

Acute Vestibular Syndrome (VS or Stroke?)

Three-step “H.I.N.T.S.” eye examination	Stroke findings: “I.N.F.A.R.C.T.” (any of these)
• <u>H</u> ead <u>I</u> mpulse (right- and leftward)	• <u>I</u> mpulse <u>N</u> ormal (bilaterally normal)
• <u>N</u> ystagmus type	• <u>F</u> ast-phase <u>A</u> lternating (direction-changing)
• <u>T</u> est of <u>S</u> kew (cover test for skew deviation)	• <u>R</u> efixation on <u>C</u> over <u>T</u> est (skew deviation)

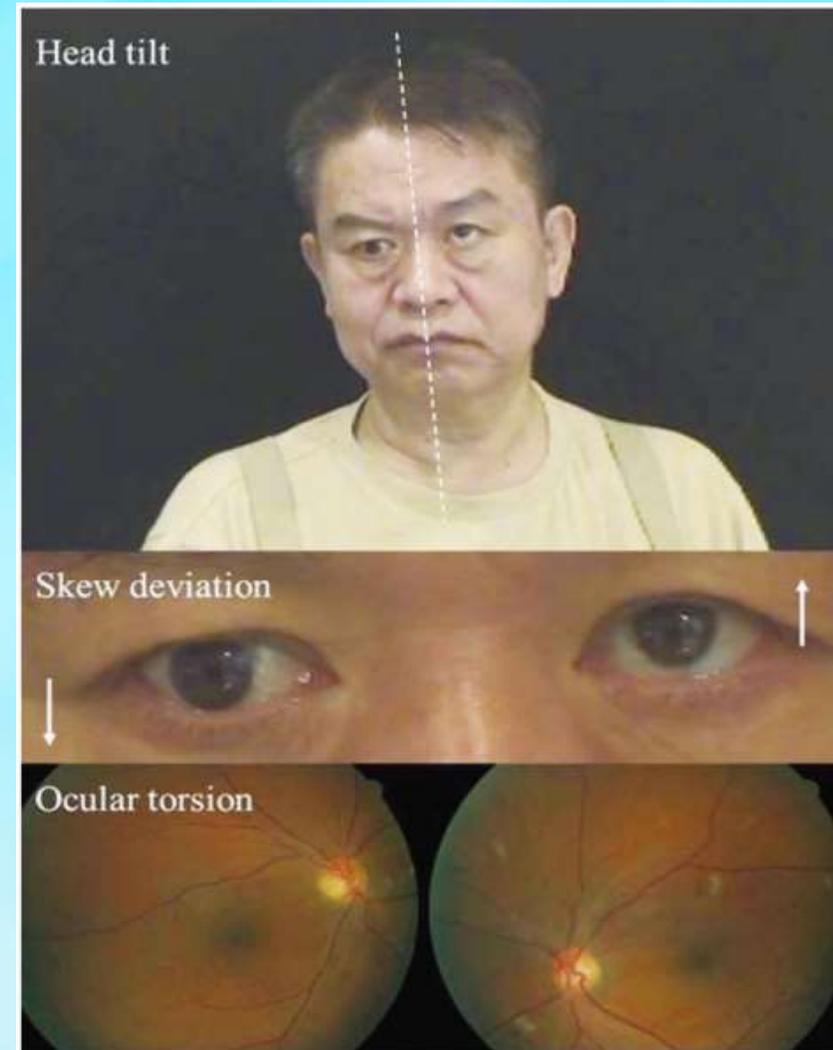
- A fourth step (H.I.N.T.S. “plus”) includes assessing the presence of new hearing loss,
 - generally unilateral
 - on the side of the abnormal head impulse test (the side opposite the fast phase of the nystagmus).
- Recent evidence suggests that, contrary to traditional teaching, **the presence of such hearing loss more often indicates a vascular (*labyrinthine or lateral pontine infarction*) rather than viral (*labyrinthitis*)** cause of the Acute Vestibular Syndrome presentation

An Acute Peripheral Vestibulopathy in AVS

- **S.E.N.D. H.I.M. O.N. H.O.M.E. S.A.F.E.** —
- **SEND** - **Straight Eyes [no skew deviation]; **No Deafness [no new hearing loss, either side];****
- **HIM** - **Head Impulse Misses [unilaterally abnormal horizontal VOR on the side opposite the nystagmus fast phase];**
- **ON** - **One-way Nystagmus [predominantly horizontal, direction-fixed in all gaze positions];**
- **HOME** - **Healthy Otic and Mastoid Exam [pearly tympanic membranes; no pimples, pus, perforation, or pain on palpation of the mastoid];**
- **SAFE** - **Stands Alone [stands without holding on to another person or object]; **Face Even [no facial palsy or weakness]).****

Ocular Tilt Reaction

- The ocular tilt reaction (OTR) is a compensatory postural reflex, which arises from unequal stimulation of the otoliths
- OTR is a postural disorder consisting of:
 - skew deviation
 - binocular eye torsion.
 - head tilt.
 - deviation of the perception of the visual vertical to the same side.



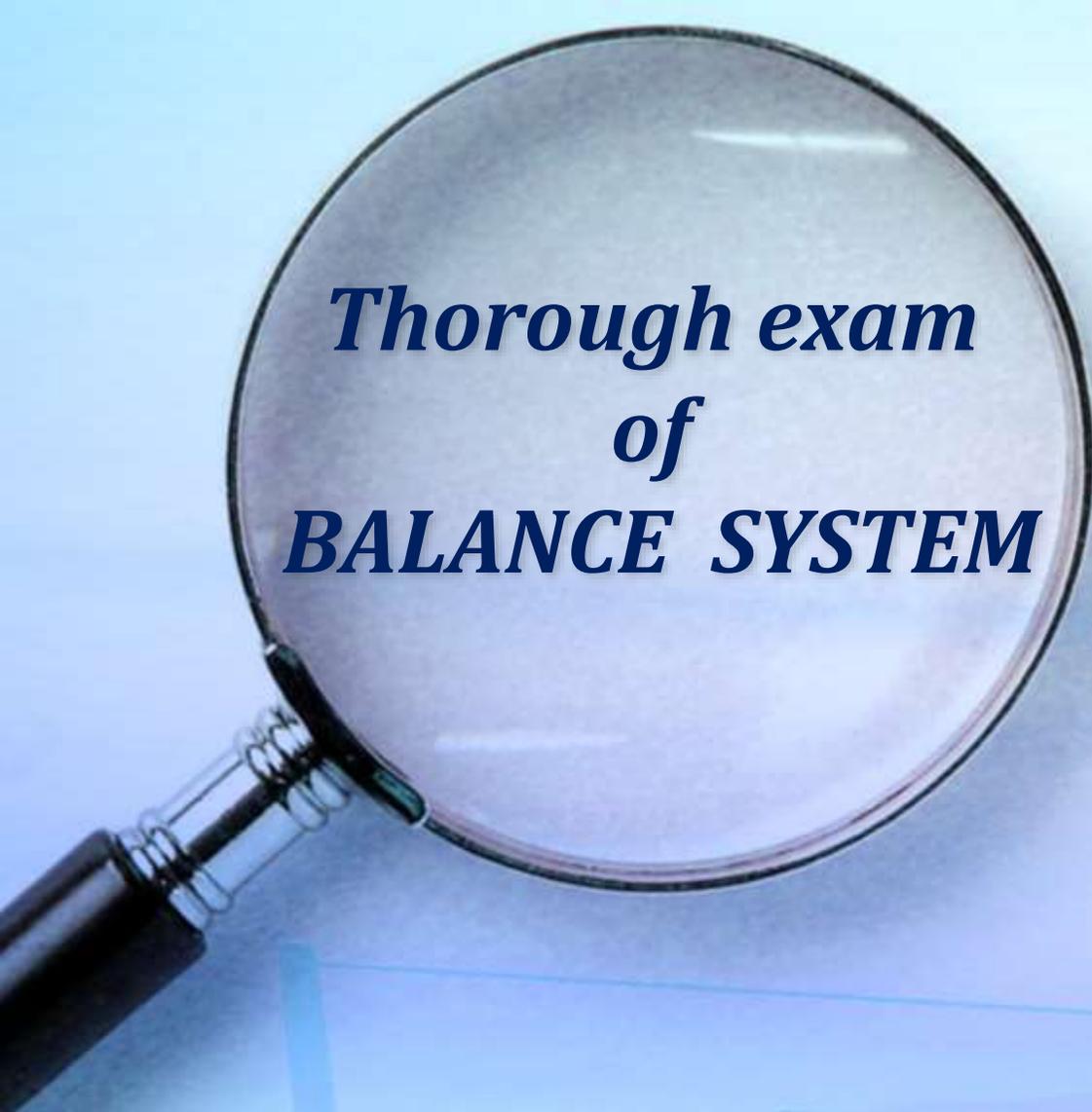
Causes of OTR

Pathological Causes

- **Peripheral Vestibular causes**
 - Otolithic dysfunction*
- **Neurological (CNS) Causes**
 - *Cerebellar Infarction/stroke*
 - *Multiple Sclerosis*
 - *Wallenberg's syndrome*
 - *Post Vestibular Schwannoma Surgery*

Etiology

- Damage to the vestibular pathways that mediate head-eye posture in the roll plane
- Localization: utricle/labyrinth, vestibular nerve, brainstem, or cerebellum
- Causative lesion: variable, but commonly stroke, demyelination, trauma, iatrogenic/post-surgical, hemorrhage, or tumor



*Thorough exam
of
BALANCE SYSTEM*

Tests for eye movements to assess
VESTIBULO-OCULAR system

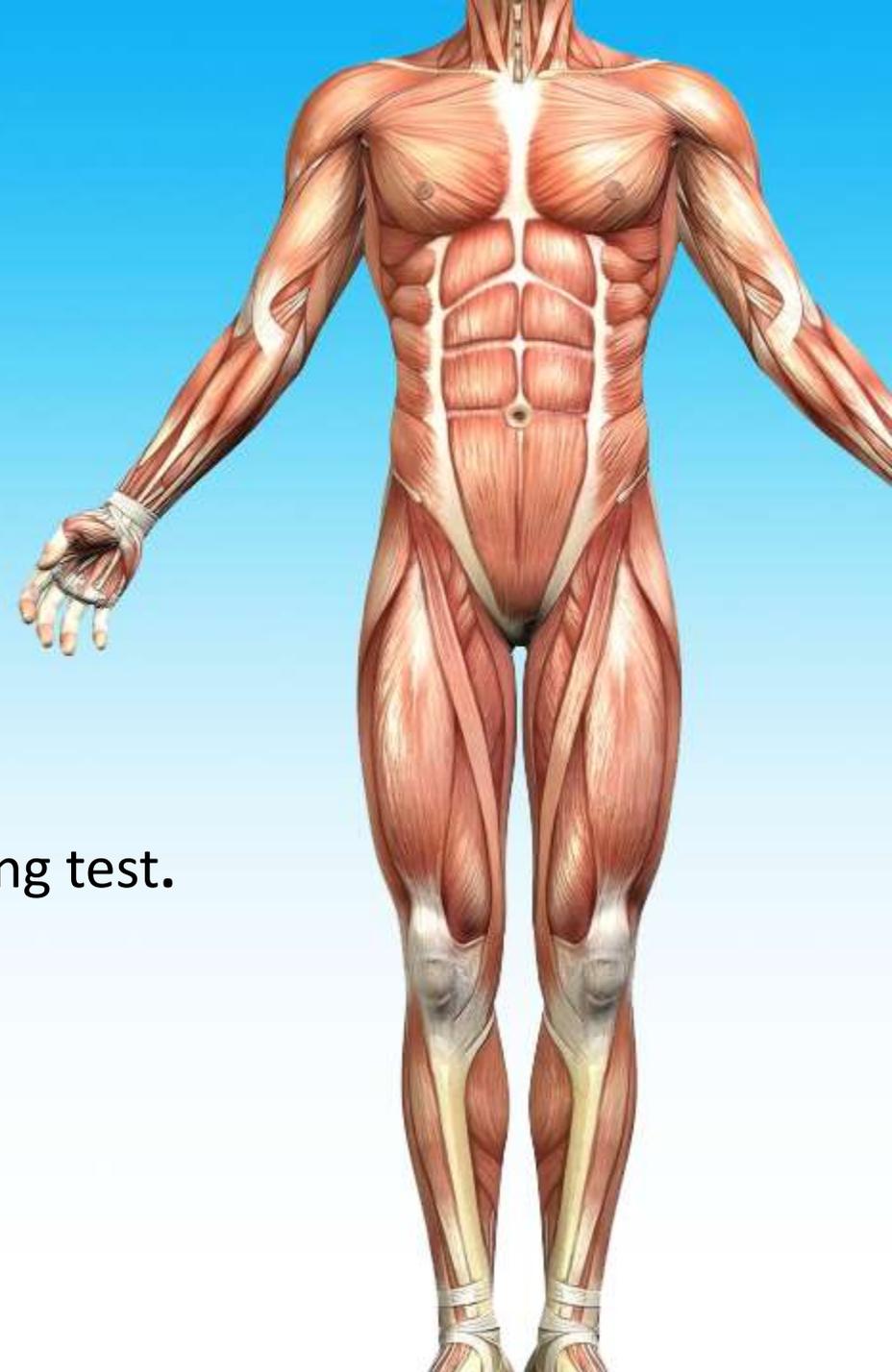
. Tests of the limbs & trunk to assess
VESTIBULO-SPINAL system

Tests to assess perception of verticality



TESTS of the LIMBS & TRUNK (VESTIBULO-SPINAL tests)

1. Standing test / Romberg's test.
2. Walking test.
3. Unterburger's Stepping test.
4. Tests for Incoordination (cerebellar tests)
 - finger nose test & past pointing test.
 - heel knee test.
 - rapidly alternating tasks test



VESTIBULO-SPINAL TESTS

Standing Test

Standing on :-

- 1) both legs with eyes open*
- 2) both legs with eyes closed*
- 3) alternately on one leg
with eyes open / closed.*



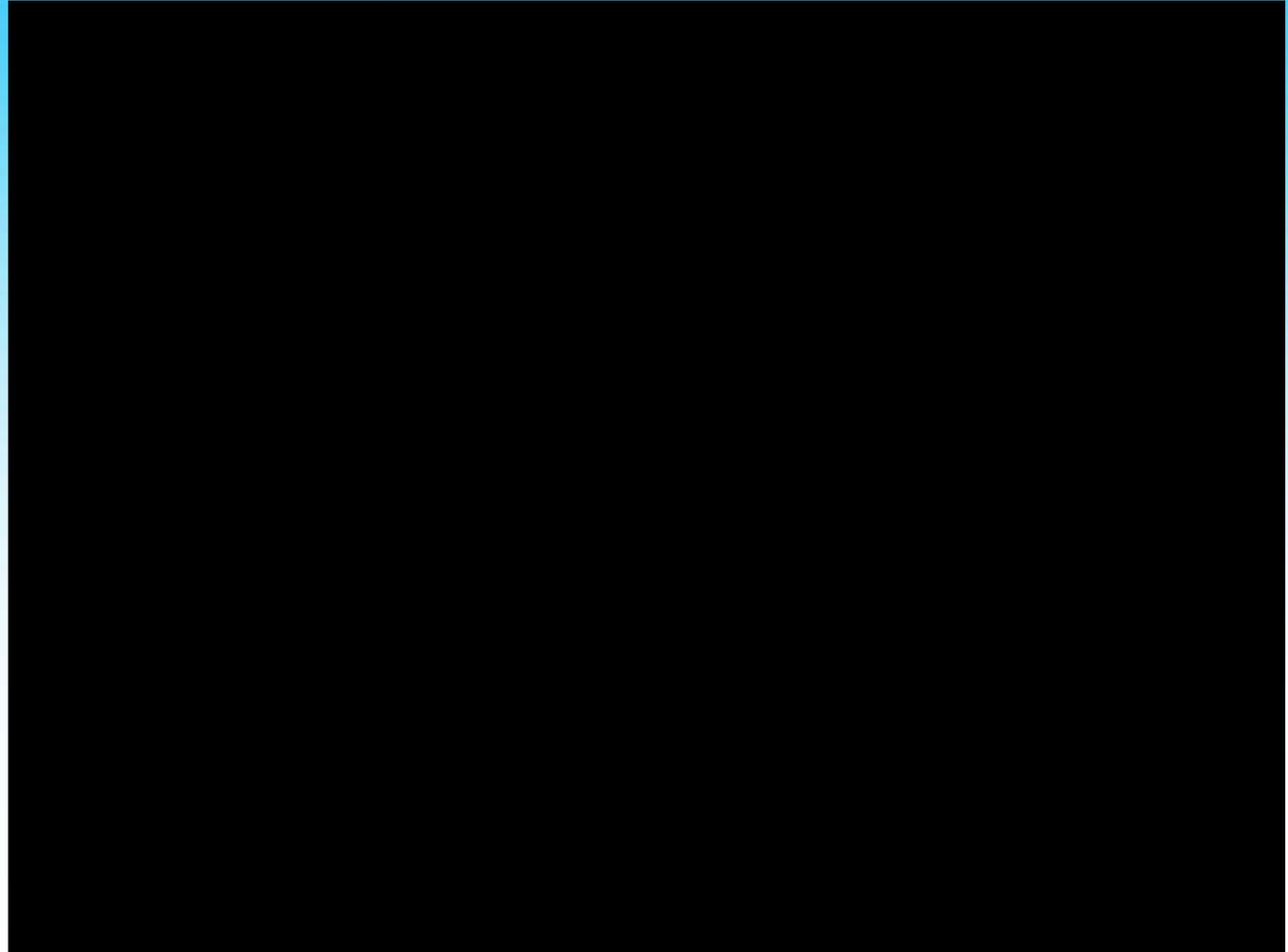
- any sway / tendency to fall is looked for

VESTIBULO-SPINAL TESTS

Romberg's Test

*Pt. stands with eyes closed
and feet close together.*

*- any tendency to fall looked for
-just gyrations are not abnormal*



VESTIBULO-SPINAL TESTS

Unterburger's Stepping Test

Test:

Pt. steps on the same spot 90 times in 1 min.
with eyes closed and arms extended.

To look for:

- 1) Rotation / Deviation
- 2) Side to side sway

Interpretation:

- 1) Rotation /deviation more than 50 degrees to one side suggests ipsilateral peripheral vestibulopathy
- 2) Widened side to side sway with gradually widening base suggests ataxia due to central lesion



VESTIBULO-SPINAL TESTS

Unterburger's Stepping Test

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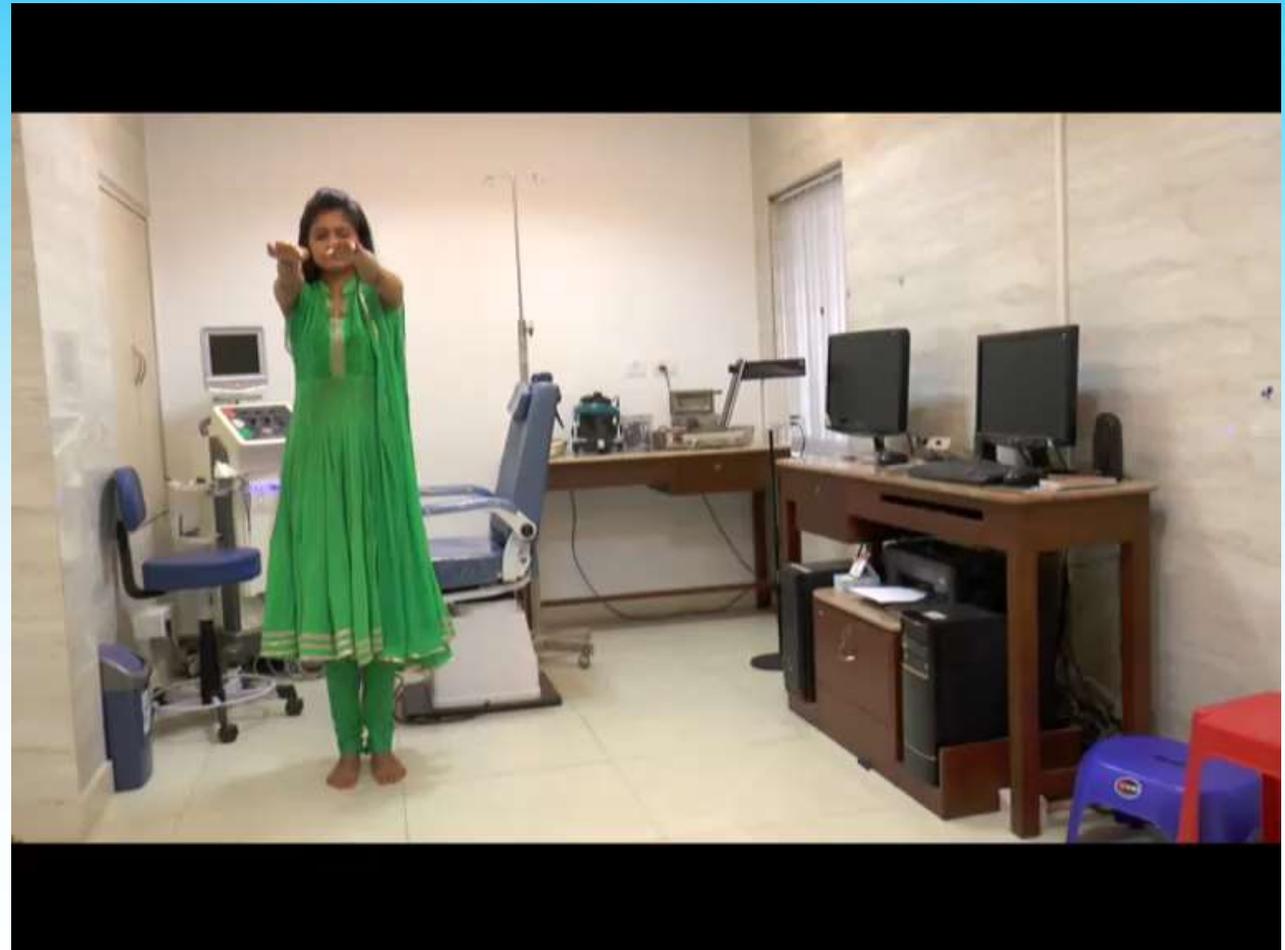
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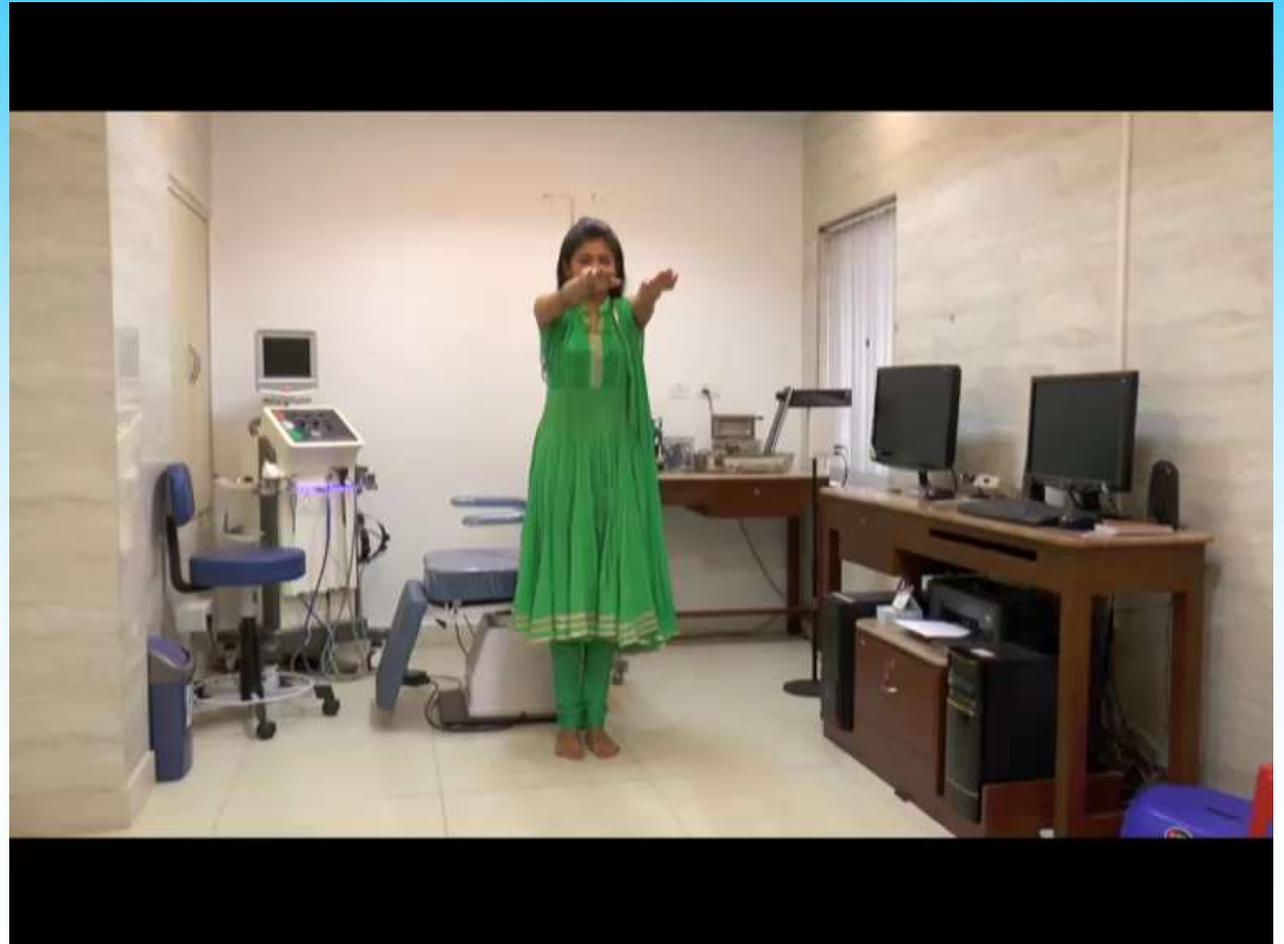
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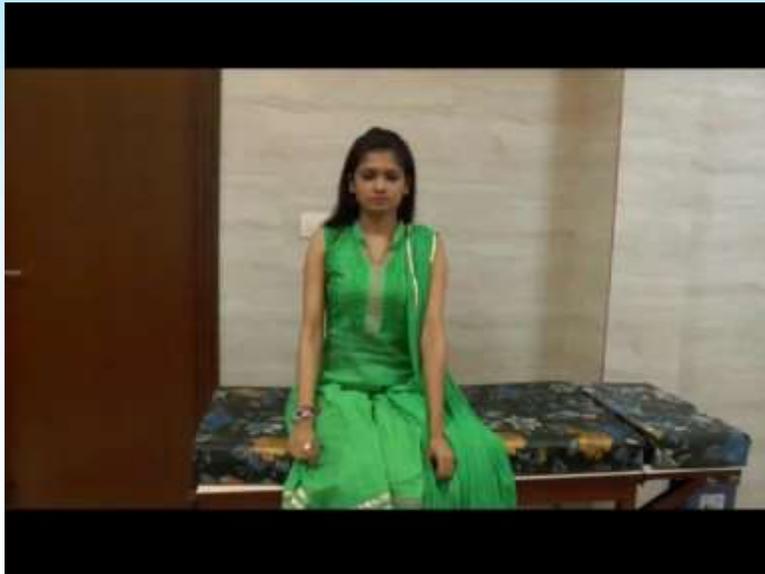


VESTIBULO-SPINAL TESTS

The Cerebellar Tests (tests for incoordination)

Check for:-

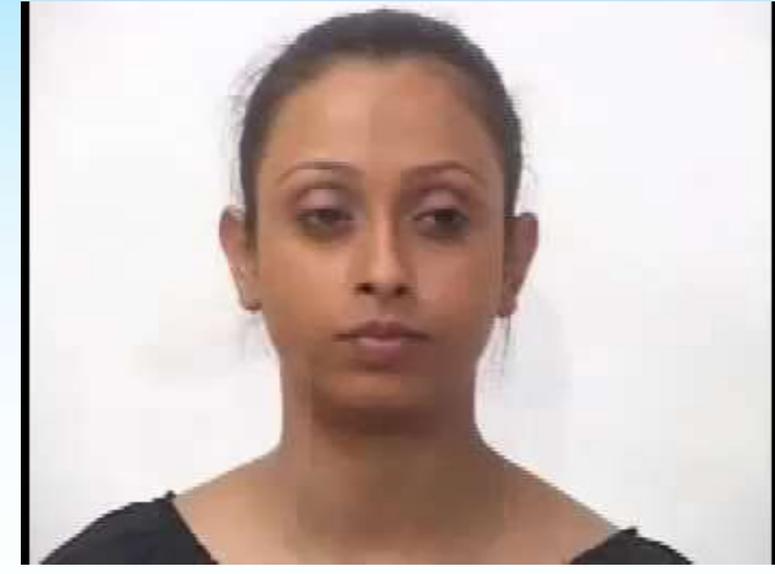
- 1) **Speech** – *slurred staccato*
- 2) **Stance** – *wide based gait*
- 3) **Stability** – *staggering gait*
- 4) **Tandem Walking with eyes closed** - *gross unsteadiness*
- 5) **Smooth pursuit test** - *impaired*
- 6) **Saccade test** - *abnormal*



Finger Nose Test



Heel Knee Test



Rapidly Alternating Task Test

VESTIBULO-SPINAL TESTS

The Cerebellar Tests
(tests for incoordination)



Rebound Test



Dysdiadochokinesia Test



Tandem Walking Test

The Cerebellar signs:-

- Dysdiadochokinesia
- Ataxia
- Nystagmus
- Intention Tremor
- Slurred Speech
- Hypotonia
- Past Pointing
- Rebound



The eye signs of Cerebellar disorder :-

- Gaze evoked nystagmus in any direction
- Jerky / Saccadic smooth tracking
- Down-beating nystagmus (DBN)
- Rebound nystagmus
- Dysmetria :- hyper/hypo metria in saccade test
- Periodic Alternating Nystagmus (PAN)
- Central positioning nystagmus
- Impaired VOR suppression



Disorder in FLOCULLUS:-
Gaze Evoked Nystagmus
Jerky smooth pursuit
DBN
Rebound Nystagmus
Impaired VOR suppression

Disorder in NODULUS:-
PAN
Central positioning nystagmus

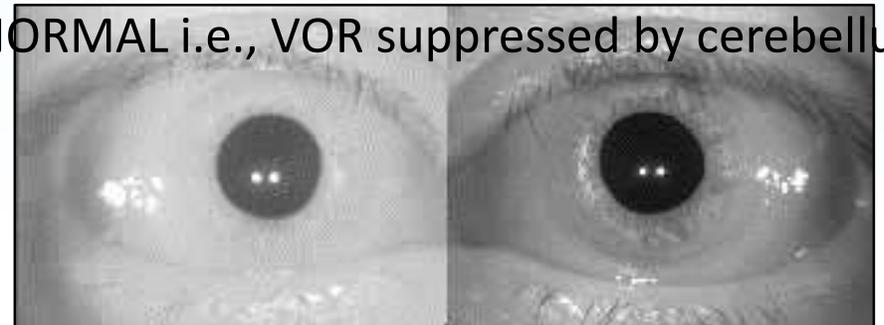
Disorder in VERMIS:-
Hypometric saccade
Disorder in FASTIGEAL NUCLEUS:-
Hypermetric saccade

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- **Central positioning nystagmus**
- **Impaired VOR suppression**



NORMAL i.e., VOR suppressed by cerebellum



Signs of Extraparamidal disorders:-

General Inspection :

Hypomimia (reduced facial expression)

Stooped posture (bent forwards)

Resting tremor (pin-rolling).

Dysarthria - slow, thick, indistinct 'Donald duck' speech

Tongue spasticity - it will appear stiff with reduced movement

Brisk jaw jerk - hyperactivity of 5th Cr nerve following UMN lesion



Test for Postural Instability :

Pull test



Signs of Extrapyrarnidal disorders:-

Gait Test

Difficulty initiating movement (**hesitancy**)

Small, **shuffling** steps

Festination, where the patient speeds up as they walk

Reduced **arm swing**

Turning **en bloc**



Cerebellar tests

cerebellum affected in MSA part of Parkinson Plus syndrome

finger nose test, past pointing test, test for dysdiadokinesia

Test for perception of visual vertical

- Bucket test
- SVV test *(if facilities are available)*



DIZZINESS SIMULATION TEST BATTERY

- 1. Orthostatic hypotension :-**
BP measured in - **SUPINE**
 - **IMMEDIATE STANDING**
 - **3 mins later STANDING**
- 2. Potentiated Valsalva maneuver :-**
 - **STRAINS with CLOSED GLOTTIS**
- 3. Carotid Sinus Stimulation :-**
Unilaterally **CAROTID SINUS MASSAGED** for 15secs.
- 4. Hyperventilation test:-**



Brief list of clinical tests in balance disorder patients

1. Brief NEUROLOGICAL Exam

- Cr Nv. 3, 4, 5 (esp. corneal reflex), 6, 7, 8, & 10
- Knee & Ankle jerks
- Planter response
- Motor-sensory loss of upper / lower limbs & trunk
- Look for any tremor, ataxia, abnormal neck position.
- Oculomotor tests :- Smooth tracking test, Saccade test, Gaze holding test

2. - VESTIBULO-SPINAL TESTS

- Standing /Romberg's test
- Stepping test
- Cerebellar tests

3. VESTIBULO-OCULAR TESTS

- Spont. nystagmus & other abnormal eye movement
- Head Impulse Test
- Test for skew deviation of eyes
- Positional / Positioning tests
- Head shaking tests



Tests for bedside examination of a vertigo patient

- 1) **Head position test** *(to look for any abnormal head tilt)*
- 2) **Eye position test** *(to look for any skew deviation of eyes)*
- 3) **Test for any Nystagmus or any other abnormal eye movement**
- 4) **Head Impulse Test for VOR function**
- 5) **Saccade test**
- 6) **Gaze holding test**
- 7) **Smooth tracking test**
- 8) **VOR suppression test**
- 9) **Basic neurological tests** *(level of consciousness, pupillary reaction, any slurring of speech, cranial nv tests, finger-nose test, heel-knee test, any motor/sensory loss, planter reflex, ankle jerk test)*

Minimum Clinical Tests for a balance disorder patient

- 1) Head Impulse Test**
- 2) Test for any Nystagmus/ abnormal eye movement**
- 3) Positioning tests**
- 4) Test for skew deviation**
- 5) Romberg's test / Standing test**
- 6) If possible also the Subjective Visual Test (bucket test)**



If a very thorough **history-taking** and a detailed **clinical test** is done, a proper diagnosis is possible in 80-85% of disequilibrium patients.

The sophisticated neurotological investigations like **VNG, VHIT, VEMP, CCG, SVV, Posturography** and imaging is necessary in about 15 to 20% patients only

Something a bit more
interesting now....