

A Study On the Effectiveness of Epley's Canalith Repositioning Maneuver on Dizziness and Activities of Daily Living among Benign Paroxysmal Positional Vertigo (BPPV) Patients

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Abstract; A Study on the Effectiveness of Epley's Canalith Repositioning Maneuver On Dizziness and Activities of Daily Living Among Benign Paroxysmal Positional Vertigo (Bppv) Patients.

➤ **Objective:**

Research to ascertain the effectiveness of Epley's Canalith Repositioning Maneuver on dizziness and activities of daily living in BPPV patients.

➤ **Design:**

Pre and post-test experimental study design is adopted.

➤ **Setting:**

The site of the study was R.V.S College of Physiotherapy, Sulur, Coimbatore. 10 BPPV patients aged 50 to 60 years with dizziness and difficulty in activities of daily living were selected. Epley's Canalith Repositioning Maneuver was given to treat them, thrice in a week for 4 weeks.

➤ **Results:**

When comparing the mean values of pre and post-test values, more changes in dizziness and activities of daily living were observed in the patients treated with Epley's Canalith Repositioning Maneuver.

➤ **Conclusions:**

The Epley's Canalith Repositioning Maneuver Is Found to be More Effective in Lowering Dizziness and Enhancing Activities of Daily Living for Patients with BPPV.

Keywords: Benign Paroxysmal Positional Vertigo, Epley's Canalith Repositioning Maneuver, Dizziness, Activities of Daily Living.

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I. INTRODUCTION

Benign paroxysmal positional vertigo (BPPV) represents the predominant issue affecting the vestibular system within thinner ear, which is not life-threatening nor fatal. BPPV produces a sensation of spinning called vertigo that is both paroxysmal and positional, that it occurs suddenly and with a sudden movement of the head ^[19].

Benign paroxysmal positional vertigo (BPPV) is a condition related to mechanical issues within the inner ear. This phenomenon occurs as a result of the displacement of calcium carbonate crystals, known as otoliths, typically found within the vestibular apparatus, into the semicircular canals located in the inner ear. The accumulation of these crystals within the canals disrupts the normal flow of endolymph fluid, which is essential for detecting head movements, ultimately leading to the generation of erroneous signals from the ear to the brain. In a state of rest, the gravitational force causes the otoliths to aggregate and settle. Conversely, during head movements, these crystals shift, prompting the cupula to transmit misleading signals to the brain, consequently manifesting as vertigo and nystagmus, characterized by involuntary eye movements ^[2].

The canalith repositioning procedure (CRP) is the preferred therapeutic intervention for benign paroxysmal positional vertigo (BPPV). The most widely recognized and efficacious CRP is the Epley maneuver, which encompasses a series of head maneuvers aimed at alleviating vertigo symptoms. This maneuver is a cost-effective, secure, and successful approach for managing BPPV. It necessitates minimal resources and serves as a straightforward bedside remedy for BPPV, regardless of the clinical setting ^[15].

After the Dix-Hallpike maneuver, the Epley's canalith repositioning maneuver is used to determine the troublesome side. By releasing otoconia from the otolithic membrane and reintroducing them into the utricle, this series of rotational siffs helps to eradicate the disturbance and its accompanying symptoms. This technique reduces vertigo by facilitating the movement of free-floating particles called displaced otoconia from the injured semicircular canal to the utricle, where they cease triggering the cupula ^[10].

II. METHODOLOGY

➤ Study setting

The study setting was conducted in RVS college of physiotherapy -out patient department.

➤ Study design and study duration:

The study design was a pre and post-test experimental study conducted over a period of 3 months.

➤ Inclusion criteria

- Clinically diagnosed posterior Benign Paroxysmal Positional Vertigo patients
- Dix – Hallpike test positive subjects
- Age between 50 to 60 years

- Both genders were included

➤ Exclusion criteria

- Central vertigo
- Other peripheral vestibular disorders
- Musculoskeletal problem at neck and back
- Cerebral palsy
- Head injury
- Stroke
- Demyelinating and degenerative disease of central nervous system
- Psychological problems
- Fractures of the limbs
- Hearing loss
- Vision loss

➤ Orientation to the subjects and procedure:

Subjects were informed of the study's purpose prior to data collection. The researcher have provided a thorough introduction to the different test procedures, including the Vestibular Disorders Activities of Daily Living Scale (VADL) to assess the degree of functional limitation or disability in individuals with dizziness and the Dizziness Handicap Inventory (DHI) to measure functional, emotional, and physical handicap caused by dizziness. Each participant's full cooperation and agreement were requested following a thorough explanation of the study's methods.

Ten subjects were chosen based on their compliance with the inclusion and exclusion criteria. They were treated with Epley's canalith repositioning maneuver for thrice in a week for 4 weeks. Patient's dizziness and activities of daily living were measured by dizziness handicap inventory and vestibular disorders activities of daily living scale. The group's pre- and post-test results were documented.

➤ Procedure

After rotating the patient's head 45 degrees to the right (the affected side), it was swiftly placed back over the table's end at a 30-degree angle. The patient's eyes should have torsional nystagmus. For at least 30 seconds, hold each pose. The otolith is descending and in the ideal position for the following stage as the nystagmus improves.

At least 30 seconds were spent with the patient's head in this posture after it had been turned 90 degrees to the left. The patient was instructed to rotate their entire head and body in the left lateral position, with the head facing 135 degrees from the supine position or 225 degrees from the starting position (looking at the floor).



Fig 1 Turning head 45 Degrees towards Right Side (Affected Side)



Fig 2 Turning Head 90 Degrees towards Left Side (Unaffected Side)



Fig 3 Turning Head Another 90 Degrees Towards Left Side (Unaffected Side), With Left Side Lying



Fig 4 Sitting Up while Keeping the Head Turned

With the head in the same position, the patient was returned to a sitting position. To align the head with the rest of the body, it was rotated 45 degrees to the right. Three rounds of the process were carried out, with numerous respite periods.

Table 1 Data Analysis and Results

Measurement	Mean	Mean difference	Standard deviation	paired 't' value
Pre-test	83.1	1.08	1.14	17.27*
Post-test	76.9			

*0.005 level of significance

Table 1 The Mean Value, Mean Difference, Standard Deviation, And Paired "T" Value of The Dizziness that the BPPV Patients Experienced Are Displayed.

The calculated paired "t" value for dizziness is 17.27 at the 0.005 level, while the "t" table value is 3.250. In

individuals with benign paroxysmal positional vertigo, there is a substantial change in dizziness after performing Epley's canalith repositioning maneuver because the calculated "t" value is greater than the "t" table value.

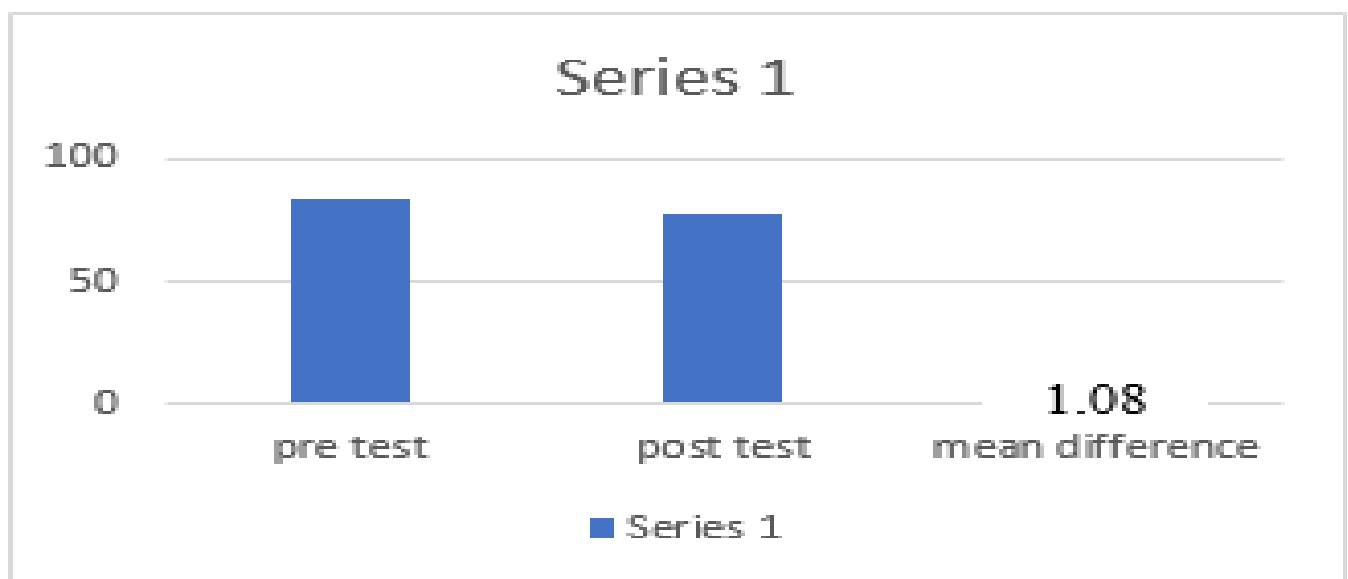


Fig 5 Graphical Representation of Pre and Post- Test Mean Values and Mean Difference of Dizziness among the BPPV Patients

Table 2 Shows Mean Value, Mean Difference, Standard Deviation and Paired 'T' Value of Activities of Daily Living Experienced by The BPPV Patients.

Measurement	Mean	Mean Difference	Standard deviation	Paired 't' value
Pre-test	230.6	2.7	0.99	9.23*
Post-test	227.9			

*0.005 level of significance

The "t" table value is 3.250 and the computed paired "t" value for daily life activities is 9.23 at the 0.005 level. In individuals with benign paroxysmal positional vertigo, there

is a substantial difference in activities of daily living after performing Epley's canalith repositioning maneuver because the calculated "t" value is greater than the "t" table value.

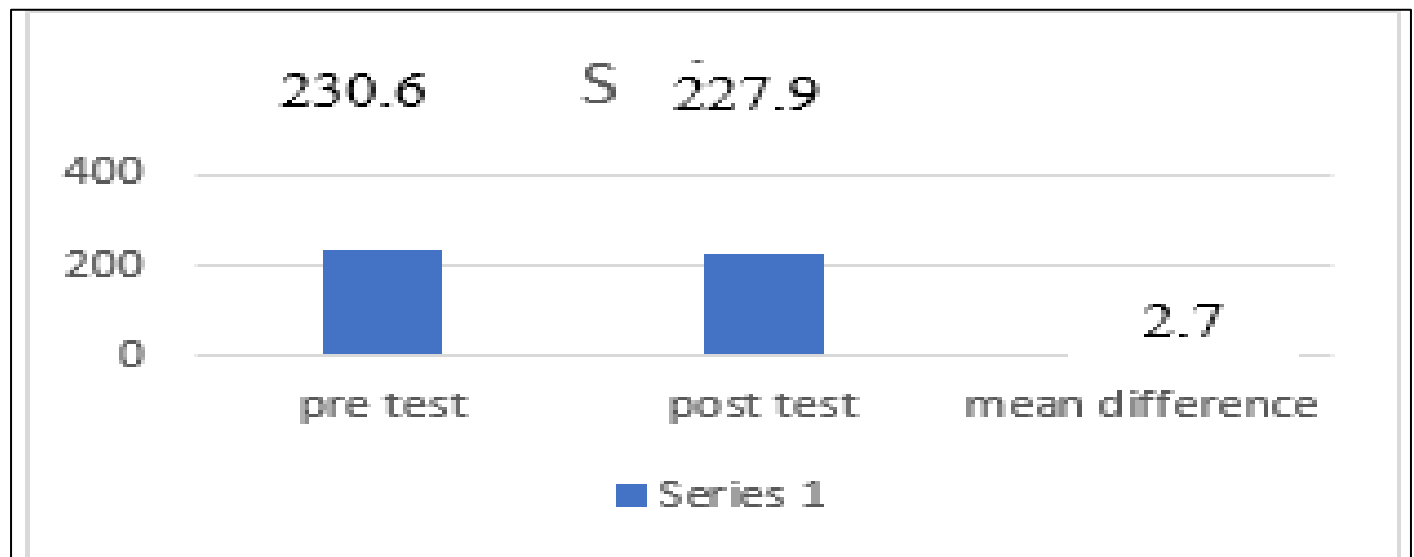


Fig 6 A visual depiction of the mean values before and after the test, as well as the mean difference in the BPPV patients' disabilities in daily living activities

Ten participants with benign paroxysmal positional vertigo who had received a clinical diagnosis were chosen for the study. For four weeks, the individuals received three weekly treatments using Epley's canalith repositioning procedure. The dizziness handicap inventory and vestibular disorders activities of daily living scale were used to measure the patient's dizziness and activities of daily living both before and after the therapy intervention was finished.

➤ *Analysis of Dependent variable dizziness in the BPPV patients*

The calculated paired "t" value for dizziness is 14.45 at the 0.005 level, while the "t" table value is 3.250. In individuals with benign paroxysmal positional vertigo, there is a substantial change in dizziness after performing Epley's canalith repositioning maneuver because the calculated "t" value is greater than the "t" table value.

➤ *Analysis of Dependent variable activities of daily living in the BPPV patients*

The calculated paired "t" value for everyday living activities is 10.82, while the "t" table value at the 0.005 level is 3.250. In individuals with benign paroxysmal positional vertigo, there is a substantial difference in activities of daily living after performing Epley's canalith repositioning maneuver because the calculated "t" value is greater than the "t" table value.

The study was conducted to find the effectiveness of Epley's canalith repositioning maneuver on dizziness and activities of daily living among BPPV patients.

Following Epley's Canalith Repositioning Manoeuvre, the results showed a notable improvement in dizziness and activities of daily life in BPPV patients.

III. DISCUSSION

The study's objective was to determine how well Epley's canalith repositioning maneuver worked for dizziness and activities of daily living in patients with benign paroxysmal positional vertigo patients.

Following Epley's Canalith Repositioning Manoeuvre, the results showed a notable improvement in dizziness and activities of daily life in BPPV patients.

In BPPV, a shift in the orientation of the ear canal in relation to gravity causes debris to relocate to the ear's lowest section, altering the pressure of the fluid surrounding the cupula, which in turn deflects the hair cells, resulting in the typical eye movement with vertigo. There are three primary mechanisms in BPPV, with the most prevalent being the presence of debris in the long section of the ear canal, a condition known as canalithiasis. Debris can also be found in the short section of the ear canal or attached to the cupula, which adds weight to the membrane, termed cupulolithiasis. The ear canal most frequently impacted is the posterior

semicircular canal. The Epley maneuver is a technique involving several head repositioning exercises used for individuals with BPPV. Typically, canaliths, or otoliths, are situated in a fluid-filled area within the inner ear known as the utricle. As these crystals move within the utricle, they stimulate hair-like cells that convey signals to the brain regarding head position. Canaliths become dislodged, they can travel to the adjacent semicircular canal, providing the brain with inaccurate information about the body's position, which leads to vertigo symptoms. The goal of the Epley maneuver is to relocate the canaliths from the semicircular canal back to the utricle, thereby alleviating dizziness (Palmeri and Anil, 2022) ^[18].

The Epley's canalith repositioning is a cost-effective, secure, and efficient method for treating benign paroxysmal positional vertigo (BPPV). It demands minimal equipment and is an easy, in-hospital solution for BPPV, whether in a medical setting or emergency department. Although BPPV often does not necessitate treatment, in certain instances, it can disrupt a patient's daily activities. In these situations, the Epley technique is used to expedite symptom relief. During the Epley technique, the patient is instructed to perform specific head movements to restore the displaced crystals in the inner ear (Pereira, 2010) ^[15].

In research, the Epley's canalith repositioning maneuver is applied following the Dix-Hallpike maneuver to identify the problematic side. This sequence of rotational sifs aids in freeing otoconia from the otolithic membrane and returning them to the utricle, eliminating the disruption and associated symptoms. This technique facilitates the movement of displaced otoconia, which are free-floating particles, from the affected semicircular canal to the utricle, where they no longer activate the cupula, thus alleviating the vertigo (Epley, 1980) ^[11].

IV. CONCLUSION

An experimental study was conducted to investigate the effectiveness of Epley's canalith repositioning maneuver on dizziness and activities of daily living in BPPV patients.

This study included ten participants who were clinically diagnosed with benign paroxysmal positional vertigo. The vestibular disorders activities of daily living scale and the dizziness handicap questionnaire were used to quantify dizziness and activities of daily living prior to and following Epley's canalith repositioning procedure, respectively.

From the results, it is concluded that the Epley's canalith repositioning maneuver is an effective treatment in reducing dizziness and handicap in activities of daily living in BPPV patients.

➤ Study Limitations:

- Number of subjects were small.
- Short term study.

RECOMMENDATIONS

- Studies can be carried out for different age groups.
- A similar study can be conducted for a bigger sample size.
- The study can be conducted for an extended length of time.

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