

# Complementary, Holistic, and Integrative Medicine: Headaches

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## Case Presentations

### Case 1

*Daria is a 15-year-old girl who has a 2-year history of migraine headaches. Her headaches occur on most days, particularly if she has had insufficient sleep, excessive stress, or exposure to tobacco smoke. She has been evaluated by a neurologist, dentist, and ophthalmologist. All of her physical examinations, computed tomography scan of the head, magnetic resonance imaging, and blood tests have yielded normal results. She has tried multiple medications, including acetaminophen, ibuprofen (which she tries to limit to once or twice weekly), triptans, imipramine, propranolol, and a short course of prednisone. She missed 20 days of school in the past 3 months, and her parents are in the midst of a separation (her father moved about 10 months ago). Her mother has read about natural remedies, including feverfew, riboflavin, and magnesium, and wants to know if they might help.*

### Case 2

*Simon is an 8-year-old boy who, according to his mother, "has had headaches as long as I can remember." As a toddler, he had cyclic vomiting. His evaluation by a pediatric gastroenterologist yielded normal results. In kindergarten, he began having headaches with vomiting, which were severe enough to necessitate a visit to the school nurse weekly. Before some of his headaches, he sees wavy, curling lines with flashing lights. Acetaminophen and ibuprofen have not been helpful. A neurologist has recommended prophylactic propranolol. His mother, who also suffers from recurrent headaches, asks about nonpharmaceutical therapies, including massage and acupuncture.*

## Introduction

Complementary and alternative medical (CAM) therapies are used commonly to prevent and treat headaches. Children and adolescents often have headaches; among adolescents, more than 50% of boys and more than 70% of girls report having had a headache in the previous month. Headache management typically includes acute treatment, preventive measures, and biobehavioral therapies. CAM therapies, primarily preventive and biobehavioral, are used most often by youth who suffer the most severe headaches and whose symptoms have been refractory to conventional treatments. (1) Few families spontaneously report CAM therapy use to their physicians. Physicians need to ask about *all* of the therapies that patients use to prevent or treat headaches. To counsel patients responsibly about the potential benefits and risks of these therapies, physicians need evidence-based information. Data on CAM therapies presented in this article are based on literature from both pediatric and adult trials.

## Identify and Reduce Triggers

Keeping a headache diary may help to identify headache triggers. In addition to such well-known triggers as specific foods or beverages, including chocolate and caffeine, abnormal sleep patterns, weather, menstrual periods, and secondhand smoke, one of the most common headache triggers is stress. (2) Physical stress (excessive heat, acute infection, fatigue, hunger) and psychological stress (school tests, excessive extracurricular activities, parental separation or divorce, bullying, breaking up with a boyfriend or

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NOTE: The agents discussed in this series are designated as dietary supplements rather than drugs. Although dietary supplements are regulated by the United States Food and Drug Administration (FDA), their manufacturers may make claims with little evidence and need not prove safety prior to marketing. The burden is on the FDA to monitor safety after the product is on the market. Readers are referred to the 1994 Dietary Supplement Health and Education Act ([www.cfsan.fda.gov/~dms/dietsupp.html](http://www.cfsan.fda.gov/~dms/dietsupp.html)).

girlfriend) also can trigger migraines. (3)(4) Accordingly, learning to manage stress is a potentially important approach to reducing recurrent headaches.

## Stress Management

Stress management, including mind-body therapies and regular exercise, helps reduce stress safely in 50% to 75% of those suffering headache. (5) Pediatric and adult headache patients benefit from stress reduction. (6)(7) A 2006 meta-analysis of recurrent headaches in the pediatric population concluded that significantly more patients improve with mind-body therapies than with usual care and that improvements associated with these therapies are prolonged. (8) These techniques (eg, biofeedback, guided imagery, self-hypnosis, autogenic training, and cognitive behavioral therapy) may have benefits for managing other problems such as insomnia, test anxiety, and other types of chronic pain.

### Biofeedback

Biofeedback is one of the treatments researched most extensively for migraine. (9) A 2007 analysis of more than 50 controlled trials concluded that biofeedback had a moderately strong treatment effect that persisted for at least 17 months after training. (10) Thermal biofeedback (increasing finger or hand temperature or decreasing forehead temperature), electromyographic biofeedback (relaxing the muscles of the forehead, skull, neck, and shoulders), and the combining of biofeedback with tranquil breathing or guided imagery have proven to be effective. (11)(12) Computer-based biofeedback programs and portable devices are available for home use. Biofeedback instruction generally is safe and may be covered by insurance.

### Guided Imagery, Relaxation, and Self-hypnosis

Self-hypnosis and guided imagery relaxation skills are very effective in preventing migraine headaches. (13)(14) One study showed that hypnosis is more effective than beta-blocking medications such as propranolol in preventing migraines in children. (15) In a school-based study of adolescents who had recurrent headaches, relaxation training was superior to self-help, attention control, or headache diary in reducing headache frequency. (16) In another study, an Internet-based headache program consisting of relaxation, autogenic training, and stress management resulted in less severe headaches and less medication use in those who received the program. (17) Pediatricians can learn to provide hypnosis therapy through the American Society for Clinical Hypnosis or the Society for Developmental and Behavioral Pediatrics. Physicians also may refer

patients to psychologists, social workers, or other health professionals skilled in teaching self-hypnosis and guided imagery.

## Cognitive Behavioral Therapy (CBT)

CBT is based on the premise that changing the cognitive or mental response to a certain situation or trigger can affect emotional and physical responses to the trigger. CBT relies on coaching or therapist guidance, using weekly teaching sessions and home practice, with the ultimate goal of acquiring skills that patients can use throughout their lives to prevent headaches or other painful symptoms. CBT has been used successfully to help manage headaches, depression, and anxiety. (5) (18)(19)

### Autogenic Training

Autogenic training is a self-hypnosis technique that consists of repeating a set series of phrases: My arms and hands are heavy and warm; My legs are heavy and warm; My heartbeat is calm and regular; My forehead is cool; My breathing is easy. Typically, each phrase is repeated slowly three times before going to the next phrase. Deceptively simple, this practice has proven effective in reducing experimentally induced migraine headaches. (20) Ancillary benefits include improvements in mood, cognitive function, and quality of life. (21)

### Exercise

Regular exercise may help relieve stress and reduce the frequency of headaches. (22) In a large cross-sectional study, low physical activity was associated with increased frequency of headaches. (23) In a randomized, controlled trial, participation in yoga classes for 3 months was associated with significant improvements in headache frequency, intensity, and duration. (24) Exercise is a prudent part of a heart-healthy and cancer-preventing lifestyle and may contribute to decreased headache frequency. On the other hand, once a migraine has started, exercise often exacerbates symptoms; exercise should not be used as an acute intervention for pediatric headaches.

## Essential Nutrients to Prevent Headaches

### Vitamin B2

In a randomized, placebo-controlled trial of 55 adult migraine patients, those who received 200 mg of riboflavin twice daily (with meals) for 3 months had a 68% reduction in the frequency, severity, and duration of migraine headaches, which was significantly better than among those who had received placebo. (25) These results have been replicated in other studies of adults who

had migraines, (26)(27) but randomized, controlled trials in pediatric patients are needed. Riboflavin is well-tolerated; the only notable effect is intensely yellow urine.

### Calcium

More than 50% of adolescent girls do not meet their minimum daily requirement for calcium through diet alone. (28) Small studies suggest that calcium supplementation may benefit women who have menstrual-related migraines. (29)(30)(31)

### Magnesium

The diet of the typical American teenager is relatively deficient in magnesium-rich foods: dark green leafy vegetables, beans and bean products, seeds, nuts, whole grains (such as brown rice and millet), shellfish, and citrus fruits. Many girls who have menstrual migraines have low magnesium concentrations. (32)(33)(34)(35) Oral magnesium supplements can help prevent migraines. (36)(37)(38) In one study, magnesium supplementation was associated with a 40% decrease in headache frequency. (39) A controlled trial also found that magnesium supplements were helpful in reducing the frequency of migraine headaches. (38) Typical adolescent doses are 350 to 500 mg daily of magnesium, which can be taken in combination with calcium to ensure adequate intake of both. Absorption is improved if magnesium is not taken at the same time as iron or zinc supplements. The most bioavailable and effective form of supplemental magnesium is magnesium L-lactate dehydrate. Several months of supplementation may be required before clinical effects are observed. Magnesium supplements generally are safe, although excessive doses can cause diarrhea. Pediatricians should ensure that patients who suffer from migraines are not deficient in calcium or magnesium.

### Essential Fatty Acids

Fish oil supplements rich in the omega-3 fatty acids, eicosapentaenoic acid and docosahexanoic acid, have become popular for a variety of conditions, including headaches. (40)(41) In a small controlled trial of adolescents, supplementation with fish oil was associated with significant reductions in headache frequency and severity, but improvements were not significantly better than improvements noted among control patients who took olive oil. (42) Similar studies also found effects no better than olive oil supplementation, although most have noted a very strong placebo effect. (43) Newer research suggests that olive oil alone may have anti-inflammatory

effects and may not be a suitable placebo. (44)(45) Fish oil supplements generally are well tolerated, particularly the molecularly distilled formulations that minimize the fishy taste and belching associated with older formulas. Independent testing has revealed no significant contamination with mercury, dioxins, or other contaminants in molecularly distilled fish oil products.

### Other Dietary Supplements

#### Butterbur (*Petasites hybridus*)

A large, three-arm, randomized, controlled trial in adults of the effects of butterbur showed a significant reduction in the frequency of migraine headaches. (46) A smaller study confirmed the benefits of butterbur in preventing migraines in pediatric patients. (47) Positive studies have used a European product at doses of 100 to 200 mg daily. (48)(49) Butterbur is well tolerated, (50) but due to the natural variability of herbal products, patients who use butterbur should be advised to use brands that have been tested in controlled trials. Possible adverse effects of butterbur include nausea, vomiting, diarrhea, and constipation.

#### Feverfew (*Tanacetum parthenium*)

Dried feverfew leaves ingested orally for at least 4 to 6 weeks have helped prevent migraine headaches in adult trials. (51)(52) For example, in one randomized, controlled trial, feverfew use was associated with a 70% reduction in headache frequency. (53) Adverse effects observed in 5% to 15% of patients included aphthous stomatitis and upset stomach. Rebound headaches also can occur when patients stop taking feverfew supplements. The quality of feverfew varies, depending on species, growing conditions, and processing. Patients who use feverfew should be advised to use standardized products from reputable manufacturers.

#### 5-Hydroxytryptophan (HTP)

5-HTP is a precursor to serotonin and is a natural therapy used commonly in the self-management of mood and anxiety problems. Plasma concentrations of 5-HTP are lower in migraine sufferers than in unaffected patients, (54) and small case series and controlled trials suggest that 5-HTP supplements may help reduce the severity of migraine headaches in adults. (55)(56)(57)(58) Larger controlled trials are needed. Serious adverse effects are uncommon.

#### Coenzyme Q10

In a pediatric/adolescent trial, coenzyme Q10 (CoQ10) concentration was measured in 1,550 patients,

in whom almost 33% were found to be below the reference range. (59) Those who had low CoQ10 values began supplementation with 1 to 3 mg/kg per day of CoQ10. Among those who returned for follow-up, the total CoQ10 concentrations improved, and the headache frequency decreased and headache disability assessed with PedMIDAS improved. (59) In an open-label trial, 31 adult patients who had migraines received 150 mg daily of CoQ10 for 3 months; 62% of these patients had more than a 50% reduction in the number of headache days without significant adverse effects. (60) In a double-blind, randomized, controlled trial, 300 mg of CoQ10 daily led to a significant decrease in headache frequency. (61) CoQ10 is well tolerated, but expensive. Studies are needed to evaluate its cost-effectiveness in pediatric patients suffering from recurrent headaches.

## Professionally Provided Therapies

### Massage

Massage decreases cortisol concentrations, increases serotonin and dopamine concentrations, and provides tangible social support. A randomized, controlled trial of massage therapy showed a significant decrease in headache frequency and improved sleep quality among migraine patients. (62) Massage can be provided by family members, which allows for more regular, inexpensive, and convenient treatments. Massage also can be used regularly in combination with exercise, optimal diet, stress management, and the avoidance of headache triggers. (63) Massage generally is safe, but careful discussion and respect for individual patients is extremely important for patients who have a history of physical or sexual abuse. Care should be taken to avoid wounds, burns, intravenous lines, pumps or other subcutaneous devices, and vigorous strokes in patients who have low platelet counts.

### Osteopathy and Chiropractic

Case series and small studies have supported the use of osteopathic therapy to prevent tension-type headaches. (64)(65)(66) Additional controlled studies are needed to evaluate the long-term cost-effectiveness of osteopathic therapy in preventing pediatric headaches. Chiropractic is used by more than 10% of migraine sufferers to help prevent symptoms. Anecdotal experience and pilot studies suggest that spinal manipulation can be effective for some patients. (67)(68)(69) However, dramatic adverse effects of cervical manipulation in a few case reports (eg, fatal cerebral artery dissections) have limited

the number of referrals of migraine patients from pediatricians to chiropractors. (70) Because of the increasing number of children and adolescents seeking chiropractic therapy for migraines, a large, randomized trial comparing chiropractic with other forms of therapy in pediatric patients is warranted.

### Acupuncture

Randomized, controlled trials suggest that acupuncture can help both adult and pediatric patients who have chronic headaches. (71)(72)(73)(74)(75) Treatment generally occurs once or twice weekly for 4 to 6 weeks. Adverse effects are rare, and as with any needle insertion, they can include mild bleeding, bruising, and infection. Benefits persist for 6 months of follow-up. (76) Acupuncture has been shown to be cost-effective compared with a number of other interventions. (77)(78)

### Homeopathy

In a systematic review, homeopathy was found to be superior to placebo for adult headaches in one study and equal to placebo in three randomized clinical trials. (79) For those who improved in one trial, positive effects remained at 1 year. (80) More studies are needed to evaluate the efficacy of homeopathy in treating or preventing pediatric headaches.

## Case Discussions

### Case 1

*Daria was enrolled in the biofeedback program in the local children's hospital, and she and her pediatrician worked on modifications to enhance her sleep hygiene with strict bedtime parameters. She also began seeing a psychotherapist trained in CBT to help her learn to cope with her parents' separation. Over the next 3 months, the frequency and intensity of her headaches decreased, and she was attending school regularly.*

### Case 2

*Simon and his family improved their diet by adding more fruits and vegetables, foods containing omega-3 fatty acids, and structure to the daily meal schedule. They began seeing an acupuncturist and added weekly massage treatments for 2 months. Simon improved dramatically and joined the local soccer team. Although he still had occasional headaches, they were less intense and less invasive in his life and to his family.*

## Summary

- Many families use complementary therapies to prevent recurrent headaches.
- Scientific studies suggest that managing stress, preventing and treating deficiencies of essential nutrients, treating with massage or acupuncture, and taking select nutritional supplements can help reduce the frequency and severity of migraine headaches with few adverse effects.
- Additional research is needed to evaluate the cost-effectiveness of widely used therapies such as riboflavin, fish oil, feverfew, 5-HTP, CoQ10, osteopathy, and chiropractic in preventing pediatric headaches.
- Clinicians should be aware of which studies have been conducted specifically in children and adolescents.

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