2025
NOTSA Meeting

Abstracts

Friday 10th & Saturday 11th October

Sunday 12th October - Training Day

Citadines on Bourke

131 Bourke Street, Melbourne

9:00

A digital neurotology history: characteristics and inter-rater reliability

Presenter:
Sally Rosengren

Authors:
Miranda Morrison, Sally M Rosengren, Diego Herrero, Mihirini Abeywickrama, Peter Park, Tram Bao Truong Nguyen , Chao Wang, Margot Woods, Kendall Bein, Andrew P Bradshaw, Benjamin Nham, Kunal Chaturvedi, Anousha Rafi, Cecelia Cappelen-Smith, Zeljka Calic, Deborah Black, Graham Brooker, Miriam S Welgampola.

Institutions:
Central Clinical School, Faculty of Medicine and Health, The University of Sydney, and Institute of Clinical Neurosciences, Royal Prince Alfred Hospital, Sydney, NSW, Australia

Dizziness is a common presenting symptom that is often misdiagnosed. The first step towards diagnosis of the underlying vestibular disorder is recognition of the vestibular syndrome, after which targeted examination and testing provide the diagnosis. We developed and evaluated a digital history tool to aid clinicians in selecting the correct vestibular syndrome. We administered a 21-item symptom questionnaire to 201 patients at a tertiary-referral outpatient clinic and 54 patients in an emergency department. Two clinicians classified each patient with one or more of four syndromes: acute vestibular syndrome (AVS), episodic positional vertigo (EPV), episodic spontaneous vertigo (ESV) or chronic vestibular syndrome (CVS). We assessed inter-rater agreement in both locations and compared the syndromic diagnosis with a gold standard diagnosis in the outpatient clinic. Inter-rater agreement was 0.66 in the outpatient clinic and 0.78 in emergency (Cohen's κ, $p<0.001$). In outpatients, gold standard syndromic diagnoses were 11 AVS, 57 EPV, 88 ESV and 45 CVS. Sensitivity was greatest for ESV (86.4%), and moderate for AVS (54.5%), EPV (71.9%) and CSV (62.2%). Automated classification using if/then rules and logistic regression analyses produced similar outcomes. Our history tool provided good reproducibility and accuracy in syndromic classification, showing promise for translation to frontline settings.

9:15
Automated Slow-phase Velocity (SPV) Analysis for BPV

Presenter:
Kunal Chaturvedi

Authors:
Kunal Chaturvedi[1], Nicholas Yang[2], Imelda Hannigan[2], Nicole Reid[3], Andrew Bradshaw[3], Gnana Bharathy[1], Ali Braytee[1], Mukesh Prasad[1], Miriam Welgampola[2,3]

Institutions:
1. School of Computer Science, Faculty of Engineering and Information Technology, University of Technology Sydney, Sydney, Australia
2. Central Clinical School, Faculty of Medicine and Health, University of Sydney, Sydney, Australia
3. Institute of Clinical Neurosciences, Royal Prince Alfred Hospital, Sydney, Australia

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Background: Video-nystagmography (VNG) is a valuable diagnostic tool in the hands of experienced examiners. However, current quantitative analysis methods rely heavily on visual inspection of eye movement traces to detect nystagmus beats and manual calculation of slow phase velocities (SPVs). This process is time consuming and requires meticulous removal of anomalies such as blinks, accurately identifying slow phases, and calculation of velocity slopes.

Methods: We automated nystagmus SPV profile analysis using a two-step approach. First, a deep learning model classified the eye movement traces into four categories: slow phase, fast phase, no nystagmus, and artifacts. Once the slow-phase segments were identified, we performed SPV profile analysis and plotted SPV as a function of time. The dataset used in the study consisted of 2,936 2D monocular eye position traces collected from 705 patients tested using the Epley Omniax Chair at RPA Hospital, Sydney.

Results: Our proposed method achieved an overall classification accuracy of 78.9% on the 10% test set. Notably, the model identified slow-phases in the traces with an F1-score of 0.82. The fast phases are detected with a precision of 0.78, recall of 0.80, and an F1 score of 0.79.

Conclusion: Our model accurately identified slow-phase segments, enabling a reliable automated SPV analysis in the diagnosis of benign positional vertigo, while reducing the time and effort required for visual interpretations.

9:45

Clinical projects looking into maximising the efficiency and effectiveness of Video Head Impulse Testing within a hospital outpatient setting.

Presenter:
Jenny Nguyen

The aim of the first project was to determine whether the number of head impulses could be reduced without compromising an accurate and clinically useful result. A reduction could save time, increase patient comfort and compliance, reduce the risk of clinician injury, and facilitate vertical testing.

The first project asked Audiologists in the Balance Disorders & Ataxia Service (BDAS) at theEye and Ear Hospital to initially perform the number of head impulses they felt necessary to determine the function of the horizontal semicircular canals, then perform a full set of head impulses for comparison. Blind analysis by the same group of Audiologists revealed that even with a significant reduction in head impulses, we were reporting results the same in a vast majority of the cases.

The second project evaluated the practical value of the addition of LARP and RALP testing to the vestibular assessment protocol. This project demonstrated that verticals, when performed routinely, provided clinical information useful for diagnosis, medical management, counselling or rehabilitation for up to 32% of patients referred for vestibular testing.

11:30

Causes and Characteristics of Bilateral Vestibular Loss

Presenter:
Belinda Kwok

Authors:
Dr Belinda Kwok, Dr Allison S Young, Ms Emma Argaet, Ms Nicole Reid, Dr Rachael L Taylor, Dr Sally M Rosengren, Prof G Michael Halmagyi, A/Prof Miriam S Welgampola

Institution:
Central Clinical School, Faculty of Medicine and Health, University of Sydney, NSW, Australia

Purpose: Bilateral vestibular loss (BVL) is a disabling chronic vestibular disorder with heterogenous causes and limited characterisation. This study aims to characterise subtypes of BVL using the three-dimensional video head impulse test (3D vHIT).

Methods: 3D vHIT was performed in 113 patients diagnosed with BVL according to the Barany Criteria Aetiology was classified by unblinded neuro-otologists using history, medical examination and audio-vestibular tests. Average vHIT gains were analysed to provide a diagnostic profile of each aetiology.

Results: Common causes of BVL were idiopathic (39%), gentamicin toxicity (18%), autoimmune inner ear disease (AIED) (7%), meningitis (6%), bilateral neuritis (5%) and CANVAS (5%). Lateral canal gains were highest for those with AIED (0.54); ranged between 0.44 – 0.49 for those with idiopathic causes, meningitis and gentamicin toxicity; and between 0.30 – 0.35 for those with bilateral neuritis and CANVAS. Anterior canal gains were higher overall with idiopathic, gentamicin, AIED and meningitis causes (range: 0.58 – 0.66), whilst bilateral neuritis and CANVAS ranged from 0.29 – 0.46. Posterior canal gains were highly variable across the subtypes with no consistent pattern.

Conclusions: vHIT gains may be useful in classifying subtypes of BVL. Lateral and anterior canal gains appear higher in those with AIED, idiopathic causes, meningitis and gentamicin toxicity; and lower in those with bilateral neuritis and CANVAS.

11:45

Rare Causes of Bilateral Vestibular Hypofunction: natural history and vestibular test characteristics.

Presenters:
Miriam Welgampola and Nicki Reid

Authors:
Nicki Reid, Belinda Kwok, Helen Lee, Diego Herrero, GM Halmagyi, Catherine Birman, Jonathan Kong, Miriam S Welgampola

Institution:
Central Clinical School, University of Sydney, Australia

We describe clinical and vestibular test characteristics of six patients with uncommon causes of bilateral vestibular loss, selected from a cohort of 179 subjects diagnosed BVL according to Barany Society Criteria.

Nearly all presented with imbalance (98%) and some with falls (19%) or persistent dizziness (26%). Diagnoses included Idiopathic BVL (n=98), autoimmune disorders (n=19), Meniere's Disease (n=2), ototoxicity (n=29), Head and Neck Radiation (n=4), Meningitis (n=9), Neurofibromatosis 2 (n=2), Superficial Siderosis (n=2), CANVAS (n=6), demyelinating neuropathies (n=4), sequential vestibular neuritis (n=2) , carcinomatous meningitis (n=1) and vitamin B6 toxicity (n=1)

Four patients with BVL between 10-15 years post irradiation for medulloblastoma or nasopharyngeal cancer had vHIT gains of 0.05-0.6, 0.15-0.7, 0.2-0.4 for horizontal (HC), anterior (AC) and posterior canals (PC). One patient with a >15 years history of consuming multiple nutraceuticals containing pyridoxine was initially diagnosed with BVL of unknown origin 10 years ago and later demonstrated a predominantly sensory neuropathy with high B6 levels (>2020nmol/L) in serum (gains 0.1, 0.35, 0.8 for HC, AC, PC). One patient with recurrent sino nasal undifferentiated carcinoma (SNUC) developed progressive bilateral audiovestibular loss (gains 0.05, 0.23, 0.11 for HC, AC, PC) and demonstrated meningitis carcinomatosa on magnetic resonance imaging. We discuss history, examinations and vestibular test characteristics that assisted with each diagnosis

12:00

Spatio-temporal characteristics of post-repositioning nystagmus in posterior canal BPPV.

Presenters:
Nicholas Yang

Authors:
Alyssa Dyball, Nicole Reid, Chao Wang, Andrew Bradshaw, Sally Rosengren, Miriam Welgampola

Institution:
University of Sydney, NSW, Australia

Background: Nystagmus is seen following posterior canal BPPV treatment with the Epley and Semont manoeuvres and may indicate successful repositioning.

Aims: To characterise the spatio-temporal characteristics of nystagmus noted in patients following with posterior canal BPPV.

Methods: Video-nystagmography from all patients treated on the Epley Omniax diagnosed with posterior canal canalithiasis BPPV were analysed using custom software. Metrics of onset latency, 50% rise-time, Peak latency/velocity, T50 and T95 were extracted and summarised.

Results: Out of 213 patients with posterior canal BPPV. 93 videos demonstrated post-repositioning nystagmus from 75 patients.

There were 24 videos demonstrating a predominantly horizontal post-repositioning nystagmus, 24 videos demonstrating predominantly vertical nystagmus, 21 videos demonstrating a diagonal nystagmus (equally dominant vertical and horizontal nystagmus), 14 videos containing reversal nystagmus, 1 video containing stimulatory nystagmus and 7 videos containing ipsiversive-torsional downbeat nystagmus.

Amongst patients who had ipsiversive-torsional nystagmus demonstrated a short onset latency of 0.97s. Nystagmus took 0.65 seconds after onset to reach 50% of the peak, peak SPV was 35.31 deg/s and occurred at 2 seconds after the onset. T50 and T95 occurred at 1.21 and 9.03 s after the peak.

Conclusion: Post-repositioning nystagmus occurred in around 35% of all patients who were treated for posterior canal BPPV on the Epley Omniax. Nystagmus of successful repositioning demonstrated high velocities and short decay times.

12:15

Balancing act: Exploring gait stability and postural control in bilateral vestibulopathy

Presenter:
Ruth McLaren - PhD Candidate

Authors:
Mrs Ruth McLaren, Professor Paul Smith, Dr Rachael Taylor, Dr Imran Niazi, Professor Denise Taylor

Institution:
Auckland University of Technology, New Zealand

Gait is a complex, multisensory motor task, and bilateral vestibulopathy (BVP) disrupts the integration of sensory inputs, leading to gait instability even when visual and somatosensory systems remain intact. Individuals with BVP frequently report gait disturbances, particularly in environments with reduced sensory cues, such as walking in darkness or on uneven terrain. This investigation characterises the spatiotemporal features of gait in individuals with BVP and examines how these features change when walking with eyes closed.

Participants walked at a self-selected comfortable speed along a 10-metre walkway, completing six laps with eyes open and six with eyes closed. Spatiotemporal parameters were captured using 3D motion capture, focusing on measures of pace, variability, and postural stability.

As anticipated, participants with BVP demonstrated significant deviations from healthy gait patterns in both eyes-open and eyes-closed conditions, particularly in spatiotemporal gait domains related to variability and postural stability. However, both the degree of impairment and the compensatory strategies employed varied considerably between individuals. These findings have important clinical implications for defining and assessing gait stability in this population.

12:30
cVEMPs selectively test saccular function

Presenter:
Ian S. Curthoys

Authors:
Ian S. Curthoys[1], Laura Fröhlich[2], Leigh McGarvie[1], Leonardo Manzari[3], Shinichi Iwasaki[4], Julia Dlugaiczyk[5], G. Michael Halmagyi[6]

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Colebatch attributed cVEMPs to saccular function because Didier and Cazals had shown in guinea pigs after ablating all cochlear afferents by cochleotoxic antibiotics, the compound action potential to clicks remained on the saccular nerve (without canal contribution). Murofushi et al (1995) reported that single semicircular canal afferents are rarely activated by sound or vibration at clinical intensities, whereas saccular afferents are activated. Other evidence confirmed the selective saccular origin of cVEMPs.

In sharp contrast Zhu reported (2011) that in the rat both canal as well as otolith afferents were activated by clicks. However, Zhu had used click intensities much higher than the clinical test intensities used with guinea pigs. In a later study using clicks at clinical test levels (Zhu, 2014) confirmed the guinea pig results: otolithic afferents are activated by sound but canal afferents only rarely. Conclusion: both guinea pig and rat results show the cVEMP is a selective test of saccular function at clinical test intensities with minimal contribution from canal afferents. Other evidence has confirmed that result. The reason for the Zhu (and Kjaersgaard 2025) error: rats have surprisingly poor hearing at low frequencies compared to guinea pigs and Zhu used rat ABR threshold (50 dB SPL) as the reference for click intensity.

2:00

Development of a Virtual Reality Head-Mounted Diagnostic Tool for Acute Vertigo and Dizziness Diagnosis

Presenter:
Daniela Meinrath

Authors:
Daniela M. Meinrath, BAppSc (Phty), MPh, Ken S. Butcher, MD , PhD, Simo Jurisic, Julia Hennessey

Institution:
UNSW Sydney, NSW 2052, Australia

Background: Acute vertigo is a common presenting complaint in the Emergency Department and is often misdiagnosed as a symptom of stroke. Bedside examination tests are inconsistently performed and frequently misinterpreted leading to delays in diagnosis and treatment.

Methods: We developed an application using a virtual reality (VR) headset to objectively and consistently reproduce oculo-motor and positioning tests for vertigo in the Emergency Department. The application provided quantitative measurements of eye movements including nystagmus. The VR application accuracy was evaluated by comparison to video nystagmography (VNG) analysis by a neuro-otology clinician.

Results: In 20 cases, the eye movement pattern detection from the VR headset was compared to that of the VNG assessment with neuro-otology clinician. Vestibular function tests and MRI were used to confirm diagnosis of vestibular neuritis or stroke. Some low amplitude eye movements were not detected by the VR headset in patients with vestibular migraine. BPPV and vestibular neuritis nystagmus and corrective saccades during head impulse tests were identified by the headset.

Conclusions: Assessment and measurement of eye movement angular velocity in patients presenting to an Emergency Department with acute vertigo using a consumer grade VR headset is feasible. The utility of this adjunctive test will need to be assessed in larger studies.

2:15
Uncommon causes of AVS presenting to the emergency department

Presenter:
Benjamin Nham

Authors:
Benjamin Nham, Nicole Reid, Kendall Bein, Chao Wang, Andrew P. Bradshaw, G. Michael Halmagyi, Miriam S Welgampola

Institution:
St George and Sutherland Clinical School, Faculty of Medicine & Health, University of New South Wales, Sydney, Australia

Background: Vestibular neuritis (VN) and posterior circulation stroke (PCS) are by far the two most common causes of acute vestibular syndrome (AVS) presenting to the emergency department. However, there are other less common causes.

Aim: To characterise clinical features and vestibular findings of other aetiologies of AVS apart from VN and PCS

Methods: During a 30-month period between 2018 and 2020, patients with acute vertigo were prospectively assessed in the emergency department and offered a clinical assessment and vestibular function tests as necessary. Some of the patients were followed up to ensure the diagnosis was accurate.

Results: Of 1154 patients, 269 (23.3%) patients presented with AVS who had a clinical and vestibular test assessment by a neuro-otology specialist. There were 93 PCS and 107 VN patients. Sixty-nine patients (25.6%) had other diagnoses. Most common diagnoses included: Vestibular migraine (8.6% of cases), Meniere's disease (1.9%), sudden sensorineural hearing loss and vertigo (1.9%), Demyelination (1.9%), Ramsay Hunt (1.1%), Labyrinthitis (1.1%). Ten patients had an unknown diagnosis. Six other patients had central vertigo of unclear aetiology. Twenty-eight patients (40.5%) had no nystagmus. Nine patients had peripheral looking HINTS assessment. Two patients had a positive test of skew. Details of vestibular testing will be presented later.

Conclusion: Over a quarter of AVS patients had a diagnosis other than VN or PCS. Most of these patients had nystagmus without a reassuring peripheral-looking HINTS assessment.

2:30

Impaired Romberg Quotient Analysis in Post-Concussion Patients with Dizziness: A Digital Biomarker of Balance Dysfunction

Presenter:
Darshpreet Kaur (PT)

Authors:
Dr. Darshpreet Kaur (PT), Dr. Gunjan Kumar, Dr. Om Prakash, Dr. Bibhuti Jha, Dr. Nitish Kumar

Institution:
Neuro Vihar, Patna, Bihar

Background: Dizziness and imbalance are common sequelae of mild traumatic brain injury (mTBI). Traditional balance tests often lack sensitivity in detecting subtle postural impairments. The Romberg Quotient (RQ)—a ratio comparing sway with eyes closed to sway with eyes open—can objectively quantify sensory integration deficits. Elevated RQ values may indicate reliance on visual cues due to vestibular or proprioceptive dysfunction.

Objective: To analyze the Romberg Quotient using a digital posturography system in patients with post-concussion dizziness and evaluate its role as a clinical biomarker for balance impairment.

Methods: A prospective observational study was conducted on 30 patients (aged 18–50) with recent mTBI and persistent dizziness. Postural sway parameters were recorded under eyes-open and eyes-closed conditions using a digital force platform. The Romberg Quotient was calculated (Sway_EC/Sway_EO), and values were compared to age-matched healthy controls. Dizziness severity was assessed using the Dizziness Handicap Inventory (DHI).

Results: Patients with concussion exhibited significantly elevated RQ values (mean: 2.1 ± 0.4) compared to controls (mean: 1.3 ± 0.2, $p < 0.001$). A strong positive correlation was noted between RQ and DHI scores ($r = 0.68$, $p < 0.01$). These findings suggest impaired non-visual sensory compensation and highlight RQ as a potential quantitative marker for vestibular dysfunction in postconcussion syndrome.

Conclusion: Digital Romberg Quotient analysis ocers a simple, non-invasive, and reproducible method to detect balance impairments in concussed patients with dizziness. It may enhance clinical decision-making in vestibular rehabilitation and return-to-activity protocols.

2:45

Assessment of Cervical Position Sense in Vestibular Migraine Patients with Dizziness Using the Cervicocephalic Relocation Test

Presenter:
Gunjan Kumar

Authors:
Dr. Gunjan Kumar, Dr. Darshpreet Kaur (PT)

Institution:
Neuro Vihar, Patna, Bihar

Background: Vestibular migraine (VM) is a leading cause of episodic vertigo, often accompanied by dizziness, unsteadiness, and visual motion sensitivity. While its pathophysiology is centrally mediated, accumulating evidence suggests that cervical proprioceptive dysfunction may contribute to persistent balance disturbances in these patients. The Cervicocephalic Relocation Test (CCRT) oEers a reliable method to objectively assess joint position sense (JPS) in the cervical spine.

Objective: To investigate cervical position sense accuracy using the Cervicocephalic Relocation Test in patients diagnosed with vestibular migraine and chronic dizziness, and to explore its clinical relevance in the sensorimotor profile of these individuals.

Methods: A cross-sectional observational study was conducted involving 25 patients with confirmed vestibular migraine (ICHD-3 criteria) and persistent dizziness. Participants underwent the CCRT using a laser-mounted headgear and wall target grid. With eyes closed, subjects performed head movements (rotation, flexion, extension) and attempted to return to a neutral head position. The joint position error (JPE) was measured in centimeters and degrees. Results were compared to 25 age-matched healthy controls. Symptom severity was assessed using the Dizziness Handicap Inventory (DHI).

Results: Patients with vestibular migraine demonstrated significantly higher JPE values across all directions of movement (mean: 5.8 ± 1.3 cm) compared to controls (mean: 2.9 ± 0.7 cm, $p < 0.001$). A moderate positive correlation was observed between JPE and DHI scores ($r = 0.54$, $p < 0.01$), indicating that impaired cervical proprioception may exacerbate dizziness-related disability.

Conclusion: The Cervicocephalic Relocation Test reveals notable deficits in cervical joint position sense in patients with vestibular migraine and dizziness. These findings highlight the importance of cervical proprioceptive assessment and rehabilitation as part of a multimodal approach to managing vestibular migraine.

3:30

Symptom profiles and health related behaviours in adults with Meniere's Disease: a cross sectional study

Presenter:
Katrina Williams

Authors:
Ms Dakota Mutch, Dr Ann Rahmann, Dr Sjaan R Gomersall, Dr Katrina Williams

Institution:
School of Health and Rehabilitation Sciences, The University of Queensland, Brisbane, Australia

Aim: To explore symptom profile, behaviours of physical activity and sedentary behaviour, and the correlations between these symptoms and behaviours.

Method: Thirty-two adults with Meniere's disease completed a comprehensive digital survey using outcome measures to capture dizziness severity, hearing dysfunction, balance confidence, fatigue, sleep, physical activity, and sedentary behaviour. Descriptive statistics were used to analyse participant characteristics, symptoms, physical activity, and sedentary behaviour. Pearson's and Spearman's correlations were used to examine associations between these variables.

Results: Participants reported moderate level of dizziness, fatigue, hearing dysfunction and participation restrictions due to hearing loss. Hearing Handicap was severe and balance confidence low (<67%) indicating risk of falls. Physical activity was lower than normative values and physical activity guidelines, and significantly correlated with dizziness (r=-0.52), fatigue (r=-0.51) and balance confidence (r=0.38). Finally, sedentary behaviour was higher than normative values and significantly correlated with hearing dysfunction only (r=-0.39).

Conclusions: Adults with Meniere's disease reported moderate levels of symptoms, did not meet physical activity guidelines, and had higher levels of sedentary behaviour

3:45

When the Pieces Almost Fit: A Case of Horizontal Canal BPPV Mimicking Acute Vestibular Syndrome

Authors:
Amanda Marriott, Ashleigh Simpson

Institution:
Physiotherapy Department, Eastern Health, Victoria

Case study:

A previously well 60 year old female was brought in by ambulance to a metropolitan Emergency department with headache, constant dizziness, vertigo and vomiting. Her symptom profile *almost resembled an acute vestibular syndrome (AVS). Her clinical exam *almost fulfilled the criteria for a peripheral HINTS. Despite the apparent alignment with AVS, inconsistencies prompted further evaluation. Positional testing revealed the presence of horizontal canal cupulolithiasis benign paroxysmal positional vertigo (BPPV). This case highlights the importance of continuing to assess when things aren't neatly fitting into the box. It also serves as a reminder of the prevalence of pseudo-spontaneous nystagmus in cases of horizontal canal BPPV.

4:00

Is a Physiotherapy led Vestibular Clinic a feasible and safe alternative for eligible patients referred to Neurology Outpatient Clinics?

Presenters:
Ashleigh Simpson & Sabrina Hernadez

Authors:
Ashleigh Simpson, Sabrina Hernandez, Professor Katherine Harding, Shae Cooke, Amanda Marriott

Institution:
Physiotherapy Department, Eastern Health, Victoria

Background: Patients with dizziness have issues with accessing timely specialist care due to long waitlists. The objective of this study was to evaluate whether an advanced vestibular physiotherapy-led clinic (AVeP) is a safe and feasible alternative for the management of patients referred to neurology specialist medical outpatient clinics with vertigo and/or dizziness at a large hospital.

Methods: A retrospective audit was used to collect data over 35 weeks of operation of the AVeP including patient demographics, attendance rates, re-presentations and safety events.

Results: Of 186 patients seen in the AVeP, 11% were referred back to Neurology outpatient services for further investigations and management. The average wait time was 25.5 days, with a 17% failure-to-attend rate. Only one (0.5%) patient re-presented to the emergency department with a vestibular related condition. Two safety events occurred due to adverse responses to Canalith repositioning manouvres, both were escalated and managed appropriately. Of the patients that had outcome measures completed on discharge from AVeP (n=67), 76% reported improved balance confidence and 82% noted reduced dizziness impairment.

Conclusion: A physiotherapy-led vestibular clinic is a safe and feasible alternative for suitable Neurology outpatient referrals, allowing timely access to specialised care for patients with dizziness and vertigo.

4:15

A joint Physiotherapy and Audiology vestibular assessment clinic – A department of health project

Presenter:
Brendan Cutts

Authors:
Mr Brendan Cutts[1, 2,*], Mr Beau Valka[1], Ms Hannah Young[1]

Institutions:
1. Barwon Health, Geelong, Victoria, Australia
2. Neurological Physiotherapy Geelong, Victoria, Australia

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In 2021 Barwon Health received Department of Health funding to begin a combined physiotherapy and audiology vestibular clinic to aid the ENT outpatient waitlist. An audit of the first 200 of the 440 clients seen in 2023-24 demonstrates the following: 42.5% referred by GP, 10% from ENT. 70% of clients were female, with an average age of 60 years (range 9-93 years). 31 were on the ENT waitlist with most not yet seen. Average wait for Cat 2 clients 794 days. Average time from referral to clinic contact was 27.4 days. Most common diagnoses included PPPD (22%), BPPV (16%) and vestibular migraine (15%), and includes identifying clients with likely central or retrocochlear pathology. Diagnoses were similar for the clients on the ENT waitlist, or seeing ENT at the time. Mean DHI score was 40/100, and 20% had vestibular dysfunction on VFTs. 70% required vestibular rehabilitation. Of the clients on the ENT waitlist, 60% could be removed, with the remainder typically having nonvestibular indicators for ENT review. The clinic was given permanent funding in 2022 and has doubled in EFT since then. Case studies demonstrating the effectiveness of the clinic will also be presented.

*Please note we will complete the audit for ~440 patients and present up to date data by the conference.

4:30
BPPV audit and some functional eye movements

Presenter:
Kate Murray, Sally Bradshaw

Authors:
Mr Brendan Cutts[1, 2,*], Mr Beau Valka[1], Ms Hannah Young[1]

Institution:
Dizzy Day Clinics (DDC), Richmond, VIC

***Correspondence:**
Brendan.cutts@barwonhealth.org.au

Results of BPPV audit:

In 2021 Barwon Health received Department of Health funding to begin a combined physiotherapy and audiology vestibular clinic to aid the ENT outpatient waitlist. An audit of the first 200 of the 440 clients seen in 2023-24 demonstrates the following: 42.5% referred by GP, 10% from ENT. 70% of clients were female, with an average age of 60 years (range 9-93 years). 31 were on the ENT waitlist with most not yet seen. Average wait for Cat 2 clients 794 days. Average time from referral to clinic contact was 27.4 days. Most common diagnoses included PPPD (22%), BPPV (16%) and vestibular migraine (15%), and includes identifying clients with likely central or retrocochlear pathology. Diagnoses were similar for the clients on the ENT waitlist, or seeing ENT at the time. Mean DHI score was 40/100, and 20% had vestibular dysfunction on VFTs. 70% required vestibular rehabilitation. Of the clients on the ENT waitlist, 60% could be removed, with the remainder typically having nonvestibular indicators for ENT review. The clinic was given permanent funding in 2022 and has doubled in EFT since then. Case studies demonstrating the effectiveness of the clinic will also be presented.

*Please note we will complete the audit for ~440 patients and present up to date data by the conference.

10:30

Step Width Haptic Feedback for Gait Stability in Spinocerebellar Ataxia: Preliminary Results

Presenter:
Penina Ponger

Authors:
H. Wang[1], Z. Ullah[1], E. Gazit[2,3], M. Brozgol[2,3], J.M. Hausdorff[2,3,4], P.B. Shull[1], P.Ponger[5,6]

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2. Center for the Study of Movement, Cognition and Mobility, Neurological Institute, Tel Aviv Sourasky Medical Center, Tel Aviv, Israel.
3. Sagol School of Neuroscience and Department of Physical Therapy, Faculty of Medical & Health Sciences, Tel Aviv University, Tel Aviv, Israel.
4. Department of Orthopedic Surgery and Rush Alzheimer's Disease Center, Rush University Medical Center,Chicago, IL, USA.
5. Department of Neurology, Tel Aviv Sourasky Medical Center, Tel Aviv, Israel.
6. Genetics Institute and Genomics Center, Tel Aviv Sourasky Medical Center, Tel Aviv, Israel.

Objectives and relevance: To examine the possibility of using wearable step width haptic-biofeedback to enhance gait stability and reduce fall-risk in individuals with SCA. Wider step width and lower step-to-step variability are linked to improved gait stability and reduced fall risk. It is unclear if patients with spinocerebellar ataxia (SCA) can learn to adjust these aspects of gait to reduce fall-risk.

Methods: Thirteen people with SCA3 performed step width training (single-session) using real-time haptic based feedback using sensing inertial measurement units (IMUs). When step width values exceeded the maximum threshold, haptic feedback was provided to prompt a narrower step, whereas values below the minimum threshold prompted feedback for a wider step.

Results: Step width increased post-training (19.3cm, interquartile range IQR 16.3-20.2cm) and at retention (16.6cm, IQR 16.2-21.1cm), compared to baseline (11.0cm, IQR 5.2-15.2cm; $p<0.001$). Step width variability decreased during post-training (19.7%, IQR 17.4-26.2%) and at retention (22.3%, IQR18.6-30.2%), compared to baseline (44.5%, IQR 28.5-71.2%; $p<0.001$). Crossover steps, another mark of instability, decreased after training ($p<0.031$).

Conclusions: These pilot results suggest that patients with SCA can use a novel, wearable biofeedback system to improve their gait stability. Our findings demonstrate the potential of using portable and readily accessible rehabilitative interventions for individuals with ataxia within clinical settings and everyday environments, based on routine training to ensure long term retention, reduce fall risk and improve gait stability. The present study and its novel findings set that stage for a large-scale randomized controlled trial.

10:45

Machine learning models can separate stroke from vestibular neuritis using clinical history, examination and vestibular tests

Presenter:
Chao Wang

Authors:
Dr Chao Wang, Mr Kunal Chaturvedi, Dr Benjamin Nham, Ms Nicole Reid, Dr Andrew Bradshaw, Dr Sally Rosengren, Prof Deborah Black, Dr Kendall Bein, Prof Michael Halmágyi, Dr Ali Braytee, Dr Mukesh Prasad, Dr Gnana Bharathy, A/Prof Miriam Welgampola

Institutions:
University of Sydney, Sydney, NSW

Background: Vestibular Neuritis (VN) and Posterior Circulation Stroke (PCS) are the two common causes of acute vestibular syndrome. Machine learning models capable of expert-level classification could expand access to diagnostic expertise.

Methods: We recruited Emergency Department (ED) patients diagnosed with VN or PCS. Data from history, bedside examination and vestibular tests were used for model development. To ensure clinical applicability across EDs with varying resources, we tailored our models for three scenarios, simulated by restricting available data to predefined tiers. Tier 1 represented an ED with neuro-otology support (history, neuro otological examination, videonystagmography, VHIT, ocular VEMP), Tier 2 a teaching hospital ED (history, basic examination, VHIT) and Tier 3 a peripheral ED (history and basic examination only). Model performance was also compared against HINTS by experts.

Results: Our dataset included 163 VN and 131 PCS patients. The best-performing model in each tier identified PCS with accuracies of 96.6% (95% CI: 93.3-99.9%), 94.6% (95% CI: 90.5-98.6%) and 88.8% (95% CI: 86.0-91.6%) in Tiers 1, 2 and 3. HINTS achieved 94.6% accuracy.

Conclusion: Machine learning models can separate PCS from VN with high accuracy and have potential as diagnostic aids for clinicians in EDs with varying neuro-otology expertise and resources.

11:00

A proposed pathophysiology of Vestibular Migraine based on the outcome of an observational treatment study of 520 consecutive cases.

Presenter:
Ross Harrington, Retired

Queensland, Australia

Symptomatic Vestibular Migraine was treated prospectively in 520 consecutive patients between September 2020 and August 2024 by oral therapy. A successful outcome was recorded after 12 weeks continuous freedom of all but minor symptoms and a resumption of daily activities in 80%.

An hypothetical pathophysiology of the migraine phenomenon is offered as a cortically initiated neuronal dysfunction in the genetically affected individual which spreads to the major midbrain nuclei regulating efferent and afferent activity of, at least the 5th and 8th cranial nerves.

The dysfunction induces dysmodulation of the normally seamless integration of the three realms of balance maintenance, visual, vestibular and somato-sensory leading, in VM, to chronic disabling loss of mobility with periods of head motion provocation of vestibular symptoms and, in some, the acute vestibular syndrome as the equivalent ictus of classical migraine.

Prevention of the initial cortical dysfunction arising from the genetically induced lowering of neuronal ion channel depolarisation thresholds is the aim of the suppressive treatment regimes involved. The common medications used all have some ion channel blocking properties.

There are very few similar studies in the literature.

11:15

Vestibulo-ocular reflex gain and vestibular evoked potentials in patients with spinocerebellar ataxia

Presenter:
Zeljka Calic

Authors:
Zeljka Calic[1], Alyssa Dyball2, Diego Herrero[3], Nicholas Yang[2], Sally Rosengren[2], Andrew Bradshaw[2], Kishore Kumar[4], Miriam S Welgampola[2]

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3. Faculty of Medicine of Clinica Alemana, Universidad del Desarrollo, Santiago de Chile, Chile
4. Concord Repatriation General Hospital, Department of Neurology, Concord, Australia

Introduction: The spinocerebellar ataxias (SCAs) are a genetically heterogeneous group of autosomal dominantly inherited progressive disorders characterised by loss of balance and coordination. This study analyses the vestibular function as measured by video-head impulse test and vestibular evoked myogenic potentials (VEMPS).

Methods: 16 patients (SCA3 n=6, SCA6 n=4, SCA7 n=2, SCA14 n=2, SCA34 n=2) with mean age 56.0 ±11.1 years (5F/11M), were recruited from Outpatient Balance Neurology Clinic. VOR gain in all three canal planes was examined. Air-conducted (AC) and bone-conducted (BC) cervical and ocular VEMPs were performed.

Results: Mean International Co-operative Ataxia Rating Scale (ICARS) was 30.1±15.0 and Scale for the assessment and rating of ataxia mean (SARA) score was 10.2±5.5. Saccadic pursuit was noted in 13 (81%) patients, and loss of VOR suppression in 11 (69%) patients.

cVEMPS to AC and BC stimuli were absent in 4 (25%) and 2 (12.5%) of patients and oVEMPS to AC and BC stimuli were absent in 11 (68%) and 5 (31%) patients.
Horizontal, anterior and posterior canal (HC, AC, PC) v-HIT gains for SCAs were 0.63±0.2, 0.67±0.3, 0.60±0.3. HC, AC and PC VOR-gain were reduced in 12(75%) patients, 10(62%) and 11(68%) patients.

Patients with SCA3 had VOR gain reduced in all six-canals. HC VOR gain was reduced in 75% patients with SCA6, and in 50% of patients with SCA7, SCA14 and SCA34.

Patients with SARA scores ≥10 had significantly lower HC VOR-gain compared to the patients with mild disease severity (0.49 vs 0.76, p=0.015). There was a negative correlation between SARA score and HC VOR-gain (r=-4.001, p=0.034).

Conclusions: Reduction in VOR gain is common and is associated with higher degree of functional impairment in patients with SCAs.

11:30

A Case Series:
Down Beating Nystagmus Examples of Central, Peripheral and Mixed Central Peripheral Patterns of Vestibular Loss/Abnormal Audio-Vestibular result patterns Observed within a Multi-Disciplinary Neurology Clinic in a Public and Private Practice Setting.

Presenter:
Benjamin Tsang

Authors:
Benjamin Tsang- Neuro-otologist, Sunshine Coast Hospital and Health Service; Beach Brain.
Kate Eykamp – audiologist, Sunshine Coast University Hospital and Health Service
Ashley Callaghan – vestibular physiotherapist, Sunshine Coast University Hospital and Health Service; Vertigo Rehab
Aliese Hoffmann – vestibular physiotherapist, Sunshine Coast University Hospital and Health Service
Grant Collins- Vestibular and Cochlear Implant Audiologist, Queensland Cochlear and Vestibular Clinic.

Background: Whilst literature is mixed in terms of spontaneous nystagmus patterns for purely central sources it is still common practice clinically for clinicians to report down beating nystagmus as a likely central source. We have documented at least 18 cases of down beating components of spontaneous nystagmus. Whist there were some examples of likely purely central nystagmus by far the majority either had a peripheral or mixed peripheral audio-vestibular abnormalities. Those with peripheral abnormalities almost all have a lateral component to the down beating and more often than not have either an episodic component to their current symptoms or may have had this prior to sudden neurological change. This may be of importance in terms of treatment and rehabilitation options where often only a central source is focused on.

Objective: The aim of this case series is to identify examples of patients exhibiting down beating nystagmus presentations assessed and managed by Neuro-otologists, vestibular audiologists and physiotherapists in a public health and private practice multi-disciplinary service on the Sunshine Coast.

Method: A retrospective observational study was conducted on a series of cases presenting to Sunshine Coast Hospital and Health Service Neurology Department, Beach Brain Neurology and Queensland Vestibular and Cochlear Clinic on the Sunshine Coast.

Results: (pending). We plan to provide 3 illustrative cases followed by tabulated summaries of our remaining cases of spontaneous downbeat nystagmus in terms of localisation, audiovestibular testing results, and presence of other localising cerebellar signs. We also will discuss the available literature from our Korean colleagues on this topic.

Conclusion: Early identification of vestibular dysfunction via audio-vestibular testing may facilitate diagnosis of alternative anatomical/physiological localisation of downbeat nystagmus.

11:45

Phenotyping in Aboriginal Australians with Machado-Joseph Disease (MJD)/Spinocerebellar Ataxia Type 3 (SCA3).

Presenter:
David Szmulewicz

Authors:
Massey L[1], Grootendorst A[1], Ryan J[1], Agostinelli G[1], Wunungmurra J[1], Lalara G[1], Nganjmirra V[1], Roberts L[2], Siederer L[2], Szmulewicz DJ[3,4]

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2. St Vincent's Hospital/University of Melbourne, Australia
3. Balance Disorders and Ataxia Service, Royal Victorian Eye and Ear Hospital, Victoria Australia.
4. Bionics Institute/University of Melbourne, Victoria Australia.

Purpose: Although representing the highest disease prevalence for MJD/SCA3 globally, phenotyping of Aboriginal Australians with this disease has hitherto not been undertaken. Additionally, increasingly SCA7 is identified in Aboriginal Australians in far North Queensland and risks representing a public health challenge.

Methods: Comprehensive phenotyping data was prospectively gathered on Aboriginal people with a molecular diagnosis MJD/SCA3 and SCA7. Data including demographics, CAG repeat length, patient age, aga at symptom onset, duration of disease, video-oculography, vestibular function and neurophysiology testing.

Results: Subjective and objective data was gathered in order to delineate the deep phenotypes seen in this patient cohort.

Discussion: Here we present the identified phenotypes, as well as the implications for management and inclusion in treatment trials.

Conclusion: MJD/SCA3 and SCA7 in Aboriginal Australians present with clearly defined phenotypes.

1:15

Meniere Disease Atlas: A Multi-Omics Web Portal for immuno profiling and genetic diagnosis

Presenter:
Jose A Lopez-Escamez

Authors:
Kiana Bagheri-Lotfabad[1], Pablo Cruz-Granados[1], Vibha Patil[1], Jose A. Lopez-Escamez[1,2,3]

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3. Sensorineural Pathology Programme, Centro de Investigación Biomédica en Red en Enfermedades Raras, CIBERER, Madrid, Spain

Background: Meniere Disease (MD) is an inner ear syndrome defined by episodes of vertigo associated with sensorineural hearing loss, tinnitus or aural fullness with a significant genetic contribution, including >20 genes reported in familial cases. Progress on genetic diagnosis is limited by the absence of integrated, accessible multi-omics data, hindering molecular insights and treatment development. Aim: To develop the MD Atlas, a web portal including genomic, epigenomic, and transcriptomic MD datasets, enabling genetic research with user dataset comparisons.

Methods: MD Atlas integrates three datasets: genome aggregated MD variants (GRCh38-aligned, annotated for position, consequence, gnomAD frequencies); epigenomic data with methylated CpG sites from MD patients; and transcriptomic data including bulk RNA-seq from mononuclear cells and single-cell RNA-seq from B cells, CD4/CD8 T cells, monocytes, and NK cells of MD participants. Datasets were curated, standardized, and paired with visualization tools for each omics layer. Future updates will allow users to upload datasets for comparison with MD Atlas.

Results: MD Atlas offers interactive visualizations of aggregated genetic variants, methylation patterns, and gene expression, revealing novel MD-specific signatures validated against public datasets from around 500 individuals. Cross-omics queries support hypothesis generation, with planned comparative tools to enhance gene discovery and personalized diagnosis.

Conclusion: MD Atlas is a pioneering platform integrating multi-omics data with visualization, advancing MD research and precision medicine. Its innovative design and comparative functionality make it highly relevant to geneticists and clinicians, promising significant impact on hearing and vestibular disorders.

Funded by the University of Sydney Meniere Research Neuroscience Program (Grant K7013_B341)

1:30

Management of Refractory Meniere's Disease: Labyrinthectomy and Cochlear Implant Surgery

Author:
Timothy Mclean

Institution:
Royal Victorian Eye and Ear Hospital

Background: Refractory Meniere's Disease is a difficult condition to manage with no strong consensus on treatment. Medical and surgical ablative therapies still hold a role in the treatment of refractory Meniere's Disease.

Methods: We present the RVEEH experience labyrinthectomy and Cochlear Implant Surgery over the last five years, as well as a review of the literature.

Results: Labyrinthectomy can improve vestibular symptoms while cochlear implantation can improve hearing in patients with refractory Meniere's Disease.

Conclusions: Labyrinthectomy and cochlear implantation presents an options for patients to control vestibular symptoms and rehabilitate hearing in patients with medically refractory Meniere's Disease, but requires careful patient selection.

1:45

Intratympanic steroids in Ménière's disease: Selective benefit, uncertain predictors

Presenter:
Kumiko Orimoto

Authors:
Dr Kumiko Orimoto[1,2], Dr Claire Iseli[1,2,3,4], A/Prof Jean Mark Gerard[1,2,5]

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Intratympanic (IT) dexamethasone is a non-ablative treatment option for patients with Ménière's disease (MD) who remain symptomatic despite standard medical management. While its precise mechanism remains unclear, it is hypothesised to reduce inner ear inflammation and preserve cochlear and vestibular function.

We reviewed seven recent cases at our centre in which patients received IT dexamethasone after failing conservative therapy, including salt restriction, betahistine, diuretics, and short courses of oral steroids. Symptom profiles varied, and all patients continued concurrent medical therapy during and after IT injections. Two patients experienced marked improvement in vertigo and hearing thresholds following IT steroid treatment, although a definitive causal relationship is uncertain. One patient showed transient benefit but eventually required IT gentamicin due to recurrent vertigo, highlighting the limitations of steroid efficacy in some cases.

Given that 30–50% of MD cases may become bilateral over time, IT steroids represent a hearing-preserving alternative prior to considering ablative options. Tympanostomy tube insertion and topical steroid application were used in some cases, though the benefit may reflect pressure equalisation rather than drug effect alone.

This case series underscores the limited and variable efficacy of IT steroids and emphasises the need to better identify patients likely to benefit from non-ablative interventions.

2:00
When the Usual Doesn't Fit: A Collaborative Case of Progressive Vertigo

Presenter:
Tess Peverill & Kumiko Orimoto

Authors:
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Diagnosing vestibular conditions can be particularly challenging when symptoms are atypical and care is fragmented across multiple health services.

We present the case of a 43-year-old male with sudden-onset vertigo who presented to three different health services. Despite assessment by experienced clinicians, he received three different diagnoses: BPPV, migraine, and labyrinthitis. As his symptoms progressed and did not follow the expected course, further investigation was undertaken. MRI ultimately revealed tumour recurrence with subepidermal spread and effacement of the fourth ventricle, providing a likely explanation for his vestibular symptoms.

This case highlights several key challenges: the difficulty of diagnosing vertigo when presentations are non-classical; the limitations of fragmented care without shared information; and the importance of multidisciplinary collaboration in recognising red flags and escalating appropriately. The final diagnosis was only reached through ongoing clinical reassessment, open communication, and input from multiple disciplines.

This case was a valuable learning experience for all involved and offers important insights for both medical and allied health clinicians involved in acute vestibular care.

2:15
Vestibular Function Testing and Surgical Outcomes in SSCD

Author:
Claire Iseli

Authors:
Dr Claire Iseli MBBS(hons), MS, FRACS, DipSurgAnt, Prof Robert Briggs

Institution:
RVEEH, RMH, RCH, Melbourne University, Melbourne Victoria

Superior semi-circular canal dehiscence can create a wide variety of symptoms and interact with other vestibular conditions. This presentation will explore the variety of vestibular function tests used to diagnose and decision-make about management in this patient population and review the latest literature on the accuracy of these investigations. It will then discuss the indications for, risk and outcomes of surgery for this condition.

3:30

Multimodal Treatment for Children and Young People with Persisting Post Concussion Symptoms: The Concussion Essentials Trial

Presenter:
Katie Davies

Authors:
Katie Davies[2,3], Vicki Anderson, PhD[1,2], Vanessa Rausa, MPsych[2], Gavin A Davis, MBBS[2,4], Stephen Hearps, MBiostat[2], Franz E Babl, MD[1,2,6,7], Bianca Charles[2,3], And The extended MCRI Team

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5. Emergency Department, Royal Children's Hospital, Parkville, Victoria, Australia.
6. Department of Critical Care, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Victoria Australia.

Aim: To investigate if a targeted multidisciplinary treatment for children with persisting post-concussion symptoms (pPCS) is more beneficial than usual care.

Design: This was a single site, assessor-blinded RCT. Symptomatic participants aged 8 – 18 were recruited and baseline secondary measures were administered at 3 weeks post-injury. Participants were then randomized into the usual care (UC) control group or the Concussion Essentials (CE) treatment group. The CE group received up to 8 weeks of symptom directed multidisciplinary treatment by a physiotherapist and neuropsychologist. The UC participants received symptom monitoring only for the 8 weeks. Primary outcome was the Melbourne Paediatric Concussion Scale (MPCS).

Results: Complete data was collected on 140 participants who were randomized into CE (n=67) or UC (n=73). Mean age was 13.1 years and 56.4% of them were male. MPCS means for the CE group reduced from 36.75 (95% CI 31.03-42.47) to 8.55 (6.66-11.04, p<0.001). In comparison, MPCS means for the UC group reduced from 33.53 (95% CI 28.34-38.72) to 21.89 (95% CI 15.68 – 28.10, p=0.410). Proportions with symptom resolution were: UC: 37% (27/73) , CE: 61.2% (41/67) (adjusted risk difference = 24.3%, 95% CI – 40.3-8.4%).

Conclusion: Individualised multi-disciplinary treatment is effective in reducing symptoms in children with pPCS.

3:15

Improving balance and reducing fall risks in older Chileans: Assessing the effectiveness of a group-based vestibular intervention using low-cost measures.

Presenter:
Juan-Pablo Faúndez-Astudillo

Authors:
Juan-Pablo Faúndez-Astudillo[1,2], Ivette Aravena-Palma3, Francisca García-Rivera[3,5], Valentina Garmendia-Gavia[3], Samanta Ortega-Torres[3], Natalia Sepúlveda-Olguín[3], Marcia Núñez-Toro[5], Ximena Hormazábal-Reed[2,4]

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5. Audiology Unit, Otorhinolaryngology Clinic. Hospital San Juan de Dios. Región Metropolitana, Chile.

The ageing population in Chile has led to a rise in balance disorders, now the third most common reason for ENT consultations in the country. However, there is a shortage of vestibular rehabilitation specialists and assessment tools, creating intervention delays. Hence, low-cost assessments and group-based interventions are potential solutions to overcome these issues. This study aimed to evaluate the effectiveness of a group-based vestibular intervention using low-cost assessments.

Twelve adults with chronic balance impairments aged 64-80 underwent a 12-session groupbased vestibular intervention. Pre- and post-intervention assessments were used to determine dynamic balance, falls risk, vestibular disability perception, and vestibular ocular reflex function.

Results showed statistically significant improvements at a group-level in subtests of dynamic balance and falls risk, and two measures of perceived vestibular disability. Nine of the participants demonstrated a decrease in the number of altered assessments' results postintervention. Our findings suggest that non-client-specific, exercise- and group-based vestibular interventions can effectively improve balance, reduce fall risks, and decrease perceived disability in older adults. This highlights the potential of using low-cost assessments and groupbased interventions in limited resources settings and where such modalities are appropriate. Further research is recommended to expand upon these results and compare them with individualised interventions.

3:30

Patterns of Vestibular Loss in Mild Traumatic Brain Injury. Who should be part of multi-disciplinary team?

Presenter:
Kate Eykamp , Ashley Callaghan

Authors:
Mrs Ashley Callaghan - Advanced Concussion and Vestibular Physiotherapist, Mrs Kate Eykamp - Advanced Audiologist

Institution:
Sunshine Coast Hospital and Health Service, Queensland Health, QLD

Background: Sequelae from mild traumatic brain injury (TBI) is complex and often cross ear and brain (clinical field of Neuro-Otology). Yet research and clinical practice often remains siloed. Current understanding of underlying pathophysiology remains poor with scarcity of research to guide current clinical practice, particularly complex multi-sensory and persisting symptoms such as hearing loss / tinnitus / hyperacusis, peripheral vestibular dysfunction, and persistent post-traumatic headache. Concussion services are expanding throughout Australia, but MDT often do not include Audiology, Ear Nose and Throat (ENT) or Neurology services.

Objective: Evaluate benefit of secondary referral pathways to Audiology, ENT, and Neurology services as part of multi-disciplinary (MDT) concussion service for patients with complex, persisting, or episodic aural and vestibular symptoms and/or refractory migraine following mild TBI (~30% of cohort).

Method: A retrospective observational study from MDT concussion service in public hospital setting.

Results: Case series demonstrated a positive impact on patient care and cost benefit to hospital and health service when MDT team included Audiology, ENT and Neurology services.

Conclusion: Expanding referral pathways as part of MDT concussion service is recommended for patients with persisting aural and/or vestibular symptoms and/or refractory migraine following mild TBI.

Feasibility considerations for establishing routine physiotherapy assessment of peripheral vestibular dysfunction in adults with severe traumatic brain injury.

Presenter:
Gretta Palmer

Authors:
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Dr Niruthikha Mahendran, Surgical Treatment and Rehabilitation Service (STARS) Education and Research Alliance, The University of Queensland and Metro North Health, Brisbane, AUSTRALIA, School of Health and Rehabilitation Sciences, The University of Queensland, St Lucia, Australia

Background: Peripheral vestibular dysfunction is common in adults with severe traumatic brain injury (TBI) but often goes undetected due to unreliable symptom reporting and clinical complexity. Physiotherapists are well positioned to identify and treat vestibular dysfunction; however, routine assessment is not standard practice in subacute brain injury rehabilitation.

Methods: A prospective mixed-methods observational feasibility study was conducted at a specialist Brain Injury Rehabilitation Unit in a tertiary Brisbane hospital. Fifteen consecutively admitted adults with severe TBI received medical clearance and received completed vestibular assessments over an eight- month period. Physiotherapists conducted standardised assessments, including oculomotor exams, vestibulo-ocular reflex (VOR) testing and positional testing for BPPV, using infrared goggles and video Head Impulse Testing (vHIT). Staff were supported through structured education, mentoring, and access to templates and equipment.

Results: Assessments were completed, including during post-traumatic amnesia, with no adverse events. Physiotherapists reported high acceptability (80%) and feasibility (80%). Barriers included time constraints, low confidence, and medical clearance delays. Enablers included training and equipment access. Vestibular dysfunction was identified in 73% of participants, including VOR hypofunction (67%), BPPV (53%), and central signs (47%), often without dizziness.

Implications: Physiotherapy-led vestibular screening is feasible, safe, and clinically relevant in inpatient TBI rehabilitation. Training, supervision and protocols support implementation.

Vestibular rehabilitation: Improving symptomatic and functional outcomes of persons with Vestibular Schwannoma: A Systematic Review

Presenter:
Jayden Yap

Authors:
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Institutions:
1. School of Health and Rehabilitation Sciences, The University of Queensland, Brisbane, Australia
2. Physiotherapy Department, Princess Alexandra Hospital, Brisbane, Australia.
3. Centre for Functioning and Health Research, Metro South Health, Brisbane, Australia

Background: Vestibular schwannoma (VS) patients often experience dizziness, imbalance, and decreased function, affecting their quality of life. While vestibular rehabilitation (VR) benefits other peripheral vestibular disorders, its effectiveness in VS patients remains unclear.

Aim: This systematic review aimed to determine the effect of vestibular physiotherapy on symptomatic and functional subjective and objective measures in VS patients.

Methods: Four electronic databases were searched for experimental or observational studies involving VS patients undergoing vestibular physiotherapy. Studies were screened and assessed for quality and risk of bias using appropriate tools. The GRADE approach synthesized the findings.

Results: Twenty-three studies were included. The overall effects of vestibular physiotherapy in VS patients were uncertain, with GRADE assessments showing very low certainty for dizziness, static and dynamic balance, and vestibular function outcomes. Multi-modal physiotherapy interventions consistent with clinical guidelines (e.g., gaze stability, habituation, balance, gait training) showed potential improvements. Prehabilitation studies indicated benefits both with and without gentamicin ablation before surgery. Single-modality interventions mostly showed insignificant results.

Implications: Multi-modal vestibular physiotherapy may benefit VS patients by improving symptoms and function. However, further high-quality research specific to VS prehabilitation and rehabilitation is needed. Clinical management of VS patients should follow multi-modal VR guidelines for peripheral vestibular hypofunction.

Benchmarking of Vestibular Physiotherapy care provided in Victorian Healthcare Services

Presenter:
Allison Luscombe

Authors:
Allison Luscombe, Stephanie Holland and Monique Nguyen

Institutions:
Department of Physiotherapy, Western Health

Dizziness is a common clinical presentation, with over half of cases linked to vestibular dysfunction. Despite its prevalence, vestibular conditions are often underdiagnosed and poorly managed, significantly affecting patients' quality of life. Physiotherapists are well positioned to address these issues, and specialised Vestibular Physiotherapy (SVP) roles are increasingly emerging across Victoria. However, there is limited understanding of how these services are delivered along the care continuum. This study aimed to investigate current SVP service models in Victoria to guide future planning at Western Health. A survey was distributed to Senior Neurological Physiotherapists across Victorian health services. Responses were analysed using summative content analysis.

Eight health services participated. While no emergency department (ED)-based SVP roles were identified, several services utilised secondary contact models within the ED. Inpatient care was typically provided by ward-based staff, supported by experienced physiotherapists. Outpatient services varied considerably, ranging from general physiotherapy pathways to specialised vestibular clinics, some aligned with medical specialists and resembling advanced practice roles. However, scope of practice and credentialing were inconsistently defined. Crucially, no service offered a fully integrated care pathway for vestibular patients.

Findings highlight variability in vestibular service delivery and provide practical insights to inform the development of an optimal SVP model at Western Health