Benign Paroxysmal Positional Vertigo

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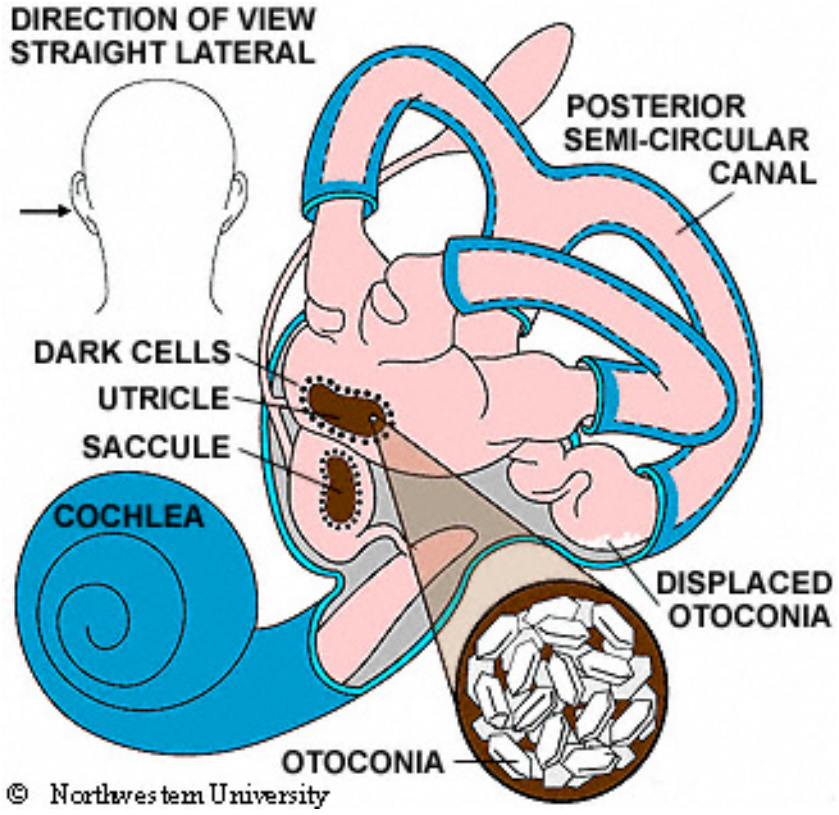
What is Benign Paroxysmal Positional Vertigo?

Benign paroxysmal positional vertigo (BPPV) causes dizziness which is thought to be due to debris which has collected within a part of the inner ear. This debris can be thought of as "ear rocks," although their formal name is otoconia. Ear rocks are small crystals of calcium carbonate which are normally a part of a structure in the ear called the utricle. The utricle may be damaged by head injury, infection, or other disorder of the inner ear or may have degenerated because of advanced age. Normally otoconia appear to have a slow turnover. They are dissolved and reabsorbed by the "dark cells" of the labyrinth (Lim, 1984), which are found in a zone adjacent to the utricle.



The symptoms of BPPV include dizziness or vertigo, lightheadedness, imbalance, and nausea. Activities that bring on symptoms will vary among persons, but symptoms are almost always precipitated by a change of position of the head with respect to gravity. Getting out of bed and rolling over in bed are common "problem" motions. Because people with BPPV often feel dizzy and unsteady when they tip their heads back to look up, BPPV is sometimes called "top shelf vertigo." Women with BPPV may find that the use of shampoo bowls in beauty parlors brings on symptoms. An intermittent pattern is common. BPPV may be present for a few weeks, then stop, then come back again.

What Causes Benign Paroxysmal Positional Vertigo?

The most common cause of BPPV in people under age 50 is head injury. In older people, the most common cause is degeneration of the vestibular system of the inner ear. BPPV becomes increasingly common with advancing age. In half of all cases, BPPV is called "idiopathic," which means that it occurs for no known reason. Viruses affecting the ear such as those causing vestibular neuritis, minor strokes such as anterior inferior cerebellar artery (AICA) syndrome, and Meniere's disease are significant but unusual causes.

How is Benign Paroxysmal Positional Vertigo Diagnosed?

Your physician can make the diagnosis based on your history, findings on physical examination, and the results of vestibular and auditory tests. Electronystagmography (ENG) testing may be needed to look for the characteristic nystagmus (jumping of the eyes). A magnetic resonance imaging (MRI) scan will be performed if a stroke or brain tumor is suspected. A rotatory chair test may be used for difficult diagnostic problems. It is possible to have BPPV in both ears (bilateral BPPV).

How is Benign Paroxysmal Positional Vertigo Treated?

BPPV has often been described as "self-limiting" because symptoms often subside or disappear within six months after onset. Symptoms tend to wax and wane. Motion sickness medications are sometimes helpful in controlling the nausea associated with BPPV but are otherwise rarely beneficial. However, various kinds of physical maneuvers and exercises have proved effective. Three varieties of conservative treatment that involve exercises and a treatment that involves surgery are described in the next sections.

Office Treatment

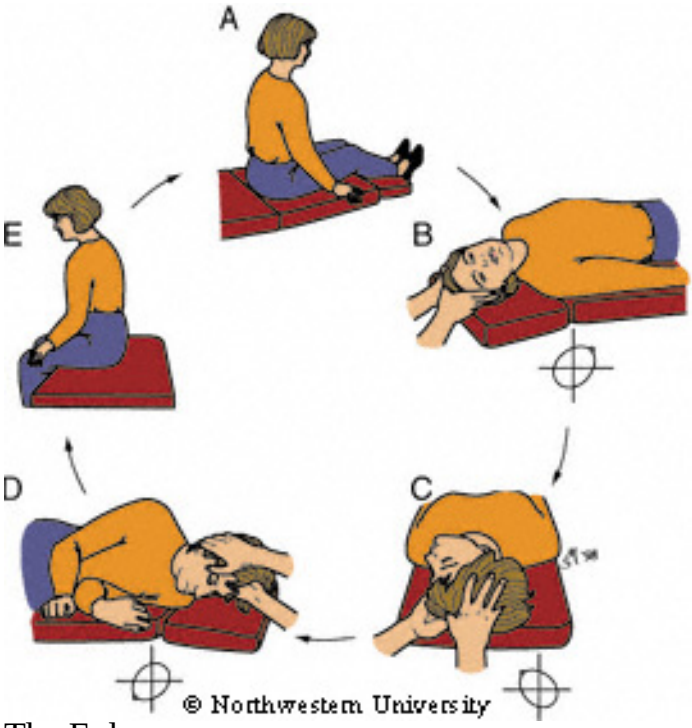
There are two treatments of BPPV that are usually performed in the doctor's office. Both treatments are very effective, with roughly an 80 percent cure rate, according to a study by Herdman and others (1993). If your doctor is unfamiliar with these treatments, you can find a list of knowledgeable doctors from the Vestibular Disorders Association (VEDA).

These treatments, maneuvers named after their inventors, are intended to move debris or "ear rocks" from the sensitive part of the ear (posterior canal) to a less sensitive location. Each maneuver takes about 15 minutes to complete.

The Semont maneuver (also called the liberatory maneuver) involves a procedure whereby the patient is rapidly moved from lying on one side to lying on the other. It is a brisk maneuver that is not currently favored in the the United States.

The Epley maneuver, also called the particle repositioning, canalith repositioning procedure, and modified liberatory maneuver involves sequential movement of the head into four positions, staying in each position for approximately 30 seconds (for more information about the Epley maneuver, see the animated demonstration). The recurrence rate for BPPV after these maneuvers is about 30 percent, and in some instances a second treatment may be necessary. While some authors advocate use of vibration in the Epley maneuver, we have not found this useful in a study of our patients.

After either of these maneuvers, you should be prepared to follow the instructions below, which are aimed at reducing the chance that debris might fall back into the sensitive back part of the ear.



The Epley maneuver.

Instructions for Patients After Office Treatments (Epley or Semont maneuvers)

1. *Wait for 10 minutes after the maneuver is performed before going home.* This is to avoid "quick spins," or brief bursts of vertigo as debris repositions itself immediately after the maneuver. Do not drive home yourself; have someone else drive you.
2. *Sleep semi-recumbent for the next two nights.* This means sleep with your head halfway between being flat and upright (a 45 degree angle). This is most easily done by using a recliner chair or by using pillows arranged on a couch. During the day, try to keep your head vertical. You must not go to the hairdresser or dentist. No exercise which requires head movement. When men shave under their chins, they should bend their bodies forward in order to keep their head vertical. If eyedrops are required, try to put them in without tilting the head back. Shampoo only under the shower.

3. *For at least one week, avoid provoking head positions that might bring BPPV on again.*
   - Use two pillows when you sleep.
   - Avoid sleeping on the affected side.
   - Do not turn your head far up or far down.

   Be careful to avoid head-extended positions, in which you are lying on your back, especially with your head turned toward the affected side. This means exercising caution at the beauty parlor, dentist's office, and while undergoing minor surgery. Try to stay as upright as possible. Exercises for low-back pain should be stopped for a week. No "sit-ups" should be done for at least one week and no "crawl" swimming. (breast stroke is okay) Also avoid far head-forward positions and certain exercises such as

toe touches.

4. *At one week after treatment, put yourself in the position that usually makes you dizzy.* Position yourself cautiously and under conditions in which you cannot fall or hurt yourself. Let your doctor know how you did.

These maneuvers are effective in about 80 percent of patients with BPPV. If you are among the other 20 percent, your doctor may wish you to proceed with the Brandt-Daroff exercises, as described below. If a maneuver works but symptoms recur or the response is only partial, another trial of the maneuver might be advised. When all maneuvers have been tried and symptoms are still intolerable, then surgical management (posterior canal plugging) may be offered.

Home Treatment

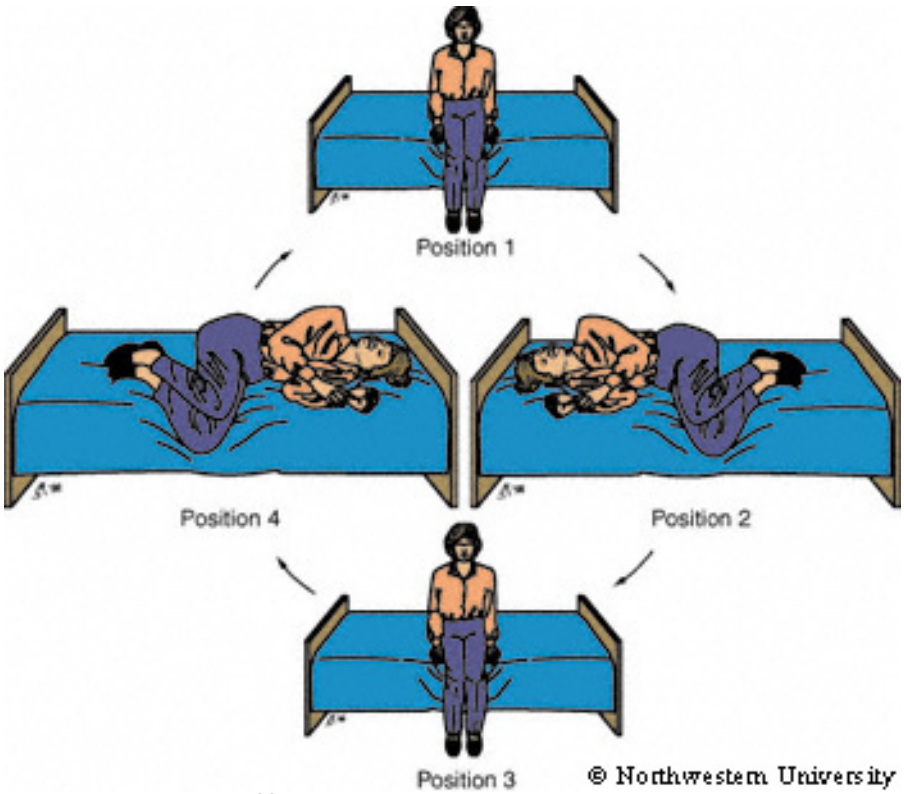
The Brandt-Daroff exercises are another method of treating BPPV, typically used when the office treatment fails. They succeed in 95 percent of cases but are more arduous than the office treatments. These exercises are performed in three sets per day for two weeks. In each set, one performs the maneuver below five times.

1 repetition = maneuver done to each side in turn (takes two minutes)

Suggested Schedule for Brandt-Daroff exercises

Time	Exercise	Duration
Morning	5 repetitions	10 minutes
Noon	5 repetitions	10 minutes
Evening	5 repetitions	10 minutes

Start sitting upright. Then move into the side-lying position, with the head angled upward about half-way. An easy way to remember this is to imagine someone standing about six feet in front of you, and just keep looking at the person's head at all times. Stay in the side-lying position for 30 seconds, or until the dizziness subsides, then go back to the sitting position. Stay there for 30 seconds and then go to the opposite side and follow the same routine (for more information about the Brandt-Daroff exercises, see the animated demonstration).



The Brandt-Daroff exercises.

These exercises should be performed for two weeks, three times per day, or for three weeks, twice per day. This adds up to 52 sets in total. In most persons, complete relief from symptoms is obtained after 30 sets, or

about 10 days. In approximately 30 percent of patients, BPPV will recur within one year. If BPPV recurs, you may wish to add one 10-minute exercise to your daily routine. The Brandt-Daroff exercises as well as the Semont and Epley maneuvers are compared in an article by Brandt (1994) listed in the reference section.

Surgical Treatment

If the exercises described above are ineffective in controlling symptoms, symptoms have persisted for a year or longer, and the diagnosis is very clear, a surgical procedure called posterior canal plugging may be recommended. Canal plugging blocks most of the posterior canal's function without affecting the functions of the other canals or parts of the ear. This procedure poses a small risk to hearing, but is effective in about 90 percent of individuals who have not responded to any other treatment. Only about one percent of our BPPV patients eventually have this procedure done. Surgery should not be considered until all three maneuvers/exercises (Epley, Semont, and Brandt-Daroff) have been attempted and failed. See the article by Parnes (1990, 1996) in the references for more information.

There are several alternative surgeries. Of course, it is always advisable when considering surgery to select a surgeon who has had as wide an experience as possible and to carefully discuss all of the alternatives.

We believe that some surgical procedures are inadvisable for the individual with intractable BPPV. Vestibular nerve section, while effective, eliminates more of the normal vestibular system than is necessary. Labyrinthectomy and sacculotomy are also generally inappropriate because of reduction or loss of hearing expected with these procedures.

How Might Benign Paroxysmal Positional Vertigo Affect My Life?

Certain modifications in your daily activities may be necessary to cope with your dizziness. Use two or more pillows at night. Avoid sleeping on the affected side. In the morning, get up slowly and sit on the edge of the bed for a minute. Avoid bending down to pick up things, and extending the head, such as to get something out of a cabinet. Be careful when at the dentist's office, the beauty parlor when lying back having ones hair washed, when participating in sports activities and when you are lying flat on your back.

What is Atypical Benign Paroxysmal Positional Vertigo?

There are several rarer variants of BPPV which may occur spontaneously or after the office maneuvers. It is believed that these variants are caused by migration of otoconial debris into canals other than the posterior canal, such as the anterior or lateral canals.

Lateral canal BPPV is the most common variant, accounting for about three percent of cases. It is diagnosed by seeing a horizontal nystagmus that changes direction depending on the down ear. The nystagmus can be either always towards the ground ("geotrophic") or always towards the sky ("ageotrophic"). Anterior canal BPPV is extremely rare and likely transient when it does occur. It is diagnosed by a positional nystagmus with components of downbeating and torsional movement.

Treatment of lateral canal BPPV has not been as well established as in typical BPPV. The "log roll" exercises are a procedure where an individual is rolled in rapid steps of 90 degrees, starting supine/affected ear down, to supine, to affected ear up, and then to sitting at intervals of 30 seconds or one minute. This procedure seems reasonable but efficacy has not yet been established. There is a report of 75 percent efficacy (15/20) of a variant procedure (e.g. Fife, 1998) called the "iterative full-contralateral roll", going from supine nose up, a full 360 degrees in 90 degree increments, rotating towards the good ear. This procedure is performed once or

twice in the clinic and repeated at home for seven days.

A variant of the Brandt-Daroff exercises can be used in lateral canal BPPV where the head is positioned upright on the trunk instead of inclined. This modified Brandt-Daroff also seems quite reasonable and might serve as a fall back strategy when the log-roll does not work. An advantage of the modified Brandt-Daroff is that the side of the lesion need not be known. This can be difficult with lateral canal BPPV. At this writing, it is unclear which (if any) procedure is best. Simply sleeping with the affected ear up has been reported to cure about 75 percent of patients (see Vannucchi et al, 1997). This positioning is similar to that recommended for posterior canal BPPV after the Epley or Semont maneuver, except for the 45 degree angle of the head with respect to the horizontal is not used here. Neuroradiological investigation may be warranted in persons who fail to improve after these maneuvers.

Where Can I Go for Help?

The Vestibular Disorders Association (VEDA) maintains a large and comprehensive list of doctors who have indicated a proficiency in treating BPPV. Please contact them to find a local treating doctor. At our institution, Northwestern University Medical School, in Chicago, Illinois, BPPV evaluations are done in the Otolaryngology Practice of the Northwestern Medical Faculty Foundation.

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