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## **A comparison between the effect of Epley's maneuver and Brandt-daroff exercise in improving the quality of life (QOL) in patients with benign paroxysmal positional vertigo (BPPV)**

**V Vijayaraj**

### **Abstract**

**Aim:** The Aim of this study is to compare the effect of Epley's maneuver and Brandt-Daroff Exercise in improving the Quality of Life in patients with BPPV

**Materials and methods:** A Quasi Experimental study design consisting of reviews of charts of BPPV patients. Thirty patients were included, (60%) were females, (40%) were males; the average age was 56 years. All the patients are presented with unilateral BPPV and underwent Dix-Hallpike test. Pre-and post-Treatment (Epley's maneuver) and (Brandt-Daroff Exercise) scores on the physical, functional and emotional dimensions of the Dizziness Handicap Inventory (DHI) and VAS were analyzed.

**Results:** The pre and post-test values were assessed by DHI and VAS in Group A and Group B. The calculated 't' values by unpaired 't' test were in group A is 12.35 and Group B is 5.64. The calculated 't' values were more than the table value 2.05 for 5% level of significance at 28 degrees of freedom.

**Conclusion:** In the present sample, Epley's Maneuver had a positive and significant effect on emotional, physical and functional dimensions of quality of life, as measured by the DHI and VAS scores before and after therapy.

**Keywords:** Epley's maneuver, brandt-daroff exercise, dizziness handicap inventory, visual analog scale-dizziness

### **Introduction**

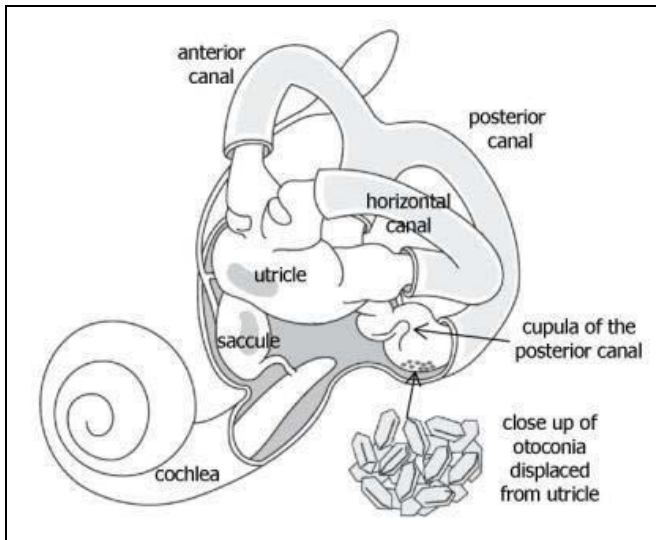
- Benign Paroxysmal Positional Vertigo (BPPV) is a disorder arising in the inner ear. Benign paroxysmal positional vertigo (BPPV) causes short episodes of intense dizziness (vertigo) when head is moved in certain directions.
- Benign means it is due to neither a cancerous nor a serious cause. The symptoms of BPPV may be unpleasant but the underlying cause is not serious.
- Paroxysmal means recurring sudden episodes of symptoms.
- Positional means that the symptoms are triggered by certain positions.
- Vertigo is dizziness with a spinning sensation.

### **Anatomy**

- The vestibular section of the ear consists of the saccule, utricle and three semicircular canals (anterior or superior canal, posterior or inferior canal and horizontal or lateral canal).
- Each of these canals plays an essential role in maintaining balance (vestibular).
- The SCCs are responsible for detecting rotational movement of the head.
- Situated at right angles to one another and contain fluid called endolymph.
- Inertial changes with rotation of the head cause this endolymphatic fluid to shift.

### **Correspondence**

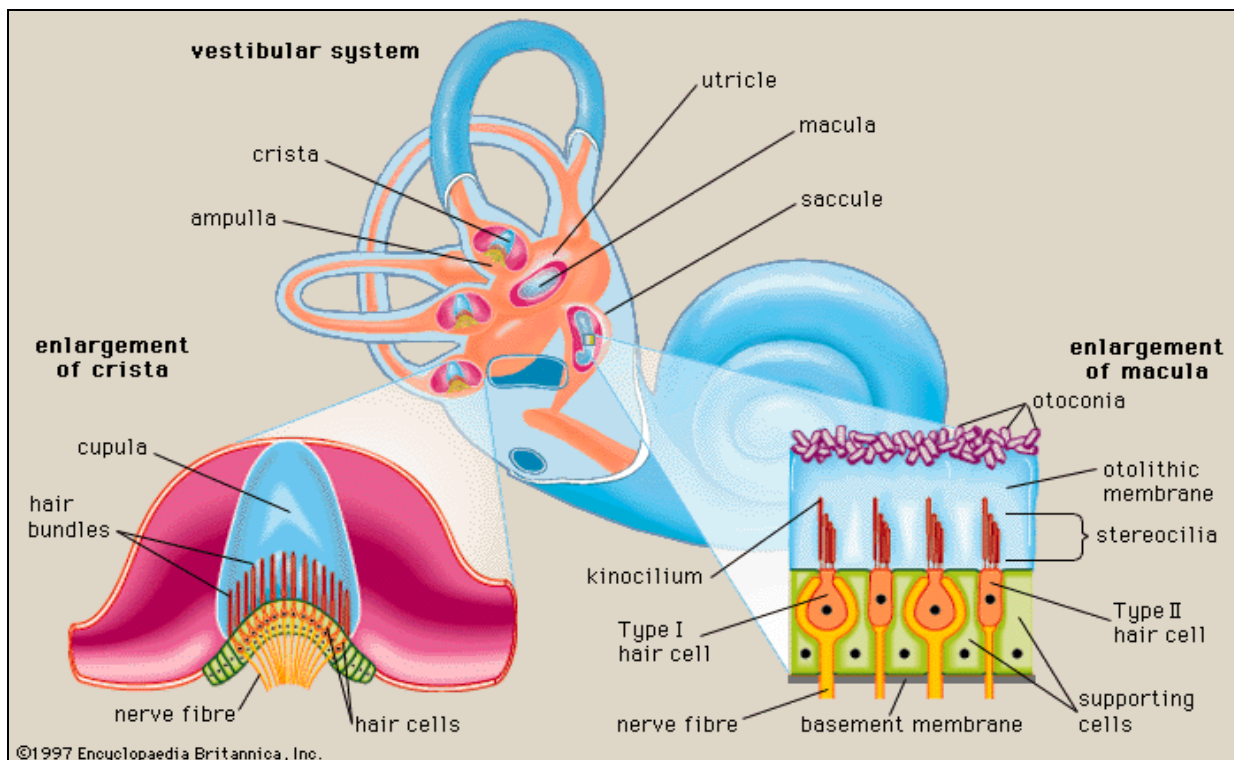
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- Each of these arms has a dilated (ampullary) end located near the top or front portion that houses the crista ampullaris (nerve receptors).
- The crista ampullaris has a sail-like tower, the cupula, that detects the flow of fluid within the SCC.
- If a person turns suddenly to the right, the fluid within the right horizontal canal lags behind, causing the cupula to be deflected left (toward the ampulla, or ampullopetaally).
- This deflection is translated into a nerve signal that confirms the head is rotating to the right.
- The information collected by the inner ear travels to the brain on the 8<sup>th</sup> cranial nerve also called the vestibulo-cochlear nerve or cochleo-vestibular nerve, auditory nerve or acoustic nerve.
- In simple terms, the cupula acts as a 3-way switch that, when pressed one way, appropriately gives the body a sensation of motion.
- The middle or neutral position reflects no motion. When the switch is moved the opposite way, the sensation of motion is in the opposite direction.
- Particles in the canal slow and even reverse the movement of the cupula switch and create signals that are incongruous with the actual head movements.
- This mismatch of sensory information results in the sensation of vertigo.

**Semicircular Canals**

- The fluid shift lags behind movement of the head and as a result pressure is exerted on the cupula, the motion sensory receptor at the base of the canal.
- Each canal consists of a tubular arm (crura) that sprouts from a large barrel like compartment, much like the handle of a coffee mug sprouts from the mug.

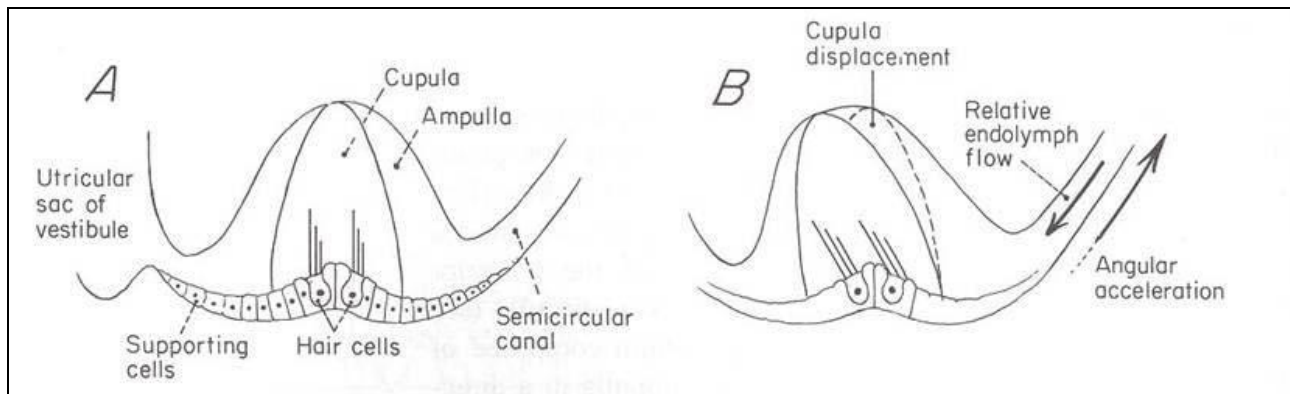


**Vestibular System**

- The macula of the utricle is considered the structure at fault for BPPV.
- It contains otoconia (calcium carbonate particles) which are surrounded by a gelatinous matrix and stereociliary hairs.
- These calcium particles behave similarly to endolymph, reacting to changes in gravity and acceleration

**Pathophysiology**

- BPPV occurs when the otoconia of the macula are dislodged and transferred into the lumen of one of the semicircular canals.
- This unintentional movement interferes with the endolymphatic system and stimulates the motion receptor (ampulla) of the affected canal, resulting in vertigo.
- Following this phenomenon, nystagmus ensues as a result of either canalithiasis or cupulolithiasis.



(Canalithiasis)

(Cupulolithiasis)

- The exact reason for the calcium crystals separating from the macula is not well understood.
- The condition is believed to arise following viral infection or trauma, but in the majority of cases it occurs in the absence of any identifiable illness or upset.
- It is also believed to be linked to age-related changes in the protein and gelatinous matrix of the otolithic membrane.
- Canalithiasis refers to freely moving otoconia settling within the posterior semicircular canal, causing the canal to be gravitationally sensitive.
- This is thought to result in posterior canal BPPV, the most common form of the condition.
- In about 5% of cases cupulolithiasis occurs, where the otoconia adhere to the cupula of the lateral semicircular canal causing it to be heavier than the surrounding endolymph.
- The direction of nystagmus is different depending on location of the calcium carbonate crystals.
- Nystagmus pattern is provoked by ampullary nerve excitation in the affected canal, which is directly

connected to extraocular muscles of the eye.

**Epidemiology**

BPPV is the most common disorder of the peripheral vestibular system. Mizukoshi and colleagues estimated the incidence to be 10.7 to 17.3 per 100 000 per year in Japan. Many studies have suggested a higher incidence in women, but in younger patients and those with post traumatic BPPV the incidence may be equal between men and women. The age of onset is most commonly between the fifth and seventh decades of life. BPPV is more likely to involve the right ear, a factor that may be related to the habit of sleeping on the right side in the general population. BPPV most often involves a single semicircular canal, usually posterior (60-90%), but may involve both posterior and lateral canals in the same inner ear. Head trauma is the most common cause of simultaneous bilateral posterior canal BPPV.

**Epidemiology**

<b>Incidence</b>	95.8/100000/year	
<b>Prevalence</b>	131.6/100000/year	
<b>Men</b>	37.2	M/W-1/1.7
<b>Women</b>	62.8	
<b>Age</b>	Range of 60-89 years	Average 57 years
<b>Posterior canal BPPV</b>	79.4%	Unilateral 72% Bilateral 7.4%
<b>Lateral canal BPPV</b>	16.9%	Geotropic 80% Apo geotropic 20%
<b>Atypic form</b>	3.7	

## Operational Definitions

### Benign Paroxysmal Positional Vertigo (BPPV)

- Benign Paroxysmal Positional Vertigo (BPPV) is defined as an abnormal sensation of motion that is elicited by certain critical provocative positions. The provocative positions usually trigger specific eye movements (nystagmus). BPPV was first described in 1921.

### Barany

#### Epley's Maneuver

- The Epley's Maneuver is used to treat benign paroxysmal positional vertigo (BPPV) of the posterior or anterior canals, which involves sequential movement of the head into 4 positions. It was first described in 1980.

### Dr. John Epley

#### Brandt-Daroff Exercise

- Brandt Daroff Exercise is defined as to reduce canal sensitivity following vertigo episodes involving anterior and posterior canal.

### Nicole Miranda

#### Dix Hall-Pike Test

- The Dix-Hallpike test is a diagnostic maneuver used for eliciting paroxysmal vertigo and nystagmus in which the patient is brought from the sitting to the supine position with the head hanging over the examining table and turned to the right or left; vertigo and nystagmus are elicited when the head is rotated toward the affected ear.

### Susan b.o' sullivan

#### Dizziness handicap inventory

- DHI is defined as the questionnaire comprises all of the self-perceived disabilities from dizziness or unsteadiness. The impact of dizziness on quality of life is often assessed by the Dizziness Handicap Inventory (DHI), which is used as a discriminative and evaluative measure.

### Kurre ' a vangool.

#### visual analog scale-(dizziness)

- A simple assessment tool consisting of a 10 cm line with 0 on one end, representing no dizziness, and 10 on the other, representing the worst dizziness ever experienced, which a patient marks to indicate the severity of his or her dizziness.

### Toupet

#### Signs and symptoms

##### Signs

- Rotatory (torsional) nystagmus, where the top of the eye rotates towards the affected ear in a beating or twitching fashion, which has a latency and can be fatigued (the vertigo should lessen with deliberate repetition of the provoking maneuver).
- Nystagmus should last for 30 seconds to one minute.

##### Symptoms

1. Vertigo: Spinning dizziness, which must have a rotational component.
2. Short duration (paroxysmal): Lasts only seconds to minutes.
3. Positional in onset: Can only be induced by a change in position.
4. Nausea is often associated.
5. Visual disturbance: It may be difficult to read or see

during an attack due to associated nystagmus.

6. Syncope (fainting) is unusual.
7. Emesis (vomiting) is uncommon but possible.

## Aetiology

- Mild to moderate or severe head trauma.
- Head in the same position for a long time, such as in the dentist chair, at the beauty shop or on strict bed rest.
- Bike riding on rough trails.
- High intensity aerobics.
- Labyrinthine conditions-viral or vascular.
- Meniere's disease.
- Vestibular migraines.
- Hormone dysfunctions.
- In most cases, BPPV is idiopathic.

## Need For The Study

- Vestibular conditions may have a negative impact on the daily activities of patients.
- It also affects the emotional, physical and functional activities of life.
- It mainly affects their quality of life in physical, emotional and functional activities.
- So I have decided to conduct my research to improve their quality of life in patients with BPPV.

## Aim of The Study

- The Aim of this study is to compare the effect of Epley's Maneuver and Brandt-Daroff Exercise in improving the Quality of Life in patients with BPPV.

## Objectives of The Study

- To have in-depth knowledge in BPPV patients.
- To improve the quality of life in patients with BPPV.
- To find out the effectiveness of Epley's Maneuver in improving the Quality of life in patients with BPPV.
- To find out the effectiveness of Brandt-Daroff Exercise in improving the Quality of life in patients with BPPV.
- To compare the effectiveness of Epley's Maneuver and Brandt-Daroff Exercise in improving the Quality of life in patients with BPPV.

## Hypothesis

### Null Hypothesis

- There is no significant difference in between the effect of Epley's Maneuver and Brandt-Daroff Exercise in improving the Quality of life in patients with BPPV.

### Alternate Hypothesis

- There is significant difference between the effect of Epley's Maneuver and Brandt-Daroff Exercise in improving the Quality of life in patients with BPPV.

## Materials and methodology

### Materials

- Treatment couch
- Treatment chair
- Towel
- Stop clock
- Stethoscope
- B.P Apparatus
- Goniometer

### Methodology

- All patients underwent a neuro- otological examination and posture
- evaluation.
- The Dix-Hall pike test is conducted to confirm the diagnose of BPPV
- especially for posterior canal.
- VAS is conducted to know the severity of BPPV.
- DHI is conducted to know how vertigo affects the QoL in patients with
- BPPV.

### Population

- Patients with age group of 40-65years having posterior canal BPPV.

### Criteria for sample selection

#### inclusion criteria

- Both genders.
- Age group between 40-65 years.
- Sufficient hearing and vision.
- Patients suffering from a BPPV of the posterior semicircular canal on any one side.
- Functional to normal ROM of neck and back.

#### Exclusion Criteria

- The exclusion criteria were not answering the dizziness handicap inventory (DHI) and or not signing the free informed consent form.
- Age group more than 65 and below 40.
- Subject with any other history of neurological problems.
- BPPV with the involvement of other canals (anterior and lateral).
- Bilateral forms BPPV History of prior ear surgery.
- Orthopaedic disorder that impairs functional neck and trunk range of motion.
- On vestibular suppressant medication.
- Alcohol intoxication.
- Meniere's disease.
- Peri lymphatic fistula.
- Vestibular neuritis.
- Bilateral vestibular disorder.
- Central vestibular disorder.
- Head trauma.

### Source Of Data

- Neuro Speciality Hospital, Erode.
- Bharath Neuro Center, Erode.
- Vikram ENT Hospital, Erode.
- Out Patient Department -Nandha College of Physiotherapy, Erode.

### Sample Sizes

Sample size is 30 subjects

- Group A-15 patients
- Group B-15 patients

### Study Design

Quasi Experimental design

- Pre and Post experimental Study Design

### Sampling Method

- Convenient Sampling Method

### Duration of The Study

- 6 Months

### Treatment Duration

- Study was carried out for 4 weeks for each individual.
- Epley's Maneuver was performed once in a day.
- Brandt-Daroff Exercise was performed twice a day.

### Parameter

#### Dizziness Handicap Inventory

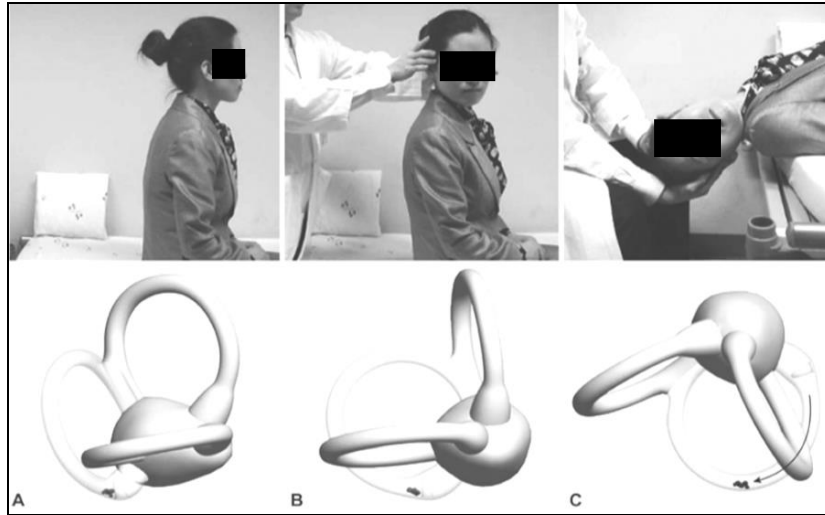
- The DHI is a specific questionnaire for assessing the impact of dizziness on the QoL of patients.
- Brief latency (1-5 seconds).
- Limited duration (< 30 seconds).
- Torsional nystagmus towards down most ear.
- Reversal of nystagmus upon sitting.
- Fatiguability of the response.

#### The DHI consists of 25 questions.

- 7 questions deal with physical aspects.
- 9 questions deal with the emotional aspects.
- 9 questions deal with the functional aspects.
- Patients answer "yes", "no" or "sometimes".
- "Yes' answers score four points.
- "Sometimes' scores two points.
- "No' answers score zero.
- 28 points for the physical aspects.
- 36 points for the emotional aspects.
- 36 points for the functional aspects.
- Total 100 points. Higher scores are associated with more losses in the QoL of subjects.
- The questions investigate the self-perception of patients about the difficulties caused by dizziness on their daily activities.

### Dix-Hallpike Test

- The Dix-Hallpike test is performed with the patient sitting upright on the examination table with the legs extended.
- The patient's head is then rotated to one side by approximately 45 degrees. The therapist helps the patient to lie down backwards quickly with the head held in approximately 20 degrees of extension.
- This extension may either be achieved by having the therapist supporting the head as it hangs off the table or by placing a pillow under their upper back.
- The patient's eyes are then observed for about 45 seconds as there is a characteristic 5–10 second period of latency prior to the onset of nystagmus.
- If rotational nystagmus occurs then the test is considered positive for benign positional vertigo.
- During a positive test, the fast phase of the rotatory nystagmus is toward the affected ear, which is the ear closest to the ground. The direction of the fast phase is defined by the rotation of the top of the eye, either clockwise or counter-clockwise.

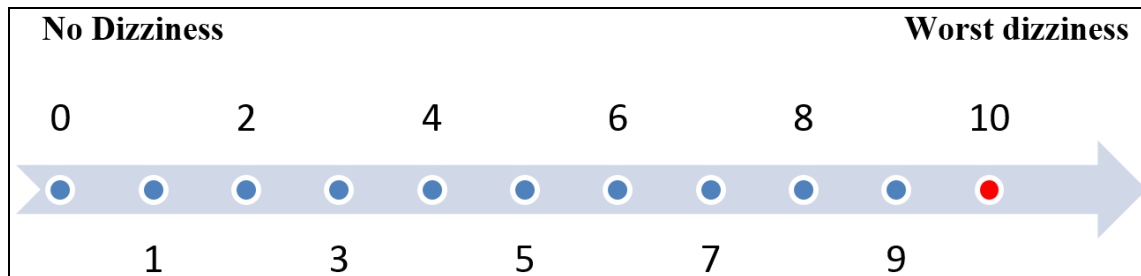


**Dix-Hallpike test**

**Visual Analogue Scale-Dizziness**

A Visual Analogue Scale (VAS) is a measurement instrument

that tries to measure a characteristic or attitude of the Dizziness level.



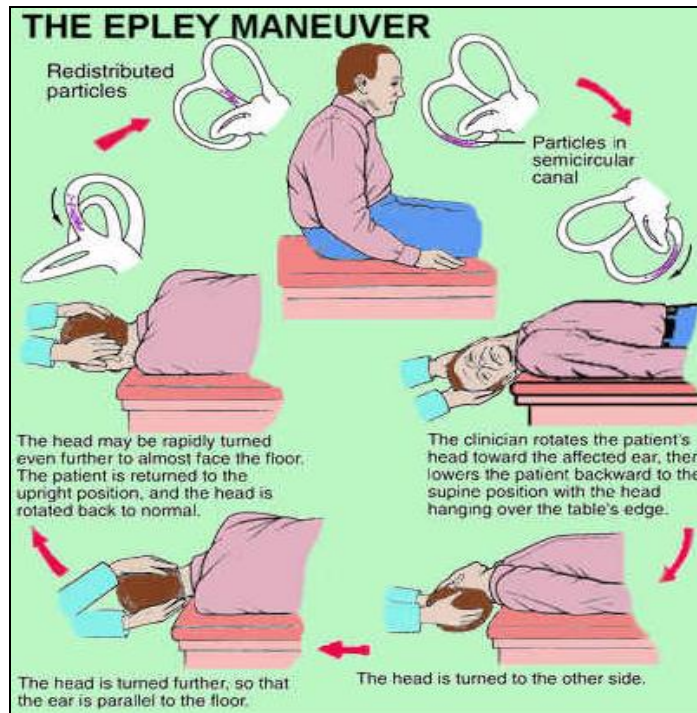
**Procedure**

- Subjects were selected by convenient sampling method. 30 subjects who fulfilled inclusion and exclusion criteria were selected by random sampling method, out of them 15 were allotted in Group A and 15 in Group B.
- Subjects were clearly explained about the study and written informed consent was obtained from the subjects who fulfilled the criteria.
- After completing the informed content and they were explained about the scale and the scale was administered.
- Proper instructions such as purpose, safety measures, comfort, precautions and psychological support were given to the subjects.
- All vital signs were checked.
- While doing the assessment, the subject’s willingness to continue the procedure with or without rest was given preference.
- Both Group A and Group B subjects were involved for pre test assessment.
- Group A underwent Epley’s maneuver once in a day.
- Group B underwent Brandt-Daroff Exercise two times per day for 4 weeks.
- The total duration is 30 minutes.

**Group-A [Epley’s Maneuver]**

- The patient begins in an upright sitting posture, with the legs fully extended and the head rotated 45 degrees towards the affected side.
- The patient is then quickly and passively forced down backwards by the therapist performing the treatment into a supine position with the head held approximately in a

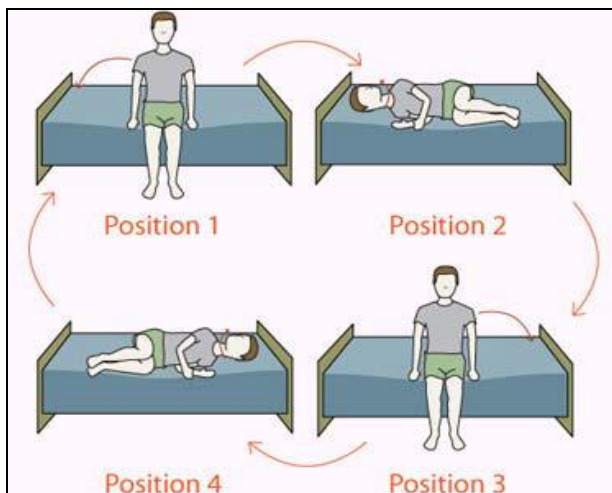
- 30 degree neck extension (Dix-Hallpike position) where the affected ear faces the ground.
- The therapist observes the patient's eyes for “primary stage” nystagmus.
- The patient remains in this position for approximately 1-2 minutes.
- The patient's head is then turned 90 degrees to the opposite direction so that the unaffected ear faces the ground, all while maintaining the 30 degree neck extension.
- The patient remains in this position for approximately 1-2 minutes.
- Keeping the head and neck in a fixed position relative to the body, the individual rolls onto their shoulder, rotating the head another 90 degrees in the direction that they are facing. The patient is now looking downwards at a 45 degree angle.
- The eyes should be immediately observed by the therapist for “secondary stage” nystagmus and this secondary stage nystagmus should beat in the same direction as the primary stage nystagmus. The patient remains in this position for approximately 1–2 minutes.
- Finally, the patient is slowly brought up to an upright sitting posture, while maintaining the 45 degree rotation of the head.
- The patient holds sitting position for up to 30 seconds.
- The entire procedure may be repeated once in a day, for a period of 4 weeks.



**Epley's maneuver**

**Group-b [brandt-daroff exercises]**

- Sit on the edge of your bed or settee
- Lie down onto the side that causes your dizziness to increase. Look towards the ceiling. Stay in this position for 2 minutes
- Sit upright and then wait for 30 seconds
- Move rapidly to the opposite side for 2 minutes. This completes the first cycle of the exercise
- Repeat the above 4 steps 5 more times
- Do the exercises 2 times a day, for a period of four weeks.



**Brandt-Daroff Exercise**

**Data Presentation And Statistical Analysis**

**Statistical Tools**

The statistical tools used in the study are paired t-test and unpaired t-test.

**Paired 't'-TEST**

The paired t-test was used to find out the statistical significance between pre and post t-test values of DHI and VAS before and after treatment for Group A and Group B.

**Formula for paired t-test,**

$$S = \frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n-1}$$

$$t = \frac{\bar{d}\sqrt{n}}{s}$$

D = difference between the pre test Vs post test

$\bar{d}$  = Mean difference

N = Total number of subjects

S = Standard deviation

**unpaired 't'-test**

The unpaired t-test was used to compare the statistically significance difference of DHI and VAS before and after treatment for Group A and Group B.

**Formula for unpaired t –test,**

$$S = \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}}$$

$$t = \frac{|\bar{x}_1 - \bar{x}_2|}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$n_1$  = Total number of subject in group A.

$n_2$  = Total number of subject in group B.

$x_1$  = Difference between pre test and post test of Group A.

$\bar{x}_1$  = Mean difference between pre test and post test of group A.

$X_2$  = Difference between pre test and post test of Group B.

$\bar{X}_2$  = Mean difference between pre test and post test of Group B.

S = Standard Deviation.

**Main Results**

The patients were in the range of 40-65 years. The mean average age of Group A and Group B were 56.

**Mean Average Age Group of Group A And Group B**

Mean Age Group	Group A	Group B
Female's	57	56
Male's	56	55

**Sex Distribution of Group A And Group**

This Table shows the sex distribution among the study. There are 60% of females and 40% of males in both Groups.

Sex Distribution	Group A	Group B
Female's	10	9
Male's	5	6

**Side Involvement of Group A And Group B**

The Group A consist of 9 right side involvement patients and 6 left side involvement patients respectively. The Group B consists of 8 right side involvement patients and 7 left side involvement patients. Right Sided involvement is statistically higher among two group.

Side Involvement	Group A	Group B
Right Side	9	8
Left Side	6	7

**Mean difference between group a and group b of Dhi and vas**

Groups	Mean difference	
	DHI	VAS
Group-a	54.66	6.6
Group-b	42.8	4.4

**Standard Deviation Between Group A And Group B of Dhi And Vas**

Groups	Standard deviation	
	DHI	VAS
Group a	2.79	1.13
Group b	2.59	1.10

**Comparision of The Paired 'T' Test And Table Value Between Group A And Group B**

Groups	Calculated' t'value		Table value	Significance
	DHI	VAS		
Group a	74.4	22.19	2.15	Significant
Group b	62.7	15.2	2.15	Significant

**Comparision of Unpaired 'T' Test And Table Value Between Dhi And Vas**

Parameters	Unpaired 't' test	Table value	Significance
Dhi	12.35	2.05	Significant
Vas	5.64	2.05	Significant

**Results and discussion**

**Results**

The study sample comprised 30 patients, of which 15 were male and 15 were female. The mean age of patients was 56 years. The diagnostic test for BPPV was positive on one side only in 30 patients. The median time interval between DHI and VAS questionnaires applied before and after therapy was 4 weeks. Among 30 patients, 15 were treated with Epley's

Maneuver, and 15 were treated with Brandt Daroff exercises. The pre and post test values were assessed by DHI and VAS in group A. The mean difference value is 54.66 and 6.6 respectively. The standard deviation value is 2.79 and 1.13 respectively. The paired 't' test value for DHI and VAS is 74.4 and 22.19. The paired 't' test value is more than table value 2.15 for 5% level of significance at 14 degrees of freedom.

The pre and post test values were assessed by DHI and VAS in group B. The mean difference value is 42.8 and 4.4 respectively. The standard deviation value is 2.59 and 1.10 respectively. The paired 't' test value for DHI and VAS is 62.79 and 15.2. The paired 't' test value is more than table value 2.15 for 5% level of significance at 14 degrees of freedom.

The calculated 't' values by unpaired 't' test were 12.35 and 5.64. The calculated 't' values were more than the table value 2.05 for 5% level of significance at 28 degrees of freedom.

The paired 't' test values have shows that Epley's Maneuver was more effective than Brandt-Daroff Exercise for patients with BPPV. The unpaired 't' test values have shown that there was significant difference between two groups in showing improvement in their quality of life in patients with BPPV.

**Group-A (Epley's Maneuver)**

S.No	Age	Sex	DHI Scale		VAS Scale	
			Pre test	Post test	Pre test	Post test
1.	57	F	88	32	8	3
2.	57	F	88	30	9	2
3.	57	F	86	30	7	0
4.	56	M	84	30	8	2
5.	57	F	80	28	9	3
6.	57	F	84	28	8	1
7.	56	M	82	24	10	2
8.	57	F	86	32	10	2
9.	57	F	84	28	9	1
10.	57	F	80	30	9	0
11.	56	M	88	36	8	2
12.	57	F	86	34	7	0
13.	57	F	82	30	9	2
14.	56	M	88	28	7	2
15	56	M	84	30	8	3

F- Female  
M-Male

**Group-B (Brandt-Daroff Exercise)**

S.No	Age	Sex	DHI scale		VAS scale	
			Pre test	Post test	Pre test	Post test
1.	56	F	82	36	8	4
2.	56	F	80	38	9	4
3.	55	M	78	40	9	5
4.	56	F	84	40	10	4
5.	56	F	86	44	9	5
6.	55	M	84	38	8	4
7.	56	F	80	40	9	4
8.	55	M	74	30	7	4
9.	55	M	78	32	10	4
10.	56	F	82	42	10	3
11.	56	F	86	44	9	4
12.	56	F	72	30	9	4
13.	55	M	78	32	9	5
14.	55	M	80	40	7	3
15.	56	F	82	38	7	7

F- Female  
M-Male



## Discussion

While consideration of improving the Quality of Life in patients with BPPV, I found there was a effective and good improvement.

There was a statistically significant difference in the impact of dizziness on the QoL of patients before and after Epley's Maneuver in all aspects (physical, functional and emotional). This demonstrates a positive effect of this maneuver on the QoL of patients. The effectiveness of repositioning maneuvers for the treatment of BPPV was good. Repositioning maneuvers are faster and more practical than vestibular rehabilitation therapies, there are also no significant adverse effects, especially when compared to drug therapy.

Studies on the factors affecting the QoL of patients with dizziness are relevant for clinical reasons, when placed alongside with the results of vestibular testing, professionals are able to better define the best approach by taking into account the changes in each patient with vertigo. The DHI and VAS may also be an interesting tool for checking the benefits and efficacy of conventional vestibular rehabilitation. It may be applied before and after therapy, which increases patient compliance each subject may check his or her own difficulties in the questionnaire. Healthcare professionals in vestibular evaluation and rehabilitation should bear in mind that recognizing the negative effects on the QoL of patients with vertigo may be an important step in the rehabilitation process. This is a new approach that has been used more often in medical practice for patients with BPPV.

According to Pereira AB et al, concluded that Epley's Maneuver had a positive and significant effect on emotional, physical and functional dimensions of quality of life, as measured by the DHI scores before and after therapy.

According to Toupet M et al, conducted study on Effect of Repositioning Maneuver with patients having Vertigo and Dizziness in BPPV, After repositioning maneuvers, VAS scores decreased before and after treatment dramatically and had a positive effect on improving their Quality of Life in BPPV patients.

According to Gustavo PK et al, conducted a study among 123 patients with BPPV, the results shows that Epley's Maneuver is more effective among any repositioning maneuver's and also had a positive effect on improving their Quality of life in BPPV patients.

**This study has proved that Epley's Maneuver is more effective than the Brandt Daroff Exercise BPPV Patients.**

### Limitations

- The study has been conducted on small sized sample only.
- This study took shorter duration to complete.
- The study limitations include only posterior canal involvement patient alone.
- This study is not extended more than 4 weeks for a patient due to time constraint

### Recommendations

- A similar study may be extended with larger sample.
- The future study can be compared with various maneuvers also.
- The Epley's Maneuver may be applied to the other conditions like anterior canal and lateral canal also.
- This Epley's Maneuver may be compared with other habitational exercises also.
- This study may also applied to other vestibular diseases like Minere's disease, vestibular neuritis, anterior inferior

cerebellar syndrome etc..

## Summary And Conclusion

Patients with BPPV present with a history of brief, episodic, position-provoked vertigo with characteristic findings on Dix–Hallpike testing. Whereas a variety of positional manoeuvres have been described, Epley's Maneuver is a simple effective treatment for most patients with objective or subjective BPPV. Although most clinicians are still advising patients to remain upright for 24–48 hours after repositioning, recent evidence suggests that this is unnecessary. To date, no factors have been identified to indicate an increased risk of BPPV recurrence after successful repositioning.

In our samples, Epley's maneuver resulted in a positive impact on the QoL in the physical, functional and emotional levels. The DHI score and VAS Scale differences in BPPV patients before and after treatment were statistically significant.

Through the results, alternate hypothesis is accepted and also the study could be concluded that there is a significant difference between Epley's Maneuver and Brandt-Daroff Exercise in improving the QoL in patients with BPPV.

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