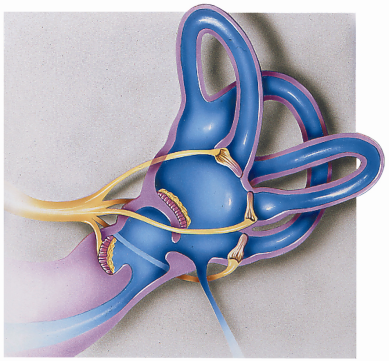
Assessing the Dizzy Patient: An ENT Surgeon's Perspective

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Royal Victoria Hospital

Belfast, Northern Ireland



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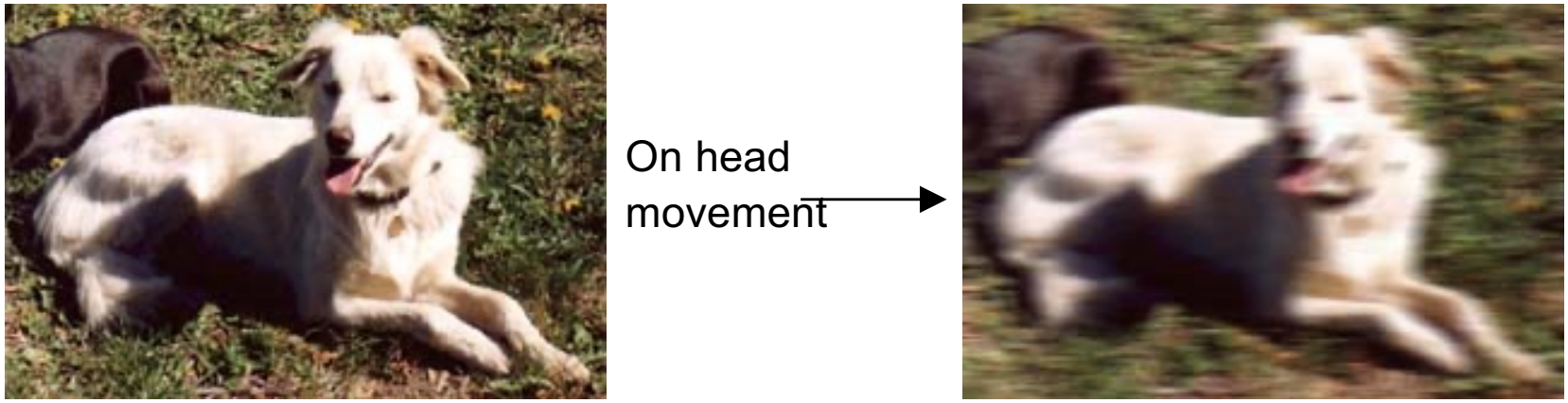
Overview

- Anatomy and physiology of the vestibular system
- Clinical assessment of the dizzy patient
- Testing vestibular function
- Common causes of vertigo and dysequilibrium in ENT practice
- H.I.N.T.S. to differentiate stroke Vs periperal vestibulopathy in acute vestibular syndrome

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Why do we Have a Vestibular System?

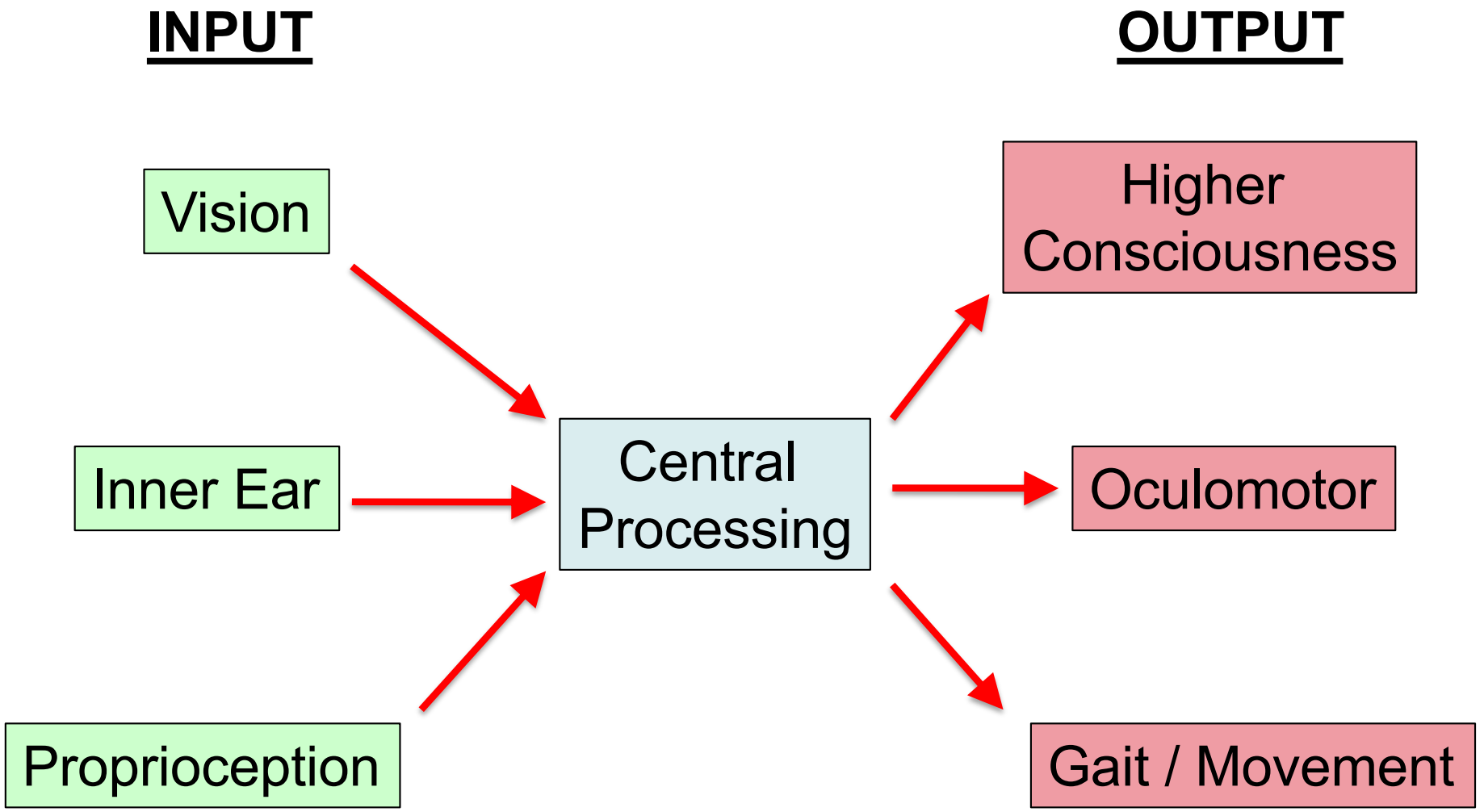
- Image stabilisation



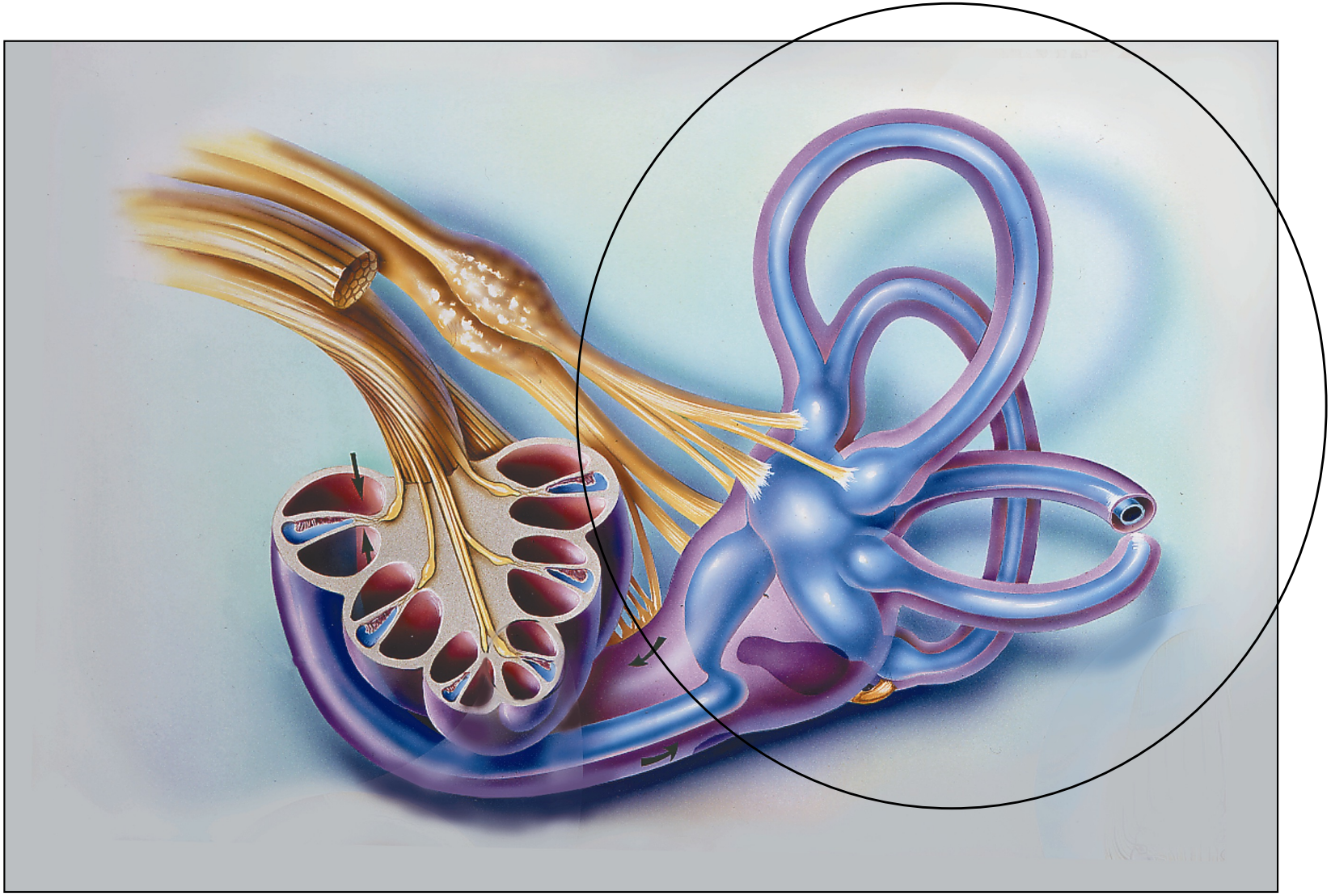
- Posture control
- Maintain spatial orientation

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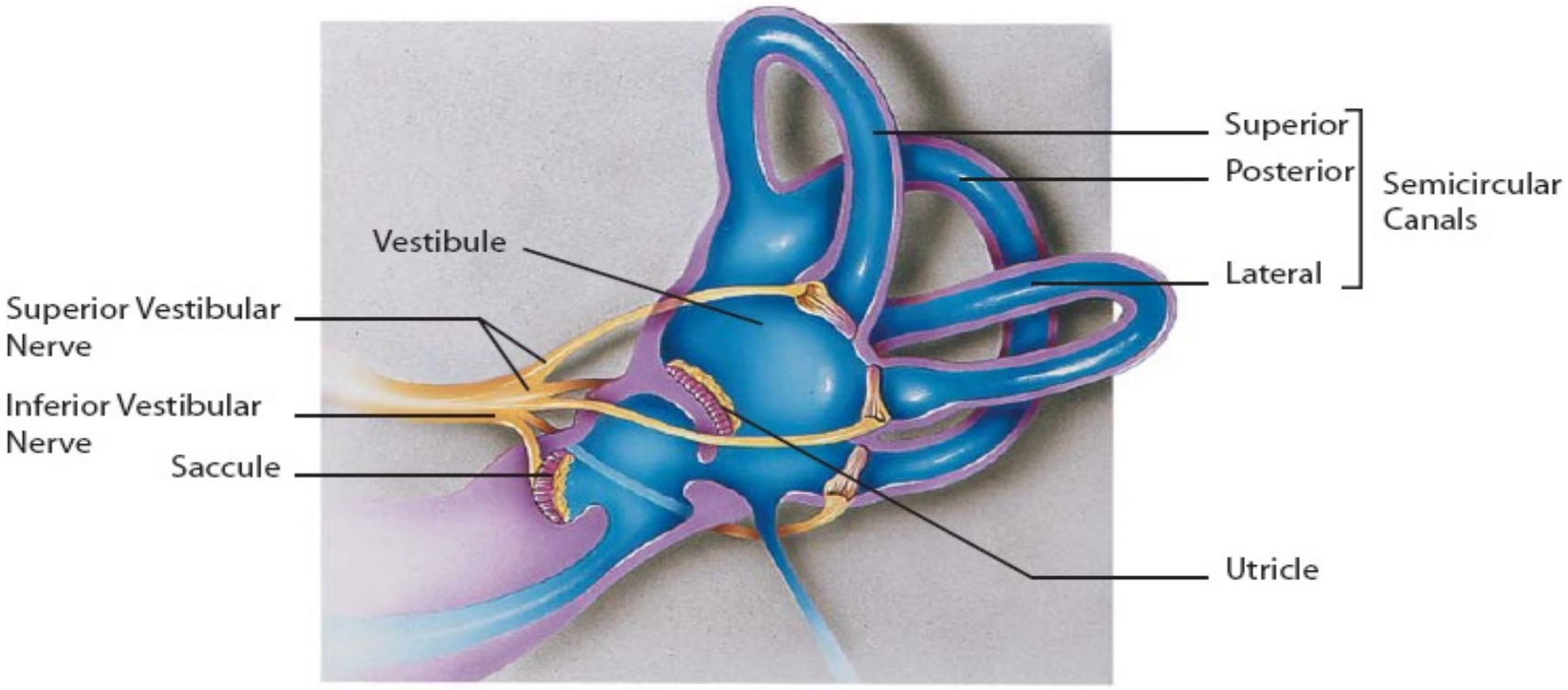
Vestibular System Overview



Anatomy and Physiology of the Peripheral Vestibular System



Peripheral Vestibular Physiology

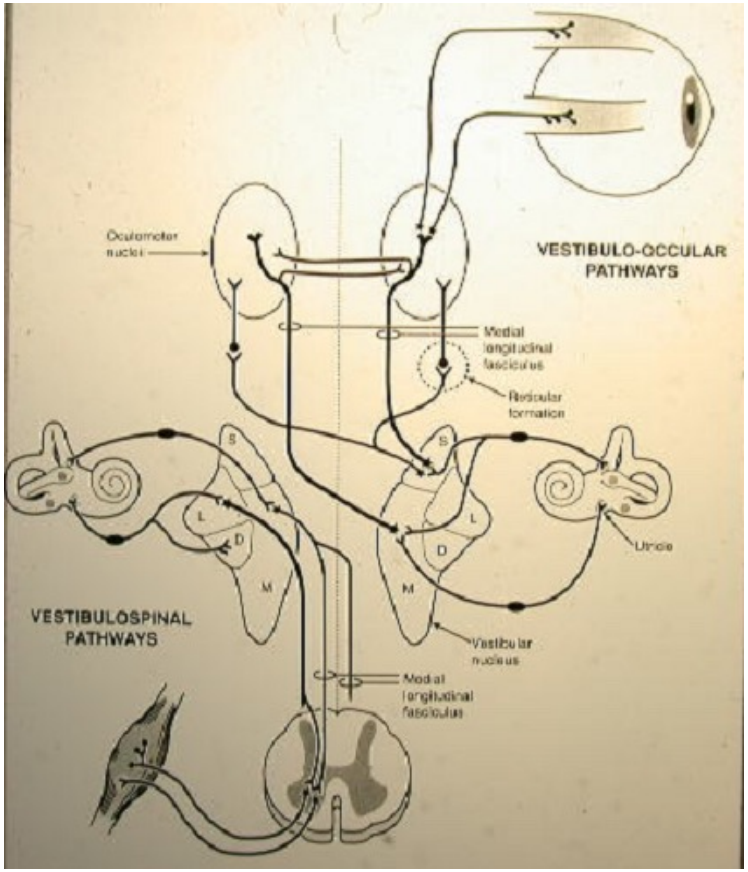


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Central Vestibular Connections

4 Pathways

- Vestibulo-ocular Reflex (VOR)
- Vestibulospinal Tracts (VST)
- Vestibulocerebellar Tracts (VCT)
- Emetic Pathways



Cardinal Signs

Nystagmus

Falling to Side

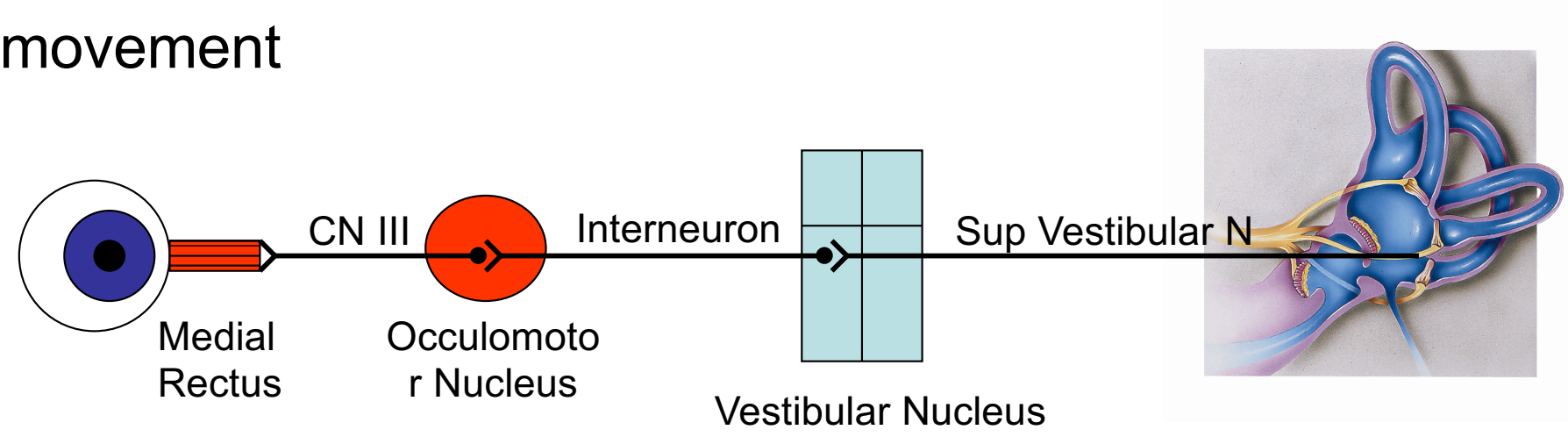
Ataxia, Past pointing

Vomiting, Nausea

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Vestibulo-Ocular Reflex (VOR)

- Best understood brain function
- 3 neuron reflex arc – very short latency (10msec)
- Eye movements equal and opposite velocity to head movement



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Clinical Assessment

History

- **A thorough history is essential**
- Start from the very first episode
- What “flavour” of dizziness are they suffering
- What is the trajectory over time?

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Making Sense of Dizziness

"Flavours" of Dizziness

- *Vertigo*
- *Dysequilibrium (Imbalance)*
- *Pre-faint*
- *Non-specific*

"Trajectory" of the Dizziness over time

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Practical Clinical Examination

- Observe gait walking into room
- Otoscopy, +/- free-field voice and tuning fork tests
- Targeted Cranial nerve examination (V, VII, IX – XII)
- Eyes - nystagmus
- Oculomotor (gaze holding, pursuit, saccades, convergence)
- Cerebellar
- Hyperventilation (30 seconds)

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Special Clinical Vestibular Tests

- Horizontal head thrust (Halmagyi) manoeuvre

- (Dix)-Hallpike positioning test

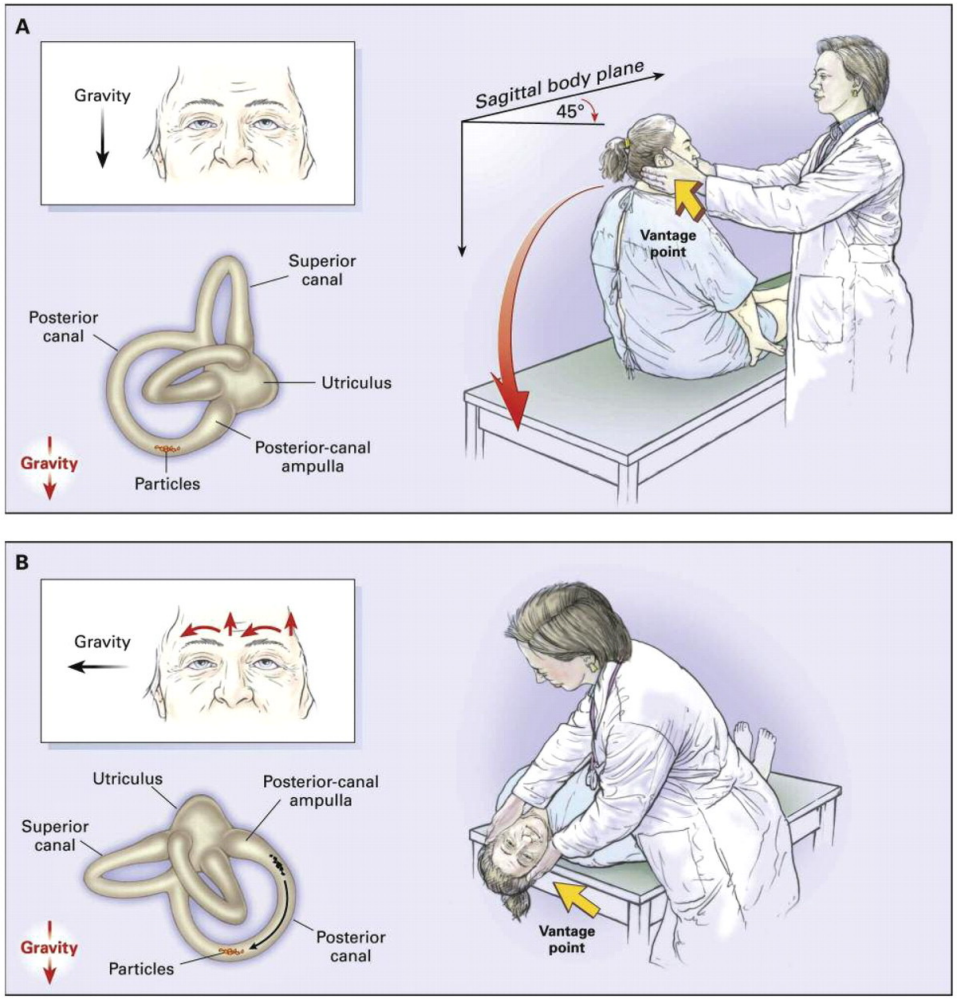
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Halmagyi Test



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Hallpike Test



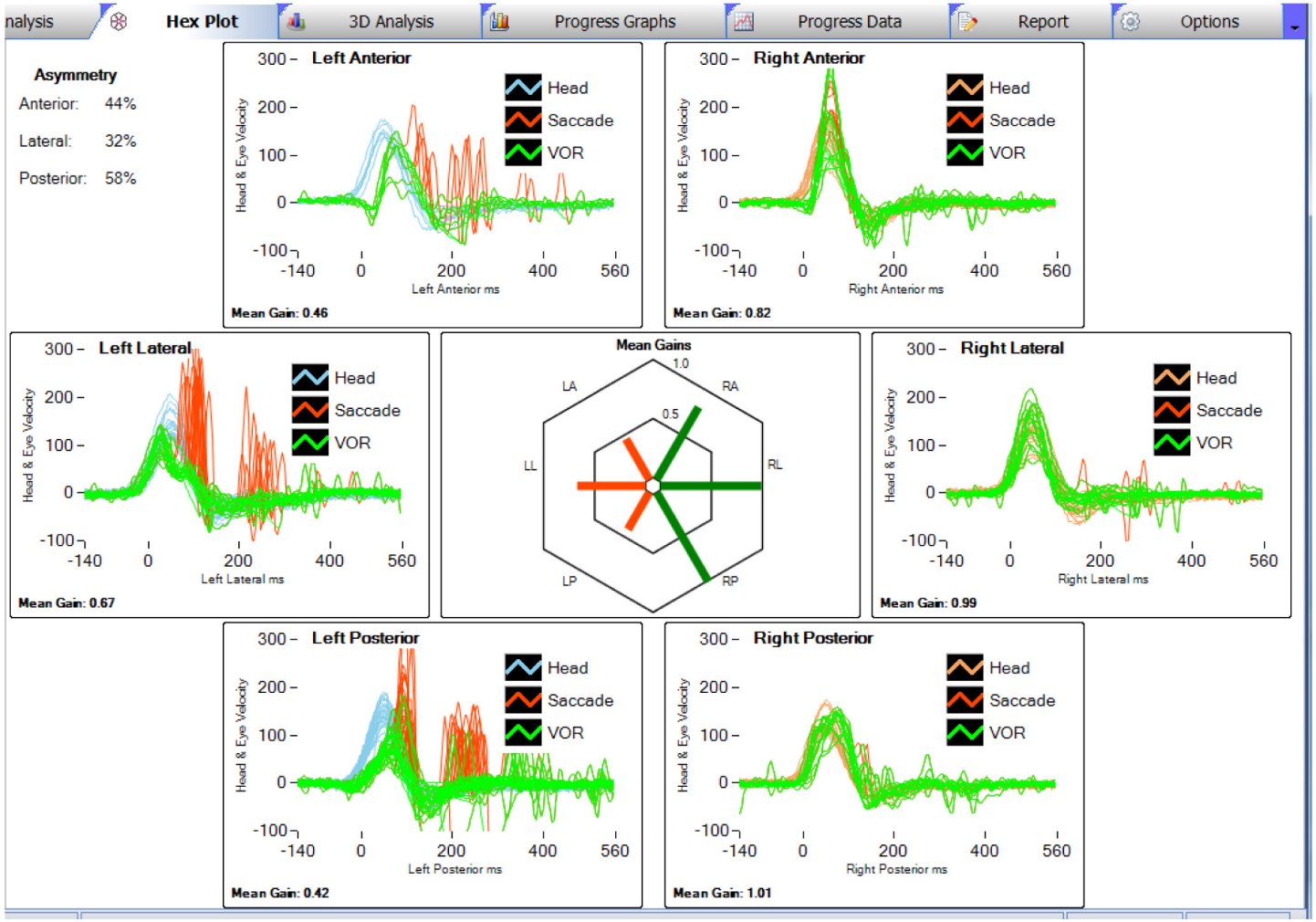
Testing Vestibular Function

VHIT – Video Head Impulse Test

Video Head Impulse



Analysis: Hex plot



otometrics

Common Causes of Vertigo Dysequilibrium in ENT Practice

The Key to Peripheral Vertigo: The Matrix

	True Vertigo	
Hearing Loss	**Episodic**	**Persistent**
No	**BPPV**	**Vestibular Neuritis**
Yes	**Meniere's Disease**	**Labyrinthitis**

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Benign Paroxysmal Positional Vertigo

Flavour	Vertigo
Trajectory	sudden onset, rapid recovery, frequent repeats

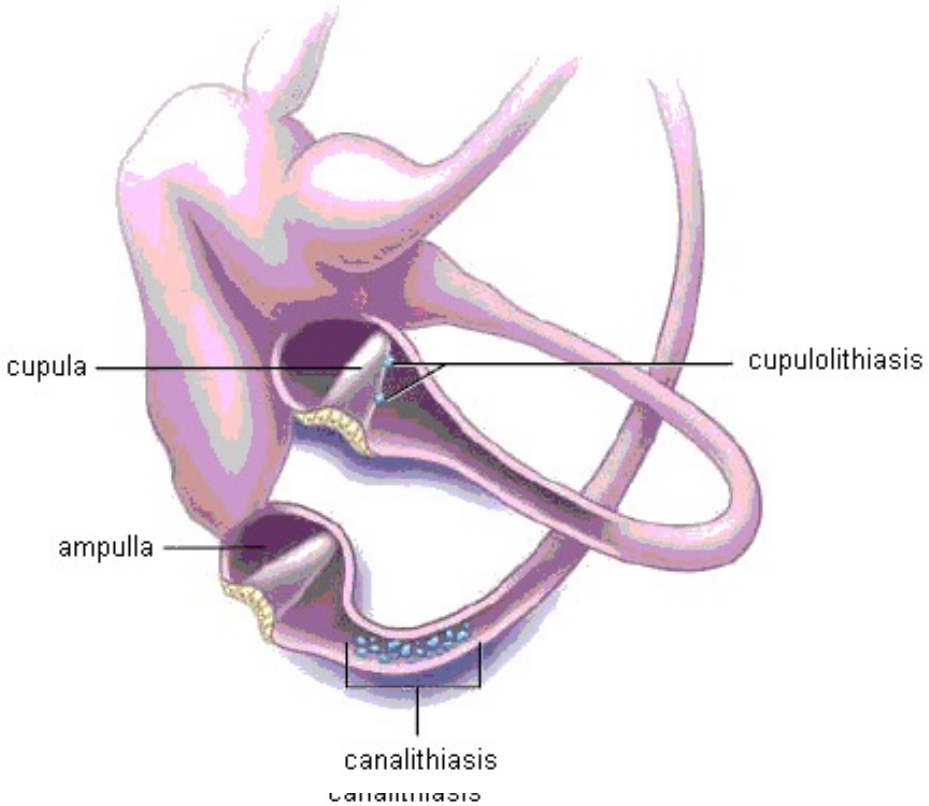
- Brief paroxysms of true vertigo precipitated by head movement – classically after rolling onto affected ear
- **Commonest single cause of peripheral vertigo** – 30% by age 70.
- Idiopathic 70 % Secondary 30 % (VN, Head Injury, Migraine)
- Spontaneous remission rate high
- Treated with Epley manoeuvre
- Responds poorly (if at all) to vestibular sedatives

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BPPV - Pathophysiology

Displaced otoconia accumulate within the PSSC

Certain head movements will cause the otoconia to move exerting a hydraulic drag on the cupula



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BPPV: Clinical Findings

1) Latent period (1 – 20 seconds)
2) Geotropic rotational nystagmus + subjective vertigo
3) Brief duration (< 1 minute)
4) Ageotropic reversal on sitting up
5) Fatigues on repeated testing

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BPPV – Epley Manoeuvre



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Meniere's Disease

Flavour Vertigo
Trajectory Rapid onset, recovery within hours, variable repeats

Diagnosis requires the presence of:

1. > 2 spontaneous episodic vertigo (20 mins – 24 hrs)

2. Audiometrically documented hearing loss during at least 1 attack

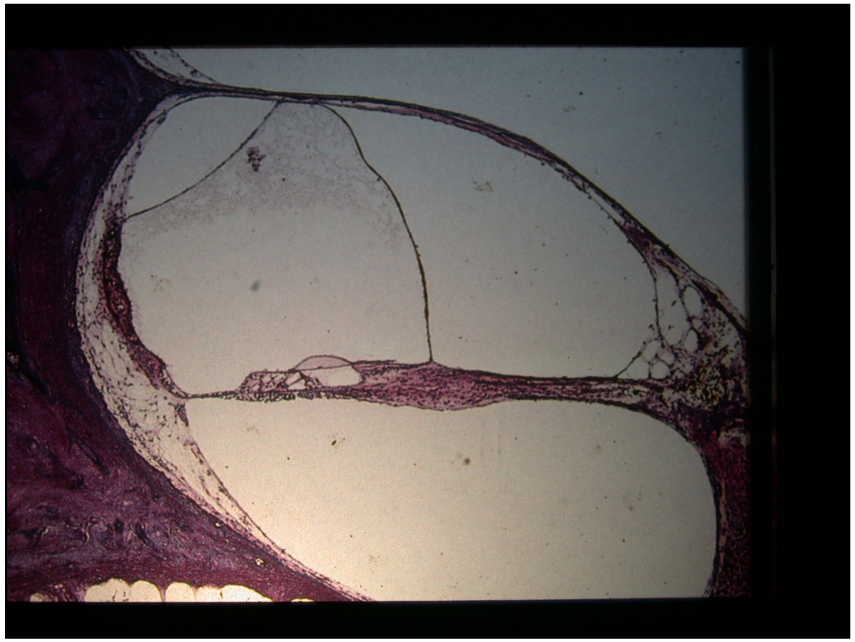
3. Tinnitus or aural fullness in the affected ear

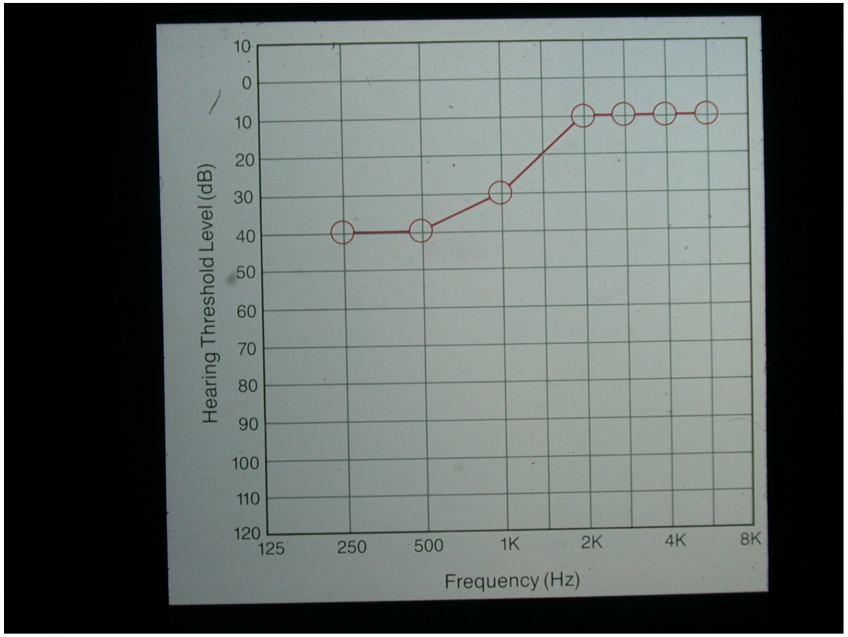
4. Other possible causes excluded

1995 AAO-HNS Guidelines

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Meniere's Disease





Caused by idiopathic **Endolymphatic hydrops**
Low frequency hearing loss ("tent-like" audiogram classic)

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Meniere's – Treatment Principles

- Acute symptom relief – vestibular sedatives / anti-emetics
- Prophylaxis – Reduce caffeine, salt intake, stress, Betahistine
- Reduce the emotional response
- Wait for natural resolution – 50% in 2 yrs, 80% in 10 yrs

<u>ENT interventions</u>

- Intratympanic steroids
- Intratympanic Gentamicin
- Surgical Labyrinthectomy

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Betahistine

- Histamine analogue that crosses the blood brain barrier
- Only licensed for treatment of Meniere's disease – use in any other condition is off licence
- Intended for regular use to reduce the frequency and severity of acute vertigo attacks – little (if any) benefit for acute symptom relief
- The largest study to date showed no additional benefit over placebo *BMJ 2016;352:h6816*

Betahistine – My Experience

- It seems to work well in a subset of Meniere's patients
- 16mg tid is the lowest dose I prescribe
- I usually prescribe it for 4 – 6 weeks and increase to 32mg tid for 4 – 6 weeks as tolerated / necessary (it appears safe to 960mg daily). Stop if no better
- If it works, stay on it for 9 – 12 months after the vertigo settles then wean off

Vestibular Neuronitis

Flavour Vertigo
Trajectory Sudden onset, gradual recovery

- Severe solitary attack of vertigo (days to weeks)
- No hearing loss or focal neurologic dysfunction
- Hx of recent URTI in 50%
- Viral de-afferentation of (usually one) vestibular nerve

- Differential posterior circulation stroke

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Vestibular Neuronitis - Treatment

- Vestibular sedatives 3-5 days only
- Some evidence for improved outcome with early corticosteroids. *Kitahara 2001*
- Encourage early mobilisation and vestibular rehab exercises. Evidence for poorer outcome if don't mobilise within 1 week.

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Labyrinthitis

- VN + hearing loss
- Inflammation / Infection in the labyrinth. Ischaemia more common in elderly
- Exclude cholesteatoma and suppurative infection
- Exclude acoustic neuroma with an MRI
- Differential is AICA stroke

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Dizziness That Doesn’t Fit “The Matrix”

Vestibular Migraine

- Incidence of migraine headache is approximately twice as common in patients attending a vertigo clinic compared to the general population 30% Vs 16%
- Second commonest diagnosis after BPPV at specialist vertigo clinics
- *? Default diagnosis when migraine and vertigo co-exist*

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Vestibular Migraine

	True Vertigo	
Hearing Loss	Episodic	Persistent
No	BPPV	Vestibular Neuritis
Yes	Meniere's Disease	Labyrinthitis

Migraine

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Vestibular Migraine

Diagnosis – ICHD-3 / ICD11

- A At least 5 episodes fulfilling C & D
- B Current or past history of migraine headache
- C Vestibular symptoms of at least moderate severity lasting 5 mins – 72 hours
- D At least half of the episodes are associated with at least 1 of the following:
  - Migraine headache
  - Photophobia and phonophobia
  - Visual aura
- E Symptoms not better accounted for by another vestibular disorder

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Vestibular Migraine - Treatment

- Diet and lifestyle modifications as per migraine headache
- Acute symptom relief with vestibular sedatives / anti-emetics – some rationale for use of Arlevert. Tryptans ineffective for vertigo
- Migraine prophylaxis medication – try at least 3 as per BNF
- Treat co-existent neck pain with physiotherapy
- Vestibular rehabilitation physiotherapy can help

Cervicogenic Dizziness

- *Flavour* = a mixture of ‘floaty-boaty’ dysequilibrium with brief spells of vertigo

- *Trajectory* = highly variable: often a “rolling baseline” of dysequilibrium punctuated with episodes of acute vertigo, Can overlap and possibly trigger migraine

Treatment of Cervicogenic Dizziness

- Upper cervical mobilisation physiotherapy by a specialist physiotherapist

Presbystasis

Flavour	Dysequilibrium
Trajectory	progressive downward decline

- Age related phenomenon (>70 yrs) with gradual decline noted
- Progressive decline in visual, vestibular, proprioceptive and central integrative function
- Pathology can accelerate change and affect compensatory processes (ie diabetes, CVA, CNS volume loss)

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Presbystasis - Treatment

- **Avoid vestibular sedatives**
- Optimise vision
- Sensible shoes
- Walking aid
- Ensure home environment safe
- Vestibular rehabilitation

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Persisting Postural Perceptual Dizziness (PPPD) ICD-11

- Rocking / swaying sensation lasting >3 months
- Present more days than not (>15 days per month) – usually present every day
- Symptoms worsen with:
  - Upright posture
  - Head or body motion
  - Complex or motion-rich environments
- Usually begins after an acute event causing vertigo or significant dizziness – BPPV, Meniere's, VM, Panic attacks with dizziness
- Maladaptive response in the vestibular system - correlates with, but not caused by anxiety

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PPPD - Treatment

- 80% response to SSRIs at 12 weeks
- 20% drop-out rate in first 2 weeks due to worsening of symptoms - ? Hypervigilence ? Serotonin surge
- Responds well to starting at lower than normal dose eg. 12.5mg Sertraline
- Good response to vestibular rehabilitation physiotherapy
- Poor response to CBT

Acute Vestibular Syndrome

- Acute onset dizziness / vertigo
- Nausea / vomiting
- Gait instability – usually more severe in stroke with truncal ataxia
- Nystagmus
- Head motion intolerance
- Lasts more than 1 day

Peripheral-AVS or Central-AVS?

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HINTS

- **H**ead **I**mpulse
- Evaluation of **N**ystagmus
- **T**est of **S**kew
- 95 % sensitivity and Specificity (> DW MRI)

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Head Impulse Test

- Positive in P-AVS
- Negative in PICA strokes
- 65 % negative in AICA strokes

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Evaluation of Nystagmus

- **P-AVS:** direction fixed horizontal or horizontal/rotatory nystagmus, follows Alexander's law, Reduced by fixation.

- **C-AVS**: direction changing nystagmus, any vertical nystagmus

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Test of Skew

- Alternate eye cover test
- Vertical ocular misalignment
- Almost always indicative of central pathology

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HINTS in AVS

- The presence of one “dangerous” sign (normal HIT, direction changing nystagmus, vertical skew deviation) in AVS is highly predictive of stroke (> DW MRI in early phase).

Stroke 2009 40(11): 3504 - 35110

Tips and Pearls

- Peripheral vertigo is usually pretty easy to identify and diagnose – use the matrix
- If migraine and/or neck problems and vertigo co-exist – treat the co-existent pathology and the vertigo will often settle
- Treat acute vestibular syndrome (especially with vascular risk factors) as stroke until proven otherwise – use HINTS

Tips on Vestibular Medication

- Betahistine is licensed only for use in Meniere's disease (and probably doesn't work *BMJ 2016;352:h6816*). Prescribing it for any other condition is an off-licence use
- Most "vertigo" medications (Prochloroperazine, Cinnarizine, Arlevert…) work as vestibular sedatives – they reduce peripheral vestibular input. Regular use will prolong recovery from acute vestibular events and worsen chronic vestibular inadequacy (eg in elderly). Use sparingly in acute vertigo only
- Diazepam is a powerful vestibular sedative and is very useful in acute peripheral vestibulopathy

Questions ?