

EXERCISE THERAPY FOR POSITIONAL VERTIGO

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Article abstract - A common cause of vertigo, benign positional paroxysmal vertigo (BPPV), its history, diagnosis and therapy is presented. BPPN is suggested by history, readily diagnosed by office examination, and cured by appropriate exercise therapy. Since the condition is so common and often unrecognized, physicians are encouraged to consider BPPV as a possible cause of treatable dizziness.

Introduction

Benign positional paroxysmal vertigo (BPPV) is a common and sometimes disabling cause of dizziness that is readily diagnosed and treated. BPPV may be suspected by careful history and confirmed by appropriate physical examination. Since pharmacologic therapy is of little benefit and exercise therapy is curative in over 90% of patients, the diagnosis and treatment deserve further emphasis.

Historical factors leading to consideration of BPPV are the following: 1) Symptoms associated with certain head positions, 2) rotational vertigo, episodic in nature, 3) antecedent episode of severe rotary vertigo with or without nausea and vomiting associated with an upper respiratory infection suggesting prior viral neurolabyrinthitis, 4) history of head trauma prior to attacks of vertigo, 5) most severe symptomatology early in the day with lessening symptoms as the day progresses, 6) relative absence of spontaneous symptoms without head movement or position change. Physical examination findings include 1) vertical-rotary benign positional paroxysmal nystagmus (BPPN) produced by provocative maneuvers, 2) latency to onset of symptoms once precipitating head position achieved, 3) short duration nystagmus (3-30 seconds) and 4) adaptation of nystagmus and symptoms: disappearance with repeated maneuvers. An additional feature of the physical examination is that BPPN is not a constant feature, being present on some examinations but absent at other times. The finding of the typical nystagmus upon assumption of certain head postures is considered the single most important physical finding in making the diagnosis of BPPV.

Discussion

BPPV has a characteristic clinical history and a pathognomonic physical finding, vertical-rotary nystagmus with a fast component beating toward the down ear. Reviews of BPPV¹⁻⁴ have emphasized diagnostic techniques, including high resolution eye movement recordings which are not available in many practitioner's offices, but have not emphasized therapy or provided follow-up information on its efficacy.

Because the diagnosis can be strongly suspected by history, confirmed by physical examination and the condition can often be completely cured by exercise therapy, the history, the physical examination and exercise therapy of BPPV are reviewed.

History

The causes of BPPV include infection, trauma, degeneration of the peripheral end-organ and spontaneous occurrence without defined antecedent cause. Baloh et al.¹ believed that the most common cause was a preceding neurolabyrinthitis. Preceding trauma, even minor, and the idiopathic type are also common. In our experience a clear precipitating cause appears to be frontal head injury with the onset of symptoms shortly following the trauma. Some patients with BPPV do not recognize or emphasize the positional nature of their symptoms until questioned.

A typical history is the sudden onset of rotary vertigo occurring only in specified head positions such as turning over in bed. Some patients note that the symptoms only occur when bending the head and rapidly abate when the head is returned to an upright position. The patient may have a persistent sensation of dysequilibration aggravated by looking upward, bending over, or rapid head turning. Still others describe an episodic sensation as though they are walking on pillows.²

During careful elicitation of the history, the examiner may become aware that even though the patient reports "dizziness all the time", they truly have episodic vertigo associated with certain physical activities. While the usual sensation is one of rotary vertigo, many patients having been symptomatic for months or years, describe their symptom as being one of light-headedness or unsteadiness without a clear rotary component. In such patients, any history of position change as an exacerbating feature must be sought. Whenever certain activities or positions produce symptoms of dysequilibration or dizziness, a careful and repeated search for BPPN is mandatory.

Physical Examination for BPPN

The patient should be seated on an examination table close enough to the end such that when they are recumbent the head may be permitted to extend further backward an additional 45 degrees. The patient is instructed that the maneuvers may produce the symptoms but are asked to keep their eyes open so that the nystagmus may be viewed. Some examiners suggest the use of Frenzel lenses to reduce fixation and magnify the view of the eyes.² If the history suggests a certain side, the initial provocative maneuver is performed with the head turned 45 degrees to that side and approximately 45 degrees back past the horizontal plane ([Fig 1](#)). The patient is instructed to describe any symptoms that occur when they are placed in the head position and the eyes are observed for a period of one minute. Eye movement recordings have disclosed that there may be no latency or periods as long as 45 seconds before the nystagmus begins with an average latency of 7.8 seconds.¹ The patient is then returned to the seated upright position and remains there until all symptoms have abated. The patient is then reclined with the head straight back position for one minute, brought upright, and then, once again, after becoming asymptomatic, back down with the head tilted to the opposite side and back ([Fig 1](#)).

Brandt⁵ believes that BPPV is positioning rather than positional: it is not induced by a particular head position relative to gravity but only by rapid changes in head position. The intensity of the positional nystagmus depends on the velocity of the positioning maneuver and BPPV attacks can be avoided if the challenging position is assumed very slowly.

BPPN has certain characteristics that help to define it as being of peripheral origin ([Table](#)). Of particular note are the following points:

The nystagmus comes on after variable latency averaging approximately 8 seconds. If the degree of

vertigo is intense, the patient may not wish to be placed in the offending position. The patient should be encouraged to do so given the belief that finding the characteristic nystagmus will permit a diagnosis and suggest a means to correct the symptoms. A nystagmus must be seen before a definite diagnosis is made. The patient must be encouraged to keep the eyes open so that the characteristic nystagmus may be observed. The nystagmus has different characteristics depending upon the position of the eyes in the orbit.^{1, 2} In general, the nystagmus is a vertical, rotary, jerk nystagmus with a fast-phase beating in an upward direction with the twelve o'clock meridian of the eye rotating toward the down ear when the eyes are in the mid orbital position. When the eyes are directed toward the down ear the nystagmus is primarily rotary, when directed toward the opposite side the nystagmus is primarily vertical ([Fig 2](#)). The nystagmus often lasts just a few seconds so that only two or three beats of the nystagmus may actually be viewed.⁶

One important feature of BPPN is that it is quite variable. Patients may not have a definite nystagmus each time they are placed in the positions described and, since it often readily accommodates or adapts, the nystagmus may not be seen on the first attempt to elicit it. Any patient who has history of positional induction of symptoms should have provocative maneuvers repeated on a number of occasions.

Exercise Therapy

Assuming that the diagnosis of BPPV has been made, there is an excellent chance that exercise therapy will be curative.⁷⁻⁹ We recommend a variation of the exercises as follows:

The patient is first instructed carefully about the type of exercise to be performed. In a seated position the patient is asked to move to one side placing the worst ear (if one can be discovered) down first ([Fig 3](#)). The patient moves laterally rapidly, but not so quickly as to produce a head or neck injury, and rests the head on a pillow or other support until the symptoms subside. The patient may close their eyes which is believed by some to reduce the intensity of the symptoms. The patient then returns to an upright position, waits until any recrudescence of symptoms subsides, and then moves to the opposite side with the ear down, resting there until the symptoms have subsided or 30 seconds have passed. The patient then returned to the upright position concluding one repetition of the exercise. Patients are asked to perform twenty repetitions of the exercises at least twice a day. If the symptoms are very intense, a minimum of ten repetitions is requested. They are encouraged to repeat the exercises three times a day. Patients are cautioned not to be too vigorous less they produce a minor neck injury. Patients are often greatly assisted by a family member or assistant helping them move quickly to the lateral head down position.

Some patients have intense symptoms at the onset of the BPPV, including vomiting. These patients may need admission, hydration and, perhaps, the concurrent administration of vestibular suppressant medication.¹⁰ It is clear that patients who experience extreme discomfort during the maneuvers will not be likely to pursue them on their own outside of an office or hospital setting.

In many patients recovery is quite sudden and occurs during the exercise therapy. Still others progressively improve over weeks and months, suggesting that the vestibular system may adapt to whatever abnormal perturbation is causing the symptoms.

Another approach is to use Semont's Liberatory Maneuver.^{9, 11} The maneuver is described in the footnote. We have no personal experience using the Liberatory Maneuver, but R B Daroff (personal communication) has adopted this as the first exercise technique. If a patient does not have the typical nystagmus of BPPV during the maneuver, they are started on the exercise therapy as described above. If, however, they do have the typical nystagmus (BPPN) the maneuver is completed with the appropriate instructions as described in the footnote. If the patient remains symptomatic, the maneuver is repeated one week later. If they then remain symptomatic, they are started on the exercise therapy described above.

The mechanism for the sudden cessation of symptomatology is debated. Cupulolithiasis has been proposed as a mechanism.^{1, 12-14} If this theory is correct, then one might speculate that sudden displacement of the otoconia from the posterior semicircular canal could relieve the abnormal condition. For patients who have been severely limited in activities because of their intense symptoms for months or years, response to exercise therapy is most gratifying. In general, medication has not successfully abated these symptoms and many patients have sought assistance from a variety of medical specialists and tried a large number of medications unsuccessfully prior to the exercise therapy. Patients may experience a second reoccurrence of intense symptoms months after successful therapy but then be able to do the exercises on their own and experience complete relief. Patients may experience minor occurrences of symptoms but these are usually treated successfully with a few days of additional exercise therapy.

After an asymptomatic state is achieved it is unlikely that additional repetition of the exercise therapy will protect against future symptoms or provide additional relief of a persistent and accompanying underlying peripheral vestibulopathy of a different mechanism. Nonetheless, many patients will, on their own, continue the exercises "just in case".

FOOTNOTE

Semont's Liberatory Maneuver (Manoeuvre Libératoire)

1. A. starting with the patient sitting straight up on the examining table, swing the patient down quickly, with the offending ear down and the head "slightly declined." If the nystagmus appears (it should be torsional with the fast-phase beating toward the down ear), keep the patient there until the nystagmus disappears and then wait another 2-3 minutes.

B. If the nystagmus doesn't appear in A, turn the head so that the face is up 45 degrees from the horizontal. The nystagmus should then appear. Again, keep the patient in this position for 2-3 minutes after nystagmus stops.

2. Hold the patient's head and neck with both hands and swing the patient quickly to the opposite side. The speed of the head must be 0 at the moment it touches the examining table.

3. A. If you are dealing with a classic case of BPPV, a rotary nystagmus will develop with the fast-phase still beating toward the offending ear (the top ear). If it is beating toward the down ear, all bets are off and you are not dealing with BPPV. The typical BPPV nystagmus generally has a greater amplitude but lower frequency than the nystagmus with the bad ear down.

B. If no nystagmus develops after the turn to the opposite ear, move the head slowly to 90 degrees facing up and then turn the head in the opposite direction 135 degrees so that it is 45 degrees facing down below the horizontal (with the sick ear up). The nystagmus should then occur.

C. Hold the patient in the nystagmus-inducing position for at least five minutes and then bring the patient back to a sitting position "very, very slowly."

4. Have patients keep their heads absolutely vertical in space during the next 48 hours, day and night. This is achieved by the "Instructions to Patients" below.

5. After the 48-hour interval, they are prohibited from sleeping on their vertigo-generating side for one week. If the maneuver is not successful, it is performed again a week later.

There is a 84% positive success rate with one maneuver and 90% positive success rate after a second maneuver one week later. The recurrence rate is 4.2%.

INSTRUCTIONS TO BPPV PATIENTS AFTER LIBERATORY MANEUVER

Whatever the position of your body, you must keep your head vertical in space for the next 48 hours. Imagine your head being hung by an invisible string to the ceiling. You must not bend your head forward or backward. You must not go to the barber, hairdresser or dentist. No exercise. When men shave under their chins, they should bend their bodies forward in order to tense the skin and keep their head vertical. No eye drops. Shampoo only under the shower.

At night, lie on your back with plenty of pillows to keep your head vertical while the trunk is about 30 - 45 degrees elevated off the bed. Put something at the bottom of the bed in order not to slip down during the night.

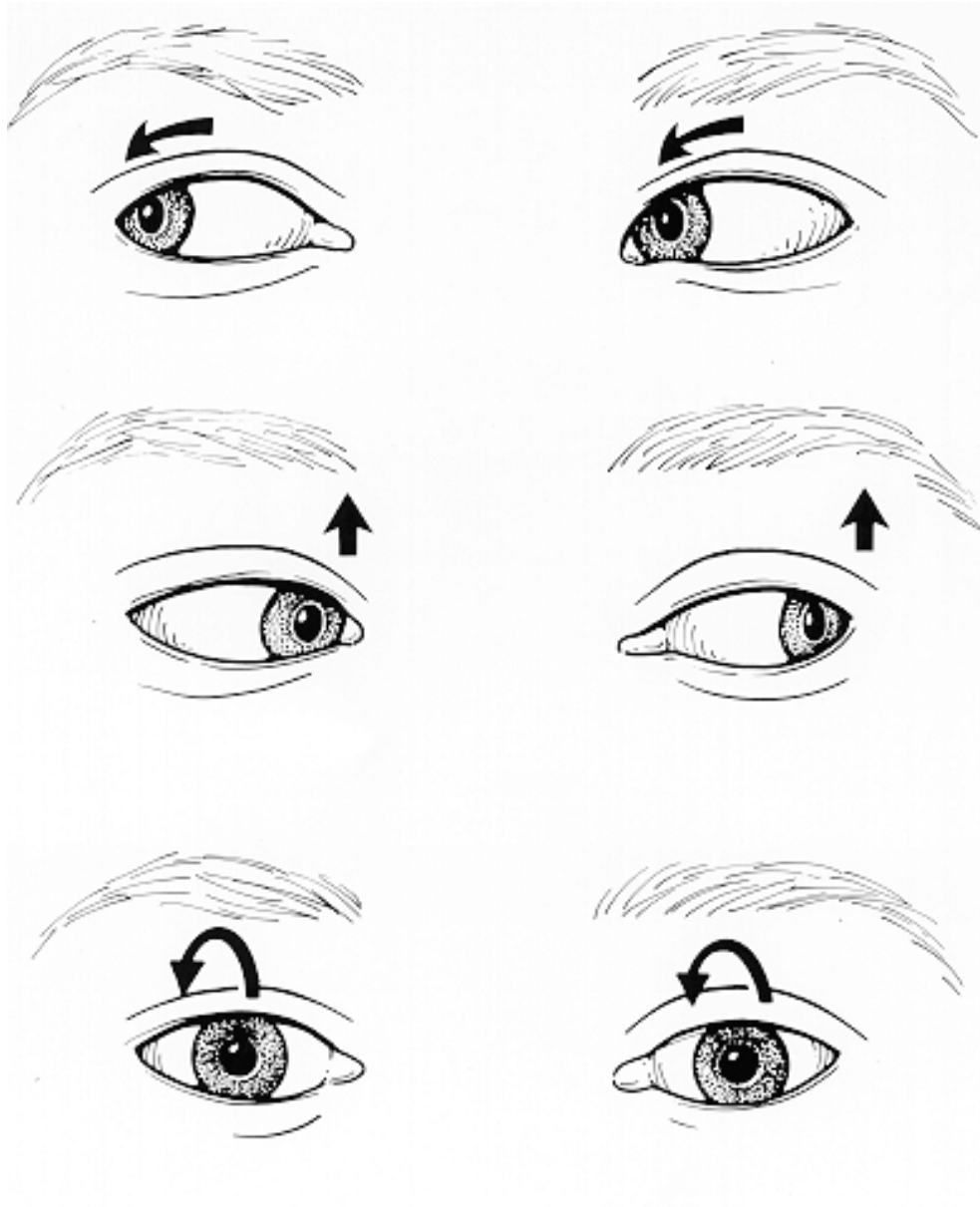
FIGURES

Figure One:



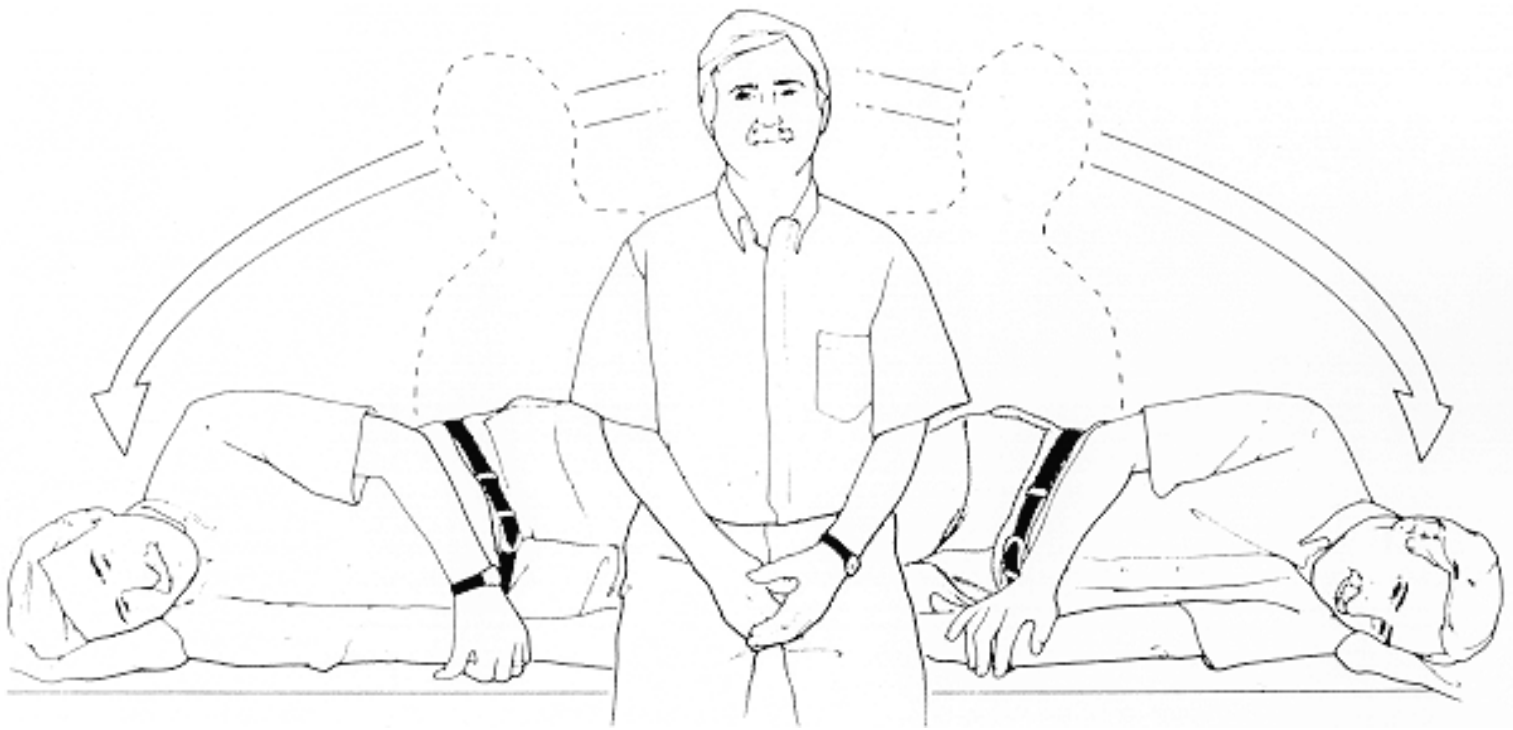
Provocative maneuvers for positional vertigo and nystagmus: The patient is abruptly moved from a seated position to one with the head hanging 45 degrees below the horizontal and rotated 45 degrees to one side. He is then observed for BPPN (See Figure 2) . The maneuvers are repeated with the head straight back and turned to the other side.

Figure Two



In BPPN the nystagmus fast phase is horizontal-rotary directed toward the undermost ear when gaze is directed toward the undermost ear (upper panel). The nystagmus fast phase is upward toward the forehead when gaze is directed to the uppermost ear (middle panel). With the eyes in the central orbital position the nystagmus fast phase is vertical upward and rotary toward the down ear (bottom panel).

Figure Three



Exercise therapy: The patient begins in the seated position and then leans rapidly to the side placing the head on the bed or table. The patient remains there until the vertigo subsides and then returns to the seated upright position remaining there until all symptoms subside. The maneuver is repeated toward the opposite side completing one full repetition. Ten to twenty repetitions should be performed three times a day.

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TABLE

Symptom or Sign	Peripheral	Central
Latency (time to onset of vertigo or nystagmus)	0-40 seconds (mean 7.8)	No Latency Begins immediately
Duration (signs and symptoms of single episode)	less than 1 minute	Symptoms may persist
Fatigability (Habituation) (lessening signs and symptoms with repetition of provocative maneuver)	Yes 87%	No
Nystagmus direction	Direction fixed, torsional, up, upper pole of eyes toward ground	Direction changing, variable
Intensity of signs and symptoms	Severe vertigo, marked nystagmus, systemic symptoms such as nausea	Usually mild vertigo, less intense nystagmus, rare nausea
Reproducibility	Inconsistent	More consistent