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Rukshana Nihmath S
Department of Physiotherapy, College of Physiotherapy, Sri Ramakrishna Institute of Paramedical Science, Coimbatore, Tamil Nadu, India

R Porkodi
Department of Physiotherapy (Neurology), College of Physiotherapy, Sri Ramakrishna Institute of Paramedical Science, Coimbatore, Tamil Nadu, India

Corresponding Author:
Rukshana Nihmath S
Department of Physiotherapy, College of Physiotherapy, Sri Ramakrishna Institute of Paramedical Science, Coimbatore, Tamil Nadu, India

Mechanistic difference between Canalith repositioning maneuver versus Brandt Daroff exercise in managing benign paroxysmal positional vertigo

Rukshana Nihmath S and R Porkodi

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Abstract
Benign Paroxysmal Positional Vertigo (BPPV) is the most common peripheral vestibular disorder, characterized by brief episodes of dizziness triggered by head movements. Among the commonly used vestibular rehabilitation techniques, the Canalith Repositioning Procedure (CRP) and Brandt-Daroff Exercises (BDE) are widely practiced, yet limited studies directly compare their relative effectiveness.

Keywords: Benign Paroxysmal Positional Vertigo (BPPV), Canalith Repositioning Procedure (CRP), Brandt-Daroff Exercise (BDE), vestibular rehabilitation, Dizziness Handicap Inventory (DHI), Timed Up and Go Test (TUG), balance, vertigo management

Introduction

Vertigo is the false perception of movement due to disruption in vestibulocortical activity, often triggered by head position changes such as rolling in bed or bending forward [1-4]. Benign Paroxysmal Positional Vertigo (BPPV) is the most common peripheral vestibular disorder and a frequent cause of dizziness [5]. Its annual incidence ranges from 64 to 107 per 100,000, with women affected twice as often as men [6-8].

BPPV is usually unilateral (85% of cases), while bilateral involvement is rare and often trauma-related [1]. Most cases are idiopathic, linked to age-related macular degeneration, though secondary causes include otoconial dislodgement, vestibular neuritis, infections, or surgical interventions [3-9]. The condition arises from canalithiasis or cupulolithiasis affecting the semicircular canals, with posterior canal BPPV being most prevalent and diagnosed using the Dix–Hallpike test [10-13, 15-16].

Treatment focuses on vestibular rehabilitation maneuvers, which reposition or disperse otolithic debris and significantly improve recovery when combined with patient education [2, 6, 7, L 11]

2.1 Materials Required

- Consent form.
- Assessment form.
- Pen, pencil.
- Stopwatch.
- Couch/ plinth.
- Pillow.

2.2 Study Setting

Sri Ramakrishna Multi specialty Hospital

2.3 Study Design

Quasi-experimental study

2.4 Sample Size

30 subjects (15 patients in group A and B).

2.5 Sampling Method
Purposive sampling

2.6 Study Duration
One year

2.7 Treatment Duration
20 minutes

2.8 Selection Criteria
Inclusion Criteria
- Age group- 35 to 45 years
- Both genders are included in the study
- Dix-Hall pike test positive.
- Patient with unilateral posterior canal BPPV
- Patient with recurrent episodes of vertigo
- DHI scale: 36-52 (Moderate Handicap)

Exclusion Criteria
- Multiple canals BPPV
- Patient with other canal BPPV
- Cervical pathology
- Other vestibular conditions are: Acoustic neuroma, Vestibular neuritis.
- Migraine related dizziness and anxiety disorder.
- Uncooperative patients

2.9 OUTCOME MEASURES
- Dizziness Handicap inventory (DHI) scale-Dizziness
- Timed Up and Go test (TUG) - Balance

2.10 Measurement Tool
- Dizziness Handicap inventory (DHI) scale-Dizziness
- Timed Up and Go test (TUG) - Balance

2.11 Procedure
Thirty patients diagnosed with posterior canal BPPV were recruited from the Neuro Rehabilitation Department, Sri Ramakrishna Multi-Speciality Hospital, Coimbatore. Participants were randomly allocated into two groups (n=15 each): Group A received the Canalith Repositioning Procedure (CRP) and Group B the Brandt-Daroff Exercise (BDE). Interventions were given for 10 minutes per session, three times per week, over three weeks.
Dizziness and balance were assessed before and after intervention using the Dizziness Handicap Inventory (DHI) and the Timed Up and Go Test (TUG). CRP consisted of sequential head–body repositioning maneuvers to relocate otolithic debris, whereas BDE involved repeated positional exercises to habituate vertigo symptoms.

2.12 Treatment Techniques
(a) Canalith Repositioning Procedure
Step 1
The patient is placed in an upright sitting position with eyes open, and the head is turned 45° toward the affected side ear.

Step 2
The patient is then quickly laid back to a position with the head extended below the shoulders, hanging 20-30 degrees off the end of the examination table. If BPPV is present, nystagmus usually ensues within seconds. The patient is held in the affected side head-hanging position for 30 seconds.

Step 3
The patient's head is then turned 90° toward the unaffected side, and the patient remains in this position for 30 seconds.

Step 4
The patient's head is further turned an additional 90° to the unaffected side, while the patient rotates their body 90° in the same direction, positioning the head almost in a face-down position. The patient remains in this position for 30 seconds.

Step 5
Finally, the patient sits up on the unaffected side of the examination table. Each Step illustrates the movement of particles within the labyrinth, demonstrating how particles are transferred from the semi-circular canal to the vestibule.

(b) Brandt Daroff Exercise
Position 1
Sitting comfortably sideways on, in the middle of your bed, turn your head 45 degrees to one side.

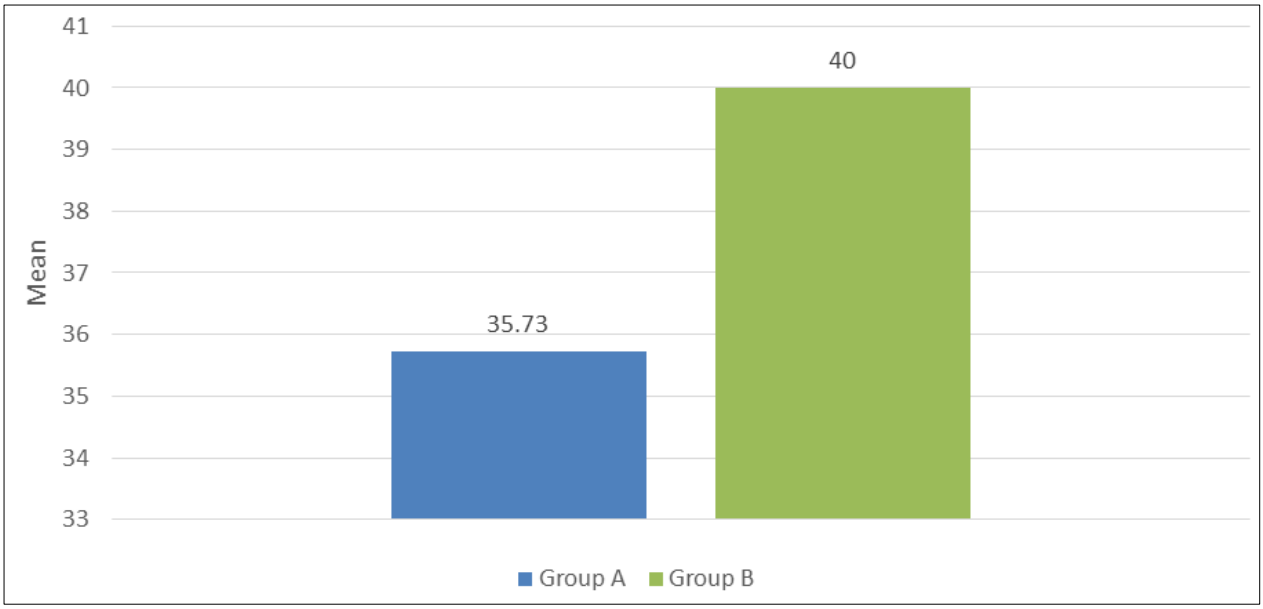
Position 2
Keeping yor head 45 degrees to one side, lie down sideways on the bed in the opposite direction to the way your head is turned. For example, if your head is turned to the left then lie down onto your right side.
This movement may provoke a brief sensation of dizziness or vertigo. Stay in this position for 30 seconds or until the dizziness has passed if this is longer.

Position 3
Return to the sitting position, staying there for 30 seconds.

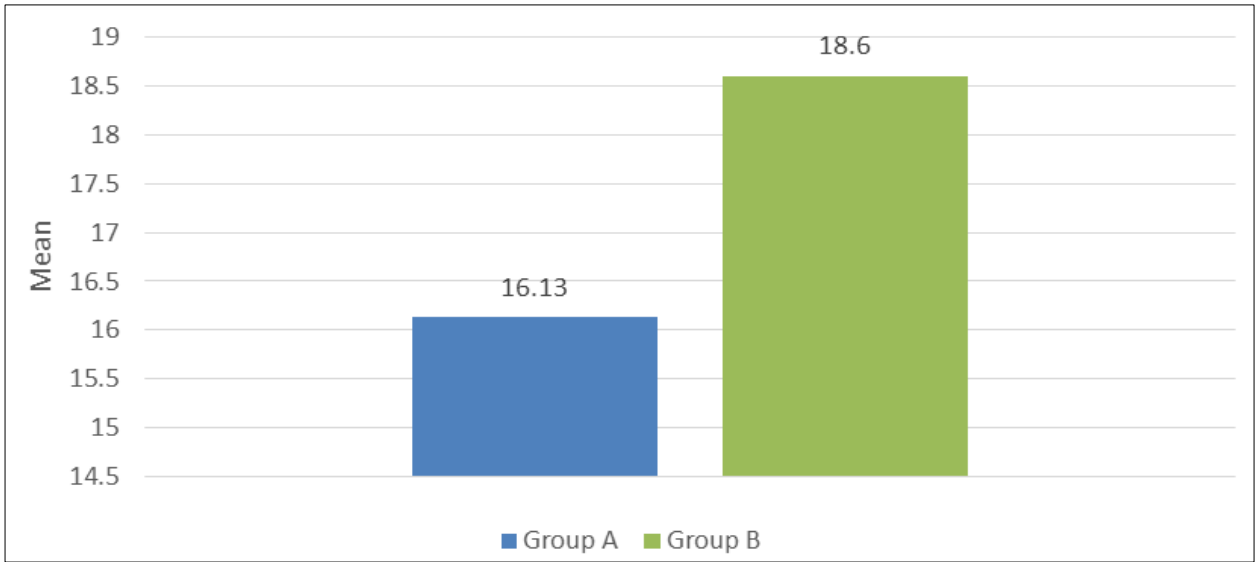
Position 4
Turn your head 45 degrees in the opposite direction to previously and go through the same routine but to the other side. This means keeping your head turned 45 degrees to one side and lying down sideways on the bed to the side opposite to the way your head is turned. For example, if your head is turned to the right then lie down onto your left side.
Again, this movement may provoke a brief sensation of dizziness. Stay in this position for 30 seconds or until the dizziness has passed if this is longer.
Return to the sitting position (position 1), staying there for 30 seconds.
On completion of your set of exercises ensure you stay sitting on the side of your bed until any dizziness has passed and you feel safe to stand up.

3. Results
Both groups showed significant improvement in dizziness (DHI) and balance (TUG) after intervention. Paired *t*-test values confirmed significant within-group changes, while unpaired *t*-tests showed that Group B (Canalith Repositioning Procedure) achieved greater reduction in dizziness ($t = 2.225$) and better balance improvement ($t = 2.547$) compared to Group A (Brandt–Daroff exercise).

Comparison of Values



Graph 1: dizziness handicap inventory



Graph 2: time up and go test

4. Discussion

This study aimed to compare the effectiveness of the Canalith Repositioning Procedure (CRP) and Brandt-Daroff Exercises in patients with BPPV. Thirty patients meeting specific inclusion and exclusion criteria were randomly assigned into two groups: Group A (CRP, n=15) and Group B (Brandt-Daroff Exercises, n=15). Interventions were administered three times per week for three weeks. Participants underwent pre- and post-test assessments using the Dizziness Handicap Inventory (DHI) and the Timed Up and Go Test (TUG).

Both groups showed statistically significant improvements in reducing dizziness and enhancing functional status. However, Group A (CRP) demonstrated superior outcomes compared to Group B. Independent *t*-test analysis revealed *t* values of 4.380 (CRP) and 5.237 (Brandt-Daroff), both exceeding the table value, confirming a significant difference between interventions.

The findings suggest that while both approaches are beneficial, CRP is more effective in symptom reduction and functional recovery for patients with BPPV.

5. Conclusion

The study concluded that the combination of the Canalith Repositioning Procedure is effective in reducing dizziness in patients with posterior canal benign paroxysmal positional vertigo (BPPV). The findings support the consideration of this integrated approach as a valuable therapeutic option for managing the symptoms associated with posterior canal BPPV.

Hence, the null hypothesis is rejected, and the alternate hypothesis is accepted, which states that there is a significant difference between the Canalith Repositioning Procedure and the Brandt-Daroff Exercises in managing symptoms and improving functional status in individuals with BPPV.

References

1. Herdman SJ, Clendaniel RA. Vestibular Rehabilitation. 4th ed. Philadelphia: F.A. Davis; 2014.
2. Ballve Moreno JL, Carrillo Munoz R. Effectiveness of the Epley maneuver in posterior canal BPPV: a RCT in primary care. Br Gen Pract. 2019 Jan.
3. Supramin N, Indirani. Effectiveness of vertigo rehabilitation exercise, dizziness and balance disorders in elderly: narrative review. J Kesehatan Mesencephalon. 2022 Apr;8(1)
4. Furman JM, Cass SP, *et al*. Benign paroxysmal positional vertigo. N Engl J Med. 2003 Dec 4;349(23):2176-2183.
5. Radtke A, von Brevern M, Tiel-Wilck K, *et al*. Self-treatment of benign paroxysmal positional vertigo: Semont maneuver vs Epley procedure. Neurology. 2004.
6. Concha-Cisternas Y, Guzman-Munoz E. Vestibular rehabilitation therapy in elderly with Benign Paroxysmal Positional Vertigo. MOJ Gerontol Geriatr. 2020;5(1).
7. Cetin YS, Ozmen OA. Comparison of Brandt-Daroff vestibular training and Epley maneuver in Benign Paroxysmal Positional Vertigo: long-term randomized clinical trial. Pak J Med Sci. 2018 May-Jun;34(3).
8. Heydari M, Ahadi M. Effect of vestibular rehabilitation on residual dizziness after modified Epley procedure for posterior canal Benign Paroxysmal Positional Vertigo. Am J Audiol. 2021 Sep;30:535-543.
9. You P, Instrum R, Parnes L, *et al*. Benign Paroxysmal Positional Vertigo. 2019 Feb.
10. Lotfi Y, Javanbakht M. Modified clinical test of sensory interaction on balance to assess Epley maneuver effectiveness in Benign Paroxysmal Positional Vertigo. Aud Vestib Res. 2018;27(1):12-18.
11. Hosein Abadi R, Pourbakht A. Effects of vestibular rehabilitation on Benign Paroxysmal Positional Vertigo recurrence in otolith dysfunction patients. J Audiol Otol. 2018;22(4):204-208.
12. Heydari M, Ahadi M. Effect of vestibular rehabilitation on residual dizziness after modified Epley for posterior canal Benign Paroxysmal Positional Vertigo. Am J Audiol. 2021 Sep;30:535-543.
13. Swain SK, Behera IC. Prevalence of BPPV: experience at tertiary care hospital, India. EJENTAS. 2018;[volume(issue)]:5246-1040.
14. Han D, Yang C, Yu H, Ha M, Son Y, *et al*. Effect of Brandt-Daroff exercise on vestibular organ in women with vertigo. 2012 Jan
15. Almohiza MA. Effects of Epley procedure on BPPV patients: systematic review of RCTs. Eur Rev Med Pharmacol Sci. 2023;27:7409-7415.
16. Figueredo Ribeiro K, Steffeni Oliveira B. Effectiveness of otolith repositioning maneuvers and vestibular rehabilitation in elderly with Benign Paroxysmal Positional Vertigo: systematic review. Braz J Otorhinolaryngol. 2018;84(1):109-118.