

Dizziness, Vertigo

&

Balance Disorders

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פיזיותרפיסט מומחה

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BPPV

Description:

Disorder of inner ear manifested by repeated episodes of spinning sensation triggered by changes in head position (positional vertigo)

Also called:

- benign positional vertigo (BPV)
- positional vertigo of Barany

Robert Bárány was born on April 22, 1876

- Bárány was born in [Vienna, Austria-Hungary](#).
- He attended medical school at [Vienna University](#), graduating in 1900.
- As a doctor in Vienna, Bárány was syringing fluid into the [inner ear](#) of a patient to relieve the patient's dizzy spells. The patient experienced [vertigo](#) and [nystagmus](#) (involuntary eye movement) when Bárány injected fluid that was too cold. In response, Bárány warmed the fluid for the patient and the patient experienced nystagmus in the opposite direction. Bárány theorized that the [end lymph](#) was sinking when it was cool and rising when it was warm, and thus the direction of flow of the endolymph was providing the [proprioceptive](#) signal to the vestibular organ. He followed up on this observation with a series of experiments on what he called the caloric reaction. The research resulting from his observations made surgical treatment of vestibular organ diseases possible.
- Bárány also investigated other aspects of equilibrium control, including the function of the [cerebellum](#).



BPPV

Definitions:

vertigo is illusion of movement of self or one's surroundings (for example, rotating, spinning, tilting, swaying)

Types:

- posterior canal BPPV (85%-95% of cases)
- lateral (horizontal) canal BPPV
- anterior canal BPPV

Organs involved:

- inner ear, usually ampulla of posterior semicircular canal

Creatine kinase MB (CK-MB) in benign paroxysmal vertigo of childhood: a new diagnostic marker.

Source

Department of Pediatrics, Falun Hospital, 791-82 Falun, [Sweden](#).

Abstract

OBJECTIVES:

To evaluate the relation between [creatinine kinase-MB \(CK-MB\)](#) and benign paroxysmal vertigo in childhood (BPV).

STUDY DESIGN:

We prospectively evaluated and followed serum CK-MB in [22 children with BPV diagnosed between 1998 and 2003](#).

RESULTS:

The average age of debut for BPV was 1.7 years, and follow-up time was 2.8 years. The CK-MB values were elevated in all children. CK-MB values were persistently increased (mean, 6.0 microg/L) during the study period and were not related to duration of BPV, time since last attack, or frequency of attacks. CK-MB became normal in 7 children who recovered during the study period. After the initial increased CK-MB value, CK, aspartate aminotransferase, and cardiac troponin I (in 16 children) were measured as markers of muscular disease. CK was slightly increased in 7 (31.8%) and aspartate aminotransferase in 14 (63.6%) of the children. Cardiac troponin I was normal in all children.

CONCLUSIONS:

[In this study, serum CK-MB levels were associated with BPV. These findings indicate a possible muscular involvement in BPV.](#)
Further studies will be needed to determine if CK-MB is useful as a diagnostic test for BPV.

[J Pediatr.](#) 2005 Apr;146(4):548-51.

[Rödöö P, Hellberg D.](#)

BPPV

Who is most affected:

- middle age to elderly, mean age 57 years
- benign paroxysmal vertigo in childhood usually begins before age 4 years, lasts 2-4 years and resolves completely
 - episodes of vertigo are brief (rarely more than a few minutes)
 - *creatin kinase-MB levels persistently increased in prospective study of 22 children with benign paroxysmal vertigo*
 - Reference - [J Pediatr 2005 Apr;146\(4\):548](#) in Pediatric Notes 2005 Jun 16;29(24):93

Symptoms of vertigo in general practice: a prospective study of diagnosis.

- **Source**
- Rathmullen, Co Donegal, [Ireland](#). nunan@gofree.indigo.ie
- **Abstract**
- **BACKGROUND:**
- There is little published evidence of the general practice experience of the diagnostic outcomes when symptoms of vertigo present. What research there is has been dominated by specialist centres. This gives a skewed view of the prevalence of the causes of such symptoms.
- **AIM:**
- [To describe the likely diagnosis of symptoms of vertigo.](#)
- **DESIGN OF STUDY:**
- Prospective cohort study
- **METHODS:**
- [Thirteen GPs](#) were recruited and trained to clinically assess and follow up all patients presenting with [symptoms of vertigo over a six-month period](#) Age-sex data were simultaneously gathered on those who consulted with non-vertiginous dizziness.
- **RESULTS:**
- The main diagnoses assigned by the GPs in 70 patients were benign positional vertigo, acute vestibular neuronitis and Ménière's disease, which together accounted for 93% (95% confidence interval = 71% to 100%) of patients' symptoms. Ninety-one per cent of patients were managed in general practice and 60% received a prescription for a vestibular sedative.
- **CONCLUSION:**
- This study suggests that presentations of symptoms of vertigo can be clinically diagnosed in most cases. The diagnoses recorded by GPs differ in proportion to those in specialist centres, with a larger number of patients suffering from benign positional vertigo and acute vestibular neuronitis in general practice, in contrast with specialist centres, which see more patients with Ménière's disease.

[Br J Gen Pract.](#) 2002 Oct;52(483):809-12.

[Hanley K, O' Dowd T.](#)

Incidence/Prevalence

- most common cause of peripheral vertigo is BPPV
- most common causes of vertigo in general practice are benign positional vertigo, acute vestibular neuronitis, and Meniere's disease
- these 3 diagnoses accounted for 93% diagnoses among 70 patients with vertigo presenting to 13 general practitioners in prospective study
- Reference - [Br J Gen Pract 2002 Nov;52\(482\):809](#), summary can be found in [Am Fam Physician 2003 Feb 15;67\(4\):845](#)

Epidemiology of vestibular vertigo: a neurotologic survey of the general population

- **Source**
- Department of Epidemiology, Robert Koch Institute, D-13353 Berlin, Germany. neuhauserh@rki.de
- **Erratum in**
- Neurology. 2006 Oct 24;67(8):1528.
- **Abstract**
- **OBJECTIVE:**
- The purpose of this study was to determine the prevalence and incidence of vestibular vertigo in the general population and to describe its clinical characteristics and associated factors.
- **METHODS:**
- The neurotologic survey had a two-stage general population sampling design: nationwide modified random digit dialing sampling for participation in the German National Telephone Health Interview Survey 2003 (response rate 52%) with screening of a random sample of 4,869 participants for moderate or severe dizziness or vertigo, followed by detailed neurotologic interviews developed through piloting and validation (n = 1,003, response rate 87%). Diagnostic criteria for vestibular vertigo were rotational vertigo, positional vertigo, or recurrent dizziness with nausea and oscillopsia or imbalance. Vestibular vertigo was detected by our interview with a specificity of 94% and a sensitivity of 84[corrected]% in a concurrent validation study using neurotology clinic diagnoses as an accepted standard (n = 61).
- **RESULTS:**
- The lifetime prevalence of vestibular vertigo was 7.4[corrected]%, the 1-year prevalence was 4.9[corrected]%, and the incidence was 1.4[corrected]%. In 80% of affected individuals, vertigo resulted in a medical consultation, interruption of daily activities, or sick leave. Female sex, age, lower educational level, and various comorbid conditions, including tinnitus, depression, and several cardiovascular diseases and risk factors, were associated with vestibular vertigo in the past year in univariate analysis. In multivariable analysis, only female sex, self-reported depression, tinnitus, hypertension, and dyslipidemia had an independent effect on vestibular vertigo.
- **CONCLUSIONS:**
- Vestibular vertigo is common in the general population, affecting [corrected] 5% of adults in 1 year. The frequency and health care impact of vestibular symptoms at the population level have been underestimated.

[Neurology](#). 2005 Sep 27;65(6):898-904.

[Neuhauser HK](#), [von Brevern M](#), [Radtke A](#), [Lezius F](#), [Feldmann M](#), [Ziese T](#), [Lempert T](#).

Incidence/Prevalence

- vestibular vertigo has 1.5% incidence, 5.2% 1-year prevalence and 7.8% lifetime prevalence
- based on random telephone screening of 4,869 persons in Germany followed by detailed neurotologic interviews of 1,003 persons
- vestibular vertigo defined as rotational vertigo, positional vertigo, or recurrent dizziness with nausea and oscillopsia or imbalance
- Reference - [Neurology 2005 Sep 27;65\(6\):898](#)

Causes

- usually no precipitating factors
- may be due to
 - head trauma
 - viral illness
 - vascular etiology (for example, labyrinthine artery vasospasm or embolic event)
 - prolonged immobility of head

Pathogenesis

- normal functioning of inner ear
- sensory hair cells in inner ear structures detect fluid (endolymph) movements during motion of head or body, leading to signals to brain for sensation of motion or position
 - semicircular canals detect rotational acceleration
 - utricle and saccule detect linear acceleration
- theories of BPPV pathogenesis include cupulolithiasis and canalithiasis
 - both theories include concept of solid matter (precipitate) within inner ear structure

Pathogenesis

- as the head moves, the precipitate stimulates sensory hair cells and triggers sensation of motion
- vertigo occurs because visual and somatosensory inputs do not match vestibular input
- **Cupulolithiasis**
 - small crystal of calcium carbonate (otoconia, "grain of sand") from the utricle becomes lodged in ampulla (cupula) of (common) posterior semicircular canal
 - may also occur in cases of posttraumatic vertigo
 - theoretically should respond to habituation therapy, for example, Cawthorne exercises

Pathogenesis

➤ Canalithiasis

- precipitation of solid matter or relocation of otoconia into semicircular canal distal to the ampulla
- theoretically should respond to canalith repositioning (Epley maneuver)

Three hundred sixty-degree rotation of the posterior semicircular canal for treatment of benign positional vertigo: a placebo-controlled trial

- **Source**
- MRC Human Movement and Balance Unit, National Hospital for Neurology and Neurosurgery, London, UK.
- **Abstract**
- The canalithiasis hypothesis proposes that benign positional vertigo (BPV) is caused by dislodged otoconia that settle in the posterior semicircular canal (PSC). When head position is changed these particles move within the canal and induce abnormal endolymph flow. To clear the PSC from debris we developed a procedure that consists of a full circle of backward head rotation in the exact plane of the canal. Patients were seated in a three-dimensional motion device that rotated in steps of 110 degrees every 30 seconds. The first part of the study was conducted as an open trial; the second part followed a single-blinded, placebo-controlled design: Forward rotation (placebo) was applied first and backward rotation was applied 1 week later if BPV persisted. All patients were assessed with a symptom diary and, in the controlled trial, also with the Dix-Hallpike maneuver. In the open study 10 of 15 patients became asymptomatic after one treatment session. In the controlled trial all 15 patients remained symptomatic after forward rotation while 10 of 14 undergoing backward rotation were relieved from positional vertigo immediately ($p = 0.004$). The presence of secondary nystagmus during the procedure indicated a favorable outcome. Our findings provide evidence for the efficacy of canal-clearing procedures that validate the canalithiasis hypothesis of BPV.

[Neurology](#). 1997 Sep;49(3):729-33.

[Lempert T](#), [Wolsley C](#), [Davies R](#), [Gresty MA](#), [Bronstein AM](#).

Pathogenesis

- support for theory of debris floating in endolymph stimulating posterior semicircular canal found in study of "canal-clearing" treatment
 - study of 30 patients with BPPV symptoms for median 3 months
 - 15 patients rotated backwards by 360 degrees over several minutes in flight simulator, 10 of 15 had complete cessation of symptoms
 - next 15 patients first underwent 360-degree forward rotation without benefit and then 360-degree backward rotation 1 week later, with 10 of 14 having cessation of symptoms

Complications

complications rare but might include

- VBI
- Foramen Magnum
- Falls
- persistent vomiting could lead to dehydration or chloride-responsive metabolic alkalosis
- Unpleasant

Associated conditions:

- additional otopathology and/or vestibulopathy identified in 31%-53% of BPPV patients

Osteopenia and osteoporosis in idiopathic benign positional vertigo

- **Source**
- Department of Neurology, Seoul National University College of Medicine, Seoul National University Bundang Hospital, [Korea](#).
- **Abstract**
- **OBJECTIVE:**
- **Causes of benign positional vertigo (BPV) are mostly unknown.** The aim of this study was to elucidate an association of osteoporosis with idiopathic BPV.
- **METHODS:**
- Two hundred nine consecutive patients with a confirmed diagnosis of idiopathic BPV underwent bone mineral densitometry of anterior-posterior lumbar spine and femur. The T scores were compared with those of 202 controls without a history of dizziness. Recurrence was defined when the patients reported two or more previous episodes of positional vertigo similar to those experienced at the time of diagnosis.
- **RESULTS:**
- In both women and men, the lowest T scores were decreased in patients with BPV compared with those in controls. Furthermore, the prevalences of osteopenia ($-2.5 < T \text{ score} < -1.0$) and osteoporosis ($T \text{ score} \leq -2.5$) were higher in both women and men with BPV than in controls. Multiple logistic regression analyses adjusted for age, sex, alcohol, smoking, and hyperphosphatemia showed that only the existence of osteopenia/osteoporosis was associated with an increased risk of BPV (adjusted odds ratio of osteopenia = 2.0, 95% confidence interval 1.2-3.4, $p = 0.011$; adjusted odds ratio of osteoporosis = 3.1, 95% confidence interval 1.4-7.2, $p = 0.007$). In women aged ≥ 45 years, the lowest T scores were also decreased in the recurrent group, compared with those in the de novo group.
- **CONCLUSION:**
- Osteopenia/osteoporosis may be associated with idiopathic benign positional vertigo (BPV). The effectiveness of measuring bone mineral densitometry and restoring normal calcium metabolism for preventing recurrences of BPV requires further validation.

[Neurology](#). 2009 Mar 24;72(12):1069-76.

[Jeong SH](#), [Choi SH](#), [Kim JY](#), [Koo JW](#), [Kim HJ](#), [Kim JS](#).

osteopenia or osteoporosis may be associated with idiopathic benign positional vertigo

- based on case-control study
- 209 patients with idiopathic benign positional vertigo (BPV) and 202 controls had bone mineral densitometry
- increased risk for BPV was associated with osteopenia (adjusted odds ratio 2, 95% CI 1.2-3.4) and osteoporosis (adjusted odds ratio 3.1, 95% CI 1.4-7.7)
- Reference - [Neurology 2009 Mar 24;72\(12\):1069](#)

BPPV-History

Chief concern (CC):

- rotational or spinning sensation after changes in head position (relative to gravity)
- often occurs when patient rolls over in bed or is tilting head
- may be sense of imbalance between discrete episodes

History of present illness (HPI)

- symptoms episodic, lasting < 1 minute
- symptoms recur with movement of head, often precipitated by recumbent head position either to left or right
- tilting head may induce symptoms such as when
 - looking up in sky
 - trying to reach top of shelf
 - bending over to tie shoes
- associated symptoms commonly include nausea and/or vomiting

Medication history

- ask about any new medications
- medications that can affect vestibular system include
 - sedatives/tranquillizers
 - Anticonvulsants
 - Antidepressants
 - Antipsychotics
 - Antihistamines

Social history (SH):

- ask about alcohol use (alcohol can affect vestibular system)

Review of systems (ROS)

- last ocular exam
- new glasses, contacts or eyedrops
- hearing
- tinnitus
- sinus problems
- nasal allergies
- weight loss or gain
- gait ataxia

Physical

General physical:

- blood pressure measurements in supine, seated and standing positions to rule out orthostatic hypotension

Head, Ears, Eyes, Nose and Throat (HEENT)

- evaluate visual acuity, cataracts and extra-ocular motility
- Nystagmus
 - typical finding - rotatory nystagmus (torsional nystagmus)
 - may also have nystagmus on lateral gaze
 - nystagmus unidirectional
 - if nystagmus is vertical or multidirectional, consider
 - brainstem involvement (multiple sclerosis, tumor, stroke, alcohol or other sedative drugs, trauma)
 - nystagmus can be assessed by observing limbus (border between iris and sclera)

Cardiac:

- listen for murmurs, arrhythmias

Otho-Neuro-Physio

- attempt to reproduce symptoms with rotation, flexion, hyperextension of head; look for symptoms and nystagmus
- BPPV not associated with central nervous system abnormalities (such as dysphagia, dysarthria, sensory deficits)
- **Dix-Hallpike maneuver for diagnosing posterior canal BPPV**
 - Dix-Hallpike maneuver also called Nylen-Barany maneuver, Barany maneuver, Hallpike-Dix maneuver
 - caution patient that positioning may elicit intense vertigo and nausea

Otho-Neuro-Physio

- Technique

- begin with patient seated upright and examiner standing on patient's side
- examiner rotates head 45 degrees towards first side to be tested
- instruct patient to keep eyes open and while supporting head, quickly move patient to supine position so that the patient's head is extended past the examination table and is hanging about 20 degrees below horizontal plane with patient's chin slightly pointed upwards
- examiner checks patient's eyes for nystagmus observing
 - latency period before onset
 - Duration
 - Direction
- typically provokes vertigo and rotator nystagmus when ear on affected side placed in downward position after 5-20 seconds (called latency and theorized to be the time to set otoliths in motion)

Otho-Neuro-Physio

- Technique
 - may cause increase in patient's subjective vertigo which usually resolves within < 20 seconds but can last up to 60 seconds from onset of nystagmus
 - after resolution of vertigo and nystagmus (if present), slowly return patient to upright position
 - nystagmus may recur in opposite direction
 - after patient asymptomatic, repeat process with other ear in dependent position
 - vertigo and nystagmus typically extinguish after repeated trials

Otho-Neuro-Physio

- clinicians should diagnose posterior semicircular canal BPPV when vertigo associated with nystagmus (typically torsional and also may have downward beating component) elicited by Dix-Hallpike maneuver ([AAO Grade B](#))
- nystagmus findings may indicate which semicircular canal is involved
 - with posterior semicircular canal involvement (most common)
 - rotator (torsional) and sometimes slight vertical (upbeating) nystagmus on Dix-Hallpike maneuver, downbeating nystagmus on return to sitting
 - rotator nystagmus is clockwise if left ear involved and down; counterclockwise if right ear involved and down

Otho-Neuro-Physio

- with anterior semicircular canal involvement - rotator and down beating nystagmus on Dix-Hallpike maneuver, up beating nystagmus on return to sitting
- with horizontal semicircular canal involvement - horizontal nystagmus on Dix-Hallpike maneuver, horizontal (opposite direction) nystagmus on return to sitting

- Reference - [Arch Otolaryngol Head Neck Surg 1996 Mar;122\(3\):281](#)

Complications of the canalith repositioning procedure

Source

Department of Otolaryngology, University of Miami School of Medicine, Florida, USA.

Abstract

OBJECTIVE:

To describe the conversion of benign paroxysmal positional vertigo involving the posterior canal into benign paroxysmal positional vertigo involving the anterior or horizontal canals after treatment using the canalith repositioning maneuver.

DESIGN:

Retrospective study of outcome.

SETTING:

Outpatient clinic.

PATIENTS:

Consecutive sample of 85 patients diagnosed as having benign paroxysmal positional vertigo affecting the posterior canal. Identification of posterior canal involvement was based on the observation of the direction of the vertical component of nystagmus after the Hallpike-Dix maneuver.

INTERVENTION:

Canalith repositioning maneuver.

MAIN OUTCOME MEASURE:

Eye movements were observed about 1 week after the treatment. The direction of nystagmus elicited after movement of the patient into the Hallpike-Dix position indicated which canal was involved in the patients who had not responded to treatment.

RESULTS:

Of the 85 patients studied who originally had posterior canal benign paroxysmal positional vertigo, five (6%) had anterior canal (n=2) or horizontal canal (n=3) positional vertigo after undergoing this maneuver.

CONCLUSION:

Careful observation of the direction of the nystagmus is necessary for correct identification of which canal is involved in patients who do not respond to the initial treatment using the canalith repositioning maneuver.

[Arch Otolaryngol Head Neck Surg.](#) 1996 Mar;122(3):281-6.

[Herdman SJ, Tusa RJ.](#)

supine roll test (Pagnini-McClure maneuver) for diagnosis of lateral canal BPPV^(1, 2)

- should be performed on patients with history consistent with BPPV but with negative Dix-Hallpike maneuver
- clinicians should diagnose lateral canal BPPV when vertigo associated with nystagmus elicited by supine roll test ([AAO Grade C](#))
- caution patient that positioning may elicit intense vertigo and nausea

supine roll test (Pagnini-McClure maneuver) for diagnosis of lateral canal BPPV^(1, 2)

- positioning procedure
 - patient supine with head in face-up neutral position
 - quickly rotate head to one side while examining for nystagmus
 - after resolution of vertigo and nystagmus (if present), slowly return head to neutral position
 - head is then quickly rotated 90 degrees to other side and again checked for nystagmus
- nystagmus may be very intense with horizontal component towards the ground

patient limitations for performing Dix-Hallpike or supine roll maneuvers include diagnoses of

- cervical stenosis
- severe kyphoscoliosis
- Down syndrome
- severe rheumatoid arthritis
- Paget disease
- ankylosing spondylitis
- spinal cord injury
- morbid obesity
- low back dysfunction
- limited range of motion of cervical spine

Treatment overview

- patients with posterior canal BPPV should be treated with a [particle repositioning maneuver](#) ([AAO Grade B](#), [AAN Level A](#))
 - canalith repositioning procedure ([Epley maneuver](#))
 - Epley maneuver has short-term efficacy ([level 1 \[likely reliable\] evidence](#)) and may have long-term efficacy ([level 2 \[mid-level\] evidence](#))
 - patients can treat themselves at [home](#) with modified Epley procedure ([level 2 \[mid-level\] evidence](#))
 - [addition of home use of Epley procedure](#) may increase efficacy of in-office Epley procedure ([level 2 \[mid-level\] evidence](#))

Treatment overview

- both canalith repositioning procedure and vestibular exercises may be taught to patient or patient may be referred to physical therapy
- [medications](#) - vestibular suppressants
 - BPPV should not be routinely treated with vestibular suppressant medications such as antihistamines or benzodiazepines ([AAO Grade C](#))
 - [for acute vertigo in the emergency department](#), dimenhydrinate 50 mg IV may be more effective and more tolerable than lorazepam 2 mg IV ([level 2 \[mid-level\] evidence](#))
- insufficient evidence to recommend or refute [surgical treatments](#) for BPPV ([AAN Level U](#))
- [reassess](#) patients within 1 month after initial period of observation or treatment to confirm symptom resolution ([AAO Grade C](#))

Have to be done

- **Dix-Hallpike maneuver for diagnosing posterior canal BPPV**
- **supine roll test (Pagnini-McClure maneuver) for diagnosis of lateral canal BPPV**

Activity

Observation:

- observation with follow-up may be initial management of BPPV ([AAO Grade B](#))(1)
 - benign illness which is usually self-limited
 - if patients being observed without any other intervention, need to counsel patients to avoid activities that may be associated with injury (such as falling from ladder, turning head while driving)

Activity

Vestibular exercises:

- vestibular rehabilitation (either self-administered or with clinician) may be initial treatment of BPPV ([AAO Grade C](#))([1](#))
 - vestibular exercises also called
 - vestibular rehabilitation
 - vestibular therapy
 - Brandt-Daroff exercises
 - Cawthorne-Cooksey exercises
 - form of physical therapy promoting habituation, adaptation or compensation for deficits from balance disorders

Activity

Vestibular diagnosis for BPPV:

- **Dix-Hallpike maneuver for diagnosing posterior canal BPPV**
- **supine roll test (Pagnini-McClure maneuver) for diagnosis of lateral canal BPPV**

Activity

Vestibular exercises:

- specific approaches to vestibular exercises include
 - simple instructions can be to hold symptom-inducing position for 10 seconds 5 times/day
 - Brandt-Daroff exercises
 - patients instructed to sit on bed, drop trunk and head to affected side until head on bed with head angled upwards, return to sitting, drop to opposite side, maintain each position for 30 seconds, repeat 5 times 3 times daily
 - self-administered Brandt-Daroff exercises or habituation exercises are less effective than canal repositioning exercises for treatment of posterior canal BPPV([AAN Level C](#))(2)
 - picture of Brandt-Daroff exercises can be found at dizziness-and-balance.com

Activity

Vestibular exercises:

- Cawthorne-Cooksey exercises
 - consist of eye and head movements while supine and sitting, frequent changes in position with eyes open or closed while standing and walking
 - exercises to be done for 15 minutes twice daily, increasing to 30 minutes

Cawthorne-Cooksey exercises

Vestibular exercises:

- eye exercises
 - look up, then down; first slowly then quickly; 20 times
 - look from one side to the other; first slowly then quickly; 20 times
 - focus on finger at arm's length, moving finger one foot closer and back again; 20 times
- head exercises
 - bend head forward then backward with eyes open; first slowly then quickly; 20 times
 - turn head from side to side; first slowly then quickly; 20 times
 - as dizziness decreases, perform these exercises with eyes closed
- Sitting
 - shrug shoulders 20 times
 - turn shoulders from side to side 20 times
 - bend forward and pick up objects from ground and sit up 20 times

Cawthorne-Cooksey exercises

Vestibular exercises:

- Standing
 - change from sitting to standing and back to sitting, 20 times with eyes open, repeat with eyes closed
 - throw small rubber ball from hand to hand above eye level 10 times
 - throw ball from hand to hand under one knee
- moving about
 - walk across room with eyes open, then closed; 10 times
 - walk up and down slope with eyes open, then closed; 10 times
 - walk up and down steps with eyes open, then closed; 10 times
 - any game involving stooping or turning

BPPV

- **vestibular rehabilitation may improve dizziness in patients with unilateral peripheral vestibular dysfunction, but appears less effective than physical maneuvers ([level 2 \[mid-level\] evidence](#))**
 - based on Cochrane review limited by clinical heterogeneity
 - systematic review of 27 randomized trials evaluating vestibular rehabilitation for symptomatic unilateral peripheral vestibular dysfunction in 1,668 community-dwelling adults
 - vestibular rehabilitation was compared to sham intervention (control), medical interventions or other forms of vestibular rehabilitation

BPPV

- comparing vestibular rehabilitation to control (placebo, sham, usual care or no intervention)
 - methods of vestibular rehabilitation varied across trials so unclear if meta-analysis is appropriate despite lack of statistical heterogeneity
 - vestibular rehabilitation associated with subjective improvement in subjective dizziness in analysis of 4 trials with 565 patients
 - odds ratio 2.67 (95% CI 1.85-3.86)
 - NNT 4-8 assuming 26% improvement in controls
- movement-based vestibular rehabilitation less effective than physical maneuvers for benign paroxysmal positional vertigo (BPPV) for short-term cure rate (62% vs. 93%, $p = 0.004$) in 1 trial with 71 patients
- no adverse effects reported

Reference - [Cochrane Database Syst Rev 2011 Feb 16;\(2\):CD005397](#)

Vestibular rehabilitation for unilateral peripheral vestibular dysfunction

Source

International Centre for Allied Health Evidence, Sansom Institute for Health Research, University of South Australia (City East), North Terrace, Adelaide, SA, Australia, 5000.

Abstract

BACKGROUND:

This is an update of a Cochrane Review first published in The Cochrane Library in Issue 4, 2007. Unilateral peripheral vestibular dysfunction (UPVD) can occur as a result of disease, trauma or postoperatively. The dysfunction is characterised by complaints of dizziness, visual or gaze disturbances and balance impairment. Current management includes medication, physical manoeuvres and exercise regimes, the latter known collectively as vestibular rehabilitation (VR).

OBJECTIVES:

To assess the effectiveness of vestibular rehabilitation in the adult, community-dwelling population of people with symptomatic unilateral peripheral vestibular dysfunction.

SEARCH STRATEGY:

We searched the Cochrane Ear, Nose and Throat Disorders Group Trials Register; the Cochrane Central Register of Controlled Trials (CENTRAL); PubMed; EMBASE; CINAHL; Web of Science; BIOSIS Previews; Cambridge Scientific Abstracts; ISRCTN and additional sources for published and unpublished trials. The most recent search was 1 July 2010, following a previous search in March 2007.

SELECTION CRITERIA:

Randomised trials of adults living in the community, diagnosed with symptomatic unilateral peripheral vestibular dysfunction. We sought comparisons of VR versus control (placebo etc.), other treatment (non-VR, e.g. pharmacological) or another form of VR. We considered the outcome measures of frequency and severity of dizziness or visual disturbance; changes in balance impairment, function or quality of life; and measure/s of physiological status with known functional correlation.

DATA COLLECTION AND ANALYSIS:

Both authors independently extracted data and assessed trials for risk of bias.

MAIN RESULTS:

We included 27 trials, involving 1668 participants, in the review. Trials addressed the effectiveness of VR against control/sham interventions, medical interventions or other forms of VR. Individual and pooled data showed a statistically significant effect in favour of VR over control or no intervention. The exception to this was when movement-based VR was compared to physical manoeuvres for benign paroxysmal positional vertigo (BPPV), where the latter was shown to be superior in cure rate in the short term. There were no reported adverse effects.

AUTHORS' CONCLUSIONS:

There is moderate to strong evidence that VR is a safe, effective management for unilateral peripheral vestibular dysfunction, based on a number of high quality randomised controlled trials. There is moderate evidence that VR provides a resolution of symptoms and improvement in functioning in the medium term. However, there is evidence that for the specific diagnostic group of BPPV, physical (repositioning) manoeuvres are more effective in the short term than exercise-based vestibular rehabilitation; although a combination of the two is effective for longer-term functional recovery. There is insufficient evidence to discriminate between differing forms of VR.

[Cochrane Database Syst Rev. 2011 Feb 16;\(2\):](#)

[Hillier SL, McDonnell M.](#)

BPPV

Vestibular exercises:

- **booklet-based vestibular rehabilitation may improve vertigo symptoms in patients with vestibular-related chronic dizziness ([level 2 \[mid-level\] evidence](#))**
 - based on randomized trial with high dropout rate
 - 337 adults with vestibular-related chronic dizziness (mean duration > 5 years) aggravated by head movement randomized to 1 of 3 groups

BPPV

Vestibular exercises:

1. booklet-based vestibular rehabilitation (self-management booklets with instructions on home vestibular rehabilitation exercises [daily for ≤ 12 weeks] with explanation of benefits, and cognitive behavioral techniques to promote positive beliefs and treatment adherence)
2. booklet-based vestibular rehabilitation plus telephone support (≤ 3 brief sessions of structured telephone support from vestibular therapist)
3. usual care

BPPV

Vestibular exercises:

- 78% completed 1-year follow-up and included in analyses
- no significant differences in vertigo symptoms at 12 weeks comparing either vestibular rehabilitation intervention vs. usual care
- both vestibular rehabilitation interventions
 - associated with improved vertigo symptoms at 1 year vs. usual care (p < 0.05 for each)
 - reported to be cost-effective

Reference - [BMJ 2012 Jun 6;344:e2237 full-text](#)

Clinical and cost effectiveness of booklet based vestibular rehabilitation for chronic dizziness in primary care: single blind, parallel group, pragmatic, randomised controlled trial

Source

Faculty of Human and Social Sciences, University of Southampton, Southampton SO17 1BJ, UK. L.Yardley@soton.ac.uk

Abstract

OBJECTIVE:

To determine the clinical and cost effectiveness of booklet based vestibular rehabilitation with and without telephone support for chronic dizziness, compared with routine care.

DESIGN:

Single blind, parallel group, pragmatic, randomised controlled trial.

SETTING:

35 general practices across southern England between October 2008 and January 2011.

PARTICIPANTS:

Patients aged 18 years or over with chronic dizziness (mean duration >five years) not attributable to non-vestibular causes (confirmed by general practitioner) and that could be aggravated by head movement (confirmed by patient).

INTERVENTIONS:

Participants randomly allocated to receive routine medical care, booklet based vestibular rehabilitation only, or booklet based vestibular rehabilitation with telephone support. For the booklet approach, participants received self management booklets providing comprehensive advice on undertaking vestibular rehabilitation exercises at home daily for up to 12 weeks and using cognitive behavioural techniques to promote positive beliefs and treatment adherence. Participants receiving telephone support were offered up to three brief sessions of structured support from a vestibular therapist.

MAIN OUTCOME MEASURES:

Vertigo symptom scale-short form and total healthcare costs related to dizziness per quality adjusted life year (QALY).

RESULTS:

Of 337 randomised participants, 276 (82%) completed all clinical measures at the primary endpoint, 12 weeks, and 263 (78%) at one year follow-up. We analysed clinical effectiveness by intention to treat, using analysis of covariance to compare groups after intervention, controlling for baseline symptom scores. At 12 weeks, scores on the vertigo symptom scale in the telephone support group did not differ significantly from those in the routine care group (adjusted mean difference -1.79 (95% confidence interval -3.69 to 0.11), $P=0.064$). At one year, both intervention groups improved significantly relative to routine care (telephone support -2.52 (-4.52 to -0.51), $P=0.014$; booklet only -2.43 (-4.27 to -0.60), $P=0.010$). Analysis of cost effectiveness acceptability curves showed that both interventions were highly cost effective; at very low QALY values, the booklet only approach was most likely to be cost effective, but the approach with additional telephone support was most likely to be cost effective at QALY values more than £1200 (€1488; \$1932). Using the booklet approach with telephone support, five (three to 12) patients would need to be treated for one patient to report subjective improvement at one year.

CONCLUSIONS:

Booklet based vestibular rehabilitation for chronic dizziness is a simple and cost effective means of improving patient reported outcomes in primary care.

[BMJ](#). 2012 Jun 6;344:

[Yardley L](#), [Barker F](#), [Muller I](#), [Turner D](#), [Kirby S](#), [Mullee M](#), [Morris A](#), [Little P](#).

BPPV

Vestibular exercises:

- **addition of vestibular stimulation exercises reported to improve balance ability and functional gain performance in patients having canalith repositioning maneuver ([level 3 \[lacking direct\] evidence](#))**
 - based on randomized trial without clinical outcomes
 - 26 patients with benign positional vertigo involving posterior semicircular canal randomized to canalith repositioning maneuver plus vestibular exercise training 3-4 times weekly for 4 weeks vs. canalith repositioning maneuver alone
 - patients having combined vestibular exercise and canalith repositioning maneuver reported to have significant improvement in measures of gait performance and balance stability

Reference - [Clin Rehabil 2008 Apr;22\(4\):338](#)

Balance improvement in patients with benign paroxysmal positional vertigo

Source

Faculty and Institute of Physical Therapy, National Yang-Ming University, Shih-Pai, Taipei, Taiwan.

Abstract

OBJECTIVE:

To investigate the effect of an additional vestibular stimulated exercise programme on balance for patients with benign paroxysmal positional vertigo.

DESIGN:

Randomized controlled trial.

SETTING:

Medical centre.

SUBJECTS:

Twenty-six subjects with benign paroxysmal positional vertigo involving the unilateral posterior semicircular canal.

INTERVENTIONS:

Subjects were randomized into experimental or control groups. Thirteen subjects in the experimental group received the canalith repositioning manoeuvre and vestibular stimulated exercise training three times a week for four weeks. Thirteen subjects in the control group received only the canalith repositioning manoeuvre.

MAIN MEASURES:

Static balance tests, tandem walk test, Dynamic Gait Index and subjective rating of the intensity of vertigo were measured at baseline, two-week and four-week assessments.

RESULTS:

Compared with the control group, subjects in the experimental group demonstrated a statistically significant improvement in single leg stance with eyes closed at the two-week assessment ($P<0.05$). Furthermore, stance on foam surface with eyes closed, single-leg stance with eyes closed, and Dynamic Gait Index at the four-week assessment were also significantly improved ($P<0.05$).

CONCLUSION:

The present study demonstrated that additional exercise training, which emphasizes vestibular stimulation, can improve balance ability and functional gait performance among patients with benign paroxysmal positional vertigo who had already undergone the canalith repositioning manoeuvre.

[Clin Rehabil.](#) 2008 Apr;22(4):338-47

[Chang WC](#), [Yang YR](#), [Hsu LC](#), [Chern CM](#), [Wang RY](#).

BPPV

Vestibular exercises:

- vestibular rehabilitation may improve symptoms and function in patients with chronic unilateral vestibular dysfunction ([level 2 \[mid-level evidence\]](#))
 - based on small randomized trial without attention control
 - 42 patients with chronic vestibular dysfunction were randomized to vestibular rehabilitation group for 4 weeks vs. no treatment
 - vestibular rehabilitation associated with significant improvements at 4 weeks in ($p < 0.05$ for all comparisons to control group)
 - symptom scores
 - dizziness-related disability scores
 - balance scores
 - postural stability scores

Reference - [Arch Phys Med Rehabil 2009 Aug;90\(8\):1325](#)

Short-term effects of vestibular rehabilitation in patients with chronic unilateral vestibular dysfunction: a randomized controlled study

Source

Department of Physical Medicine, University of Ege, Izmir, Turkey.

Abstract

OBJECTIVE:

To evaluate the short-term effects of vestibular rehabilitation on symptom, disability, balance, and postural stability in patients with chronic unilateral vestibular dysfunction.

DESIGN:

Randomized controlled trial.

SETTING:

Department of Physical Medicine and Rehabilitation, University Hospital.

PARTICIPANTS:

Patients (N=42) with chronic vestibular dysfunction were divided into either a rehabilitation group (group 1) or a control group (group 2).

INTERVENTIONS:

Patients in group 1 were treated with a customized exercise program for 4 weeks, while the patients in the control group did not receive any treatment.

MAIN OUTCOME MEASURES:

Subjects were assessed before and after the rehabilitation program with respect to symptoms (visual analog scale [VAS]), disability (Dizziness Handicap Inventory [DHI]), balance (Berg Balance Scale [BBS]), and postural stability (modified Clinical Test for Sensory Interaction on Balance [mCTSIB]).

RESULTS:

Significant improvements in all parameters (VAS, DHI, BBS, mCTSIB) were observed in group 1 ($P < .05$). When the 2 groups were compared, there were significant improvements in postexercise VAS, DHI (emotional, functional, physical, total), BBS, and mCTSIB (standing on a firm surface with eyes open, standing on a foam surface with eyes open, standing on a foam surface with eyes closed, mCTSIB mean) in favor of group 1 ($P < .05$). No significant improvements were seen in any parameters in the control group ($P > .05$).

CONCLUSIONS:

Significant improvements were seen in symptom, disability, balance, and postural stability in chronic unilateral vestibular dysfunction after an exercise program. Customized exercise programs are beneficial in treatment of chronic unilateral vestibular dysfunction.

[Arch Phys Med Rehabil.](#) 2009 Aug;90(8):1325-31.

[Giray M](#), [Kirazli Y](#), [Karapolat H](#), [Celebisoy N](#), [Bilgen C](#), [Kirazli T](#).

Medications

- BPPV should not be routinely treated with vestibular suppressant medications such as antihistamines or benzodiazepines ([AAO Grade C](#))⁽¹⁾
 - potential side effects including drowsiness, cognitive side effects, and restrictions operating machinery (including driving)
 - may also interfere with central nervous system compensation for vestibular injury
- no evidence to support recommendation of any medication in the routine treatment of BPPV ([AAN Level U](#))⁽²⁾

Medications

- benzodiazepines not shown to be beneficial ([level 2 \[mid-level\] evidence](#))
 - based on small randomized trial
 - 25 patients with BPPV randomized to [diazepam](#) 5 mg vs. [lorazepam](#) 1 mg vs. placebo orally 3 times daily for 4 weeks
 - no significant differences in nystagmus or dizziness

Reference - [J Otolaryngol 1980 Dec;9\(6\):472-7](#) in

[J Fam Pract 2003 Dec;52\(12\):971](#) [EBSCOhost Full Text](#)

Lorazepam and diazepam in the treatment of benign paroxysmal vertigo

Abstract

Animal studies indicate that diazepam suppresses resting activity in the vestibular system. Despite lack of clinical studies, diazepam and lorazepam have been used empirically for relief of vertigo. However, drug use with benign paroxysmal vertigo (BPV) is controversial which led to this study to evaluate the value of diazepam and lorazepam for relief of BPV. Twenty-five BPV patients were given diazepam, lorazepam, or a placebo over four weeks using a double-blind technique. Each patient rated his dizziness after each week, and the patient's nystagmus was rated before and after treatment. The result showed a gradual decline in symptoms in all treatment groups with no additional relief with the drugs. The latter was attributed to the fact that BPV represents a dynamic state whereas diazepam provides symptom relief due to action on the system in its static state.

[J Otolaryngol.](#) 1980 Dec;9(6):472-7.

[McClure JA](#), [Willett JM](#).

What is the best way to manage benign paroxysmal positional vertigo?

□ EVIDENCE SUMMARY

BPPV is characterized by brief, self-limited episodes of vertigo, provoked by typical position changes. This condition may result from free-floating debris in the endolymph of the posterior semicircular canal. This debris moves with position change, causing an abnormal perception of movement and classic symptoms of vertigo. Dix-Hallpike testing aids in the diagnosis, but treatment is often prescribed empirically¹. The most widely studied treatments for BPPV are the single treatment repositioning techniques, such as the Epley maneuver². A Cochrane review of treatments for BPPV yielded 11 trials, of which 9 were excluded due to a high risk of bias³. The 2 remaining trials compared the Epley maneuver with a sham procedure among 86 patients referred to specialty care^{4,5}.

Repositioning maneuvers for posterior canal BPPV

Recommendations for particle repositioning maneuvers:

- recommendations for particle repositioning maneuver for posterior canal BPPV
 - patients should be treated with a particle repositioning maneuver ([AAO Grade B](#))⁽¹⁾
 - canalith repositioning procedure is safe and effective therapy that should be offered to patients of all ages with posterior semicircular canal BPPV ([AAN Level A](#))⁽²⁾
 - maneuvers include
 - Epley maneuver (canalith repositioning procedure)
 - Semont maneuver (liberatory maneuver)
 - mastoid vibration probably of no added benefit to patients treated with canal repositioning for posterior canal BPPV ([AAN Level C](#))⁽²⁾

Epley maneuver

- moves sludge from posterior semicircular canal to utricle giving relief to most patients

Technique for Epley maneuver

- inform patient that any of nausea, vomiting, or sense of falling may occur during positioning⁽¹⁾
- from seated position, have patient turn head 45 degrees to side of BPPV (toward head-down position which elicits vertigo)
- quickly move patient into Hallpike-Dix position (fully extended and lying down) and hold for 3 minutes
- rotate head through extension until opposite ear is downward, turn body on unaffected side with head still turned 45 degrees and hold for 3 minutes
- slowly sit patient up
- chin tucked down at 20 degrees has been recommended to help drop canalith into utricle

Reference - Epley in [Otolaryngol Head Neck Surg 1992 Sep;107\(3\):399](#) for original description

picture of Epley maneuver can be found at dizziness-and-balance.com

BENIGN PAROXYSMAL POSITIONAL VERTIGO

In Benign Paroxysmal Positional Vertigo (BPPV) dizziness is generally 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 the formal name is "otoconia". Ear rocks are small crystals of calcium carbonate derived from a structure in the ear called the "utricle" (figure1). While the saccule also contains otoconia, they are not able to migrate into the canal system. The utricle may have been 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 probably dissolved naturally as well as actively reabsorbed by the "dark cells" of the labyrinth (Lim, 1973, 1984), which are found adjacent to the utricle and the crista, although this idea is not accepted by all ([see Zucca, 1998](#), and Buckingham, 1999).

The canalith repositioning procedure: for treatment of benign paroxysmal positional vertigo

Source

Portland Otologic Clinic, OR 97213.

Abstract

The Canalith Repositioning Procedure (CRP) is designed to treat benign paroxysmal positional vertigo (BPPV) through induced out-migration of free-moving pathological densities in the endolymph of a semicircular canal, using timed head maneuvers and applied vibration. This article describes the procedure and its rationale, and reports the results in 30 patients who exhibited the classic nystagmus of BPPV with Hallpike maneuvers. CRP obtained timely resolution of the nystagmus and positional vertigo in 100%. Of these, 10% continued to have atypical symptoms, suggesting concomitant pathology; 30% experienced one or more recurrences, but responded well to retreatment with CRP. These results also support an alternative theory that the densities that impart gravity-sensitivity to a semicircular canal in BPPV are free in the canal, rather than attached to the cupula. CRP offers significant advantages over invasive and other noninvasive treatment modalities in current use.

[Otolaryngol Head Neck Surg.](#) 1992 Sep;107(3):399-404.

[Epley JM.](#)

Epley maneuver improves symptoms in short-term (level 1 [likely reliable] evidence)

- based on Cochrane review
- systematic review identified 22 randomized trials of Epley maneuver for posterior canal BPPV (including positive Dix-Hallpike test)
- 17 trials were excluded due to high-risk of bias (primarily inadequate randomization sequence generation and poor allocation concealment)
- 5 included trials compared Epley maneuver to sham maneuver or control group in 273 adults (follow-up 24 hours to 4 weeks)
 - Epley maneuver associated with
 - complete symptom resolution (odds ratio [OR] 4.42, 95% CI 2.62-7.44, NNT 3-5 assuming symptom resolution in 21% of controls)
 - conversion from positive to negative Dix-Hallpike test (OR 6.4, 95% CI 3.63-11.28)
 - no serious adverse effects reported
- no trials compared Epley maneuver to other treatments or assessed long-term outcomes

Reference - [Cochrane Database Syst Rev 2010 Sep 8;\(9\):CD003162](#)

The Epley (canalith repositioning) manoeuvre for benign paroxysmal positional vertigo

Source

Royal Devon & Exeter Hospital, Barrack Rd, Exeter, Devon, UK, EX2 5DW.

Abstract

BACKGROUND:

Benign paroxysmal positional vertigo (BPPV) is a syndrome characterised by short-lived episodes of vertigo in association with rapid changes in head position. It is a common cause of vertigo presenting to primary care and specialist otolaryngology clinics. Current treatment approaches include rehabilitative exercises and physical manoeuvres including the Epley manoeuvre.

OBJECTIVES:

To assess the effectiveness of the Epley manoeuvre compared to other treatments available for posterior canal benign paroxysmal positional vertigo, or no treatment.

SEARCH STRATEGY:

The Cochrane Central Register of Controlled Trials (CENTRAL) (Cochrane Library Issue 1, 2004), MEDLINE (1966 to 2004), EMBASE (1974 to 2004) and reference lists of identified publications. Date of the most recent search was January 2004.

SELECTION CRITERIA:

Randomised trials of adults diagnosed with posterior canal BPPV (including a positive Dix-Hallpike test). Comparisons sought: Epley manoeuvre versus placebo Epley manoeuvre versus untreated controls Epley manoeuvre versus other active treatment Outcome measures that were considered include: frequency and severity of attacks of vertigo; proportion of patients improved by each intervention; and conversion of a "positive" Dix-Hallpike test to a "negative" Dix-Hallpike test

DATA COLLECTION AND ANALYSIS:

Both reviewers independently extracted data and assessed trials for quality.

MAIN RESULTS:

Fifteen trials were identified but twelve studies were excluded because of a high risk of bias, leaving three trials in the review. Trials were mainly excluded because of inadequate concealment during randomisation, or failure to blind outcome assessors. The studies included in the review (Lynn 1995; Froehling 2000; Yimtae 2003) addressed the efficacy of the Epley manoeuvre against a sham manoeuvre or control group by comparing the proportion of subjects in each group who had complete resolution of their symptoms, and who converted from a positive to negative Dix-Hallpike test. Individual and pooled data showed a statistically significant effect in favour of the Epley manoeuvre over controls. There were no serious adverse effects of treatment.

REVIEWERS' CONCLUSIONS:

There is some evidence that the Epley manoeuvre is a safe effective treatment for posterior canal BPPV, although this is based on the results of only three small randomised controlled trials with relatively short follow up. There is no good evidence that the Epley manoeuvre provides a long term resolution of symptoms. There is no good evidence comparing the Epley manoeuvre with other physical, medical or surgical therapy for posterior canal BPPV.

[Cochrane Database Syst Rev. 2004;\(2\):](#)
[Hilton M, Pinder D.](#)

Epley maneuver has short-term efficacy

(level 1 [likely reliable] evidence)

- based on randomized trial
- 67 patients with acute unilateral benign paroxysmal positional vertigo of posterior canal (brief vertigo and nystagmus) were randomized to Epley maneuver vs. sham procedure (Epley maneuver for opposite side)
 - Epley maneuver group had procedure repeated (up to 3 maneuvers) until vertigo and nystagmus no longer elicited, mean 1.8 maneuvers
 - sham group had number of maneuvers equal to previous Epley maneuver patient

Epley maneuver has short-term efficacy

([level 1 \[likely reliable\] evidence](#))

- outcome assessed at 24 hours by blinded investigator using Dix-Hallpike maneuver
- 1 patient did not show up for follow-up, 66 patients analyzed
- comparing Epley vs. sham group
 - 80% vs. 10% no longer had positional nystagmus ($p < 0.001$, NNT 2)
 - 80% vs. 13% no longer had positional vertigo ($p < 0.001$, NNT 2)
 - 23% vs. 3% had transient nausea (NNH 5)
 - 11% vs. 0 had vomiting (NNH 9)
- sham patients were treated with Epley maneuver at 24 hours, so no longer-term outcomes are reliable

Reference - [J Neurol Neurosurg Psychiatry 2006 Aug;77\(8\):980 full-text](#)

Short-term efficacy of Epley's manoeuvre: a double-blind randomised trial

Source

Department of Neurology, Charité, Campus Virchow-Klinikum, Berlin, Germany.
michael.von_brevern@charite.de

Abstract

BACKGROUND:

Benign paroxysmal positional vertigo of the posterior canal (PC-BPPV) is a common vestibular disorder and can be easily treated with Epley's manoeuvre. Thus far, the short-term efficacy of Epley's manoeuvre for treatment of PC-BPPV is unknown.

OBJECTIVES:

To evaluate the efficacy of Epley's manoeuvre for treatment of PC-BPPV 24 h after applying the manoeuvre.

METHODS:

The short-term efficacy of Epley's manoeuvre was compared with a sham procedure in 66 patients with PC-BPPV by using a double-blind randomised study design.

RESULTS:

24 h after treatment, 28 of 35 (80%) patients in the Epley's manoeuvre group had neither vertigo nor nystagmus on positional testing compared with 3 of 31 (10%) patients in the sham group ($p < 0.001$).

CONCLUSION:

Epley's manoeuvre is shown to resolve PC-BPPV both effectively and rapidly.

[J Neurol Neurosurg Psychiatry](#). 2006 Aug;77(8):980-2.

69 [von Brevern M](#), [Seelig T](#), [Radtko A](#), [Tiel-Wilck K](#), [Neuhauser H](#), [Lempert T](#).

Epley maneuver appears effective within 1 week **(level 2 [mid-level] evidence)**

- based on systematic review with limited evidence
- systematic review of 5 randomized trials of Epley maneuver in adults with BPPV confirmed by Dix-Hallpike test
- review limited to trials scoring at least 3 points on 5-point Jadad quality scale
- all trials had small samples sizes and follow-up generally limited to 1 month

Epley maneuver appears effective within 1 week (level 2 [mid-level] evidence)

- comparing Epley maneuver vs. control
 - 25% vs. 61% had symptoms at 1 week ($p < 0.00001$, NNT 3) in analysis of 4 trials with 179 patients
 - analysis limited by heterogeneity ($p = 0.03$) with 1 trial with large effect size contributing 43% of the weighted data
 - results without this trial would be 31% vs. 54% symptoms at 1 week (NNT 5)
 - 34% vs. 77% had positive Dix-Hallpike test at 1 week ($p < 0.0001$, NNT 3) in meta-analysis of 3 trials with 146 patients, limited by heterogeneity ($p = 0.05$)
 - 23% vs. 71% had positive Dix-Hallpike test at 1 month ($p < 0.0001$, NNT 2) in meta-analysis of 4 trials with 178 patients, limited by heterogeneity ($p = 0.03$)

Epley maneuver appears effective within 1 week ([level 2 \[mid-level\] evidence](#))

- additional interventions that have no evidence of effect
 - mastoid vibration
 - subtle changes in maneuver movements
 - neck collar to restrict neck movements
 - movement limitation recommendations
 - avoiding lying down on affected side after maneuver
- no trials found for [Semont maneuver](#)

Reference - [Braz J Otorhinolaryngol 2006 Jan-Feb;72\(1\):130](#)

Maneuvers for the treatment of benign positional paroxysmal vertigo: a systematic review

Source

University of Vale do Itajaí, Univali, SC, Brazil. lazaro@univali.br

Abstract

Benign Paroxysmal Positional Vertigo (BPPV) is one of the most frequent diseases of the vestibular system and it is characterized by episodes of recurrent vertigo triggered by head movements or position changes. There are several approaches for treatment, but efficacy is still being discussed.

AIM:

To assess the effectiveness of the specific maneuvers available to the treatment of BPPV.

METHODOLOGY:

An electronic search at the main databases, including MEDLINE, LILACS, PEDro, Cochrane Collaborations Database was performed, and we selected only randomized clinical trials studying adults with diagnosis of BPPV confirmed by the Dix-Hallpike test. The trials should have included physical maneuvers such as Epley and Semont. The main outcome was Dix-Hallpike negative test and the changes to subjective complaints. The trials were assessed using Jadad's scale and only studies with quality scores equal or above 3 were pooled on a meta-analysis to assess their effectiveness.

RESULTS:

We found five controlled clinical trials phase I comparing the Epley's maneuver with controls or placebo. The meta-analysis showed positive evidence of Epley's maneuver to the posterior semicircular canal (effect size = 0.11 [CI 95% 0.05, 0.26] of objective improvement [Dix-Hallpike] within one week, 0.24 [CI 95% 0.13, 0.45] within one month and 0.16 [CI 95% 0.08, 0.33] of improvement reported by the patients within one week. There are no studies about the efficacy of Semont's maneuver.

CONCLUSION:

There is scientific evidence showing good efficacy of Epley's maneuver in the treatment.

[Braz J Otorhinolaryngol.](#) 2006 Jan-Feb;72(1):130-9.

[Teixeira LJ](#), [Machado JN](#).

Epley maneuver may improve vertigo severity within 30 minutes ([level 2 \[mid-level\] evidence](#))

- based on small randomized trial with early termination
- 22 patients presenting to emergency department with BPPV randomized to Epley maneuver vs. placebo maneuver
- trial stopped early after planned interim analysis
- severity of vertigo rated before and 15-30 minutes after Epley maneuver on 1-10 scale
- median decrease in severity was 6 with Epley maneuver vs. 1 with placebo (p = 0.001)

Reference - [Acad Emerg Med 2004 Sep;11\(9\):918](#)

A randomized clinical trial to assess the efficacy of the Epley maneuver in the treatment of acute benign positional vertigo

Source

Department of Emergency Medicine, Albert Einstein College of Medicine, Montefiore Medical Center, Bronx, NY, USA. achang@montefiore.org

Abstract

OBJECTIVES:

To compare the efficacy of the Epley maneuver with that of a placebo maneuver in patients presenting to the emergency department (ED) with benign positional vertigo (BPV).

METHODS:

This was a prospective, randomized, single-blind placebo-controlled trial. Consecutive adult ED patients presenting to a university teaching hospital with BPV were randomized to treatment with either the Epley or placebo maneuver. The severity of vertigo was evaluated on a 0 to 10-point scale before and after the maneuvers.

RESULTS:

Eleven patients were randomized to the Epley group and 11 to the placebo group before the trial was terminated, based on a planned interim analysis. The median decreases in vertigo severity were 6 (95% confidence interval [95% CI] = 4 to 9) for the Epley group and 1 (95% CI = 0 to 3) for the placebo group ($p = 0.001$).

CONCLUSIONS:

The Epley maneuver is a simple bedside maneuver that appears to be more efficacious than a placebo maneuver in the treatment of acute BPV among ED patients.

[Acad Emerg Med.](#) 2004 Sep;11(9):918-24.

[Chang AK](#), [Schoeman G](#), [Hill M](#).

Epley maneuver may have long-term efficacy (level 2 [mid-level] evidence)

- based on small randomized trial
- 40 patients with BPPV randomized to particle repositioning maneuver vs. placebo and followed for 1 year
- placebo maneuver was having patient seated and tilted laterally to horizontal precipitating position, maintained for 2 minutes after nystagmus subsided, then returned to sitting position; repeated by patient every 3 hours while awake
- comparing maneuver vs. placebo
 - 95% vs. 15% had complete resolution of symptoms without recurrence at 1 week (NNT 2)
 - 95% vs. 15% had no vertigo symptoms at 6 months (NNT 2)
 - 90% vs. 15% had no symptoms at 1 year (NNT 2)

Reference - [Am J Otolaryngol 2003 Nov-Dec;24\(6\):355](#)

Efficacy of particle repositioning maneuver in BPPV: a prospective study

Source

Department of Otolaryngology, Head and Neck Surgery, Chandigarh, India.

Abstract

PURPOSE:

A single blinded prospective randomized controlled trial was conducted in 40 patients with benign paroxysmal positional vertigo (BPPV) to determine the efficacy of particle repositioning maneuver (PRM).

MATERIALS AND METHODS:

Out of 40 patients, 20 underwent PRM with the rest receiving a placebo treatment. Postprocedural instructions were given to all the patients who underwent PRM. Follow-up was for 1 year at regular intervals. Analysis was based on the symptomatic status and the Hallpike maneuver at each visit.

RESULTS:

After the initial week, 95% showed complete resolution of symptoms with none reporting a recurrence after PRM. On the contrary, only 15% of the controls had complete resolution with 14 out of 20 reporting a recurrence of BPPV. Results remained more or less the same at the end of 4 weeks. Six months after PRM, 19 of 20 patients had no vertigo with a meager 5% showing recurrence versus 75% of controls reporting a recurrence with only 3 of 20 reporting a favorable symptom status. At the end of 1 year, 18 of 20 patients had complete relief from symptoms with only 10% showing Hallpike maneuver positive in the study group compared with 3 of 20 reporting a relief from symptoms with 90% turning out to be Hallpike maneuver positive in the control group.

CONCLUSIONS:

This study establishes the efficacy of PRM in short- and long-term management of BPPV; the procedure is easy and simple.

[Am J Otolaryngol.](#) 2003 Nov-Dec;24(6):355-60.

[Simhadri S](#), [Panda N](#), [Raghunathan M](#).

modified Epley maneuver may be effective in elderly patients ([level 2 \[mid-level\] evidence](#))

- based on randomized trial without blinding
- 47 patients > 70 years old with unilateral posterior canal BPPV randomized to canalith repositioning maneuver (modified Epley maneuver) vs. avoidance (no treatment)
- at 1 month, 64% treatment group vs. 5% control group had improvement of provoked vertigo and nystagmus on Dix-Hallpike testing (NNT 2)

Reference - [Otolaryngol Head Neck Surg 2003 May;128\(5\):719](#)

Systematic approach to benign paroxysmal positional vertigo in the elderly

Source

Department of Otolaryngology, University of Miami School of Medicine, PO Box 016960 (D-48), Miami, FL 33101, USA.
sangeli@med.miami.edu

Abstract

OBJECTIVE:

We evaluated the effectiveness of a management approach that combines the canalith repositioning maneuver (CRM) and vestibular rehabilitation (VR) in the treatment of benign positional paroxysmal vertigo (BPPV) in elderly persons.

STUDY DESIGN AND SETTING:

Forty-seven patients (≥ 70 years old) with the diagnosis of unilateral posterior semicircular canal BPPV formed the study population. This study has 2 parts. In the first part, patients were randomly assigned to 1 of 2 groups: the CRM and avoidance (no treatment). Patients were evaluated 1 month after the first visit. Those patients not responding to treatment were enrolled in the second part of the study, treated with an individualized combination of CRM and VR, and then reevaluated 3 months later.

RESULTS:

Statistically significant improvement of vertigo and provoked nystagmus in 64% of patients in the CRM group compared with the no-treatment group. After the addition of VR, 77% of all patients improved.

CONCLUSION:

A combination of CRM and VR improves BPPV in the elderly.

SIGNIFICANCE:

These findings suggest that although CRM is more effective than no treatment, VR can be added to improve the results in the treatment of BPPV.

[Otolaryngol Head Neck Surg.](#) 2003 May;128(5):719-25.

[Angeli SI](#), [Hawley R](#), [Gomez O](#).

particle repositioning maneuvers associated with resolution of nystagmus in patients with BPPV ([level 3 \[lacking direct\] evidence](#))

- based on systematic review without clinical outcomes
- systematic review of 10 randomized or quasi-randomized trials evaluating particle repositioning maneuvers in patients with posterior canal BPPV
- patients were assessed with Dix-Hallpike test \geq 24 hours after treatment
- canalith repositioning procedure associated with greater likelihood of nystagmus resolution compared to sham in 2 randomized trials, similar results obtained in 2 quasi-randomized trials
- liberatory maneuver associated with greater likelihood of nystagmus resolution compared to no treatment in 2 quasi-randomized trials
- no significant difference in treatment success rates between canalith repositioning procedure and liberatory maneuver in 2 quasi-randomized trials

Reference - [Phys Ther 2010 May;90\(5\):663](#) [EBSCOhost Full Text](#)

Effectiveness of particle repositioning maneuvers in the treatment of benign paroxysmal positional vertigo: a systematic review

Source

Department of Physical Therapy, Northwestern University, 555 31st St, Downers Grove, IL 60515, USA. jhelmi@northwestern.edu

Abstract

BACKGROUND:

Benign paroxysmal positional vertigo (BPPV) is the most common cause of vertigo.

PURPOSE:

The purpose of this systematic review was to determine whether patients diagnosed with posterior canal (PC) BPPV, based on positional testing, and treated with a particle repositioning maneuver will show the resolution of benign paroxysmal positional nystagmus (BPPN) on the Dix-Hallpike Test performed 24 hours or more after treatment.

DATA SOURCES:

Data were obtained from an electronic search of the MEDLINE, EMBASE, and CINAHL databases from 1966 through September 2009.

STUDY SELECTION:

The study topics were randomized controlled trials (RCTs), quasi-RCTs, the diagnosis of PC BPPV, treatment with the particle repositioning maneuver, and outcome measured with a positional test 24 hours or more after treatment.

DATA EXTRACTION:

Data extracted were study descriptors and the information used to code for effect size.

DATA SYNTHESIS:

In 2 double-blind RCTs, the odds in favor of the resolution of BPPN were 22 times (95% confidence interval=3.41-141.73) and 37 times (95% confidence interval=8.75-159.22) higher in people receiving the canalith repositioning procedure (CRP) than in people receiving a sham treatment. This finding was supported by the results reported in 8 nonmasked quasi-RCTs. Studies with limited methodological quality suggested that a liberatory maneuver (LM) was more effective than a control intervention; there was no significant difference in the effectiveness of the LM and the effectiveness of the CRP; the self-administered CRP was more effective than the self-administered LM; and the CRP administered together with the self-administered CRP was more effective than the CRP administered alone. The Brandt-Daroff exercises were the least effective self-administered treatments.

LIMITATIONS:

The limitations included the methodological quality of the studies, the lack of quality-of-life measures, and confounding factors in reporting vertigo.

CONCLUSIONS:

Randomized controlled trials provided strong evidence that the CRP resolves PC BPPN, and quasi-RCTs suggested that the CRP or the LM performed by a clinician or with proper instruction at home by the patient resolves PC BPPN. There were no data on the effects of the maneuvers on outcomes relevant to patients.

[Phys Ther.](#) 2010 May;90(5):663-78.

[Helminski JO](#), [Zee DS](#), [Janssen I](#), [Hain TC](#).

Semont positioning maneuver

- also called Semont maneuver, liberatory maneuver, Semont liberatory maneuver
- Technique
 - patient seated in middle of exam table with head rotated 45 degrees away from affected side
 - while maintaining this head position throughout maneuver, patient rapidly moved to side-lying position onto affected side for 5 minutes, then moved en bloc to opposite side-lying position for 5 minutes
 - then slowly return patient to sitting position
 - patients were discharged with instructions to sleep upright and avoid head movements, looking up or down and bending for 24 hours

Semont positioning maneuver

- American Academy of Neurology recommendations regarding Semont maneuver(2)
 - Semont maneuver possibly effective for BPPV ([AAN Level C](#))
 - insufficient evidence to compare effectiveness of Semont maneuver vs. canalith repositioning procedure ([AAN Level U](#))

Semont positioning maneuver

- **high response rates reported in 2 uncontrolled retrospective studies ([level 3 \[lacking direct\] evidence](#))**
 - based on retrospective study of 278 patients with unilateral BPPV of posterior semicircular canal treated exclusively with Semont maneuver performed weekly for up to 4 maneuvers
 - 90.3% cure rate after maximum of 4 maneuvers
 - 83.5% cured after 2 maneuvers
 - efficacy decreased with repeated maneuvers, from 62.6% for first maneuver to 18.2% for fourth maneuver

Reference - [Arch Otolaryngol Head Neck Surg 2003 Jun;129\(6\):629](#)

Efficacy of the Semont maneuver in benign paroxysmal positional vertigo

Source

Otoneurology Unit, Otolaryngology-Head and Neck Surgery Clinic, Centre Hospitalier Universitaire Vaudois, Switzerland.

Abstract

OBJECTIVES:

To assess the efficacy of the Semont maneuver in the treatment of benign paroxysmal positional vertigo (BPPV) of the posterior semicircular canal and to evaluate the possible effect of various factors on the efficacy of this maneuver.

DESIGN AND SETTING:

Retrospective study in an outpatient clinic.

PATIENTS:

Two hundred seventy-eight patients presenting with symptomatic, unilateral BPPV of the posterior semicircular canal, exclusively treated with the Semont maneuver.

INTERVENTIONS:

During the first consultation, each patient was treated with a Semont maneuver. When BPPV persisted, this maneuver was repeated during follow-up visits, performed at weekly intervals.

MAIN OUTCOME MEASURES:

Patients were considered cured when vertigo disappeared within 30 days (allowing up to 4 maneuvers).

RESULTS:

More than 90% of patients were cured after a maximum of 4 maneuvers, and 83.5% were cured after only 2 maneuvers. The efficacy of the maneuver decreased each time it was repeated (from 62.6% at the first maneuver to 18.2% at the fourth). The duration of symptoms before initial consultation and the etiology of BPPV had a significant effect on the maneuver's efficacy ($P < .001$ and $P = .002$, respectively), whereas age ($P = .12$), sex ($P = .06$), and affected side ($P = .20$) had no effect.

CONCLUSIONS:

The Semont maneuver demonstrated a 90.3% cure rate after a maximum of 4 sessions. Patients consulting late (>6 months after the beginning of symptoms) or having traumatic BPPV had lower recovery rates than patients without these factors (74.7% vs 96.5%).

[Arch Otolaryngol Head Neck Surg.](#) 2003 Jun;129(6):629-33.

[Levrat E](#), [van Melle G](#), [Monnier P](#), [Maire R](#).

Semont positioning maneuver

- high response rates reported in 2 uncontrolled retrospective studies ([level 3 \[lacking direct\] evidence](#))
- In retrospective study of Semont maneuver in 162 patients with BPPV
 - 90% had significant improvement with mean 1.49 maneuvers
 - 29% recurrence rate (96% recurrences responded to further maneuvers)

Reference - [Laryngoscope 2002 May;112\(5\):796](#)

Treatment of benign positional vertigo using the semont maneuver: efficacy in patients presenting without nystagmus

Source

Vanderbilt Bill Wilkerson Center for Otolaryngology and Communicative Sciences, Nashville, Tennessee, USA.

Abstract

OBJECTIVE:

To evaluate and compare the efficacy of the Semont liberatory maneuver on "objective" benign paroxysmal positional vertigo (BPPV) defined as vertigo with geotropic nystagmus in Dix-Hallpike positioning versus "subjective" BPPV defined as vertigo without nystagmus in Dix-Hallpike positioning.

STUDY DESIGN:

Retrospective chart review.

METHODS:

One hundred sixty-two patients with positional vertigo during Dix- Hallpike positioning were identified. Patients were evaluated for the presence or absence of nystagmus. All patients underwent the Semont liberatory maneuver. The patient's condition at follow-up was documented at 3 weeks as complete, partial, or failure. Repeated procedures were performed if necessary.

RESULTS:

There were 127 cases of objective BPPV and 35 cases of subjective BPPV. Overall, 90% of all patients tested had significant improvement of their vertigo after 1.49 maneuvers on average. Improvement was seen in 91% of patients with objective BPPV after 1.59 maneuvers on average, compared with 86% in subjective BPPV after 1.13 maneuvers on average (chi2 test, not significant [P = .5]). Patients with a history of traumatic origin or cause had an overall success rate of 81% compared with 92% for nontraumatic causes or origins (chi2 test, not significant [P = .1]). Recurrences were seen in 29% of patients after a successful initial maneuver; however, 96% of these patients responded to further maneuvers. Four patients with persistent symptoms after conservative management underwent posterior semicircular canal occlusion with resolution of symptoms.

CONCLUSION:

The Semont liberatory maneuver provides relief of vertigo in patients with positional vertigo, even in patients without objective nystagmus.

[Laryngoscope](#). 2002 May;112(5):796-801.

Semont maneuver associated with resolution of nystagmus in patients with BPPV ([level 3 \[lacking direct\] evidence](#))

- based on systematic review without clinical outcomes
- systematic review of 10 randomized or quasi-randomized trials evaluating particle repositioning maneuvers in patients with posterior canal BPPV
- patients were assessed with Dix-Hallpike test \geq 24 hours after treatment
- liberatory maneuver associated with greater likelihood of nystagmus resolution compared to no treatment in 2 quasi-randomized trials
- no significant difference in treatment success rates between canalith repositioning procedure (Epley maneuver) and liberatory maneuver (Semont maneuver) in 2 quasi-randomized trials

Reference - [Phys Ther 2010 May;90\(5\):663](#) [EBSCOhost Full Text](#)

Effectiveness of particle repositioning maneuvers in the treatment of benign paroxysmal positional vertigo: a systematic review

Source

Department of Physical Therapy, Midwestern University, 555 31st St, Downers Grove, IL 60515, USA. jhelmi@midwestern.edu

Abstract

BACKGROUND:

Benign paroxysmal positional vertigo (BPPV) is the most common cause of vertigo.

PURPOSE:

The purpose of this systematic review was to determine whether patients diagnosed with posterior canal (PC) BPPV, based on positional testing, and treated with a particle repositioning maneuver will show the resolution of benign paroxysmal positional nystagmus (BPPN) on the Dix-Hallpike Test performed 24 hours or more after treatment.

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LIMITATIONS:

The limitations included the methodological quality of the studies, the lack of quality-of-life measures, and confounding factors in reporting vertigo.

CONCLUSIONS:

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