Alder Hey Children's NHS Foundation Trust

Assessment of vestibular function in children including compensation after management

Prof Soumit Dasgupta

MBBS DLO MS FRCS MSc FIAOHNS FRCP

Consultant Audiovestibular Physician and Clinical Lead

Alder Hey Children's NHS Foundation Trust, Liverpool, UK

Honorary Visiting Professor, Otology and Skull Base Surgery, University of Siena, Italy

Honorary Senior Clinical Lecturer, University of Liverpool, UK

Honorary Lecturer, University of Manchester, UK

Visiting Faculty, University of Sheffield, UK

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Learning Outcomes

•After this course, participants will be able to Identify the key components of pediatric vestibular assessment, including developmental considerations, test selection, and the importance of individualized laboratory norms.

•After this course, participants will be able to differentiate between central and peripheral vestibular dysfunction in children by analyzing clinical history, vestibular test results, and associated neurological findings.

•After this course, participants will be able to discuss how to assess vestibular compensation in pediatric patients using psychometric questionnaires, vestibular function tests (VNG, vHIT, VEMPs, posturography), and the SHIMP test to evaluate recovery and guide treatment strategies.

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Risks/Benefits

- The applicability and accuracy of the course content may vary by the clinical, geographical, and cultural context; you should evaluate the course accordingly.
- As healthcare is rapidly evolving, new findings may change the validity of the information presented in this course. Providers should always consult the latest research and guidelines from professional associations.
- The interventions discussed in this course may be limited in generalizability, requiring practitioners to consider specific individual and population factors.
- The course may not cover all possible risk factors, diagnostic methods, or treatment options, and complex cases may require additional considerations.
- Healthcare providers should apply cultural competence and sensitivity to ensure effective and respectful care based on their patients' diverse needs.
- Providers should always evaluate the limitations of diagnostic and screening tools, considering their potential for false results as well as any ethical implications.
- It is the responsibility of course participants to critically evaluate the evidence from multiple sources to guide professional practice.

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The vestibular response

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Tonotopicity of the vestibular sensory epithelia (Schubert 2003; van der Bergh 2014)

- Knowledge is emerging that the vestibular sensory epithelia is frequency specific or tonotopic and individual frequency zones may be involved in disease sparing other regions

- These other tests are designed to measure individual frequency information for devising customised vestibular rehabilitation for the most favourable outcome

Quantification of the vestibular system in children

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Special considerations in children

- Testing children is an art and must incorporate fun activities and improvisations
- Often a second tester or a distractor required especially in young children
- Tests selected according to the developmental age of the child
- Laboratory norms for tests used in adults are **not established** in children – every paediatric vestibular laboratory must have its own norms
- Aetiology and vestibular phenotypes are markedly different in children as compared to adults that must be borne in mind and objective of assessment is also to figure out a cause for decompensation
- Along with vestibular function, we are also assessing central or neurological function

Significance of diagnosis

- Distinguish between central and peripheral causes of imbalance
- Formulation of effective management regimen including compensation, adaptation and habituation protocols with customised rehabilitation exercises
- Particle repositioning manoeuvres
- Exclusion/inclusion of vestibular pathology in solitary/ multifactorial conditions

The clinical algorithm

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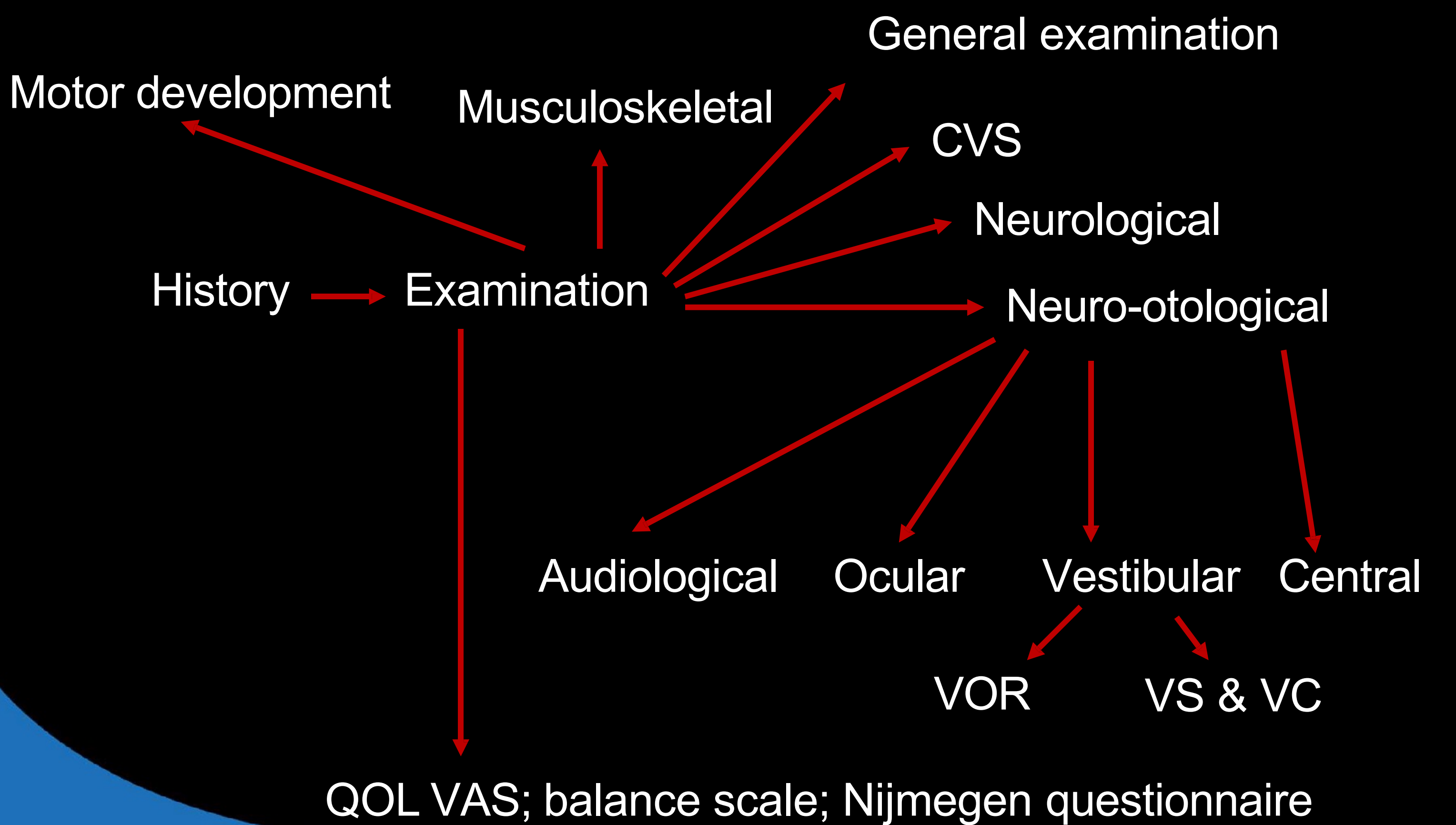

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Presentation/history

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- *Obvious dizziness/vertigo/lightheadedness* (+ 8y)
- Fright or pallor
- Clutching
- *Bumping into things*
- Clumsiness
- *Sudden pole axing falls*
- *Periodic episodes of nausea or vomiting +/- migrainous features*
- Delayed motor functions
- *Difficulties in playground activities*, dancing
- *Oscillopsia*
- *Difficult to track challenging visual targets*
- *Difficulties in reading*
- Poor head eye coordination
- Loss of postural control
- *Difficulty with ambulation in the dark*
- Abnormal movements/behaviour
- Difficulties in challenging movements (swimming)
- Autonomic symptoms

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Key points in history

- Type – vertigo or otherwise
- Duration – episodic suggestive of vestibular pathology
- Loss of consciousness – suggestive of non vestibular pathology
- Trigger – movement, aural pressure changes and darkness induced suggestive of vestibular pathology
- Movement from dependant position suggests postural hypotension
- Ataxia – suggestive of TIA or central syndromes
- Headache – suggestive of migraine variant
- Visual vertigo – peripheral vestibular mainly otolith dysfunction

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9 different presentations

Dizziness/light headedness/vertigo

Episodic
VM, VN, MD, VP
Mins – days
Seconds

Sustained
BVH. 3PD

Positional
Otolith, BPPV

Oscillopsia
BVH

Hearing
Periphery

Central symptoms/ataxia
Neurological

Headache
Migraine

Visual vertigo
Vestibular

Postural instability/balance
All systems

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5 major peripheral vestibular phenotypes

- Acute vestibular event or ictus : infection or vascular
- Intermittent decompensation following acute event; traumatic fibrosis; tumour or SOL
- Paroxysmal irritation of the vestibular system : BPPV; VM; endolymphatic hydrops; vestibular paroxysmia; cervical causes
- MDD like syndrome and visual vertigo
- Bilateral vestibular failure

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Children might not able to describe their symptoms in which case the parents/carers need to assist. They usually and quite astutely observe 'vestibular behaviour' that are vital clues to the history

Remember, even if the history suggests that the problems is non vestibular in origin, one should still do at least a screening balance function assessment with a clinical vestibular examination

The history is the most important way to get an idea about aetiology

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Other history

- Birth history
- Family history
- Ear symptoms
- Development history especially motor development
- Other medical illness
- Head injury in the past
- Ototoxic history
- Musculoskeletal pain
- Gluten sensitivity and history of autoimmune disorders
- Past history of sepsis

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These symptoms might entail a referral to neurology or even ophthalmology – vestibular disorders will account for at least a third of a diagnosed aetiology in children

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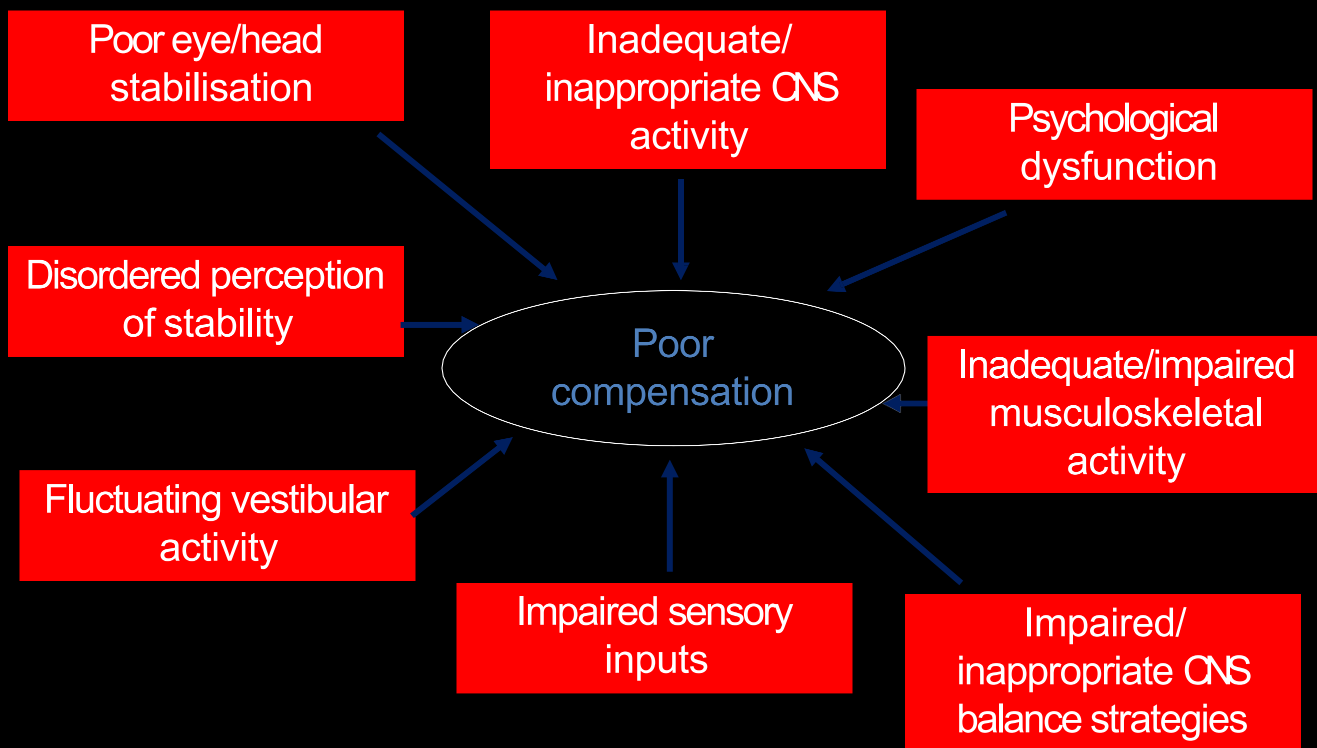
Decompensation and manifestation of balance disorders



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Important points to remember

- Difficult engagement so must be a part of play
- Needs to be quick
- Apprehension
- Difficult fixation and unstable gaze
- Selection of appropriate visual target
- Long eyelashes
- Circumference of head
- Position of hands on the head

- May need assistant
- VOR gain in vertical canals difficult to interpret
- Needs lots of practice
- Minimum 5 thrusts required
- Chances of artefacts are more than in adults
- Presence of comorbidities especially complex neurological presentations
- Due to the variability of responses in children, every individual vHIT needs to be interpreted in the holistic way and not just the trace itself and fine decisions based on knowledge and wisdom about paediatric vestibular disorders

- ***Paediatric norms are different in children***

Vestibular quantification algorithm in children

AGE	TEST
Birth to 6 months	Developmental reflexes, VNG
6 months to 12 months	Clinical, cVEMP, VNG, remote vHIT, chair
12 months to 3 years	Clinical, cVEMP, VNG, remote vHIT, VST, chair
3 years to 6 years	Clinical, oVEMP, cVEMP, mounted vHIT, SHIMP, VNG, VST, chair
5 years to 10 years	Clinical, oVEMP, cVEMP, mounted vHIT, SHIMP, VNG, VST, chair, fHIT, Vanderbilt DHI, balance scores
10 years to 18 years	Clinical, oVEMP, cVEMP, mounted vHIT, SHIMP, VNG, VST, chair, fHIT, psychometry DHI, balance scores

Equipment

- *Your hands, eyes and brain*
- VNG kit adapted to children
- DVA and SVV equipment (non digital possible)
- Foam cushion
- Toys and tools especially for neurological examination
- Children psychometric questionnaires
- Standard VEMP equipment
- Video Head Impulse test battery tailored to age

If you have no VNG, use your mobile phone to catch eye movements; always perform a clinical examination

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Assessment in children under 1 year of age

- Moro reflex
- Tonic neck reflex
- Head righting reflex
- Parachute reaction
- Doll's eye reaction

All these reflexes are influenced by the vestibular system and are crucial to assess vestibular function until 5 months of age

- cVEMP 6 months onwards
- vHIT 8 months onwards
- VNG 6 months onwards
- Neurological assessment

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Angular motion sensor tests

- Nystagmus at rest and ectopic eye movements with VNG
- The head shake test (VNG)
- The hyperventilation test (VNG)
- The Hennebert's test (VNG)
- The mastoid vibration test (VNG)
- Computerised dynamic visual acuity test (VNG)
- The video head impulse test
- Suppression head impulse test
- The functional head impulse test
- Caloric test
- Rotatory chair tests

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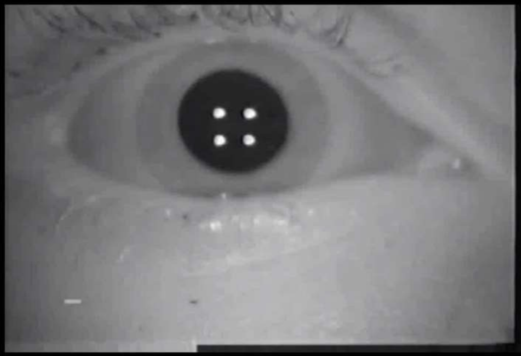
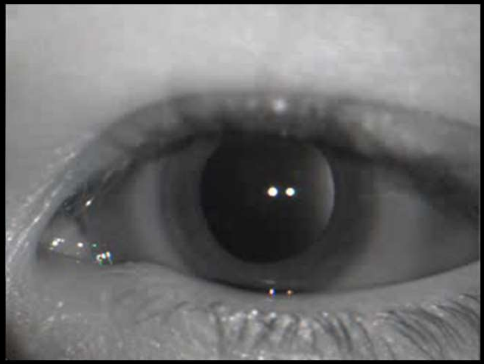
Gaze tests





- VNG spontaneous and eccentricity all positions
- Indicates lateral semcircular function in static conditions
- Nystagmus characteristic indicates peripheral or central lesion
- Highly specific and sensitive

Mastoid vibration test (Lucke 1973)

- Good correlation with caloric tests and may be used as a replacement for caloric tests in children
- Measures low frequency vestibular response
- Good sensitivity and specificity (Nuti and Mandala 2005)
- Nystagmus beats towards the affected ear and can be stimulated contralaterally

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Rotatory chair tests (Mach 1885; Barany 1907)

- Measures lateral semicircular canal function only
- Measures low frequency response
- Suppression of visual fixation indicates cerebellar flocculonodular lobe function
- Optokinetic tests measure very low frequency head movement (under 100^0 per second and is allied to smooth pursuits)

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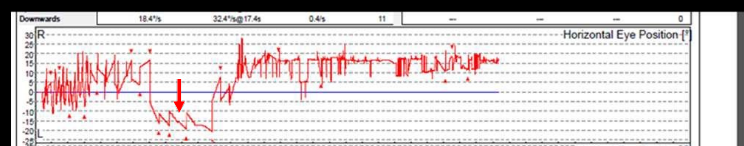
The head shake test (Barany 1907)



- Horizontal post headshake nystagmus for vestibular asymmetry
- Perverted or vertical for central
- Checks mid frequency response LSCC
- Useful for prognosis
- Not very sensitive or specific and does not localise side (Nuti and Mandala 2005)

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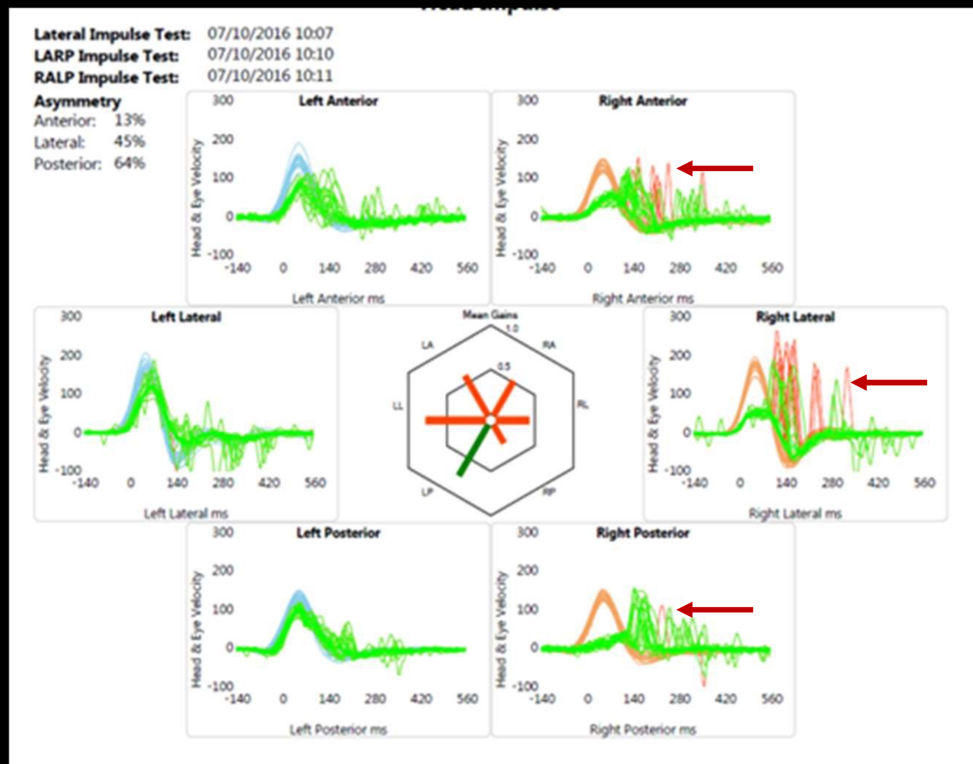
The dynamic visual acuity test (Cohen 1984)

- Measures low to mid frequency vestibular function
- Useful for prognosis and effects of rehabilitation
- Based on the principles of retinal slip on head movement
- Found in unilateral and active unilateral lesions
- Computerised variety (cDVA) with high sensitivity and specificity (Herdman 2010)

The video head impulse test vHIT (Halmyagi 1988 – McDougal 2009)

- In expert hands high sensitivity and specificity (McDougal 2009)
- Measures high frequency angular motion sensor function
- Useful for prognosis
- Measures all 6 canals
- Revolutionised approach to vestibular diagnostics and can be performed in young children


Lateral Impulse Test: 07/10/2016 10:07
LARP Impulse Test: 07/10/2016 10:10
RALP Impulse Test: 07/10/2016 10:11
Asymmetry
Anterior: 13%
Lateral: 45%
Posterior: 64%
Left Anterior
Right Anterior
Left Lateral
Right Lateral
Left Posterior
Right Posterior
Mean Gains
LA
RA
LL
RL
LP
RP
Head & Eye Velocity
Left Anterior ms
Right Anterior ms
Left Lateral ms
Right Lateral ms
Left Posterior ms
Right Posterior ms

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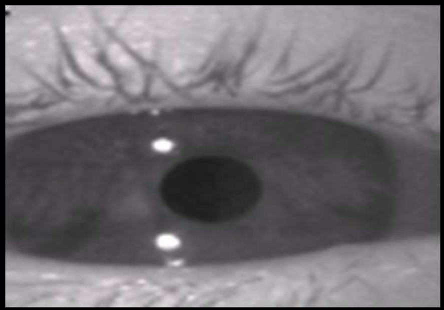
The suppression head impulse test (McDougall 2016)



- Voluntary suppression of high frequency VOR with moving target
- Indicates compensation – asymmetry, peak saccadic velocity and VOR gain
- Indicates peripheral central cerebellar function

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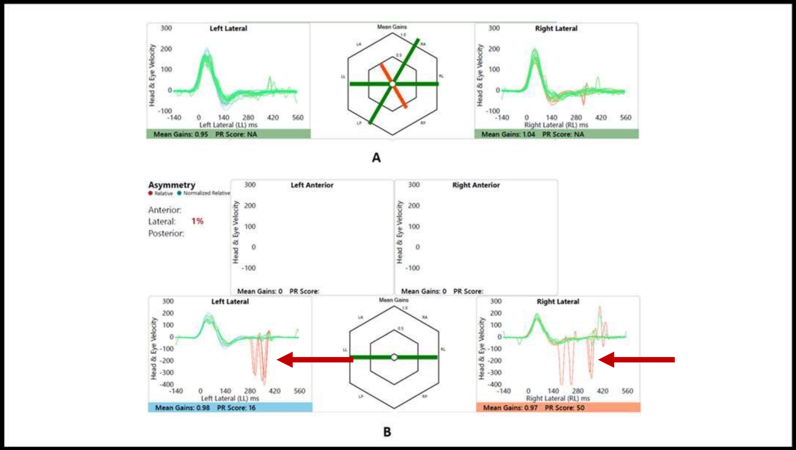
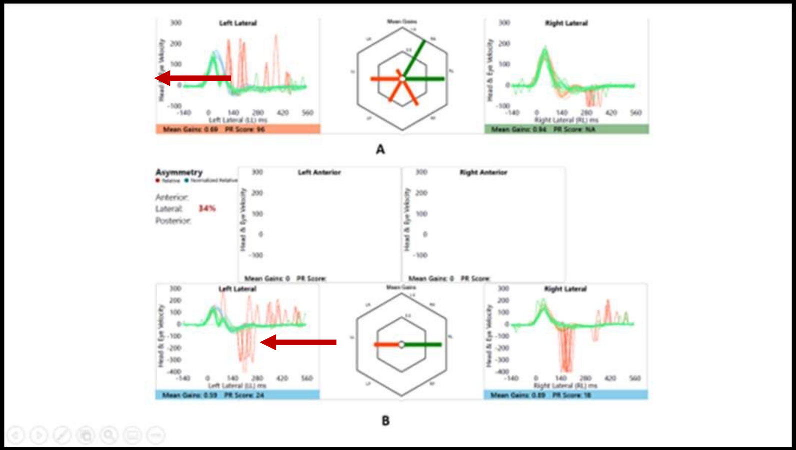

Left Lateral
Mean Gains
Right Lateral
A
Asymmetry
Anterior:
Lateral: 1%
Posterior:
Left Anterior
Right Anterior
Left Lateral
Mean Gains
Right Lateral
B


Left Lateral
Right Lateral
A
Asymmetry
Anterior:
Lateral: 34%
Posterior:
Left Anterior
Right Anterior
Left Lateral
Right Lateral
B

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The functional head impulse test (Ramat 2012)

- Recently introduced measures high frequency functional angular VOR in canals
- Good correlation with video head impulse test
- Yet to be tried in children
- Advantage in measuring a whole range of head velocities not available in the standard vHIT software

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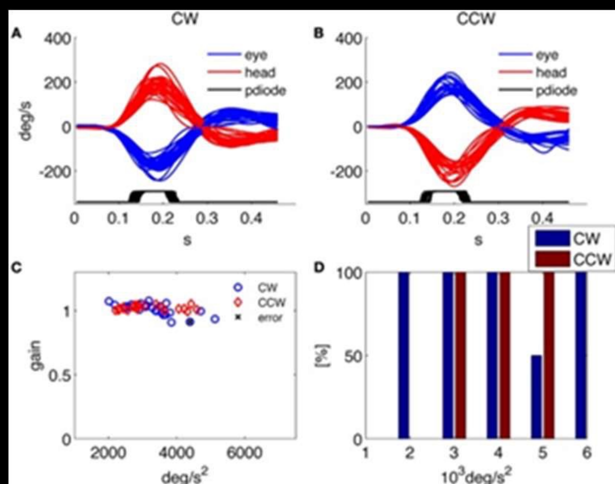

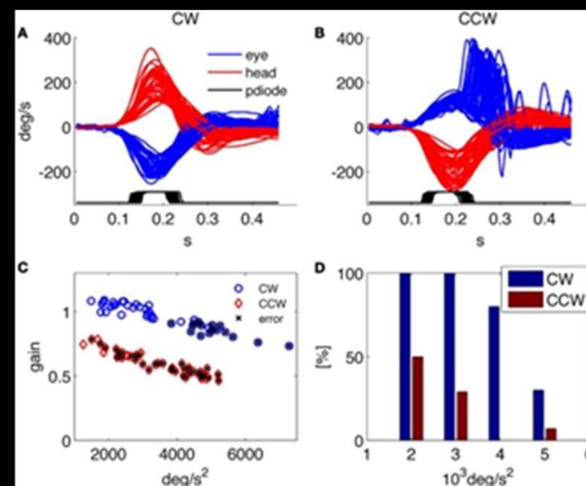

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Caloric testing (Brown-Sequard 1854, Bornhardt 1877, Baginsky 1899 refined by Barany 1907 and Hallpike-Fitzgerald 1943)

- Cannot be performed in all children
- Measures ultra low frequency non physiological vestibular lateral semicircular canal response
- High sensitivity and specificity but can be quite uncomfortable

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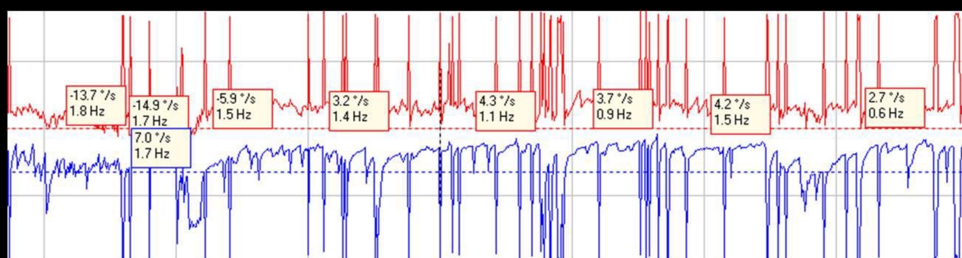
Hyperventilation induced nystagmus HVIN (Theunissen 1986)



- Indicates lesion in the CPA; thus aetiological test
- Sensitivity is medium with high specificity (Mandala 2013)
- Change of direction of nystagmus may indicate increased size of lesion
- Uncomfortable and cannot be used in epilepsy

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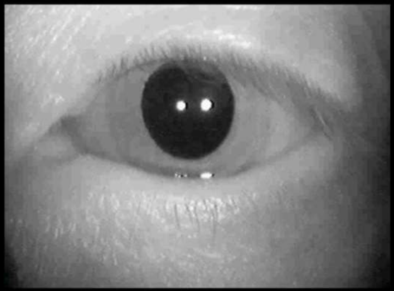
Hennebert's test (Hennebert 1905)

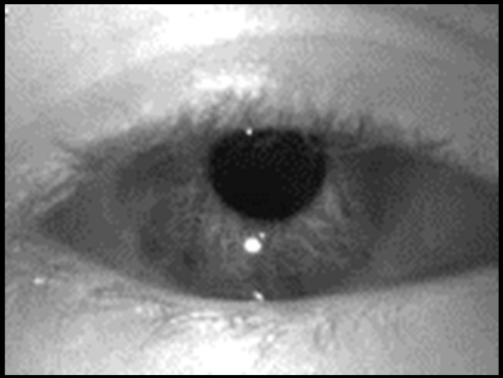


- Tragal pressure or forced expiration against closed glottis/Valsalva
- Characteristic of third window syndromes
- Indicates aetiology
- Unknown sensitivity and specificity (Schuman 2012) but personal series indicated more common than Tullio's phenomenon and slightly less common than mixed hearing losses

Translational motion sensor tests

- The head heave test (VNG)
- The subjective visual vertical test
- The ocular counter rolling test (VNG)
- The skew deviation
- The vestibular evoked myogenic potential test

The head heave test (Ramat 2001)



- Translational analogue of head thrust
- Checks utricle high frequency responses
- Good correlation with oVEMP (personal series)
- Operator dependent
- May be found normally if not performed correctly
- Limited series to comment on sensitivity and specificity

Subjective visual vertical (Friedman 1970)

- Checks utricular static response
- Can be simply done with i phone app and with a bucket and protractor or can be computerised
- May be noisy due to other conditions – torticollis or strabismus
- Specificity is over 80% but sensitivity is low (Chetana 2015)

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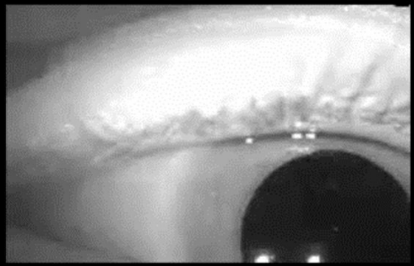
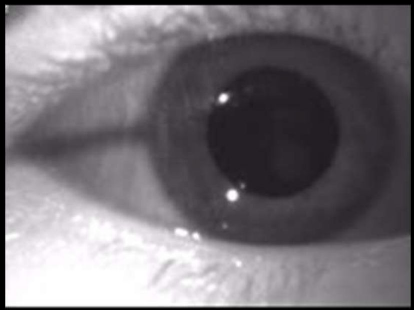
Ocular counter roll test (Yakoleva 1982)





- Recording eye movement on passive and active head tilt
- Possible mid frequency utriculosaccular response
- Low sensitivity and specificity due to cervical and truncal proprioception cues (Chandrakumar 2011)
- Does not need expensive equipment to measure when used VNG videography and playback
- May be a useful adjunct to other tests
- Contaminated by ocular palsies

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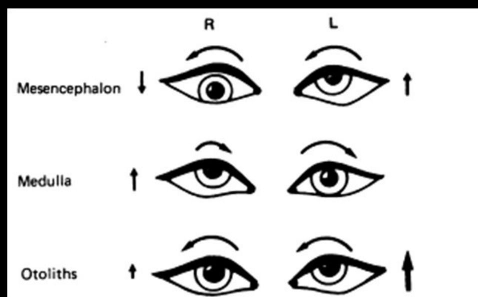
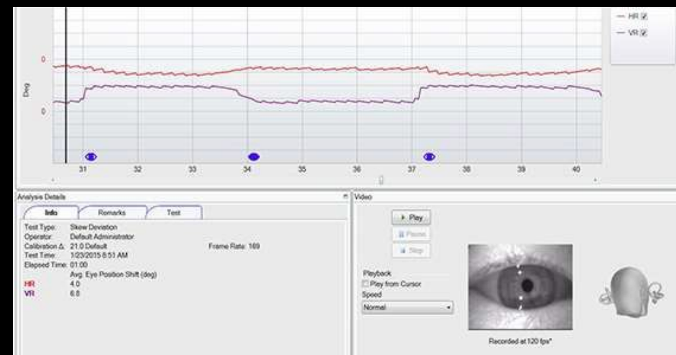
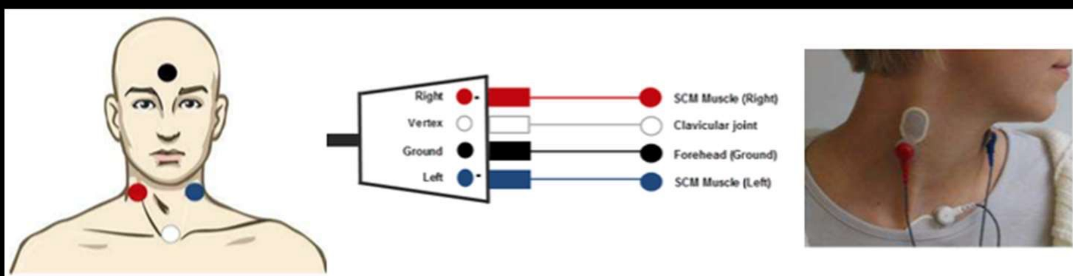
Skew deviation (Hertwig 1885)

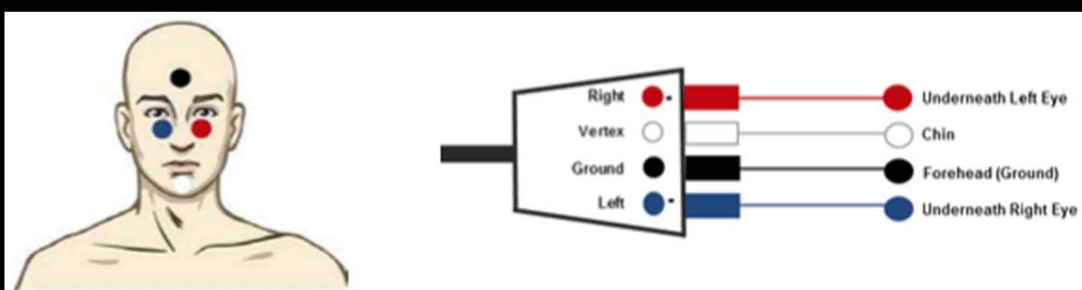




- 30% of skews may be due to otolith dysfunction (Brandt 1991)
- Can be measured with software
- In vestibular diagnostics should be backed up with video evidence
- Vestibular sensitivity and specificity undetermined

The vestibular evoked myogenic potential tests (Colebach 1996, Jombyk Bahyl 2005)





- Assesses mid frequency utricular response with oVEMP
- Assesses mid frequency saccular response with cVEMP
- Variable sensitivity/specificity but very useful in third window and recently VEMP tuning in endolymphatic hydrops

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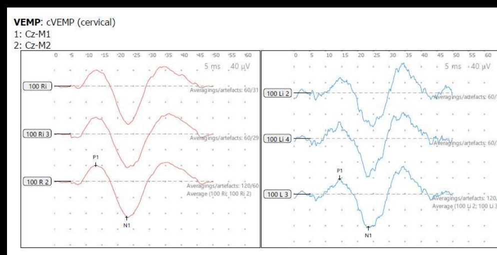

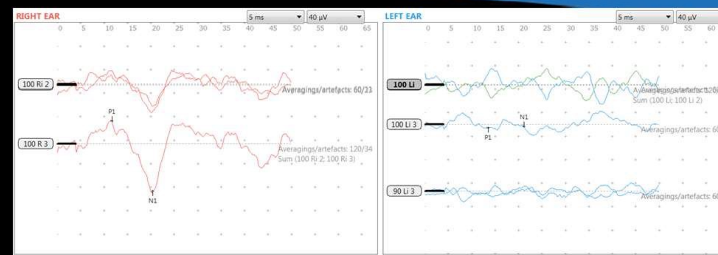

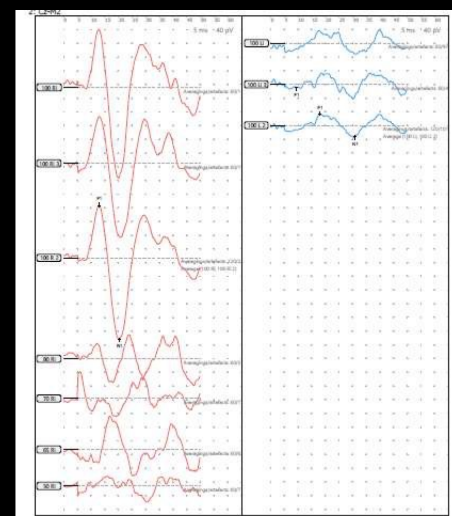

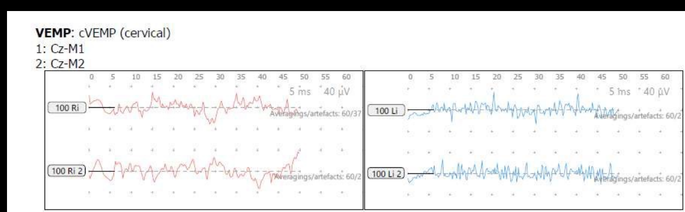

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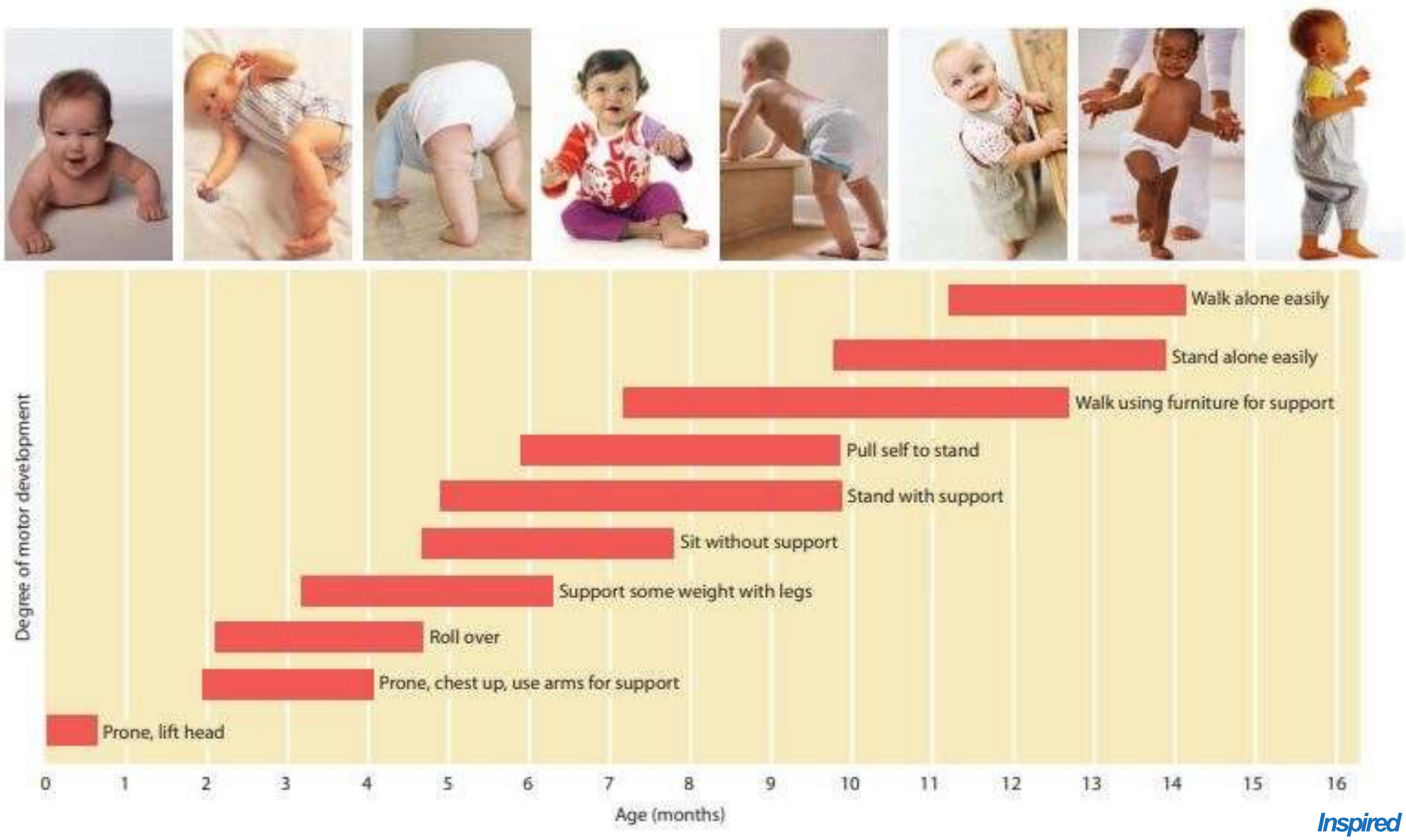
Other tests

- Vestibulo-spinal tests; static and dynamic posturography
- Central tests
  - VNG ectopic eye movements
  - Smooth pursuits and saccades
  - VOR cancel test
  - Perversion of expected peripheral eye movements
  - Non vestibular movement disorders

It is absolutely crucial to distinguish between central and peripheral pathological eye movements

- Full musculoskeletal/motor, cardiovascular and neurological assessment
- Development assessment
- Hearing assessment
- Imaging studies – HRCT for bony labyrinth, MRI for membranous labyrinth
- Static and dynamic posturography
- Blood tests when indicated including genetic testing

Gross Motor assessment



Fine Motor assessment

Fine motor skill milestones for children

Age range	Activities
0 to 6 months.	• Grasping something with both hands (3 months). • Grasping something with one full hand (5 months).
6 to 12 months.	• Pinching things with their thumb and one other finger. • Transferring objects from one hand to the other. • Picking up and dropping toys and putting them in their mouth.
1 to 2 years.	• Stacking three small blocks. • Turning knobs. • Beginning self-feeding with utensils. • Turning a few pages of a book at a time.
2 to 3 years.	• Turning single pages of a book. • Holding a crayon with their thumb and first two fingers (not a fist). • Making small cuts with scissors. • Rolling, squeezing and pulling putty.
3 to 4 years.	• Building a tower of nine small blocks. • Drawing copies of circles. • Using their non-dominant hand to assist and stabilize objects while using them.
4 to 5 years.	• Cutting continuously with scissors on a line. • Printing their name and the numbers 1 through 5. • Dressing and undressing without help.
5 to 6 years.	• Cutting out simple shapes with scissors. • Coloring within the lines. • Using a three-fingered grasp of a pencil.
6 to 7 years.	• Tying shoelaces by themselves. • Writing consistently on lines. • Writing most numbers and letters correctly.

Cleveland Clinic

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Courtesy: Cleveland Clinic

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Neurological examination

- Cranial nerves
- Tone, power, reflex
- Gait and posture
- Cerebellum
- Sensation

Musculoskeletal examination

- Any obvious craniofacial dysmorphia
- Leg length discrepancy
- Lower limb varus and valgus deformities
- Joint deformities
- Elasticity of joints

Cardiovascular examination

- Lying, sitting and standing BP
- Lying, sitting and standing pulse

Ophthalmological examination

- Oculomotor eye movements
- Convergence

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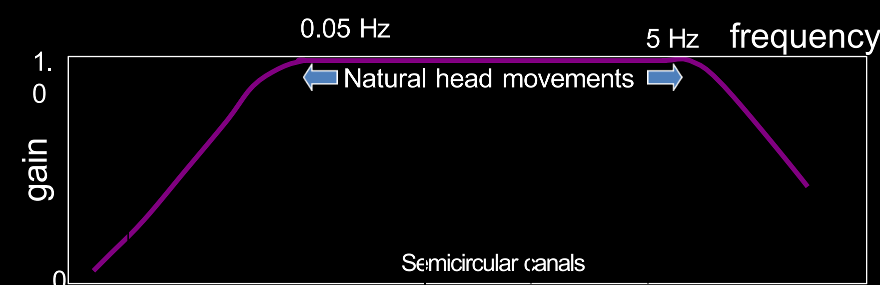
Vestibular assessment

Detailed history from child, parents and carers to identify vestibular behaviour



Developmental reflexes upto 6 months

- Moro reflex
- Tonic neck reflex
- Head righting reflex
- Parachute reaction
- Doll's eye reaction

Spontaneous / gaze tests (*0 Hz*)

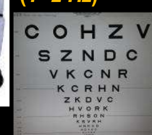
With fixation
without fixation

Calorics (*0.003 Hz*)

Mastoid vibration (*0.02 Hz*)

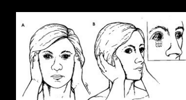
Rotating chair (*0.5 - 1 Hz*)

Dynamic visual acuity (*1 -2 Hz*)



Headshake (*2 - 4 Hz*)

Head Thrust (*5 -7 Hz*)



Heave SVV oVAR cVEMP oVEMP OCR
High Static Mid Low Low Mid

Utricle Saccule US Saccule Utricle US

Hyperventilation test
Hennebert's test
fHIT and SHIMP
Static and dynamic posturography

Neurological assessment

- Examination
- Smooth pursuits
- Saccades
- Vertical headshake and perversion
- VOR cancel
- Optokinetic assessment
- Skew deviation
- Caloric disassociation and fixation index
- Oculomotor movements for central signs

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Assessment of vestibular compensation in children

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Domains

Subjective:

- Interview about symptoms, use VAS
- School report and educational report
- Vanderbilt Dizziness Handicap Inventory
- Berg Balance and motor assessment scales

Objective:

- VNG
- Caloric
- Rotatory chair
- DVA
- Video Head Impulse Test
- Suppression Head Impulse Test
- Vestibular evoked myogenic potential test
- Static and dynamic posturography

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- It must be remembered that subjective perceptions may not match with objective improvement in many instances
- This is because, there might be comorbid medical and/or mental issues that maintain vestibular decompensation and thus the perception of imbalance
- In some instances there may be no objective recovery at all
- *Objective monitoring is essential to assess effectiveness of treatment, understand factors maintaining decompensation and treating them and predict natural history of vestibular pathologies*

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Measurements of vestibular compensation

- Recovery of Alexander's nystagmus
- Recovery of subjective visual vertical tilt
- Caloric recovery
- Recovery of mastoid vibration nystagmus
- Recovery of rotatory chair gain
- Recovery of horizontal headshake nystagmus
- Recovery in dynamic visual acuity
- VEMP recovery

Armato, E. et al.Determination of Recovery by Total Restitution or Compensation Using Multifrequency Vestibular Tests and Subjective Functional Scales in a Human Model of Vestibular Neuritis. Audiol. Res. 2024, 14, 958-982. https://doi.org/10.3390/audiolres14060080

Guo et al. Dynamic change of vestibular function and the long-term prognosis of vestibular neuritis. Journal of Vestibular Research. 2024;33(6):411-422. doi:10.3233/VES-220104

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Compensation measured by video head impulse test

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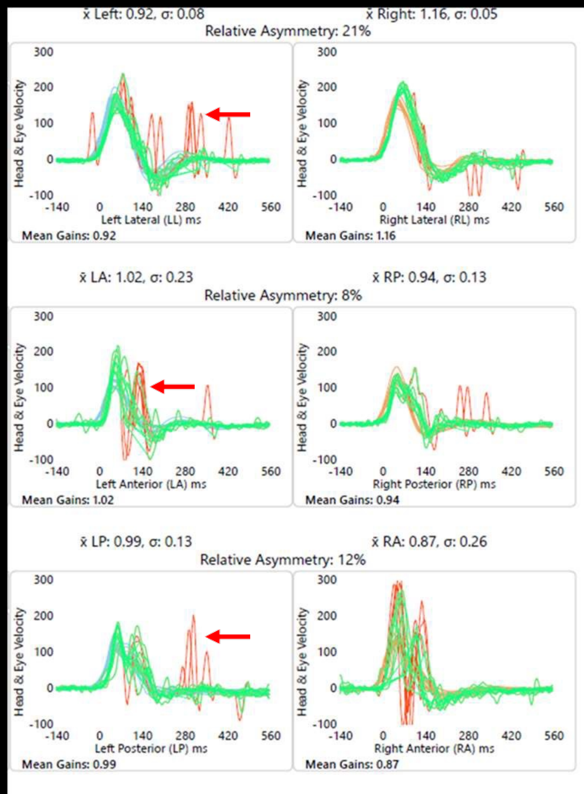
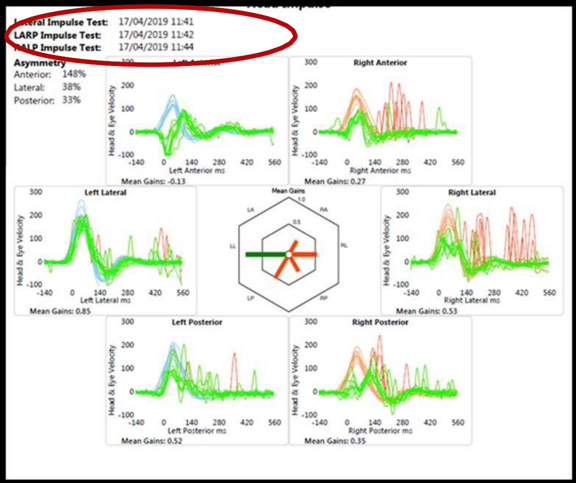
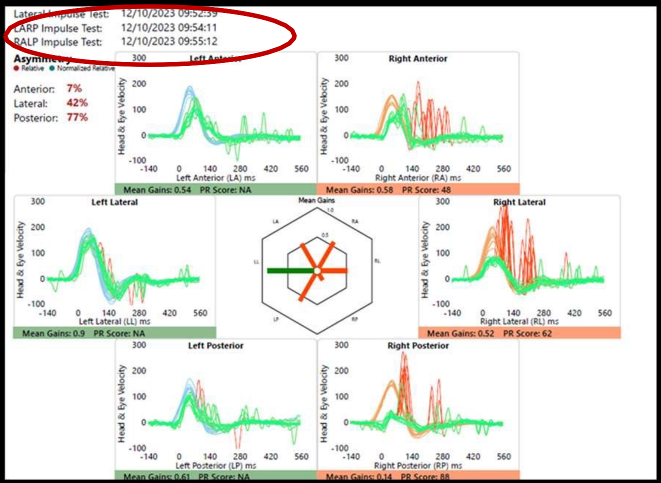
The evidence (Suman et al 2022, Measure of Central Vestibular Compensation: A Review; J Int Adv Otol. 2022 Sep; 18(5): 441–446)

- Video head impulse test can be used as an objective measure to evaluate central vestibular compensation
- **Vestibulo-ocular reflex gain:** vestibulo-ocular reflex gain is a good measure to evaluate temporary unilateral vestibular dysfunction and for permanent unilateral vestibular dysfunction
- **Catch-up saccade morphology**: saccade velocity, amplitude, latency, clustering of saccade indicate central vestibular compensation better
- **PR scores:** Lesser the Perez and Rey score better the central vestibular compensation
- **Normal VOR gain with catchup saccades:** an indication of compensation (Kabaya et al; Presence of corrective saccades in patients with normal vestibulo-ocular reflex gain in video head impulse test. Front. Neurol. 14:1152052)
- Subjective and functional perceptions may not correlate to test results

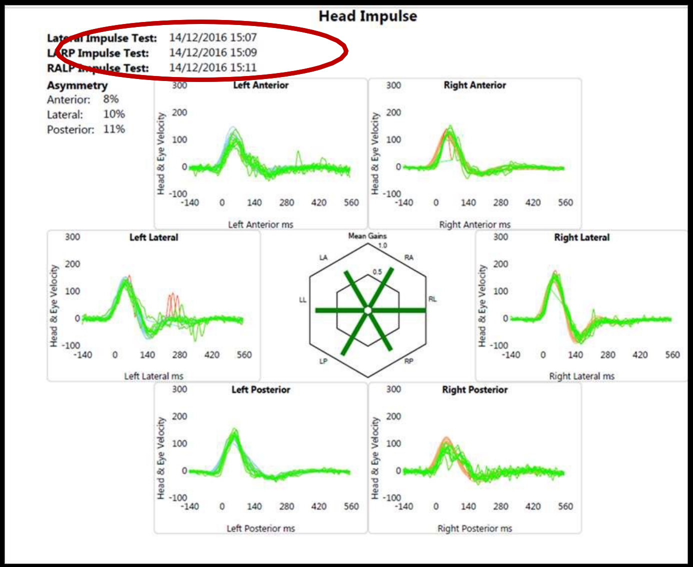


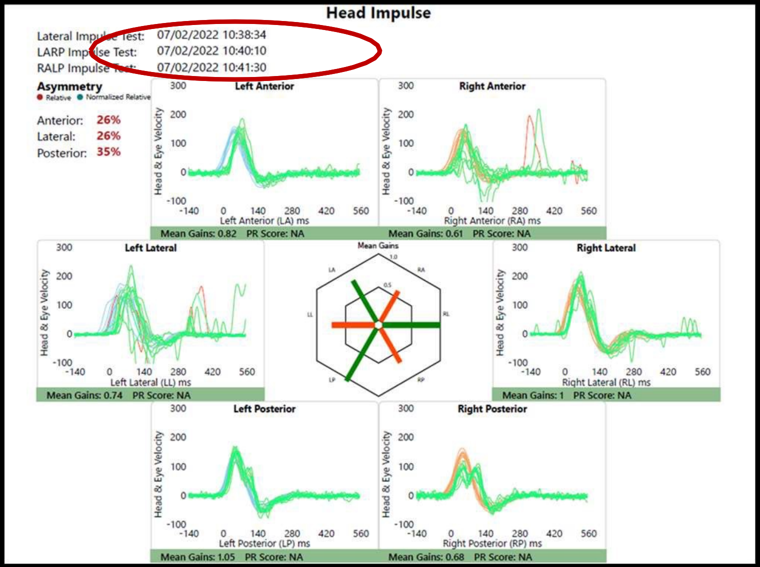
Left vestibular nerve hypoplasia– symptoms of imbalance but functioning well – normal VOR with persisting saccades





Bilateral incomplete partition II with right sided vestibular dysplasia – improved gain and clustering of saccades – asymptomatic after rehabilitation but decompensation on provocation





Bilateral EVA – asymptomatic by natural compensation, complete saccade recovery

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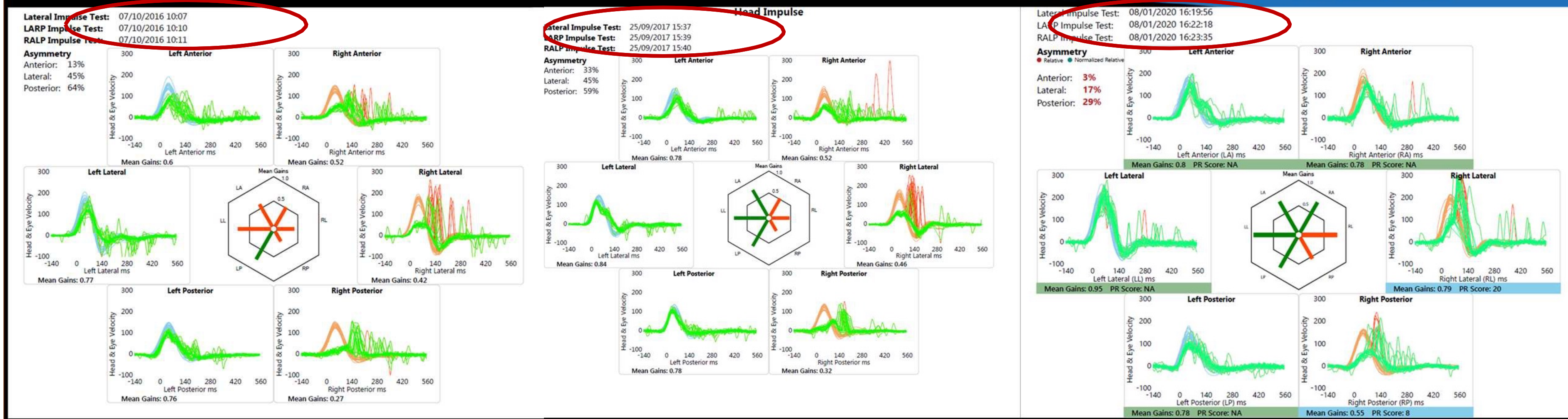

October 2017; 0.52, 0.42, 0.27
Overts dispersed

September 2017; 0.57,0.46, 0.32
Coverts/overts clustered

January 2020; 0.78, 0.79. 0.55
Mainly coverts, clustered

Acute vestibular neuritis (R) - asymptomatic after rehabilitation

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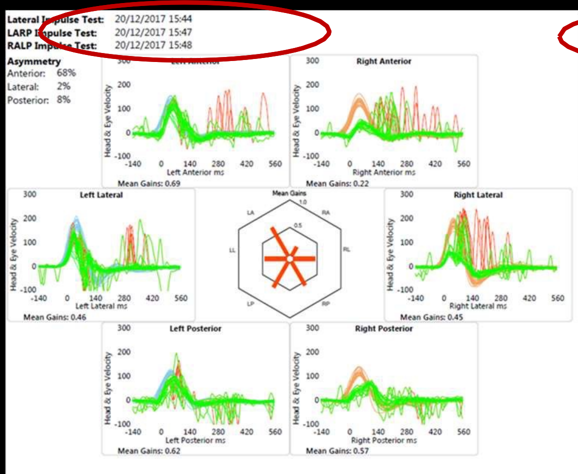
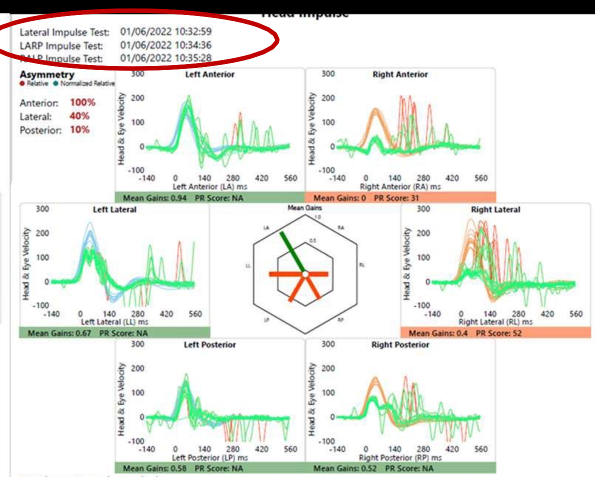
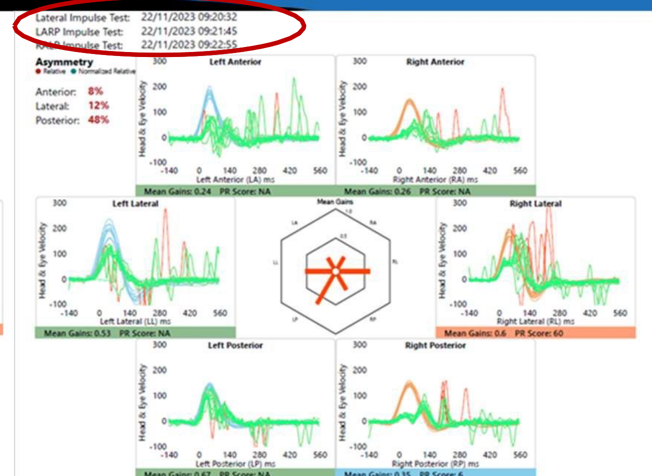


December 2017; Overts dispersed



June 2022; contre coup VOR recovery



November 2023; coup SSC/LSC VOR recovery, saccade clustering

Posterior fossa SOL right with acute bleeding, BVH, *asymptomatic* after rehabilitation and surgery

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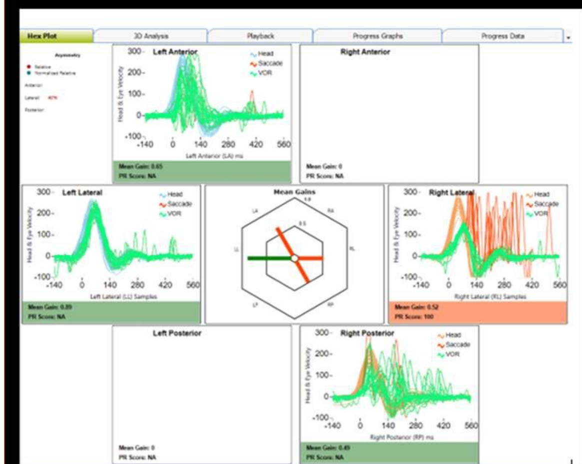

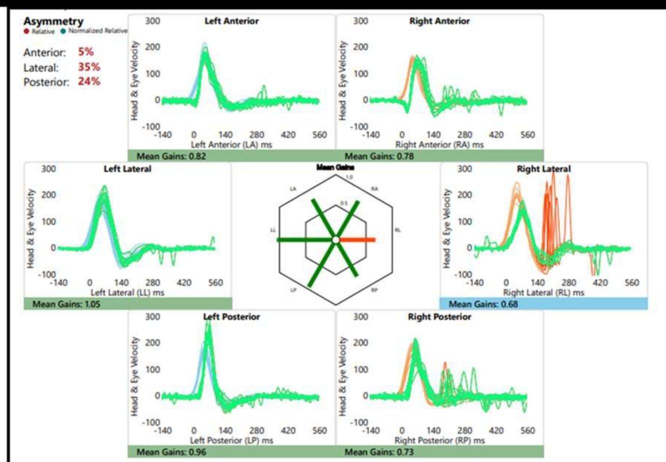

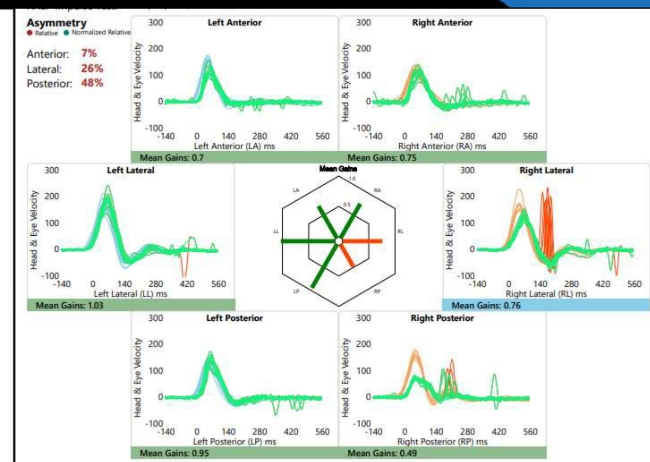

March 2022; 0.52, 0.48
Overts dispersed

October 2022; 0.78,0.68, 0.73
Overts clustered

June 2023; 0.75, 0.76. 0.49
Overts, clustered

Unilateral CMV - asymptomatic after rehabilitation

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Compensation measured by suppression head impulse test

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The evidence (Dasgupta S et al. Suppression head impulse test in children- experiences in a tertiary paediatric vestibular centre. Front Neurol. 2024 Mar 14;15:1297707. doi: 10.3389/fneur.2024.1297707)

- SHIMP is considered to indicate vestibular ocular reflex recovery, i.e. compensation
- However, few studies have been conducted to study this systematically and none in children
- Based on a study in Alder Hey (Dasgupta t al) the following SHIMP parameters are proposed to monitor compensation in children:
    - VOR gain
    - Asymmetry of VOR gain
    - Peak saccadic velocity of anticompensatory saccades
- *Subjective/functional perception and objective quantification might not match*

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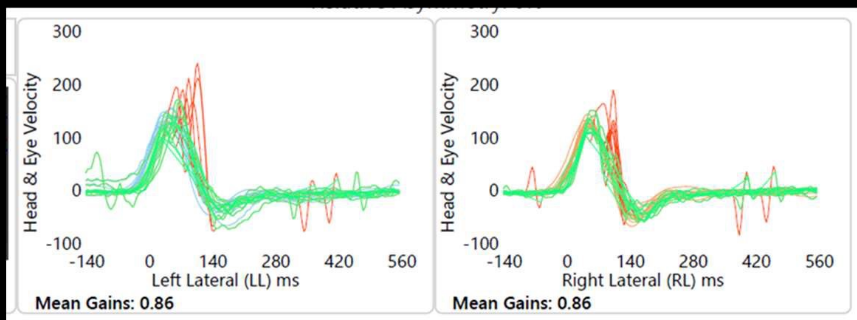
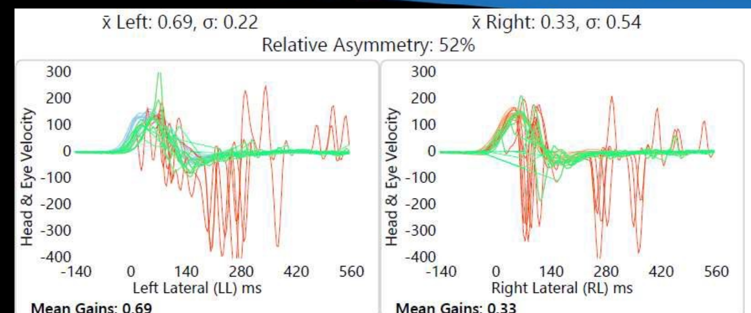
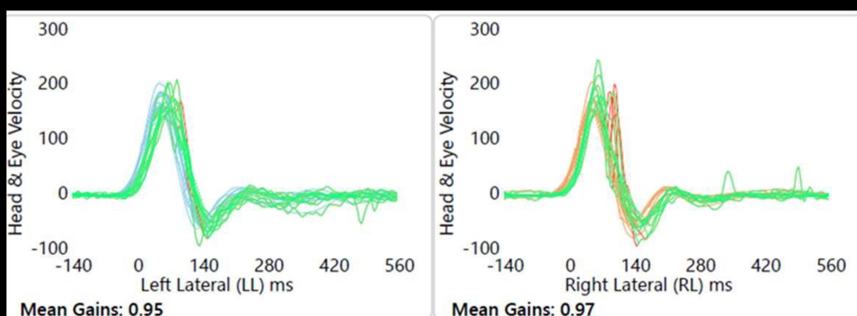


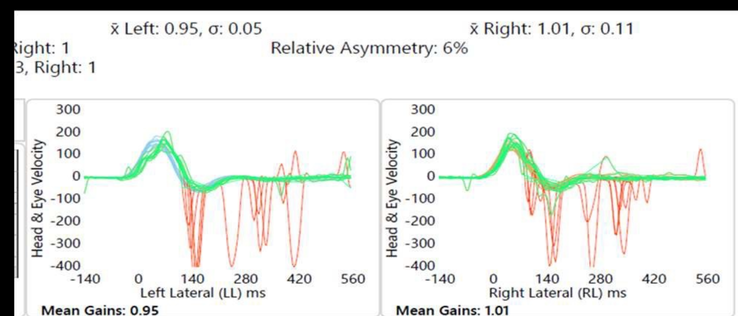
August 2022 → Coverts, normal VOR gain 0.86



August 2022 → PSV 319/269; asymmetry 52%; VOR 0.69/0.33



January 2023 → Coverts (L), normal VOR gain 0.97



January 2023 → PSV 224/228; asymmetry 6%; VOR 0.95/1.01

Acute bilateral AIED – well compensated with mild residual problems after rehabilitation

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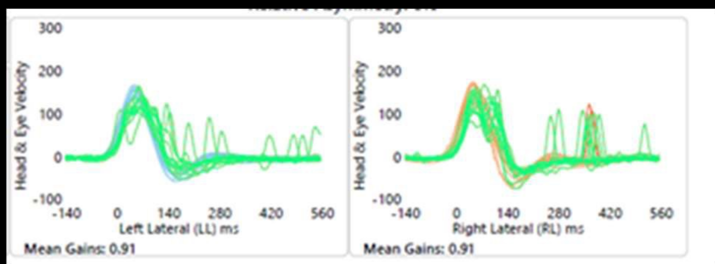
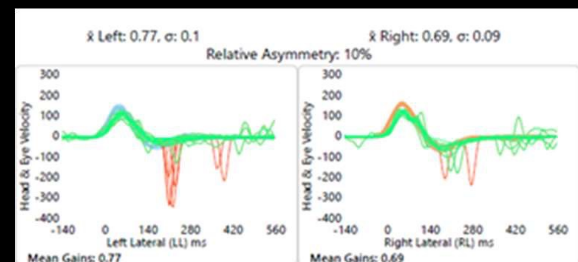
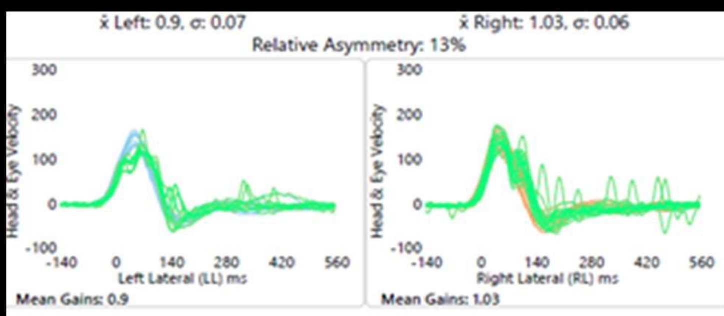
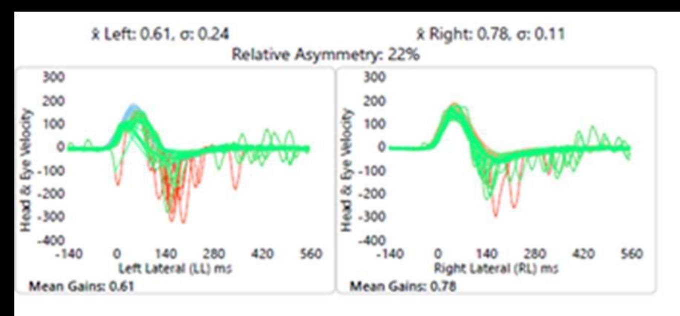




October 2023 → Saccades, normal VOR gain 0.91/0.91

October 2023 → 247/201; asymmetry 10%; VOR 0.33 (R)





November 2023 → No saccades, normal VOR gain 0.9/1.03

November 2023 → 204/221; asymmetry 22%; VOR 0.78 (R)

Acute Cogan's syndrome with SNHL – early compensation 75% return of function, rehabilitation started

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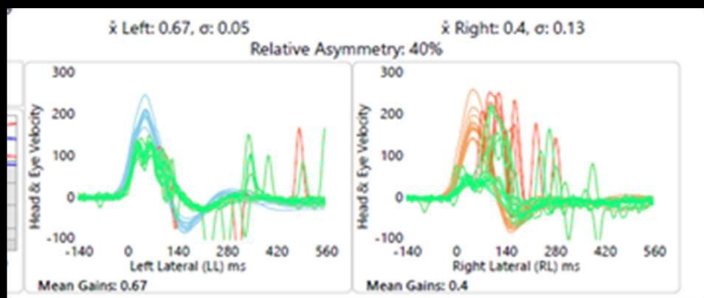
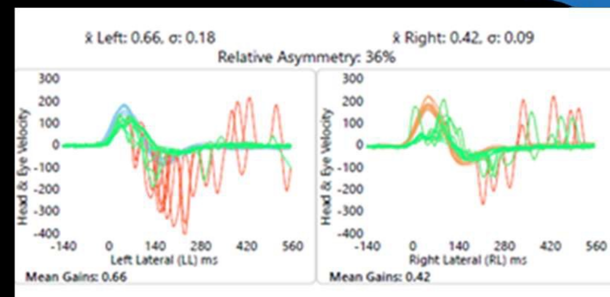
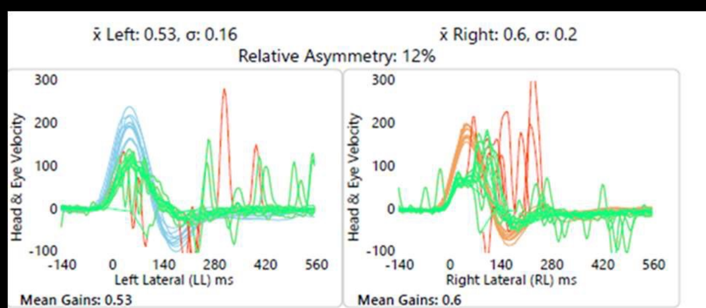
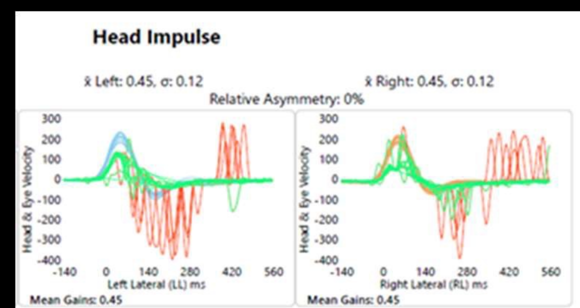


June 2022 → saccades, VOR gain 0.67/0.4



June 2022 → 256/287; asymmetry 36%; VOR 0.66/0.4





November 2023 → saccades, VOR gain 0.53/0.6

November 2023 → 320/261; asymmetry 0%; VOR 0.45/0.45

Posterior fossa SOL right with acute bleeding, BVH, *asymptomatic*
after rehabilitation and surgery

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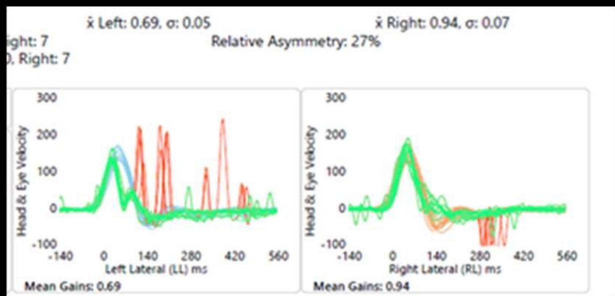
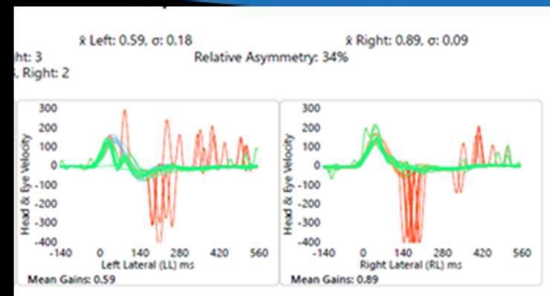
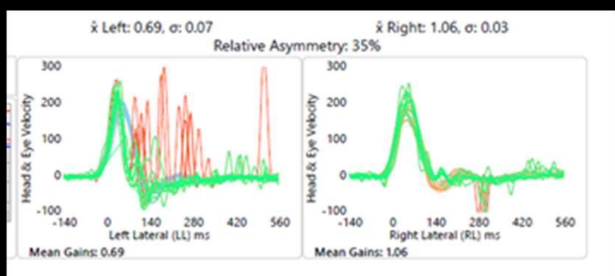
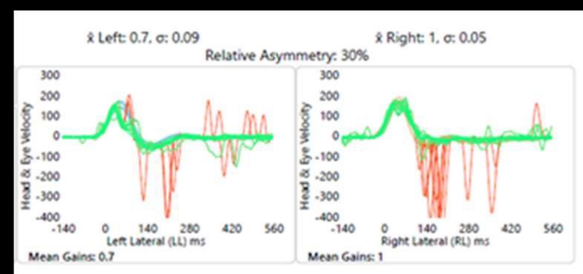




January 2023 → saccades, VOR gain 0.69/0.94

January 2023 → 211/271; asymmetry 34%; VOR 0.59/0.89





November 2023 → saccades, VOR gain 0.69/1.06

November 2023 → 260/290; asymmetry 30%; VOR 0.7/1

Left cochleovestibular hypofunction likely Usher; largely asymptomatic after rehabilitation

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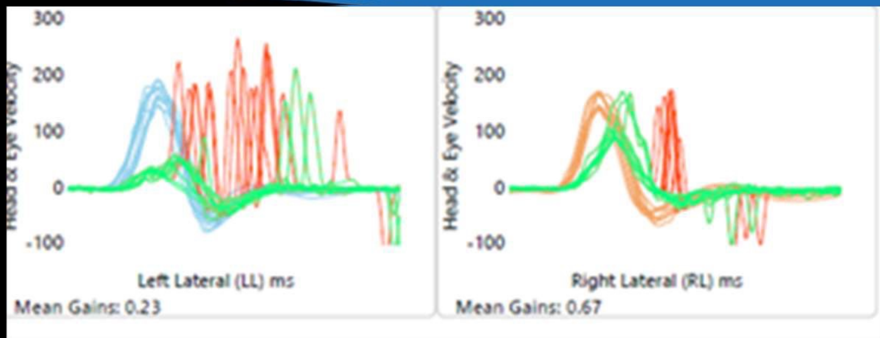
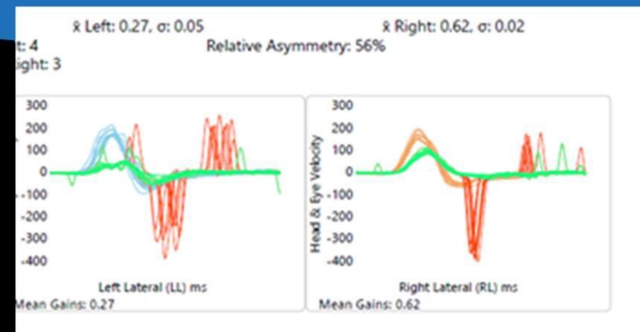
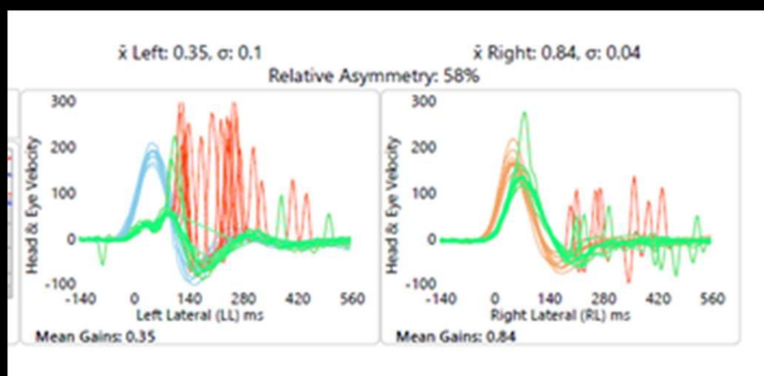
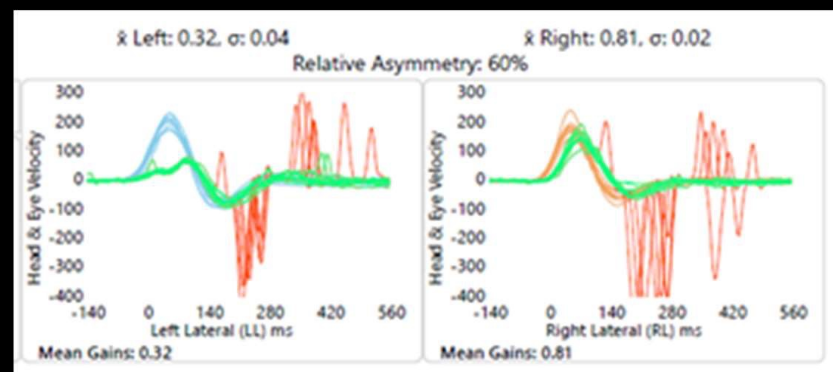




June 2023 → saccades, VOR gain 0.23/0.67

June 2023 → 260/346; asymmetry 56%; VOR 0.27/0.62





November 2023 → saccades, VOR gain 0.35/0.84

November 2023 → 252/371; asymmetry 60%; VOR 0.32/0.81

Head injury with left cochleovestibular weakness - decompensated

Conclusions

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- Diagnosing balance disorders and detecting an aetiology in children is challenging, stimulating and rewarding as it is so complex
- The paediatric vestibular physician is required to possess wide knowledge in paediatric medicine especially neurology
- Assessment of vestibular function in children demand a high skill set, is age specific and eminently possible
- Aetiology, phenotypes, natural history of pathology, laboratory norms and treatment are different in children as compared to adults
- Compensation can be measured both subjectively and objectively and are important for continuing management

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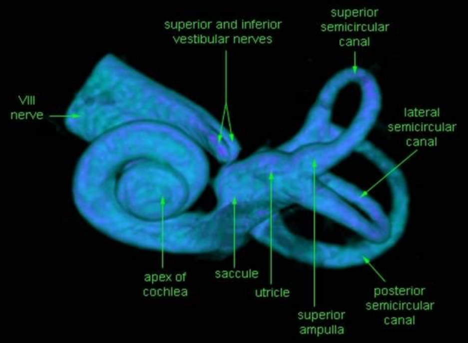

2012

Vestibular knowledge is evolving at a fast pace and the possibility of a tonotopic vestibular gram is real. We are living in exciting times especially regarding knowledge about the vestibular system in children

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Thank you

soumit.dasgupta@alderhey.nhs.uk

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