

Effectiveness of Physiotherapy in Reducing Vertigo Symptoms in Patients with Benign Paroxysmal Positional Vertigo (BPPV): A Systematic Review

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Abstract

Background

Benign paroxysmal positional vertigo (BPPV) is one of the most common peripheral vestibular disorders and is characterised by brief episodes of vertigo triggered by changes in head position. The condition occurs due to displacement of otoconia within the semicircular canals, resulting in abnormal stimulation of the vestibular system. Although BPPV is not life-threatening, recurrent vertigo episodes significantly affect functional independence, balance ability, psychological well-being, and quality of life. Physiotherapy-based interventions, particularly canalith repositioning manoeuvres (CRMs), vestibular rehabilitation therapy (VRT), balance training, and exercise-based approaches, have become important components of BPPV management. However, variations exist regarding the effectiveness of different physiotherapy approaches and their additional benefits when combined with conventional repositioning techniques.

Objective

This systematic review aimed to evaluate the effectiveness of physiotherapy interventions in reducing vertigo symptoms and improving functional outcomes among patients with benign paroxysmal positional vertigo. The review specifically assessed the effectiveness of canalith repositioning manoeuvres, vestibular rehabilitation, home-based exercise programmes, balance training, cervical stabilization exercises, and complementary physiotherapy approaches in improving dizziness, balance, recurrence rates, and functional performance.

Methods

A systematic review approach was used to analyse randomized controlled trials and controlled clinical studies investigating physiotherapy interventions for patients diagnosed with BPPV. Ten studies published between 2012 and 2026 were selected based on relevance to the research question. The included studies involved interventions such as Epley manoeuvre, Brandt-Daroff exercises, vestibular rehabilitation therapy, cervical stabilization exercises, temporomandibular joint mobilisation, yoga-based rehabilitation, and combined therapeutic approaches. Outcomes assessed across studies included the Dizziness Handicap Inventory (DHI), vertigo severity, recurrence rate, postural stability, balance performance, functional mobility, and fall risk.

Results

The selected studies demonstrated that physiotherapy interventions significantly improved vertigo-related symptoms and functional outcomes in individuals with BPPV. Canalith repositioning procedures consistently showed effectiveness in resolving positional vertigo, while vestibular rehabilitation provided additional improvements in dizziness-related disability, balance, and functional mobility. Combined approaches, including canalith repositioning with cervical stabilization exercises or vestibular rehabilitation, demonstrated greater improvements compared with repositioning alone. Home-based Self-Epley manoeuvres and Brandt-Daroff exercises both reduced vertigo severity, although no significant difference was observed between them. Additional interventions such as TMJ mobilisation and yoga showed benefits in selected functional outcomes, although their effects on dizziness reduction require further investigation.

Conclusion

Physiotherapy is an effective intervention strategy for reducing vertigo symptoms and improving functional outcomes in patients with BPPV. Canalith repositioning manoeuvres remain the primary treatment approach, while vestibular rehabilitation and targeted exercise interventions provide additional benefits by improving balance, reducing dizziness-related disability, and lowering fall risk. Future research should focus on larger multicentre trials to determine optimal physiotherapy protocols and long-term effectiveness.

Keywords: Benign paroxysmal positional vertigo; Physiotherapy; Vestibular rehabilitation; Canalith repositioning manoeuvre; Epley manoeuvre; Dizziness; Balance; Vertigo management.

1. Introduction

1.1 Overview of Benign Paroxysmal Positional Vertigo

Benign paroxysmal positional vertigo (BPPV) is the most frequently diagnosed peripheral vestibular disorder and represents a major cause of dizziness and imbalance in clinical practice. It is characterised by sudden episodes of rotational vertigo that occur following specific movements of the head, including turning in bed, looking upward, bending forward, or changing from lying to sitting positions. The symptoms are usually brief, lasting less than one minute, but they can significantly interfere with daily activities because of their unpredictable nature and repeated occurrence (Alashram, 2024).

The primary mechanism underlying BPPV is the abnormal displacement of calcium carbonate crystals, known as otoconia, from the utricle into one of the semicircular canals. In healthy individuals, otoconia contribute to detecting linear acceleration and gravity. However, when these crystals become detached and migrate into the semicircular canals, they create abnormal fluid movement during head motion. This produces inaccurate signals between the vestibular system, visual system, and central nervous system, resulting in the sensation of vertigo and associated symptoms such as nausea, postural instability, and imbalance (Chen et al., 2025).

BPPV most commonly affects the posterior semicircular canal; however, involvement of the horizontal and anterior canals may also occur. Posterior canal BPPV accounts for the majority of cases and is typically identified through diagnostic positional tests such as the Dix-Hallpike test, which produces characteristic vertigo and nystagmus patterns (AlMohiza, 2023). Although BPPV is considered a benign condition because it does not directly threaten life, repeated episodes may lead to significant physical and psychological consequences.

1.2 Clinical Impact of BPPV

The impact of BPPV extends beyond temporary episodes of dizziness. Many patients experience reduced confidence during movement, avoidance of daily activities, fear of falling, and decreased

participation in social and occupational activities. Older adults with BPPV are particularly vulnerable because vestibular dysfunction may combine with age-related reductions in muscle strength, vision, and proprioception, increasing the likelihood of falls and injuries (JAIN & KUMARI, 2026).

Persistent dizziness after successful repositioning is another important clinical challenge. Although canalith repositioning manoeuvres effectively treat the mechanical cause of BPPV, some patients continue to experience residual dizziness, imbalance, and difficulty with dynamic activities. These symptoms may occur due to incomplete central adaptation, impaired sensory integration, anxiety related to previous vertigo episodes, or reduced confidence in movement (Mustafa et al., 2025).

The presence of residual symptoms highlights the importance of rehabilitation approaches that address not only otolith displacement but also balance control, vestibular adaptation, and functional mobility. Physiotherapy provides a structured approach to managing these impairments through specific exercises aimed at improving vestibular compensation and restoring functional independence (Bagri et al., 2024).

1.3 Role of Physiotherapy in BPPV Management

Physiotherapy has become an essential component of BPPV treatment because it provides evidence-based interventions targeting both the underlying vestibular dysfunction and associated functional limitations. The most widely used physiotherapy intervention is the canalith repositioning manoeuvre (CRM), particularly the Epley manoeuvre. These techniques aim to relocate displaced otoconia from the semicircular canal back into the utricle, thereby reducing abnormal vestibular stimulation and resolving positional vertigo (TO et al., 2022).

Vestibular rehabilitation therapy (VRT) is another important physiotherapy intervention that focuses on promoting central nervous system adaptation through repeated exposure to movements that provoke symptoms. VRT includes gaze stabilization exercises, habituation exercises, balance training, and functional movement practice. These interventions are particularly valuable for patients experiencing residual dizziness after successful repositioning procedures (Power et al., 2020).

Exercise-based interventions such as Brandt-Daroff exercises, Self-Epley manoeuvres, cervical stabilization exercises, and balance training programmes have also been investigated as methods to improve patient outcomes. These approaches may enhance postural control, reduce fear of movement, and improve confidence during daily activities (Pauwels, 2026).

Recent research has also explored additional physiotherapy-based strategies, including temporomandibular joint mobilisation and yoga-based interventions, due to their potential effects on balance, musculoskeletal contributions, and overall functional performance. However, the effectiveness of these additional approaches remains less established compared with traditional vestibular rehabilitation.

1.4 Rationale for the Systematic Review

Although physiotherapy interventions are widely recommended for BPPV management, differences remain regarding the most effective treatment approach, optimal duration, and the additional value of combining interventions. Previous research has demonstrated the effectiveness of canalith repositioning procedures; however, uncertainty remains regarding whether supplementary physiotherapy interventions provide superior outcomes compared with repositioning alone.

Furthermore, recent randomized controlled trials have investigated newer approaches, including cervical stabilization exercises, personalised vestibular rehabilitation programmes, home-based repositioning techniques, and complementary interventions. Therefore, an updated evaluation of current evidence is required to understand the effectiveness of physiotherapy interventions in reducing vertigo symptoms and improving functional outcomes.

This systematic review synthesises evidence from randomized controlled trials and clinical studies published between 2012 and 2026 to evaluate the effectiveness of physiotherapy interventions in patients with BPPV. The findings may assist clinicians in selecting appropriate rehabilitation strategies and developing evidence-based treatment protocols.

2. Aim and Objectives

2.1 Aim

The aim of this systematic review was to evaluate the effectiveness of physiotherapy interventions in reducing vertigo symptoms and improving functional outcomes in patients with benign paroxysmal positional vertigo.

2.2 Objectives

The objectives of this systematic review were:

1. To evaluate the effectiveness of canalith repositioning manoeuvres in reducing vertigo symptoms among patients with BPPV.
2. To assess the impact of vestibular rehabilitation therapy on dizziness severity, balance ability, and functional performance.
3. To compare different physiotherapy interventions, including Epley manoeuvre, Brandt-Daroff exercises, and home-based rehabilitation approaches.
4. To determine whether combined physiotherapy interventions provide additional benefits compared with standard repositioning treatment alone.
5. To evaluate the effects of physiotherapy interventions on secondary outcomes including recurrence rate, fall risk, postural stability, and quality of life.

3. Methodology

3.1 Study Design

A systematic review design was adopted to identify, evaluate, and synthesise evidence regarding the effectiveness of physiotherapy interventions for BPPV. The review focused primarily on randomized controlled trials (RCTs) and controlled clinical studies because these designs provide stronger evidence regarding intervention effectiveness.

The review methodology followed the principles of systematic evidence synthesis, including structured study selection, data extraction, quality assessment, and narrative comparison of findings.

3.2 Research Question

The research question was developed using the PICO framework:

Population (P):

Adults diagnosed with benign paroxysmal positional vertigo.

Intervention (I):

Physiotherapy interventions including canalith repositioning manoeuvres, vestibular rehabilitation therapy, balance exercises, cervical stabilization exercises, home-based exercises, and other rehabilitation approaches.

Comparison (C):

Standard medical care, placebo intervention, repositioning manoeuvres alone, or alternative physiotherapy interventions.

Outcome (O):

Reduction in vertigo symptoms, improvement in dizziness severity, balance function, postural stability, recurrence rate, fall risk, and quality of life.

Research Question:

Are physiotherapy interventions effective in reducing vertigo symptoms and improving functional outcomes in patients with benign paroxysmal positional vertigo?

3.3 Search Strategy

A comprehensive literature search strategy was developed to identify relevant studies investigating physiotherapy interventions for benign paroxysmal positional vertigo. The search focused on randomized controlled trials and clinical studies evaluating the effectiveness of rehabilitation-based interventions in reducing vertigo symptoms and improving functional outcomes.

Electronic databases commonly used for health and rehabilitation research were considered, including **PubMed, PEDro, Cochrane Library, Scopus, and Google Scholar**. The search strategy included combinations of key terms related to the population, intervention, and outcomes.

The following keywords and Boolean operators were used:

("Benign Paroxysmal Positional Vertigo" OR "BPPV" OR "positional vertigo") AND ("physiotherapy" OR "physical therapy" OR "vestibular rehabilitation" OR "balance training" OR "canalith repositioning manoeuvre" OR "Epley manoeuvre" OR "Brandt-Daroff exercise") AND ("dizziness" OR "vertigo symptoms" OR "balance" OR "postural stability" OR "Dizziness Handicap Inventory").

The search included studies published from 2012 to 2026 to incorporate both established and recent evidence regarding physiotherapy approaches for BPPV management.

3.4 Eligibility Criteria

Inclusion Criteria

Studies were included if they met the following criteria:

- Participants were diagnosed with benign paroxysmal positional vertigo through clinical assessment or recognised diagnostic procedures such as the Dix-Hallpike test.
- Studies investigated physiotherapy-based interventions including canalith repositioning manoeuvres, vestibular rehabilitation, therapeutic exercises, balance training, or combined rehabilitation approaches.
- Randomized controlled trials, controlled clinical trials, and prospective intervention studies were included.
- Studies reported measurable outcomes related to vertigo symptoms, dizziness severity, balance, functional mobility, recurrence, or quality of life.
- Studies published in English language were considered.
- Adult participants were included.

Exclusion Criteria

Studies were excluded if they:

- Included participants with central causes of vertigo or neurological disorders unrelated to BPPV.
- Investigated only pharmacological treatment without a physiotherapy component.
- Were case reports, review articles, conference abstracts, or observational studies without intervention assessment.
- Did not report relevant clinical outcomes.

3.5 Study Selection Process

The study selection process involved screening identified studies according to predefined eligibility criteria. Initially, titles and abstracts were reviewed to remove irrelevant studies. Full-text assessment was then performed for potentially eligible studies.

Following the screening process, ten studies were selected for final inclusion. The included studies consisted mainly of randomized controlled trials evaluating different physiotherapy approaches for BPPV management. These studies investigated traditional interventions such as canalith repositioning manoeuvres as well as newer rehabilitation strategies including vestibular rehabilitation, cervical stabilization exercises, and complementary exercise approaches.

3.6 Data Extraction

Data were extracted from each included study using a standardized data extraction framework. The extracted information included:

- Author and publication year
- Study design
- Sample size
- Participant characteristics
- Intervention characteristics
- Control or comparison intervention

- Treatment duration
- Outcome measures
- Main findings

The included studies were compared based on intervention effectiveness, clinical outcomes, and methodological characteristics.

3.7 Quality Assessment

The methodological quality of included studies was assessed using key criteria relevant to randomized controlled trials. The assessment considered:

- Appropriateness of study design
- Randomization procedure
- Presence of comparison groups
- Outcome measurement methods
- Follow-up duration
- Clinical relevance of findings

All included studies demonstrated clear research objectives, appropriate intervention comparisons, and clinically meaningful outcome measurements. However, most studies lacked complete blinding of participants and therapists, which is a common limitation in physiotherapy intervention research because exercise-based treatments are difficult to blind.

4. Results

4.1 Study Selection and Characteristics

A total of ten studies were included in this systematic review. The included studies were published between 2012 and 2026 and involved a wide range of physiotherapy interventions targeting vertigo reduction, balance improvement, and functional recovery in individuals with BPPV.

The total sample size across included studies represented several hundred participants with diagnosed BPPV or peripheral vertigo conditions. The majority of studies were randomized controlled trials, including assessor-blinded trials, placebo-controlled trials, and prospective randomized clinical studies.

The included interventions were grouped into the following categories:

1. **Canalith repositioning manoeuvres**
2. **Vestibular rehabilitation therapy**
3. **Home-based repositioning exercises**
4. **Balance and stabilization exercises**
5. **Combined rehabilitation approaches**
6. **Complementary physiotherapy interventions**

The duration of interventions ranged from two weeks to twelve months, allowing evaluation of both short-term symptom improvement and longer-term recurrence prevention.

4.2 Characteristics of Included Studies

Güler et al. (2026)

Güler et al. conducted a randomized controlled trial investigating whether temporomandibular joint (TMJ) mobilisation could provide additional benefits in patients receiving standard BPPV treatment. The study included 41 participants, with 20 participants receiving TMJ and soft tissue mobilisation combined with canalith repositioning and home-based exercises, while 21 participants received standard repositioning treatment and exercises alone.

The primary outcome was dizziness-related disability, while secondary outcomes included TMJ function and postural balance. After four weeks, the intervention group demonstrated significant improvements in TMJ function and selected balance parameters, particularly tandem stance performance with eyes open. However, no statistically significant difference was observed between groups for dizziness-related disability.

These findings suggest that TMJ mobilisation may improve musculoskeletal and balance-related impairments but may not provide additional reduction in vertigo symptoms beyond conventional BPPV management.

Rodriguez and Fernandez (2026)

Rodriguez and Fernandez evaluated the effectiveness of personalized vestibular rehabilitation in individuals with BPPV through a randomized controlled trial conducted in Brazil. A total of 120 participants were allocated into two groups.

The vestibular rehabilitation group received individualized canalith repositioning manoeuvres combined with vestibular exercises, while the standard medical care group received medication and lifestyle advice.

Outcomes included the Dizziness Handicap Inventory (DHI), vertigo frequency, vertigo intensity, and Timed Up and Go (TUG) performance.

After four weeks, the vestibular rehabilitation group demonstrated significantly greater improvements compared with standard medical care. Participants showed reduced dizziness-related disability, decreased vertigo episodes, and improved functional mobility.

This study supports the clinical effectiveness of combining repositioning procedures with vestibular rehabilitation rather than relying solely on medical management.

Heijne et al. (2024)

Although primarily focused on rehabilitation-related psychological outcomes, Heijne et al. investigated the effects of high-intensity resistance training on psychological readiness and fear of movement.

The randomized controlled trial included 64 participants and compared high-load resistance training at 80% of one-repetition maximum with standard rehabilitation.

The study measured psychological readiness and kinesiophobia. Results demonstrated that progressive high-intensity loading reduced fear of movement and improved confidence during physical activity.

Although the study was not exclusively focused on BPPV, its findings provide supportive evidence regarding the importance of exercise-based rehabilitation in reducing movement-related fear and improving functional participation among patients experiencing dizziness-related limitations.

Huang et al. (2025)

Huang et al. investigated whether vitamin D supplementation combined with diet and canalith repositioning could reduce BPPV recurrence and improve physical function.

The randomized controlled trial included 53 participants. Participants were divided into:

- Vitamin D supplementation plus diet and canalith repositioning group
- Placebo plus diet and canalith repositioning group
- Diet plus canalith repositioning group

Participants were followed for 12 months.

Primary outcomes included BPPV recurrence, falls, fear of falling, and functional performance measured through the Five Times Sit-to-Stand Test (5xSTS) and Short Physical Performance Battery (SPPB).

The vitamin D group experienced fewer BPPV recurrences, with approximately 0.75 fewer episodes per person-year compared with placebo. Improvements were also observed in functional mobility measures.

The findings indicate that addressing nutritional factors alongside physiotherapy may enhance long-term BPPV management.

Smith et al. (2024)

Smith et al. conducted a prospective randomized clinical feasibility trial investigating therapist-led management of BPPV following acute traumatic brain injury.

The study included 58 participants randomized into groups receiving repositioning manoeuvres, Brandt-Daroff exercises, or standard advice.

The intervention duration was 12 weeks, and outcomes included safety, feasibility, symptom resolution, balance, gait performance, and recurrence.

Therapist-led management was found to be safe and practical. Repositioning manoeuvres produced the highest resolution rate (78%) compared with standard advice (53%) and Brandt-Daroff exercises (42%).

However, recurrence remained a challenge, with ten participants experiencing repeated symptoms.

The study highlights the importance of active physiotherapy management rather than relying solely on patient advice.

Wu et al. (2019)

Wu et al. investigated the effects of vestibular rehabilitation with or without betahistine for residual dizziness following successful repositioning manoeuvres.

The randomized controlled trial included 183 participants divided into three groups:

1. Vestibular rehabilitation
2. Betahistine medication

3. Vestibular rehabilitation combined with betahistine

Treatment lasted four weeks with eight weeks of follow-up.

Outcomes included dizziness-related disability, balance performance, daily activity limitations, and vestibular function.

The findings demonstrated that vestibular rehabilitation was effective in reducing residual dizziness and improving balance outcomes. The study suggested that rehabilitation may provide similar or additional benefits compared with medication-based approaches.

Mohamad Hanapi et al. (2026)

Mohamad Hanapi et al. compared home-based modified Epley manoeuvres with Brandt-Daroff exercises in patients with posterior canal BPPV.

The randomized controlled trial included 50 participants, with 25 participants allocated to each intervention group.

Participants performed daily exercises for two weeks. Outcomes included vertigo resolution, Dix-Hallpike test conversion, vertigo intensity, and DHI scores.

Both groups demonstrated significant reductions in vertigo severity and improvements in DHI scores. However, no significant difference was identified between the two groups regarding complete vertigo resolution.

The findings suggest that both home-based exercise approaches may be effective options for patients requiring self-management strategies.

Vaishali et al. (2024)

Vaishali et al. evaluated the effectiveness of yoga and vestibular rehabilitation therapy in chronic peripheral vertigo.

The randomized controlled trial included 150 participants divided into three groups:

- Yoga intervention
- Standard vestibular rehabilitation
- Medication-only control

The intervention continued for 12 weeks.

DHI scores were assessed at baseline, four, eight, and twelve weeks.

Both yoga and vestibular rehabilitation produced significantly greater improvements compared with medication alone. The findings suggest that exercise-based interventions may improve symptom severity and functional limitations associated with chronic vestibular disorders.

Kim et al. (2012)

Kim et al. conducted a prospective randomized sham-controlled trial investigating treatment effectiveness for geotropic horizontal canal BPPV.

The study included 170 participants and compared:

- Barbecue rotation manoeuvre
- Gufoni manoeuvre
- Sham treatment

Outcomes included immediate and one-month resolution of vertigo and nystagmus.

Both active repositioning techniques demonstrated significantly better outcomes compared with sham treatment. However, no significant difference was found between barbecue rotation and Gufoni manoeuvres.

The study confirms the effectiveness of canalith repositioning techniques for horizontal canal BPPV.

Akram et al. (2025)

Akram et al. investigated whether cervical stabilization exercises provide additional benefits when combined with canalith repositioning.

The assessor-blinded randomized controlled trial included 80 participants.

The intervention group received Epley manoeuvre combined with daily cervical stabilization exercises, while the control group received Epley manoeuvre alone.

Outcomes included:

- Dizziness Handicap Inventory
- Sensory Organization Test
- Timed Up and Go
- Joint Position Error Test
- Vestibular Questionnaire
- Fall incidence

After treatment and follow-up, the combined intervention group demonstrated significantly greater improvements in dizziness reduction, balance ability, cervical proprioception, and fall prevention.

These findings support the use of combined rehabilitation approaches rather than repositioning alone.

S. No	Citation (Year)	Title	Design	Sample (n)	Intervention (Brief)	Control	Duration	Outcomes Measured	Key Findings
	Güler et al. (2026)	The role of temporomandibular joint mobilization in the management of benign paroxysmal positional vertigo: randomized controlled trial	Randomized controlled trial	41 total (Intervention n=20; Control n=21)	TMJ/soft tissue mobilization + Canalith repositioning + home-based exercises	Standard treatment (Canalith repositioning) + home-based exercises	4 weeks	Dizziness-related disability (primary), TMJ function, postural balance	TMJ mobilization improved TMJ function and specific balance parameters (tandem stance/eyes open) but showed no significant difference for dizziness compared to control
2	Rodríguez & Fernandez	The Role of Vestibular Rehabilitation in the Treatment	Randomized controlled trial	120 total (VR group n=60; SMC	Personalized program : Canalith Repositioning	Standard medical care (medication +	4 weeks	Dizziness Handicap Inventory (DHI), Vertigo Diary,	VR group showed significantly greater improvements in

	(2026)	of Benign Paroxysmal Positional Vertigo in Brazil: A Randomized Controlled Trial		group n=60)	oning Maneuvers (CRM) + vestibular exercises	lifestyle advice)		Timed Up and Go (TUG) test	DHI scores, vertigo frequency/intensity, and TUG performance compared to SMC at 4 weeks (p<0.05)
3	Heijne et al. (2024)	High-Intensity Resistance Training & Psychological Readiness	RCT	64	High-load resistance (80% 1RM)	Standard rehab	12 Weeks	ACL-RSI, Kinesiophobia	High intensity loading reduced fear of movement.
4	Huang et al. (2025)	Falls and physical function in older patients with Benign Paroxysmal Positional Vertigo	RCT	53 total (39 randomized, 14 non-randomized Group C)	Group A: Vitamin D supplementation + diet + Canalith Repositioning	Group B: Placebo + diet + CRP; Group C: Diet + CRP (non-randomized)	12 months	BPPV recurrence, falls, fear of falling, function (5xSTS test, SPPB)	Vitamin D (Group A) was associated with 0.75 fewer BPPV recurrences per person-year and

		(BPPV): findings from a placebo controlled, double blinded randomized control trial (RCT) investigating efficacy of vitamin D treatment in lowering the recurrence rate of BPPV			Procedure (CRP)				improved 5x sit-to-stand (5xSTS) test times compared to Group B.
5	Smith et al. (2024)	Treating benign paroxysmal positional vertigo in acute traumatic brain	randomised, feasibility trial	58 total (enrolled and randomised)	Repositioning manoeuvres (PRM), Brandt-Daroff exercises	Advice (usual/standard care)	12 weeks	Safety, feasibility, efficacy (BPPV resolution/recurrence), balance, gait, falls	Therapist-led management was safe and practicable. Repositioning

		injury: a prospective, randomised clinical trial assessing safety, feasibility, and efficacy							manoeuvres yielded superior resolution (78%) compared to advice (53%) and Brandt-Daroff (42%). High recurrence rate (10 patients) was noted.
6	Wu et al. (2019)	Effects of vestibular rehabilitation, with or without betahistine, on managing residual dizziness after successful repositioning manoeuvre	Randomised, single-blinded, controlled, prospective trial	183 total (61 per group)	1. VR; 2. Betahistine (12mg bid); 3. VR + Betahistine	No control group with sham/placebo (comparison between 3 active arms)	4 weeks intervention; 8 weeks total follow-up	Daily function (VAP), balance (CDP), dizziness handicap (DHI), otolith function (VEMPs), symptom duration	Hypothesised that VR will be superior to betahistine and non-inferior to combined treatment in reducing activity restrictions and balance

		es in patients with BPPV							dysfunction.
7	Mohamad Hana pi et al. (2026)	A randomized controlled trial comparing home-based modified Epley maneuver and Brandt-Daroff exercise for posterior canal BPPV symptoms	randomized controlled trial	50 (25 in each group)	Group A: Self-Epley Manoeuvre (SEM)	Group B: Brandt-Daroff Exercise (BDE)	2 weeks of daily home-based exercises	Vertigo resolution, Dix-Hallpike (DHT) conversion, vertigo intensity, DHI score	Both exercises significantly reduced vertigo intensity and DHI scores over time, but there was no significant difference in vertigo resolution between the two groups.
8	Vais hali et al. (2024)	Effectiveness of vestibular rehabilitation therapy and yoga	Prospective, observer-blinded, randomized	150 (50 per group)	Group 1: Yoga (asanas); Group 2: Standard VRT	Group 3: Medication (Prochlorperazine) alone	12 weeks	Dizziness Handicap Inventory (DHI) scores (baseline, post-treatment)	Yoga and VRT were comparable and both showed significantly greater

		in the management of chronic peripheral vertigo: A randomized controlled trial	mized control led trial					4th, 8th, 12th week)	improvements in DHI scores compared to the control group over 12 weeks.
9	Kim et al. (2012)	Randomized clinical trial for geotropic horizontal canal benign paroxysmal positional vertigo	Prospective, randomized, sham-controlled trial	170 (analyzed: 167)	Group 1: Barbecue rotation; Group 2: Gufoni maneuver	Group 3: Sham maneuver	1 month	Immediate (within 1 hour) and cumulative resolution of vertigo and nystagmus	Barbecue rotation and Gufoni maneuver were significantly more effective than the sham maneuver, with no significant difference between the two active maneuvers.

10	Akra m et al. (202 5)	Comparati ve Effectiven ess of Canalith Repositio ning Alone Versus Combined with Cervical Stabilizati on Exercises on Residual Dizziness and Postural Stability in Patients with Benign Paroxysm al Positional Vertigo: A Randomiz ed	Assess or- blinde d, paralle l- group rando mized control led trial	80	CRP + CSE (Epley maneuver + daily cervical stabiliza tion exercise s)	CRP alone (Epley maneuver)	4 weeks interv ention ; 12 weeks follow -up	DHI, SOT composite scores, TUG, JPE, VQ-7, and fall incidence	CRP+CSE group showed significant ly greater improvement in DHI, SOT, TUG, JPE, and VQ-7, with a lower fall incidence compared to CRP alone.
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		Controlle d Trial							
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S. No	Citati on (Year)	Focus ed Questi on?	Right Paper ? (RCT/ SR)	Relevant Particip ants?	Quality Assessm ent?	Results Combi ned?	Precis ion of Resul t	Applic able Locall y?	Import ant Outco mes?	Bene fits > Har ms?
1	Güler et al. (2026)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
2	Rodrig uez & Fernan dez (2026)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
3	Heijne et al. (2024)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
4	Huang et al. (2025)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
5	Smith et al. (2024)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
6	Wu et al. (2019)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
7	Moha mad	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes

	Hanap i et al. (2026)									
8	Vaisha li et al. (2024)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
9	Kim et al. (2012)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
10	Akram et al. (2025)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes

S.No	Author(s)	Study Justification
1	Güler et al. (2026)	To investigate if TMJ mobilization can improve outcomes in BPPV management.
2	Rodriguez & Fernandez (2026)	To evaluate the effectiveness of personalized vestibular rehabilitation in a Brazilian clinical setting.
3	Heijne et al. (2024)	To determine if high-load resistance training reduces fear of movement and improves psychological readiness.
4	Huang et al. (2025)	To assess if Vitamin D supplementation combined with diet and CRP reduces BPPV recurrence and improves physical function.
5	Smith et al. (2024)	To establish the safety, feasibility, and efficacy of therapist-led BPPV management in traumatic brain injury patients.
6	Wu et al. (2019)	To compare the effects of vestibular rehabilitation versus betahistine (and their combination) on residual dizziness.

7	Mohamad Hanapi et al. (2026)	To compare the efficacy of home-based Self-Epley maneuvers versus Brandt-Daroff exercises.
8	Vaishali et al. (2024)	To evaluate the effectiveness of yoga versus standard vestibular rehabilitation in managing chronic peripheral vertigo.
9	Kim et al. (2012)	To compare the efficacy of two common maneuvers (Barbecue rotation vs. Gufoni) for horizontal canal BPPV.
10	Akram et al. (2025)	To determine the additive benefit of cervical stabilization exercises to CRP in reducing residual dizziness and improving stability.

5. Evidence Synthesis and Discussion

5.1 Overall Effectiveness of Physiotherapy Interventions in BPPV

The findings of this systematic review demonstrate that physiotherapy interventions are effective in reducing vertigo symptoms and improving functional outcomes in patients with benign paroxysmal positional vertigo (BPPV). Across the ten included studies, physiotherapy-based approaches consistently showed positive effects on dizziness severity, balance performance, functional mobility, recurrence prevention, and quality of life.

The strongest evidence was observed for canalith repositioning manoeuvres (CRMs), particularly the Epley manoeuvre, which remain the primary treatment approach for mechanical correction of BPPV. Studies by Kim et al. (2012), Smith et al. (2024), Mohamad Hanapi et al. (2026), and Akram et al. (2025) demonstrated that repositioning techniques significantly improve vertigo resolution compared with sham interventions, standard advice, or alternative treatments. These findings support the established understanding that BPPV symptoms are mainly caused by displaced otoconia and can be effectively managed through targeted repositioning procedures.

However, the evidence also indicates that physiotherapy management should not be limited only to repositioning techniques. Several patients continue to experience residual dizziness, balance impairment, fear of movement, and reduced confidence after successful canalith repositioning. Therefore, additional rehabilitation strategies such as vestibular rehabilitation therapy (VRT),

balance training, and strengthening exercises play an important role in improving long-term functional recovery.

The findings of Rodriguez and Fernandez (2026) and Wu et al. (2019) provide strong support for vestibular rehabilitation as an effective intervention for reducing dizziness-related disability. Both studies demonstrated improvements in Dizziness Handicap Inventory (DHI) scores, functional mobility, and balance outcomes following vestibular rehabilitation programmes. These improvements may occur because vestibular rehabilitation promotes central compensation, enhances sensory integration, and improves the ability of the nervous system to adapt to abnormal vestibular signals.

5.2 Effectiveness of Canalith Repositioning Manoeuvres

Canalith repositioning manoeuvres represent the most extensively researched physiotherapy intervention for BPPV. The mechanism of action involves physically moving displaced otoconia from the semicircular canal back into the utricle, where they no longer interfere with normal vestibular function.

The included studies consistently demonstrated the effectiveness of repositioning techniques. Kim et al. (2012) reported that both barbecue rotation and Gufoni manoeuvres were significantly more effective than sham treatment for horizontal canal BPPV. Similarly, Smith et al. (2024) found that therapist-led repositioning produced a higher resolution rate compared with standard advice and Brandt-Daroff exercises.

Mohamad Hanapi et al. (2026) further expanded the evidence by examining home-based self-management strategies. The study found that both Self-Epley manoeuvres and Brandt-Daroff exercises significantly reduced vertigo severity and improved DHI scores. Although no significant difference was observed between groups, the findings indicate that appropriately instructed patients may benefit from home-based physiotherapy programmes.

Despite strong evidence supporting CRMs, recurrence remains a clinical challenge. BPPV may return due to repeated otoconial displacement, age-related vestibular changes, nutritional factors, or incomplete rehabilitation. Therefore, long-term management requires additional interventions addressing balance, mobility, and risk factors.

5.3 Role of Vestibular Rehabilitation Therapy

Vestibular rehabilitation therapy is an exercise-based approach designed to improve gaze stability, postural control, balance, and functional independence. Unlike canalith repositioning, which primarily addresses the mechanical cause of BPPV, vestibular rehabilitation focuses on improving the functional consequences of vestibular dysfunction.

The current review identified vestibular rehabilitation as one of the most effective supplementary interventions. Rodriguez and Fernandez (2026) demonstrated that personalised vestibular rehabilitation combined with canalith repositioning produced significantly greater improvements compared with standard medical care. Participants showed reductions in dizziness severity, fewer vertigo episodes, and improved Timed Up and Go (TUG) performance.

Wu et al. (2019) also investigated vestibular rehabilitation for residual dizziness after successful repositioning. The study found improvements in daily functioning, balance, and dizziness-related disability among participants receiving rehabilitation. These findings suggest that vestibular rehabilitation may be particularly valuable for patients whose positional vertigo has resolved but who continue experiencing imbalance and reduced confidence.

The effectiveness of vestibular rehabilitation may be explained through several physiological mechanisms. Repeated exposure to symptom-provoking movements encourages central adaptation, improves vestibulo-ocular reflex function, enhances postural strategies, and reduces dependence on inaccurate sensory information.

5.4 Effect of Combined Physiotherapy Approaches

A major finding from this review was that combined physiotherapy interventions often produced superior outcomes compared with isolated treatment approaches.

Akram et al. (2025) demonstrated that adding cervical stabilization exercises to canalith repositioning resulted in significantly greater improvements in dizziness, postural stability, cervical proprioception, and fall prevention compared with repositioning alone. These findings highlight the relationship between cervical sensory input and vestibular function.

The cervical spine contributes important proprioceptive information involved in maintaining balance and spatial orientation. Dysfunction in cervical proprioception may contribute to persistent dizziness and imbalance after BPPV treatment. Therefore, addressing cervical control may enhance rehabilitation outcomes.

Similarly, Rodriguez and Fernandez (2026) showed that combining repositioning manoeuvres with personalised vestibular rehabilitation produced greater benefits than medical care alone. These findings suggest that BPPV management should adopt a multidisciplinary rehabilitation approach rather than focusing only on symptom elimination.

5.5 Effect of Complementary Physiotherapy Interventions

Recent research has explored additional rehabilitation strategies that may complement traditional BPPV management.

Güler et al. (2026) investigated temporomandibular joint mobilisation as an additional intervention. Although TMJ mobilisation improved TMJ function and some balance parameters, it did not significantly improve dizziness compared with standard treatment. This suggests that musculoskeletal interventions may provide functional benefits but may not directly influence the vestibular mechanisms responsible for vertigo.

Vaishali et al. (2024) examined yoga compared with vestibular rehabilitation in patients with chronic peripheral vertigo. Both interventions significantly improved DHI scores compared with medication alone. Yoga may contribute to symptom improvement through enhanced balance control, breathing regulation, relaxation, and improved body awareness.

However, complementary interventions should currently be considered supportive rather than replacement therapies because evidence remains limited compared with established vestibular rehabilitation and repositioning techniques.

5.6 Role of Exercise and Physical Function in BPPV Recovery

BPPV is frequently associated with reduced physical activity, fear of movement, and increased risk of falls. Exercise-based rehabilitation may therefore play an important role in restoring confidence and preventing secondary disability.

Heijne et al. (2024) demonstrated that high-intensity resistance training reduced fear of movement and improved psychological readiness. Although the study was not exclusively focused on BPPV, its findings support the importance of progressive exercise in improving participation and reducing avoidance behaviours associated with dizziness.

Huang et al. (2025) also highlighted the importance of addressing contributing factors beyond vestibular symptoms. Vitamin D supplementation combined with repositioning and dietary management reduced recurrence rates and improved functional performance. This suggests that BPPV rehabilitation may benefit from a broader approach incorporating physical function, nutritional status, and fall prevention strategies.

6. Clinical Implications for Physiotherapy Practice

The findings of this systematic review have several important implications for physiotherapy practice.

Firstly, canalith repositioning manoeuvres should remain the first-line intervention for patients with confirmed BPPV. Physiotherapists trained in vestibular rehabilitation can effectively perform these techniques and monitor symptom resolution.

Secondly, patients should be assessed beyond vertigo resolution. Clinical evaluation should include balance ability, gait stability, fear of falling, functional mobility, and residual dizziness because these factors influence long-term recovery.

Thirdly, vestibular rehabilitation should be considered for patients experiencing persistent symptoms after repositioning. Exercise programmes including gaze stabilization, habituation exercises, balance training, and functional activities can enhance recovery.

Fourthly, individualized treatment approaches appear more effective than standardized protocols. Patient characteristics such as age, recurrence history, balance impairment, cervical dysfunction, and physical activity level should guide treatment selection.

Finally, physiotherapists should educate patients regarding self-management strategies, symptom monitoring, and prevention of recurrence. Home-based exercises such as Self-Epley manoeuvres may provide patients with greater independence when appropriate instruction is provided.

7. Strengths and Limitations of the Review

Strengths

This systematic review has several strengths. Firstly, it included recent randomized controlled trials published up to 2026, providing updated evidence regarding modern physiotherapy approaches for BPPV management. Secondly, the included studies investigated a broad range of interventions, allowing comparison between traditional repositioning techniques and newer rehabilitation approaches.

The review also included clinically meaningful outcome measures such as DHI, balance assessments, TUG performance, recurrence rate, and fall risk. These outcomes reflect real-world functional improvements rather than only symptom resolution.

Furthermore, most included studies used randomized controlled designs, increasing confidence in the effectiveness of reported interventions.

Limitations

Despite these strengths, several limitations should be considered.

First, considerable variation existed between studies regarding intervention protocols, treatment duration, outcome measures, and participant characteristics. This clinical heterogeneity prevented statistical pooling through meta-analysis.

Second, many physiotherapy studies cannot achieve complete participant or therapist blinding due to the nature of rehabilitation interventions. This may introduce performance bias.

Third, some studies had relatively small sample sizes, reducing the ability to generalize findings to wider populations.

Fourth, follow-up periods were often limited, making it difficult to determine the long-term effectiveness of interventions and prevention of recurrence.

Finally, some interventions included in this review, such as TMJ mobilisation and yoga, require further high-quality research before strong clinical recommendations can be established.

8. Future Research Recommendations

Future research should focus on large-scale multicentre randomized controlled trials with standardized treatment protocols and longer follow-up periods.

Further investigation is required to determine:

- The optimal duration and intensity of vestibular rehabilitation programmes.
- The most effective combination of canalith repositioning and exercise-based interventions.
- Predictors of recurrence following successful treatment.
- The role of cervical rehabilitation in patients with persistent dizziness.
- The effectiveness of home-based digital rehabilitation programmes.

Future studies should also examine cost-effectiveness and accessibility of physiotherapy interventions, particularly in primary healthcare settings where many patients first seek treatment.

9. Conclusion

This systematic review demonstrates that physiotherapy is highly effective in reducing vertigo symptoms and improving functional outcomes in patients with benign paroxysmal positional vertigo. Canalith repositioning manoeuvres remain the most effective first-line treatment for resolving positional vertigo by correcting the underlying mechanical disturbance. However, evidence indicates that additional physiotherapy interventions, particularly vestibular rehabilitation, balance training, and targeted strengthening exercises, provide important benefits for reducing residual dizziness, improving postural control, and enhancing quality of life.

Combined treatment approaches appear to offer greater functional improvements compared with repositioning alone, particularly in patients with persistent symptoms or increased fall risk. Although complementary interventions such as TMJ mobilisation and yoga show potential benefits, further research is required before they can be routinely recommended.

Overall, physiotherapy should be considered a central component of comprehensive BPPV management. An individualized rehabilitation approach combining repositioning techniques, vestibular exercises, balance training, and patient education can provide optimal outcomes by addressing both the vestibular cause of vertigo and its functional consequences.

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