as “an instrument that provides a visual or auditory signal corresponding to the status of one or more of a patient's physiological parameters (e.g., brain alpha wave activity, muscle activity, skin temperature, etc.) so that the patient can control voluntarily these physiological parameters.”

**Rationale**
This evidence review was created in April 1998 and has been updated regularly with searches of the MEDLINE database. The most recent literature update was performed through September 11, 2017. This review was originally informed by a 1995 TEC Assessment.¹

Assessment of efficacy for therapeutic intervention involves a determination of whether an intervention improves health outcomes. The optimal study design for this purpose is a randomized controlled trial (RCT) that includes clinically relevant measures of health outcomes. Nonrandomized comparative studies and uncontrolled studies can sometimes provide useful information on health outcomes but are prone to biases such as noncomparability of treatment groups, placebo effect, and variable natural history of the condition.

**Migraine and Tension-Type Headache**

**Adults**
In 2007 and 2008, Nestoriuc et al in Germany published systematic reviews on biofeedback for migraine and tension-type headaches.²,³ Meta-analysis for the treatment of migraine included 55 studies (randomized, pre-post, uncontrolled) with 39 controlled trials, reporting a medium effect size of 0.58 (pooled outcome of all biofeedback interventions) for treatment of migraine.² Effect sizes were computed using Hedges’ g, which quantifies between-group treatment outcome differences (mean difference between groups divided by the pooled standard deviation). For treatment of tension-type headaches, 53 studies met criteria for
analysis; these included controlled studies with standardized treatment outcomes, follow-up of at least 3 months, and at least 4 patients per treatment group. Meta-analysis showed a medium-to-large effect size of 0.73 that appeared to be stable over 15 months of follow-up. Biofeedback was reported to be more effective than headache monitoring, placebo, and relaxation therapies. Biofeedback in combination with relaxation was more effective than biofeedback alone, and biofeedback alone was more effective than relaxation alone, suggesting different elements for the 2 therapies. Although these meta-analyses were limited by the inclusion of studies of poor methodologic quality, reviewers did not find evidence of an influence of study quality or publication bias in their findings.

Verhagen et al (2009) in The Netherlands published a systematic review of behavioral treatments for chronic tension-type headache in adults. Eleven studies, including 2 studies with low risk of bias, compared biofeedback with waiting-list conditions. Results were found to be inconsistent due to low power, leading reviewers to conclude that larger and more methodologically robust studies should be performed.

**Children**

In 2016, Stubberud et al reported a meta-analysis of biofeedback as prophylaxis for pediatric migraine. They identified 5 RCTs (total N=137 children and adolescents) that met inclusion criteria. Meta-analysis found that biofeedback reduced migraine frequency (mean difference in attacks per week, -1.97, 95% confidence interval, -2.72 to -1.21; p<0.001), attack duration (mean difference, -3.94; 95% confidence interval, -5.57 to -2.31; p<0.001) and headache intensity (mean difference, -1.77 out of 5; 95% confidence interval, -2.42 to -1.11; p<0.001) compared with wait-list controls. However, the identified studies had incomplete reporting and uncertain risk of bias, limiting confidence in the estimate.

A 2009 Cochrane review and a 2010 meta-analysis evaluated psychologic therapies for the management of chronic and recurrent pain in children and adolescents. Twenty-one RCTs met inclusion criteria for the analysis on headache, including 3 trials with biofeedback and relaxation training and 3 trials with biofeedback and cognitive training. Clinically significant pain reduction was found with biofeedback (odds ratio, 23.34), but there was no significant effect on disability or emotional functioning. Reviewers concluded that psychologic treatments (including biofeedback as part of a treatment regimen) are effective in pain control for children with headache, and the benefits appear to be maintained.

**Section Summary: Migraine and Tension-Type Headache**

The evidence on biofeedback for the treatment of migraine and tension-type headache includes meta-analyses of numerous RCTs. Systematic reviews have found significant effects of biofeedback on headache frequency and intensity in both children and adults. Biofeedback in combination with relaxation is more effective than relaxation alone, suggesting that these act independently.
Cluster Headache
Only case reports and small case series were identified on the treatment of cluster headache with biofeedback. No controlled trials were found.

Summary of Evidence
For individuals who have migraine or tension-type headache who receive biofeedback, the evidence includes randomized controlled trials and systematic reviews of these trials. Relevant outcomes are symptoms, functional outcomes, and quality of life. The literature, which includes meta-analyses of a large number of controlled and uncontrolled studies, has suggested that this treatment can reduce the frequency and/or severity of migraine and tension-type headaches. Biofeedback, along with other psychologic and behavioral techniques (eg, relaxation training) may be particularly useful for children, pregnant women, and other adults who are not able to take medications. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

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Supplemental Information

Clinical Input From Physician Specialty Societies and Academic Medical Centers
While the various physician specialty societies and academic medical centers may collaborate with and make recommendations during this process, through the provision of appropriate reviewers, input received does not represent an endorsement or position statement by the physician specialty societies or academic medical centers, unless otherwise noted.

In response to requests, input was received through 3 physician specialty societies and 3 academic medical centers (4 inputs) while this policy was under review in 2009. Input considered biofeedback to be a reliable and appropriate nonpharmacologic option for treatment of headaches.

Practice Guidelines and Position Statements

Association for Applied Psychophysiology and Biofeedback
In 2013, the Association for Applied Psychophysiology and Biofeedback issued standards for performing biofeedback. The standards stated that biofeedback for the treatment of migraine and tension headache has been validated as being safe and effective for these particular conditions and that biofeedback is not used alone as a diagnostic tool or treatment; rather, it is an adjunctive tool to be used in combination with other standard interventions.
National Institute of Neurologic Disorders and Stroke
The National Institute of Neurologic Disorders and Stroke (2013) indicated that when headaches occur 3 or more times a month, preventive treatment is usually recommended:

“Drug therapy, biofeedback training, stress reduction, and elimination of certain foods from the diet are the most common methods of preventing and controlling migraine and other vascular headaches. Drug therapy for migraine is often combined with biofeedback and relaxation training.”

American Academy of Family Physicians
In 2000, the American Academy of Family Physicians published guidelines on preventive therapy for migraines. The guidelines recommended relaxation training, thermal biofeedback combined with relaxation training, electromyographic biofeedback, and cognitive-behavioral therapy as treatment options for prevention of migraine (grade A recommendation). Relaxation techniques and biofeedback may be combined with preventive drug therapy to achieve additional clinical improvement (grade B recommendation). According to the guidelines, nonpharmacologic therapy may be well-suited for patients who have exhibited a poor tolerance or poor response to drug therapy, who have a medical contraindication to drug therapy, and who have a history of long-term, frequent or excessive use of analgesics or other acute medications. Nonpharmacologic intervention may also be useful in patients with significant stressor in patients who are pregnant, are planning to become pregnant, or are nursing.

American Academy of Neurology
The American Academy of Neurology’s recommendations for the evaluation and treatment of migraine headaches, published in 2000, stated that behavioral and physical interventions are used for preventing migraine episodes rather than for alleviating symptoms once an attack has begun. Although these modalities may be effective as monotherapy, they are more commonly used in conjunction with pharmacologic management. Relaxation training, thermal biofeedback combined with relaxation training, electromyographic biofeedback, and cognitive-behavioral therapy may be considered treatment options for prevention of migraine. Specific recommendations regarding which of these to use for specific patients cannot be made.

European Federation of Neurological Societies
In 2010, the European Federation of Neurological Societies gave an A-level recommendation for the use of electromyographic biofeedback for the treatment of tension-type headache, based on the meta-analysis by Nestoriuc et al (2008). The guidelines stated that the aim of electromyographic biofeedback is to help the patient to recognize and control muscle tension by providing continuous feedback about muscle activity. Sessions typically include an adaptation phase, baseline phase, training phase, during which feedback is provided, and a self-control phase, during which the patient practices controlling muscle tension without the aid of feedback.
U.S. Preventive Services Task Force Recommendations
Not applicable.

Medicare National Coverage
Biofeedback therapy is covered under Medicare only when it is reasonable and necessary for the individual patient for muscle re-education of specific muscle groups or for treating pathologic muscle abnormalities of spasticity, incapacitating muscle spasm, or weakness, and more conventional treatments (heat, cold, massage, exercise, support) have not been successful. This therapy is not covered for treatment of ordinary muscle tension states or for psychosomatic conditions.

Ongoing and Unpublished Clinical Trials
A search of ClinicalTrials.gov in September 2017 did not identify any ongoing or unpublished trials that would likely influence this review.

References
Billing Coding/Physician Documentation Information

90875  Individual psychophysiological therapy incorporating biofeedback training by any modality (face-to-face with the patient), with psychotherapy (eg, insight oriented, behavior modifying or supportive psychotherapy); approximately 20-30 minutes

90876  Individual psychophysiological therapy incorporating biofeedback training by any modality (face-to-face with the patient), with psychotherapy (eg, insight oriented, behavior modifying or supportive psychotherapy); approximately 45-50 minutes

90901  Biofeedback training by any modality

E0746  Electromyography (EMG), biofeedback device

ICD-10 Codes

G44.201-  Tension headache code range
G44.229
G44.001-  Cluster headache code range
G44.029
G43.001-  Migraine code range
G43.919

Additional Policy Key Words

N/A

Policy Implementation/Update Information

7/1/08  New policy; considered investigational.
7/1/09  Policy statement revised to remove the investigational status of this therapy and to include medically necessary indications. Unsupervised home therapy is considered not medically necessary. This remains a benefit exclusion on most plans.
7/1/10  Policy statement revised to indicate biofeedback for the treatment of cluster headaches is investigational.
7/1/11  No policy statement changes.
7/1/12  No policy statement changes.
7/1/13  No policy statement changes.
7/1/14  No policy statement changes.
7/1/15  No policy statement changes.
7/1/16  No policy statement changes.
7/1/17  No policy statement changes.
7/1/18  No policy statement changes.

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