

# A Protocol on Effect of Gaze Exercises and Balance Regimen on Quality of Life of Patients with Peripheral-Vertigo

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## Abstract

**Background:** As vertigo is been one of the most common condition affecting the individual functionally, physically and emotionally and result in some form of disability. Most of physiotherapy intervention proves to be effective in vestibular rehabilitation of patients with vestibular disorders. Gaze stabilization exercises are effective and some suggest balance training is also effective in vestibular rehabilitation. But there is minimal literature on combination of both exercise protocol. **Aim:** To find out the effect of Gaze stabilization Exercises and balance training on quality of life of patients with Peripheral Vertigo. **Methods:** 30 participants with vertigo due to peripheral pathology will be selected on the basis of inclusion, exclusion and head impulse test. The patient will be evaluating using Visual analogue scale, Dizziness Handicap Inventory, Berg Balance Scale and Dynamic Gait Index Scale. The participants will be distributed into two categories. Group- A will receive gaze stabilization exercise and Group- B will receive balance training along with gaze stabilization exercise. Participants will be evaluating post-treatment. **Conclusion:** This study concluded that there may be significant reduction in vertigo symptoms and improved Quality of Life in peripheral vertigo by using combine effect of Gaze Exercise with Balance Training.

**Keyword:** Peripheral-Vertigo, Physical therapy, Gaze Stabilization Exercises, Balance training.

## Introduction

Vertigo is the term used to refer to a self or environmental illusion, usually defined as spinning or whirling<sup>1</sup>. The prevalence of vertigo throughout the world is ~30%, with associated co-morbidity being 3.2%.<sup>2</sup>

A study in Germany found that vertigo prevalence was 22.9 percent and 3.1 percent<sup>3</sup>. According to an epidemiological study performed in France, the prevalence of vertigo was 48.3 per cent for one year<sup>4</sup>.

The precise incidence and prevalence of the vertigo is still unknown in the general Indian population.

However, the overall prevalence of vertigo in India's adult population was stated to be 0.71%.<sup>5</sup> In the 5th decade following the 7th and 4th decades, incidence of vertigo found was more common in patient. Women (57.7%) were found to be more frequently affected than men (42.30%) in the 4:3 ratio<sup>6</sup>.

Vertigo that is present as a symptom can have a central or peripheral cause<sup>2</sup>. The HEAD IMPULSE TEST is a bedside test for distinguishing between the central or peripheral causes of vertigo<sup>7</sup>. Dizziness, nausea, and vomiting, sweating and spatial disorientation are the typical signs of vertigo<sup>8</sup>. Vertigo induces risk of falling, restricts mobility and daily life activities, and limits social involvement<sup>9</sup>. Vestibular rehabilitation is a clinical tool which is based on the core neuroplastic system<sup>10</sup>.

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Gaze stabilization exercise is one of the steps that emerged in late 1980 for vestibular recovery. Gaze stabilization exercise is a key component of care for patients with the aim of enhancing the vestibular eye reflex, increasing visual acuity during head movement and reducing vertigo symptoms<sup>11</sup>.

Balance exercise can have a positive effect on physical activity for elderly people with vertigo<sup>12</sup>. It is important to reduce prevalence and impact of vertigo as adult vestibular dysfunction can cause serious impairment with significant psychological morbidity<sup>8</sup>.

**Aim:** To find out the effect of gaze exercises and balance regimen on quality of life of patients with peripheral-vertigo.

## Method

The present experimental study will include the 30 adult participants which will be selected randomly from Ravi Nair Physiotherapy College, Sawangi (Meghe), Wardha (MS), India. on the basis of inclusion and exclusion criteria. The male and female participants between the ages of 20-60 years having Vertigo patient due to peripheral cause will be included. The participants below 20 years and above 60 years, having Vestibular schwannoma, Multiple sclerosis and Cervicogenic vertigo will be excluded. The informed consent need be obtained. They will be going through the following Test and measure prior to treatment and also post treatment. The participants will be divided into two groups. Group A will receive Gaze Stabilization Exercises alone and Group B will receive Gaze Stabilization Exercises with Balance Training. The study duration is of 6 month and intervention duration is 15 days. Assessment will be done on first day of visit and patient have to visit daily for the treatment, during the treatment period assessment will be done after every 2 days on Head Impulse Test, Visual Analogue Scale, Dizziness Handicap Inventory, Berg Balance Scale and Dynamic gait index.

## Data Collection Tools

**1. Visual Analogue Scale:** It is an effective technique to obtain subjective intensity rating of vertigo, lightheadness, disequilibrium and Oscillopsia. The patients is asked to answer a question (e.g. How intense are your symptoms?) and mark on 10-cm line (on extreme of left indicate "non" to right "worst possible

intensity"). The clinician then measure the line and obtain a quantified value.

**2. Head impulse Test:** This is a commonly recognized clinical method for analyzing function of semi-circular canal. cervical range of motion should be determined before performing the HIT and physical therapist should explain why the head must be move quickly. The HIT is conducted by first setting the patient to near-target (e.g., the nose of a clinician). When testing horizontal semi-circular canals, the head is flexed 30 degree. In the case of a low amplitude (5-15) of either a moderate amplitude (approximately 200/sec) and high amplitude with an angular momentum (3000-4000/sec), the eyes turn in a direction opposite to the head movement and the focus stays in a manual direction, while the Vestibular Reflex is working in a normal way. In a patient with a loss of vestibular function, the person will not move the eyes rapidly from the target as the head and eyes move away from target. The patient will then take a remedial saccade to reposition the eyes to the target. HIT is a test designed to provide a sensitive indication of vestibular hypofunction.

**3. Dizziness Handicap Inventory (DHI)** is a popular scale used in calculating the automatic impairment of a patient due to vestibular diseases. The DHI is highly accurate in tests and has good reliability internally. Patients respond to 25 question, sub-group into functional, emotional and physical component. The DHI quantifies the patient's sense of disequilibrium and its effect on day-to-day activities. It provides Subjective improvements. Scoring are as: 16-34 -mild disable, 26-35-moderately disable and 54+indicate severely disable.

**4. Berg Balance Scale:** It is used to assess Balance ability of an individual (or incapacity) to manage them safely during a predetermined task. It is a set of 14 items each with an ordinal five-point scale of between 0 and 4. 0 is the lowest function level and 4 shows the highest function level. A. Functional equilibrium is indicated by 56 and score < 45 indicates that the person is more vulnerable to fall.

**5. Dynamic Gait Index:** This is important tool for persons of vestibular dysfunction. Because the test incorporates various head rotation action that challenge vestibular response to gait activities. The DGI is an

eight-item test with each item graded (0 to 30) as severely impaired, or normal, for a maximal score of 24. Then participant will be divided into two: Group-A: Gaze stability exercises and Group-B: Gaze stability exercises with Balance training under supervision. Both exercise protocol will be given for 15-40 min for 15 days depending upon treatment protocol. The exercise should also be progress in gradually so that it should start from simple gaze stabilization exercises (e.g. Patients advised to focus their eyes on close goal) and progressing gradually make it complex (e.g. Patients are advised to concentrate their attention on a near-target as the concentrate is held, the patient rotates the head and target horizontally in the opposite direction. The protocol for Balance should also progress in sequential manner from simple (e.g. Stand apart with feet about shoulder width, arm around the chest and move to near feet) and make it complex (e.g. standing on one leg). After 15 days of treatment program again above test and measure will be performed to evaluate the treatment effects.

### Statistical Analysis

The data will be collected and analysed utilizing inferential and descriptive statistics by using Chi-Square test and student's 't' test (unpaired and paired) & software for analysis will be SPSS 22.0 version and Graph pad prism 6.0 version & level of significance will be considered as  $P < 0.05$ .

### Discussion

Vertigo is the term used to refer to a self for environmental illusion, usually defined as spinning or whirling<sup>1</sup>. Vertigo induces risk of falling, restricts mobility and daily life activities, and limits social involvement<sup>9</sup>. Gaze stabilization exercise is a key component of care for patients with the aim of enhancing the vestibular eye reflex, increasing visual acuity during head movement and reducing vertigo symptoms<sup>11</sup>. Balance exercise can have a positive effect on physical activity for elderly people with vertigo<sup>12</sup>. The study conducted on Effect of gaze stabilization exercise on vestibular function during postural control by Akiyoshi Matsugi, Yusuke Ueta et.al. (2017) on 18 healthy participant (13 men and 5 women mean age) concluded that gaze stabilization exercise are helpful for improving balance and also suggest that the effect of gaze stabilization exercise can produced immediately

after 5 min of training<sup>15</sup>. The study on Effectiveness of gaze stability exercise on balance in healthy elderly population by Vaishali Bhardwaj et.al. (2014) involving 30 participants without any definite balance disorder. The study suggests that the patient undergoing gaze stability exercise for 6-week shown to improve confidence for activities of daily living and balance than control group<sup>16</sup>. The study on Recovery of dynamic visual acuity in unilateral vestibular hypofunction by Susan J. Herdman et.al. (2003) on twenty-one patient with unilateral vestibular hypofunction, aged 20-86 years receiving gaze stabilization exercise four 4-week suggest that gaze stabilization exercise facilitate the recovery of gaze stability during head movement and also suggest that older patients and patient with chronic unilateral vestibular hypofunction may benefit from vestibular rehabilitation<sup>14</sup>. This study protocol detail two physiotherapy intervention in patient with peripheral-vertigo to improve quality of life and to reduce vertigo symptom: Exercises for Gaze stabilization and balance regimen. This study will focus on combine effect of both technique on quality of life and symptom of vertigo in peripheral-vertigo patient.

### Conclusion

This study concluded that there may be significant reduction in vertigo symptoms and improved Quality of Life in peripheral vertigo by using combine effect of Gaze Exercise with Balance Training.

### Ethical Approval and Dissemination

Ethical approval will be taken from institutional ethical committee. The DMIMS who will fund for research and the subjects who will be participating in the study can access the main findings of the research. Data held safely for the enrolled subjects a minimum of five years. After completion of data collection, statistical analysis a completion report will be formed and after review by institutional research cell will be send for publication.

### Confidentiality

Participant and the relative will be informed about the study program and personal information will be taken by principal investigator only, in consent from the confidentiality statement will be mentioned. Signatures of both investigator and patient with two witness will

be taken and for the purpose of the study if needed to disclose some information complete assurance and consent will be taken from the patient.

**Funding of Resources:** No funding

**Conflict of Interest:** The author declares no conflict of interest.

**Dissemination:** After completion of data collection, statistical analysis will be done and completion report will be formed then after checking plagiarism, review by institutional research cell, will be send for publication.

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