International Journal of Otorhinolaryngology and Head and Neck Surgery
George RR et al. Int J Otorhinolaryngol Head Neck Surg. 2026 Apr;12(2):191-195
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937
DOI: https://dx.doi.org/10.18203/issn.2454-5929.ijohns20260786

Original Research Article

Position test with video Frenzel: does it have an added advantage compared to position test without video Frenzel?

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Received: 15 July 2025
Revised: 06 February 2026
Accepted: 07 February 2026

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ABSTRACT

Background: Benign paroxysmal positional vertigo (BPPV) is a common peripheral vestibular disorder that affects 2.4% of the population at any point in their lifetime. The diagnosis of this condition using positional tests has been a major milestone, largely due to the eminent work of Robert Bárány, Margaret Dix, and Charles Hallpike, who devised the positional test. As research and innovations progressed, Frenzel glasses—used to identify nystagmus clearly—and video-Frenzel system, which magnify and record nystagmus, became prevalent.
Methods: A prospective study was conducted on 118 patients with symptoms suggestive of BPPV. Initially, the positional test was performed without Frenzel glasses. After 15 minutes, the test was repeated with video-Frenzel.
Results: Results were analyzed using the chi-square test. A statistically significant increase in the detection rate of BPPV and multi-canal BPPV was observed when the positional test was performed with video-Frenzel.
Conclusions: Hence, we recommend performing the positional test with video-Frenzel in suspected BPPV cases.

Keywords: BPPV, Positional test, Frenzel glasses

INTRODUCTION

Benign paroxysmal positional vertigo (BPPV) is a common peripheral vestibular disorder which affects 2.4% of population at any point in their life time. The diagnosis of this disease by position test has been a major mile stone and has been due to the eminent work by Robert Barany, Margret Dix, Charles Hall pike who devised position test for diagnosis of BPPV. From time, immemorial history and position tests have been the Gold Standard for the diagnosis of BPPV. Recurrent vertigo lasting seconds to minutes, triggered by looking up, down, turning head, rolling in bed which occur in Spells, multiple episodes a day or week suggest BPPV. Dix hall pike test, Mc Clure Pagnini test, Supine head hanging test helps to elicit the corresponding nystagmus characteristic for a particular canal affected and helps to diagnose the type of BPPV. As per the Ewald's first law, the diagnosis of BPPV rest on the type of nystagmus generated and not the type of test performed. Stimulation of a semicircular canal results in nystagmus in the same plane as the semicircular canal. Hence, it is the type of nystagmus generated that diagnose BPPV and not the test performed.[1] A fundamental characteristic of peripheral vestibular nystagmus is that it is suppressed by visual fixation. Nearly a hundred years ago, Professor Dr Hermann Frenzel (1895-1967) an eminent otolaryngologist from Gottingen started his work on removal of visual fixation while still being able to observe the eye movements. He incorporated high dioptre lenses that made it difficult for the patient to focus on him but easy for him to focus on the patient's eye,

especially when the goggles were illuminated from within.[2] As research and innovations progressed, Frenzel glass to identify the nystagmus clearly and video Frenzel which magnify and record the nystagmus came in to prevalence.

Video-Frenzel has magnifying glass, lighting system which help in eye movement recording which can be reproduced any number of times without causing discomfort to the patient. It gives a precise assessment of nystagmus. The conversion of nystagmus in to graphs in video Frenzel helps to clearly distinguish vertical and horizontal nystagmus which help in diagnosing multi-canal BPPV.[2]

Aims and objectives

Aims and objectives were to know whether position test done with video Frenzel has an added advantage in picking up BPPV cases compared to position test done without video Frenzel; to know whether there is any increase in pick up rate of multi canal BPPV if position test is done with video Frenzel.

METHODS

Prospective study was conducted in 118 patients who attended ENT department of tertiary care center with symptoms suggesting BPPV.

Sample selection

Patients with symptoms suggesting BPPV who attended ENT OPD of tertiary care center during the time period of 6 months from June 2024 to November 2024 who were ready for two tests i.e., position test without video Frenzel and position test with video Frenzel were included in the study after obtaining verbal consent from patients and bystander.

Material used

The study utilized a Cyclops Balance–Eye videonystagmography instrument for performing position test with video Frenzel and a high-end laptop for data processing.

Data collection methods

The treating ENT doctor after taking a detailed history of patients would send those who are suspected to have BPPV as per the clinical history to the equipped vertigo clinic where a trained audiologist would perform position test with out and with video Frenzel. The same trained audiologist performed the test and interpreted the results in 118 patients. The person performing the test is not taking history. Interpretation of the result as positive was based on whether the nystagmus characteristic for BPPV is produced along with the symptom.

The disease is characterized as posterior canal, lateral canal (Canalolithiasis/ Cupulolithiasis), anterior canal based on the type of nystagmus generated which is elaborated in the discussion part. All the patients underwent position test without Frenzel initially. Whether the result was positive for BPPV or not all of them were asked to go for a walk and position test with video Frenzel was repeated after 15 minutes.

Inclusion criteria

Patients with symptoms typical for BPPV i.e., external vertigo lasting few seconds to minutes on getting up from lying, turning head, lying from sitting position.

Exclusion criteria

Patients with long duration of vertigo and which is not positionally triggered. Patients with severe neck pain or difficulty in turning head.

Results were analyzed with SPSS software. Chi-square test was applied.

RESULTS

Mean age of the study population was 57.7±14.66. The study group had more females than males (Figure 1). Posterior canal involvement was 70.3 % followed by lateral canal (20.80 %). Anterior canal BPPV accounted for 4% and multi-canal BPPV accounted for 5% (Figure 2).

Table 1: Statistics of patients who were positive for BPPV without Frenzel and with Frenzel.

Position test without Frenzel	Frenzel test		Chi square	P value
	Positive	Negative		
Positive	22 (100%)	0	12.897	0.002
Negative	79 (82.3%)	17(17.7%)		
Total	101(86.32%)	17(14.53%)		

Out of the 118 patients studied, 22 were positive for BPPV even when position test was performed without video Frenzel were negative for BPPV when position test was done with-out video Frenzel. Out of 118 became positive for BPPV when position test was done with video Frenzel patients who were negative for BPPV when position test was done with video Frenzel turned out to be

as follows -on vestibular sedatives (8 patients), case of vestibular migraine (8 patients), TIA(1 patient) in which case patient responded very well to ecospirin (Table 1). There is an increase in pick up rate of BPPV by 78.3% when position test is performed with video Frenzel. No patients were identified as multi-canal BPPV when position test was done without video Frenzel. When position test was performed with video Frenzel, five patients were identified as multi-canal BPPV. Multi-canal BPPV identified in our study were a combination of lateral and posterior canal. Two of these patients were identified as single canal BPPV when position test was done without video Frenzel. In multi-canal BPPV the resulting nystagmus will be the vector summation of individual nystagmus. Identifying this becomes easier if position test is performed with video Frenzel as the horizontal and vertical nystagmus can be viewed and analyzed separately (Table 2). Hypertension and diabetes were the comorbidities in our study group. Patients were treated with Epley's maneuver, BBQ roll and Yacovino maneuver.

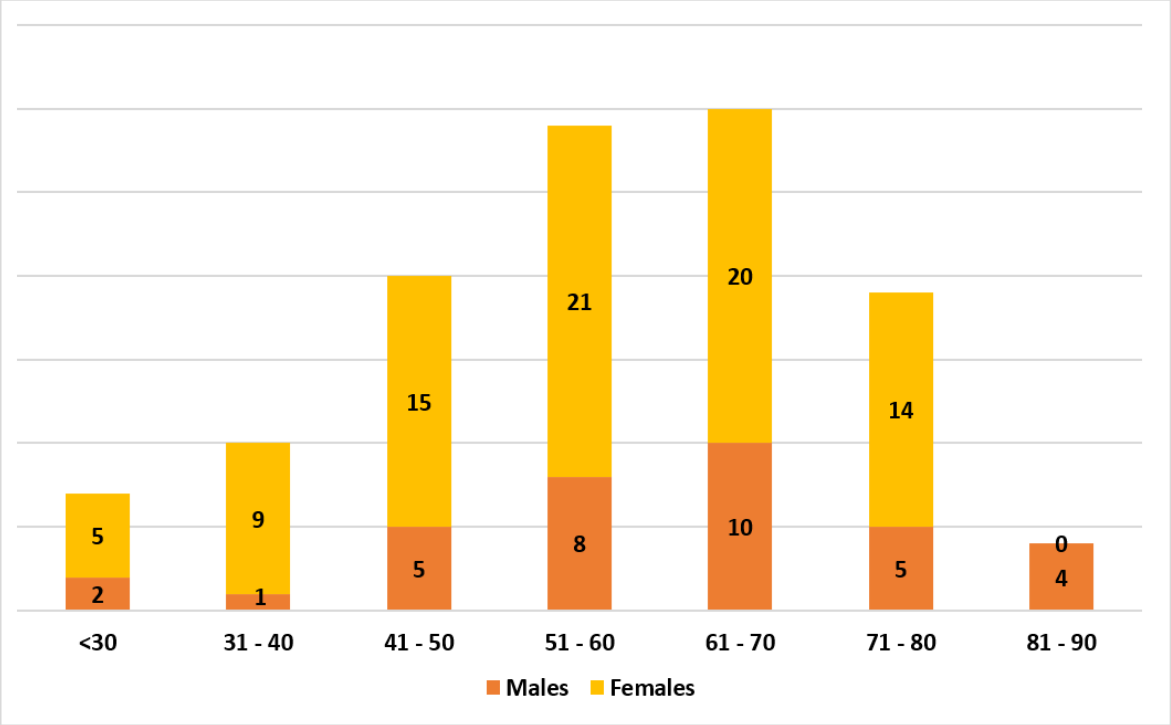

Figure 1: Age and sex distribution of study population.

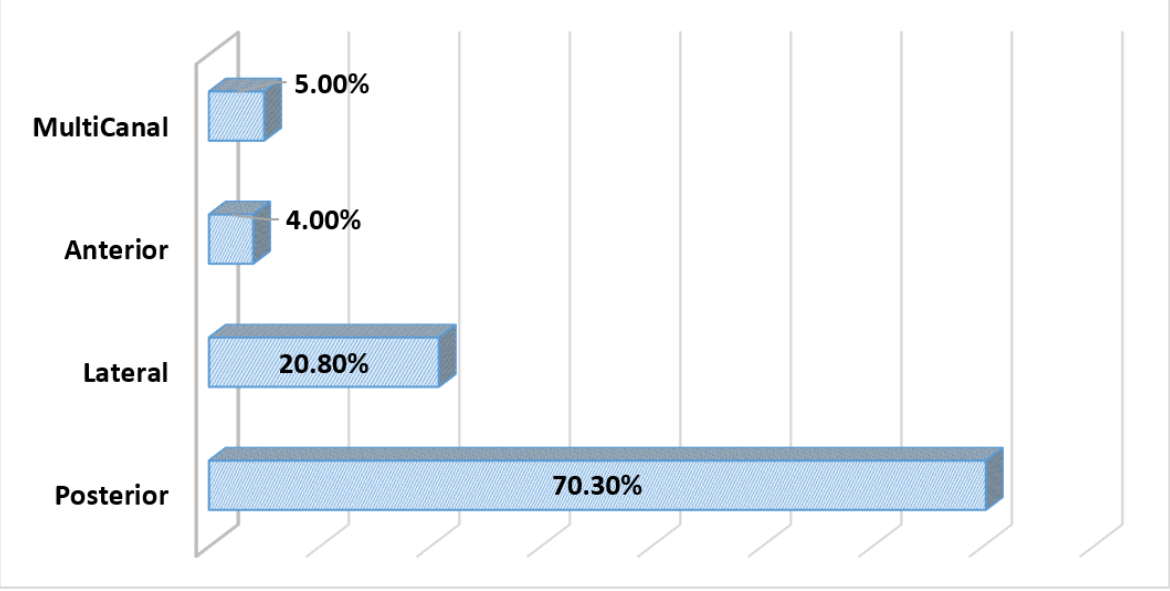

Figure 2: Percentage of involvement of different semicircular canals.

Table 2: Number of multi canal BPPV picked up by positional test with Frenzel and without Frenzel.

Multi canal BPPV picked up	Number
In position test with Frenzel	5 patients
In position test without Frenzel	Nil (2 patients identified as single canal BPPV). 3 patients missed

DISCUSSION

BPPV is the most common cause of peripheral vertigo which inflicts a considerable personal and socio-economic burden. BPPV is characterized by spontaneous remissions, frequent and infrequent recurrences. BPPV can be posterior canal, lateral canal, anterior canal which in turn can be canalolithiasis, cupulolithiasis, short arm BPPV, long arm BPPV. The otoconia trapped in the semicircular canal because of gravity move after changes of the head position in the plane of the affected canal. The resulting inappropriate endolymph flow deflects the cupula and thus modulates the activity of the vestibular afferents of the affected canal, causing attacks of positional vertigo and nystagmus (canalolithiasis). BPPV can be attributed to otoconia that are attached to the cupula of a semicircular canal and render it sensitive to gravity (cupulolithiasis).[3,4]

Position tests help in diagnosis of BPPV. Posterior canal BPPV is diagnosed if vertical upbeat nystagmus with or without torsional component (torsional component with beating of the upper pole of the eyes towards the affected side) is induced by the Dix-Hallpike test and the reversal of the nystagmus occurred on returning to an upright position.[5,6]

The diagnostic maneuver for lateral semicircular canal BPPV is supine roll test or McClure Pagnini test. In geotropic variant of horizontal semicircular canal, the affected side is the one in which nystagmus is more intense in lateral turn of McClure Pagnini. In the apogeotropic variant of lateral canal BPPV, the affected side is the one with less intense nystagmus in McClure Pagnini. The anterior canal BPPV is diagnosed by supine head hanging test where down beating nystagmus with IPSI torsion suggests anterior canal involvement.[6-8]

Ewald's has proposed three laws based on polarity of kinocilia in semicircular canal cristae. Ewald's first law state that eye and head movement occur in the plane of semicircular canal being stimulated and in the direction of endolymph flow. Hence whatever be the test performed to identify the canal involved the type of nystagmus generated during the test become a guide.

Why should we think of doing position test with video Frenzel when position test was routinely performed to diagnose BPPV from old days. With advancement in scientific research our understanding of BPPV has increased over the years and now we have identified subtypes for posterior, lateral and anterior canal BPPV based on position of otoconia in the semicircular canal. The diagnostic accuracy of BPPV depends on the identification of nystagmus.

The difficulties faced in BPPV patients which cause difficulty in identifying the nystagmus are the following. In many cases of BPPV the patient may be in acute distress and the examiner performing the test may find it difficult to assess the type of nystagmus amidst managing the patient in distress. The presence of horizontal and vertical nystagmus as in multi canal BPPV may be difficult to determine as it is the vector summation of nystagmus which is perceived.

The advantages of performing position test with video Frenzel are video recording of eye movements and graphical recordings of eye movement are obtained simultaneously. Examiner may perform the position test comfortably giving full care and attention to the patient and then reassess the nystagmus from the video recordings of eye movements and graphs. This can be done any number of times without causing additional discomfort to the patient. It is non-invasive. No pain or discomfort for the patient.

We conducted this study to know whether there is a statistically significant increase in pick up rate of BPPV when position test is performed with video Frenzel. To avoid bias a trained audiologist who does not know the history of patient was asked to interpret the result by analyzing the nystagmus in test without video Frenzel and with video Frenzel. This study clearly shows that nystagmus is picked up easily and clearly when position test is done with video Frenzel.

There is an increase in pick up rate of BPPV by 78.3% when position test is performed with video Frenzel. Multicanal BPPV cases that were missed during positional testing without video-Frenzel were detected when the test was performed with video-Frenzel. Multi canal BPPV missed when position test was performed without video Frenzel were picked up when position test was performed with video Frenzel.[9]

Patients who have symptoms during position test but the examiner does not get the nystagmus are categorized as subjective BPPV. In our study patients who were felt to have subjective BPPV turned out to be BPPV positive cases when position test was performed with video Frenzel. The reason may be the subtle nystagmus missed by the observer, less noxious form of BPPV where nystagmus may not be robust for to diagnose BPPV.[10]

CONCLUSION

Instrumentation and technology have improved the diagnosis and treatment of diseases. As science advance the diagnosis and treatment strategies improve. Our aim should be to give the best of all available modalities in diagnosing a disease Video Frenzel use has definitely increased the pickup rate of BPPV and multi canal BPPV. If there is availability of video Frenzel, it is always better to perform position tests with video Frenzel. In the diagnostic work up of BPPV doing position test with video Frenzel definitely has an added advantage.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Hornibrook J. Horizontal Canal Benign Positional Vertigo. Ann Otol Rhinol Laryngol. 2004;113(9):721-5.
2. Halmagyi GM, McGarvie LA, Strupp M. Nystagmus goggles: how to use them, what you find and what it means. Pract Neurol. 2020;20(6):446-50.
3. Von Brevern M, Bertholon P, Brandt T, Fife T, Imai T, Nuti D, et al. Benign paroxysmal positional vertigo: Diagnostic criteria. J Vestib Res. 2015;25(4):105-17.
4. Von Brevern M, Bertholon P, Brandt T, Fife T, Imai T, Nuti D, et al. Benign paroxysmal positional vertigo: Diagnostic criteria Consensus document of the Committee for the Classification of Vestibular Disorders of the Bárány Society. Acta Otorrinolaringol Esp. 2017;68(6):349-60.
5. Wang W, Yan S, Zhang S, Han R, Li D, Liu Y, et al. Clinical Application of Different Vertical Position Tests for Posterior Canal-Benign Paroxysmal Positional Vertigo-Cupulolithiasis. Front Neurol. 2022;13:930542.
6. Hornibrook J. Benign Paroxysmal Positional Vertigo (BPPV): History, Pathophysiology, Office Treatment and Future Directions. Int J Otolaryngol. 2011;2011:835671.
7. Libonati GA. Benign Paroxysmal Positional Vertigo and Positional Vertigo and positional vertigo Variants. Int J Otorhinolaryngol Clin. 2012;4(1):25-40.
8. Lempert T, Tiel-Wilck K. A positional maneuver for treatment of horizontal-canal benign positional vertigo. Laryngoscope. 1996;106(4):476-8.
9. Zhu Y, He X, Chang L, Hu M, Yang J, Chang L, et al. Objective findings in patients with multi-canal benign paroxysmal positional vertigo. Ear Nose Throat J. 2024;103(8):NP508-13.
10. Balatsouras DG, Korres SG. Subjective Benign Paroxysmal Positional Vertigo. Otolaryngol Head Neck Surg. 2012;146(1):98-103.

Cite this article as: George RR, Dhanya EK, John S, Lazar A, Sashikumar S, Baby J, et al. Position test with video Frenzel: does it have an added advantage compared to position test without video Frenzel?. Int J Otorhinolaryngol Head Neck Surg 2026;12:191-5.