

Edited by: Hamid R. Djalilian, M.D.
Adapted from Teixido and Carey
UC Irvine Otolaryngology, Neurotology, and Skull Base Surgery
714-456-7017
www.ent.uci.edu

Migraine - More than a Headache

Introduction

Migraine is a common clinical condition characterized by episodes of attacks of head pain and associated symptoms such as nausea, sensitivity to light, sound, or head movement. Most think that it only a headache problem, but it has become apparent in recent years that many patients suffer symptoms from migraine who do not have severe headaches as a dominant symptom. These patients may have a primary complaint of dizziness, of ear pain, of ear or head fullness, "sinus" pressure, and even fluctuating hearing loss. Fortunately, treatment regimens long established for the treatment of "classic" migraine headaches are generally effective against these "atypical" symptoms of migraine. In fact approximately 50% of patients who are carriers of the migraine genetic background never get the severe headaches and get the "atypical" symptoms. These may include symptoms as innocuous as motion sickness, ice cream headaches, etc.

How Common is Migraine?

There are currently 28 million Americans with "classic" migraine headaches. In a room with 100 people, 13 are likely to have migraine. This is as common as diabetes and asthma combined. The number of people suffering with atypical forms of migraine is unknown. Females are 3 times more likely to have migraine than males. Although any person can have migraine at any age, migraine is most common between ages 30 and 50. The peak incidence of migraine in females occurs at 35 years of age-at this age, 28% of all females have migraine headaches. The peak incidence of migraine in men occurs at 30 years of age-at this age, about 10% of all males have migraine headaches.

Migraine is a lifelong problem. It may start in childhood and disappear and reappear in new forms throughout an individual's life. In general, there is a decrease in headache intensity and an increase in the incidence of atypical symptoms of migraine (vertigo, ear pain, bowel symptoms, etc) as patients mature. Migraine tends to run in families, so having a relative with migraine makes it more likely that you will have migraine as well.

Surveys show that only 48% of people with migraine headaches have had a diagnosis and are being treated for their headaches. Unfortunately, only 29% of US migraine sufferers are very satisfied with their treatment. This is usually a reflection of a lack of understanding of the nature of migraine and its treatment, or lack of commitment to effective treatments. We hope this material will help you to achieve better control of your migraine symptoms, whatever they are, and improve your quality of life.

How are People with Migraine Different?

Migraine is an inherited problem of ion channels in the brain. This may result in what is best described as a "sensitive brain". Most individuals exposed to loud noise, bright light, or excessive motion can adapt to these strong stimuli within minutes, but in the brain of a migraine sufferer (migraineur), the strength of the stimulus continues to grow until a migraine crisis occurs. This lack

of ability to adapt to strong sensory stimulation helps us understand why so many patients have migraine headache or other migraine symptoms that can be provoked by bright light, excessive noise, strong smells, excessive motion, and painful stimuli.

What Happens During a Migraine Attack?

Abnormal electrical activity may occur in and around the brain during a migraine attack. Areas of altered activity have been found on brain imaging studies in patients having migraine attacks. This activity is called "spreading depression," and it represents a wave of increased activity of nerve cells, followed by decreased activity. Originally it was thought that blood vessel spasms caused this abnormal activity, but more recently we have learned that this is not the case. The electrical disturbance is the primary event, and the blood flow changes are a response to the electrical disturbance.

The tendency to generate this electrical disturbance is probably enhanced by inheriting certain forms of the ion channels that set the electrical activity in these nerve cells. Ion channels are like chemical gates - they control the flow of sodium, potassium, and other elements in and out of nerve cells. Migraine may represent a set of biochemical abnormalities of these gates. In a sense, individuals with abnormalities are "primed" to generate this abnormal electrical activity. The addition of something else may push them over the edge and generate the electrical disturbance that underlies migraine attacks. This is where other triggers come to play a role: certain foods, weather changes, stress, hormonal changes, sleep disruptions, etc.

The electrical disturbance may cause very obvious symptoms. For example, spreading depression in the vision areas of the brain may result in unusual visual phenomena such as the appearance of spark-like bursts, wavy lines, blind spots, or even complete visual loss in rare cases. Abnormal cortical brain activity over other regions of the brain can result in temporary confusion, inability to speak, numbness, or even paralysis of any part of the body. They can also cause tingling (pins and needles sensation) that run along the arms or legs (typically one side of the body). These symptoms, which occur due to electrical disturbances at the surface of the brain, typically are brief, lasting no longer than 20 minutes.

The electrical disturbance of migraine frequently involves deeper parts of the brain that are important processing centers for the senses. We believe that these centers become "hypersensitized." This means a person having a migraine who senses pain, motion, or sound will tend to have an exaggerated, distorted experience of the pain, motion, or sound that may be so intense that it is difficult to tolerate. A hallmark of migraine headache - rare but telltale when it happens - is allodynia, the experience of just simply touching the scalp or even the hair as intolerably painful. Light, sound, motion, or odors can also become intolerable. The patient may become so sensitive that he or she has no choice but to withdrawal to a quiet, dark place and sleep until the episode has passed.

Another element in migraine is the release of chemicals by the trigeminal nerve. This nerve supplies sensation to the entire face, scalp, lining of the eyes, nasal cavity and sinuses, teeth and gums, jaw joints, parts of the neck and ears, even shoulders. This nerve releases inflammatory molecules into the tissues nearby. These molecules can cause the local blood vessels to become "leaky," losing their fluid into surrounding tissues. The tissues can even swell and become painful on this basis. Classic migraine headache may occur when branches of the trigeminal nerve going to the lining of the brain get inflamed. But painful throbbing headache may be associated with sensitization of the blood vessels around the brain by the inflammatory molecules. And if branches going to the sinuses are involved instead of those going to the lining of the brain, the symptoms may not seem like classic migraine headache, but instead may be sinus congestion and runny nose. These patients often feel that they have sinusitis, but scans show no anatomic abnormality of the sinuses.

Other symptoms of migraine activity in the brain may include retention of fluid, lethargy, nausea, fainting, anxiety, fever, and even seizures.

What is a Migraine Trigger?

A migraine trigger is any environmental, dietary, or physiologic factor that can provoke migraine activity in the brain. Most commonly these include,

1. Stress. Stress can be psychological (e.g., conflict at work/home, death of relative, etc.) or physical (e.g., back pain, common cold, other illness).

2. Hormonal changes (e.g., menstrual cycle, menopause, hormone replacement therapy, and oral contraceptives).

3. Changes in sleep (too much sleep (over sleeping or napping), too little sleep, interrupted sleep (waking up in the middle of the night or sleep apnea), and a shifting sleep schedule (e.g., having a different sleep schedule on the weekends vs. weekdays, or jet-lag sleep).

4. Diet. Skipping meals can trigger migraines and eating certain foods can trigger migraines (see below). Also dehydration (not drinking enough water) can trigger migraine.

5. Intense stimulations, e.g., bright lights, intense sound, intense motion, visual motion (e.g., scrolling on computer screen, movie theaters, 3-D movies, etc.), weather changes (primarily related to atmospheric pressure changes [low pressure, e.g., cloudy, rainy, snowy, thunder storms]), heat, and intense smells.

Environmental triggers

Examples of environmental triggers include odors, bright lights, noise, and other excessive sensory stimuli. Painful stimuli that trigger migraine usually occur in the head and neck. Some patients' symptoms are triggered by pressing on a single point around their head or neck. We commonly see this after a dental procedure, massage, etc.

40% of migraine sufferers are affected by weather changes. Patients tend to get worse with low atmospheric pressure such as cloudy/rainy days. Some patients can develop problems on airplanes and at lower pressures. The mechanism of this trigger is mediated through the eardrums, which are our pressure sensors. These patients usually say that they can tell when a storm is coming for example. If a patient purely has pressure sensitive migraine we usually can control symptoms by placing a small tube in the eardrum.

Food triggers

There are hundreds of potential food triggers for migraine. Comprehensive lists of foods which may contribute to triggering migraine can easily be found on the Web. In general, these foods fall into two main categories: 1) byproducts of food aging and 2) foods with chemicals similar to neurotransmitters (molecules used for communication between brain cells) our brains use. Byproducts of food aging are found in fermented products like red wine, aged cheeses, and yeast in fresh bread and yogurt (tyramine). Foods with chemicals similar to our own neurotransmitters which may aggravate migraine are coffee, chocolate, MSG (monosodium glutamate), and the nitrates used as preservatives in many of our prepackaged foods. Food triggers are not the result of allergy, but are direct chemical sensitivities.

There is a common misconception that if a person is sensitive to a food item, they will know it, because they will have migraine symptoms within an hour of eating the particular food item. In fact, some effects may come immediately or sometimes hours later. Added to this confusion is the reality that many real food triggers may not cause migraine alone, but only in combination with other partial triggers, which together may provoke an attack of migraine headache or symptoms. For example, some migraine sufferers can eat chocolate or red wine alone with no problem, but will suffer a migraine attack if chocolate and red wine are taken together. That is because there is a cumulative effect of the triggers.

We generally recommend an initial dietary trial which avoids only the most common migraine triggers. If good results are not achieved within a few weeks, a comprehensive diet which eliminates all potential migraine triggers is recommended. It may take 6-10 weeks for a patient suffering from severe and debilitating migraine symptoms to respond, but most do. After an improvement in symptoms is achieved, suspect foods can be added to the diet one at a time to see whether they are an important trigger for that patient. Despite the difficulty of this kind of a trial, we have found that even the most severely affected migraine sufferers tend to respond and are generously rewarded for their efforts.

Some patients ask why they have to observe the strict diet when they used to eat the same things before and did not get symptoms. The reason is that all the triggers are cumulative. This means that in the past, the patient may not have had stress, poor sleep, etc. and when they ate those food items their migraine did not get triggered (they were way below their migraine threshold). However, when other triggers occur (e.g., hormonal changes around menopause), that elevates the brain activity to near the threshold and any small trigger such as a food item will cause triggering of the migraine process. The migraine process will, in turn, cause the various symptoms, e.g., dizziness, ear pressure, ear pain, headache, etc.

Physiologic triggers

Perhaps the most common trigger of migraine is stress. Patients commonly report increased symptoms when they are fatigued and suffer lack of sleep. Many other physiologic stresses can also trigger migraine, such as hunger, exercise, and pain. Some patients suffer migraine from sleeping too much, and cannot understand why most of their weekends are ruined by headaches or dizziness. Migraines are commonly triggered by hormone changes, like the drop in estrogen levels before the menstrual period or after menopause.

Sleep

We recommend that patients sleep the same schedule weekdays and weekends. We ask patients to use guided meditation from youtube.com and search for “meditation body scan” and do it on a nightly basis before sleep. We recommend not looking at screens and turn lights down for the last hour of the evening to not suppress the melatonin secretion in the brain which triggers the sleep process in our brain. Melatonin production is triggered by darkness. If a patient has a history of significant snoring or stopping of breathing during sleep (sleep apnea), it must be treated in order to correct the migraine problem. A significant migraine trigger such as sleep apnea (waking up multiple times during the night due to obstruction of breathing in the throat from tongue falling back) usually cannot be overcome with just medicines alone.

Diet

We ask patients to eat on time (not let their meals get late). Even if you are not hungry, one should eat something. We recommend that patients drink at least 6-8 glasses (8 oz) per day (more if they exercise a lot or they are outside in the heat). Observation of the migraine diet is very important.

Stress

We recommend exercise (not overly strenuous when migraine is active), and to practice meditation. Patients with migraine and dizziness often feel that exercise worsens their symptoms. The only exercise migraine dizziness patients can tolerate is a stationary bike. This helps since there is no up and down motion of the head. We recommend a slow start of 5 minutes a day with gradual increase of 1-2 min per week up to 20-30 min as tolerated. Practicing meditation is another “natural” way of reducing stress. Meditation is like exercise, it has to be done frequently for it to be effective and it takes a few weeks of doing it for it to have the desired effect. We recommend using Youtube and searching for “guided meditation” or “meditation body scan” as a starting point.

Treatment of Migraine

It seems easy to take pain medications or medications that stop migraines such as narcotics or triptans (e.g., Imitrex, Zomig, etc.) to suppress symptoms, but when taken frequently, these can worsen the problem by causing rebound symptoms more intense than the original attack. It is typical for patients to get themselves into a vicious cycle, resulting in decreased functioning at work and at home with the expected emotional consequences before treatment is sought. The best treatment results will be obtained by those patients who work to understand what migraine is and how migraine is affecting their lives. This allows a teamwork approach with the physician and better outcomes.

The mainstay of treatment for migraine headache and atypical migraine symptoms is **trigger identification and avoidance**. This requires education about migraine triggers and the use of a migraine diary in which the patient is asked to record their symptoms and the probable trigger for that particular episode. Unlike many environmental and physiologic triggers, dietary triggers can be avoided. In general, an attempt to improve lifestyle by reducing stress, improving sleep habits, and adding regular exercise are beneficial. When done maximally, many patients will obtain near complete freedom from their migraines with this treatment alone.

At times, symptoms may be so constant that individual events and their triggers cannot be easily identified. In these cases, it may be helpful to give **medications to elevate the threshold** above which migraine triggering in the brain occurs. These may be medications originally used for blood pressure control, depression, or seizures which have been found to be easily tolerated and very good at preventing frequent migraine attacks. When this is successful, the breakthrough attacks which do occur are usually easily attributed to some particular trigger or aggravating factor, which can then be avoided. It may take 6 to 9 weeks to respond to a medication, and it is not uncommon for a patient to have to try more than one medication. Patients requiring medications to elevate migraine threshold can realistically expect a 50-80% reduction in symptom intensity and frequency. Once the symptoms become intermittent then the patient can identify their trigger. Usually, when a symptom occurs (e.g., dizziness, ear pressure, hearing loss, tinnitus), look back 6-12 hours. It is usually stress, poor sleep, diet (food trigger, hunger, or dehydration), or an intense stimulation (e.g., lots of head or visual motion, weather change, bright light, loud sound, etc.).

If after maximizing the benefits of trigger identification and avoidance and medications to elevate the threshold of migraine, breakthrough symptoms are still occurring, **medications to abort acute attacks** may be prescribed. There are now excellent medications which can help improve migraine symptoms both deep in the brain and those painful symptoms associated with sensitized blood vessels around the brain. These new medications are called triptans. Because they can cause rebound, they should not be used more than 2-3 times a month. Doctors' opinions may vary on this.

Some patients will have occasional severe headaches which can be aborted effectively with triptans without the risk of rebound. These patients should always be on the lookout for an increase in headache frequency and intensity that are the first signs of rebound. Long term treatment of acute headaches with narcotics generally leads to increasing medication needs and must be considered very cautiously, especially in patients with histories of chemical dependency.

Migraine and Meniere's Disease

There is increasing interest among ENT physicians in the connection between migraine and Meniere's disease. Meniere's disease is a disorder characterized by episodic fullness, tinnitus (ringing), hearing loss, and vertigo whose cause is poorly understood. While the prevalence of migraine in the US population is 13%, the prevalence of migraine in patients with Meniere's disease is 56%, and the prevalence of migraine in patients with bilateral Meniere's disease is 85%. We have found signs and symptoms of migraine in nearly all our patients with Meniere's disease. In a recent

study we found 100% of Meniere's patients had a migraine related symptom complex (headache, family history of migraine, or sensitivity to at least 3 stimuli).

It has recently been discovered that the tiny blood vessels in the inner ear are innervated by branches of the same nerve that innervates the intracranial blood vessels severely affected in migraine attacks. Electrical stimulation of this trigeminal nerve has caused fluid changes in the inner ear which could affect it severely enough to cause a problem like Meniere's disease. Many patients with migraine and Meniere's disease who are treated effectively for migraine have experienced an improvement in their Meniere's symptoms. In a recent publication by our team 92% of patient with Meniere's disease responded to a regimen of migraine medications, diet, and lifestyle changes. We almost exclusively use the migraine treatment regimen for our Meniere's patients. We do not restrict salt (sodium) intake but rather have them follow the migraine diet. Sodium on its own is not a trigger as long as enough water is consumed by the patient in a day. Having a lot of sodium and not drinking water makes the body feel dehydrated and can trigger the migraine process and cause the Meniere's symptoms. Sodium is often high in foods that contain other molecules (usually preservatives and tyramine) which trigger migraine (and thus Meniere's). For example, soy sauce has lots of sodium but it also has lots of tyramine (from the breakdown of soy) and glutamate (from MSG) which are the real triggers.

Migraine and Vertigo

Approximately 25% of migraine sufferers experience vertigo along with their other migraine symptoms. In many patients seen at our center, vertigo is the predominant feature of their migraine. We typically find that they have had more classic migraine headaches at some time in the past, or have a family history of migraine. Migraine symptoms of new onset in a patient with no personal or family history of migraine can also occur. This is particularly common after head injury or brain surgery. Patients often have accompanying neck spasms and are many times are worked up for cervical spine disease. These symptoms are originate in the brainstem from faulty central processing of balance information from the inner ears but can also be due to the effect of the trigeminal nerve (the nerve that supplies sensation to our head/face) on the blood vessels feeding the inner ear. These patients are often best treated with migraine therapy.

The dizziness experienced by migraine patients can come in different forms. One is vertigo (spinning sensation), one is a sensation of being on a boat (what is experienced by mal de debarquement patients as well as others), another is a sensation that it is difficult to focus when moving the head, etc. All these conditions are manifestation of the same processes in the brain driven by migraine and are treatable in the same way.

Migraine and Otagia (Ear pain) and Ear Pressure

Up to 40% of migraine sufferers report sharp ear pains which last only seconds.

These may occur infrequently and spontaneously between migraine headaches. Ear pain has many causes, including infection and Eustachian tube problems in the ear, TMJ, and referred pain from the extensive lining of the throat. Migraineurs who present to the doctor with ear pains frequently complain that their ears are hypersensitive to touch, to wind, and to cold. When an otolaryngologist has ruled out all of these other causes of ear pain in a patient with a history of migraine, migraine treatment is often effective in eliminating the pain. This usually requires an imaging study (e.g., MRI or CT) to rule out other causes.

A significant number of patients with migraine can develop pressure in the ear. This usually manifests itself as a pressure sensation in the ear similar to having water in the ear or during a common cold. Attempts at "popping" the ear are usually not successful in reducing the pressure in

the ear. This problem usually recovers once the migraine has been under control with lifestyle/diet modification or medication. We have been successful in treating this condition with the migraine regimen in nearly 90% of patients.

Migraine and Hearing Loss

Similar to the way that migraine can affect the balance organ of the inner ear in vertigo, it can also affect the hearing organ of the inner ear. This has recently been termed “cochlear migraine”. Patients will most commonly have a low-pitch hearing loss. Other patterns of hearing loss include sudden hearing loss, loss of hearing in all frequencies, or a hearing loss in the low and high frequencies. The hearing loss can be temporary or can be permanent. A sudden drop in the hearing is best treated with a course of medication that is taken by mouth (e.g., prednisone) and steroid injected through the ear drum to reach the inner ear in higher concentrations. A sudden hearing loss is an emergency and needs to be treated very quickly to improve the likelihood of recovery. We usually treat our patients with adjunctive migraine preventative medications and ask them to follow the migraine diet.

Migraine and Sinus Pressure

A great deal of confusion exists among patients and their physicians regarding the source of symptoms of facial pressure. While facial pressure is indeed a cardinal symptom of sinusitis, up to 45% of migraine patients report attack-related "sinus" symptoms, including tearing, runny nose, and nasal congestion. In migraine, these symptoms are caused by a strong outflow of nerve signals normally associated with migraine, but which causes swelling of the mucous membranes in the nasal cavity and sinuses. These symptoms may last only a few minutes or hours during the migraine episode. Sinus symptoms caused by colds or sinus infections tend to last for days.

Sinus pain, which feels like pressure, is also commonly associated with migraine, and may be the only "headache" experienced in a migraine. In migraine, symptoms tend to last minutes to hours rather than for days, as in sinus infections. 50% of migraine patients report that their headaches are influenced by weather. 88% of patients with chronic sinus pressure have been found to have migraines. We frequently see patients who have had multiple sinus surgeries for “sinus pain” who have migraine as their underlying problem.

Migraine and Tinnitus and Hyperacusis

Tinnitus is caused by brain activity in response to hearing loss. The brain attention to that activity causes the sensation of ringing or buzzing sound in the ear. The attention of the brain to tinnitus increases when the brain becomes very sensitive and causes the tinnitus to become louder. The brain's sensitivity to tinnitus in some people is driven by the same processes that cause migraines. Pulsatile tinnitus (whooshing tinnitus) can be caused by migraine as well. These patients with pulsatile tinnitus usually need extensive work up before stating that it is related to migraine. Usually we start the migraine treatment while we are doing the work up since most patients tend to respond to the regimen. The same stress, sleep, diet, triggers affect tinnitus and can make it louder. Adhering to the migraine lifestyle changes in combination with medications and supplements has been found to be beneficial. The same processes of migraine can also cause hyperacusis (sensitivity to sound) by amplifying sound information coming into the brain. We have found that patients with hyperacusis often respond well to the migraine regimen.

Migraine and Mal de Debarquement (MDD) and Persistent Postural Perception of Dizziness (3PD)

We have found that MDD and 3PD are highly related to migraine and are likely manifestations of chronic migraine. Treatment of the underlying migraine process improves the symptoms in a majority of patients. For MDD patients, in a recently published study from UC Irvine, we found that 85% of the MDD patients improve with migraine therapy.

Migraine and Motion Sickness

Motion sickness is a manifestation of being a carrier of the migraine genetic background. Our sensitivity to motion will fluctuate depending on migraine triggers. Reducing the migraine triggers will help in decreasing the sensitivity to motion; however, motion sickness cannot be eliminated since it is a part of your genetic make up.

Treatment

For treatment we first encourage a strict migraine control diet, eliminating common migraine culprits including chocolate, wines, caffeine, certain as well as less frequently recognized problem foods containing yeast (yoghurt, sourdough, freshly made bread), nuts, and nut products. Glutamate can occur in foods not only through the addition of MSG, but also by hydrolyzing (breaking down) proteins. So labels that include "hydrolyzed casein," "hydrolyzed yeast extract," etc., are likely to include glutamate.

We also encourage a regular sleep schedule and aerobic exercise program.

Patients are also counseled to avoid vasoconstrictive medications such as psuedoephedrine, and to minimize the use of triptans, which may cause rebound symptoms.

When patients follow these guidelines and still have migraine-associated symptoms, we emphasize prophylactic medications in preference to the "quick fix" agents such as fiorinal, triptans, or narcotics. Effective prophylactic medications are chosen based on the patient's other medical problems and tolerance of side effects.

All patients are cautioned that migraine symptoms often do not respond quickly to these interventions. Great patience is required of the patient and physician as 6-8 weeks of diet changes or the full dose of any new medication may be needed before benefits are seen. Sometimes we have to combine medications to get full relief of symptoms.

Anxiety, depression, and even panic attacks are frequent accompanying diagnoses in these patients. These diagnoses should be recognized and discussed. The choice of a prophylactic medication may also be influenced by these other conditions.

Migraine Diet

Food may play a significant role in the frequency of your dizziness. Although some migraine patients find that eating certain foods may trigger a dizziness or headache every single time, the effect of diet may be less obvious. In general, the more "trigger" foods you consume, the more dizziness or headaches you may have. The hope is that by avoiding these possible triggers, the better off you will be. Eating regularly timed meals, avoiding hunger, avoiding dehydration, and avoiding skipping meals is probably more important than the specific foods you do or do not eat. Try following this list as strictly as possible for at least two months. If it helps, you may gradually add back your favorite foods one at a time, keeping track of your symptoms as you do so.

Category	Foods to Avoid, Reduce, or Limit	Foods that are OK
Caffeine	Ideally no caffeine. Do not vary the amount of timing from day to day. Coffee, tea, colas, Mountain Dew, Sunkist, certain medications (Anacin, Excedrin)	Decaffeinated coffee, herbal or green tea, caffeine free sodas, fruit juice (see below)
Snacks	Chocolate, nuts (peanuts especially)	Fruits listed below, seeds, sherbet, ice cream, cakes, pudding, Jell-O, sugar, jam, jelly, honey, hard cookies made without chocolate or nuts
Alcohol	Avoid all, especially: ales, Burgundy, chianti, malted beers, red wine, sherry, vermouth. Note: some medications contain alcohol (Nyquil)	Non-alcoholic beverages, vodka
Dairy	Certain cheeses (aged or fermented): brie; blue, boursault, brick, camembert, cheddar, emmental, gouda, mozzarella, parmesan, provolone, romano, roquefort, stilton, swiss Buttermilk, chocolate milk, sour cream, yoghurt Egg whites, almond milk	Other cheeses: American, cottage, cream Cheese, farmer, ricotta, Velveeta. Milk, rice milk, oatmeal Egg substitute, Egg yolk
Cereals & Grains	Fresh breads and yeast products, fresh bagels, fresh doughnuts, yeast extracts, brewer's yeast, sourdough	Commercial breads (white, wheat, rye, multi Italian), English Muffins, crackers, rye, toast potatoes, rice, spaghetti, noodles, hot or dried oatmeal
Meats	Aged, canned, cured, or processed meats (bologna, pepperoni, salami, other pre-packaged deli meats), pickled meats or fish, salted or dried meats or poultry, hot dogs, sausages, jerky	Fresh / unprocessed meats, poultry, fish, veal, lamb, tuna
MSG (Monosodium Glutamate)	Avoid in all its multiple forms: Soy sauce, foods containing "hydrolyzed protein products" or "autolyzed yeast", canned soups, bouillon cubes, Accent, meat tenderizers, seasoned salts. Pickled, preserved or marinated foods	Salt and other spices, butter, margarine, white vinegar, salad dressing (small amount)
Sweetener	Aspartame (Equal, Nutrasweet)	Sucrose (sugar), high fructose com syrup, Splenda, saccharin (Sweet 'n Low)
Vegetables	Pole or broad beans, lima beans, Italian beans, lentils, snow peas, fava beans, Navy beans, pinto beans, pea pods, sauerkraut, garbanzo beans, onions, olives, pickles	Asparagus, beets, broccoli, carrots, garlic, pumpkins, spinach, squash, string beans, lettuce, tomatoes, all those not listed
Fruit	Avocados, figs, papaya, passion fruit, raisins, red plums. Limit bananas and citrus fruit (orange, lemon, lime, grapefruit, tangerines)	Apples, berries, peaches, pears, prunes. Overly ripened fruits have high tyramine content and are triggers (very soft peaches, pears, etc are possible triggers)
Mixed Dishes	Beef stroganoff, cheese blintzes, frozen meals, TV dinners, lasagna, macaroni and cheese, pizza	

Vitamins and Dietary Supplements

Certain vitamins and food supplements may provide a benefit in terms of dizziness or headache prevention. Many unsubstantiated claims can be found on the internet and at health food stores. The best evidence exists for the agents below. Side effects are typically mild.

1. Vitamin B2/Riboflavin - up to 400mg / day - Start at 200mg twice a day.
2. Magnesium oxide- up to 400mg 2x / day (diarrhea possible). If you get diarrhea, cut it in half.
3. Coenzyme Q-10 - up to 100mg 3x / day (expensive)
4. Butterburr (*Petasfies hybridus*) extract, Petadolex brand (pyrrolizidine alkaloid free), 50-75mg twice a day with food (expensive)
5. Feverfew (*Parthenium integrifolium*) 50mg+ per day (inexpensive)
6. Melatonin - There is some weaker evidence that melatonin, a hormone that helps regulate sleep, may help headaches if 3-6 mg is taken an hour or so before bedtime. Significant side effects are rare. Probably most useful in treating cluster headaches.

For many patients who want to try a supplement first, we recommend Vitamin B2 (Riboflavin) at 200 mg twice a day (has to be purchased separately, there is usually not enough in a multivitamin), and Magnesium oxide 400 mg twice a day (reduce to 200 twice a day if diarrhea develops).

If you have sleep problems we recommend Melatonin 3 mg at night. If a patient does not have sleep issues and wants to take something in addition to magnesium and vitamin B2 (and not take a prescription medicind), we suggest Feverfew 50-100 mg per day.