International Neurological Physical Therapy Association

A physiotherapist's evaluation of dizziness: Is it a stroke or a vestibular issue? Questions & Answers from the lecture (Both Morning and Afternoon sessions)

Thanks for attending this INPA webinar!

Do you still use the HINTS tests if nystagmus isn't present?

If the patient presents with dizziness, then yes. Remember, you may see 'spontaneous nystagmus' (also called 'resting nystagmus') during the acute phase of a vestibular neuralgia, labyrinthitis, or stroke. If a patient presents with complaints of dizziness, just because you do not initially see nystagmus does not mean they have not had a stroke or have an ear infection. As mentioned in the Q & A after the talk, if someone has a subacute neuritis or labyrinthitis, you may only see nystagmus with eccentric gazes (left of right), or when fixation is removed using infrared goggles, Frenzel goggles, or a ganzfeld (staring at a blank wall).

When someone has a nystagmus due to a central problem how much impact does it have on functional mobility e.g., walking, and is there anything PTs can do about it?

Nystagmus that occurs because of a stroke usually subside. In the case of nystagmus caused by a stroke, I give Vestibular Ocular Reflex (VOR) exercises. When needed, if different positions provoke dizziness, I use habituation exercises as well.

Nystagmus that are congenital typically do not impact walking and functional mobility. If they are bothersome or are impacting function, I recommend working on their balance and mobility while referring them to a neuro-optometrist for prisms which may help.

I have heard of a HINTS plus test. How does that differ from the HINTS test and do you use it in your practice?

The HINTS Plus test is the HINTS test with the addition of testing the patient's ability to hear you rub your fingers together (test each ear). Yes, I use it, but keep in mind that 80% of the time you will find the dizziness issue is peripheral (ear) related, and not a stroke. So, while the acute loss of hearing may be a sign of stroke, according to Dr. Jorge Kattah and others in an article published in STROKE journal (HINTS to Diagnose Stroke in the Acute Vestibular Syndrome. Three-Step Bedside Oculomotor Examination More Sensitive Than Early MRI Diffusion-Weighted Imaging. 2009), "Acute auditory symptoms were infrequent but associated with strokes in the anterior inferior cerebellar artery territory and presumed secondary to labyrinthine infarctions, cochlear nucleus involvement, or both."

However, as it only takes a few seconds to test, I test it in case the patient has had one of these strokes. Also, the finger rub will help you determine if an ear infection is a labyrinthitis (which as fluctuating hearing loss) or a vestibular neuritis (which does not have hearing loss).

Could the head impulse test also pick up on a horizontal BPPV, seeing as you are tilting the head into the 30-degree position as you would do in the roll test?

Short answer: Not likely. While it is possible a head impulse can provoke momentary symptoms from a head impulse test, in most cases you will see if the ear is functioning (eyes stay on target) or not (eyes come off the target). Remember, the HINTS test is done in sitting, where the later canal BPPV test (Roll Test) is done either is supine, or in supine with neck flexed to ~ 30 degrees. The positioning tests (Roll Test or Dix-Hallpike) are done to place the canals in a position that will allow otoconia to fall, thereby pushing endolymph against the cupula and causing nystagmus. The Head Impulse Test is a quick head turn of 30 degrees or less, and if there are loose otoconia in the lateral canal, they typically will not move enough to cause nystagmus.

What is VOR cancellation please?

To answer this question, we must first discuss the Vestibular Ocular Reflex (VOR). The VOR occurs when we turn our heads in one direction while maintaining visual fixation on a stationary object, or an object moving (or relatively moving) in the opposite direction of head motion. If we want to move our head and eyes in the same direction of a moving object we are visually fixated on, let's say an airplane, then we must suppress the VOR. Otherwise, while we turn our head to follow the plane, our eyes would move in the opposite direction. The cerebellum is responsible for suppression of the VOR in these instances.

The VOR – C (VOR Cancellation) is when we have our patients fixate on their outstretched thumb while moving it with the head (tracking it as it moves in the same direction as their head). If you see a bunch of catch-up saccades, these indicates a cerebellar issue. If the eyes stay on the target as they turn their head without coming off, that indicates a normal test. I use it as a cerebellar screen.

Head Impulse test: positive bilaterally. Does this indicate bilateral ear issues?

It may, but under certain circumstances. Typically, we see bilateral vestibular loss following toxicity from aminoglycoside antibiotics, or cisplatin chemotherapy. Sometimes you also see if following a stroke. If while testing a patient for acute dizziness or falls you find positive head impulse tests, I recommend asking for an MRI to rule-out central pathology.

Do Vestibular Rehab Programs -CAWTHORNE COOKSEY EXERCISESS work only for ear problems or also for the cerebellar causes of dizziness?

I do not use Cawthorne-Cooksey Exercises, as they are a 'shotgun' approach. If I am treating a vestibular issue, I prefer VOR exercises. If I am treating a central dizziness, I use either/or VOR exercises and habituation exercises. Targeted treatments work much better than Cawthorne-

Cooksey. However, if you are unfamiliar with these types of treatments, Cawthorne-Cooksey exercises will work to some degree for both.

Which test would differentiate between acute stroke recurrence and chronic stroke?

The HINTS exam is not able to determine the age of a stroke, it will just detect the stroke. An MRI and interpretation of a Radiologist would be needed to determine the age of a stroke. If you have a patient who has already had a stroke and presents with dizziness, a MRI is recommended.

What's the difference in between saccades and nystagmus?

Saccades are a rapid jumping motion of the eyes used to either look between objects, or to catch up to an object that is moving faster than our eyes. Saccades move in one direction. Nystagmus are a reflex used to allow us to see clearly when we are in constant motion, our world is in constant motion, or both. Nystagmus has two phases, a quick phase on one direction and a slower phase in the opposite direction. Examples of nystagmus: when you look out of a train window and watch the world go by. Your eyes move quickly in the direction the train is going, finds something one which to fixate, then slowly tracks the object as it moves across the visual field. When it leaves the visual field, we once again quickly move our eyes as far as we can in the direction of the train's motion and find another object and the process repeats.

I work in gastroenterology, and we have a lot of alcoholic patients. I'm assuming that if these patients have positive central signs, it could be due to chronic alcohol-related brain injury rather than acute infarct?

Yes. Often in acute care we see alcoholics that are being de-toxified. Initially they often have nystagmus due to the cerebellar involvement with the toxicity. Most times, the nystagmus resolve, however, if someone has been a long-time alcoholic, there may be permanent damage to the cerebellum.

Are there any online courses for PTs focused on management of central vestibular disorders?

I don't know of any that are specifically for 'central vestibular disorders.' However, there are a number of online courses for 'vestibular' therapy. The Vestibular Special Interest Group of INPA will be developing online courses in the future.

Should the two eyes move upward downward or one ?

This question was asked while we were discussing the Alternating Cover Test. During the Alternating Cover Test, each eye is tested individually. Ideally the eye never moves during the test. If the eye moves in our out (laterally) after you uncover it, this is not as an important finding than if it moves vertically (up or down). If you see the eye move up or down to find the target (your nose), this is a central sign. I would ask for an MRI in cases of vertical skews.

In case study 1, is the bilateral positive HI test relevant

Yes. Typically, bilaterally positive head impulse tests are caused by one of the following: Toxicity from an aminoglycoside antibiotic, Toxicity from Cisplatin chemotherapy, or from a Stroke. Since this patient has no history of chemotherapy, and does not recall receiving aminoglycoside antibiotics recently, this is likely due to the stroke.

Is the HINTs exam true for all areas of the brain that are affected by a stroke?

No. Areas of the brain the cause vertigo (moving sensations) and nystagmus include the cerebellum and brainstem (pons, medulla, and the peduncles).

Is the hints exam effective for subacute or chronic patients?

Remember, this is a test to differentiate stroke from an ear issue. If a patient is having dizziness, I would still do the hints exam. Sometimes you may not see nystagmus caused from a subacute vestibular neuritis or labyrinthitis in the room light, and may need to use infrared goggles, Frenzel goggles, or a ganzfeld (black wall) to elicit nystagmus if it is caused by an ear infection.

With central dizziness, you usually see nystagmus when the patient is visually fixating on an object, but they disappear when they can't fixate (Infrared goggles, Frenzel goggles, or ganzfeld).

I have a patient who has a cerebellar stroke and nausea/ vomiting. We are struggling to progress his basic mobility.

Personally, I would begin with either VOR exercises or Optokinetic stimulation, and also motion habituation.

Any tips for differentiating cerebellar stroke and functional disorder?

Since functional disorders are of an unknown origin, I have no way to differentiate the two. If you see cerebellar signs, treat it as such (even if the MRI is negative). MRIs within the first 24 hours after symptoms onset may miss 20% of large strokes and up to 50% of brainstem and cerebellar strokes with a diameter of < 1 cm. (according to the article: Zwergal A., Dieterich M. Vertigo and dizziness in the emergency room. Curr Opin Neurol. 2020:33:117-125). If the patient has not had an MRI, or had just after symptom initiation, I would ask for another. If they can tolerate dye, ask for the MRI to be with and without contrast and include not only the brain, but the vestibular systems as well.

Any tips on how to get patient to relax enough for 'successful' head impulse in acute scenarios?

I work in acute care and do these tests daily! The easiest way I have found to get the patient to relax is to demonstrate how far I plan to turn their head. I say, "I'm going to have you look at my nose while I turn your head. I will turn it quickly but in a very small motion like this (demonstrate head turn). Your job is to keep your eyes on my nose."

Also, I do not 'wind up' the patients head by turning it side to side prior to the test. I only turn it while testing. I never have trouble doing this test when I follow this protocol.

Can the head impulse test be used with patients with a confirmed stroke to check if they are suffering from vestibular issues?

Yes. Remember, the vestibular system includes the ears, the 8th cranial nerve, the vestibular nuclei, and parts of the cerebellum deal with vestibular information! If you know where the previous stroke in the brain is located, this will help you decide. However, if the patient has a vestibular loss, it doesn't matter if the vestibular loss is due to a brain issue or a peripheral issue as you treat them both the same way (VOR exercises).

Does vertical skew show vertical movement in two eyes or according to the region of stroke?

You may see a skew in one or both eyes.

Is it common for those with recent stroke to then experience BPPV?

Strokes do not directly cause BPPV. BPPV is, however, the most common issue with the vestibular system. So, while the stroke did not cause BPPV, the patient my coincidentally develop BPPV. BPPV can be caused by ear infections (labyrinthitis or vestibular neuritis).

What is the sensitivity and specificity of the HINTS exam? Are there small chances of false negatives. In particular missing PICA strokes?

Sensitivity/Specificity info is in the handout. Is the HINTS exam perfect? No. It is only a screening tool.

With the pandemic and the need for masks in patient contact. The nose is covered. What have you used as point of focus instead?

I wear a mask and ask the patient to fixate on the point of the mask by my nose. It works just fine. If you want, you can draw a point on your mask with a pen and ask them to fixate on that. Just don't forget to change your mask or you run the risk of looking like Rudolph the red-nose reindeer.

We have outpatients coming with complaints of dizziness. Examination positive for Romberg's and mCTSIB. No oculomotor signs and no nystagmus on Dix Hallpike or roll test. How to proceed further for these cases.

Do the HINTS exam. Do cerebellar screens. Check for acute hearing loss. Do a thorough oculomotor screen. Check for spasticity. If you see ANYTHING that looks central, ask for an MRI.

Does the cause affect/dictate the management?

Sometimes. As mentioned in an earlier answer, if the patient has a vestibular loss the treatment is the same whether it is caused by a central or peripheral pathology. However, for central pathologies, the patient may also have motion provoked central dizziness that may benefit from motion habituation.

During dix-hallpike we find a three to four down or up beat nystagmus during the transition from sitting to lying. Then there is no nystagmus recorded. Is this physiological or is there is any abnormality?

More than likely, it is a result of the patient moving. Typically for canalithiasis (loose crystal) there is a latency of a few seconds up to 45 seconds prior to the onset of nystagmus. If the patient has cupulolithiasis, onset is immediate but lasts for 1 minute or longer.

Can you please list the parts of your exam in the order you do it?

You can choose any order you want, just do it the same way all the time as your exam will be faster. Typically, I do the following:

Oculomotor Exam:
Fixation (can the hold fixation?)
Nystagmus (Do I see any at rest, with gaze at 45 degrees, or > 3 beats near end-range?)
Ocular Range of motion (is it normal? Keep in mind we lose some up-gaze with age)
Cover tests
Near Point of Convergence
Visual Acuity (I don't always check this, but I do in cases of stroke)

Cerebellar Screens

Somatosensory: light touch, proprioception

Orthostatic Blood Pressures (Supine-sit-stand)

Vestibular:
Head Impulse Test
Head Shake Test
Dix-Hallpike
Roll Test
(If you suspect barotrauma, you can also do a valsalva)

Strength (Manual muscle tests)

Balance: (there are many, I try to do at least 2)
Romberg (eyes open/closed), mCTSIB, Functional Reach Test, Timed Up and Go, Gait Speed.

Gait observation

What medication would you suggest to help vestibular symptoms i.e. Dizziness?

In the USA, Physiotherapists cannot prescribe medications. The one's I see used the most in my acute care setting are Antivert (meclizine) and Valium.

What do you think of a Patient diagnosed with a unilateral vestibulopathy but main challenge is dizziness during mobility? (and also) What about a patient who tells you they get dizzy moving around but not when stationery? This patient was diagnosed with a unilateral vestibulopathy by ENT.

A 'Vestibulopathy' is an inner ear disorder of some kind. If it is sub-acute or chronic, I would expect dizziness with quick head movements or body turns. Typically, they feel better when they sit still.

Young people typically do not complain of mobility induced dizziness because they are already moving around a lot, and the cerebellum is constantly working to stabilize their gaze. If the patient does not move around enough, the cerebellum does not adequately adapt the vestibular input and the patient remains dizzy (especially with motion).

How useful is the Romberg test, single limb test and mCTSIB?

They are good balance tests, but remember, not all balance tests assess balance in the same way. I try to do at least 2 different balance tests: One checking static balance and one while moving (such as the Functional Gait Assessent, Tinetti, or Gait Speed. The mCTSIB is basically a Romberg done on a firm surface and a complaint (soft) surface. While vestibular issues correlate with the mCTSIB it cannot tell you if a patient has a vestibular issue. I use the mCTSIB to tell under what circumstances someone is balance compromised. For example, if they have difficulty balancing on a firm surface with eyes open I know I need to recommend an assistive device (cane or walker). If they have difficulty balancing with eyes closed, I know they will likely fall at home if they get up at night without turning on a light. I can warn them against doing this (e.g., you need to turn a light on). If they have trouble balancing on foam with eyes open, then they likely will fall on thick carpet or grass or gravel. Once I understand the situations that put them at risk, I can treat them under these same conditions to improve their balance.

Can an abnormal skew be caused by a peripheral problem?

Yes, it can be caused by otolith dysfunction. It may also be caused by nerve palsy. Google the 'Park 3 Step Test'.

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