

Something Awesome: A Life in Neurosurgery

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This guide provides a clear step-by-step approach to performing the head impulse, nystagmus and test of skew (HINTS) examination in an OSCE setting with an included checklist.

Dizziness is a common presentation to general practice and emergency departments, affecting 15-35% of the population, with a 12-month incidence of 3%.¹ Peripheral vestibular dysfunction is present in around 40% of dizzy patients.² Dizziness can be extremely frustrating and debilitating for patients, not to mention a challenge for clinicians eliciting a subjective experience that can be difficult to put into words. Is it a spinning sensation (vertigo), a feeling of imbalance (disequilibrium), or light-headedness (a sensation of giddiness), or more a sense of feeling faint (pre-syncope)?³ Having an approach that is likely to diagnose the most common causes, while also screening for rarer but more serious possibilities, is a vital skill.

This article is focussed on an important component of the assessment of patients you suspect have true vertigo: the HINTS examination.

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Overview of vertigo

Vertigo specifically describes the sensation of illusory movement. It arises when the labyrinth, vestibular nerve, or central vestibular tracts of the brainstem are dysfunctional or damaged. Patients with vertigo may also present with nausea and vomiting, postural and gait instability, a tilt illusion (feeling that the environment is tilted), drop attacks (sensation of being pulled to the ground), spatial disorientation, or oscillopsia.⁴ Peripheral causes are far more common than central causes and include benign paroxysmal positional vertigo (BPPV), vestibular neuronitis (or labyrinthitis), and Ménière's disease. Central causes can be as a result of stroke affecting the posterior circulation-supplied vestibular structures (cerebellum, brainstem, or vestibular nuclei), multiple sclerosis, medication toxicity, trauma, posterior fossa brain tumours and migraine. Importantly, it should be remembered that older patients have a higher incidence of central causes of vertigo (with the

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majority being stroke).2

A general approach to vertigo, as well as its common differentials, can be found in the Geeky Medics guide here. For patients with suspected benign paroxysmal positional vertigo (BPPV), a description of how to perform the Dix-Hallpike test and Epley manoeuvre can also be found here.

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Introduction

Wash your hands and don PPE if appropriate.

Introduce yourself to the patient including your name and role.

Confirm the patient's name and date of birth.

Briefly explain what the examination will involve using patient-friendly language.

Gain consent to proceed with the examination.

Position the patient on a chair or sitting upright on a clinical examination couch.

Ask the patient if they have any pain before proceeding with the clinical examination.

Performing the HINTS examination

Determining whether vertigo is of peripheral or central origin is critical. Taking a detailed history regarding the onset, tempo, prior episodes, associated symptoms and relevant risk factors is the first step in determining the aetiology. In combination with a good history, the HINTS examination is a useful tool in detecting acute, time-sensitive, central causes of vertigo, including posterior circulation strokes like lateral medullary syndrome.

While most vertebrobasilar strokes are also accompanied by other signs (such as diplopia, dysarthria, dysphagia, motor and sensory deficits) a proportion of cerebellar strokes present only with vertigo and subtle incoordination on examination. A positive HINTS exam has been reported to have a high sensitivity and specificity for the presence of a central cause of vertigo.⁵

The HINTS exam is only used on a subset of the patients who present with:

Persistent vertigo over hours or days

Nystagmus

A normal full neurological exam.

HINTS is comprised of three core components: head impulse test, evaluation of nystagmus, and a test of skew.

Head-impulse test

To perform the head impulse test:

1. Gently move the patient's head side to side, making sure the neck muscles are relaxed.
2. Then ask the patient to keep looking at your nose whilst you turn their head left and right.
3. Turn the patient's head 10-20° to each side rapidly and then back to the midpoint.

Interpretation

A positive test indicates there is a disruption to the vestibulo-ocular reflex, so the eyes move with the head, then saccade rapidly back to the point of fixation on the clinician's nose (a "corrective saccade"). Patients will also have difficulty fixating on the clinician's nose. If there is a corrective saccade (a positive head-impulse test) this is reassuring that the pathology is most likely a problem with the vestibulocochlear nerve on the

ipsilateral side " that is, it is peripheral and not central. It's important that this test is done on patients who are currently symptomatic. Patients who are not symptomatic at the time of examination will likely have normal clinical findings.

There are some important and common-sense contraindications for the head-impulse test to consider, including head and neck trauma and severe cervical spine osteoarthritis.

Nystagmus

To assess nystagmus:

1. Observe the patient's primary gaze while they look straight ahead.
2. Then ask the patient to look to the left and to the right without fixating on any object (which can minimise nystagmus).

Interpretation

The direction of the saccadic eye movement is important.

Unidirectional nystagmus is reassuring and more likely to be of peripheral origin. When nystagmus changes direction or is vertical, it is much more likely to be associated with central pathologies.

Bidirectional nystagmus, in particular, is highly specific for stroke. In this case, the saccadic movement beats in the direction that the patient is looking, then changes direction with their gaze (gave-evoked nystagmus).

Test of skew

To perform the test of skew:

1. Ask the patient to look at your nose and subsequently cover one of their eyes.

2. Then, quickly move your hand to cover the patient's other eye. During this process, observe the uncovered eye for any vertical and/or diagonal corrective movement.

3. Repeat this manoeuvre on the other eye.

Interpretation

Any abnormal movement observed here, often associated with vertical diplopia, is highly specific for a central cause of vertigo.

Summary

In summary, with an otherwise normal neurological exam, ascertaining the peripheral and central causes of vertigo using HINTS exam can be summarised in Table 1.

Table 1. Distinguishing peripheral vs central vertigo using the HINTS examination

| Peripheral | Central | Head impulse test | Abnormal | Normal | Nystagmus | None or unidirectional | Bidirectional or vertical | Test of skew |
|------------|----------|-------------------|----------|--------|-----------|------------------------|---------------------------|--------------|
| No | vertical | skew | Vertical | skew | | | | |

There are some excellent videos on YouTube which show real-life examples of clinical findings of the HINTS exam. Dr Peter Johns, an Emergency Physician at the University of Ottawa, has some clearly explained videos.

To complete the examination

Explain to the patient that the examination is now finished.

Thank the patient for their time.

Dispose of PPE appropriately and wash your hands.

Summarise your findings.

References

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Reference

[Screening for Suicide Risk: A Systematic Evidence Review for the U.S. Preventive Services Task Force: Systematic Evidence Review Number 32](#)

[SPSS Basics: Techniques for a First Course in Statistics](#)