

## ORIGINAL ARTICLE

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## EFFECTIVENESS OF CANALITH RE POSITIONING PROCEDURE VERSUS BRANDT DAROFF EXERCISES IN BENIGN PAROXYSMAL POSITIONAL VERTIGO SUBJECTS

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## ABSTRACT

**Background:** Vertigo is perception of motion, when no movement is present or abnormal perception of motion in response to movement. Vertigo is usually due to a disturbance in the vestibular System. Physical therapy plays an important role in reducing vertigo and nystagmus in benign paroxysmal positional vertigo subjects. Benign paroxysmal positional vertigo(BPPV) comes under the peripheral Vertigo which is the most common disease causing vertigo. Cawthorne and Cooksey were the first clinicians to advocate exercises for persons suffering from vertigo. Canalith repositioning procedure was effective in treating BPPV. Brandt Daroff exercises were designed to habituate the central nervous system to provoking position and they dislodge and move the debris out of canal which is effective in treating BPPV. Hence this study compares the effectiveness of these two techniques in treating BPPV.

**Methods:** Total number of 30 subjects was taken and they were divided into two groups by simple random sampling method with Pre test and post test experimental design . Group A subjects were treated with Canalith repositioning procedure and Group B subjects were treated with Brandt Daroff exercises. Outcome measure is dizziness handicap inventory (DHI)

**Results:** P-value is less than 0.05 which shows that there is significant difference between Canalith repositioning procedure and Brandt Daroff exercises.

**Conclusion:** Canalith repositioning procedure is most effective and less time consuming procedure in treating the Benign Paroxysmal positional vertigo subjects and found to have less recurrence.

**Keywords:** Benign paroxysmal positional vertigo, Canalith repositioning procedure, Brandt Daroff exercises, Dizziness handicap inventory.

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## INTRODUCTION

Vertigo is usually due to a disturbance in the vestibular System. Definition of the word vertigo is "Perception of motion when no movement is present or abnormal perception of motion in response to movement. Dizziness is the synonym for the vertigo. Dizziness is the 3<sup>rd</sup> most common complaint reported to physicians behind chest pain and fatigue. 42% experience dizziness or vertigo at some time. Vertigo is not a disease; it is a symptom of disease. There are three types of vertigo Central Vertigo, Peripheral Vertigo and Systemic Vertigo. Benign paroxysmal positional vertigo comes under the peripheral Vertigo. Benign paroxysmal positional vertigo is the most common disease causing vertigo. It is a condition that is usually easily diagnosed. 'Barany' first described the condition in 1921. Benign paroxysmal positional vertigo defined as a vestibular syndrome of peripheral origin characterized by short and intensive episodes of vertigo, associated with predominantly horizontal-rotation nystagmus, triggered by quick change of head position<sup>1</sup>. Incidence-Varies in epidemiological studies from 11 to 64 per 100000/year [1,2,3].

Benign Paroxysmal Positional Vertigo is one of the most common disease of the inner ear, responsible for approximately 17% of the clinical diagnosis of dizziness [4,5]. Benign paroxysmal positional vertigo peak incidence is within 50-70 years. In a recent cross section study conducted by the division of otoneurology HCFMUSP, diagnosis of BPPV amounted 15% of the etiologies of dizziness in the population older than 65yrs [6]. In 50 to 70% of the cases Benign paroxysmal positional vertigo is idiopathic or primary [7] and the second most common cause is head trauma that Corresponds to 7 to 17% of cases. Dizziness Handicap Inventory (DHI) is used to measure a patient's self perceived handicap as a result of vestibular disorders.

Clinical pathology substrate corresponding to Benign paroxysmal positional vertigo was proposed by Schuknucht in 1969. Which describe the presence of crystals coming from utricle, which are released and adhere to the top of posterior semicircular canal (Cupulolithiasis). Some years later in 1979 by Hall, ruby, Mc clure, described the concept of canalithiasis and the phenomenon was first demonstrated in Vive by parness and Mc clure in 1992. Canalith theory which comprises the increase of the endolymph density caused by the presence of free suspension particles Benign paroxysmal positional vertigo may be originated from any semicircular canal. But the posterior canal is the most frequently affected in the majority of cases i.e.63%, Anterior Canal 12%, Horizontal Canal 1% respectively.

Cause for this is the posterior canal is most gravity dependent part of the vestibular labyrinth in both the upright and supine position. Agrawal and parness found obvious free floating endolymph particles in 30% of ears operated on for posterior Canal BPPV the Mechanism by which Canalithiasis cause nystagmus in the post semicircular canal was described by Epley. The natural clinical course of Benign paroxysmal positional vertigo is self limited and takes from weeks to months and it normally doesn't respond to

anti-vertigo drugs. Physical therapy plays an important role in reducing vertigo and nystagmus in Benign paroxysmal positional vertigo subjects. Cawthorne and Cooksey were the first clinicians to advocate exercises for persons suffering from vertigo. In this study two types of Maneuvers are applied to Benign paroxysmal positional vertigo patients and difference of their outcomes is measured. The two Maneuvers are Canalith repositioning procedure and Brandt Daroff exercises Canalith repositioning procedure was first proposed by Epley although he had been teaching his technique for many years but it was published in 1992. Early this procedure consists 5 separate positions and now they modified in to 3. Canalith repositioning procedure is performed by a slow rotation of the head so otoconia are guided towards their natural exit. This is the most easier to perform and comfortable for the patient. Lot of studies done on this procedure and they concluded this is effective in treating Benign paroxysmal positional vertigo. Brandt Daroff exercises were introduced in 1980 by Drs. T.Brandt and R.B. Daroff. It is based on cupulolithiasis theory of Benign paroxysmal positional vertigo. These exercise were designed to habituate the CNS to provoking position, they act by dislodging debris and causing move the debris out of canal.

## METHODS

Subjects with unilateral posterior canal Benign paroxysmal positional vertigo with age group between 50 -70years, both male and female subjects from "Narayana Medical College and Hospital, Nellore", A.P. India were taken into the study. Sample size of 30 subjects comprising of 15 in each group was selected by simple random sampling method. Group A subjects were treated with Canalith repositioning procedure and Group B subjects were treated with Brandt Daroff exercises. Outcome measure is dizziness handicap inventory (DHI). Subjects with Central Vertigo, Head Injury, Neck Stiffness, Motion Sickness, Cervical fractures, Vertebro Basilar Insufficiency and Menieres disease were excluded from the study. After the treatment Dix-Hall pike test is performed to know that whether vertigo and nystagmus are subsided or not to assess the subjective problems of the patients. All subjects were instructed to wear soft collars for 2-5days after the treatment and patients were thought to do horizontal movements to prevent neck stiffness. After the 7<sup>th</sup> day of treatment one more time Dizziness handicap inventory scale assessment was taken.

### Canalith Repositioning Procedure (GROUP A):

Modified canalith repositioning procedure is the particle repositioning maneuver (PRM) which is a 3 position maneuver that eliminates the need for sedation and mastoid vibration. Position the subject in sitting on a couch then first rotate the head towards the involved side. The subject is then moved into the Dix Hall pike position with affected ear towards ground. Next the head is rotated 180 degrees to the opposite side while maintaining the neck in 30 degrees extension. The subject is rolled on to the unaffected side shoulder and slowly brought up to sitting position; head is still rotated to opposite side. The subject then

fitted with a soft collar to avoid vertical movements that may again dislodge the otoconia. Between each step is held for 1-2 minutes or until the vertigo and nystagmus has stopped. To ensure replacement of the otoconia, the subject is instructed to remain upright position for 1-2 nights (by sleeping in a recliner chair) and avoid sleeping on the involved side for another 5 additional nights. Horizontal movements should be performed to prevent stiff neck.

**Brandt Daroff Exercises (GROUP B):**

Brandt Daroff exercises are performed in three sessions per day for two weeks. In each set one performs the maneuver less than 5 times. Subject while sitting upright move in to one side lying position, with the head angled upward about half way. Stay in the side lying position for 30 sec or until the dizziness subsides, then go back to sitting position stay there for 30 sec and then go to the opposite side and follow the same routine. These exercises are done in the morning, afternoon and evening 5 repetitions for duration of about 10 minutes in each session.

**RESULTS**

This All data analysis was computed with Software Products for Statistics Solutions (SPSS) data package version 13.0 Descriptive statistics including the main mean for selected items on Canalith repositioning procedure and Brandt Daroff exercises were calculated. The relationships between the total scores of two groups were analyzed by wilcoxon test and between scores from selected subjects from two maneuvers were analyzed by Mann Whitney 'U' test. Calculated the floor and ceiling effects representing the percentage of subjects achieving the lowest and highest scores possible, respectively. Floor and ceiling effects exceeding 20% are considered to be significant indicating that the measure can represent only a limited range recurrence of symptoms, the prognostic ability and predictive ability of Brandt Daroff exercises compared with Cannlith repositioning exercises.

**RESULT:** Post mean is less than pre mean. This says that post values of DHI are reduced after canalith repositioning procedure, therefore canalith repositioning procedure is effective in treating BPPV.

**Table 1:** Canalith repositioning procedure

	Mean	Z- Value	P- Value
Pre value	59.333	3.416	0.001
Post value	17.733		

**Table 2:** Brandt Daroff exercises(BDE):

	Mean	Z-Value	P-Value
BDE pre	55.333	3.419	0.001
BDE post	127.466		

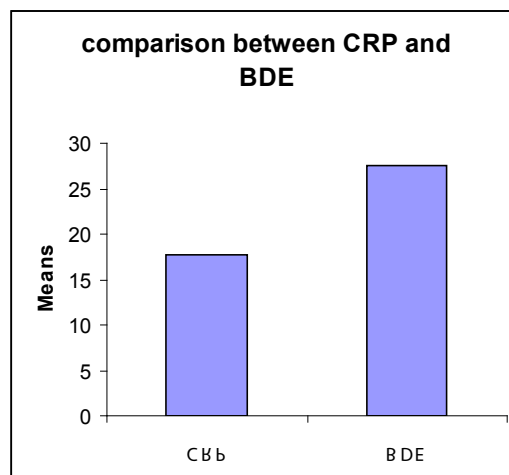
**Result:** Post mean is less than pre mean this says that post values of DHI reduced after Brandt Daroff exercises, therefore Brandt Daroff exercises are effective in treating BPPV.

**TABLE 3:** Comparison between Canalith Repositioning

Procedure and Brandt Daroff Exercises

	Means	Z-Value	P-Value
CRP post	17.733	2.230	0.026
BDE post	27.466		

On comparing the Canalith repositioning procedure with Brandt Daroff exercises it shows that Canalith repositioning procedure is effective than Brandt daroff exercises in treating BPPV.



**Graph 1:** Comparison between CRP and BDE

**DISCUSSION**

Treatment of posterior canal Benign paroxysmal positional vertigo is based upon two groups of treatments; “canalith repositioning procedure” in which guiding otoconia out of the canal into the utricle by slowly moving the head of the patient from the affected to the opposite side; “Brandt Daroff exercises” are designed to habituate the central nervous system to provoke position and also act by dislodging debris and leading to move the debris out of semicircular canal. Valenzuela v et.al, June 2000 done a study on Benign paroxysmal positional vertigo patients and they found that Canalith repositioning maneuvers were highly effective for the treatment of Benign paroxysmal positional vertigo [8]. Ruckenstein MJ et al 2001 Jun Conducted study Epleys canalith repositioning maneuver results in resolution of vertigo in the majority of patients (70% of cases) immediately after one treatment it is safe and require no special equipment or investigations [9]. Perez vazquez p, et al 2001 told that particle repositioning Maneuvers are simple and effective treatment, for patient’s and Benign paroxysmal positional vertigo and they concluded that Epley Maneuver is safe and effective in treatment of Benign paroxysmal positional vertigo [10].

In this study 30 cases of posterior canal Benign paroxysmal positional vertigo were selected on whom canalith repositioning procedure for 15 patients Group A and Brandt Daroff exercises for the other 15 patients Group B maneuver performed for seven days. Seventh day performing Dix Hall pike test resulted that both the treatments are effective in reducing vertigo and nystagmus. On comparing both post values on dizziness handicap inventory

scale following tabulated as post values and means scores were 17.733 and 27.46; standard deviation 8.64 and 11.62 respectively, these values were compared with pre values taken by dizziness handicapped inventory scale before test the following mean score was 59.33 and 55.33; standard deviation is 11.65 and 14.19, showed 20% more improvement in Group A than Group B

Total percentage improvement in Group A -70%, Group B-50. Cause for the improvement may be displaced otoconia in to the semicircular canal stimulates vestibular nerve causing nystagmus and vertigo, by performing canalith repositioning procedure these otoconia were positioned to cupula resulting in decrease of abnormal stimulus on vestibular nerve so nystagmus and vertigo subsides. In group B (Brandt Daroff exercises) recurrences were more often on comparison with group A this may be due to Brandt Daroff exercises mainly depend on accommodation of central nervous system to provoking stimulus this may vary from individual to individual on hyper stimulus than accommodation level recurrence occur. Group B is less efficient or temporary reduction compared to group A.

### CONCLUSION

Canalith repositioning procedure and Brandt Daroff Exercises are two therapeutic available procedures used to treat Benign Paroxysmal positional vertigo subjects, among these two therapeutic exercises Canalith repositioning procedure is most effective and less time consuming procedure in treating the Benign Paroxysmal positional vertigo subjects and found to have less reoccurrence.

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