

02.01.72 Biofeedback as a Treatment of Headache

Original Effective Date: July 2001

Review Date: December 2025

Revised: December 2025

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This Medical Policy document describes the status of medical technology at the time the document was developed. Since that time, new technology may have emerged, or new medical literature may have been published. This Medical Policy will be reviewed regularly and updated as scientific and medical literature becomes available; therefore, policies are subject to change without notice.

Related Policies:

- [02.01.65 Neurofeedback](#)
- [07.01.70 Biofeedback as a Treatment of Anorectal Disorders](#)
- [07.01.71 Biofeedback as a Treatment for Chronic Pain](#)
- [07.01.73 Biofeedback as a Treatment of Urinary Incontinence](#)
- [07.01.74 Biofeedback for Miscellaneous Indications](#)

Summary

Description

Biofeedback is a technique intended to teach individuals 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.

Summary of Evidence

For individuals who have migraines or tension-type headaches who receive biofeedback, the evidence includes systematic reviews. Relevant outcomes are symptoms, functional outcomes, and quality of life (QOL). 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 migraines 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 unable to take certain medications. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have cluster headache who receive biofeedback, the evidence includes small case series and case reports. Relevant outcomes are symptoms, functional outcomes, and QOL. No controlled trials were identified on biofeedback for cluster headache. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have headaches who receive biofeedback devices for home use, no evidence was identified. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Additional Information

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.

OBJECTIVE

The objective of this evidence review is to determine whether biofeedback improves the net health outcome when used for the treatment of migraine, tension headache, or cluster headache.

PRIOR APPROVAL

Not applicable.

POLICY

Biofeedback therapy training sessions by qualified provider (see [Policy Guidelines](#)) may be considered **medically necessary** up to 20 sessions as part of the overall treatment plan for migraine and tension-type headache.

Biofeedback therapy training sessions when the above criteria are not met and for the treatment of cluster headache is **investigational** because the evidence is insufficient to determine the effects of the technology on net health outcomes.

Home biofeedback is considered **investigational** for all indications, including but not limited to the following devices because the evidence is insufficient to determine the effects of the technology on net health outcomes:

- FreeSpira
- Heart Rate Variability
- InTandem
- StressEraser

POLICY GUIDELINES

Guidance on biofeedback protocol:

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

Covered Provider

Biofeedback supervised by a physician or licensed qualified non-physician practitioner (a licensed qualified non-physician may include the following: physical therapists, Nurse Practitioners, Physician Associates, or Clinical Nurse Specialists practitioner).

Required Documentation

The medical record documentation must support the medical necessity of the services as directed in this policy. Documentation in the individual's medical record must include the following:

- There should be a written treatment plan which includes **ALL** the following information:
 - The specific diagnosis/conditions to be treated; **and**
 - Indicate the types of biofeedback training to be utilized; **and**
 - The time frame and the frequency of treatment in which the goals and objectives will be achieved.

Note: *If the provider or licensed qualified non-physician practitioner (a licensed qualified non-physician practitioner may include the following: physical therapists, Nurse Practitioners, Physician Associates, or Clinical Nurse Specialists practitioner) has determined that the individual does not appear to be benefiting from biofeedback training or moving forward toward individual treatment goals after 20 sessions the use of biofeedback should be re-evaluated and the documentation provided should include information to support the request for further biofeedback therapy training sessions or the provider should consider suggesting an alternative treatment plan.*

Coding

See the [Codes](#) table for details.

BACKGROUND

Biofeedback

Biofeedback is intended to teach individuals self-regulation of certain physiological processes not normally considered to be under voluntary control. The various forms of biofeedback mainly differ in the nature of the disease or disorder under treatment, the biologic variable that the subject attempts to control, and the information that is fed back to the subject.

Biofeedback techniques include peripheral skin temperature feedback, blood-volume-pulse feedback (vasoconstriction and dilation), vasoconstriction training (temporalis artery), and electromyographic biofeedback; they may be used alone or in conjunction with other therapies (e.g., relaxation, behavioral management, medication). Biofeedback training is done either in individual or group sessions. A typical program consists of 10 to 20 training sessions of 30 minutes each.

Biofeedback has been proposed as a treatment for a variety of diseases and disorders, including anxiety, headaches, hypertension, movement disorders, incontinence, pain, asthma, Raynaud disease, and insomnia.

Headache Overview

Migraine, tension-type, and cluster headache are all primary headaches with distinct presentations. Migraine is characterized by intense, often localized, pain or throbbing, usually accompanied by nausea, vomiting, light and/or sound sensitivity. Tension headache pain tends to be less intense and may be bilateral or encircle the head. Both migraine and tension-type headache are relatively common conditions. Cluster headache occurs less frequently. Subjects with cluster headache have brief but intensely painful attacks that occur multiple times per day. Cluster attacks may last days, weeks, or months.

Regulatory Status

A variety of biofeedback devices have been cleared for marketing by the U.S. Food and Drug Administration (FDA) through the 510(k) process. These devices are designated by the FDA as class II with special controls and are exempt from premarket notification requirements. The FDA defines a biofeedback device as “an instrument that provides a visual or auditory signal corresponding to the status of 1 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 July 2001 and has been updated regularly with searches of the PubMed database. The most recent literature update was performed through December 2025.

Evidence reviews assess the clinical evidence to determine whether the use of technology improves the net health outcome. Broadly defined, health outcomes are the length of life, quality of life, and ability to function including benefits and harms. Every clinical condition has specific outcomes that are important to patients and managing the course of that condition. Validated outcome measures are necessary to

ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of technology, 2 domains are examined: relevance and quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial (RCT) is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. RCTs are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

Migraine and Tension-Type Headache

Clinical Context and Therapy Purpose

The purpose of biofeedback for individuals who have migraines or tension-type headaches is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with migraines or tension-type headaches.

Interventions

The therapy being considered is biofeedback.

Comparators

The following therapy is currently being used to treat migraines or tension-type headaches: standard therapy without biofeedback.

Outcomes

The general outcomes of interest are reductions on instances and intensity of migraines or tension-type headaches and reductions in medication usage. The intent of biofeedback use is for the prevention of migraine or tension-type headache. The American Headache Society identified the following treatment goals of preventive biobehavioral therapy (including biofeedback):

- Reduced frequency and severity of headache;
- Reduced headache-related disability;

- Reduced reliance on poorly tolerated or unwanted pharmacotherapies;
- Enhanced personal control of migraine;
- Reduced headache-related distress and psychological symptoms.

Follow-up over the course of 10 to 20 sessions would be of interest to monitor for outcomes.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Adults

Systematic Reviews

Paudel et al (2025) conducted a systematic review and meta-analysis of 9 RCTs that evaluated the efficacy of biofeedback for migraine. All of the included studies compared biofeedback to a control group that did not receive biofeedback (wait list) and 3 studies had an active comparator group. The results found that biofeedback significantly reduced headache severity (mean difference [MD], -0.68; 95% confidence interval [CI], -1.07 to -0.30) and frequency (MD, -0.20; 95% CI, -0.39 to -0.01) compared to wait list control. However, there was no difference in headache severity or frequency between biofeedback and active therapies.

Nestoriuc et al (2007, 2008) published systematic reviews on biofeedback for migraines and tension-type headaches. Meta-analysis for the treatment of migraine included 55 studies (randomized, pre-post, uncontrolled) with 39 controlled trials, reporting a pooled medium effect size of 0.58 (95% [CI], 0.52 to 0.65) for treatment of migraine. Effect sizes were computed using Hedges' *g*, which quantifies between-group treatment outcome differences ([MD] between groups divided by the pooled standard deviation). For the treatment of tension-type headaches, 53 studies met criteria for analysis; they 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 (95% CI, 0.61 to 0.84) 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) conducted a systematic review of behavioral treatments for chronic tension-type headaches 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.

Martino Cinnera et al (2023) conducted a systematic review and meta-analysis of electromyographic biofeedback for headache. A total of 29 RCTs were included in the systematic review, and 4 RCTs were included in the meta-analysis. The headache types represented in the included studies were tension headache (69%), migraine (30%), and mixed types (1%). Risk of bias was generally low in the included studies, but about 60% of studies had concerns about potential deviations from the intended intervention. There was also high heterogeneity regarding patient demographics. The meta-analysis found no difference in headache frequency ($p=.66$), intensity ($p=.99$), or duration ($p=.54$) between electromyographic biofeedback and controls.

Children and Adolescents

Systematic Reviews

Arce Saez et al (2024) conducted a systematic review of nonpharmacologic therapy for tension-type headaches in children. Meta-analysis was not performed. Among the 18 included studies, biofeedback was used in 3 studies, all of which were cohort studies. The authors concluded that all of the data for biofeedback is in patients who are also receiving concurrent therapy programs, so it is difficult to make conclusions about the effect of biofeedback alone.

Stubberud et al (2016) reported on a meta-analysis of biofeedback as prophylaxis for pediatric migraines. They identified 5 RCTs (total $n=137$ children and adolescents) that met inclusion criteria. The mean age among the 5 included RCTs ranged from 10 to 13 years. Meta-analysis found that biofeedback reduced migraine frequency (mean difference in attacks per week, -1.97 ; 95% CI, -2.72 to -1.21 ; $p<.001$), attack duration (MD, -3.94 ; 95% CI, -5.57 to -2.31 ; $p<.001$), and headache intensity (MD, -1.77 out of 5; 95% CI, -2.42 to -1.11 ; $p<.001$) compared with wait-list controls. However, the identified studies had incomplete reporting and uncertain risk of bias, limiting confidence in the estimates.

Section Summary: Migraine and Tension-Type Headache

The evidence on biofeedback for the treatment of migraines and tension-type headaches 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

Clinical Context and Therapy Purpose

The purpose of biofeedback for individuals who have cluster headache is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with cluster headache.

Interventions

The therapy being considered is biofeedback.

Comparators

The following therapy is currently being used to treat cluster headache: standard therapy without biofeedback.

Outcomes

The general outcomes of interest are reductions on instances and intensity of cluster headache and reduction in medication usage. The intent of biofeedback use is for the prevention of cluster headache. The American Headache Society identified the following treatment goals of preventive biobehavioral therapy (including biofeedback):

- Reduced frequency and severity of headache;
- Reduced headache-related disability;
- Reduced reliance on poorly tolerated or unwanted pharmacotherapies;
- Enhanced personal control of migraine;
- Reduced headache-related distress and psychological symptoms.

Follow-up over the course of 10 to 20 sessions would be of interest to monitor outcomes.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Only small case series and case reports were identified in the treatment of cluster headache with biofeedback. No controlled trials were found.

Home Biofeedback

No relevant studies on the clinical effectiveness of biofeedback using home equipment were identified.

SUPPLEMENTAL INFORMATION

The purpose of the following information is to provide reference material. Inclusion does not imply endorsement or alignment with the evidence review conclusions.

Clinical Input from Physician and 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.

2009 Input

In response to requests, input was received from 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 the treatment of headaches.

Practice Guidelines and Position Statements

Guidelines or position statements will be considered for inclusion in 'Supplemental Information' if they were issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

American Headache Society

In 2021, the American Headache Society released a consensus statement on integration of new migraine treatments into clinical practice, including biobehavioral therapies (cognitive behavioral therapy, biofeedback, and relaxation). According to the consensus statement, "biobehavioral therapies have Grade A evidence supporting their use as preventive treatments in patients with migraine." The statement notes that biobehavioral therapies are particularly suited for the following individuals:

- Prefer nonpharmacologic interventions
- Have inadequate response, poor tolerance, or medical contraindications to specific pharmacologic treatments
- Are pregnant, lactating, or planning to become pregnant
- Have a history of acute medication overuse or medication-overuse headache
- Exhibit significant stress or deficient stress-coping skills
- Have high migraine-related disability, and/or low health-related quality of life, and/or comorbidities.

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 conditions and that biofeedback is not used alone as a diagnostic tool or treatment; rather, it is an adjunctive tool used in combination with other standard interventions.

Department of Veterans Affairs/Department of Defense

In 2023, the Department of Veterans Affairs/Department of Defense updated their guideline on management of headache. The guideline stated that there is insufficient evidence to recommend for or against biofeedback for the treatment or prevention of headache.

Ongoing and Unpublished Clinical Trials

Some currently ongoing and unpublished trials that might influence this review can be located at clinicaltrials.gov.

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CODES

To report provider services, use appropriate CPT codes, HCPCS codes, Revenue codes, and/or ICD diagnosis codes.

Codes	Number	Description
CPT		
	90875	Individual psychophysiological therapy incorporating biofeedback training by any modality (face-to-face with the patient), with psychotherapy (e.g., insight oriented, behavior modifying or supportive psychotherapy); 30 minutes
	90876	Individual psychophysiological therapy incorporating biofeedback training by any modality (face-to-face with the patient), with psychotherapy (e.g., insight oriented, behavior modifying or supportive psychotherapy); 45 minutes
	90901	Biofeedback training by any modality
	90912	Biofeedback training, perineal muscles, anorectal or urethral sphincter, including EMG and/or manometry, when performed initial 15 minutes of one-on-one physician or other qualified health care professional contact with the patient

	90913	Biofeedback training, perineal muscles, anorectal or urethral sphincter, including EMG and/or manometry, when performed; each additional 15 minutes of one-on-one physician or other qualified health care professional contact with the patient (List separately in addition to code for primary procedure)
HCPCS		
	E0746	Electromyography (EMG), biofeedback device
	E1399	Durable medical equipment, miscellaneous (may be used for home biofeedback devices which may include the following: (Heart Rate Variability or StressEraser)
	E3200	Gait modulation system, rhythmic auditory stimulation, including restricted therapy software, all components and accessories, prescription only (inTandem)
Type of Service	Medicine	
Place of Service	Physician Office	

POLICY HISTORY

Date	Action	Action
December 2025	Annual Review	Policy Revised
December 2024	Annual Review	Policy Revised
August 2024	Annual Review	Policy Renewed
August 2023	Annual Review	Policy Revised – Content moved from retired medical policy “Biofeedback”
June 2022	Interim Review	Policy Revised and biofeedback content incorporated into this medical policy from medical policies: Biofeedback/Neurofeedback as a Treatment of Headaches and Other Disorders and Temporomandibular Joint Dysfunction (TMJ/TMD) Treatment
June 2021	Annual Review	Policy Revised
July 2020	Annual Review	Policy Revised
July 2019	Annual Review	Policy Revised
July 2018	Annual Review	Policy Revised

Date	Action	Action
July 2017	Annual Review	Policy Revised
July 2016	Annual Review	Policy Revised
August 2015	Annual Review	Policy Revised
September 2014	Annual Review	Policy Revised
April 2014	Interim Review	Policy Revised
October 2013	Annual Review	Policy Revised
December 2012	Annual Review	Policy Renewed
December 2011	Annual Review	Policy Renewed
December 2010	Annual Review	Policy Renewed

New information or technology that would be relevant for Wellmark to consider when this policy is next reviewed may be submitted to:

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