

## Functional headache

Most patients seen in primary care for head or neck pain have one of the primary headaches:

- migraine
- tension-type headache (TTH)
- cluster headache

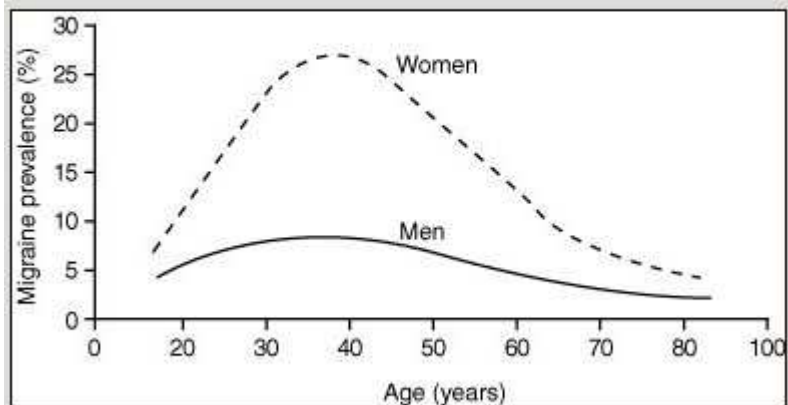


- Migraine is the most common
- About half remain either undiagnosed or incorrectly diagnosed.
- It is not uncommon for several types of headache to co-exist.

## Burden of suffering

- ~30 million over age of 12 in US.
- ~21 million females
- ~7 million males
- 1 in 4 households

### Age - and Gender-Specific Prevalence of Migraine



From [Lipton and Stewart \[1993\]](#), with permission.

## Diagnosis

Diagnosis is made from established criteria.

5 or more attacks with two or more of the following:

- Pain is unilateral in more than 50%
- Usually pulsating
- Physical activity worsens the pain
- Moderate to severe symptoms



There are several types of migraine headache, but most are characterized by severe pain on one or both sides of the head (which may move to the other side), nausea, dizziness and visual disturbances caused by dilation and constriction of the blood vessels in the head

ADAM.

At least one of the following:

- Nausea and/or vomiting
- Sensitivity to light, sound, and smell

## Screening

3 items:-

- Nausea
- Photosensitivity
- At least one day of disability in prior 3 months

had:-

- Sensitivity 0.81
- Specificity 0.75
- Positive predictive value 0.95



Lipton RB. Self-administered screener in primary care.  
Neurology 2003;61:375-382

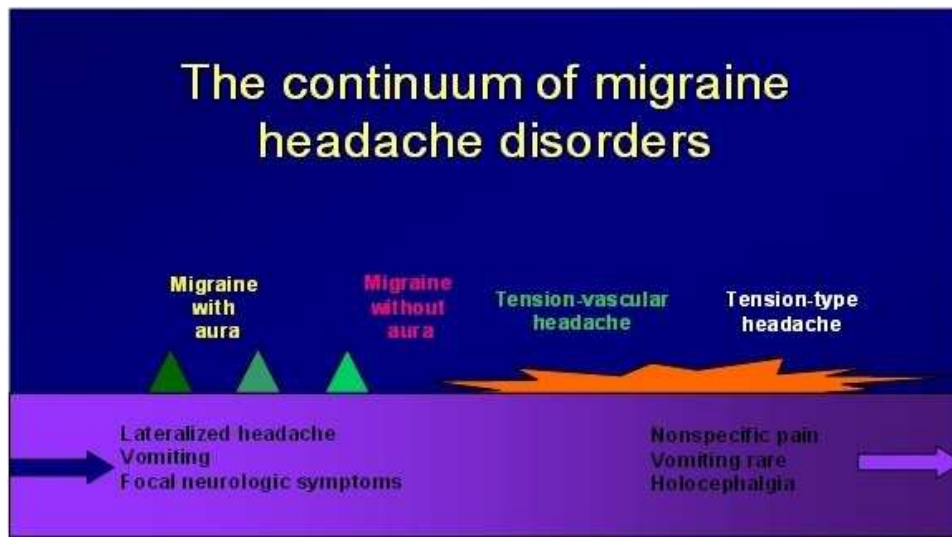
## Continuum

Many consider that:-

- Migraine,
- Tension-Type Headache,
- Cluster Headache,
- "Sinus"

are part of a continuum, and not distinct diseases.

For example, as many as 80% of those believed to be suffering from "sinus headache" will improve with specific migraine therapy.



## Tension-type headache

Not debilitating and does not worsen with exercise;

Does not include:

- sensitivity to light, sound, or smell
- nausea.

Unlike migraine, pain is usually bilateral rather than unilateral.

The occurrence of neck pain in patients with migraine may lead to misdiagnosis as tension-type headache



## "Sinus"

Headache associated with sinusitis is characterized by:

- aching
- throbbing
- facial pain with purulent nasal discharge and fever.

- Confusion with migraine is frequent.

- Nasal symptoms and facial pain associated with headache should not automatically lead to a diagnosis of sinus headache or rule out migraine.

## **Cluster headache**

- Pain occurs on one side of the face, generally periorbital, often described as excruciating.
- Attacks last one to three hours and tend to occur in "clusters" of weeks to months, followed by remissions lasting months to years.
- Occur more often in males, whereas only 25% of migraines occur in males.
- Associated symptoms include ipsilateral facial congestion and redness and tearing of the eyes, which can be seen bilaterally

## **Chronic daily headache**

Occurs in approximately 5% of the population.

Encompasses several subtypes, including:-

- transformed migraine,
- chronic TTH,
- new-onset daily persistent headache.



**CDH**

## Migraine

- Migraine is recognized as a chronic illness, not simply headache.
- 75% are without an aura - migraine without aura, or common migraine.
- Classic migraines are those with auras and have four symptom phases:
  - Prodrome
  - Aura
  - Attack
  - Postdrome



## Prodrome

Definition:

A group of vague symptoms that may precede a migraine attack by several hours, and can include the following:

- sensitivity to light or sound
- changes in appetite
- fatigue and yawning
- malaise
- mood changes
- food cravings

## Auras

Sensory disturbances occurring before attack in ~20%. Can be positive or negative:

Positive auras include:-

- bright or shimmering light/shapes at edge of field of vision called scintillating scotoma.
- Can enlarge and fill line of vision;
- other aura's are zigzag lines or stars.

Negative auras include:-

- dark holes, blind spots, or tunnel vision.

Some may have mixed positive and negative auras. This is sometimes described as a fortress with sharp angles around a dark center

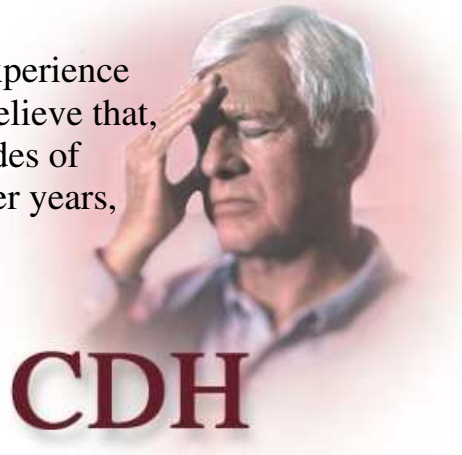


## Chronic migraine

A proportion of patients eventually experience on-going, chronic headaches. Some believe that, unless otherwise demonstrated, episodes of disabling pain, recurring regularly over years, should be considered as migraine.

There are two forms: -

- Rebound
- Transformed



### Rebound

The most common form.

- Patients typically have taken medication for more than three days a week on an ongoing basis.

- When medications are stopped, rebound headache occurs.

Medications are restarted but eventually are no longer effective.

- Medications implicated include simple painkillers - acetaminophen, aspirin, ibuprofen, barbiturates, sedatives, narcotics, and migraine medications, particularly those that also contain caffeine. (Heavy caffeine use can also cause this.)

### Transformed

- In some, migraines themselves evolve into chronic, daily headaches.

- These resemble tension headaches but are more likely to be accompanied by gastrointestinal distress and mental or visual disturbances.

- In women, they are prone to be affected by menstrual cycles.





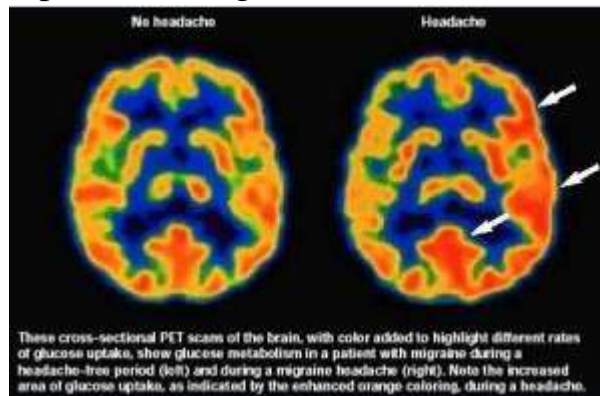
## Etiology of migraine

Many believe that the process starts with an underlying central nervous system disorder, which, when triggered by various stimuli, sets off a chain of neurologic and biochemical events, some subsequently affecting brain's vascular system.

- No experimental model fully explains the process.
- Strong genetic component is present in migraine with or without auras.

A single genetic mutation responsible for rare familial hemiplegic migraine has been identified.

- Numbers of genes are likely to be involved in great majority of cases.



## Treatment

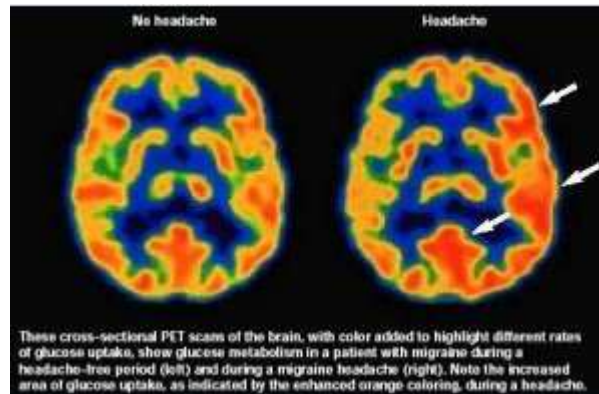
[See Algorithm]

### Principles

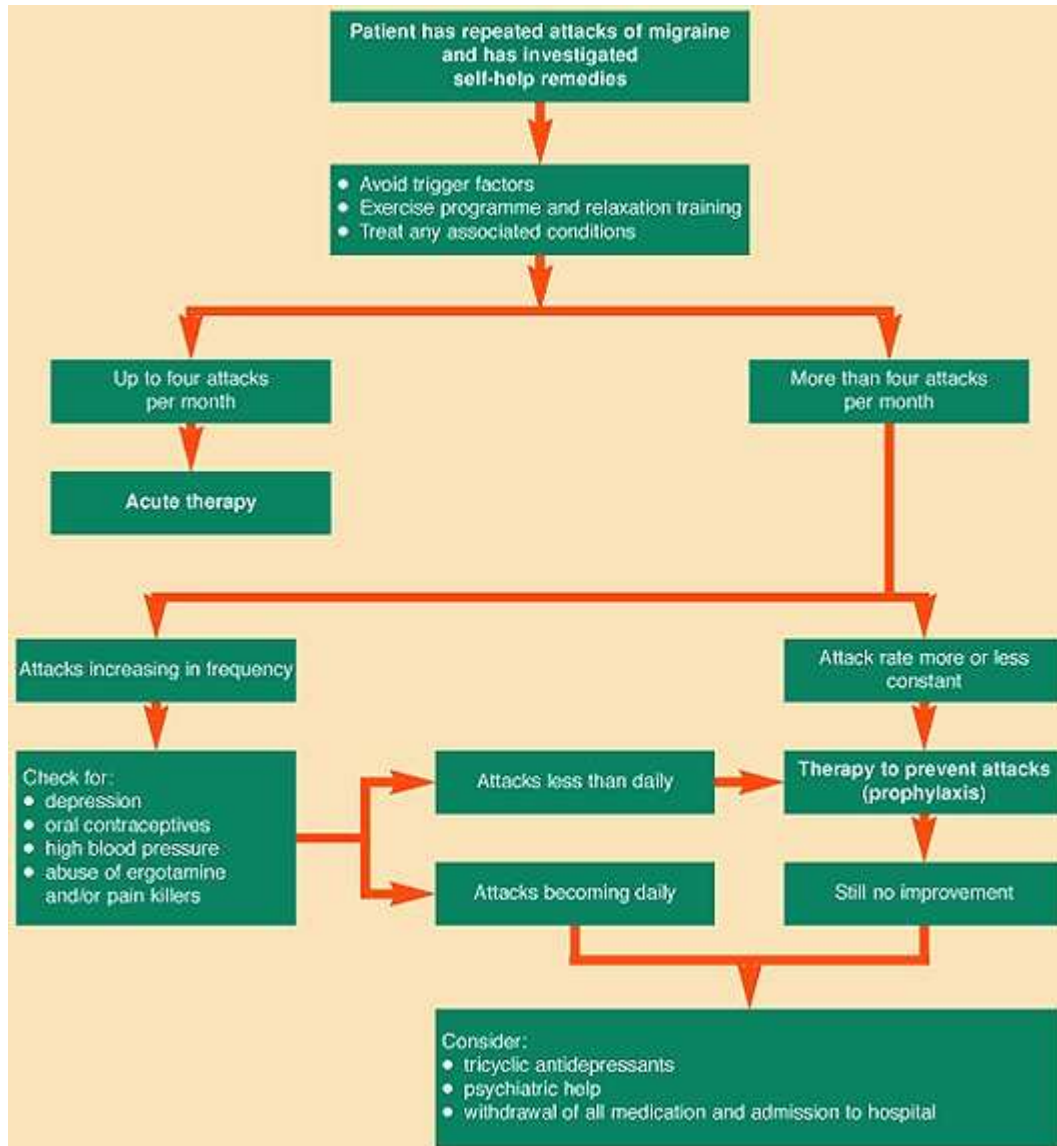
- Choose medications with minimal side effects
- Select administration method - oral, injection, nasal spray, rectal suppositories
- Treat rapidly, within an hour of symptom onset, if possible
- Start low, go slow
- Minimize the use of backup or rescue medications
- Minimize risk of rebound (None of the drugs should be taken for longer than two days per week)
- It may take two to four months for an agent to be effective

### Practice

- General pain relievers (Naproxen , Excedrin Migraine) and stress-reduction techniques first
- If ineffective within two hours, migraine specific agents. Tryptans are the first choice, then ergot derivatives (dihydroergotamine [DHE])
- Injected or rectally administered drugs may be used for patients with severe nausea or vomiting
- Nausea itself should be treated with specific anti-nausea drugs, such as metoclopramide (Reglan)
- If migraine medications fail to relieve symptoms within four hours, rescue drugs (opioids, corticosteroids) may be considered.



# Algorithm



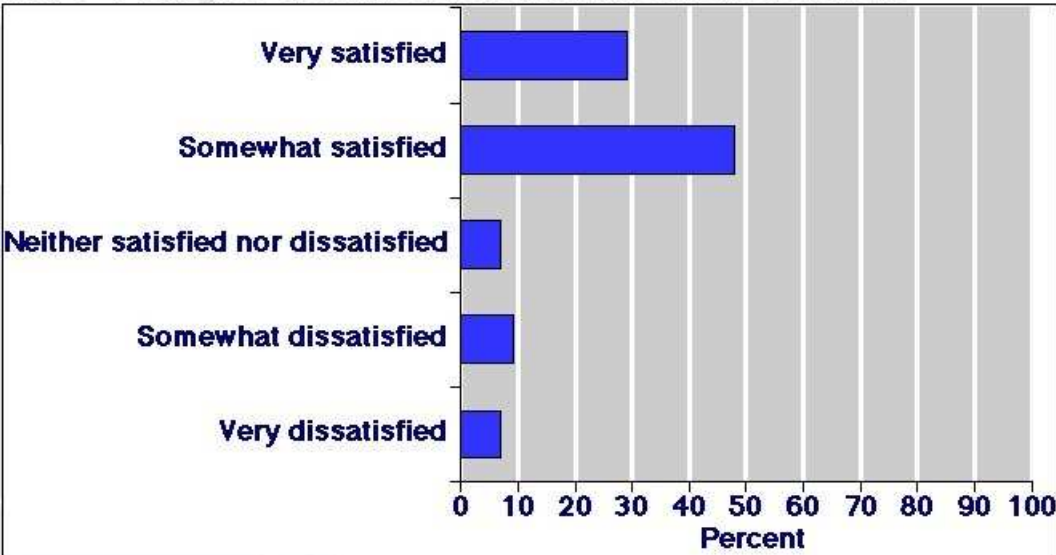
## Effectiveness

Figure 2: Reasons for dissatisfaction with current migraine treatment



# Satisfaction

Figure 1: Patients reporting satisfaction with current treatment



## Imaging

Imaging tests may be recommended under the following circumstances:

- if there are neurologic abnormalities on exam
- headaches that awaken at night
- new headaches in the elderly. In this age group, it is particularly important to first rule out age-related disorders, including stroke, hypoglycemia, hydrocephalus, and head injuries (usually from falls)
- worsening headaches

Image the first or the worst, and the clearly unusual!



## Migraine

From Wikipedia, the free encyclopedia

Migraine is a neurological [1] disorder.[1][2][3] Usually migraine causes episodes of severe or moderate headache [2] (which is often one-sided and pulsating) lasting between several hours to three days, accompanied by gastrointestinal upsets, such as nausea and vomiting, and a heightened sensitivity to bright lights (photophobia [3]) and noise (phonophobia [4]). Approximately one third of people who experience migraine get a preceding aura [5].[4] The word migraine is French in origin and comes from the Greek [6] hemicrania, as does the Old English term megrim. Literally, hemicrania means "half (the) head".

Migraine is widespread in the population. In the U.S., 18% of women and 6% of men report having had at least one migraine episode in the previous year[5] Wrongdiagnosis.com reports that 10% of people have been diagnosed with migraine and 5% have migraine but have not been diagnosed,[6] with seriousness varying from a rare annoyance to a life-threatening and/or daily experience. Treatments are typically expensive. Periodic or unpredictable disability can cause impoverishment due to patients' inability to work enough or to hold a job at all.

Migraines' secondary characteristics are inconsistent. Triggers precipitating a particular episode of migraine vary widely. The efficacy of the simplest treatment, applying warmth or coolness to the affected area of the head, varies between persons, sometimes worsening the migraine.[7] A particular migraine rescue drug may sometimes work and sometimes not work in the same patient. Some migraine types don't have pain or may manifest symptoms in parts of the body other than the head.

Available evidence suggests that migraine pain is one symptom of several to many disorders of the serotonergic control system, a dual hormone-neurotransmitter with numerous types of receptors. Two disorders — classic migraine with aura [7] (MA, STG) and common migraine without aura (MO, STG) — have been shown to have a genetic factor.[8] Studies on twins show that genes have a 60 to 65% influence on the development of migraine (PMID 10496258 [8] and PMID 10204850 [9] ). Additional migraine types are suspected and could be proved to be genetic. Migraine understood as several or many disorders could explain the inconsistencies, especially if a single patient has more than one genetic type.

However, still other migraine types might be functionally acquired due to hormone organ disease or injury. Three quarters of adult migraine patients are female, although pre-pubertal migraine affects approximately equal numbers of boys and girls. This reveals the strong correlation to hormonal cycling and hormonal-related causes or triggers. Hormonal migraine is a likely consequence of periodically falling hormone levels causing reduction in protein biosynthesis

[10] of metabolic components including intestinal tract serotonin [11].

### Signs and symptoms

The signs and symptoms of migraine vary among patients. Therefore, what a patient experiences before, during and after an attack cannot be defined exactly. The four phases of a migraine attack listed below are common but not necessarily experienced by all migraine sufferers. Additionally, the phases experienced and the symptoms experienced during them can vary from one migraine attack to another in the same migraineur:

1. The prodrome [12], which occurs hours or days before the headache.
2. The aura [13], which immediately precedes the headache.
3. The pain [14] phase, also known as headache phase.
4. The postdrome [15].

### Prodrome phase

Prodromal symptoms occur in 40% to 60% of migraineurs. This phase may consist of altered mood, irritability, depression [16] or euphoria [17], fatigue [18], yawning [19], excessive sleepiness, craving for certain food [20] (e.g., chocolate [21]), stiff muscles (especially in the neck), constipation or diarrhea, increased urination, and other vegetative symptoms. These symptoms usually precede the headache phase of the migraine attack by several hours or days, and experience teaches the patient or observant family how to detect that a migraine attack is near. The headache can range from mild to moderate or intolerable.[1] [22]

### Aura phase

For the 20-30%[9][10] of migraineurs who suffer migraine with aura, this aura comprises focal neurological phenomena that precede or accompany the attack. They appear gradually over 5 to 20 minutes and generally last less than 60 minutes. The headache phase of the migraine attack usually begins within 60 minutes of the end of the aura phase, but it is sometimes delayed up to several hours, and it can be missing entirely. Symptoms of migraine aura can be visual, sensory, or motor in nature.[11]

Visual aura [23] is the most common of the neurological events. There is a disturbance of vision consisting usually of unformed flashes of white and/or black or rarely of multicolored lights (photopsia [24]) or formations of dazzling zigzag lines (scintillating scotoma [25]; often arranged like the battlements of a castle, hence the alternative terms "fortification spectra" or "teichopsia"). Some patients complain of blurred or shimmering or cloudy vision, as though they were looking through thick or smoked glass [26], or, in some cases, tunnel vision [27] and hemianopsia [28]. The somatosensory aura of migraine consists of digitolingual or cheiro-oral paresthesias [29], a



feeling of pins-and-needles experienced in the hand and arm as well as in the ipsilateral nose-mouth area. Paresthesia migrate up the arm and then extend to involve the face, lips and tongue.

Other symptoms of the aura phase can include auditory or olfactory hallucinations, aphasia [30], vertigo [31], tingling or numbness of the face and extremities, and hypersensitivity to touch.

#### Pain phase

The typical migraine headache is unilateral, throbbing, moderate to severe and can be aggravated by physical activity. Not all of these features are necessary. The pain may be bilateral at the onset or start on one side and become generalized, and usually alternates sides from one attack to the next. The onset is usually gradual. The pain peaks and then subsides, and usually lasts between 4 and 72 hours in adults and 1 and 48 hours in children. The frequency of attacks is extremely variable, from a few in a lifetime to several times a week, and the average migraineur experiences from one to three headaches a month. The head pain varies greatly in intensity. The pain of migraine is invariably accompanied by other features. Nausea [32] occurs in almost 90 percent of patients, while vomiting occurs in about one third of patients. Many patients experience sensory hyperexcitability manifested by photophobia [33], phonophobia [34], osmophobia [35] and seek a dark and quiet room. Blurred vision, nasal stuffiness, diarrhea, polyuria [36], pallor [37] or sweating may be noted during the headache phase. There may be localized edema [38] of the scalp or face, scalp tenderness, prominence of a vein or artery in the temple, or stiffness and tenderness of the neck. Impairment of concentration and mood are common. Lightheadedness, rather than true vertigo [39] and a feeling of faintness may occur. The extremities tend to be cold and moist.

#### Postdrome phase

The patient may feel tired, "washed out", irritable, or listless and may have impaired concentration, scalp tenderness or mood changes. Some people feel unusually refreshed or euphoric after an attack, whereas others note depression and malaise [40]. Often, some of the minor headache phase symptoms may continue, such as loss of appetite, photophobia, and lightheadedness.

#### Diagnosis

The diagnosis of migraine without aura, according to the International Headache Society, can be made according to the following criteria, the "5, 4, 3, 2, 1 criteria":

- 5 or more attacks
- 4 hours to 3 days in duration
- 2 or more of - unilateral location, pulsating quality, moderate to severe pain, aggravation by or avoidance of routine physical activity

- 1 or more accompanying symptoms - nausea and/or vomiting, photophobia [41], phonophobia [42]

For migraine with aura, only two attacks are required to justify the diagnosis. The presence of either disability, nausea, or sensitivity can diagnose migraine with[12]:

- sensitivity [43] of 81%
- specificity [44] of 75%

### Pathophysiology

Migraine was once thought to be initiated by problems with blood vessels [45]. This theory is now largely discredited.[13] Current thinking is that a phenomenon known as cortical spreading depression [46] is responsible for the disorder.[14] In cortical spreading depression [47], neurological activity [48] is depressed over an area of the cortex [49] of the brain. This situation results in the release of inflammatory [50] mediators leading to irritation of cranial nerve [51] roots, most particularly the trigeminal nerve [52], which conveys the sensory information for the face and much of the head.

This view is supported by neuroimaging [53] techniques, which appear to show that migraine is primarily a disorder of the brain (neurological), not of the blood vessels (vascular). A spreading depolarization (electrical change) may begin 24 hours before the attack, with onset of the headache occurring around the time when the largest area of the brain is depolarized. The effects of migraine may persist for some days after the main headache has ended. Many sufferers report a sore feeling in the area where the migraine was, and some report impaired thinking for a few days after the headache has passed.

In 2005, research[15] was published indicating that in some people with a patent foramen ovale [54] (PFO), a hole between the upper chambers of the heart, suffer from migraines which may have been caused by the PFO. The migraines end instantly if the hole is patched. Several clinical trials are currently under way in an effort to determine if a causal link between PFO and migraine can be found. Early speculation as to this relationship has centered on the idea that the lungs detoxify blood as it passes through. The PFO allows uncleaned blood to go directly from the right side of the heart to the left without passing through the lungs.

Migraine headaches can be a symptom of Hypothyroidism [55].

## Types

### Migraine without aura

This is the most commonly seen form of migraine; patients who primarily suffer from migraine without aura may also have attacks of migraine with aura. According to the International Classification of Headache Disorders[16] it is a recurrent headache disorder manifesting in attacks lasting 4-72 hours. Typical characteristics of the headache are unilateral location, pulsating quality, moderate or severe intensity, aggravation by routine physical activity and association with nausea and/or photophobia and phonophobia.

In order to diagnose migraine without aura, there must have been at least 5 attacks not attributable to another cause that fulfill the following criteria:

1. Headache attacks lasting 4-72 hours when untreated
2. At least two of the following characteristics:
  - Unilateral location
  - Pulsating quality
  - Moderate or severe pain intensity
  - Aggravation by or causing avoidance of routine physical activity
3. During the headache there must be at least one of the following associated symptom clusters:
  - Nausea and/or vomiting
  - Photophobia and phonophobia

Where these criteria are not fully met, the problem may be classified as "probable migraine without aura" but other diagnoses such as "episodic tension type headache" must also be excluded.

### Migraine with aura

This is the second most commonly seen form of migraine: patients who primarily suffer from migraine with aura may also have attacks of migraine without aura. According to the International Classification of Headache Disorders[17] it is a recurrent disorder manifesting in attacks of reversible focal neurological symptoms that usually develop gradually over 5-20 minutes and last for less than 60 minutes. Headache with the features of "migraine without aura" usually follows the aura symptoms. Less commonly, the aura may occur without a subsequent headache or the headache may be non-migrainous in type. In order to diagnose migraine with aura, there must have been at least 2 attacks not attributable to another cause that fulfill the following criteria:

1. Aura consisting of at least one of the following, but no muscle weakness or paralysis:
  - Fully reversible visual symptoms (e.g. flickering lights, spots, lines, loss of vision)
  - Fully reversible sensory symptoms (e.g. pins and needles, numbness)
  - Fully reversible dysphasia (speech disturbance)

2. Aura has at least two of the following characteristics: - Visual symptoms affecting just one side of the field of vision and/or sensory symptoms affecting just one side of the body

- At least one aura symptom develops gradually over more than 5 minutes and/or different aura symptoms occur one after the other over more than 5 minutes

- Each symptom lasts from 5-60 minutes

Where these criteria are not fully met, a diagnosis of "probable migraine with aura" may be considered, although other neurological causes must also be excluded. If the picture complies with the criteria but includes one-sided muscular weakness or paralysis, a diagnosis of "sporadic hemiplegic migraine" or "familial hemiplegic migraine" should be considered.

#### Basilar type migraine

Basilar type migraine (BTM), formerly known as basilar artery migraine (BAM) or basilar migraine (BM), is an uncommon type of complicated migraine with symptoms that result from brainstem [56] dysfunction. Serious episodes of BTM can lead to stroke, coma, or even death. The use of triptans [57] and other vasoconstrictors [58] as abortive treatments in BTM is contraindicated. Abortive treatments for BTM often focus on vasodilation and restoration of normal blood flow to the vertebrobasilar territory and subsequent return of normal brainstem function.

#### Familial hemiplegic migraine

See also the main article on Familial hemiplegic migraine [59]  
Familial hemiplegic migraine 'FHM' is a type of migraine with a possible polygenetic component. These migraine attacks may last 4-72 hours[18] and are apparently caused by ion channel mutations, three types of which have been identified to date. Patients who experience this syndrome have relatively typical migraine headaches preceded and/or accompanied by reversible limb weakness on one side as well as visual, sensory or speech difficulties. A non-familial form exists as well, "sporadic hemiplegic migraine" (SHM). It is often difficult to make the diagnosis between basilar-type migraine and hemiplegic migraine. When making the differential diagnosis [60] is difficult, the deciding symptom is often the motor weakness or unilateral paralysis which can occur in FHM or SHM. While basilar-type migraine can present with tingling or numbness, true motor weakness and/or paralysis occur only in hemiplegic migraine.

### Abdominal migraine

According to the International Classification of Headache Disorders[19] abdominal migraine is a recurrent disorder of unknown origin which occurs mainly in children. It is characterised by episodes of moderate to severe central abdominal pain lasting 1-72 hours. There is usually associated nausea and vomiting but the child is entirely well between attacks.

In order to diagnose abdominal migraine, there must be at least 5 attacks, not attributable to another cause, fulfilling the following criteria:

1. Attacks lasting 1-72 hours when untreated 2. Pain must have ALL of the following characteristics: - Location in the midline, around the umbilicus or poorly localised

- Dull or 'just sore' quality
- Moderate or severe intensity

3. During an attack there must be at least two of the following: - Loss of appetite

- Nausea
- Vomiting
- Pallor

Most children with abdominal migraine will develop migraine headache later in life and the two may co-exist during adolescence.

### Acephalgic migraine

Acephalgic migraine is a neurological syndrome. It is a variant of migraine in which the patient may experience aura symptoms [61] such as scintillating scotoma [62], nausea [63], photophobia [64], hemiparesis [65] and other migraine symptoms [66] but does not experience headache [67]. Acephalgic migraine is also referred to as amigrainous migraine, ocular migraine, or optical migraine.

Sufferers of acephalgic migraine are more likely than the general population to develop classical migraine with headache.

The prevention and treatment of acephalgic migraine is broadly the same as for classical migraine. However, because of the absence of "headache", diagnosis of acephalgic migraine is apt to be significantly delayed and the risk of misdiagnosis significantly increased.

Visual snow [68] might be a form of acephalgic migraine.

If symptoms are primarily visual, it may be necessary to consult an ophthalmologist [69] to rule out potential eye disease before considering this diagnosis.

## Epidemiology

Migraine is an extremely common condition which will affect 12-28% of people at some point in their lives.[20] However this figure — the lifetime prevalence — does not provide a very clear picture of how many patients there are with active migraine at any one time. Typically, therefore, the burden of migraine in a population is assessed by looking at the one-year prevalence — a figure that defines the number of patients who have had one or more attacks in the previous year. The third figure, which helps to clarify the picture, is the incidence — this relates to the number of first attacks occurring at any given age and helps understanding of how the disease grows and shrinks over time. Based on the results of a number of studies, one year prevalence of migraine ranges from 6%-15% in adult men and from 14%-35% in adult women.[20] These figures vary substantially with age: approximately 4-5% of children aged under 12 suffer from migraine, with little apparent difference between boys and girls.[21] There is then a rapid growth in incidence amongst girls occurring after puberty[22],[23][24] which continues throughout early adult life.[25] By early middle age, around 25% of women experience a migraine at least once a year, compared with fewer than 10% of men.[20][26] After menopause, attacks in women tend to decline dramatically, so that in the over 70s there are approximately equal numbers of male and female sufferers, with prevalence returning to around 5%.[20][26]

At all ages, migraine without aura is more common than migraine with aura, with a ratio of between 1.5:1 and 2:1.[27][28] Incidence figures show that the excess of migraine seen in women of reproductive age is mainly due to migraine without aura.[29] Thus in pre-pubertal and post-menopausal populations, migraine with aura is somewhat more common than amongst 15-50 year olds[30][31]

Geographical differences in migraine prevalence are not marked. Studies in Asia and South America suggest that the rates there are relatively low,[32][33] but they do not fall outside the range of values seen in European and North American studies.[20][34]

## Triggers

A migraine trigger is any factor that, on exposure or withdrawal, leads to the development of an acute migraine headache. Triggers may be categorized as behavioral, environmental, infectious, dietary, chemical, or hormonal.

According to the National Library of Medicine's Medical Encyclopedia, Migraine attacks may be triggered by:

- Allergic reactions
- Bright lights, loud noises, and certain odors or perfumes
- Physical or emotional stress
- Changes in sleep patterns
- Smoking or exposure to smoke
- Skipping meals
- Alcohol or caffeine
- Menstrual cycle fluctuations, birth control pills
- Tension headaches
- Foods containing tyramine (red wine, aged cheese, smoked fish, chicken livers, figs, and some beans), monosodium glutamate (MSG), or nitrates (like bacon, hot dogs, and salami)
- Other foods such as chocolate, nuts, peanut butter, avocado, banana, citrus, onions, dairy products, and fermented or pickled foods.[35]

Many people report that one or more dietary, physical, hormonal, emotional, or environmental factors precipitate their migraines. The most-often reported triggers include: pesticides (sprayed fruits/vegetables), perfumes or fragrances (30% of sufferers) stress [70], over-illumination [71] or glare, alcohol [72], foods, too much or too little sleep [73], and weather. Some women experience migraines in conjunction with monthly menstrual cycles.

Sometimes the migraine occurs with no apparent "cause". The trigger theory supposes that exposure to various environmental factors precipitates, or triggers, individual migraine episodes. Migraine patients have long been advised to try to identify personal headache triggers by looking for associations between their headaches and various suspected trigger factors. Patients are urged to keep a "headache diary" in which to note what they eat and when they get a headache, to look for correlations, and to try to avoid headache by avoiding factors they identify as triggers. Typically this advice is accompanied by a list of trigger factors.

## Food

In 2005, authors who reviewed the medical literature[36] found that the available information about dietary trigger factors relies mostly on the subjective assessments of patients. Some suspected dietary trigger factors appear to genuinely promote or precipitate migraine episodes, but many other suspected dietary triggers have never been demonstrated to trigger migraines. The review authors found that alcohol, caffeine [74] withdrawal, and missing meals are the most important dietary migraine precipitants. The authors say dehydration deserves more attention, and that some patients are sensitive to red wine. The authors found little or no demonstrated evidence that notorious suspected triggers chocolate, cheese, or that histamine [75], tyramine [76], nitrates [77], or nitrites [78] normally present in foods trigger headaches. The artificial sweetener aspartame [79] (NutraSweet [80]®) has not been shown to trigger headache, but in a large and definitive study monosodium glutamate [81] (MSG) in large doses (2.5 grams) was associated with adverse symptoms including headache more often than was placebo [82]. The review authors also note that while general dietary restriction has not been demonstrated to be an effective migraine therapy, it is beneficial for the individual to avoid what has been a definite cause of the migraine.

On the other hand, several headache clinics have had good results with individually tailored dietary restriction as a therapy. Dr. Ian Livingstone, director of the Princeton Headache Clinic, recommends eliminating the following common headache triggers from the diet: aged cheese, monosodium glutamate, processed fish and meats containing nitrates (such as hot dogs), dark chocolate, aspartame, certain alcoholic beverages (including red wine), citrus fruits, and caffeine. After a period of one to two months, these foods can be reintroduced one at a time to determine their trigger potential for that individual. Adding large amounts of the suspected trigger in a short time may generate a response that is easy to observe.

Dr. David Buchholz, a neurologist who treats headaches at Johns Hopkins Hospital [83], has a longer list of suspected migraine triggers. He also recommends eliminating the triggers from the diet altogether, and then reintroducing them slowly after many weeks to measure the effects. His list includes: coffee (including decaf), chocolate, monosodium glutamate, processed meats and fish (aged, canned, preserved, processed with nitrates, and some meats that contain tyramine), cheese and dairy products (the more aged, the worse), nuts, citrus and some other fruits, certain vegetables (especially onions), fresh risen yeast baked goods, dietary sources of tyramine (including the foods listed above), and whatever gives you a headache. The National Headache Foundation has a more specific list of triggers, which differs slightly from David Buchholz's list. For example, it says that decaffeinated coffee is allowed. The list details "Allowed", "Use with caution", and "Avoid" triggers.[37]