

## Does the percutaneous closure of patent foramen ovale help the migraine sufferer?

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### What is a migraine?

A migraine is a chronic episodic headache condition associated with other symptoms such as nausea/vomiting and sound/light sensitivity. Migraines can be classified into two types: with aura and without aura. An aura is a neurological warning symptom that precedes the headache. More information about migraine headache can be found on the next page.

### What is a patent foramen ovale (PFO)?

The heart's right side receives blood that does not contain much oxygen and pumps the blood into the lungs to get oxygen. Then the blood goes through the heart's left side to get to the brain and other organs of the body. A patent foramen ovale (PFO) is a persistent hole in the heart's right/left wall boundary that did not close after birth. This opening can cause blood in the right side of the heart to move into the left side of the heart before it has had a chance to get oxygen from the lungs. When this happens, the rest of the body does not get as much oxygen as it should. It is possible that blood clots can pass through this hole and lead to stroke. The figure shows what this looks like.

### How is a PFO related to migraine?

Research has shown that patients who have a PFO also have migraine more often than people without a PFO. Why might this be? It is possible that blood without enough oxygen may trigger a migraine when it reaches the brain. In this issue of *Neurology*, two groups of researchers from Belgium and Switzerland studied whether percutaneous closure (closing the PFO by a technique that does not require a major surgical procedure) would lead to fewer migraines.

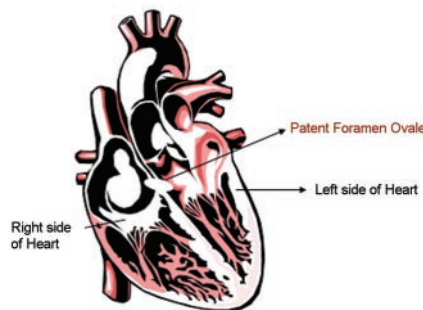


Figure. Diagram of patent foramen ovale (the hole in the "atrial septum").

The Belgian group gave a questionnaire about migraines to people after they had the PFO closure.<sup>1</sup> The Swiss group gave a questionnaire assessing the headache frequency and characteristics for the year before and after the PFO closure.<sup>2</sup> There was no appreciable affect on the non-migraine headache patients. In both studies, the PFO closure was done because doctors suspected that a blood clot passing through the PFO might have caused a stroke. The frequency of migraine was decreased in both studies after PFO closure. Only the Swiss study evaluated both migraine and non-migraine headaches. More information about the effectiveness of PFO closure and headaches from these two studies can be found in the table.

### What do these studies mean?

These studies add to the growing body of evidence that there is an association between a PFO and migraine. First, the number of people who had migraine with aura in both studies was higher than in the general population. Second, PFO closure was associated with reduction of migraine symptoms in patients having migraine both with and without aura. Third, in the second study, non-migraine headaches were not affected by PFO closure.

These studies are important in that they hold a clue to a potentially correctable trigger of migraine. However, they do not support PFO closure as a treatment for migraine because of two major limitations: (1) the studies were retrospective (they asked patients for information about their headaches that occurred in the past); and (2) they studied only stroke patients. To get better results, a study is needed that evaluates otherwise healthy migraine patients and collects information in real time (prospectively).

Currently, the treatment standard for migraine includes medications and lifestyle modification. However, more research may help uncover some of the mechanisms behind the migraine and yield future remedies.

Study	Patients with headache before PFO closure, %	Effect of PFO closure on migraine with aura	Effect of PFO closure on migraine without aura	Effect of PFO closure on nonmigraine headaches
Belgian group				
Total	39	71% reduction in number of people with headaches	50% reduction in number of people with headaches	Not tested
Migraine with aura	18			
Migraine without aura	21			
Nonmigrainous	unknown			
Swiss group				
Total	22	54% decrease in the number of headaches	62% decrease in the number of headaches	No significant decrease in nonmigrainous headaches
Migraine with aura	17			
Migraine without aura	5			
Nonmigrainous	11			

### **What is a migraine headache?**

A migraine is a recurring, throbbing headache. It usually occurs on one side of the head. While it is much more common in young women, it can strike anyone, at any age. It often runs in families.

### **What causes migraine?**

The exact cause of migraine is unknown. During an attack, changes in brain activity may cause blood vessels and nerves around the brain to become inflamed. Many women have attacks linked to their menstrual cycles.

### **What are the symptoms of migraine headache?**

People with migraines may have very different symptoms, which can include:

- Moderate to severe headache that lasts 4 to 72 hours
- Throbbing pain, often on one side of the head
- Increased pain after exercise or movement
- Sensitivity to bright light, sound, or odors
- Nausea or vomiting with the headache

One in five people with migraine have a warning before the headache. This is called an aura. You may see flashing lights, temporarily lose your sight, or go numb on one side of your body.

### **How is migraine diagnosed?**

No medical test can tell you if you have migraine. You will need to provide details about your headache to your neurologist. Your doctor will also do a neurological exam. Often, no further testing is needed.

### **How is migraine treated?**

Although there is no cure, migraine is treatable with medications, stress management techniques and a

healthy lifestyle. Most people with migraine can find relief using some of the treatment approaches described below. Talk to your doctor about which treatment is best for you. Keeping a headache diary is a valuable tool for treating migraine. It will help you work with your neurologist to identify triggers and track how medical and nonmedical interventions are working.

### **What are some of the things I can do other than taking medicine to treat my migraine?**

There are many ways to reduce the impact migraine has on your life.

Know and avoid your migraine triggers, which may include:

- **Diet:** Missed meals, alcohol (especially red wine), foods with monosodium glutamate (MSG), excessive caffeine, and meats preserved with nitrates and nitrites
- **Sleep:** Too much or too little sleep
- **Stress:** Stress and release from stress
- **Environmental factors:** Weather change, glaring or fluorescent lights, strong odors, and high altitude

Research has shown that some cognitive and behavioral treatments can help prevent migraine:

- Relaxation training
- Thermal biofeedback with relaxation training
- Electromyographic biofeedback
- Cognitive-behavioral therapy (also called stress-management training)

### **Medicines to treat the headache right after it has started**

Acute, or immediate, treatments are used to stop an attack when it occurs or to treat its symptoms. These are listed below. Overuse of

acute drugs can lead to a daily migraine-like headache, called a rebound headache.

- Nonprescription (over-the-counter) medications, such as aspirin, ibuprofen or acetaminophen combined with aspirin and caffeine
- Prescription nonsteroidal anti-inflammatory drugs and analgesics
- Specific drugs used to stop migraine attacks such as triptans and ergot alkaloids

### **Medicines to prevent migraine**

Daily preventive medications are available for people with frequent, debilitating headaches:

- Antidepressants
- $\beta$ -Blockers
- Calcium channel blockers
- Medicines also used to treat epilepsy
- Alternative treatments such as vitamin B<sub>2</sub>, magnesium, and feverfew

### **For more information**

American Academy of Neurology  
Education & Research Foundation  
651-695-2712  
[www.thebrainmatters.org](http://www.thebrainmatters.org)

American Council for Headache  
Education  
856-423-0258  
[www.achenet.org](http://www.achenet.org)

American Headache Society  
856-423-0043  
[www.ahsnet.org](http://www.ahsnet.org)

National Headache Foundation  
888-NHF-5552  
[www.headaches.org](http://www.headaches.org)

### **References**

1. Post MC, Thijs V, Herroelen L, Budts WIHL. Closure of a patent foramen ovale is associated with a decrease in prevalence of migraine. *Neurology* 2004;62:1439-1440.
2. Schwerzmann M, Wiher S, Nedeltchev K, et al. Percutaneous closure of patent foramen ovale reduces the frequency of migraine attacks. *Neurology* 2004;62:1399-1401.