

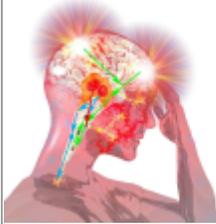
Migraine headache

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migraine	
	Anatomy of a migraine. Sensory triggers cause the thalamus to interact with the trigeminal nucleus and nerve (red arrow) and dilate blood vessels in face and brain. Pain signals are sent to the brainstem nuclei (green arrows). The hypothalamus may also send signals to the brainstem and gut to induce pain, nausea, and vomiting (blue arrows).
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Definition

Migraine is a type of headache marked by severe head pain lasting several hours or more.

Description

Migraine is an intense and often debilitating type of headache. The term *migraine* is derived from the Greek word *hemikrania*, meaning "half the head," because the classic **migraine headache** affects only one side of the person's head. Migraines affect as many as 24 million people in the United States, and are responsible for billions of dollars in lost work, poor job performance, and direct medical costs. Approximately 18% of women and 6% of men experience at least one migraine attack per year. Currently, one American in 11 now suffers from migraines, more than three times as many are women, with most of them being between the ages of 30 and 49. Migraines often begin in adolescence, and are rare after age 60.

Two types of migraine are recognized. Eighty percent of migraine sufferers experience "migraine without aura" (common migraine). In "migraine with aura," or classic migraine, the pain is preceded or accompanied by visual or other sensory disturbances, including hallucinations,

partial obstruction of the visual field, numbness or tingling, or a feeling of heaviness. Symptoms are often most prominent on one side of the head or body, and may begin as early as 72 hours before the onset of pain.

Causes and symptoms

Causes

The physiological basis of migraine has proved difficult to uncover. There are a multitude of potential triggers for a migraine attack, and recognizing one's own set of triggers is the key to prevention.

Physiology

The most widely accepted hypothesis of migraine suggests that a migraine attack is precipitated when pain-sensing nerve cells in the brain (called nociceptors) release chemicals called neuropeptides. At least one of the neurotransmitters, substance P, increases the pain sensitivity of nearby nociceptors. This process is called sensitization.

Key Terms

Key Terms	
Term	Definition
<i>Aura</i>	A group of visual or other sensations that precedes the onset of a migraine attack.
<i>Autogenic training</i>	A form of self-hypnosis developed in Germany that appears to be beneficial to migraine sufferers.
<i>Coenzyme Q10</i>	A substance used by cells in the human body to produce energy for cell maintenance and growth. It is being studied as a possible preventive for migraine headaches.
<i>Nociceptor</i>	A specialized type of nerve cell that senses pain.
<i>Transcutaneous electrical nerve stimulation (TENS)</i>	A treatment in which a mild electrical current is passed through electrodes on the skin to stimulate nerves and block pain signals.

Other neuropeptides act on the smooth muscle surrounding cranial blood vessels. This smooth muscle regulates blood flow in the brain by relaxing or contracting, thus dilating (enlarging) or constricting the enclosed blood vessels. At the onset of a **migraine headache**, neuropeptides are thought to cause muscle relaxation, allowing vessel dilation and increased blood flow. Other neuropeptides increase the leakiness of cranial vessels, allowing fluid leak, and promote inflammation and tissue swelling. The pain of migraine is thought to result from this combination of increased pain sensitivity, tissue and vessel swelling, and inflammation. The aura

seen during a migraine may be related to constriction in the blood vessels that dilate in the headache phase.

Genetics

Susceptibility to some types of migraine is inherited. A child of a migraine sufferer has as much as a 50% chance of developing migraines. If both parents are affected, the chance rises to 70%. A team of Australian researchers identified a region on human chromosome 1 that influences susceptibility to migraine. It is likely that more than one gene is involved in the inherited forms of the disorder. Many cases of migraine, however, have no obvious familial basis. It is likely that the genes that are involved set the stage for migraine, and that full development requires environmental influences, as well.

Two groups of Italian researchers have identified two loci on human chromosomes 1 and 14 respectively that are linked to migraine headaches. The locus on chromosome 1q23 has been linked to familial hemiplegic migraine type 2, while the locus on chromosome 14q21 is associated with migraine without aura.

Triggers

A wide variety of foods, drugs, environmental cues, and personal events are known to trigger migraines. It is not known how most triggers set off the events of migraine, nor why individual migraine sufferers are affected by particular triggers but not others.

Common food triggers include:

- alcohol
- caffeine products, as well as caffeine withdrawal
- chocolate
- foods with an extremely high sugar content
- dairy products
- fermented or pickled foods
- citrus fruits
- nuts
- processed foods, especially those containing nitrites, sulfites, or monosodium glutamate (MSG)

Environmental and event-related triggers include:

- stress or time pressure
- menstrual periods, menopause
- sleep changes or disturbances, including oversleeping
- prolonged overexertion or uncomfortable posture
- hunger or fasting
- odors, smoke, or perfume
- strong glare or flashing lights

Drugs that may trigger migraine include:

- oral contraceptives
- estrogen replacement therapy
- Theophylline
- Reserpine
- Nifedipine
- Indomethacin
- Cimetidine
- oversuse of decongestants
- analgesic overuse
- benzodiazepine withdrawal

Symptoms

Migraine without aura may be preceded by elevations in mood or energy level for up to 24 hours before the attack. Other pre-migraine symptoms may include fatigue, depression, and excessive yawning.

Aura most often begins with shimmering, jagged arcs of white or colored light progressing over the visual field in the course of 10-20 minutes. This may be preceded or replaced by dark areas or other visual disturbances. Numbness and tingling are common, especially of the face and hands. These sensations may spread, and may be accompanied by a sensation of weakness or heaviness in the affected limb.

Migraine pain is often present only on one side of the head, although it may involve both, or switch sides during attacks. The pain is usually throbbing, and may range from mild to incapacitating. It is often accompanied by nausea or vomiting, painful sensitivity to light and sound, and intolerance of food or odors. Blurred vision is also common. Some migraineurs experience dizziness or vertigo episodes; back, neck, or shoulder pain; or other unusual symptoms precipitating or during migraine. Others never experience actual head pain, but only experience the related symptoms.

The pain tends to intensify over the first 30 minutes to several hours, and may last from several hours to a day, or longer. Afterward, the affected person is usually weary, and sensitive to sudden head movements.

Diagnosis

Ideally, migraine is diagnosed by a careful medical history. Unfortunately, migraine is underdiagnosed because many doctors tend to minimize its symptoms as "just a headache." According to one study, 64% of migraine patients in the United Kingdom and 77% of those in the United States never receive a correct medical diagnosis for their headaches.

So far, laboratory tests and such imaging studies as computed tomography (CT scan) or magnetic resonance imaging (MRI) scans have not been useful for identifying migraine. However, these

tests may be necessary to rule out a brain tumor or other structural causes of **migraine headache** in some patients.

Treatment

At the onset of symptoms, the migraine sufferer should seek out a quiet, dark room and attempt to sleep. Placing a cold, damp cloth or a cold pack on the forehead may help. Additionally, tying a headband tightly around the head can relieve migraines for some.

Migraine headaches are often linked with food allergies or intolerances. Identification and elimination of the offending food or foods can decrease the frequency of migraines and/or alleviate these headaches altogether.

Alternative treatments for migraine include:

- Acupressure. Pressing on the Gates of Consciousness (GB 20) points may relieve migraine.
- Acupuncture. A National Institutes of Health (NIH) panel concluded that acupuncture may be a useful treatment for headache.
- Aromatherapy. The essential oil rosemary may ease migraine pain.
- Autogenic training. Autogenic training is a form of self-hypnosis developed in Germany in the 1930s that has been shown in several studies to relieve the pain of migraine.
- Cognitive behavior therapy.
- Herbal remedies. Valerian (*Valeriana officinalis*), passionflower (*Passiflora incarnata*), feverfew (*Chrysanthemum parthenium*), ginger, ginkgo (*Ginkgo biloba*), goldenseal (*Hydrastis canadensis*), hawthorn (*Crataegus oxyacantha*), linden, wood betony (*Stachys officinalis*), skullcap (*Scutellaria lateriflora*), or cramp bark (*Viburnum opulus*) may relieve migraines.
- Hydrotherapy. Contrast showers, in which a short hot shower is followed by a longer cold shower, may halt an oncoming migraine. A hot enema can temporarily relieve migraine pain.
- Naturopathy. Migraine headaches are one of the most common reasons for consulting naturopathic practitioners. Naturopaths typically treat migraine with a combination of nutritional therapy and mind/body techniques.
- Relaxation techniques. Meditation, yoga, hypnosis, visualization, breathing exercises, or progressive muscular relaxation may halt the progression of a migraine.
- Supplements. Clinical studies have shown that vitamin B2 (riboflavin), magnesium, 5-HTP, or melatonin can reduce the severity of migraines.
- Transcutaneous electrical nerve stimulation (TENS).

Allopathic treatments

Nonsteroidal anti-inflammatory drugs (NSAIDs) acetaminophen (Tylenol), ibuprofen (Motrin), and naproxen (Aleve) are helpful for early and mild headache. Excedrin Migraine is a combination product that is indicated for **migraine headache**.

More severe or unresponsive attacks may be treated with ergotamine (botulinum toxin), dihydroergotamine, sumatriptan (Imitrex), beta-blockers and calcium channel-blockers, antiseizure drugs, antidepressants (SSRIs), meperidine, or metoclopramide. Some of these drugs are also available as nasal sprays, intramuscular injections, or rectal suppositories when vomiting prevents taking the drug by mouth.

Sumatriptan and other triptan drugs (zolmitriptan, rizatriptan, naratriptan, almotriptan, and frovatriptan) should not be taken by people with any kind of vascular disease because they cause coronary artery narrowing. Otherwise these drugs have been shown to be very safe.

Continued use of some antimigraine drugs can lead to "rebound headache," marked by frequent or chronic headaches, especially in the early morning hours. Rebound headache can be avoided by using antimigraine drugs under a doctor's supervision, with the minimum dose necessary to treat symptoms. Tizanidine (Zanaflex) has been reported to be effective in treating rebound headaches when taken together with an NSAID.

Expected results

Most people can control migraines through recognizing and avoiding triggers, and by using effective treatments. Some people with severe migraines do not respond to preventive or drug therapy. Migraines usually wane in intensity by age 60 and beyond.

Prevention

The frequency of migraine headaches may be lessened by avoiding triggers. It is useful to track these triggers by keeping a headache journal.

One substance that is being studied as a possible migraine preventive is coenzyme Q10, a compound used by cells to produce energy needed for cell growth and maintenance. Coenzyme Q10 has been studied as a possible complementary treatment for cancer. Its use in preventing migraines is encouraging and merits further study.

As of 2013, the U.S. Food and Drug Administration has approved five drugs for the prevention of migraine: propranolol (Inderal), timolol (Blacadrene), divalproex sodium (Depakote), topiramate (Topamax), and onabotulinumtoxin A (Botox).

A natural preparation made from butterbur root (*Petasites hybridus*) has been sold in Germany since the 1970s as a migraine preventive under the trade name Petadolex. Petadolex has been available in the United States since December 1998 and has passed several clinical safety and postmarketing surveillance trials.

Other possible preventive measures include: eating at regular times, not skipping meals, reducing the use of caffeine and pain-relievers, restricting physical exertion (especially on hot days), and keeping regular sleep hours, but not oversleeping. Other measures include:

- Aerobic exercise, which can reduce the frequency of migraines.

- Biofeedback thermal control was found to be as effective as medications in preventing migraines.
- Celery juice consumed twice daily may help to prevent migraines.
- Feverfew was shown to reduce the severity and frequency of migraines. This herb should not, however, be used during pregnancy or by people taking blood-thinning medications.
- Ginger may help prevent migraines.
- Pulsing electromagnetic fields. A preliminary study found that pulsing electromagnetic fields reduced the frequency of migraines.
- Relaxation techniques can reduce migraine frequency.
- Supplementation with magnesium and riboflavin was shown to prevent migraines.

For More Information

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Organizations

American Council for Headache Education

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