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THE EFFICACY OF EPLEY MANEUVER IN TREATING BENIGN PAROXYSMAL POSITIONAL VERTIGO

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ABSTRACT

Benign paroxysmal positional vertigo (BPPV) constitutes the most common cause of peripheral vertigo, significantly reducing patients' quality of life. The Epley maneuver is considered the gold standard treatmen, though its effectiveness depends on many factors, and recurrences remain a significant clinical problem.

Objective: Systematic evaluation of the effectiveness of the Epley maneuver in treating BPPV based on current literature, including factors influencing treatment efficacy and recurrence rates.

Materials and methods: A systematic review was conducted according to PRISMA guidelines. We analyzed 32 studies (including 17 RCTs, 5 meta-analyses and 10 cohort studies) from 1990-2025, identified in PubMed, Cochrane Library and Embase databases. Inclusion criteria comprised: confirmed BPPV diagnosis, use of the Epley maneuver, and efficacy assessment. Case reports and studies without control groups were excluded.

Results: The average effectiveness of the Epley maneuver is 85-90% after the first session for posterior canal BPPV [7,13]. Factors reducing effectiveness: age >65 years (70% vs 90%; $p<0.05$) [3], delayed treatment (>7 days: 75% vs 90%; $p<0.01$) [6,15], coexisting diabetes/migraine [15,16]. Recurrences occur in 30-50% of patients within one year [17,18]. Technique modifications (e.g., changed rotation angle) increase effectiveness to 95% ($p=0.04$) [14].

Conclusions: The Epley maneuver remains a highly effective method for treating BPPV, but requires individualization in elderly patients and those with comorbidities. Further research is needed on strategies to reduce recurrences and standardize protocols.

KEYWORDS

BPPV, Peripheral Vertigo, The Epley Maneuver

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Introduction

Benign paroxysmal positional vertigo (BPPV, benign paroxysmal positional vertigo) represents one of the most common causes of peripheral-origin vertigo [1,2]. This condition occurs in approximately 2.4% of the general population [2], with increasing incidence among elderly individuals [3], making it a significant health and social issue.

BPPV results from displaced otoconia (calcium carbonate crystals) migrating from the utricular macula to the semicircular canals [6,7], leading to abnormal vestibular responses to head position changes. Symptoms are paroxysmal, featuring sudden vertigo episodes lasting seconds to minutes [1,6], often accompanied by nausea (rarely vomiting), and are typically triggered by specific head movements.

Although not life-threatening, BPPV substantially impacts quality of life by causing anxiety about symptom recurrence, activity limitations, and increased fall risk [1,17].

BPPV treatment includes both pharmacological (e.g., betahistine) and non-pharmacological approaches. Among non-pharmacological methods, repositioning maneuvers are most effective [1,12], with the Epley maneuver being the most commonly used and best-documented [7,12].

The objective of this review is to evaluate the efficacy of the Epley maneuver in BPPV treatment based on available scientific literature [1,12], including randomized controlled trials, systematic reviews and meta-analyses, while considering pathophysiology, diagnostic methods, and factors influencing treatment efficacy.

Pathophysiology and Diagnosis of BPPV

BPPV is caused by displacement of otoconia (calcium carbonate crystals) from the utricle into the lumen of the semicircular canal [6,7], most commonly the posterior canal, resulting in abnormal stimulation of vestibular receptors during head movement. There are two main pathophysiological hypotheses: canalithiasis,

where otoconia move freely within the canal lumen, and cupulolithiasis, where otoconia adhere to the cupula of the canal [6,7,19].

The etiology is most often idiopathic, though research shows that inner ear disorders such as Ménière's disease, as well as migraine, may predispose to its occurrence [16]. Other risk factors include head trauma and inner ear surgeries [1,9].

Diagnosis of BPPV relies primarily on detailed medical history and provocative tests. The key diagnostic tool is the Dix-Hallpike test [1,5], which induces characteristic nystagmus and vertigo by rapidly moving the patient from sitting to supine position with the head rotated 45° and extended 20-30° backward. For suspected horizontal canal BPPV, the rotational Roll test is used [5,19], involving rapid 90° head turns while supine, which provokes horizontal nystagmus and vertigo. Differential diagnosis should consider other causes of vertigo, including Ménière's disease, vestibular neuritis, and central disorders [1,2].

The Epley Maneuver - Description of Technique

The Epley maneuver, first proposed in 1992 by John Epley [7], is a repositioning procedure designed to move otoconia from the semicircular canal back to the utricle.

It consists of a series of head and body movements performed in specific positions to utilize gravity. The procedure begins with the Dix-Hallpike test, followed by rotating the patient's head to the opposite side, then moving the body to a side-lying position, and finally returning to sitting. The maneuver may be repeated several times in a single session.

The literature describes modifications including self-administered versions and the use of assistive devices [14,21]. Based on available data, we can state that the Epley maneuver remains the most effective treatment for posterior canal BPPV, achieving 80-90% efficacy after just one session [7,13]. The Semont maneuver, while somewhat less effective, also shows high efficacy - averaging 70-85%, particularly in cases with limited cervical spine mobility [8]. In contrast, Brandt-Daroff exercises demonstrate lower short-term efficacy (approximately 50-70%), but may be useful as adjunctive therapy or for chronic BPPV cases [10]. Meta-analyses and comparative studies suggest the Epley maneuver provides faster symptom resolution, though all three methods are well-tolerated and can be effectively used according to individual patient needs.

Study	Design	Efficacy	Recurrence
Saishoji (2023)	Meta-analysis	89%	22% [13]
Chen (2023)	RCT	85%*	18% [14]

A Review of Scientific Studies

A meta-analysis by Saishoji et al. (2023) involving 27 randomized controlled trials demonstrated that the Epley maneuver significantly increased the probability of symptom resolution compared to control groups, both in specialist and primary care settings, particularly in the latter group (RR = 3.14; 95% CI: 1.96-5.02) [13]. This meta-analysis also emphasized that the maneuver's effectiveness does not significantly depend on the therapist's experience, making it a valuable tool in daily clinical practice.

The study by Chen et al. (2023) compared the traditional Epley maneuver with a modified version incorporating subtle changes in head position and movement speed to optimize otolith movement [14]. Results showed the modified maneuver was more effective after single application - achieving symptom resolution in 85% of patients versus 63% with the standard maneuver ($p = 0.040$). This indicates that appropriate technical modifications can enhance treatment effectiveness, particularly for refractory or recurrent cases.

Alsolamy et al. (2025) evaluated combining the Epley maneuver with betahistine [22]. Although their systematic review included fewer studies (7 RCTs), the authors noted that patients receiving both interventions reported faster symptom resolution and lower short-term recurrence risk. However, due to methodological limitations and population variability, they emphasized the need for larger, better-controlled studies to definitively assess this combination's efficacy.

Factors Influencing Treatment Efficacy

The effectiveness of the Epley maneuver in treating BPPV depends not only on the technique used but also on various clinical and demographic factors. Age is particularly important, especially above 65-70 years [3]. Studies indicate that repositioning maneuvers may be less effective due to degenerative changes in the inner ear with aging - including hair cell loss, decreased labyrinth elasticity, and impaired semicircular canal function - which may weaken the treatment response. Additionally, movement limitations, such as those from degenerative joint disease, may hinder proper maneuver execution. Faralli et al. showed that in patients over 65 years, single-maneuver efficacy was approximately 70% versus over 90% in younger patients [3]. This suggests the need for individualized approaches in elderly patients, potentially requiring repeated maneuvers or additional therapeutic strategies.

Time from symptom onset to treatment initiation is another crucial factor influencing therapeutic success. Von Brevern et al. demonstrated that patients treated within 7 days of symptom onset had significantly higher treatment efficacy compared to those treated later, particularly when the maneuver was performed more than 14 days after symptom onset (90% vs 75%) [6]. With prolonged symptoms, maladaptive central compensatory mechanisms may develop, potentially weakening the response to repositioning maneuvers.

Comorbid conditions can significantly influence patient response to repositioning maneuvers. Diabetic patients often exhibit microangiopathy and polyneuropathy that impair vestibular function. Johkura et al. reported that Epley maneuver efficacy was approximately 30% lower in diabetic patients compared to controls [15]. Migraine patients show increased BPPV recurrence rates and reduced treatment efficacy, possibly related to central nervous system hypersensitivity [16].

Limitations and Controversies

Despite well-documented high efficacy of the Epley maneuver in treating benign paroxysmal positional vertigo (BPPV), its use is not without limitations. One major issue is the high recurrence rate. According to meta-analyses and prospective studies, BPPV recurs in 15% to 50% of patients within the first year after successful Epley maneuver treatment [17,18].

Pérez et al. found that 43% of patients experienced symptom recurrence within 12 months after treatment completion [17]. The authors emphasize that recurrence risk is influenced by multiple factors including comorbidities, patient age, and previous BPPV episodes. Additionally, some cases involve canal conversion, requiring therapeutic protocol modifications [19].

Another significant limitation is poor BPPV awareness among both patients and some healthcare providers, particularly in primary care. This leads to diagnostic delays and suboptimal treatment. Studies by Oghalai et al. showed that fewer than 20% of BPPV patients receive correct diagnoses during their first medical consultation [20].

Lack of standardization in performing repositioning maneuvers remains problematic. Variations in technique, duration of individual maneuver stages, number of repetitions, and use of post-procedure positional restrictions contribute to inconsistent therapeutic outcomes. Although many guidelines, such as those from the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS), don't recommend routine post-maneuver restrictions, some clinicians still advise them - creating discrepancies in clinical practice [1,21].

Conclusions

The Epley maneuver remains the gold standard for treating posterior canal BPPV, with 80-90% efficacy after a single session, as confirmed by randomized clinical trials and meta-analyses. Its effectiveness is reduced in elderly patients and those with comorbidities (diabetes, migraine), while early intervention (<7 days after symptom onset) increases success rates. Despite high efficacy, recurrences occur in 15-50% of patients within one year, highlighting the need for further research on optimizing treatment protocols and preventing recurrences. Controversies remain regarding technique standardization and the role of adjunctive pharmacotherapy (e.g., betahistine), requiring further investigation.

In preparing this work, the authors used DeepSeek for the for retrieving relevant studies and improving linguistic clarity in early drafts. After using this service, the authors have reviewed and edited the content as needed and accept full responsibility for the substantive content of the publication.

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