Biofeedback and Relaxation Training for Headaches

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Biofeedback, progressive muscle relaxation, and abdominal breathing are just several of the behavioral medicine techniques proven to reduce headaches and improve the quality of functioning. When employed regularly and combined with preventative medication and optimized acute therapy, quality of life is significantly better than with medication alone.

Headache sufferers are justifiably offended when a doctor or a friend dismisses their pain with an offhand remark such as: "You're just under too much stress. Try to relax.

"Physical and mental tension can certainly make headaches worse. But simply telling someone to relax doesn't help deal with deadlines, demanding bosses, crying babies, honking horns, unpaid bills, and missed sleep—to name just a few of life's daily hassles. Relaxation is a skill and like other skills, it can be mastered with time, practice and a good instructor. There are a variety of mind-body approaches to easing tension and improving pain tolerance. Some have proven track records in preventing headaches or reducing their severity.

Biofeedback and progressive muscles relaxation are the most widely accepted non-drug techniques for headache control and prevention. Their effectiveness has been demonstrated across 25 years of research and well over 100 investigations.

Biofeedback and relaxation training typically yield a 45% to 60% reduction in headache frequency and severity. This is equivalent to the reduction in headache achieved by many headache medications, such as propranolol (Inderal®) and amitriptyline (Elavil®), but without any of the negative side effects. The most common limitation of biofeedback and relaxation training is that it requires time commitment and implementation effort on behalf of the patient. Biofeedback sessions may take one hour and training sessions may include several weekly visits over the course of several months.

For many headache sufferers, the combination of drug and non-drug treatments yields the most significant improvement in headache activity. For example, the average improvement with either biofeedback or propranolol alone is a 55% reduction in migraine. However, when biofeedback is combined with propranolol, the average improvement is a 70% reduction in migraine.

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skin temperature, as the person tries to modify that response. For example, the monitor might give feedback with a tone that goes higher if the muscles in the forehead tighten and lower if the muscles relax. Another type of monitor uses a visual display such as a light that changes color as you increase or decrease the temperature in your hands (or feet).

Increased muscle tension and changed body temperature are two of the body's responses to stress and strain. By providing you with instant and continuous information on these involuntary and unconscious processes in the body, you can observe and modify your body's reaction to stress.

After you have used biofeedback to develop your ability to recognize and reduce tension in your body, you will be able to do so anywhere and anytime without the help of the equipment. These skills aid in preventing, reducing, or stopping a headache. Biofeedback, like progressive muscle relaxation, works best when you learn the skills from a qualified professional—typically a psychologist or psychiatrist who is trained in this procedure.

Typically, **Electromyogram (EMG)** biofeedback is used as a prevention approach for tension-type headaches. With EMG biofeedback, an EMG machine monitors skeletal muscle tension.

Just about any muscle can be monitored, but three muscles most commonly used are:

Frontalis: the muscle in your forehead that is involved with frowning and tightens up when you are worried or under pressure.

Masseter: this muscle tightens your jaw and often stays clenched when you are tense, frustrated, or angry.

Trapezius: this muscle hunches your shoulders and tightens when you are alarmed or anxious or in response to environmental stressors, such as sitting too long at a computer.

These muscles are used in EMG biofeedback because they typically respond to stress and can be easily measured. EMG training is done by placing two sensors (electrodes) at a specified distance from each other on the skin over the identified muscle. A third sensor is placed on a neutral spot to serve as an electrical reference point. These sensors do not cause any discomfort whatsoever; they simply record your body's responses.

Thermal or hand-warming biofeedback was first used at the famous Menninger Clinic in Kansas. Researchers there discovered that headache patients who learned to raise the temperature of their hands using biofeedback had fewer and less severe headaches when they practiced this skill regularly.

Hand-warming works in the following way: When a person is anxious or under stress, the blood vessels in the fingers narrow and the hands become cooler. That's why we tend to get "cold and clammy hands" when we're frightened or nervous. On the other hand, when you are relaxed, the blood vessels in your hands expand, and your hands get warmer. You can get an idea of how stressed you are by taking your hand or finger temperature with a thermometer or biofeedback instrument. You can learn to reduce your level of arousal through the process of temperature biofeedback training. Then, whenever your hands are cool or you are experiencing stress, you use your hand-warming skills to produce a more relaxed state.

Although it's often assumed that "tension-type" headache responds better to techniques to control muscle tension, it has been found that migraine patients improve as much with EMG biofeedback as they do with thermal biofeedback. Thus, the mechanism of action for biofeedback and relaxation training may be more complex than meets the eye. We know that headache sufferers who regularly practice these techniques report a decreased sense of helplessness and an increased sense of self-control. These changes in mental outlook and behavior may increase your ability to prevent headaches as well as your ability to reduce pain, especially if used as soon as you notice a headache developing.

Relaxation training

Relaxation training involves learning how to achieve a physical and mental state of calm and relaxation within a few minutes. It is a systematic set of procedures, rather than simply trying to relax on your own with activities like gardening, reading, or watching TV. Relation training is recommended for headache management because headaches are often related to the body's reaction to everyday stresses like deadlines, demanding bosses, crying babies, honking horns, unpaid bills, and missed sleep, to name a few of life's daily hassles. For headache-prone people, stress does not need to be excessive Unpredictability or change in life is all that is needed. Even normal everyday levels of stress can trigger a headache.

Relaxation training slows down the sympathetic nervous system, which is responsible for the stress response. The sympathetic nervous system is involved in regulating heart rate, blood vessel expansion and contraction, blood pressure, sweat production, sleep, and alertness. During stress, heart rate and blood pressure increase, sweat production increases, breathing becomes shallow, and adrenaline and other hormones are released, causing blood vessels to constrict and muscles to contract. You may have noticed that your shoulders are hunched up, and your jaws are clenched during stress. You can see then how slowing the stress response might be beneficial.

Deep relaxation reverses many of the physical responses that can trigger headaches. Additionally, during deep relaxation, the relaxed person takes fewer breaths per minute, yet breathes more deeply. This results in "bathing" the blood cells in oxygen, which means more oxygen gets to the muscles and to the brain. Increasing oxygen supply to the brain seems to help prevent headaches. With practice, deep relaxation changes your body's response to adrenaline and other stress hormones so that it takes a greater disruption from life stresses (and the stress response)

Learning to become deeply relaxed may take several sessions, so you may be scheduled for 4 to 10 visits. Visits may be scheduled a couple of weeks apart or once weekly. During your clinic visits, you will be given instructions and in-office practice sessions for a variety of relaxation techniques. Most likely you will be provided audiotapes and written materials to help you practice at home between your office visits. Then you will learn how to use these skills in your daily life. Relaxation training typically begins with two primary techniques: abdominal or deep breathing and progressive muscle relaxation.

Deep breathing

To teach you deep breathing, your therapist will ask you to place one hand on your chest and one hand on your abdomen, just under your ribs, so that you are more aware of your breathing. Next, you will be asked to breathe in slowly through your nose, pulling your breath down towards your stomach, pushing your abdomen outwards, allowing yourself to fill your lungs completely. Your hand on your abdomen should rise slightly more than your hand on your chest when you are breathing deeply. Breathe out slowly, pulling your stomach in towards your spine, and think the word "relax." With each slow, deep breath you likely will feel yourself becoming progressively more relaxed.

After you have learned to breathe deeply, you will be asked to focus on slowing your breathing. For the first one to two weeks, you will probably be asked to practice this breathing exercise for five to ten minutes, two to three times daily as well as during progressive muscle relaxation (PMR) training. After you have mastered the technique, you should check in with yourself throughout the day to remember to breathe deeply.

Progressive muscle relaxation

Next, you will be instructed in PMR—the most commonly used muscle relaxation technique for the management of headaches. With PMR, you physically tense and then relax your muscles. It might sound like a contradiction, but for a muscle to become relaxed it is helpful for it to be tightened first. Tightening muscles also makes you more aware of what tense muscles feel like. This will help you to identify tension in those muscles early on, so you can apply relaxation skills to prevent increased muscle tension and to reserve the stress response.

Your therapist will demonstrate how to tense and relax each muscle gently. You will learn to tense and then relax muscles in your hands, forearms, upper arms, feet, calves, thighs, stomach, chest, shoulders, neck, face, and head. Next, your therapist will take you through an in-office practice of slowly tensing and relaxing these muscles, while asking you to focus on each muscle, comparing sensations of relaxation with sensations of tension. Between muscle groups, you will be asked to focus also on your breathing.

After tensing and relaxing all of the muscle groups, your therapist may ask you to focus on a relaxing scene that you have discussed before beginning the PMR practice. For example, many patients describe a beach scene, waterfalls, or walking through the woods. For many patients, this helps to further deepen their relaxation, and the imagery can be used alone as a quick relaxation skill. The entire practice session takes about 25 to 30 minutes.

During your in-office practice of PMR, the room may be dimly lit, and you may be offered the comfort of a recliner. You also will be asked to remove your eyeglasses, and you might be asked to remove your shoes, loosen your tie, belt, or any other restrictive closing (suit jacket, for example) in order to be as comfortable as possible.

Your therapist will probably ask you to rate your tension levels before and after your in-office practice. And you will probably be asked to keep track of your practice in relaxation logs so that you can discuss with your therapist any problems you might have with practicing the techniques.

The Relaxation Routine

Some people become very relaxed after their first practice session, but the vast majority of people do not notice substantial reductions in muscle tension, stress levels, or headache activity until they have practiced for some time. So, do not become discouraged if you do not get immediate results. Also, not everyone can imagine the pleasant relaxing scene as vividly as they'd like.

This will likely come with practice although some people find it difficult to learn this skill. If it doesn't get easier with practice, don't use it as a relaxation strategy. It is important that you use what works best for you rather than to get discouraged. You don't have to master all of the techniques your therapist teaches you to improve.

For relaxation training to be effective at reducing your headaches, initially you need to practice daily for about 25 minutes at a time. Ideally, you will practice twice daily. You need to practice enough that deep relaxation becomes a habit, so that when you say "relax" to yourself, your body knows how to respond. The amount of time it takes to get deeply relaxed gets shorter with practice and as you learn briefer methods of relaxation in your follow-up office visits.

The goal is for relaxation training to be a portable skill that you can use at a moment's notice. Initially, you might want to consider that your body is in training, and accept that you must train your body to know what it is to be completely relaxed.

Summary

duration of headache if used during a headache attack. Many patients find these techniques to be effective alternatives to medication. Research also shows that typically headaches are best controlled over time by combining these techniques with some use of preventive and acute medication.

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Join the Movement

Children Get Migraines Too!

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Migraine headaches can begin at any age. However, the presentation of migraine in a child may be different than that of an adult. Migraine headache in adults is commonly associated with nausea, vomiting, and/or sensitivity to light and sound and can last for up to 3 days. In children, these symptoms may not be as obvious or may be mistaken for other disorders. As a result children often remain without a correct headache diagnosis for many years.

Since children can experience headaches and are not always able to describe what they are feeling, it's important for parents to provide information. With careful observation, and insightful questioning, you can get an idea about your child's headaches and help to get the right diagnosis. Asking your child to draw a picture of what they are feeling can sometimes help express what they are unable to put into words.

Migraine Headache Differences in Children

Headaches experienced by children may actually be migraine with or without aura. There are some notable differences in migraine when comparing symptoms between children and adults:

- The headaches may be shorter, lasting only two hours. Often children may want to go to sleep because of their headache and the time they are sleeping should be included as part of the duration of the headache.
- The episodes don't occur as often. They may happen only once a month or every few months.
- The pain tends to be more across the forehead (bi-frontal) than on one side of the head (unilateral). As children and adolescents get older, the pain tends to be more unilateral.

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Migraine Variants In Children

- Cyclic vomiting syndrome consists of regular, predictable episodes of vomiting several weeks apart. These vomiting episodes can be very severe and can lead to dehydration.
- Abdominal migraine seems like migraine except instead of headache, children complain of stomachaches. The pain is vague or cramping around the belly button.
- Appropriate investigations should be completed prior to making the diagnosis of cyclic vomiting syndrome or abdominal migraine as episodic abdominal pain or vomiting may be due to other problems involving the gastrointestinal or urogenital system.

Getting Help for Your Child

If your child is experiencing headaches it is important to get the right diagnosis as soon as possible by having your child formally evaluated by their doctor or Allied health care professional. Once an accurate diagnosis is made, effective acute and if necessary preventive therapy can be given. Acute therapy should stop a headache or at least reduce the pain within 2 hours and preventive treatment reduces headache frequency and severity. If the initial therapies are not effective, consider seeing a Pediatric Neurologist or Headache Specialist who is comfortable in caring for children with headaches.