



# Case Study:

## Interprofessional practice (IPP) team’s vestibular assessment provides clues for life-changing diagnosis.

### Summary

An interprofessional disciplinary team utilized a vestibular test battery—along with other clinical, laboratory, and imaging findings—to help support the diagnosis of demyelinating disease in a 57-year-old male. Vestibular testing includes a battery of test measures designed to determine the function of the peripheral vestibular system and associated central nervous system pathways. While this testing does not identify underlying disease, it can aid in revealing the site of the lesion to support a diagnosis.

### Patient Info



**57-YEAR-OLD MALE**

#### Current Diagnosis:

Concerns about right-sided facial paresthesia and otalgia, which began 5 months prior

### Meet The Team



Audiologist



Physical therapist



Neurotologist



Neurologist



Radiologist



Emergency room physician



Medical resident



Otolaryngologist



Physician assistant



Patient

Continue for more 

## Background

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A 57-year-old male presented to the emergency room (ER) with concerns about right-sided facial paresthesia and otalgia, which began 5 months prior. He had a previous history of recurrent “eardrum perforations” and reported that he had “problems with his ear for quite some time.” A basic laboratory work-up was completed, which was unremarkable. Computed tomography (CT) of the brain was negative for an acute process. While the patient was in the ER, the ER physician consulted the on-call medical neurology resident, who completed a bedside exam. It was recommended that the patient be discharged from the ER but follow up with (1) an otolaryngologist for further management of otalgia and (2) a neurologist, given the patient’s facial paresthesia.

The patient was evaluated by an otolaryngologist 6 days following the ER visit. In addition to right-sided otalgia and facial paresthesia, the patient also endorsed right-sided aural pressure, hyperacusis, and dizziness. He reported vertigo near the initial onset of symptoms (5 months prior), which was resolved with an at-home canalith repositioning maneuver (Epley). Although positional vertigo had improved, he still felt symptoms of constant dizziness occurring nearly daily, exacerbated by quick head movements. The otolaryngologist recommended an audiological evaluation and vestibular testing.

The patient was also evaluated by a neurologist (as recommended by ER physician), who observed nystagmus with left lateral gaze and decreased sensation in the right V1 through V3 distribution. Functional gait assessment revealed decreased left-arm swing and falls to the right when walking. A magnetic resonance imaging (MRI) of the brain and cervical spine was done to rule out a central cause of this vertigo—such as prior infarct, demyelinating disease, or enhancing lesion.

## How They Collaborated

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The patient endorsed the aforementioned symptoms and bilateral subjective hearing loss—with the right ear performing poorer than the left.

The audiological evaluation revealed right ear hearing sensitivity within normal limits through 2000 Hz sloping to moderately severe sensorineural hearing loss. Left ear hearing sensitivity was within normal limits through 3000 Hz sloping to moderate sensorineural hearing loss.

Although air conduction pure-tone thresholds did not reveal a significant interaural asymmetry, word recognition scores (WRS) for the right ear were 80%; WRS for the left ear were 100%. Tympanometry was within normal limits bilaterally for the following parameters: ear canal volume, tympanic membrane mobility, peak pressure, and tympanic width.

Acoustic reflexes were not completed due to equipment availability. Vestibular testing revealed significant uncompensated right-sided vestibular hypofunction with the concern of a central vestibular contributor, given the patient’s history and symptoms. Clinical correlation—that is, connecting test results to clinical findings to arrive at a correct diagnosis—was advised. During the vestibular test battery, bedside examination revealed lagophthalmos (inability to close eye) of the right eye; normal ocular function was observed with the right eye.

Given the patient’s right-sided facial paresthesia, observed ocular abnormalities, and evidence of a right-sided vestibular dysfunction, the vestibular audiologist consulted a physician assistant (PA) with a specialty in otology. The PA evaluated the patient’s facial nerve function. The examination of the face suggested that facial nerve function was grade two out of six on the House-Brackman scale. The providers decided a prompt referral to neurotology was necessary.

The patient was evaluated by a neurotologist 2 days after the vestibular evaluation. The neurotologist agreed with the PA's evaluation of facial nerve dysfunction. The patient's overall clinical picture—including the results of audiological and vestibular testing—warranted an MRI of the internal auditory canals. The neurotologist also recommended vestibular rehabilitation (physical therapy) to aid in treatment of dizziness symptoms. The MRI confirmed the suspicions of the vestibular audiologist, PA, neurologist, and neurotologist, as evidenced by the radiologist's report of abnormal signal of the right dorsolateral pontomedullary junction (in the region of medial and inferior vestibular nuclei, posterior cochlear nucleus, nucleus of the tractus solitarius, and inferior cerebellar peduncle) with considerations for late subacute infarct, demyelination, or neoplasm.

A team meeting with the vestibular audiologist, neurologist, neurotologist, radiologist, and vestibular PT was scheduled. The team reviewed MRI results, vestibular test battery results, and clinical examination findings. The medical providers (neurologist, neurotologist, and radiologist) determined that a demyelinating disease was weighted highest on their differential diagnosis list based on other clinical factors from their examinations and expertise. The radiologist suggested a repeat MRI within 2-3 months, with close clinical surveillance of the patient. The neurotologist shared his knowledge regarding vertigo as a possible initial symptom of demyelinating disease. The vestibular audiologist shared vestibular testing results and how this could support the patient's vestibular-related symptoms and the current impact on overall quality of life. The vestibular PT and the vestibular audiologist discussed a tailored vestibular rehabilitation treatment program for this patient, given the vestibular testing results. The audiologist informed the team that a hearing needs assessment and hearing aid evaluation should be completed, given the patient's bilateral high-frequency sensorineural hearing loss. The neurotologist medically cleared the patient for hearing aids.

## Outcome

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The patient continued medical management with neurology for purported demyelination disease. He continued to work with his vestibular PT to improve vestibulo-ocular reflex (VOR) deficiencies observed with vestibular testing. The patient reported that his dizziness significantly improved with vestibular physical therapy. He utilized bilateral amplification—which, he reported, helped to significantly improve his ability to converse with his wife and children. The work of the IPP team helped confirm a diagnosis, thus initiating treatment to help improve the patient's quality of life.

## On-Going Collaboration

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# Case Rubric:

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MALE**

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Neurotologist



Neurologist



Radiologist



Emergency room physician



Medical resident



Otolaryngologist



Physician assistant



Patient

### History and Concerns

(Share key information gathered from team)

A **57-year-old male** presented to the ER with a history of right-sided otalgia, facial nerve dysfunction, dizziness, and hearing loss, with the right ear poorer than the left. The patient was referred to an audiologic and vestibular evaluation through comprehensive otology. Asymmetrical WRS scores were observed upon the audiologic evaluation. During vestibular testing, incomplete closure of the right eye (paralytic lagophthalmos) was observed, with significant right-sided vestibular hypofunction in an uncompensated state. An otology physician assistant (PA) then examined the patient, given the facial nerve dysfunction. It was recommended that a neurotologist further evaluate and manage the patient.

Continue for more ↓

## Case Rubric continued

### Assessment Plan

(Determine roles/  
responsibilities for  
evaluation)

#### Meet the team:



**Audiologist:** Completes an assessment of the vestibular system with use of the following measures: videonystagmography (VNG), video head impulse test (vHIT), vestibular-evoked myogenic potentials (VEMPs), and rotational chair. The audiologist also diagnoses and manages hearing loss.



**Physical therapist (PT):** Facilitates targeted treatment and rehabilitative efforts for vestibular-related symptoms.



**Neurotologist (team leader):** An otolaryngologist with additional specialized medical and surgical training of the ear.



**Neurologist:** A physician to diagnose and treat conditions related to the brain and central nervous system.



**Radiologist:** A physician who makes a diagnosis based on medical imaging procedures.



**Patient**

#### Other team members facilitating the patient's care:



**Emergency room physician:** A physician who provides medical care to patients with acute critical conditions.



**Medical resident:** A medical doctor who is completing post-graduate training.



**Otolaryngologist:** A physician who diagnoses and treats ear, nose, and throat conditions.



**Physician assistant:** A licensed medical provider who diagnoses and treats medical conditions.

## Case Rubric continued

### Assessment Plan

(Determine roles/responsibilities for evaluation)

The patient was evaluated by a neurotologist, who expedited neuroimaging of the internal auditory canals and recommended vestibular rehabilitation with physical therapy. The MRI revealed an abnormal signal of the right dorsolateral pontomedullary junction (in the region of medial and inferior vestibular nuclei, posterior cochlear nucleus, nucleus of the tractus solitarius, and inferior cerebellar peduncle) with considerations for late subacute infarct, demyelination, or neoplasm. The IPP team—consisting of the vestibular audiologist, vestibular PT, neurotologist, neurologist, and radiologist—discussed their examination findings. Through a series of repeat imaging (including an MRI of the cervical spine) and clinical evaluations, the team ascertained a diagnosis of demyelinating disease.

### IPP Treatment Plan

(Discuss, reflect, and modify recommendations to develop a coordinated plan)



**Audiologist(s):** Presented clinical findings to the treatment team and conferred with vestibular physical therapy regarding treatment for vestibular rehabilitation. The audiologist also managed hearing loss by way of bilateral amplification.



**Physical therapist:** Utilized vestibular findings to guide decision making during treatment and rehabilitation efforts.



**Neurotologist:** Shared their clinical insights regarding the presentation of vertigo in patients with demyelinating disease. The provider also medically cleared the patient for hearing aids.



**Radiologist:** Relayed differential diagnosis based on neuroimaging; recommended next steps.



**Neurologist:** Contributed to final diagnosis based on clinical, laboratory, and neuroimaging examination.

## Case Rubric continued

### Treatment Outcomes

(Discuss results of treatment)

Although the patient received an unfortunate diagnosis, the IPP team helped provide an accurate diagnosis and curate a patient-centered treatment plan to improve the patient's overall quality of life.

### Acknowledgement

ASHA extends its gratitude to the subject matter expert(s) who were involved in developing the original version of this IPP case:

Evalena Behr, AuD, Head and Neck Institute, The Cleveland Clinic

### Citations

American Speech-Language-Hearing Association. (n.d.). *Team's Vestibular Assessment Provides Clues for Life-Changing Diagnosis*. <https://www.asha.org/practice/ipe-ipp/case-studies/case-study-24/>

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