Integrative Approaches to Headaches

Integrative Health emphasizes mindful awareness and self-care along with conventional and integrative approaches to health and well-being. The Circle of Health highlights eight areas of self-care: Surroundings; Personal Development; Food & Drink, Recharge; Family, Friends, & Co-Workers; Spirit & Soul; Mind and Emotions; and Physical Activity. The overview below shows what an Integrative Health clinical visit could look like and how to apply the latest research on complementary and integrative health to headache.

An Integrative Health approach to headache starts with a discussion and understanding of each Meaning, Aspiration, and Purpose (MAP). From there, the conversation extends to incorporating a variety of personal and professional approaches ranging from physical therapy and tai chi, to elimination diets and various supplements, to many other complementary and integrative health (CIH) approaches to prevent and treat the pain.

Meet the Patient

Mike is a 33-year-old man suffering from chronic headaches, both migraine and tension-type, since 2004. He has tried many pharmacological treatments for his headaches, including beta-blockers, tricyclic antidepressants, gabapentin, nonsteroidal anti-inflammatory drugs (NSAIDs), Tylenol, triptans, antiemetics, and opioids. His friend, who had success with acupuncture, recommended that Mike consider something similar for his pain.

Mike suffers from tension headaches most days of the week and has migraines 1-2 times weekly. He currently takes propranolol and uses sumatriptan and occasional hydrocodone as needed to abort his pain. He sees a counselor on a weekly basis and has a psychiatrist who follows him for his PTSD. His psychiatrist prescribes fluoxetine. Mike is frustrated by the medication side effects, including fatigue, dizziness, nausea, and impotence, especially given that he does not feel that his symptoms are well controlled. After speaking with his friend, Mike decided to schedule an appointment with his primary care clinician to explore further other treatment options. Prior to his appointment, he was asked to complete a Personal Health Inventory (PHI).

Personal Health Inventory

Mike rates himself a 2 out of 5 for his overall physical well-being and a 2 for overall mental and emotional well-being. When asked what matters most to him and why he wants to be healthy, Mike responds:

“My wife and son are the most important people in my life. I want to be there for them. I worry that my health will make it difficult to support my family in the future.”

The Personal Health Inventory (PHI) has eight areas of self-care where Mike rates himself on where he is, and where he would like to be. Mike writes in his PHI that he has “no idea” which

self-care area of Integrative Health he would like to begin with. After talking with him about his response, you hear from him that he has not been physically active at all, and he eats fast food six out of seven days per week. He recognizes that in order to be around for his family, it may be helpful to start looking at the areas of Nutrition and Physical Activity as a starting point. Over the course of 2-3 office visits Mike and you begin work in these areas by improving his diet and caffeine intake, as well as focusing on learning yoga, and breathing exercises.

For more information, click on Mike's PHI.

Introduction

Ninety percent of headaches are migraines (with or without aura), tension headaches, or a mixture of the two.[1] Sixteen percent of women and six percent of men suffer from migraine.[1] The highest incidence of migraine occurs between the ages of 20 and 35 and is often associated with family history. In girls and women the rate of headaches almost triples between the ages of 10 and 30.[2] Remissions are common during pregnancy or with the initiation of oral contraceptive pills (OCPs).[3] According to the World Health Organization, one half to three-quarters of the people in the world between the ages of 18-65 have had a headache in the last year.[4] Data collected from the National Health Interview Survey, the National Hospital Ambulatory Medical Care Survey, and the National Ambulatory Medical Care Survey, show that in the United States, over a 3 month period of time, 1 out of every 6 people self-report migraine and severe headache. The prevalence is highest in people identifying as American Indian or Alaska Natives (18.4%), unemployed (21.4%), family income less than $35,000 per year (19.9%), and elderly and disabled (16.4%).[5]

Migraine headaches cost employers $7.9 billion annually with an additional $5.4 billion lost as a result of decreased productivity, and migraine medical care costs are estimated at $1 billion per year.[6] Headache is consistently the fourth or fifth most common reason for emergency department visits in the United States.[5] Tension-type headache is the most common type of primary headache, and the disability attributed to it is larger worldwide than disability due to migraine.[7] The lifetime prevalence of tension-type headache varies between 30%-78%.[7]

Red-flag symptoms indicating headaches may require further evaluation:[1]

1. Early morning headaches that awaken the patient
2. Visual dimming or double vision
3. Headaches that are increasing in severity or frequency
4. Headaches worsened by postural changes
5. Quick onset of new and severe pain
6. Headaches associated with mental status changes
7. Focal motor or sensory deficits, syncope, seizures, fever, or stiff neck

Definitions

Migraine is a disorder of recurrent headaches manifesting in attacks lasting 4-72 hours. Typical characteristics of the headache are that they[7]:

1. Are unilateral in location.
2. Have a pulsating quality.
3. Are moderate to severe in intensity.
4. Are aggravated by routine physical activity.
5. Can be associated with nausea and/or intolerance to light or sound.

Tension headache is defined as a disorder of recurrent episodes of pain which is typically[7]:

1. Bilateral
2. Pressing or tightening in quality
3. Mild to moderate in intensity
4. Does not worsen with physical activity

With tension headaches, there is no nausea, but light or sound intolerance (photophobia and phonophobia) may occur.

Other common types of headaches include medication over-use headaches (e.g., from NSAIDs and opioids), headache related to obstructive sleep apnea (OSA) and obesity, and sinus headaches.[8]

Pathophysiology

Migraine headaches are thought to be related to vasodilators such as substance P and calcitonin gene-related peptide, which are released by peripheral nerve endings from cranial nerve V on blood vessels in the scalp and meninges.[1] Glutamate, nitric oxide, and vanilloid receptors are also theorized to play a role in migraines. Release of serotonin by platelets seems to increase pain and prolong headaches. Genetic, environmental, and hormonal factors also play a role.[1]

Self-Care and Headache

Evidence supports the importance of eating regular meals, routine exercise, and improved sleep hygiene.[1]

Physical Activity

Physical activity benefits people suffering from headache, and many reasons have been postulated for this.[9]

Exercise

Exercise seems primarily to decrease headache intensity, as opposed to frequency or duration, according to some studies, but more research is needed to clarify the degree to which exercise in different forms is helpful, according to a 2014 systematic review.[10] Another review shows moderate-quality evidence that aerobic exercise therapy can decrease the number of migraine days in people with migraines.[11] A 30-minute exercise program three times per week at aerobic

levels has been shown to have beneficial effects on headache intensity and variable effects on frequency.[12] Another study showed that aerobic exercise of 45 minutes, 3 days per week, reduced migraine frequency, pain intensity and duration of migraine and migraine disability. These improvements were not noted through quantitative sensory measures, and thus it was concluded that exercise benefits might be a result of non-nociceptive pathways such as increased well-being.[13]

Physical Therapy (PT)
Physical Therapy has not been shown effective when used alone but can be useful as an adjunct to biofeedback and relaxation in patients with limitation of head and neck range of motion.[14] A 2016 randomized controlled trial found that doing 8 physical therapy sessions (50 minutes each) over 4 weeks showed nonsignificant improvement of migraine frequency, pain intensity, and pain perception.[15] It is difficult to assess from current data how effective vestibular rehabilitation is on individuals with vestibular migraines.[16] Often physical therapists will include variations of manual therapy in their practice. For research describing the effect of these manual therapies on headaches, refer to Manipulative Therapies section of this overview.

Tai Chi
One small clinical trial found that a 15-week program of tai chi was effective in reducing the impact of tension-type headache when compared to waitlist control.[17] A randomized controlled trial found a 12-week Tai Chi training program for Chinese women was significantly effective in reducing the number of migraine days compared to controls.[18]

Of course, as a part of active self-care, physical activity has innumerable benefits for many health conditions. Refer to the "Physical Activity" Integrative Health module for more details. Any recommendations that focus on patients taking ownership of their own health are likely to have added benefit.

Nutrition

Dietary triggers are found in 20% of patients with migraine.[19] Multiple studies have shown that people with aura symptoms are more likely to report foods as headache triggers.[20-22] Common food triggers include the following[1]:

1. Red wine
2. Dark beers
3. Aged cheeses
4. Nuts
5. Onions
6. Chocolate
7. Aspartame (NutraSweet)
8. Processed meats containing nitrates
9. Caffeine excess (more than 5 cups daily)
10. Caffeine withdrawal

Fasting, alcohol, chocolate, and cheese are the precipitating food triggers most frequently reported by headache sufferers as problematic.[23] Sodium nitrite is a preservative used for food coloring and added to cured meats. It is thought to cause headaches through the release of

nitric oxide and resultant blood vessel dilation.[24] The vasoactive amines tyramine and phenylethylamine in wine, cheese, and chocolate have neuronal actions that are thought to cause migraines.[2] Phenylethylamine causes the release of serotonin and catecholamine, especially in migraine patients with reduced monoamine oxidase activity. Tyramine causes the release of norepinephrine from sympathetic nerves.[2] These theories in relation to migraines have been challenged by recent inconclusive studies. A randomized controlled trial (RCT) of 80 patients with frequent migraines showed tyramine-containing foods and placebo-induced migraine at the same rate.[25] Another double-blind RCT of 63 study participants found that chocolate (which contains phenylethylamine) was not more likely to induce migraines than carob.[26] Some theorize that it is actually the caffeine in chocolate that is linked to headaches.[2]

Allergies to foods such as wheat or dairy can cause headaches. Studies have shown success with elimination of foods based on positive IgE and IgG antibodies to specific foods.[27-29,30,,31]. One small study of 54 patients found that reducing fat intake from 65.9 to 27.8 gm daily was associated with decreases in headache frequency, intensity, duration, and medication intake.[32] A food diary is recommended for identifying headache food triggers. It is important to recognize that food can trigger headaches up to 24 hours after consumption.[24] While additional research data specific to headaches and elimination diets is needed, an elimination diet may be a helpful component of a Personal Health Plan (PHP) for someone with headaches. Refer to the "Elimination Diet" Integrative Health tool for more information.

In addition, some migraine sufferers have reactive hypoglycemia due to diet-induced hyperinsulinemia.[23] A review of 45 studies found that the most frequently cited and most significant precipitating factor for migraine headache was skipping meals. This effect was more pronounced in women.[33] Low glycemic index snacks may be beneficial between meals and light snacks before bedtime may reduce the onset of early morning migraine.[23] In one study, two-thirds of participants with migraine headaches demonstrated 5-hour glucose tolerance tests consistent with reactive hypoglycemia.[34]

Excessive caffeine intake has been linked to headaches. One case series found that adolescents and children ingesting over 1,400 mg weekly of caffeine from cola drinks experienced resolution of headaches with gradual reduction in cola intake.[35] Energy drinks, which are increasingly popular with younger people, contain significant amounts of caffeine and other stimulants and should be used with caution. Obesity, elevated fasting blood sugar, total cholesterol, LDL cholesterol, and truncal obesity increase the risk of migraine.[36]

Other foods and food ingredients have been studied as well. In one study, aspartame (the artificial sweetener NutraSweet) triggered migraine in 9% of patients.[37,38] Evidence suggests that aspartame may be a headache trigger in people who ingest moderate to high doses over a prolonged period of time.[39,40] Consuming monosodium glutamate (MSG) dissolved in liquid is one of the strongest triggers for headaches (as is caffeine withdrawal).[31] Omega-6-heavy diets are proinflammatory and can aggravate headaches. Omega-3 supplementation has been found to combat this. One study found a lower consumption of fish among patients with migraines.[41] Low fat diets and higher omega-3/omega-6 fatty acid diets have been shown to decrease the frequency of migraines and other headaches. [31] Studies regarding consumption of citrus fruits and vegetables have been contradictory.[33] Another study found a reduction in migraines among control groups with diets rich in fiber.[42] Observational studies have provided some evidence

that gluten and histamine-containing foods, as well as alcohol, may cause headaches as well, in certain groups of people. [31] In people with biopsy-confirmed celiac disease, strict adherence to a gluten-free diet was reported to significantly improve both migraine and tension headaches.[43] Evidence with regard to the effect of ketogenic diets on headache management is still very preliminary. One small study of 18 people with chronic cluster headaches found that a 3-month ketogenic diet led to full resolution of the headaches in 11 people, and the other 4 people had a 50% reduction in the mean monthly number of headaches. [44]

Pearls to remember in exploring food and headaches

1. Avoid fasting or missing meals as reactive hypoglycemia is a common trigger.
2. Avoid caffeine, which can cause withdrawal vasodilation. Taper slowly.
3. Avoid processed foods including meats treated with nitrites.
4. Avoid aspartame (NutraSweet).
5. Consider reducing total fat intake, particularly saturated fat. Replace with sources of omega-3 fatty acids (fish, nuts, vegetables).
6. Avoid aged foods rich in tyramine such as wine and cheese.

Mind and Emotions

The U.S. Headache Consortium evidence-based guidelines of 2000 note that[45]:

1. Relaxation training, electromyographic (EMG) biofeedback, and Cognitive Behavioral Therapy (CBT) may be considered as treatment options for migraine prevention.
2. Behavioral therapy (biofeedback, relaxation) may be combined with preventive drug therapy to achieve additional clinical improvement for migraine relief.
3. Patients for whom behavioral treatments of migraine may be most suitable include those with the following characteristics:
    - Preference for nondrug approaches
    - Intolerance or contraindication to drug treatment
    - Absent or minimal response to drug treatment
    - Pregnancy
    - Long-term/excessive history of analgesic medications that aggravate symptoms
    - Presence of significant life stress or lack of coping skills]

Refer to "Mind and Emotions" Whole Health module for more detailed descriptions of the mind-body techniques discussed below.

Relaxation and Stress Management

Many therapeutic approaches fall into this category, including progressive muscle relaxation (PMR), focused breathing exercises, and Guided Imagery. Other preventive measures enhance the effects of these treatments.[46] Relaxation is known to reduce headache frequency and disability associated with migraines among college students. One RCT of 80 men and women found that a group intervention involving 18 group relaxation exercise sessions, 2 stress management and relaxation lectures, 1 diet lecture, and 2 individual massage therapy sessions led to significant improvement in self-perceived pain frequency, pain intensity, pain duration, functional status, quality of life, health status, pain-related disability, and depression.[47] The

participants perceived the relaxation exercise sessions as the most beneficial component to their stress reduction. Another study of 51 patients with tension headache and 90 patients with migraine found that relaxation training was effective at improving headache frequency and disability, whereas written emotional disclosure had no effects.[47] PMR specifically has been shown clinically effective for migraine prophylaxis.[48]

Relaxation techniques generally are considered safe. There have been rare reports of certain relaxation techniques causing or worsening symptoms in people with epilepsy, certain mental illness, or a history of abuse or trauma.[49]

Exercise caution when teaching someone with PTSD relaxation exercises, which may trigger symptoms.

Cognitive Behavioral Therapy (CBT)

1. CBT involves acknowledging present-moment and historical emotional states, as well as shifting habitual thought patterns. This can lead to changes in physiologic responses to stress.[1]
2. CBT has been found effective alone or in combination with other behavioral therapies.[50]
3. One trial involving 232 participants who had not responded to five weeks of acute migraine therapy found that those receiving behavioral migraine management did markedly better in terms of migraine-related disability and their ability to cope with symptoms.[51]
4. A recent review suggested that there is sufficient evidence to recommend Cognitive Behavioral Therapy (CBT), biofeedback, and relaxation techniques for treatment of chronic migraines.[52] The German Migraine and Headache Society Guidelines also support this approach to migraine management.[53]

Biofeedback

Biofeedback teaches patients how to actively prevent and manage symptoms by using devices to receive information about physiological processes. Through this feedback, they learn how to consciously control muscle tension, heart rate, body temperature and other body states.[54] For the treatment of headaches, several different biofeedback modalities have been utilized and studied. Biofeedback-assisted relaxation employs EMG and thermal feedback, as well as feedback on sweat gland activity to guide a patient in counteracting the activation of sympathetic nervous system activation. These types of biofeedback are often combined with relaxation-based strategies to augment the effect.[45]

Biofeedback is appropriate for patients intolerant to medication, those interested in self-efficacy in pain management, and in pregnancy.[1] A meta-analysis of 25 controlled studies showed that biofeedback is equivalent in efficacy to preventive pharmacotherapy, with fewer side effects.[46] A review of 94 trials on the use of biofeedback involving 3,500 patients concluded the following:[45]

1. Various forms of biofeedback are effective for migraine and tension type headache.
2. Outcomes with these forms of biofeedback rival outcomes with medication alone.
3. Combining biofeedback with medication can enhance outcomes.
4. The outcome effects from biofeedback seem to endure for extended periods.

5. Despite efficacy in many patients, biofeedback fails to bring significant relief to a sizeable number of headache patients.

A meta-analysis of 55 studies found that biofeedback reduced frequency and duration of migraines significantly, in comparison to wait list controls, as well as comparison groups using relaxation or medications for headache treatment.[54] Biofeedback also reduced associated symptoms of depression and anxiety and improved self-efficacy. These results remained at over one year follow-up.[54]

For more information about biofeedback, refer to the "Biofeedback" Integrative Health tool.

Hypnosis
Hypnosis was shown to reduce the number of headache days and decrease the intensity of headaches among patients with chronic tension headaches.[55] A systematic review of 8 studies showed that clinical hypnosis and relaxation techniques were effective in decreasing both short-term and long-term headache activity in people with migraines.[56] Refer to the "Hypnosis" Integrative Health tool for more information.

Autogenic Training
A recent systematic review of autogenic training (AT) found that five out of six randomized controlled studies demonstrated some improvement in headaches. The studies reviewed were too heterogeneous to draw any conclusions about the optimal duration of autogenic training/practice or the type of headaches for which AT is most effective. [57] Refer to the "Autogenic Training" Integrative Health tool for more information.

Mindfulness Meditation
Patients who practice mindfulness meditation report improved sleep and less anticipatory anxiety related to headache, as well as reduced headache intensity.[58]A review of mindfulness meditation for the treatment of primary headache pain showed that there was significant improvement in pain intensity and headache frequency. The 8-week Mindfulness-Based Stress Reduction (MBSR) program in particular led to a statistically significant improvement of pain intensity.[59] Another review specifically assessed MBSR's role in treating chronic headaches. This review found that compared to usual care, neither MBSR nor Mindfulness-Based Cognitive Therapy (MBCT) improved headache frequency, duration, or pain intensity. [60]

Music Therapy
One RCT including 58 children found that Music Therapy was an effective prophylactic treatment for pediatric migraine, with the additional benefit of earlier symptom reduction, higher therapy satisfaction, and improved patient compliance compared to drug or placebo.[61] It is unknown whether or not adults can derive similar benefits.

Other Complementary Approaches

Dietary Supplements

Note: *Please refer to the Passport to Whole Health. Chapter 15 on Dietary Supplements for more information about how to determine whether or not a specific supplement is appropriate for a given individual. Supplements are not regulated with the same degree of oversight as medications, and it is important that clinicians keep this in mind. Products vary greatly in terms of accuracy of labeling, presence of adulterants, and the legitimacy of claims made by.*

The following supplements listed below appear based on the order that they could be introduced to headache patients. Each description notes that the approach should be tailored according to what else a person is taking and recognizes that sometimes taking more than one supplement at a time can have additional benefits. Patients tend to tolerate these supplements quite well. If possible, have a patient try each one for a few weeks prior to making a change, and only change one supplement at a time, so it is easier to tell which supplements are having which effects. Costs of each supplement range from $5 to $20 a month.

Magnesium

Magnesium may prevent migraines from occurring by counteracting vasospasm, inhibiting platelet aggregation, and stabilizing cell membranes.[62,63] It also influences serotonin receptors, nitric oxide synthesis and release, and inflammatory mediators.[62,63] Levels of ionized tissue magnesium are often low in patients with migraines, especially in those with menstrual migraine.[64-66] Oral supplementation with magnesium has proved beneficial in various types of migraines. Dosing varies by study.[1] One study showed Magnesium dicitrate, 600 mg daily, reduced frequency of migraine by 41.6% compared to 15.8% by placebo.[67] Another study found that 360 mg of pyrrolidine carboxylic acid magnesium daily for 2 months provided better pain relief than placebo in women with menstrual migraines.[68]

The American Academy of Neurology and the American Headache Society state in their 2012 guidelines that a dose of 600 mg is probably effective (evidence category B) for migraine prevention and should be considered for prophylaxis.[69] For migraine prevention, potassium magnesium aspartate, 500-1,000 mg at bedtime, has shown beneficial. For acute migraine, 2 gm in 100 mL of saline given intravenously over 30 minutes, has been shown effective.[70-72] A recent meta-analysis of 10 studies examining the effects of oral magnesium on migraine prophylaxis revealed that oral magnesium significantly improved migraine frequency and intensity. [73]

Magnesium oxide is the most widely available form of magnesium, and it is the least costly option. However, it is poorly absorbed, especially when taken with calcium, zinc, or iron. This said, a recent randomized controlled trial demonstrated that magnesium oxide 500 mg once daily for 8 weeks is as effective as valproate sodium 800 mg once daily for reducing the number of migraine attacks and the number of days with moderate/severe headache per month.[74] Magnesium may cause diarrhea, particularly in patients with irritable bowel syndrome. Magnesium gluconate is less likely to cause diarrhea, as is magnesium aspartate.[1] Magnesium supplementation should continue for 3 months to determine benefit, especially in menstrual migraines. Magnesium can be used safely for prevention and treatment of migraine in pregnancy.[1]

Magnesium has also been studied in combination with other supplements and botanical medicines. In a randomized controlled trial, a combination supplement containing magnesium 600 mg, CoQ10 150 mg and riboflavin 400 mg did not significantly reduce migraine days versus placebo; however, it did significantly improve pain intensity and HIT-6 scores (Headache Impact Test tool).[75] An observational study demonstrated that a combination supplement of magnesium, CoQ10, and feverfew did lead to a reduction in migraine days as well as photophobia, phonophobia, nausea, depression and anxiety. Quality of life also improved.[76]

Riboflavin (B2)

Riboflavin is hypothesized to improve mitochondrial energy reserves. Patients with migraine are thought to have reduced phosphorylation potential in brain and muscle, suggesting a mitochondrial defect in electron transport.[1] Several studies have shown preventive benefit with riboflavin use.[77,78] A large case series found that high dose riboflavin reduced headache days by 50% and abortive medications by 35%. It may have synergistic preventive effects when used with beta-blockers. [79] In a review of 11 trials related to riboflavin use in migraine prophylaxis, authors concluded that riboflavin is effective in reducing adult patients' migraine headache frequency and has the additional benefit of having a low side effect profile.[80] It has also been shown to have benefit for migraine symptoms when used in combination with magnesium and CoQ10. [75]

The American Academy of Neurology and the American Headache Society state in their 2012 guidelines that riboflavin, 400 mg daily, is probably effective (category B evidence) for preventing migraines and should be considered for prophylaxis.[12] Note that the common dose in over-the-counter B complex supplements is only 50 mg, so it is often necessary to take additional riboflavin beyond what one obtains in a multivitamin. It is safe in pregnancy, and it may cause yellow discoloration of the urine.[1]

Coenzyme Q10 (Co-Q10)

Co-Q10 is an endogenous cofactor functioning to promote mitochondrial proton-electron translocation.[2] One double-blind, placebo controlled study showed reduction in migraine frequency at three months with Co-Q10, 150 mg daily.[81] No reduction in headache intensity or duration was noted once a headache occurred.[81,82]. A 2019 meta-analysis of five studies demonstrated that Co-Q10 significantly reduced migraine days/month and migraine duration; however, it had a comparable effect to placebo with respect of number of migraine attacks/month and migraine severity.[83]

The American Academy of Neurology and the American Headache Society state in their 2012 guidelines that Co-Q10, 100 mg three times daily, is possibly effective (evidence category C) for migraine prevention and may be considered for prophylaxis.[69] The recommended dosage is 150-300 mg daily for a minimum of three months.[1] It is safe in pregnancy.[1] One double-blinded randomized controlled trial found that CoQ10 300mg daily has a synergistic effect with nano-curcumin 80mg daily in significantly reducing migraine frequency, severity, and duration of migraine attacks.[84] Another recent randomized controlled trial (RCT) showed significant improvement of migraine severity, duration, and frequency when combining CoQ10 30 mg daily with L-carnitine 500 mg daily for 8 weeks. [85]

Fish Oil
Fish oil is theorized to decrease inflammation, relax vasculature, and inhibit serotonin release from platelets. One study compared olive oil to omega-3 supplementation for two months in 27 adolescents and found that both groups had reduction in headache frequency.[86] A larger study with 97 adults using omega-3 supplementation found no effects.[87] A large cross-sectional study has been conducted of a nationally representative sample of 12,317 men and women in the United States equal to or greater than 20 years old who participated in the National Health and Nutrition Examination Surveys of 1999-2004. This study showed a higher dietary intake of EPA and DHA was associated with lower prevalence of headache.[88] While this cross-sectional study points to significant potential benefit of omega-3 fatty acids in the diet, a review and meta-analysis of 11 randomized controlled trials demonstrated that when taken alone as supplements for migraine prophylaxis, omega-3 fatty acids did not affect headache frequency or severity. However, they did reduce migraine duration. [89] A double-blind randomized controlled trial did show that polyunsaturated omega 3 fatty acids improved amitriptyline's migraine prophylaxis potential, significantly reducing the number of headache days per month compared to amitriptyline plus placebo.[90] The recommended dose varies from 2-4 grams daily of DHA + EPA. Side effects include nausea and gastric reflux. Refer to the "Nutrition" Integrative Health overview for more information on omega-3s and essential fatty acids in general.

Alpha Lipoic Acid
Alpha Lipoic Acid (ALA) is a mitochondrial cofactor involved in energy production. It is also an antioxidant. Daily use for three months decreased frequency and severity of migraines in one study.[91] Some preliminary research shows that ALA may be able to decrease number of migraine attacks in people with known insulin resistance, though further study is necessary.[92] It is safe in pregnancy, and the dose is typically 200 mg, 3 times daily.[1]

Melatonin
Melatonin is used for improved sleep in individuals with chronic headaches. Beneficial effects have been found for migraine and other headaches.[93-95] However, a double-blind, placebo controlled study comparing extended release melatonin, 2 mg at bedtime, to placebo did not find benefit.[96] The recommended dose varies greatly. Some people do well on just 0.3 mg, but for most people, starting at 2 mg at bedtime and titrating up every four days from the lowest dose is reasonable. Side effects include: fatigue, drowsiness, dizziness, abdominal cramps, or pain.[1] More recent data has shown that 3 months of melatonin at a nightly dose of 3 mg decreased the number of migraine headache days per month similar to 25 mg of amitriptyline, with higher responder rates than amitriptyline and placebo, as well as weight loss versus the weight gain associated with amitriptyline.[97] In a pilot study, 6 months of melatonin 4mg resulted in significantly fewer migraine days and less disability. [98]Despite these results, a 2018 systematic review of melatonin for headache prophylaxis demonstrated that there is still insufficient evidence to support its use in clinical practice.[99]

Headache Prevention

Consider starting with

- Magnesium 600 mg at bedtime
- Riboflavin (B2) 400 mg daily and
- Coenzyme Q 10, 150-200 mg daily

If there is an inflammatory component to the headaches (e.g., allergy triggers), consider adding Butterbur (Petasites), 75 mg BID.

Vitamin B6 (*PYRIDOXINE*)

Some recent evidence points to vitamin B6 being supportive in migraine management. A 2015 randomized controlled trial showed that vitamin B6 80 mg once daily did not improve headache frequency; however, it did significantly improve headache duration and severity.[100] Another study showed that when used in combination with 5 mg folic acid, 80 mg vitamin B6 once daily significantly reduces headache frequency, severity, and headache diary results (headache duration x frequency).[101] Although these studies are promising, another study looking a combination of 25 mg vitamin B6, 1 mg folic acid, and 400 ug vitamin B12 taken daily for 6 months did not find that improvement in migraines in any way. [102]

Vitamin D

Some other recent studies have suggested that vitamin D may be another supplement to consider in caring for people with migraines. One study showed a correlation between serum vitamin D levels >57nmol/L and a lower incidence of severe headaches in people taking statin medication.[103] A randomized double-blind placebo controlled study showed that taking vitamin D 50,000 IU once weekly for 10 weeks did significantly decrease headache diary entries (headache duration x frequency). This study did not show any difference in headache frequency or C-reactive protein levels, though.[104] One other randomized controlled trial showed that normal vitamin D levels did not necessary mean that supplementing with vitamin D would be ineffective. The study demonstrated that in people with a baseline vitamin D level of 75-125 nmol/L, taking vitamin D 100 ug (4,000 IU) once daily reduced migraine days significantly compared to placebo.[105]

Butterbur (*Petasites hybridus* root)

Butterbur has been used for fever, muscle spasm, and wound healing for centuries.[106] It is thought to act through calcium channel regulation and inhibition of peptide leukotriene biosynthesis.[2] It might be thought of as an herbal leukotriene inhibitor. One large study found a 50% reduction in migraine attack frequency amongst 68% of participants.[107] A systematic review found that higher-dose extracts (150 mg) resulted in reduced frequency of attacks compared to lower dose and placebo. [108]

The American Academy of Neurology and the American Headache Society state in their 2012 guidelines that Butterbur, 50-75 mg twice daily, is established as effective (category A evidence)

and should be offered to patients for migraine prophylaxis.[69] Side effects include excessive belching. Effects in pregnancy are unknown.[1]

Pyrrolizidine alkaloids (PAs) found in butterbur can be carcinogenic, hepatotoxic, and cause bleeding problems, so it is important to use preparations in which these compounds have been removed.[106] Look for supplements labeled or certified as PA-free and for supplements labeled with the United States Pharmacopeia logo to ensure that the product contains what the label states.

Feverfew (*Tanacetum parthenium* leaf)
Feverfew is a member of the daisy family, and it has been used for centuries for pain, fever, and headache.[106] It inhibits platelet aggregation and inflammatory mediators, such as serotonin and prostaglandins. One study found a 70% reduction in frequency and severity in 270 patients with migraine.[109] No head-to-head trials with other migraine treatments have been conducted, and no long-term studies have documented safety.[1]. An observational study demonstrated that a combination supplement of magnesium, CoQ10, and feverfew did lead to a reduction in migraine days as well as other related symptoms such as photophobia, phonophobia, nausea, depression and anxiety. Overall quality of life also improved.[76] Overall, data supporting feverfew's use is still not strong.

The dose for feverfew is 125 mg daily of the dried leaf standardized to a minimum of 0.2% parthenolide.[1] Note that feverfew is not safe in pregnancy because it can cause uterine contractions.[106] Drugs that interact with feverfew include anticoagulants and some hepatically-metabolized medications.[106]

Valerian (*Valeriana officinalis* root)
Valerian is used for improved sleep and anxiety in general and for people with chronic headaches. In migraine patients with anxiety, valerian may be preferable to benzodiazepines because it is not associated with morning grogginess or dependency.[2] It works by stimulation of GABA receptors, and inhibition of reuptake of GABA. The dosage is 100-300 mg of extract standardized to 0.8% valerate at bedtime, or 250 mg every six hours for anxiety.[1] It should not be used during pregnancy.[1] It has been found to be safe in studies of sleep and anxiety.[110-112] It occasionally causes gastrointestinal irritation.

Phytoestrogens
There is some limited evidence that phytoestrogens, including black cohosh, dong quai, and soy extracts, may prevent menstrual migraine.[38]

Cannabinoids
Recent evidence has failed to support its benefit for migraine headaches.[24] A 2016 retrospective chart review of 121 adults with migraines, who went to two medical marijuana specialty clinics in Colorado, suggested that marijuana may decrease migraine frequency[113]. In 2015 the American Headache Society stated that while cannabis may be effective for headache treatment based on some case-based, anecdotal, and laboratory-based research, there is still insufficient evidence to support its use clinically. [114]

Manipulative Therapies

Manual therapies are a form of passive treatment that people who experience headaches may elect to receive as part of their treatment plan. A 2018 systematic review of 10 studies showed that manual therapies in general can have positive effects on pain intensity and frequency, disability, quality of life, and craniocervical range of motion. The authors also concluded that combining different techniques seems to be the most effective approach.[115]

Chiropractic

Headache is the third most common reason to seek chiropractic care.[116] A National Center for Complementary Alternative Medicine-funded research study of 80 patients found that compared with massage, spinal manipulative therapy (SMT) led to greater improvements in pain and disability that lasted through follow-up at 24 weeks.[117] One study compared results of cervical manipulation and mobilization by a chiropractor, physical therapist, and physician. All groups showed improvement as far out as 20 months, but no statistically significant difference was found between the three groups.[118] Another trial of chiropractic SMT for migraine found improved frequency, duration, disability, and medication use compared to control.[119] A systematic review of seven RCTs concluded that Massage Therapy, PT, relaxation, and chiropractic SMT might be equally effective as propranolol and topiramate in the prophylactic treatment of migraine headaches.[120] A 2016 multi-center randomized clinical trial showed that 6-8 sessions of upper cervical and upper thoracic spinal manipulation (high-velocity, low-amplitude technique, HVLA) were more effective than myofascial/spinal mobilization plus exercise, in people with chronic headaches. These effects were maintained 3 months post-intervention.[121] A 2017 randomized controlled trial showed that spinal manipulation (HVLA) and a sham "push maneuver" both led to fewer monthly migraine days, with the authors concluding that the perceived benefits of chiropractic manipulation may be due to a placebo response.[122] More recently, a 2019 review and meta-analysis suggested there is preliminary evidence that spinal manipulation is effective in reducing migraine days and pain/intensity. [123]

Guidelines developed after a systematic review of 21 trials published through 2009 concluded the following:[116]

- For migraine, spinal manipulation and massage are recommended for management of patients with episodic or chronic migraine.
- For tension-type headache, spinal manipulation cannot be recommended for management of episodic headaches.
- A recommendation cannot be made for or against the use of spinal manipulation for patients with chronic tension-type headaches.

Adverse effects from chiropractic are uncommon, and overall risk is low. A 2009 systematic review of chiropractic safety, while noting more research was needed, found that serious adverse event reports had an incidence of 1.46 for every 10 million manipulations.[124] One study found that 4.3% of study participants experienced neck stiffness after initial spinal manipulation, and it disappeared for all patients after 2 weeks.[125] Spinal manipulation was noted to have a risk of stroke of 5 per 100,000 manipulations.[124]

Craniosacral Therapy (CST)
CST, which involves gentle manipulation of the skull and sacrum, often is used to treat headaches. More studies are needed to fully assess its effects.[126,127]

Massage
A randomized controlled trial (RCT) of 47 participants found that a massage group receiving six 45-minute massages exhibited greater improvements in migraine frequency and sleep quality than control subjects during the interventions and at 3-week follow up.[128] A 2016 randomized controlled trial showed lymphatic drainage results in fewer migraine days per month and decreased analgesic intake.[129] At this point, research regarding massage and headache is limited; findings to date are only somewhat promising.

Osteopathic Medicine
A three-armed randomized controlled trial showed that osteopathic manual therapy (OMT) plus medication was significantly better than sham plus medication and medication alone. The study showed improved migraine days per month, decreased medication usage and improved HIT-6 scores. [130]

Manual/Interventional Physical Therapy
A 2014 systematic review of three studies assessed the effect of dry needling for cervicogenic or tension-type headaches. The results showed that while the three studies did show statistically significant improvements in various headache measures, there was no significant difference between groups in the studies. Thus, the authors concluded that at that time there was insufficient evidence to strongly support use of dry needling along with conventional physical therapy. [131]A 2019 randomized controlled trial of 168 patients compared trigger point dry needling versus sham needling for chronic tension-type headaches. The results suggest that dry needling is in fact effect and safe in reducing headache intensity, frequency, and duration, while also increasing quality of life.[132]

A 2018 randomized pilot study showed that a suboccipital release technique, also known as suboccipital soft tissue inhibition, led to significantly less headache-related disability.[133] A 2019 meta-analysis showed that combined suboccipital soft-tissue inhibition plus occiput-atlas-axis global manipulation may be more effective than either treatment alone for tension-type headaches.[134]

Vagus Nerve Stimulation
Noninvasive vagus nerve stimulation (nVNS) through personal handheld devices is a newer nonpharmacological approach to headache management that has been studied in recent years. While initial studies are promising, systematic reviews to date report that there is still not enough evidence to advocate for the use of these devices.[135] Similar data limitations have been seen in related interventions such as occipital stimulation, supraorbital transcutaneous stimulation, and transcranial direct current stimulation. [52]

Other systems

Acupuncture
A U.S. survey revealed that 9.9% of those using acupuncture did so for migraine or other headaches.[7] Clinical Practice Guidelines published in 1998 by the National Institutes of Health

stated that acupuncture could be a useful adjunctive treatment or an acceptable alternative treatment for several disturbances, including headaches.[136]

Two main theories about acupuncture's mechanism of action have been postulated:

1. First, there is the theory that migraine headaches are mediated by deregulation of the autonomic nervous system. This was tested in one study of 30 patients with migraine.[137] Sham acupuncture and true acupuncture were performed and heart rate variability (HRV) was recorded. The clinical responders (people who had at least a 50% reduction of migraine attacks) exhibited an improvement in HRV; this was not observed in the patients who did not experience benefit. Compared with sham acupuncture, true acupuncture produced a relatively stronger HRV effect.
2. A second theory, which holds that migraines may be mediated by nitric oxide (NO) and neuropeptides, has also been tested.[138] One study found significant reduction in NO levels in rats treated with acupuncture. Another found reduction in calcitonin gene-related peptide, another potent dilator of small arteries.

A systematic review that pooled data from 31 RCTs involving a total of 3,916 patients found that acupuncture was superior to sham acupuncture and medication therapy in improving chronic headache (migraine and tension headache) intensity, frequency, and response rate.[139] One systemic review involving 22 trials and 4,419 participants found that acupuncture was more effective than routine care, but not more effective than sham acupuncture for migraine prophylaxis. Acupuncture had fewer adverse effects and better outcomes than use of prophylactic medications,[7] and one review of two large trials found that adding acupuncture to pain relievers was more effective than pain relievers alone for tension-type headache.[140] Another systematic review of 11 trials with 2,317 participants found acupuncture to be better than control (no treatment, drugs, relaxation, or PT) and sham acupuncture for treatment of tension headaches, in terms of number of headache days and pain intensity.[7] Long-term effects beyond three months were not evaluated. A 2017 randomized clinical trial published in *JAMA Internal Medicine* did show sustained benefit of acupuncture for migraine prophylaxis at 16 weeks.[141] More recently, two more systematic reviews have been added to the literature for headache management with acupuncture. A 2016 Cochrane review of 22 trials and 4,985 participants found acupuncture's effect similar to prophylactic medications and superior to sham acupuncture.[142] A 2018 review concluded that acupuncture was superior to sham acupuncture for migraine treatment. [143]

Risk of adverse events for acupuncture was noted to be 0.05 per 10,000 treatments and 0.55 per 10,000 patients.[144,145] For more information about acupuncture, refer to the "Acupuncture" Integrative Health tool.

Homeopathy
A systematic review done in 1999 concluded that available trial data did not indicate that homeopathy is more effective in migraine prophylaxis than placebo.[146]

Back to Mike

Mike discussed his PHI with his primary care provider (PCP), and they identified a number of options he might try. He was given initial information on rebound headaches and has begun to gently taper a few of his medications as he works with a Health Coach to make some major self-care changes.

He followed through with the recommendations to step up exercise, work with a dietician, and begin bicycling again, and while his headaches have not completely gone away, he reports that they have decreased in frequency and intensity. He intends to try some mind-body skills that his psychologist recommended, including progressive muscle relaxation to reduce the tension in his neck. He also signed up for a Mindfulness-Based Stress Reduction course, noting that he has his psychiatrist's approval to use these approaches.

If he continues to have difficulties, he has agreed to do an elimination diet. He suspects that chocolate and recently baked breads are potential headache causes for him. He will continue to see his Health Coach regularly and check in with his PCP again in three months.

Personal Health Plan

Name: Mike
Date: xx/xx/xxxx

Mission, Aspiration, Purpose (MAP):
My mission is to be healthy enough to enjoy day-to-day life with my wife and son and to enjoy time outdoors and immersed in my photography.

My Goals:

- Improve nutrition and focus on eating regular meals and decreasing caffeine intake. Work with a nutritionist or dietitian.
- Increase aerobic physical activity by adding cycling three times per week. Create an exercise plan with a personal trainer, and meet with the trainer twice a month. Consider yoga classes.
- Learn how to incorporate mind-body tools into daily life through exercises taught by mental health providers.

Strengths (what's going right already)/Challenges:

- A supportive spouse and family
- Photography

My Plan for Skill Building and Support

Mindful Awareness:

- Practice paying more attention to what my body tells me through symptoms. This will include watching to see if I am truly hungry before eating and practicing mindful eating at the beginning of each meal.

- Note sleep patterns, and keep a sleep journal: the hours slept, times of wake up, dreams, or flashbacks.
- Pay attention to what I notice just before a flashback, to learn more about the patterns. This may make it easier to predict when they will come. Continue to learn ways to keep safe when they occur.

Areas of Self-Care:
Physical Activity

- As we agreed, continue weightlifting 3 times per week, and add cycling 3 times per week for a minimum of 30 minutes at a time. Add yoga classes 1-2 times per week. This can be done at home with a DVD or through the classes offered at your gym. Go out hiking once or twice a week. You agreed that you could benefit from the help of a personal trainer and would like to improve your body image and sex life. I will refer you to the MOVE program and hope that you can also talk more with your counselor about these concerns.

Surroundings

- I like my current home and work environment. After discussing the safety of my home, I've shared that I do not keep a gun at home because of the flashbacks.

Personal Development

- Sign up for volunteering through the Boys and Girls Club in the neighborhood.

Nutrition

- Refer to the dietitian through the MOVE Program. Work on reducing caffeine intake by tapering to decaffeinated coffee. Aim for no more than 1 cup per day in the morning. Try to stop drinking the soda.

Recharge

- Review the information on healthy sleep and make sure to follow the sleep hygiene steps. Add melatonin, 2 mg of the extended release form, which often helps with sleep. Keep following through with the counselor for the work with PTSD. Consider the sleep study referral.

Family, Friends, and Co-Workers

- I care deeply about my wife and want to keep my relationship with her a priority. I would consider bringing her to a counseling appointment and in a safe place being able to tell her more about what I am experiencing and the desire for a better sex life. Learn to open up to her more and allow her to offer some support in your life. Increasing your support system at this time seems important; do this in a way that is comfortable and safe for you.

Spirit and Soul

- I love nature and photography. Take time every week to go out with my wife and son to spend time in nature. Bring my camera and share my love for photography with my son.

Mind and Emotions

- There are many ways to explore the mind-body connection. Talk with a counselor about options. Start with some deep breathing exercises that were demonstrated and in a given handout. Talk to a psychologist about biofeedback, Guided Imagery and relaxation.

Professional Care: Conventional and Complementary

- Prevention/Screening
  - Up-to-date, blood pressure up at 150/90; return for re-check in 2 weeks
- Treatment (e.g., conventional and complementary approaches, medications, and supplements)
  - Continue medications as prescribed
  - Lisinopril
  - Tylenol as needed
  - Add melatonin for sleep
  - Add riboflavin and magnesium for migraines
  - We can phase out headache medications as these other approaches help improve symptoms
  - Look over the information about osteopaths in town who do Spinal Manipulative Therapy (SMT) and Craniosacral Therapy (CST) treatments.
- Skill building and education
  - Mindfulness-Based Stress Reduction (MBSR)
  - Anti-inflammatory diet

Referrals/Consults

- Nutrition and health coaching on board
- Follow-up with that sleep study as discussed

Community Resources

My Support Team

- Principal Professions
  - Primary care clinician
  - Psychiatrist
  - Mental health clinician
  - Whole Health Coach
  - Dietitian
- Personal
  - Wife, Lisa (most support)
  - Friends (casual friends)
  - Parents (although does not rely on them)

Next Steps

- Call to set up an initial appointment with a Health Coach (within 1 week).
- Meet with the dietitian (within 1 week).
- Schedule an appointment with an osteopath in town for SMT or CST.
- Follow up with the sleep study referral (within the next month).
- Return to see the nurse for a blood pressure check (in 2 weeks).

See me again in 2 months, and we will go over additional supplements in depth at that time.

Please Note: This plan is for my personal use and does not comprise my complete medical or pharmacological data, nor does it replace my medical record. `

Author(s)

This overview was adapted for the University of Wisconsin Integrative Health Program from the original written by Amy Bauman, DO and updated by Vincent Minichiello, MD (2014, updated 2020).

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