BSNO

British Society of Neuro-otology
www.bsno.org.uk

5th meeting of the British Society of Neuro-Otology

Monday 10 October 2005

Glennister Lecture Theatre
Margravine Road
Imperial College London

ABSTRACTS

Adherence to rehabilitation for dizziness

Lucy Yardley
School of Psychology, University of Southampton

The traditional biomedical view of adherence to therapy was that the rational course of action must be to comply with medical advice and therefore any non-compliance must be due to a failure of rationality (e.g. misunderstanding, forgetting, emotional interference). Recent research has instead emphasised rational, intentional non-adherence resulting from patients' beliefs and priorities. This talk considers how rational and non-rational factors may separately and/or in combination influence patients' adherence, examined in the laboratory and in two studies of adherence to rehabilitation for dizziness due to peripheral vestibular disorder.

The problem with studying adherence in clinical settings is that there are many relevant influences that cannot be easily controlled or manipulated (e.g. disease severity and fluctuations, personal circumstances, therapeutic interactions), and so it is difficult to experimentally test the influence of any one factor because of the confounding effect of other factors. In addition, adherence to therapy usually cannot be assessed unobtrusively and prospectively, but is instead measured by self-report at a single time-point. To circumvent these problems, we developed a computer simulation of physiotherapy which was completed by 84 healthy participants. Participants were either given aversive or non-aversive feedback concerning whether they were following instructions to carry out simulated exercise correctly. Aversive feedback affected adherence to instructions in a manner that was different and independent from rational beliefs and intentions regarding following instructions.

We examined similar processes observationally in two randomised controlled trials of adherence to rehabilitation for dizziness. In the first study, adherence was studied in 137 primary care patients with dizziness who were taught rehabilitation exercises by practice nurses.[1] Beliefs about therapy were assessed before treatment and three months later, and severity of provoked symptoms was assessed pre-treatment and one and three weeks post-treatment. Non-adherence was predicted longitudinally primarily by reported level of and change in symptoms, and symptoms were unrelated to beliefs. In a second trial, 240 people with Meniere's disease carried out either vestibular rehabilitation exercises or stress reduction techniques. In the vestibular rehabilitation group non-adherent participants were significantly more likely to report that adhering to the intervention made their symptoms worse, and adherence was predicted by change in symptoms at three weeks. In the stress reduction group non-adherent participants were significantly more likely to report that they could not adhere due to lack of time or opportunity, and there was no effect on adherence of symptom change at three weeks.

It appears that both rational and non-rational factors may independently influence adherence, and that their relative influence may vary depending upon the therapeutic context.

[1]Yardley,L., Donovan-Hall, M., Smith, H.E., Walsh, B.M., Mullee, M. & Bronstein, A.M. (2004). Effectiveness of nurse-delivered vestibular rehabilitation for chronic dizziness in primary care: a randomized controlled trial. Annals of Internal Medicine, 141, 598-605.

Applications of Vestibular evoked myogenic potentials (VEMPs) in Menière's disease

V. Osei-Lah*, Borka Ceranic** and Linda M. Luxon**

Abstract:

The commonest vestibular organ affected in Menière's disease is the saccule. VEMP specifically assesses the saccule and the inferior vestibular nerve and it is proving to be a useful tool in clinical vestibular function assessment.

The aims of the study were to identify the usefulness of VEMPs in active and stable MD and in those MD patients exhibiting vestibular sensitivity symptoms of Tullio and phonophobia; evaluate its diagnostic utility and to aid understanding of the pathophysiology of MD.

Twenty patients (11 active and 9 stable) and 20 normal volunteers were recruited for the study. All subjects underwent tone burst VEMP testing. The patients had audiovestibular tests according to standard protocol of the Neuro-otology department.

Main findings:
VEMPs were present in 65% and absent in 35% of patients. The longer the duration of MD, the shorter the p13 latency. Threshold of stimulation did not differ between controls and patients nor was it different in the two patient groups. Threshold in patients with vestibular sensitivity symptoms was slightly higher than in those without. Interaural amplitude difference (IAD) ratio was higher in the stable compared with the active group.

Conclusions
VEMPs (threshold, latency and IAD ratio) can be useful in the assessment of the clinical course of MD but further research is required to clarify their clinical utility.

*St Helier University Hospital, Surrey; **The National Hospital for Neurology and Neurosurgery, London

NB: The study was supported by the Menière's Society, London

Posterior BPPV treatment : Comparative study

B. Cohen, B. Meyer

ENT Department, CHU St-Antoine, Paris, France

We describe a prospective study carried out between February 2003 and May 2005 designed to compare the efficacy of different treatments for P-BPPV.

Aim of study: compare efficacy of habituation performed by the patient him/herself, and the liberatory maneuvers i.e. Semont and Epley manoeuvers, in order to clarifiy therapeutic indication.

Materials et methods : for the first treatment, we chose either habituation exercises (patients do these 3 times Dix-Hallpike manoeuver at home, morning and evening during 3 days) or Semont manoeuver. In last months of study we also introduced the Epley manoeuvre.
On the fourth day, we monitored the patient using a questionnaire and the Dix-Hallpike manoeuvre. In case of failure of the first treatment, we proposed an alternative treatment, the outcome of which was also monitored 4 days after the second treatment.

Results: 158 patients were included, but 193 BPPV because some patients got a recurrence during the period of study.
The following were excluded:

- 3 patients who refused any treatment
- 4 patients with suspected central positionnal vertigo

75% of patients were female;
2% were bilateral BPPV.
An aetiology was found in 30% of cases (32% head injury, 21% vestibular hypofunction on the same side, 9% Menière disease, 9% after neuritis (Lindsay-Hemingway syndrome)).

Results of the first treatment:

- habituation was trialled in 42 cases (23% of BPPV): by the fourth day, 27% were cured, 35% improved and 23% failed.
- Semont manoeuver was the first treatment in 142 cases (76% of BPPV): by the fourth day, 64% cured, 13% improved and 18% failed.

Results of second treatment (i.e. when first treatment failed or only partly improved the patient) on the fourth day:

- 40% were cured by habituation and
- 68% with Semont manoeuvre
- Epley Manoeuver was performed in 18 cases (61% cured and 22% failed).

We will report the side effects of P-BPPV on balance, even the Dix–Hallpike manoeuver cured BPPV, and the possibility of migration of otoliths into the other canals during treatment.

Conclusion: The Semont manoeuvercured patients in 64% of cases, Epley in 61%, and habituation in only 31%. But the 3 treatments showed rapid efficacy in improving symptoms (75% for Semont manoeuvre, 78% for Epley and 58% for habituation).

Many patients of all groups felt cured or improved a lot after treatment but BPPV still persist with Dix-Hallpike manoeuver. Do we have to go on treatment for these patients?
We have to be aware of and use all these 3 treatments, especially when the liberatory manoeuver is difficult to perform or when one method of treatment failed.

Asynchronous recovery of perceptual and oculomotor vestibular processing following Miller Fisher Syndrome

Seemungal BM, Massaoutis P, Green D, Plant GT, Bronstein AM

During head movements, the vestibule-ocular reflex (VOR) stabilises gaze, and a brainstem mechanism, the 'velocity storage' (VS) mechanism, optimises the VOR during low frequency movements. The VS mechanism may be demonstrated by stopping after prolonged spinning on the spot. The engendered vertigo and associated nystagmus is prolonged by VS from 20s (i.e. endolymph motion duration) to circa 60s duration. The *time constants* of exponential decline in VOR slow-phase velocity and perceived angular velocity (normal value for both = 15s) are well correlated suggestive of fidelitous perceptual processing of ascending vestibular brainstem signals.

In chronic (not acute) external ophthalmoplegia (EO), patients do not complain of head-motion-induced oscillopsia despite excessive retinal slip. Chronic EO possess increased visual motion perception thresholds and deficient VS which together help to reduce sensations of dizziness from visual-motion or inertial signals. During the evolution of an acute but recovering ophthalmoplegia (from Miller Fisher Syndrome), we serially assessed *oculomotor* and *perceptual* VS time constants and were respectively as follows post-EO zenith in recovery:

		Oculomotor time constant	Perceptual time constant
(1)	Day 14	6.2s	7.6s
(2)	Day 18	6.3s	7.7s
(3)	Day 40	8.6s	15.3s

This shows asynchronous recovery of perceptual and oculomotor vestibular mechanisms, implying a differential processing of perceptual vestibular signals from

(ascending) brainstem signals. This is the first evidence that perceptual and brainstem vestibular signals may be incongruent. This may explain why some patients complain of vertigo despite normal vestibular testing since standard vestibular tests examine the integrity of the peripheral vestibular apparatus and its brainstem processing. Clinical perceptual vestibular testing may be required in some patients.

Comparative effectiveness of vestibular rehabilitation in the treatment of individuals with or without otolith dysfunction

Authors: **Mrs Kate Murray**, PhD candidate, University of Melbourne, Australia
Dr. Keith Hill, National Ageing Research Institute, Melbourne, Australia
Dr. John Waterston, Consultant Neurologist, Alfred Hospital, Melbourne, Australia
Dr. Bev Phillips, University of Melbourne, Australia

Testing of vestibular function has traditionally involved measurement of horizontal semicircular canal function only. Two tests of otolith function have recently been developed. The clinical significance of identifying otolith dysfunction, however, has yet to be determined.

In this study, the response to rehabilitation of individuals with or without otolith organ involvement was compared in a prospective trial of 47 subjects with a diagnosed peripheral vestibular disorder. Based on vestibular function test results, there were 18 subjects (38%) with isolated loss of semicircular canal function only and 29 subjects (62%) with a combined loss of semicircular canal and otolith organ function. Following rehabilitation, successful outcomes were identified for the full sample across a number of key domains. There were, however, no significant differences between individuals with or without otolith organ involvement with respect to their response to rehabilitation. No significant differences were identified between the groups with respect to improved subjective reports of symptom severity ($p=0.81$), self-perceived handicap ($p=0.92$), functional status ($p=0.93$) or balance performance ($p=0.92$).

It was concluded that newly developed tests of otolith function, while providing further information regarding vestibular impairment, do not reliably identify individuals who will respond less well to rehabilitation. Other factors, such as time since onset of vestibular dysfunction and psychological status, may play a more major role in influencing the success of vestibular rehabilitation in individuals with a diagnosed peripheral vestibular lesion.

Development of a screening vestibular test battery in children
Authors: Lishani R, Luxon LM

Abstract:

Standard tests of vestibular function such as caloric testing and rotational chair testing are time consuming and require co-operation and concentration, which are beyond the ability of many young children. In addition, these tests are frequently not available in paediatric clinics.

A simple battery of tests suitable for use in young children to evaluate vestibular and balance function has been developed. The tests include stepping on the spot, walking on a narrow beam, standing on one foot, standing on a pad foam, head shaking and eye movement recording test, and subjective visual vertical and horizontal tests.

A study of 131 healthy normal school children (4-15 years old) were tested in Tripoli, using this simple vestibular test battery, and 27 children with vestibular symptoms were also tested

in Tripoli Central Hospital and GOSH / London by standard tests (caloric test/ rotation chair) and the simple test battery.

The preliminary results showed that some of these tests are statistically significant, and by using the logistic regression analysis we are able to weight different tests in this battery. A new mathematical scoring system also has been used in this study to achieve this weighting. The results suggest that the screening vestibular test battery is a valid way of identifying children with balance disorders. No previous study has defined a simple vestibular screening test battery in children that could be routinely used to identify vestibular dysfunction, requiring further investigation and management.

Rotational and translational vestibulo-ocular reflex in patients with superior canal dehiscence syndrome

J. Goumans, MMJ Houben, LJJM Boumans, L. Feenstra, J. van der Steen

We tested the rotational and translational vestibulo-ocular reflex (VOR) in two patients with dehiscence of bone overlying the superior semicircular canal and one controle subject. Using a motion platform with six degrees of freedom, eye movement responses were evoked through both sinusoidal and short impulse stimulation. Three-dimensional eye movements were recorded with dual scleral search coils. The directions of sinusoidal stimulation were in the three cardinal axes (rotation: yaw, pitch, roll and translation: heave, sway, surge) and about intermediate axes with increments of 22.5 degrees in the horizontal plane. Short impulse stimuli were delivered in the planes of the vertical canals for rotation and along the three cardinal axes for translation. No specific changes in gain were found between the control subject and the two patients during sinusoidal rotation and translation. During short impulse stimulation the gain of the rotational VOR was lower in the planes of the vertical canals.

A PROSPECTIVE STUDY ON POSITIONAL NYSTAGMUS IN 100 CONSECUTIVE PATIENTS.

P Bertholon[1], S Tringali[1], MB Faye[1], A Oletski[1], JC Antoine[2], C Martin[1].

[1] Service ORL, CHU de Saint Etienne, Hospital Bellevue, Saint Etienne, France.
[2] Service de Neurologie, CHU de Saint Etienne, Hospital Bellevue, Saint Etienne, France.

Correspondence to:
Pierre Bertholon,
Service ORL,
Hôpital Bellevue,
Boulevard Pasteur,
CHU de Saint Etienne,
Saint Etienne,
France.

e-mail: pierre.bertholon@univ-st-etienne.fr

SUMMARY

Introduction. The purpose of this report is to investigate the various diagnosis of patients presenting with a positional nystagmus.
Methods. We conducted a prospective study of 100 patients using positional maneuvers performed in the plane of the posterior canal (PC; Dix-Hallpike maneuver) and the horizontal canal (HC; patients were rolled to either side in a supine position).

Results. There was evidence for a benign paroxysmal positional vertigo (BPPV) in 80 patients; the PC was involved in 61 patients, the HC in 18 patients (geotropic horizontal nystagmus in 11 and ageotropic in 7; changing geotropic-ageotropic in 4 patients), both PC and HC in 1 patient. There was evidence of a central positional nystagmus in 12 patients including a positional down-beating nystagmus during the Dix-Hallpike maneuver in 7 patients with various neurological disorders and an ageotropic horizontal nystagmus during the HC maneuver in 2 patients suffering respectively from a cerebellar ischemia and a definite migrainous vertigo. The peripheral or central origin of the positional nystagmus was not definitively ascertained in 8 patients, including one patient with probable migrainous vertigo and another with a possible anterior canal BPPV.
Conclusion. A rotatory upbeating nystagmus in the context of a PC BPPV, an horizontal nystagmus whether geotropic or ageotropic due to an HC BPPV and a positional down beating nystagmus related to different central disorder are the 3 most frequent causes of positional nystagmus. Geotropic horizontal positional nystagmus and certainly horizontal positional nystagmus changing geotropic – ageotropic are in favor of an HC BPPV. In contrast, ageotropic horizontal positional nystagmus which is not changing (ageotropic – geotropic) can reveal a central lesion. Migrainous vertigo may be an underestimated cause of positional nystagmus.

Abstract:

Dr Rosalyn A Davies
Department of Neuro-otology, The National Hospital for Neurology and Neurosurgery, Queen Square, London WC1N 3BG
(*The title of Dr. Davies' talk was altered after submission of the enclosed abstract – no revision of abstract was submitted)*

Actual title of talk - "Expanding the definition of migraine"

This abstract was submitted but not actually delivered.
Is our definition of posterior circulation migraine too tight?

5 patients (2 from one kindred) are presented with acute episodes of headache associated with symptoms ascribable to temporary perturbations of the posterior circulation. In all these patients their symptoms fall outside the IHS criteria for basilar migraine. However, they show full resolution of symptoms inter-ictally and a decreased rate of attacks with migraine prophylaxis. In most, a vascular event had been diagnosed, although no vascular cause was found, and some of the patients had the impression that their symptoms were due to stroke. No genetic abnormality i.e. for familial hemiplegic migraine, was identified in any of these cases.

In one patient, admitted acutely for in-patient investigation, a central-type eye movement abnormality was documented in association with an acute confusional state. Symptoms that could have been described as "aura" persisted throughout the attack, and her confusional state slowly improved throughout her 10 day stay. These eye movement abnmormalities had completely resolved by the time of her follow-up. Although the associated headache was unpleasant, it was not a predominant symptom of her attacks. Notably, migraine prophylaxis has dramatically improved her attack rate.

The kindred pair, a mother and daughter, both have attacks which include headache and hemiplegia, the latter lasting upto 5 days maximum. They were negative for the known FHM mutation on genetic testing. The daughter's attack rate has significantly decreased since stopping the oral contraceptive pill.

These patients are compared with the group of 90 sequential dizzy patients seen in the balance clinic (previously reported from this department), of whom 42 had headache which fell within the IHS criteria for migraine, and 27 of whom had adequate criteria to be

diagnosed as basilar migraine. Some of the putative neurotransmitter links between vertigo and migraine will be discussed, and a "channelopathy" basis for the 5 patients described will be proposed.

Abstract

Superior Semicircular Canal Dehiscence Syndrome
Report of Two Cases
(Short Communication)

Superior Semicircular Canal Dehiscence Syndrome is a recently described clinical disorder (Minor at. al.1998) characterized by vertigo and disequilibrium in response to loud sounds or pressure changes and hypersensitivity to bone conducted sound and reduced sensitivity to air conducted sound due to dehiscence of the SSC. The diagnosis is based on the clinical picture and imaging and can be confirmed by electrophysiology. We describe two cases successfully treated surgically and summarize the diagnosis and treatment options of this condition.

Attila Dezso Neurotology and Skull Base Fellow
Professor Richard T. Ramsden
Department of Otorhinolaryngology
Manchester Royal Infirmary
Manchester Oxford Road
M13 9WL

Dr. Yvonne Silove
SpR. Audiovestibular Medicine
Charing Cross Hospital.

This is a case presentation of a 24 yr old lady with a four year history of periodic unilateral rushing tinnitus and hearing loss, becoming more frequent, and continual distortion of sound. She had a four month history of intermittent disequilibrium and vomiting, becoming more frequent. Examination revealed generalised dizziness and unsteadiness with eyes closed, but no specific abnormalities.

MRI of the brain and IAMs was obtained 2 days later and showed a non-enhancing well circumscribed area in the right cerebello pontine angle best seen on T1 imaging whose appearance was consistent with a CPA lipoma.

Surgery was performed two months later. It was felt that the level and progression of her symptoms clinically made the diagnosis more likely to be an epidermoid than a lipoma, and epidermoids are relatively easy to remove. At operation, however, the lesion was found to be a lipoma and surgery was limited to a biopsy. Postoperatively she was left with a partial sixth nerve palsy, complete seventh nerve palsy and no recoverable hearing on that side. Her vestibular symptoms resolved.

CPA lipomas are very rare (0.14% of CPA/IAM tumours). Reports in the literature illustrate the densely adhesive nature of these tumours and the high incidence of new deficits postoperatively – around 65% or more. This case illustrates the perils of operating on these lesions and reviews the status of the current world literature on this topic.

Periodically periodic alternating nystagmus

O'Sulllivan E & Radomskij P

Address

Department of Ophthalmology
Mayday University Hospital
Croydon

Department of Audiology
St George's Hospital
London

Introduction

Acquired periodic alternating nystagmus (PAN) is a horizontal jerk nystagmus with regularly alternating fast phase direction. The cycle duration lasts 3-4 minutes; 90-120 seconds of nystagmus in one direction with an increasing and then decreasing intensity, a transition period and then nystagmus in the opposite direction. We described a patient in whom this periodically occurred.

Case report

A 66 year old man was referred to eye clinic with a 3 month history of episodic blurred vision. He described things appeared to move from side to side in the horizontal plane for about 30 seconds every 5minutes. There was no associated vertigo. The patient had suffered a myocardial infarction one month earlier and had a history of bronchiectasis.

On examination his visual acuity was 6/6 bilaterally, though it was noted to fall to 6/9 in his right eye and 6/24 in his left during an episode. Clinically he was noted to have nystagmus in the primary position, the direction of which alternated, but not in obvious periodic manner. Of note was that neither pupil appeared to react to light and only the right had an accommodative response. There was nil else of note on ocular examination. Investigations including an MRI brain scan were unremarkable.

Eye movement recordings were undertaken. These demonstrated that the nystagmus was indeed alternating. The nystagmus could beat in one direction and be followed by a transition period, but the nystagmus would then beat in the same direction as before. This could occur several times over a period, usually of between 120 and 150 seconds, before the direction would change.

Conclusion

A patient with alternating nystagmus in whom the direction of nystagmus did not always change after the transition period has been described.

Sudden onset of deafness and vertigo preceding signs of pontine and cerebellar dysfunction in AICA infarction.

Dominic J. Mort & Adolfo M. Bronstein
Dept of Movement and Balance (Neuro-otology), Imperial College London, Charing Cross Hospital, London, UK

A 48 year old man suddenly went deaf in his left ear and experienced acute vertigo whilst straining at stool, one week after a long haul flight. Twenty minutes later symptoms of incoordination emerged in his limbs on the left side, seen as severe left-sided ataxia when examined in hospital. There was a nystagmus beating to the right in the primary position. MRI confirmed infarction in the pontine and cerebellar territory supplied by the anterior inferior cerebellar artery (AICA). This artery also perfuses the labyrinth. A patient foramen ovale with right-to-left shunt demonstrated on echo was felt to have been the source of paradoxical embolus and was successfully closed. Recent prospectively gathered evidence has shown that sudden hearing loss is a presenting symptom in about one tenth of cases of posterior circulation ischaemia, sometimes in advance of symptoms of brainstem and cerebellar infarction, as in this case. The debate over what proportion of cases of idiopathic sudden hearing loss are due to isolated infarction of the labyrinth will continue until better techniques for making a pathophysiological diagnosis are available. However, cases like emphasise to a possible broader vascular aetiology, as well as reminding us that more research is needed into how intervention might prevent those cases of sudden deafness presaging more extensive ischaemia progressing to a more disabling posterior circulation stroke.

"Vestibular Prothesis"

Herman Kingma, Maurice Janssen, Jos Aarts, Rob van Lummel, Sjors van Pinxteren, Jaap Patijn, Hans Vles, Yvonne Potten, Robert Stokroos.
Departments of ENT, Neurology, Biomedical technology and Anaesthesiology, IDEE
University Hospital Maastricht, University Maastricht, Technical University Eindhoven, European Graduate School of Neuroscience
P.O. Box 5800
62202 AZ Maastricht
email: hki@skno.azm.nl

Problem definition

In case of acquired severe vestibular function loss, central compensation allows reduction of the severe dizziness, imbalance and nausea but does not restore functionality really. Major limitations remain: poor visual acuity during head motion, reduced spatial orientation (dizziness) after fast head motions, normal balance and spatial orientation in optimal "easy" conditions but imbalance, fear and falls in case of reduced proprioceptive cues (irregular or soft floor) or reduced visual cues (dimmed light or misleading visual orientation or motion cues). Postural control and dynamic vision are not or less automatised and require specific visual and cognitive attention. This results in a reduced ability to have a normal conversation during walking (impairment of multi-tasking) and early fatigue. In summary: an aquired bilateral vestibular impairment, like severe bilateral hearing or visual losses leads in many but not all patients to a high burden of illness and impairment. An additional severe problem with some of the labyrinthine deficit patients can be chronic nausea or dizziness (limited neuroplasticity or fluctuating remains of labyrinthine function) and a fear to fall, leading to social isolation.
Recent research is engaged with the development of a vestibular prothesis as a possible therapy for patient with bilateral vestibular areflexia.

Solving the problem
The development of a vestibular prothesis is a complex technological challenge. Linear accelerometers with a required frequency range from DC to 40 Hz generally suffer from drift which results for example in errors in the detection of the gravity vector and absolute acceleration. Accurate angular acelerometers are generally based on gyroscopes or paired linear accelerometers and require substantial energy consumption. As a result a complete labyrinthine prothesises is still bulky, relatively inaccurate and require relatively large batteries for ambulatory aplication. The stable "Dutch" prothesis that we developped and use now is about 10 x 30 x 30 mm, still large but very accurately sensing linear and angular acclerations in 3D with virtually no drift. As we estimate, miniaturization is just a matter of time as the prototyping proceeds fast now.
In our clinic the ambulatory sensor is used in combination with an ambulatory vibrotactile display and we will show some interesting results that agree with data provided with a laboratory system (Wall III et al.) and to the electro-tactile stimulation on the tongue reported by Bach Y Rita et al. Promising is the fact that Minor and coworkers developed and tested a prosthetic semicircular canal that senses angular head velocity. The output of the sensor was decoded in the rate of current pulses and applied to the vestibular nerve via a stimulating electrode in the squirrel monkey. Over a period of two weeks, the gain of the horizontal VOR during yaw axis rotation gradually increased. This study showed that chronic stimulation of the eighth nerve can indeed provide adequate information to the brain to generate a measurable VOR response.
In conclusion, application of a vestibular implant seems to be a feasible approach to restore some functionality in patient with severe vestibular bilateral areflexia.

2nd delivery:

Function tests of the statolith system

Herman Kingma

Division of Balance Disorders, Department of ENT, University Hospital Maastricht, The Netherlands

Many methods have been proposed to try and evaluate otolith function: ocular counter-rolling (OCR) induced by lateroflexion, whole body roll, eccentric rotation and translational acceleration have all been explored and promoted as indicators of vestibular otolith function. However, these methods showed poor sensitivity and specificity, thereby preventing a sound clinical application. For example, healthy subjects can show a wide range of ocular counter rolling, from 3 to 11 degrees, induced by 40 degrees of lateroflexion test. It is also possible to measure responses to a linear acceleration (translation), which is also one of the specific stimuli for the otolith system. The induced eye torsion is small and the linear VOR is influenced by mental setting and virtual fixation distance; these factors again prevent the usefulnessof sleds for clinical application.
Measuring the perception of translation for diagnosis of statolith function losses has a long history starting with the use of simple parallel swings to sophisticated linear sleds that allow the application of various stimulus prophiles with different frequency compositions in the horizontal plane. However, despite the inventive constructions and high technology it remains very difficult to eliminate all other sensory cues that might affect the perception thresholds (e.g. vibration). But even more complicated is the consistent finding that the perception thresholds decrease upon repetition by learning and increases again by fatigue and vary widely among healthy subjects.
The statolith can also be stimulated by eccentric rotation in a 'human centrifuge'. Ocular counter rolling can be measured in this way, at constant rotation velocities with the amplitude

of the response depending on the centrifugal force acting upon both labyrinths. When combining a centrifuge with a motor driven linear sled, it is also possible to test each of the labyrinths separately by rotation around one labyrinth in order to centrifuge the other labyrinth alone. However this centrifuge technology is again hampered with a low sensitivity; recently detection of the SVV is reported to show more consistent and clinical relevant results than eye torsion.
Over the last two year, many papers focused on the application of the Vestibular Evoked Myogenic Potentials (VEMP) which seems to be a test of saccular function. Several aspects are under survey: a search for optimal stimuli, search for normative data, search for which labyrinthine function losses and what kind of pathologies induce abnormal VEMP's.

POSTER TITLES:

A pilot study of rehabilitation in central (vestibulo-cerebellar) balance disorders
Patil S; Buckwell D, Bronstein AM

Feasibility of vibro-tactile biofeedback to cue balance in patients with vestibular loss
Asseman F, Bronstein AM and Gresty MA

How can optokinetic stimulation improve chronic vertigo?
B.S. Cohen, I. Israel, R.A. Davies, B. Meyer

A 3D cine modelling otolith movement during BNPPV manoeuvres
B. Cohen, P. Bertholon, B. Meyer

Visuo-vestibular influences involved in the 'broken escalator' gait aftereffect (GAE)
K Bunday and AM Bronstein

The effects of smoking nicotine tobacco and smoking deprivation on motion sickness
John Golding

Effect of temporal relationship between respiration et mouvement on motion sickness.
A. Vouriot, P. Denise, H. Normand, N. Mohyud-Din, J.F. Golding, M. Gresty.