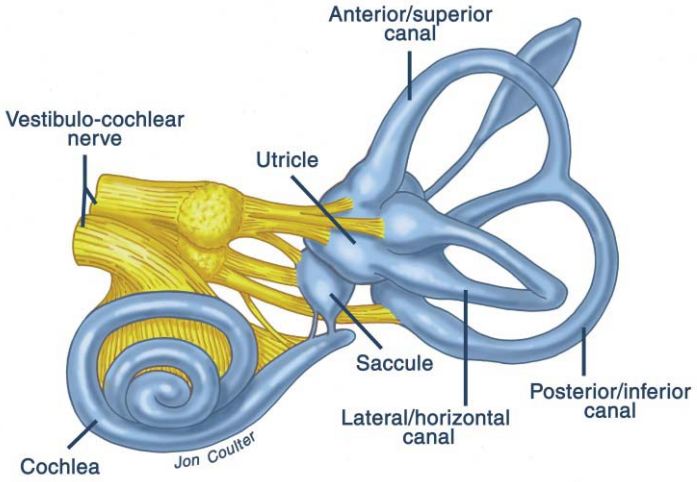
VERTIGO & DEAFNESS CLINIC

BJ - 252, Salt Lake, Sector - 2, Kolkata - 700091, India

VESTIBULAR LABYRINTH

AN INTRODUCTION



Vertigo and Deafness Clinic is a very specialized and complete clinic for diagnosis and treatment of VERTIGO and DEAFNESS. It is the only one of its kind in South East Asia and is equipped with all types of contemporary diagnostic and therapeutic gadgetry and technical manpower required for managing hearing and balance disorders. A state-of-the-art set up for complete pediatric hearing assessment including all types of subjective and objective tests possible in neonates and small children is also a part of the clinic. There is also an attached unit for physiotherapy of balance disorder and gait disorder patients only. It is the only one of its kind with different types of electromechanical instruments, a virtual reality set up and other modalities for precise therapy of patients suffering from vertigo, unsteadiness and gait disorders.

The clinic is also equipped with a very sophisticated set-up for dispensing hearing aids scientifically and ethically. All requisite arrangements for dispensing high-end digital hearing aids like REAL EAR INSERTION GAIN apparatus, Hearing AID Analysers, special music room with a 5.1 top-end music system for aided trials in different simulated sound fields(i.e., clarity of hearing for sounds and speech in different types of noisy situations with the patient wearing aids) is available in this clinic.

Clinic remains open from Monday to Saturday from 9.00AM to 8.00PM for different audio-vestibular tests and for dispensing of hearing aids. Dr. Anirban Biswas is available for consultation on neurotological disorders (i.e., vertigo and deafness).

More details of our clinic can be had from the following websites :

www.vertigoclinic.in

SERVICES AVAILABLE

AUDIOLOGICAL TESTS

- Pure tone audiometry(PTA) with all localizing tests like SISI/TDT/ABLB/SDS/SRT in a two-room professionalymade sound proof room set-up.
- High frequency Audiometry test (test frequencies 9000 Hz to 20,000 Hz)-essential for tinnitus patients and there suspected of ototoxicity.
- Glycerol Dehydration Test to confirm Meniere's disease.
- Free field audiometry for subjective evaluation of hearing in children.
- Visual reinforcement audiometry with professional pheratak video set-up.
- Play audiometry for small children who may not respond reliably in subjective PTA test.
- Brain Stem Evoked Response Audiometry (BERA/BSER) for threshold estimation as well as for site of lesion test (including neuro-latency examination, neuro - rate study examination for neurological diagnosis).
- CE-CHIRP BERA test- the most modern and improved form of BERA test. Sensitivity of CHIRP BERA is much higher than that of routine conventional BERA test. Wave peaks are earlier, better and easy to identify.
- Bone conduction BERA test- to assess bone conduction threshold objectively for children with microtia / ear deformities.
- ASSR Test - for objective frequency specific hearing threshold evaluation.
- ECochG test -to confirm Meniere's disease
- Otoacoustic Emission test (OAE) test, (DPOAE / TEOAE)- for neonatal hearing screening.
- ABRIS- Automated BERA for fast evaluation of deafness in children.
- Impedance Audiometry with Acoustic Reflex test with a special impedance audiometry machine for newborns and small children
- Eustachian tube function test (ETF tests) -for both intact and perforated TM. (Williams test and Toynbee's test)
- Tinnitus evaluation for matching & masking at exact frequency.

SERVICES AVAILABLE

VESTIBULOMETRIC TESTS

- Electronystagmography (ENG).
- Video Nystagmography (VNG) with complete oculomotor tests.
- Subjective Visual Vertical test (SVV).
- Video Head Impulse test (VHIT) with Visual VOR and VOR Suppression (VORS).
- Craniocorpography (CCG).
- Vestibular Evoked Myogenic Potential test (both ocular and cervicalVEMP).
- Stabilometry
- Dynamic Visual Acuity Test (DVA)

REHABILITATIVE AUDIOLOGY – HEARING AID FITTING ETC

- Aided audiogram / aided trial and fitting of hearing aids.
- Programming of digital hearing aids
- Dispensing of Hearing Aids including very high end models.
- Analysis of hearing aids (Analysis of Electro-acoustical features of hearing aids)using hearing aid analyser
- Real Ear Insertion gain measurement (REIG) to ascertain the amount of sound in different frequencies delivered by the hearing aid into the ear after programming.
- Voice / Speech therapy using Dr. Speech computerized speech therapy system.
- Auditory training.
- Tinnitus matching / masking.

SERVICES AVAILABLE

OTHER SERVICES

- Speech Therapy
- Consultancy on diagnosis and management of VERTIGO, DEAFNESS and TINNITUS.
- Neurotological Rehabilitation / Vestibular Physiotherapy

RECEPTION

SET-UP FOR VESTIBULOMETRY

EVOKED POTENTIAL MACHINES

NEUROTOLOGIST'S CONSULTATION ROOM

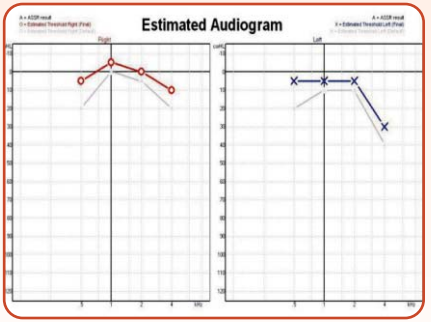
VESTIBULAR PHYSIOTHERAPY & VIRTUAL REALITY SET UP

AUDIOMETRY SET-UP

AUDITORY STEADY STATE RESPONSE **(ASSR)**

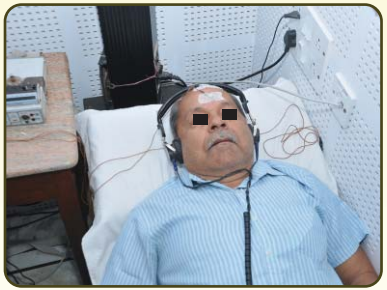
Brief description of some of the services rendered in our clinic :

ASSR- The Auditory Steady State Response (ASSR) is an objective test to evaluate the frequency-specific hearing threshold in a hearing impaired child / adult. Very much like the BERA test that is used to evaluate the hearing level of a patient automatically without having to depend on the patient's cooperation / ability to correctly and consciously respond and report whether a particular sound is being heard or not, the ASSR test too can ascertain a patient's hearing level in both ears separately without depending on the subjective responses obtained from the patient. The click-evoked 'BERA for threshold estimation' test that is commonly used to determine hearing threshold objectively just gives us a broad idea of the average hearing threshold and that too mainly for the hearing in the high frequency range. ASSR test overcomes this limitation of BERA and gives us the specific hearing threshold in the different frequencies and that too automatically. ASSR test reports are just like that of a pure tone audiometry test and the subject's hearing threshold level can be ascertained in each of the different frequencies like 500Hz/1000Hz/2000Hz/4000Hz. This is extremely helpful for fitting of digital hearing aids in infants and small children and other difficult to test patients. We have four very advanced ASSR systems in our clinic at BJ-252 Salt Lake, one of Labat from Italy (www.labat.it) one and one of Interacoustics Denmark (www.interacoustics.com).

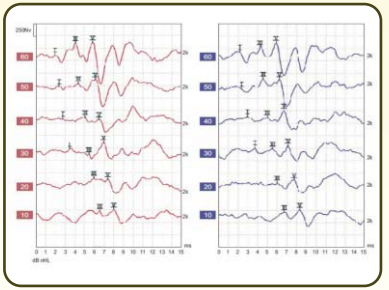


BERA TEST

BERA Test- (including CE-CHIRP BERA, tone evoked BERA and Bone conduction BERA test) -The Brain Stem Evoked Response Audiometry (BERA/ BSER) is an objective test that gives us the approximate average hearing threshold level of the subject. It is a very reliable but time consuming test to objectively evaluate the average hearing threshold. As it is an objective test, the hearing threshold can be ascertained without depending on the reliability of responses obtained from the patient. It is usually done using a click sound by which the subject's average hearing threshold across all frequencies can be automatically assessed without any subjective response of the patient. We have the full setup for CHIRP-BERA in our clinic. Advantages of CE-CHIRP BERA test over conventional BERA are e.g., less rejection / artifacts during recording, much higher sensitivity, earlier formation of wave peaks, better morphology of the BERA graph, and easy to identify wave peaks even in low intensities of stimulation at threshold. All these make CHIRP BERA a more accurate and more reliable test than the conventional BERA test especially for accurately evaluating the hearing threshold levels in infants and small children.

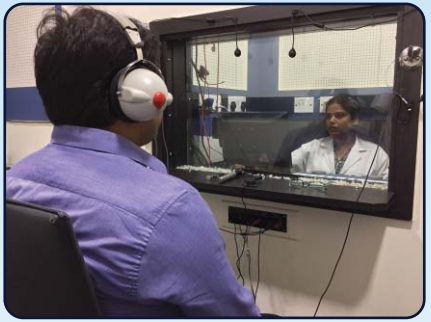


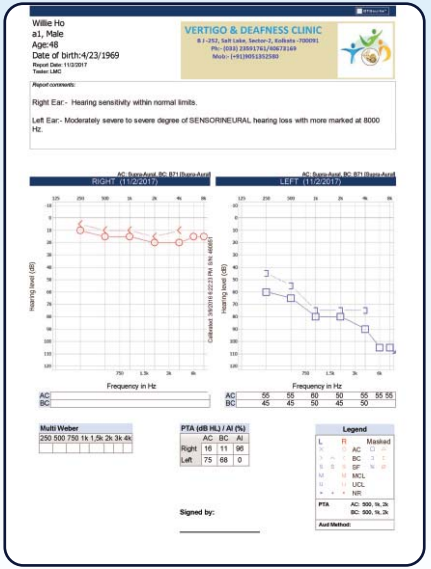
Details on the technology of this advanced form of BERA testing medically known as CHIRP BERA can be obtained from the Interacoustics website. We also have set-up for automated BERA (ABRIS) for very fast hearing screening in infants / neonates. Our clinic is equipped with both supra aural headphones as well as insert ear phones for the BERA and ASSR tests. Bone conduction BERA test for objective evaluation of BC hearing thresholds esp in babies with microtia and anotia and facilities for tone evoked BERA in which we can find out the hearing threshold for any individual frequency (say) 3000Hz by BERA is also possible in our clinic. Site of lesion testing for neurological diagnosis in patients of deafness / tinnitus by neuro-latency and neuro-rate study is also possible. We have six BERA machines in our clinic, two from RMS, India, one from Labat, Italy and two from Otometrics, Denmark and one from Interacoustics, Denmark.

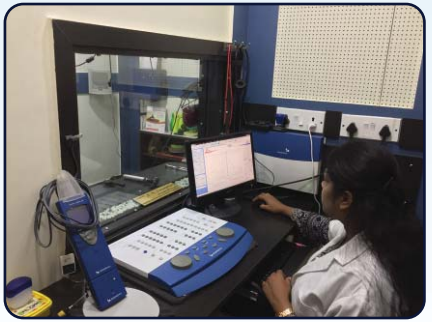


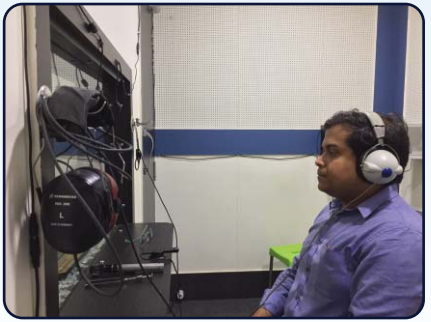
PURE TONE AUDIOMETRY

Pure Tone Audiometry (PTA) is the basic hearing test and the mother of all audiological tests. Though it is a subjective test (i.e. the test results are dependent upon the subject's responses and if the subject responds erroneously then a wrong report is obtained), yet it is the most informative test in the audiological test battery and is a very reliable test but if only done by a reliable person. It gives an idea of the hearing threshold in the different frequencies and also tells us whether the subject has any deafness. If there is deafness it tells us whether the deafness is due to a defect in the middle ear or in the inner ear or in the nerve of hearing. Localizing tests like TDT, SISI, ABLB, Speech audiometry test (SRT / SDS) and glycerol dehydration tests which help in diagnosing the nature and site of lesion are also routinely done here. PTA Test is a time consuming test and takes a minimum of 20-30 minutes for it to be done properly. In our clinic we have very sophisticated audiometers like Madsen Astera 2, Siemens Unitysystems, and Labat andrometh local audiometers for Alps. The madsen Astera 2 audiometer is equipped with facilities for complete evaluation of tinnitus patients including testing the maskability, maching, adaptability etc. and also has facilities for ten test as well as some tests for central deafness. We also have two very sophisticated high frequency audiometry systems.









IMPEDANCE AUDIOMETRY

Also called **Tympanometry**, this test tells us about the functioning of the middle ear and also that of the cochlea (i.e. inner ear). This is an objective test (i.e. the results are not dependent upon the subject's response) and it helps the clinician to identify the nature of pathology in middle ear disorders, like whether it is a case of Otosclerosis, Otitis Media with Effusion, adhesive otitis media etc. Evaluation of Eustachian tube function for ears with intact ear drums (William's test) as well as that with perforated ear drums (Toynbee's test) and also Acoustic Reflex Tests is possible in the clinic. We have four tympanometry set-ups in our clinic Otometrics, Interacoustics and Maico.

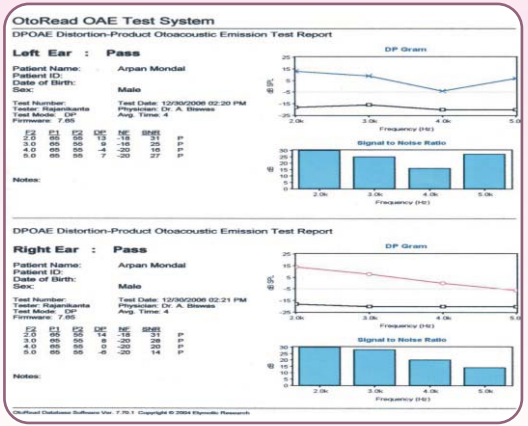
FREE FIELD AUDIOMETRY **(FFA)**

This is also called **Behavioral Observation Audiometry (BOA).** The auditory behaviors of children upto 3 yrs of mental age are observed / tested in a sound field system by presenting different type of sounds from amplifiers through speakers in different angles. A pairing of a visual stimulus (blinking of colorful lights) with the sound (Visual

reinforcement audiometry) helps to elicit the auditory behaviors of hyperactive and difficult to test children. We have the complete set-up for **free field audiometry, visual reinforcement audiometry and play audiometry** for subjective evaluation of the conscious perception of sound in infants and small children. Our clinic in equipped with the most sophiscated pehratek visual response video system for VRA.

OTOACOUSTIC EMISSION TEST **(OAE)**

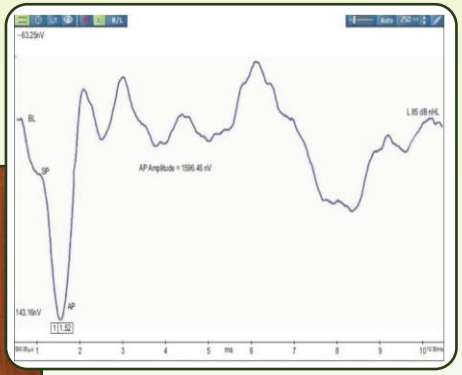
Otoacoustic Emission Test (TEOAE / DPOAE) is a very quick objective test to know whether the subject (i.e. the adult / child) has normal hearing or not. A complete test takes hardly 5-7 minutes time. Like the other audiological tests it is a painless and non – invasive test. The test is very commonly used for testing newborns / infants to check whether they have any hearing defect. If any deafness is detected in the OAE, then the degree of deafness has to be ascertained by other tests like- BERA / ASSR etc. as OAE cannot evaluate the hearing threshold and it can only tell us whether any deafness is at all present or if the hearing is normal. The OAE test is now mandatory in all newborns in most developed countries and is a must in all infants born out of at-risk-pregnancies in other countries. We have in our clinic arrangements for both TEOAE as well as DPOAE tests as well as for a detailed OAE in which the structural /functional integrity of the entire cochlea can be evaluated at thirty discrete points in the basilar membrane. Our clinic has OAE apparatus from Interacoustics (Denmark), from Labat (Italy) as well as Otometrics (Denmark).



ELECTROCOCHLEOGRAPHY (ECOCHG)

Electrocochleography (EcochG) evaluates the function of the cochlea which is a very important part of the hearing apparatus. The function of the cochlea is to convert sound energy into electrical energy and then send it to the brain for further processing. EcochG is an objective test that tells us whether the cochlea is able to carry out this function properly or not.

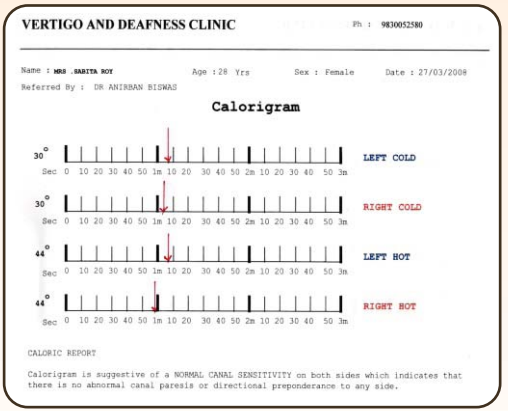
This test is also used to confirm some neurotological disorders like Meniere's disease that presents with vertigo, deafness and tinnitus. At Vertigo and Deafness Clinic we have 4 ECochG systems – one from Labat, Italy two from Otometrics (Denmark) and one from Interacoustics, Denmark.



CALORIC TEST

This age-old age test is a crude test of the balance system but is still used by some clinicians to get a very gross idea of the functioning of the vestibular labyrinths which are the organs of balance situated deep inside the ear. The vestibular labyrinths are a small part of the balance system and disorders of the vestibular labyrinth are one of the many causes of giddiness. Though one of the commonest tests advised for evaluation of vestibular / balance function, yet it is a very incomplete and un-physiological test of balance function.

In spite of this being an out dated test, yet we retain the arrangements for the traditional caloric tests as many clinicians specifically request for this test even now.



VERTIGO AND DEAFNESS CLINIC

Ph : 9830052580

Name : MRS . SABITA ROY Age : 28 Yrs Sex : Female Date : 27/03/2008

Referred By : DR ANIRBAN BISWAS

Calorigram

30° Sec 0 10 20 30 40 50 1m 10 20 30 40 50 2m 10 20 30 40 50 3m — LEFT COLD

30° Sec 0 10 20 30 40 50 1m 10 20 30 40 50 2m 10 20 30 40 50 3m — RIGHT COLD

44° Sec 0 10 20 30 40 50 1m 10 20 30 40 50 2m 10 20 30 40 50 3m — LEFT HOT

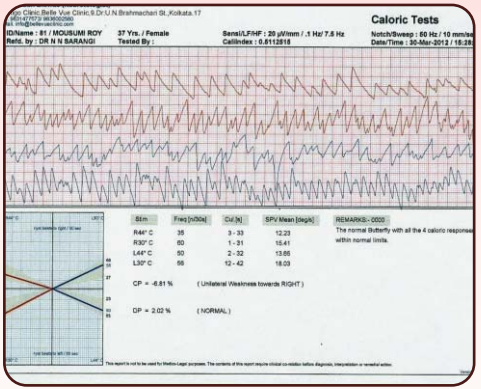
44° Sec 0 10 20 30 40 50 1m 10 20 30 40 50 2m 10 20 30 40 50 3m — RIGHT HOT

CALORIC REPORT

Calorigram is suggestive of a NORMAL CANAL SENSITIVITY on both sides which indicates that there is no abnormal canal paresis or directional preponderance to any side.

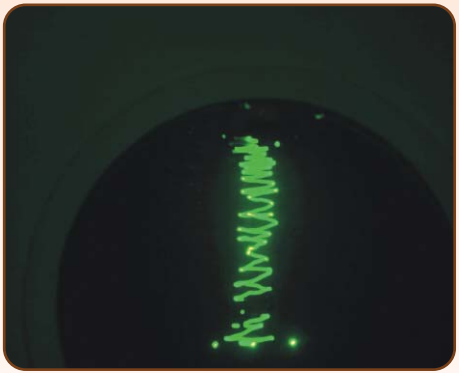
ELECTRONYSTAGMOGRAPHY (ENG)

ELECTRONYSTAGMOGRAPHY (ENG) is the basic test for evaluating the functioning of the balance system. It is the primary test of balance function and is mandatory in all patients suffering from vertigo and imbalance, i.e. giddiness and instability. It is quite a time consuming and a somewhat cumbersome test and though objective, yet it requires a lot of cooperation from the patient. ENG test evaluates the functional and structural integrity of a part of the vestibular labyrinths and that of the vestibulo-ocular reflex system. It evaluates parts of the central nervous system functioning that are essential for maintenance of balance but does not test many parts of the balance system like the anterior and posterior semicircular canals, the otolith organs etc. Though it partly evaluates the vestibulo-ocular reflex it does not test the other reflexes involved in maintenance of balance like vestibulo-spinal reflex, vestibulo-collic reflex etc



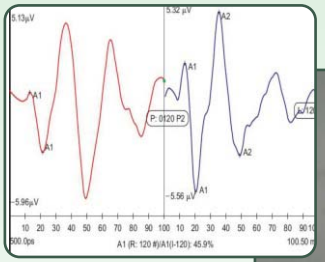
CRANIOCORPOGRAPHY (CCG)

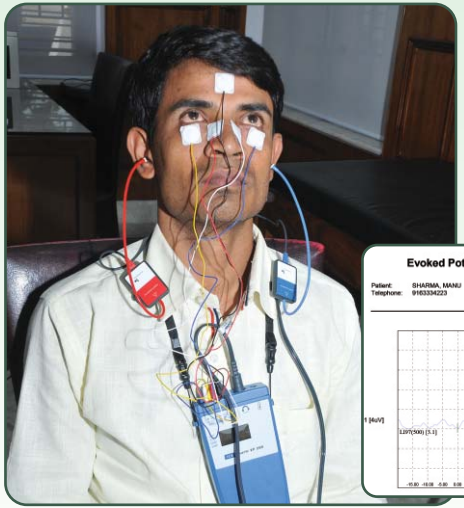
CCG- Craniocorpography is a test to evaluate a part of the balance system that cannot be evaluated by other tests. It is very simple, objective test which hardly takes 5-7 minutes time and informs the clinician about the net vestibular status of the patient and also whether the vestibular lesion has compensated or not. This is the most important information obtained from the CCG test and this information is of immense value to the clinician for formulating the treatment protocol in a balance disorder patient. CCG evaluates the functional and structural integrity of the vestibulo-spinal reflex system.

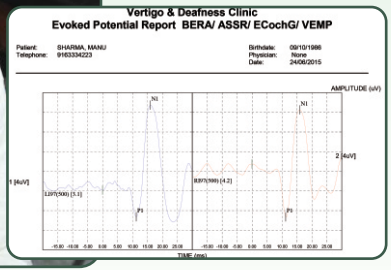


VESTIBULAR EVOKED MYOGENIC POTENTIAL TEST **(VEMP)**

VEMP- Vestibular Evoked Myogenic Potential test evaluates the portion of the balance system that is not evaluated by the ENG, VNG, VHIT and CCG tests. It is the only test which evaluates the functional and structural integrity of the otolith organs. The cervical VEMP or cVEMP evaluates the saccule and the inferior vestibular nerve and the ocular VEMP or oVEMP evaluates the utricle and the superior vestibular nerve. Both tests are necessary to evaluate the otolith system completely. The VEMP test is definitely not a stand-alone test but is an important part of vestibulometry. We have in our clinic arrangements for cervical and ocular VEMPs as well as for bone conducted VEMP. We have VEMP systems from Labat (Italy) and from Interacoustics (Denmark) and from Otometrics (Denmark) in our clinic at BJ-252 Salt Lake, Kolkata.







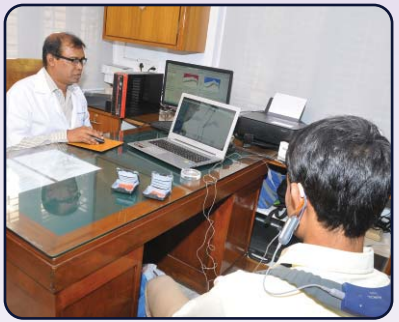
TRANSCRANIAL DOPPLER (TCD)

TCD- Transcranial Doppler is a test to evaluate the blood flow in the brain especially the posterior circulation and also the other parts of the brain. It tells us whether there is any obstruction or stenosis in the blood vessels that supply the different parts of the brain especially the cerebellum and brainstem. In case of any abnormal increase in the velocity of blood flow an obstruction / stenosis beyond it is suspected; a decrease of velocity of blood flow indicates an obstruction / stenosis before it.

TCD test is a very important test to evaluate whether the vertigo / imbalance is due to vertebrobasilar insufficiency. Blood flow in the vertebral and basilar arteries as well as the cerebral arteries and the carotids can be assessed by TCD.

HEARING AID FITTING AND PROGRAMMING

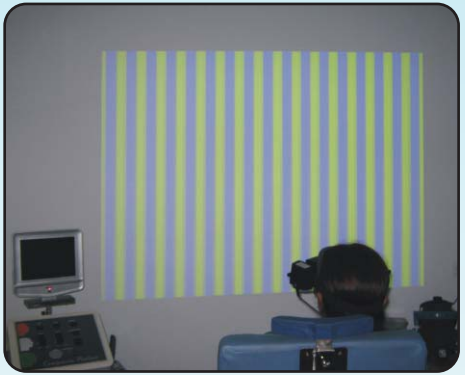
Hearing aid Fitting and Programming of high tech digital hearing aids is another facility that we have at the Vertigo & Deafness Clinic. Very sophisticated modern digital hearing aids of GN Resound, Siemens and other renowned manufacturers are dispensed through High Tech Hearing Instruments in our clinic. Being one of the best equipped hearing aid clinics in the country, we have unique set-up for evaluating the hearing of a patient in simulated sound fields and in a set up with multi-directional surround sound system. This ensures that hearing aid clients can not only have a feel of the hearing with the hearing aids in challenging acoustic environments but also experience hearing different types of music in real life situations. This is done through a customized software devised by us.



We also have the complete set up for real ear insertion gain (REIG) measurement by which the exact amount of sound delivered by the hearing aid in the ear can be measured and matched with the target output required in an individual for the degree of hearing loss. Our clinic is equipped with a very sophisticated Otometrics Auricle hearing aid analyzer for analysis of the electroacoustic parameters of hearing aids and for exact measurement of the acoustics of the external ear through real ear measurements for a very precise and perfect fit of the hearing aid Very few hearing aid dispensing clinics in the country have such an advanced set-up for perfect programming and dispensing of hearing aids.

VIDEO NYSTAGMOGRAPHY (VNG)

Videonystagmography is a test of the balance systems more or less similar to ENG described above, but it has a much higher resolution, is a much more advanced test and provides much more of clinically relevant diagnostic information in patients suffering from vertigo and imbalance. It is also is a much better test to evaluate the intricacies of the oculo-motor system. The oculo-motor system plays a very big role in gaze stabilization which is one of the primary functions of the balance system and a thorough evaluation of the oculo-motor system is vitally important in all patients presenting with vertigo / imbalance especially if it is due to a disorder in the central vestibular pathways. Vertigo and Deafness Clinic is equipped with the most sophisticated and advanced VNG system of Interacoustics (www.interacoustics.com) Neuro Equilibrium Diagnostic Systems (india) and Otometrics of Denmark (www.otometrics.com) as well as and Otometrics of Denmark (www.otometrics.com) that of Synapsys (www.synapsys.fr) from France. It also has a Ecleris VNG system. Interacoustics and Synapses are the industry leaders in VNG and the best VNG machines come from these companies. VNG has now replaced ENG in most advanced neurotological clinics throughout the world. Our clinic at BJ-252, Salt Lake , Kolkata-700091 is equipped with facilities for both water and air-caloric stimulation during VNG. Air Caloric stimulatior is done using the most advanced air caloric stimulator Aircal of Otometrics, Denmark. It is Used for patients whose tympanic membrone is not intact or for those patients who cannot tolerate water irrigation in the ears.

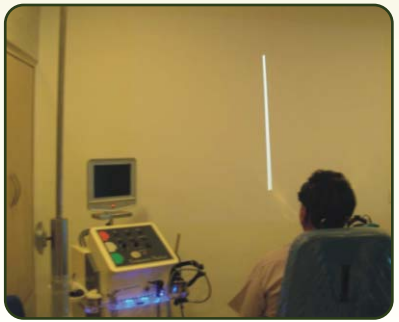


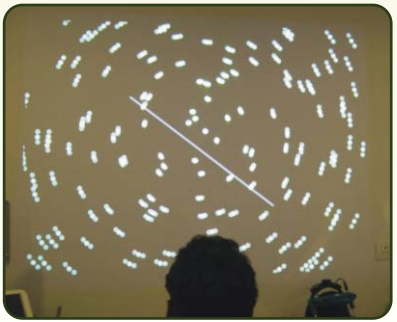
STABILOMETRY

Stabliometry is one of the most modern tests for evaluating the Balance System and acts as an adjuvant to ENG, VNG, CCG, VEMP etc. The stabilometry machine manufactured by Politecnica of Italy that we have in our clinic is a very costly computerized machine that objectively documents the instability in a standing patient. The stabilometry machine in our clinic also has a therapeutic module by which we can impart balance improving training to our patients of instability. Many patients come to our clinic complaining of generalized INSTABILITY, but many of these are actually of psychogenic origin and do not actually have any documentable instability. This test allows us to know if there is actually any definite instability or whether it is of psychogenic origin. The stabilometry test allows us to evaluate instability in different conditions like with eyes open, eyes closed (i.e., with and without visual input), when standing on a hard surface with good proproioceptive input and when standing on a soft surface with inadequate proprioceptive inputs and also when looking at a moving visual field (i.e., with optokinetic stimulation). Patients with defects in the optokinetic system or if there is a bilateral vestibulopathy often complain of instability in shopping malls and while seeing moving objects like a passing train in a railway station. All this can be documented and measured by Stabilometry. Stabilometry is static posturography.

SUBJECTIVE VISUAL VERTICAL TEST **(SVV)**

The subjective visual vertical (SVV) test evaluates otolithic function. Orientation of the vertical and horizontal is a function of the utricle and saccule (otolithic systems) in the vestibular labyrinth and is one of the primary functions of the vestibular system. The subjective visual vertical test evaluates this faculty of the vestibular system. The patient is asked to place a light bar projected on a wall in a dark room without any visual references using a joystick. If the patient has a peripheral vestibular lesion that has not yet been compensated, the patient cannot place the bar perfectly vertically or horizontally and tilts the bar towards the side of the weaker labyrinth. The test requires hardly 10-15 minutes time. This is hence a good, quick and very easy as well as an entertaining test for uncompensated unilateral peripheral vestibular lesions. A further improvement of the test called dynamic visual vertical test evaluates the patient's ability of placing the bar vertically or horizontally on the background of a moving visual field. The patient is asked to place the bar vertically on the background of an optokinetic stimulus. The optokinetic stimulus is provided by rotating the background clockwise and counterclockwise and the patient is asked to place the light bar vertically on this moving background. Patients having a unilateral vestibular failure are unable to place the bar perfectly vertically even if the peripheral vestibular lesion has compensated. Subjects with normal vestibular function can place the bar within 0 to 2.5°, whereas those with defects in the vestibular system cannot do so. This applies both for the static as well as the dynamic visual vertical tests. Tilting the bar more than 10° is considered to be evidence of very gross abnormality in the vestibular system. By performing the static and dynamic tests the clinician can ascertain whether the otolithic lesion has compensated or not. The most important contribution of SVV in assessment of balance disorder patients is that this test is the only test that can evaluate the perception of the visual vertical which is one of the most vital functions of the vestibular system.





VIDEO HEAD IMPULSE TEST (VHIT)

The **video head impulse test (VH IT)** is one of the newer tests to evaluate the structural and functional integrity of the vestibular system. It offers a much deeper insight into the functioning of the semicircular canals. The test measures the gain of the vestibular ocular reflex (VOR) separately in all the six semicircular canals. The anterior, posterior and lateral semicircular canals of the left side as well as these three canals of the right side are separately evaluated. Through the VHIT we can pinpoint whether the left anterior semicircular canal is at fault or the right posterior canal is defective. So long with all the other vestibular function tests, the sensitivity of only the lateral semicircular canals could be ascertained but with the video head impulse test all the six semicircular canals can be tested separately This is the uniqueness of this test. The test is based on the clinical Halmagy's head impulse test. It is a non-invasive and easy to perform, quick test that does not generate any unpleasant vertiginous or nauseating sensation for the patient unlike the VNG/ENG tests. The caloric tests done by ENG or VNG is not only a very time consuming and unpleasant test but have poor patient compliance(many patients discontinue the test after one or two caloric stimulations) and is dependent on the alertness of the patient. Moreover the stimulus used in a caloric stimulation of the vestibular system is an unphysiological stimulus and stimulates the vestibular system at an acceleration which is much below the acceleration at which the head moves during day to day activities. InVHIT the vestibular system is stimulated at a speed of thousands of degrees per second which is the speed at which the head moves in our day to day activities and is hence a more physiological and practical test.The VHIT can be performed very easily even in children and in ears with a perforation in the ear drum. We have in our clinic two VHIT systems – one from SYNAPSES of France(www.synapsys.fr) and one from OTOMERTICS of Denmark (www.icsheadimpulse.com).

VESTIBULAR PHYSIOTHERAPY

Vestibular physiotherapy is physical therapy that helps in the correction of vestibular disorders (that present as vertigo / imbalance/ unsteadiness) and in the improvement of body's balance mechanism. Physical therapy and not medicines /surgery is currently considered the mainstay of treatment in balance disorder patients especially for restoring the normal balance function after the balance system is deranged by disease. At Vertigo & Deafness Clinic once the defective sense organ in the balance system is identified by the modern vestibulometric tests which are all available there, we subject the patient to very specialised organ targeted vestibular physiotherapy (a new concept introduced by our neurotologist) using machines, most of which are devised by us. The physiotherapy unit at Vertigo and Deafness Clinic is a veryspecialised setup only for physiotherapy of balance and gait disorder patients. The physiotherapy is carried out by our trained therapists who are specially trained in the therapy of this special group of patients. Different types gadgets including advanced virtual reality systems for improving the stability, poise and steadiness of the balance compromised patient are used here. At Vertigo & Deafness Clinic experts in physical therapy for balance disorder patients and specialists in neuro-rehabilitation work in coordination with neurotologist(s) to provide a much better quality of life to most if not all balance disorder patients. This form of physical therapy is very scientific and logical and stimulates the residual function of any dysfunctional sense-organ in the vestibular system after modern vestibulometry pinpoints the offending organ..

INVESTIGATIONS AND THEIR ANATOMICAL TARGET AREA OF EVALUATION

Test	Evaluates
ENG	VOR + LSCC + Superior vestibular nerve
VNG	VOR + LSCC + Oculomotor system + Superior vestibular nerve
CCG	VSR
vHIT	VOR of 6 SCCs (anterior, lateral and posterior SSCs of both sides)
SVV	Otolithic system
Stabilometry	VSR + stability
VEMP	Saccule + inferior vestibular nerve by cVEMP and the utricle +sup vest nerve by oVEMP
PTA	Middle ear/cochlear/retrocochlear function
BERA	Retrocochlear structure / function from inner ear to midbrain + average hearing threshold
ECochG	Cochlear function
ASSR	Hearing threshold at 500, 1000, 2000, 4000Hz
Imp Audiometry	Middle ear structure/ function, Eustachian tube function
OAE	Outer hair cell + middle ear function

ENG: electronystagmography; **VNG:** videonystagmography; **CCG:** craniocorpography; **vHIT:** video head impulse test; **SVV:** subjective visual vertical; **VEMP:** vestibular evoked myogenic potential; **PTA:** pure tone audiometry; **BERA:** brainstem evoked response audiometry; **ECochG:** electrocochleography; **ASSR:** auditory steady state response; **OAE:** otoacoustic emission test; **VOR:** vestibulo-ocular reflex; **LSCC:** lateral semicircular canal; **VSR:** vestibulo spinal reflex; **SCCs:** semicircular canals.

VERTIGO & DEAFNESS CLINIC

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