

# BENIGN PAROXYSMAL POSITIONAL VERTIGO

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## INTRODUCTION

*Benign paroxysmal positional vertigo (BPPV) is one of the most common peripheral vestibular disorders characterised by a brief period of vertigo that occurs when the position of the head is altered with respect to gravity in a particular way: typically when turning over in bed, getting in and out of bed, bending over and straightening up or extending the neck to look up.*

*The condition is important to recognize because the vertigo can be very distressing, and because in most patients the diagnosis is easily made with a positioning test and it can be cured with a simple bedside manoeuvre.*

*BPPV can result from several inner ear diseases, or head injury; in about half of the cases no cause can be found.*

*The basic features of BPPV and the associated positioning vertigo and nystagmus were described by Robert Bárány (1921) but it was not until 1952 that Dix and Hallpike described a provocative positioning manoeuvre and defined the syndrome clearly.*

## PATHOPHYSIOLOGY

Cupulolithiasis was proposed initially as the pathophysiological mechanism giving rise to this condition. Debris from the otolith organ of the posterior semicircular canal was hypothesised to become attached to the cupula, such that on assuming a critical head position, the heavy cupula became hypersensitive to the effects of gravity and a burst of neuronal activity would ensue (Schuknecht, 1969). However more recent work led to the theory of canalithiasis which better explains all the characteristic features of BPPV (Baloh, 1996). This theory proposes that calcium carbonate crystal debris forms in the most dependent position of the posterior semicircular canal and upon assuming a certain head position the clot moves and this has a 'plunger' effect within the posterior semicircular canal, which causes movement of the cupula in the same direction (ampullofugal) resulting in a brief paroxysm of vertigo and nystagmus (Luxon, 1997).

Typical causes of BPPV include head trauma, vascular disease and viral labyrinthitis.

## CLINICAL FEATURES

BPPV is usually induced by positional change in the plane of the posterior semicircular canal. The most common circumstance is turning over in bed or getting in and out of bed and for this reason patients often report that the vertigo is severe in the morning and tends to disappear once they are up and about. The vertigo and associated nystagmus actually lasts less than 30 seconds, although the patient may estimate that the attacks last a minute or so (Baloh et al., 1987). Often after a flurry of episodes patients complain of more prolonged non-specific dizziness that may last hours or persist throughout the day. Vertigo can also awaken patients from sleep: presumably positional vertigo occurs when they turn over while sleeping. Severe

nausea and vomiting which occurs in some patients can be more troublesome than the vertigo.

BPPV is a benign disorder that remits spontaneously. It often recurs, and bouts of BPPV can be intermixed with variable periods of remission over many years.

## DIAGNOSIS

The diagnosis of BPPV is confirmed by a positioning manoeuvre originally described by Dix and Hallpike (1952) in which the patient is seated near one end of the examining couch while the examiner holds the patient's head and turns it 45° to the side (right or left) which the patient suspects is more likely to be symptomatic. The patient is then rapidly laid down with the head extended over the edge of the couch and the eyes carefully observed for the development of positional nystagmus. Frequently, if the diagnosis of BPPV is correct patients will be alarmed and frightened of this procedure as they are aware of the unpleasant symptoms that will develop. This is why one must explain the manoeuvre carefully and emphasise the importance of keeping the eyes open, even in the presence of severe symptoms. Benign positional nystagmus may fatigue to such a degree that repetition of the test may

Table 1. Positional nystagmus (from Davies, 1997).

	BPPV	Central type
Latent period	2-20 sec	none
Adaptation	disappears in 50 sec	persists
Fatiguability	disappears on repetition	persists
Vertigo	always present	typically absent
Direction of nystagmus	to undermost ear	variable
Incidence	relatively common	relatively uncommon



fail to elicit signs and therefore it is important to obtain the optimal diagnostic information from the first test. Once the symptoms and signs have abated the patient is restored to the sitting position again observing the eyes carefully for the development of nystagmus. If positional nystagmus is observed, the test is repeated to determine the presence of fatiguability, which is characteristic of BPPV, but not central positional vertigo. Having completed the test with the head turned in one direction, the same sequence of manoeuvres is repeated with the head turned in the opposite direction (Davies, 1997).

In BPPV the Hallpike manoeuvre typically provokes rotational nystagmus directed towards the undermost ear after a short latency of between 5 and 20 seconds, but which adapts and then fatigues (in >90% of patients) on repeating the manoeuvre (see Table 1).

In addition to the characteristic positioning nystagmus, patients with BPPV may exhibit a static positional nystagmus in one or both lateral positions with eyes open in the darkness or with eyes closed (which can be recorded by electronystagmography), as well as either a canal paresis or a directional preponderance to caloric stimulation (Baloh et al., 1987). In most patients with caloric hypoexcitability, the decreased response is on the side that is undermost when positioning nystagmus was induced. Presumably such patients have involvement of both the horizontal and the posterior semicircular canals on the same side (Baloh, 1996), but on the other hand the existing pathology is probably different as the function of the posterior canal is thought to be necessary to provoke positional vertigo (Harada, 1993).

## MANAGEMENT

Once BPPV is diagnosed, a simple explanation of the nature of the disorder and its favourable prognosis can help relieve the patient's anxiety. Because of the dramatic nature of the episodes of vertigo, many patients believe they have a life threatening disorder, such as tumour or stroke, and they are reassured to learn they have a benign inner ear disorder.

All workers adopting specific therapies for BPPV have reported excellent results. Based on the theory of cupulolithiasis as the pathophysiological mechanism causing BPPV, positional exercises were designed to loosen and disperse the otolithic debris from the cupula of the posterior semicircular canal. Brandt and Daroff in 1980 reported complete relief of symptoms in 66 out of 67 patients with BPPV, as a result of performing head precipitating exercises regularly.

The pathophysiological mechanism of canalolithiasis resulted in the development of

positional manoeuvres which rely on the anatomical configuration of the posterior semicircular canal and the ability to reposition the head in a variety of ways in order to enable the offending debris in the posterior canal to migrate by gravitation via the common crus into the utricle (Luxon, 1997).

Such a procedure was first introduced by Epley in 1980 (Epley, 1992) and a similar single-manoeuvre therapy, which is however based on the theory of cupulolithiasis, was introduced by Semont, Freyss and Vitte in 1988. After either of the particle-repositioning procedures the patient is advised to remain in the upright position for at least 48 hours, even during the night; a soft collar may be used to facilitate immobility (Luxon, 1997). It is recommended to repeat the manoeuvre on subsequent occasions, particularly if the patient continues to be symptomatic after the initial manoeuvre. Between 10% to 20% of patients have an exacerbation within a week or two of performing the manoeuvre that typically is relieved by repeating the manoeuvre (Baloh, 1996).

Herdman et al. (1992) compared the Epley (1992) and Semont et al. (1988) manoeuvres for treating BPPV and found a comparable cure rate of 70% to 90% with both. These authors conclude that these single manoeuvres provide useful alternatives to positional exercises which repeatedly produce vertigo are therefore less well tolerated by patients, and they further state that based on the results of the study, the choice of using either the Semont or the Epley manoeuvre is dependent on factors such as the ease with which patients can be moved into either of the two positions. Also if one of these manoeuvres does not relieve the symptoms the alternate manoeuvre should be attempted.

Antivertiginous medications have relatively little use in the management of patients with BPPV because the acute attacks are not suppressed by these drugs and the manoeuvres much more effectively control the condition. Rarely, patients have prolonged, intractable BPPV, which is not corrected by the particle repositioning procedures. In these cases, surgery, (singular neurectomy or a canal plugging procedure) may prove of value.

## ANTERIOR AND HORIZONTAL CANAL VARIANTS OF BPPV

Occasionally, anterior and horizontal canal variants of BPPV have been observed. In the anterior canal variant, there is a torsional nystagmus towards the uppermost ear on the standard Dix-Hallpike manoeuvre and it may be treated successfully with the same positioning manoeuvre used for posterior canal BPPV. The rare horizontal canal BPPV is important to recognize because it has features that have been attributed to central nervous system lesions, namely, a direction changing

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nystagmus (beating towards the ground on either side), which is horizontal and develops paroxysmally when the head is turned to the side while the patient is lying down, lasting about a minute. The nystagmus has minimal latency and no fatiguability. Treatment is by a positional manoeuvre which rotates patients in the plane of the horizontal canal (Baloh, 1996).

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