


# Clinical Practice Guideline: Benign Paroxysmal Positional Vertigo (Update)

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## Abstract

**Objective.** This update of a 2008 guideline from the American Academy of Otolaryngology—Head and Neck Surgery Foundation provides evidence-based recommendations to benign paroxysmal positional vertigo (BPPV), defined as a disorder of the inner ear characterized by repeated episodes of positional vertigo. Changes from the prior guideline include a consumer advocate added to the update group; new evidence from 2 clinical practice guidelines, 20 systematic reviews, and 27 randomized controlled trials; enhanced emphasis on patient education and shared decision making; a new algorithm to clarify action statement relationships; and new and expanded recommendations for the diagnosis and management of BPPV.

**Purpose.** The primary purposes of this guideline are to improve the quality of care and outcomes for BPPV by improving the accurate and efficient diagnosis of BPPV, reducing the inappropriate use of vestibular suppressant medications, decreasing the inappropriate use of ancillary testing such as radiographic imaging, and increasing the use of appropriate therapeutic repositioning maneuvers. The guideline is intended for all clinicians who are likely to diagnose and manage patients with BPPV, and it applies to any setting in which BPPV would be identified, monitored, or managed. The target patient for the guideline is aged  $\geq 18$  years with a suspected or potential diagnosis of BPPV. The primary outcome considered in this guideline is the resolution of the symptoms associated with BPPV. Secondary outcomes considered include an increased rate of accurate diagnoses of BPPV, a more efficient return to regular activities and work, decreased use of inappropriate medications and unnecessary diagnostic tests, reduction in recurrence of BPPV, and reduction in adverse events

associated with undiagnosed or untreated BPPV. Other outcomes considered include minimizing costs in the diagnosis and treatment of BPPV, minimizing potentially unnecessary return physician visits, and maximizing the health-related quality of life of individuals afflicted with BPPV.

**Action Statements.** The update group made *strong recommendations* that clinicians should (1) diagnose posterior semicircular canal BPPV when vertigo associated with torsional, upbeat nystagmus is provoked by the Dix-Hallpike maneuver, performed by bringing the patient from an upright to supine position with the head turned 45° to one side and neck extended 20° with the affected ear down, and (2) treat, or refer to a clinician who can treat, patients with posterior canal BPPV with a canalith repositioning procedure. The update group made a *strong recommendation against* postprocedural postural restrictions after canalith repositioning procedure for posterior canal BPPV. The update group made *recommendations* that the clinician should (1) perform, or refer to a clinician who can perform, a supine roll test to assess for lateral semicircular canal BPPV if the patient has a history compatible with BPPV and the Dix-Hallpike test exhibits horizontal or no nystagmus; (2) differentiate, or refer to a clinician who can differentiate, BPPV from other causes of imbalance, dizziness, and vertigo; (3) assess patients with BPPV for factors that modify management, including impaired mobility or balance, central nervous system disorders, a lack of home support, and/or increased risk for falling; (4) reassess patients within 1 month after an initial period of observation or treatment to document resolution or persistence of symptoms; (5) evaluate, or refer to a clinician who can evaluate, patients with persistent symptoms for unresolved BPPV and/or underlying peripheral vestibular or central nervous system disorders; and (6) educate patients regarding the impact of BPPV on their safety, the potential for disease recurrence, and the importance of follow-up. The update group made *recommendations against* (1) radiographic imaging for a patient who meets diagnostic criteria for BPPV in

the absence of additional signs and/or symptoms inconsistent with BPPV that warrant imaging, (2) vestibular testing for a patient who meets diagnostic criteria for BPPV in the absence of additional vestibular signs and/or symptoms inconsistent with BPPV that warrant testing, and (3) routinely treating BPPV with vestibular suppressant medications such as antihistamines and/or benzodiazepines. The guideline update group provided the *options* that clinicians may offer (1) observation with follow-up as initial management for patients with BPPV and (2) vestibular rehabilitation, either self-administered or with a clinician, in the treatment of BPPV.

## Keywords

benign paroxysmal positional vertigo, BPPV

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## Differences from Prior Guideline

This clinical practice guideline is as an update and replacement for an earlier guideline published in 2008 by the American Academy of Otolaryngology—Head and Neck Surgery Foundation (AAO-HNSF).<sup>1</sup> An update was necessitated by new primary studies and systematic reviews that might suggest a need for modifying clinically important recommendations. Changes in content and methodology from the prior guideline include the following:

- Addition of a patient advocate to the guideline development group
- New evidence from 2 clinical practice guidelines, 20 systematic reviews, and 27 randomized controlled trials (RCTs)
- Emphasis on patient education and shared decision making
- Expanded action statement profiles to explicitly state quality improvement opportunities, confidence in the evidence, intentional vagueness, and differences of opinion
- Enhanced external review process to include public comment and journal peer review

- New algorithm to clarify decision making and action statement relationships
- New recommendation regarding canalith repositioning postprocedural restrictions
- Expansion of the recommendations regarding radiographic and vestibular testing
- Removal of the “no recommendation” for audiometric testing
- Addition of a diagnostic and treatment visual algorithm

## Introduction

A primary complaint of dizziness accounts for 5.6 million clinic visits in the United States per year, and between 17% and 42% of patients with vertigo ultimately receive a diagnosis of benign paroxysmal positional vertigo (BPPV).<sup>2-4</sup> BPPV is a form of positional vertigo.

- *Vertigo* is defined as an illusory sensation of motion of either the self or the surroundings in the absence of true motion.
- Positional vertigo is defined as a spinning sensation produced by changes in head position relative to gravity.
- BPPV is defined as a disorder of the inner ear characterized by repeated episodes of positional vertigo (**Table 1**).

Traditionally, the terms “benign” and “paroxysmal” have been used to characterize this particular form of positional vertigo. In this context, the descriptor *benign* historically implies that BPPV was a form of positional vertigo not due to any serious central nervous system (CNS) disorder and that there was an overall favorable prognosis for recovery.<sup>5</sup> This favorable prognosis is based in part on the fact that BPPV can recover spontaneously in approximately 20% of patients by 1 month of follow-up and up to 50% at 3 months.<sup>6,7</sup> However, the clinical and quality-of-life impacts of undiagnosed and untreated BPPV may be far from “benign,” as patients with BPPV are at increased risk for falls and impairment in the performance of daily activities.<sup>8</sup>

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Table 1. Definitions of Common Terms.

| Term  | Definition   |
|---|--|
| Vertigo                                     | An illusory sensation of motion of either the self or the surroundings in the absence of true motion.  |
| Nystagmus                                   | A rapid, involuntary oscillatory movement of the eyeball.  |
| Vestibular system/apparatus                 | The sensory system within the inner ear that, with the vestibular nerve and its connections in the brain, provides the fundamental input to the brain regarding balance and spatial orientation.   |
| Positional vertigo                          | Vertigo produced by changes in the head position relative to gravity.  |
| Benign paroxysmal positional vertigo (BPPV) | A disorder of the inner ear characterized by repeated episodes of positional vertigo.  |
| Posterior canal BPPV                        | A form of BPPV in which dislodged inner ear particles in the posterior semicircular canal abnormally influence the balance system producing the vertigo, most commonly diagnosed with the Dix-Hallpike test.   |
| Lateral canal BPPV                          | A form of BPPV in which dislodged inner ear particles in the lateral semicircular canal abnormally influence the balance system producing the vertigo, most commonly diagnosed by the supine roll test.  |
| Canalithiasis                               | A theory for the pathogenesis of BPPV that proposes that there are free-floating particles (otoconia) that have moved from the utricle and collect near the cupula of the affected canal, causing forces in the canal leading to abnormal stimulation of the vestibular apparatus.   |
| Cupulolithiasis                             | A theory for the pathogenesis of BPPV that proposes that otoconial debris attached to the cupula of the affected semicircular canal cause abnormal stimulation of the vestibular apparatus.  |
| Canalith repositioning procedures (CRPs)    | A group of procedures in which the patient moves through specific body positions designed to relocate dislodged particles within the inner ear for the purpose of relieving symptoms of BPPV. The specific CRP chosen relates to the type of BPPV diagnosed. These have also been termed <i>canalith repositioning maneuvers</i> or <i>canalith repositioning techniques</i> . |

Furthermore, patients with BPPV experience effects on individual health-related quality of life, and utility measures demonstrate that treatment of BPPV results in improvement in quality of life.<sup>9</sup> The term *paroxysmal* in this context describes the rapid and sudden onset of vertigo, initiated at any time by a change of position, thus resulting in BPPV. BPPV has also been termed *benign positional vertigo*, *paroxysmal positional vertigo*, *positional vertigo*, *benign paroxysmal nystagmus*, and *paroxysmal positional nystagmus*. In this guideline, the panel chose to retain the terminology of BPPV, as it is the most common terminology encountered in the literature and in clinical practice.<sup>8</sup>

BPPV is most commonly clinically encountered as 1 of 2 variants: BPPV of the posterior semicircular canal (posterior canal BPPV) or BPPV of the lateral semicircular canal (also known as horizontal canal BPPV).<sup>10-12</sup> Posterior canal BPPV is more common than horizontal canal BPPV, constituting approximately 85% to 95% of BPPV cases.<sup>12</sup> Although debated, posterior canal BPPV is most commonly thought to be due to canalithiasis, wherein fragmented otolith particles (otoconia) entering the posterior canal become displaced, cause inertial changes to the cupula in the posterior canal, and thereby result in abnormal nystagmus and vertigo when the head encounters motion in the plane of the affected semicircular canal.<sup>12,13</sup> Lateral (horizontal) canal BPPV accounts for 5% to 15% of BPPV cases.<sup>11,12</sup> The etiology of lateral canal BPPV is also felt to be due to the presence of abnormal debris within the lateral canal, but the pathophysiology is not as well understood as that of posterior canal BPPV. Other rare variations include anterior canal BPPV, multicanal BPPV, and bilateral multicanal BPPV.

## Guideline Purpose

The primary purposes of this guideline are to improve quality of care and outcomes for BPPV by improving the accurate and efficient diagnosis of BPPV, reducing the inappropriate use of vestibular suppressant medications, decreasing the inappropriate use of ancillary testing such as radiographic imaging, and increasing the use of appropriate therapeutic repositioning maneuvers. The guideline is intended for all clinicians who are likely to diagnose and manage patients with BPPV, and it applies to any setting in which BPPV would be identified, monitored, or managed. The target patient for the guideline is aged  $\geq 18$  years with a suspected or potential diagnosis of BPPV. The pediatric population was not included in the target population, in part due to a substantially smaller body of evidence on pediatric BPPV. No specific recommendations are made concerning surgical therapy for BPPV.

The guideline focuses on BPPV, recognizing that BPPV may arise in conjunction with other neurologic or otologic conditions and that the treatment of the symptom components specifically related to BPPV may still be managed according to the guideline. This guideline does not discuss BPPV affecting the anterior semicircular canal, as this diagnosis is quite rare and its pathophysiology is poorly understood.<sup>14,15</sup> It also does not discuss benign paroxysmal vertigo of childhood, disabling positional vertigo due to vascular loop compression in the brainstem, or vertigo that arises from changes in head position *not* related to gravity (ie, vertigo of cervical origin or vertigo of vascular origin). These conditions are physiologically distinct from BPPV.

**Table 2.** Interventions Considered in Benign Paroxysmal Positional Vertigo Guideline Development.

|            |  |
|------------|--|
| Diagnosis  | Clinical history<br>Review of the medication list<br>Physical examination<br>Dix-Hallpike (positional) testing<br>Supine roll test and bow and lean test side-lying<br>maneuver Post-head-shaking nystagmus<br>Audiometry<br>Magnetic resonance imaging<br>Computed tomography<br>Blood tests: complete blood count, serum chemistry, etc<br>Frenzel lenses and infrared goggle testing<br>Electronystagmography<br>Videonystagmography<br>Vestibular evoked myogenic potentials<br>Balance and gait testing<br>Vestibular function testing<br>Computerized posturography<br>Orthostatic balance testing<br>Vestibular caloric testing   |
| Treatment  | Watchful waiting/observation<br>Education/information/counseling<br>Medical therapy (vestibular suppressant medications, benzodiazepines)<br>Cervical immobilization with cervical collar<br>Prolonged upright position<br>Patient self-treatment with home-based maneuvers or<br>rehabilitation Brandt-Daroff exercises<br>Epley maneuver and modifications of the Epley<br>maneuver Semont maneuver<br>Gufoni maneuver<br>Physical therapy/vestibular physical<br>therapy Spinal manipulative therapy<br>Mastoid vibration<br>Posterior semicircular canal occlusion (excluded from guideline)<br>Singular neurectomy (excluded from guideline)<br>Vestibular neurectomy (excluded from guideline) |
| Prevention | Head trauma or whiplash injury as potential causative factors<br>Use of helmets to prevent head trauma and/or cervical<br>collars Fall prevention  |

In 2008, the AAO-HNSF published a multidisciplinary clinical practice guideline on benign positional vertigo.<sup>1</sup> As 8 years have elapsed since the publication of that guideline, a multidisciplinary guideline update group was convened to perform an assessment and planned update of that guideline, utilizing the most current evidence base. Our goal was to revise the prior guideline with an a priori determined transparent process, reconsidering a more current evidence base while taking into account advances in knowledge with respect to BPPV.

The primary outcome considered in this guideline is the resolution of symptoms associated with BPPV. Secondary outcomes considered include an increased rate of accurate diagnoses of BPPV, a more efficient return to regular activities and work, decreased use of inappropriate medications and unnecessary diagnostic tests, reduction in recurrence of BPPV, and reduction in adverse events associated with undiagnosed or untreated BPPV. Other outcomes considered include minimizing costs in the diagnosis and treatment of BPPV, minimizing potentially unnecessary return physician visits, and maximizing

the health-related quality of life of individuals afflicted with BPPV. The significant incidence of BPPV, its functional impact, and the wide diversities of diagnostic and therapeutic interventions for BPPV (**Table 2**) make this an important condition for an up-to-date evidence-based practice guideline.

### Health Care Burden

Overall, the prevalence of BPPV has been reported to range from 10.7 to 140 per 100,000 population.<sup>16-18</sup> However, studies of select patients have estimated a prevalence of 900 per 10,000.<sup>19-21</sup> Others have reported a lifetime prevalence of 2.4%, a 1-year prevalence of 1.6%, and a 1-year incidence of 0.6%.<sup>22</sup> Women are more frequently affected than men, with a female:male ratio of 2.2 to 1.5:1.<sup>23</sup> BPPV is also the most common vestibular disorder across the life span,<sup>12,24,25</sup> although the age of onset is most commonly between the fifth and seventh decades of life.<sup>5</sup> Given the noteworthy prevalence of BPPV, its health care and societal impacts are tremendous.