

VESTIBULAR REHABILITATION SIG

APTA & Academy of Neurologic Physical Therapy



VESTIBULAR REHABILITATION
SPECIAL INTEREST GROUP

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Message from the Chair

Rachel Wellons, PT, DPT, NCS
Vestibular Rehab SIG Chair

I'm honored to write my first message as the Chair of the Vestibular SIG. I've been a PT for over 17 years, practicing in Vestibular Rehab for 15 years. I first became interested in Vestibular Rehabilitation as a PT student at the University of Scranton about 20 years ago. I completed an independent study project entitled "Differential Diagnosis of Dizziness" and happily I'm just as passionate about the subject now as I was then!

After PT school I lived and worked in Philadelphia at Thomas Jefferson University Hospital and ran their Vestibular Rehabilitation program. Ten years ago I decided to transition to a career in fulltime academia and moved to New Orleans to take a faculty position. In my faculty role at LSU Health Sciences Center New Orleans I teach the neurorehabilitation courses, prosthetics and orthotics, and a professionalism course. The LSU New Orleans PT program has a clinic which is used for patient care, research, education, and a pro-bono student neuro clinic. I treat about 5-10 patients a week in that clinic, focusing my practice on patients with vestibular disorders or other gait/balance impairments from other neurologic disorders.

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Message from the Chair cont.

As we approach almost a year of living with COVID, I want to acknowledge how COVID has impacted Vestibular Rehab and how members of the SIG have risen to the challenges unexpectedly hoisted upon them. This has without a doubt been the most challenging time for patient care in my career. I have noticed that the momentous events of 2020 – the pandemic, fight for racial equality, and presidential election of 2020 have caused significant increases of anxiety and depression in my patients. I believe this has perpetuated vestibular symptoms and made these patients more complex. I'm sure all of you have experienced this as well and have stepped up to provide support and care during these difficult times, very likely during times that you felt like you had nothing left to give. Nevertheless you persisted, dug deep, and found more capacity to give care. For that I am endlessly proud of each and every one of you.

COVID changed how we provided PT care overnight. Vestibular Rehabilitation has been at the forefront in the telehealth movement for a few years but this spring we all realized how valuable our efforts have been. Overnight vestibular therapists transitioned to telehealth practice, with Sarah Gallagher and Sara Oxborough providing resources for members. Many of you did this while figuring out how to transition your children to online learning and/or caring for small children without daycare or grandparent help. Most of you have put yourself in harm's way to provide PT care during the pandemic. Others lost jobs and incomes overnight and worried how bills were going to get paid. You are now leading by example by getting vaccinated for COVID. It must also be acknowledged that you did all of this mostly without the usual outlets for stress relief, such as vacations, events, restaurants/bars, family gatherings, celebrations, exercise classes, and more. I am proud of your ability to put one foot in front of the other each day and to figure out how to best provide care during these difficult times.

Despite the difficulties of COVID, the Vestibular SIG has made major accomplishments during this time. Thanks to the 96 people who filled out our membership survey. We value your feedback and are utilizing your feedback to tailor SIG resources. We have started monthly Facebook Live journal clubs/education on the 1st Wednesday of the month at 8:00 EST. Thanks to **Emma VanSickle**, **Rebecca Russell**, and **Lynn Johnson** for their help with this initiative. We have also continued to provide resources for members through Abstract of the Week (**Sara Oxborough**), Podcasts (**Maureen Clancy**), Social Media (**April Hodge**) and Fact Sheets (**Lisa Heusel-Gillig**). We're continuing efforts for online education, and there is an online course on "Introduction to Vestibular Rehabilitation" in development. We are also outlining a path for clinical development in the area of Vestibular Rehab, led by Carrie Hoppes, to help guide members as to the next step in their professional development in this area.



Message from the Chair cont.

I am sad that I will not be able to meet and engage with members in person at CSM this year. I hope that the virtual format will make CSM programming more accessible to those members who could not travel for the meetings. As always there will be fantastic Vestibular Rehabilitation programming and research, with the specifics highlighted in this newsletter.

If you are like me, planning for the future helps you make it through the day. The Academy of Neurologic Physical Therapy will host the first Annual Conference virtual this year from October 1st – 3rd. In 2022, we look forward to the 2nd Annual ANPT Conference (Thursday, October 13th – Saturday, October 15th) back to back with the 2nd International Conference for Vestibular Rehabilitation (Saturday, October 15th – Monday, October 17th) in Minneapolis, MN.

Many thanks to all of the Vestibular SIG volunteers and members. We are only as strong as our members. I look forward to serving as your chair and feel free to reach out to me (rtromm@lsuhsc.edu) for suggestions on driving our organization forward.

CSM Programming

Monday, February 8th

- 8:30 EST Headaches, Dizziness, and Tinnitus: It's all in the Neck

Thursday, Feb 11th

- 8:30 EST Neuromodulation of the Brain: Treatment options to manage Migraine, Clinical Depression, and Locomotion Deficits

Monday, February 15th

- 7:30 EST Acknowledging Vestibular Dysfunction in the Wake of a Multitude of Cardiovascular and Pulmonary Presentations

Tuesday, February 16th

- 7:00 EST Chronic Pain and Chronic Dizziness: Parallels in Pathophysiology and Intervention
- 7:30 EST: Fear Avoidance Behaviors in Concussion Management: Using the Pain Science Framework to Improve Outcomes
- 9:30 EST Virtual Reality Application for Balance Examination and Intervention: From Theory to Practice

Thursday, February 18th

- 8:00 EST Vestibular SIG Business Meeting

On-Demand Sessions

- Vestibular Function, Visuospatial Ability, and Cognition in Ageing: Where are we now
- Perceiving is Believing: Understanding Verticality Perception, Navigation, and Motion Perception in Health and Impaired Populations
- Is Your Patient a Dizzy Dame/Spinning Sir? Vestibular Differential Diagnosis in the Home
- Triage Guide for Dizzy Patients in Home Health: Should They Stay or Should They Go?
- Neurology Platform 3A: Balance and Vestibular Disorders
- Neurology Platform 3B: Balance and Vestibular Disorders
- Telehealth, Not if or How but Who: Searching for Best Practice In the Trenches

A Case of COVID-19 Induced Vestibular Neuritis

Authors: Malayala SV and Raza A

Review by Holly Paczan, PT, MPT, NCS

The World Health Organization declared COVID-19, a novel coronavirus infection, as a pandemic in March 2020. Since then, information is constantly evolving regarding the pathophysiology, clinical presentation, and treatment of both COVID-19 and its secondary complications. This article highlights a case report of a 29-year-old Hispanic female who presented to the emergency room with sudden onset of severe vertigo, nausea and vomiting. Her only other symptom was generalized fatigue. The patient denied all other symptoms related to COVID-19 as well as other symptoms such as hearing loss, imbalance, or recent trauma. She reported her symptoms as “persistent” vertigo at rest and it worsened with movement. Of note, she was working at a chicken plant in her community, which had a large cluster of COVID-19 infections.

The patient’s exam in the ED was normal – her vitals were within normal limits, she was afebrile, and had no neurological findings. The oculomotor and vestibular exam was minimal per the article due to the patient’s highly symptomatic nature – they could not identify nystagmus and were unable to perform positional testing for possible BPPV or assess her gait and balance. They did perform a CT of her chest/abdomen and pelvis, which showed features consistent with acute COVID-19 pneumonitis. COVID-19-induced acute vestibular neuritis was the presumed diagnosis and she was managed symptomatically with anti-emetics, meclizine, and benzodiazepines as needed.

Additionally, the patient was administered a COVID-19 polymerase chain reaction (PCR) test following the CT findings and the patient tested positive. She was then started on hydroxychloroquine and azithromycin. She never had a fever or any respiratory symptoms throughout her hospital course. She was also treated with intravenous steroids and received vestibular rehabilitation from physical and occupational therapy for a brief time, although no specifics were given related to an objective vestibular exam or what interventions were performed. The patient was released from the hospital 8 days later.

Clinical bottom line:

- It may be important to screen for COVID-19 as an outpatient provider as highlighted in the above case if someone presented to your clinic in this fashion.
- There is increasing information coming out regarding the neurological manifestations of COVID-19 such as non-specific symptoms like dizziness, headache, impaired consciousness, ataxia, seizures, and possibly stroke.
- We know there can be cranial nerve involvement in COVID-19 infections.
- It is important to rule out central causes in patients who present with acute and intractable vertigo.
- This case suggests the importance of having an index of suspicion for COVID-19 infection in patients presenting with upper respiratory and vestibular symptoms or patients who have a known exposure to COVID-19.

Malayala SV, Raza A. A Case of COVID-19-Induced Vestibular Neuritis. *Cureus*. 2020;12(6):e8918. Published 2020 Jun 30. doi:10.7759/cureus.8918

Consensus on Virtual Management of Vestibular Disorders: Urgent Versus Expedited Care

Authors: Shaikh AG, Bronstein A, Carmona S, et al.

Review by Holly Roberts, PT, PhD, GCS, NCS

As a result of the novel coronavirus pandemic (COVID-19), the utilization of virtual and telemedicine services has become more common. Acute vestibular syndrome (AVS), which is characterized by severe vertigo, postural imbalance, intolerance to head movements, and nausea/vomiting accounts for approximately 2.6 million emergency room visits each year. AVS can be caused by stroke or inflammatory disease, which warrant immediate medical attention. Clinicians who provide telehealth services may evaluate patients with AVS. The purpose of this consensus paper was to: 1) describe an examination strategy to capture eye movement and vestibular function using virtual platforms, and 2) develop a decision pathway to guide non-neurotologist clinicians about which patient should seek urgent medical care and which patient should have non-urgent but expedited outpatient management. This consensus paper was written by a taskforce of vestibular and eye movement experts and the target audience is clinicians who are not specialized in neurotology.

Virtual Examination

History The clinician should use the history to ascertain whether the patient is experiencing diplopia, acute unilateral deafness, sensory deficits, focal weakness, or inability to maintain posture. The presence of one or more of these symptoms often suggests central pathology that requires urgent care.

Observation/binocular eye position/nystagmus Clinicians should observe for a head tilt, which suggests an ocular tilt reaction. Next, the patient will gaze directly into the camera in order for the clinician to evaluate for any misalignment of the eyes. The cover/uncover test can be performed using a large spoon or the patient's hand. The symmetry of light reflexes can be assessed using the reflection of the screen. Pupil and lid symmetry should also be observed. Spontaneous nystagmus can be observed with the patient close to the camera and positional nystagmus can be observed using a cell phone or with caregiver assist.

Saccades If the patient is using a computer, saccades can be examined by having the patient quickly shift their gaze to each corner of the monitor. If a cell phone is used, the patient should be directed to use other targets in their room.

Pursuit Using the camera as the target, the patient moves the camera slowly toward the left, right, up, and down with the head stationary and the eyes fixed on the target. Alternatively, the clinician can present a slowly moving target.

Convergence The patient can slowly move the camera toward the eyes while looking at the camera. Alternatively, the patient can slowly move their own finger toward or away from their eyes.

Consensus on Virtual Management of Vestibular Disorders: Urgent Versus Expedited Care cont.

Authors: Shaikh AG, Bronstein A, Carmona S, et al.

Review by Holly Roberts, PT, PhD, GCS, NCS

Vestibulo-ocular reflex and its suppression The vestibulo-ocular reflex (VOR) can be assessed by having the patient move the head while the eyes are fixated on the stationary camera. VOR cancellation is assessed by having the patient hold the camera and rotate the body to the left and right while fixating on the camera.

The taskforce concedes that the head impulse test is difficult to perform in a virtual environment as there is a higher risk of a false negative when the corrective saccade is generated from an active versus passive head movement. However, an active head impulse test is most feasible in the virtual environment and can be performed by having the patient make active rapid head rotations while fixating on the stationary camera.

Stance and gait Standing balance can be assessed with the patient standing in the corner of a room for safety. The patient can ambulate toward and away from the camera to assess gait.

Hearing Hearing can be assessed using a watch or finger taps. Online hearing tests (i.e. <https://hearingtest.online>) can be used to establish significant hearing asymmetry. Table 1 gives descriptions of the examination techniques listed above.

Table 1 Techniques recognized by the taskforce for examining eye movements and vestibular function using virtual platforms

Exam	Description
Nystagmus	<ol style="list-style-type: none"> 1. Instruct the patient to move close to the camera with eyes fully illuminated. 2. Ask the patient to stare straight ahead at the camera, then assess for nystagmus or other abnormalities. 3. Ask the patient to look approximately 15 deg rightward, leftward, upward, or downward, holding each position for at least 10 s (for down and down/lateral gazes instruct patient/family member to elevate eyelids to ensure visualization of the eyes). 4. Evaluate nystagmus under closed eyelids by looking at the corneal bulges or instruct caregiver/patient to perform a modified penlight-cover test using a cellphone flashlight to examine fixation-removed nystagmus
Saccades	<ol style="list-style-type: none"> 1. Instruct the patient to look straight at the camera. 2. Ask the patient to shift gaze to an eccentric location, such as the rim of the computer monitor or objects on the right or the left of the room at the examiner's instruction. 3. Ask the patient to shift gaze up or down at the examiner's instruction.
Pursuit	<ol style="list-style-type: none"> 1. Instruct the patient to look at the camera. 2. Ask the patient to move the camera smoothly to the right or to the left while fixating on the camera.
Test of binocular alignment	<ol style="list-style-type: none"> 1. Instruct the patient to move close to the camera with eyes fully illuminated. 2. Look for asymmetry in the corneal light reflection. 3. Ask the patient to use their palm to cover and uncover one eye. The examiner watches the movement of the eye after it is uncovered. 4. Ask the patient to perform alternating monocular occlusion using the palm of the hand for 2-3 s at a time and/or following the physician's direction.
Head impulse test	<ol style="list-style-type: none"> 1. Instruct the patient to move close to the camera with eyes fully illuminated 2. Ask the patient to fixate on a shared visual target in the center of the screen and rapidly move the head in the horizontal plane at the direction of the physician.

Consensus on Virtual Management of Vestibular Disorders: Urgent Versus Expedited Care cont.

Authors: Shaikh AG, Bronstein A, Carmona S, et al.
Review by Holly Roberts, PT, PhD, GCS, NCS

Asynchronous Virtual Examination

Asynchronous virtual examinations are useful when there is suboptimal video quality, poor lighting, or a slow network speed. With proper instructions, patients can record videos of elements of the examination and send them to the clinician using a secure web-based platform.

Determining the Level of In-Person Care

Clinicians must determine whether the patient with AVS needs immediate medical care (i.e. emergency department) or whether the patient can undergo non-urgent outpatient medical management. The following guidelines are proposed for clinical decision-making.

Urgent admission to the emergency department Features in the subjective exam that suggest the need for immediate admission to the emergency department include the first spell of acute imbalance, advanced age, and vascular risk factors. Features of the objective exam that indicate the patient should present to the emergency department are 1) signs of brainstem or cerebellar dysfunction such as impaired speech, diplopia, unilateral limb weakness, ataxia, clumsiness, paresthesia or numbness, and hearing loss; 2) truncal ataxia to an extent as to the patient cannot ambulate unassisted, especially in the presence of nystagmus; 3) occipital or sub-occipital headache, especially if this is the first episode of a headache with vertigo; 4) a known exacerbation of multiple sclerosis, and 5) patients with vestibular neuritis who do not fit typical characteristics or those with positional vertigo who do not fit typical characteristics of benign paroxysmal positional vertigo (BPPV).

Non-urgent but expedited outpatient evaluation Features in the objective exam that indicate the patient should have a non-urgent, but expedited in-person examination include 1) progressive deficits of eye movements and vestibular function or truncal and gait ataxia; 2) severe forms of BPPV that do not resolve with virtually-directed intervention, and 3) patients with recurrent episodes of vertigo without inter-ictal deficits as this could indicate a risk for a stroke.

The supplementary material for the article includes a video demonstration of a synchronous examination of a healthy volunteer. There are also video links for patients with abnormal examination findings. The videos are helpful for clinicians who are new to conducting virtual examinations or who are unfamiliar with the tests. The recommendations proposed in the article are based on the clinical practice of the taskforce members. The authors emphasize “if there is any doubt, unusual features, or lack of clarity in the acute or subacute of a novel symptom, or inability to accurately examine the patient due to technical limitations” providers should exercise a low threshold to direct the patient to an emergency department for an expedited evaluation. The recommendations are driven by consensus of the taskforce members and have not been validated for efficacy. Future research should investigate the effectiveness of application of the suggested practice patterns and patient outcomes. Medical and rehabilitative management beyond triage are not addressed in the article.

Shaikh AG, Bronstein A, Carmona S, et al. Consensus on Virtual Management of Vestibular Disorders: Urgent Versus Expedited Care. *Cerebellum*. 2020 Aug 14:1-5. doi: 10.1007/s12311-020-01178-8.

Otolaryngological Manifestations of Hospitalised Patients with Confirmed COVID-19 Infection

Authors: Korkmaz M, Eğilmez O, Özcelik M, et al.

Review by Andrea Richards PT, DPT, NCS

According to the researchers, Korkmaz et al, current evidence suggests the most common signs and symptoms of a COVID-19 infection are cough, fever, sputum production, dyspnea, arthralgia, myalgia, rhinorrhea, sore throat, headache, and diarrhea. However, as more research is being conducted, there has been another subset of symptoms identified, but the frequency and duration of these symptoms is not well studied. Those symptoms are the chemosensory dysfunction symptoms of anosmia and ageusia. The presence of anosmia without nasal symptoms suggests that direct viral damage occurs to the chemosensory system (olfactory nerve); however, the extent of direct viral damage to the cranial nerves has not been studied. These researchers hypothesized that direct viral damage may affect other cranial nerve pairs, including the vestibular and acoustic nerve.

The study researchers theorize that the neurological involvement of COVID-19 virus is through the Angiotensin-converting enzyme 2 (ACE2) mechanism. This enzyme receptor is commonly found in the lung alveoli and is also expressed in glial cells and neurons, and it has been suggested that SARS-CoV-2 can pass through the cribriform lamina through the ACE2 receptor, and transneuronal transportation can be achieved through the olfactory nerve, leading to anosmia. Therefore, the researchers hypothesize that it seems likely the virus can also affect the functions of the other cranial nerves.

Korkmaz et al performed a prospective observational cohort study of one hundred and sixteen patients with COVID-19 infection with a positive reverse transcription-polymerase chain reaction (RT-PCR) test result, who were also treated by an ear-nose-throat specialist between April and May 2020. There were equal men and women participants included in this study. The average age of the patient was 57.24 ± 14.32 years. The study questionnaire determined that the most common symptoms were consistent with current evidence including dry cough, dyspnea, headache, and nausea/vomiting. Patients in the cohort also experienced otolaryngological symptoms of hypogeusia/ageusia (41.3%) and hyposmia/anosmia (37.9%). Additionally, the questionnaire included the incidence of otologic/vestibular symptoms including dizziness (31.8%), tinnitus (11.2%), hearing impairment (5.2%), and true vertigo (6.1%), to identify the possibility of additional cranial nerve involvement.

The symptoms of tinnitus, true vertigo, headache, smell/taste impairment, sore throat, and voice complaints were statistically significantly common in patients under 60 years of age ($p < 0.05$) and dizziness, headache, smell/taste impairment, sore throat and voice complaints were statistically significantly higher in women ($p < 0.05$). This particular study also found the complaint of dizziness was higher at 31% of participants, than in previous studies examined, which occurred at 16.8% on average. The researchers were unable to determine if the cause of tinnitus and vertigo were truly due to cranial nerve damage, or due to other sequelae of infection, because audiology laboratories were closed during April and May 2020, and therefore objective testing of the other cranial nerves was unable to be performed.

Otolaryngological Manifestations of Hospitalised Patients with Confirmed COVID-19 Infection cont.

Authors: Korkmaz M, Eğilmez O, Özçelik M, et al.

Review by Andrea Richards PT, DPT, NCS

The research conducted by Korkmaz et al attempted to investigate the hypothesis that the SARS-CoV-2 virus can affect the function of other cranial nerves, particularly the vestibulocochlear nerve by the same mechanism that it effects the olfactory nerve. Had the researchers been able to collect objective data to confirm their hypothesis, it would be practical to evaluate patients that have been diagnosed with COVID-19 for peripheral vestibular loss or impairment. Unfortunately, the researchers were unable to obtain objective data to evaluate the vestibulocochlear nerves. The subjective data collection, did reveal that patients in this cohort did experience vestibulocochlear nerve symptoms at a higher rate in patients under 60 years of age and additional cranial nerve impairments were seen at higher rates in women than men.

The limitations of this study to contribute truly novel information to the COVID-19 symptoms database, including the addition of vestibulocochlear nerve involvement and assessment, is that the study cohort was small and the participants did not have significant co-morbidities, which makes it difficult to apply the findings to the general public. Additionally, there were no objective measurements available to determine the extent of direct viral damage to either vestibular or cochlear nerve. The results of this study do indicate that there are higher percentages of patients that experience symptoms related to vestibulocochlear nerve damage, and would warrant further investigation and objective data collection for dizziness, tinnitus and vertigo in the future.

Özçelik Korkmaz M, Eğilmez OK, Özçelik MA, Güven M. Otolaryngological manifestations of hospitalised patients with confirmed COVID-19 infection. *Eur Arch Otorhinolaryngol.* 2020 Oct 3:1-11. doi: 10.1007/s00405-020-06396-8.

2020 Newsletter Article of the Year Award



Dr. Jeffrey Hebert

The VRSIG Leadership Committee and Co-Editors of the Newsletter would like to congratulate Jeffrey Hebert, PhD, PT for authoring the Newsletter Article of the Year entitled “The Evolving Landscape of Vestibular-related Rehabilitation for Patients with Multiple Sclerosis: From Conceptualization to Current Best Evidence.”

This award is decided by a panel of reviewers from the SIG leadership team which evaluates articles using the following criteria:

- The article is written clearly and concisely.
- There is a clear theoretical basis for the article.
- The review of literature and introductory statements provide evidence for the importance of the article to physical therapy and makes an important contribution to the understanding of clinical practice and patient care.
- The article provides information that can assist others in the delivery of physical therapy services.
- The article contains clear descriptions of clinical procedures or describes approaches that can be understood by others and contains supportive rationales for the approaches used an elements of the articles with enough clarity to permit replication.

Dr. Hebert’s article clearly describes the process of developing clinical observations into an evidenced based exercise program that objectively addresses sensory integration for the MS patient. His article is an excellent example of knowledge translation into clinical practice. Dr. Hebert describes the BEEMS program approach that can be understood by others with supportive rationale so that application in the clinic setting is immediate.

The VRSIG leadership team would like to acknowledge Dr. Hebert’s contribution to ongoing efforts of education to the VRSIG membership.

Thank you Dr. Hebert!