TO MY PARENTS

ACRONYMS FOR AUDIOLOGISTS

*Register No. 8*40 3

An independent project submitted as part fulfilment for Frirst year M.Sc. (Speech and Hearing) to the University of Mysore.

MAY 1984

ALL INDIA INSTITUTE OF SPEECH AND HEARING,
MYSORE-570006.

CERTIFICATE

This is to certify that the Independent Project entitled: **" ACRONYMS FOR AUDIOLOGIST"** is the bonafide work, done in part fulfilment for First Year M.Sc., (Speech & Hearing) of the student with Register No.

DIRECTOR
All India Institute of Speech and Hearing
Mysore-570006

CERTIFICATE

This is to certify that the Independent Project entitled: **"ACRONYMS FOR AUDIOLOGISTS"** has been prepared under my supervision and guidance.

GUIDE

DECLARATION

This Independent Project entitled: **"ACRONYMS FOR AUDIOLOGISTS"** is the result of my own study undertaken under the guidance of Dr.(Miss) S. Nikam, Professor and Head, Department of Audiology, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier at any University for any other Diploma or Degree.

MYSORE

DATED :April '84 REGISTER NO.

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CONTENTS

CHAPTER - I

INTRODUCTION

INTRODUCTION

Acronym is the form of abbreviation that is commonly employed. An Acronym is a word composed of the initial letters of a name, title, or saying and may be pronounced as a single word, or it may be pronounced letter by letter.

We see the beginnings of this alphabet soap in the SPQR of Caesar's Day (Senatus Populusque Romances - the Senate and People of Rome) then in World War-1 - ANZAC was used for Australia and Newzealand Army Corps eg: But the heydey of the acronymy, still with us, began withthe World War-II's fractured English. JEEP for the G.P. of general purpose vehicle is perhaps the simplest and common of all. An example of an acronym in today's era of supertechnology would be LASER - light amplification by stimulated Emission of Radiation.

In short, an acrynym is one of the short cuts that is used in speech. Acronyms are to be found in any specialized discipline to represent lengthy or repetitive technical terms, which a student of that discipline is expected to know.

In the field of audiology, too, acronyms are employed frequently. The terms SRT, PTA, SPL, HOH are some of the better known examples. In this compilation,we shall consider in detail acronyms which are to found in audiology.

Audiology is a vast field which can be classified into various sections such as clinical Audiology, Industrial Audiology. An Auditory Physiology, Psychophysics in Audition, Audiological Rehabilitation, Pediatric Audiology and Geniatric Audiology, Clinical Audiblogy itself may be discussed in sub-sections such as screening audiometry, pure tone audiometry masking, speech audiometry, Impedance audiometry, special tests, etc.

Each section has its own array of technical terms for which the use of Acronyms has become the rule.

NEED FOR THE STUDY

There is an exceedingly large number of acronyms in use in the various sections and subsections into which Audiology is classified. It is difficult to know what each one of them signifies. It is therefore felt that a collection of such acronyms together with their definition and description would prove to be useful. Such an attempt has been made in the following pages.

It is expected that this compilation would be useful, particularly to students who are new to the course and being exposed to the acronyms, might find it difficult to appreciate their significance. The ready availability of the explanation

for there acronyms will thus serve useful purpose for reference, and for replenishment of their residual knowledge.

For those engaged in the allied disciplines also, who may be having a special interest in the field of audiology such as special teachers, training exceptional or handicapped children, ENT doctors, neurologists, etc. This work may prove to be of some utility, as acronyms may act as hurdles to comprehension, when referring to various books on audiology.

Even for those who are working in this field of audiology itself, and who are familiar with the technical jargon, this work might be of interest, to be used whenever required for reference.

An indepth study of the implication of the different terms is beyond the scope of this work. What has been attempted is to give a definition and a short note to explain the significance of the terms. References for further study have been given whenever necessary.

HOW TO REFER THE PRESENT WORK

The acronyms in the field of audiology have been dealt under different sections such as - General, Electrophysiological Indices and Tests, Hearing Aids; Management of the Aurally Handicapped; Noise; Organizations and Special Tests in Audiology.

If the reader wishes to acquire more information regarding a particular item, than what is imparted in this work, references have given wherever deemed necessary.

Note: The number given below some of the acronyms correspond to the reference of that particular acronym which is listed in Bibliography.

An index of all the item, in this work has also been given.

CHAPTER - II

ACRONYNMS FROM GENERAL TOPICS IN AUDIOLOGY

ACRONYMS FROM GENERAL TOPICS IN AUDIOLOGY

2.1 AC - AIR CONDUCTION

This refers to the mode of listening where the auditory/ acoustic stimuli are transmitted to the innear ear through the external and middle ear.

2.1 AICA SYNDROME - ANTERIOR INFERIOR CEREBELLAR ARTERY SYNDROME

This syndrome resulting from defects in the AICA, affects certain auditory and vestibular functions. It is known to give rise to the following signs and symptoms: double vision, stumbling gait, facial paralysis, ipsilateral facial anasthesia, cerebellar signs, contralateral anasthesia of the body and limbs.

2.3 AL - A-WEIGHTED SOUND LEVEL

It is the sound pressure level in decibels as measured on a sound level meter using the A-weighting network.

The level so read is also designated as dB(A) or dBA.

(52-Pg.295)

2.4 APR - AUROPALPABRAL REFLEX

An eyeblink in response to sound is called an auropal-pabral reflex (APR) or cochleopalpalsal reflex and is commonly

observed in infants, waking or sleeping.

With both infants and adults, a relatively intense signal is required for elicitation of the APR. Northern and Downs (1974) indicated that APRs can be reliably elicited in a quiet room, with broad band signals (noise makers) at 50-70 dB SPL, for speech signals at about 55-75 dB SPL and for warble tones at about 55-90 dB above the normal human threshold of audibility.

APR is considered a useful response as it is common and quite resistant to extinction.

(32-Pg 176-177)

2.5 AR CENTER - AUDITORY RECEPTION CENTRE

This centre in the cerebrum is responsive to acoustic/ auditory stimuli. It is located in the posterior portion of the superior temporal gyrus and is also known as Heschl's gyrus. (41-Pg.234)

2.6 BC - BONE CONDUCTION

When a vibrating body comes in contact with the skull, it sets the cranial bones into vibration either in whole or in parts depending upon the stimulating frequency. The inner ear fluids may be displaced through one or a combination of the three modes normally recognized.

From this point onwards the processing is similar to that of air conducted signals.

Clinically it is useful to measure hearing through this mode, as it yields information regarding the nature of the hearing loss.

2.7 CLL - COMFORTABLE LISTENING LEVEL

The term CLL is used in preference to the widely used MCL because listening level can be shown to be comfortable but is not necessarily a unique value.

(55-Pg.141)

2.8 CF - CHARACTERISTIC FREQUENCY

This refers to the frequency to which a given cochlear fibre is responsive.

(21-Pg.l0, 14)

2.9 CMR - COMMON MODE REJECTION

It means that signals that are unique to one input channel or electrode will be amplified while signals that are common to both inputs are rejected. 'Common' implies that signal on both inputs are in phone and of the same amplitude.

(74-Pg.21)

2.10 COCB - CROSSED OLIVOCOCHLEAR BUNDLE

The efferent nerve fibres innervating the inner hair and outer hair cells entering the cochlea has got crossed and uncrossed componants. The crossed components are the fibres derived from the contralateral superior olivary regions of the brain stem and are called the crossed olivary-cochlear bundle.

2.11 CPS - CYCLES PER SECOND

This is the unit of frequency. It refers to the number of vibrations a particle executes per second.

This term is now replaced by the unit Hertz, abbreviated as Hz.

2.121 CRO - CATHODE RAY OSCILLOSCOPE

The CRO gives pictures of the electrical activity of the cochlea responding to interms rapidly increasing sound and they show that the response rises. Then is reduced as the middle ear muscles undergo reflex contraction.

The CRO pictures of this reflex to sound has been shown by Galambos (1959). When recorded by means of CRO, the electrical response of the inner ear resulting pass stimulation by rapidly rising sound gives a picture, at appropriate sweep

rates, that appears exactly like that pictured as the result of middle ear muscle contraction.

(58-Pg.102-108)

2.13- dB - DECIBEL

It is the unit of intensity. It is usually a relative measure. It is the ratio of the intensity of a given signal in terms of power (dB IL) or pressure (dBSPL), to the reference intensity on the corresponding scale.

$dB\ IL = 10 \log \frac{I_1}{I_0}$ I_1 - Intensity being measure

I_0 - Reference intensity

$dBSPL = 20 \log \frac{P_1}{P_0}$ P_1 - Intensity being measured

P_0 - Reference pressure.

The use of decibel scale facilitates the representation of the entire range of hearing within a smaller range than would have been possible if the direct measures were used.

2.14 dB(A)

This is one of the four weighting networks available on measuring instruments which are used to assess the magnitude of acoustic signals such as noise. This scale is used to when the interest is in knowing the response of the human ear to the stimuli under concern.

The frequency response of the A-weighting network is similar to the 40-phon curve. However, it does not mean that this weighting network is to be used only while measuring noises of this level.

2.15 dB(B)

It is the unit of intensity measured on the 'B' scale. The 'B' weighted network has a frequency response similar to the 70-phone curve. The 'B' weighting network is not commonly used.

2.16 dB(C)

It is the unit of intensity measured on the 'C scale. The 'C' weighted network has a flat frequency response. This network is used to measure ambient noise levels in sound treated room, in calculating the sound level correction (SLC) etc.

2.17 - dB(D)

It is the unit of intensity measured on the'D' scale. The 'D' weighted network has a frequency response similar to the 40 PN dB curve. This network is employed while measuring aircraft noise.

2.18 - dBHL - (dB - HEARING LEVEL)

This is the unit of intensity used in clinical audiology. The minimum level at which normal hearing young adults hear a tone of a given frequency is the 0 dB HL at that frequency.

This 0 dB HL at a given frequency is also known as the audiometric zero. The value of 0 dB HL in terms of dB SPL differs with variations in frequency and with transducers.

The dial reading of 0 dB HL on an audiometer corresponds to a standard level in dB SPL, for a specific frequency and for a given transducer. This standard value is determined by taking into consideration the minimum level required for perception by normal hearing young adults.

2.19 dB HTL - DECIBEL HEARING THRESHOLD LEVEL

When dB HTL is used, it implies that the decibel value given is a measured threshold from a patient. That is, the value is an actual level obtained from a given patient.

2.20- dB SL

This refers to the level above a given individual's threshold.

eg: If an individual's threshold at a given frequency is 10 dB HL then 0 dB SL is equal to 10 dB HL. The intensity dial on the audiometer would read 20 dB HL, when set to 10 dB SL for this individual

2.21 dB SPL-dB SOUND PRESSURE LEVEL

SPL refers to a stating of reference point used to specify stimulus levels in pure tone audiometry.

It is a physical measure whose reference point is 20 N/m^2 of 0.0002 $dyne/cm^2$ i.e, when a sound is 25 dB SPL it is 25 dB above 20 N/m^2.

2.22 DL - DIFFERENCE LIMEN

It is the minimum difference in a signal in terms of frequency, intensity or time that can be detected by an individual. It is also known as the j.n.d. The DL value is the reciprocal of the j.n.d.

The ratio of DL to the intensity or frequency is the relative DL $\frac{\Delta I}{I}$ $\frac{\Delta f}{f}$ $\frac{\Delta t}{t}$ while the actual value of DL is the absolute DL.

2.23 DL - DISCRIMINATION LOSS

It is defined as 100 minus the maximum discrimination score.

(29-Pg.l07)

2.24 DLI - DIFFERENCE LIMEN FOR INTENSITY

It is the minimum difference in intensity that an Individual can detect. DLI depends on intensity and frequency. The value of

DLI is lesser at high intensities. Likewise it is lower at the mid-frequencies than at high and low frequencies.

DLI is often used to detect the presence of recruitment.

(54-Pg.l79)

2.25 DLF - DIFFERENCE LIMEN FOR FREQUENCY

It is the smallest difference in frequency which an individual can detect. DLF is smaller at higher intensities. The value of DLF is high at low frequencies.

2.26 - DR - DEFENSIVE RESPONSE

According to sokolov, this is one of the two reflexive types of responses of the autonomic nervous systems and the postulates that it is this DR which prepares the organism for flight or fight. The DR becomes stronger as the strength of noise increased. This occurs to meaning less sounds or noises but as the meaning becomes established through repetition of the noises, the response becomes inhibited or habituated.

(48-Pg.532)

2.27 EML - EFFECTIVE MASKING LEVEL

It is determined using the following method: Pure tone of a given frequency is presented at 30 dB HL. To the same ear.

noise with the same centre frequency is presented. To begin with noise is presented at a low level say 5 dB, and then gradually increased till the subject reports that he no longer hears the tone. The level of noise at this instant is taken as 30 dB EL. The noise level 30 dB below this is marked as 0 dB EL. For eg: If a 45 dB level noise just masks the 30 dB tone, then, 15 dB is marked as 0 dB EL and 20 dB as 5 dB EL so on.

(87-Pg.137-138)

2.28 FET - FIELD EFFECT TRANSISTBR

It is an intermediate device which accomplishes the coupling of the elethet microphone, a device which has essentially no current flow capabilities, to a conventional transister whose output is controlled by an input current.

In there devices, there is no current flow, actually at the input portion of the transister.

In FET devices, the control of output current is by a voltage or an 'electric field' input rather than by current flow. Thus, the output of the FET is controlled by the variations in the electric field of the electric microphone. In turn, the output of the FET is delivered to a conventional transister for control of the transistor's output current. The FET is built into the housing containing the electric microphone itself.

(73-Pg.28)

2.29 FTC - FREQUENCY THRESHOLD (TUNING) CURVE

Every cochlear fibre is tuned to a restricted range of frequencies. As the signal level is increased, this range increases resulting in a U-shaped frequency-intensity response area. The boundary of this area is called, the frequency threshold (tuning) curve.

(21-Pg.10)

2.30 IALD - IRREVERSIBLE AUDITORY LEARNING DISASTER

Children prone to frequent recurrence of otitis media are observed to develop certain learning disabilities. This is known as the IALD.

There are two reasons why the otitis prone child turns into the IALD. The first reason is that the unvoiced consonants have very little energy and may fall below the threshold of the normal ear. The child who does not hear these sounds clearly is not able to learn all the strategies necessary to understand them and thus becomes an incomplete auditory receptor and is unable to assimilate sounds in their proper relationship all the time.

The second reason for IALD is that the critical periods for laying the basis of language skills occurs in the first two years of life and this is the time when the prevalence of otitis media reaches its peak.

(19-Pg.99-101)

2.31 _ IM - INTERMODULATION DISTORTION

Flotorp (1971) proposed a method of study IM distortion and reported that IM distortion at 500, 760, lOOOHz influenced the performance of normal listeners in the perception of phonetically balanced lists. The concluded that concessive IM reduces intelligibility.

(90-Pg.ll3)

2.32 KEMAR - KNOWLES ELECTRONICS MANNEQUIN FOR ACOUSTIC RESEARCH

This mannequin was constructed in such a way that it resembles an average human torso and affects the acoustical signal in the way the human ear, head and body would. It is used for the electro-acoustic evaluation of hearing aids.

(23-Pg.81)

2.33 LDL - LOUDNESS DISCOMFORT LEVEL

It is the intensity level at which an individual reports that the auditory signal brings causes about a discomfort.

2.34 LOT - LENGTHENED OFF-TIME

This is a test used to identify non-organic hearing loss. Conventionally, the pulsed signal in Bekesy audiometry employs an on-time of 200 msec, and an off time of 200 msec. In LOT, the off time is increased to 800 msec. This is observed to

to enhance the difference between the tracings for the continuous and interrupted signals, the tracing for continuous signal being below that for the interrupted signal in case of non-organic hearing loss.

(24-Pg.78)

2.35 LPC - LINEAR PREDICTIVE CODING

LPC provides a succession of resonance patterns representing the speech spectrum at successive time points.

(75-Pg.82)

2.36 MAF - MINIMUM AUDIBLE FIELD

Minimum Audible Field is one of the methods of measurement used for the determination of the threshold of hearing of sound waves in air.

The intensity of a sound wave in free space, which will just elicit a sensation of hearing, in an observer who enters the space is known as the MAF.

To determine the MAF, the intensity of the sound is first measured without the observer in the field and then the observer enters the field and listens to the sound.

2.37 MAP - MINIMUM AUDIBLE PRESSURE

Measuring the MAP at the eardrum is one of the methods used for the determination of the threshold of hearing of sound waves in air.

A known pressure is established at some measurable intensity well above threshold and then the amount by which the pressure must be reduced in order to reach the threshold value is determined. This is MAP.

The thresholds measured by MAP are 6 dB better than those measured by MAF (Refer MAF).

2.38 - MBLD - MINIMAL BRAIN DAMAGE LEARNING DISABILITY

Children with minimal brain damage learning disability may be found to have normal intelligence, no visual deficits nor physical handicaps which could account for their reading difficulties. When the auditory pitch perception test was administered, the MBLD subjects perceived the temporal order of the tone burst patterns accurately, but the processing between input recognition and the output of sequencing the response was faulty. Although the stimulus was nonverbal it is probable that the manual response was linguistically mediated. But the auditory stimulus could not be translated into the motor response which suggests a dysfunction in sensory motor integration.

The MBLD can be diagnosed in children by administering various psychological and reading tests such as the Wechsler Intelligence Scale for children (raised), wide range achievement test, Stanford-Binet intelligence test, Bender-Gertlat visual-motor test, Wepman Auditory Discrimination test, Illinois test of psycholinguistic diliness, Peabody individual achievement test.

(76-Pg.245-246)

2.39 - MCL - MOST COMFORTABLE LEVEL

This corresponds to the level where an individual reports that the signal being presented is'most comfortable' neither 'too soft' nor 'too loud'. This is around 45-55 dB above threshold among normal hearing subjects.

2.40. MESA - MULTIPOINT ELECTROTACTICE SPEECH AID

It is an electrotactile instrument, as the name suggests, which is used for the training of deaf children.

(92-Pg.246-157)

2.41 MHA - MALLEUS HANDLE ANGLE

It is the angle between the long axis of the malleus handle and Reid's basal line MHA in normal ears varied from 30^{o} to 75^{o}. MEP variation between 400 and +400 mm H_2O produced visible movement of malleus handle over the range -50 to +50 mm H_2O Between -400 and -50 mm H_2O no obvious change in MHA. Also between +50 and +400 mm H_2o there is no obvious change. MHA assessment correlates poorly with MEP -400 to + 400 mm H_2O.

2.42 MLD - MASKING LEVEL DIFFERENCE

MLD is the difference between binaural masked threshold in hamophasic condition and binaural masked threshold in anti-phasic condition.

2.43 MPL - MEDIAN PLANE LOCALIZATION

Two equally intense sounds of similar spectra presented simultaneously to the two ears are heard as a single sound at or near the middle of the head, in earphone listening or to the front, in sound field listening. Since localization of there sounds is done in the median plane, it is termed Median Plane Localization.

MPL can be used to measure loudness adaptation.

(89-Pg.l4)

2.44 MTF - MODULATION TRANSFER FUNCTION OR m(F)

The factor 'm' by which the original modulation depth decreases, as a function of F, the modulation frequency, is termed the modulation transfer function.

2.45 MRL - MINIMAL RESPONSE LEVEL

The term MRL has been substituted for the term threshold, by Matkin and Thomas (1974) in testing children 6-35 months of age in a procedure called visual reinforcement audiometry (See VRA).

They stated that this level improved with age through 23 months, then reached a plateu.

(25-Pg.220)

2.46 NAR - NON-AUDITORY RECEPTION PORTION

The non-auditory portion refers to the entire cerebrum excluding the auditory reception centers (Refer AR center).

(41-Pg.234)

2.47- NBN - NARROW BAND NOISE

It is obtained by selectively filtering white noise. It has a centre frequency and the spread of frequencies on either side of the centre frequency is equal. It is found to be the most efficient signal for masking pure tones. The bandwidth for narrow band noise is specified in the form of standards.

One should consider both the bandwidth and the rejection rate.

2.48 OCB - OLIVO COCHLEAR BUNDLE

The efferent nerve fibres innnervating the inner hair cells and outer hair cells enter the cochlea via the OCB, which has both crossed and uncrossed components i.e. fibres that derive from boththe contralateral and ipsilateral superior olivary regions of the brain stem.

2.49 OR - ORIENTING RESPONSE

According to Sokolov, this is one of the 2 reflexive type of responses, wherein the autonomic nervous system responds to any sound stimulus in order to alert and make the organism - ready for the purpose of receiving and responding appropriately to the stimulus situation. The OR, it is postulated would tend to get larger as the noise stimuli becomes weaker because the organism would require more effort to react to weaker than to more readily observed stimuli.

As the meaning becomes established through repitition of noises. The response becomes inhibited or habituated.

(48-Pg.532)

2.50 PICA SYNDROME - POSTERIOR INFERIOR CEREBELLAR ARTERY SYNDROME

This associated with a lesion in the PICA. The patient complains of a sudden onset of vertigo, nausea, vomiting, incoordination, nystagmus, ipsilateral facial anasthesia. cerebellar signs etc. No hearing loss may observed/reported.

(97-Pg.29)

2.51- PST - PERISTIMULUS HISTOGRAM

A peristimulus (PST) histogram is generated by presenting the same acoustic signal and repeatedly sampling the activity during the signal interval.

This can be used to characterize the average fixing pattern of a unit.

(86-Pg.l82)

2.52 PTC - PSYCHOPHYSICAL TUNING CURVES

The procedure for obtaining psychophysical tuning curve involves a simultaneous or forward masking paradigm using two tones. The listener's task is to detect a low intensity probe of fixed frequency.

Then a masking tone is introduced and adjusted in level until it just masks the probe. When the masking procedure is carried out across a range of frequencies, a masked threshold contour is obtained which is similar in shape to a neural tuning curve, that is, there is a low threshold narrowly tuned trip and a high threshold, broadly tuned tail.

(86-Pg.l82)

2.53 REM - RAPID EYE MOVEMENT

This refers to a stage of sleep, characterized by rapid eye movements and dreaming. EEG recorded during this stage shows low voltage, irregular beta waves.

2.54 RETSPL - REFERENCE EQUVALENT THRESHOLD SOUND PRESSURE LEVEL

Errors in objective calibration of audiometers of shifts in reference thresholds due to progress in standardization may involve systematic discrepancies between the mean value of hearing level as determined by different investigators. The International organization for standardization (ISO) attempted' to unify these threshold levels and their recommendation R-389 was published in 1964. This gives values of reference equivalent threshold sound pressure level, artificial ear. As there reference earphones were not used as practical audiometers and to calibrate other types it would still be necessary to make a subjective comparison with a reference earphone. A number of such transfers have been carried out in 1969, which gives values of RETSPL for the TDH-39 earphone and for various PDR types. Different values of RETSPL are given for different models of PDR earphone when there are fitted with the same earcap (Mx-41/AR).

(17-Pg.98-101)

2.55 RT - REVERBERATION TIME

It is the time taken for the intensity of a sound to decrease by 60 dB from its initial value, after the cessation of the stimulus with increase in Rt. intelligibility of speech decreases.

2.56 SUM - SIMPLE HARMONIC MOTION

It is that motion along a line for which the acceleration of a body towards some fixed point on that line varies in proportion to the displacement of the body away from that point.

2.57 SLM - SOUND LEVEL METER

It is an objective noise meter designed to measure a frequency weighted value of the sound pressure level in accordance withthe International Electrotechnical Commission and British Standards. It consists of the following parts:

1. Microphone
2. Input Amplifier (Adjustable)
3. Weighting networks A, B, C
4. Output Amplifier (Adjustable)
5. Indicating Meter
6. Power supply

2.58 SRA -10 - SPEECH RECOGNITION AID-10

This vibrotactile aid was first described by Scott in 1979 and is used by profoundly deaf children and adults. The SRA-10 was seen to have improved speech reading in one type of connected discourse - namely narratives. The guiding principle behind the development of the aid was to provide the user with qualities of sensation perceived by the ear. In other words, the aim was to make speech feel like it sounds.

(83-Pg.64)

2.59 **TD - THRESHOLD OF DISCOMFORT**

TD is used as a synonym for UCL (Refer UCL)

2.60 TIA - TRANSIENT ISCHEMIC ATTACKS

This refers to the frequent focal neurologic dysfunctions arising from vascular pathologies in the cerebral blood vessels. The attack may last for less than a few hours.

(97-Pg.28)

2.61 TTI - TWO TONE INHIBITION

TTI is one of the prominent linear responses that can be recorded in the auditory nerve. Two tone inhibition can be readily demonstrated by stimulating a normal unit with a continuous tone at characteristic frequency (fl) and then presenting a tone burst (f2) which is slightly above or below the characteristic frequency. The discharge rate exceeds the spontaneous rate when either fl or f2 is presented alone.

However, whenthe two tones (fl and f2) are presented simultaneously, the firing rate is less than that for either tone alone and temporarily less than spontaneous rate. Latency for TTI is very short. Thus TTI most likely does not involve the efferent system.

(86-Pg.l85)

2.62 UCL - UNCOMFORTABLE LEVEL

It may also be called the threshold of discomfort (TD) or the tolerance level. It is the hearing level at which the sound stimulus presented to the subject becomes uncomfortably loud.

The normal ear should be able to tolerate sound stimulus at hearing levels of 90-100 dB without experiencing discomfort i.e. 122 dB SPL. Average UCL is around 120 dB SPL.

The purpose of this measure is to find the upper limit of the patient's range of hearing so that the audiological tests can be administered within that range.

Also, the UCL represents the maximum amplification that the patient can accept in a training situation or in a hearing aid.

2.63 VOT - VARIABLE ON TIME

In Bekesy audiometry the on-time may be varied keeping the off-time constant. Normal hearing subjects, patients with conductive hearing loss and non-end organ lesions require greater intensity to reach the threshold when the on-time is reduced. Patients with cochlear lesion, on the other hand, do not require an increase in intensity with reduction in VOT, to reach the threshold.

(24-Pg.83)

2.64 VU METER - VOLUME UNITS METER

It is also called Volume Indication (VI) Meters. They enable the enamines to monitor the inputs to the amplifiers. The output of the amplifiers must be calibrated in terms of a specific level of input signal. It is customary to monitor all inputs to an average peak reading of zero dB on the VU meter. The input level is controlled by a potentiometer (volume control). The examiner compensates for differences in levels of recording or for differences in vocal intensity in live noice testing by tunning the input volume control until the needle on the VU meter is peaking on the average at 0 dB.

2.65 WN - WHITE NOISE

Also called WBN (Wide Band Noise) or BBN (Broad Band Noise)

This is a complex acoustic signal which contains various frequencies upto 6000 Hz at approximately equal intensity. It is often used for masking speech.

CHAPTER - III

ELECTROPHYSIOLOGICAL INDICES & TESTS

ELECTROPHYSIOLOGICAL INDICES AND TESTS

3.1 - ABR - AUDITORY BRAINSTEM RESPONSE

This test is carried out by placing electrodes on the scalp and mastoid of the individual being tested. The electrical activity in the auditory pathway in thus recorded. The latency of response, amplitude and wave-form are the important points considered in its inter-pretation.

(82.Pg.85)

3.2 - AER - AUDITORY ELECTROENCEPHALIC RESPONSE

The evoked responses observed in Electroencephalic Response Audiometry are called AER.

AER can be divided arbitrarily into four classes of responses on the basis of latency, different properties and presumably different anatomical sources, i.e. Early response. Middle response, Late response and Very late response.

AER is used for threshold determination and there may be considerable individual variability among AER waveforms due to subject state (awake or asleep) age, signal para-meters and auditory pathology.

(90.Pg.311-327)

3.3 - AER - AVERAGE EVOKED RESPONSE

The rationale behind AER is that, if a given stimulus produces a consistent change (positive or negative) in the cortical potentials at a fined time delay after stimulus onset, and, this information is stored or preserved by a computer, the algebraic some of these changes or responses should result in increased amplitude as the number of responses in increased.

(90-Pg.31l)

3.4 - AP - ACTION POTENTIAL

Action potentials are neural components resulting from synchronous firing of a large number of auditory nerve fibres when electrodes are located in the vicinity of the cochlear

AP is usually seen at the onset of tone bursts or in response to clicks for it requires well localized events in time to synchronize adequate populations of neurons. AP is usually manifested as a series of predominantly negative brief potential peaks. Its magnitude is related to the number of fibres discharging simultaneously. This is because

uniform fibres diameter results in uniform conduction velocity and thus "from any given region all fixings arrive at the recording electrode at the same time and thus summate.

(16-Pg.27)

3.5 - BRA - BRAINSTEM RESPONSE AUDIOMETRY

The process whereby the brainstem responses are evoked is called Brain Stem Response Audiometry.

In BRA the target and comparison electrodes are usually placed at the vertex and earlobe, respectively, with a ground at the forehead.

Auditory stimuli used are clicks or rapid rise tone bursts and are repeated between 2 1/2 to 10 times per sec.

(9-Pg.l28)

3.6 - BSER - BRAIN STEM EVOKED RESPONSE

It may be an electroencephalography related evoked potential synonymous withthe moment of hearing.

The process whereby the brain stem responses are evoked is called Brain Stem Response Audiometry (See BRA) The BSER is recorded and the evoked potential is seen to

have been peaks which are of diagnostic importance and the presumed source of each of there responses is given as below:

1. The 1st peak is the compound VIIIth nerve action potential presumably arising from synchronous discharge of single units in the VIIIth nerve.

2. The 2nd peak is presumed to come from cochlear nucleus

3. The 3rd from the contralateral olivary bodies.

4. The 4th from the ventral nucleus of the lateral lemniscus and preolivary nucleus.

5. The 5th (and most consistently used for studies of auditory sensitivity) is presumed to come from the inferior colloculus.

6. The subsequent waves probably from the medial BSER is not affected by sedation or sleep.

BSER may be useful not just audiometrically, but also to aid in the diagnosis of various other problems which stimulate or complicate deafness. The BSER techniques is very useful in the pediatric assessment of acoustic function.

(0 9.pg.128-134)

3.17 - CAP - COMPOUND ACTION POTENTIAL

The compound action potential of auditory system

differs from the single unit action potential and represents the some of many single unit discharges, all of which occured almost synchronously following the arrival of an acoustic stimulus at the ear.

This compound action potential is only recordable in response to a click or tone burst with a rapid rise time; continuous tones, or tones with slow rise times will not elicit a response even though the tones are audible to the listener as the synchronous discharge of many fibres at once is not visible.

(9.Pg.l22)

3.8 - CERA - CARDIAC EVOKED RESPONSE AUDIOMETRY

CERA is a procedure whereby changes in the heart rate are measured following auditory stimulation.

This procedure may be used in difficult to test children where routine audiometrical procedures cannot be carried out.

3.9 - CM - COCHLEAR MICROPHONICS

Cochlear microphonics may be defined as the electrical activity of the cochlea.

At moderate levels of the acoustic stimulus the CM potential duplicates to a great extent, the displacement time pattern of the cochlear partition. The CM prossesses

an alternating current waveform which means that this potential changes its polarity between positive and negative signs with a time pattern that largely depends upon the stimulus waveform. The frequency of CM is same that of the stimulus.

The CM potential is generally proportional in magnitude to the intensity of the stimulus but at high intensities. The CM generators saturate and the CM magnitude cases to increase with growing stimulus Strength.

The intensity limit at which CM is measurable depends solely on the experimental techniques used. The upper limit of CM is dependent upon species frequency, and electrode location.

The CM potentials are biggest if the recording electrode is located in the scale media. The popular sites for measuring the CM potentials have been the round window, the bony, and cochlear fluid.

(16.Pg.24)

3.10 - CNV - CONTINGENT NEGATIVE VARIATION

One of the indirect (or mediated) procedures to assess the auditory function is to test the late, slow cortical responses having latency of 50 - 300 m.sec.

The EEG activity in CNV is usually recorded from an electrode placed on the vertex (the target) a reference electrode (the companion) on the mastoid and a ground electrode onthe forehead. There responses require amplification of about 10^4 or 10^5, but aband pass in the preamplifiers not much higher than 15 KHz. The signals can be either tones or speech given at rates not exceeding 1-2 per sec. CNV is subject to drugs and sleep.

If a subject receives a warning signal and under-stands that a subsequent target is to follow,the expectation of the target geneaates a slow, direct current (DC) shift of the baseline of the EEG about 300 or 80 milliseconds after the earning signal is received.

The CNV can be recorded from any place on the skull. The technique requires adequate bandpass in the preamplifiers and sufficient amplification. If adequate paradigms are developed, it may be possible to use a CNV to get insight into childrens ability to discriminate speech sounds, environmental noises etc.

(0.pg.146-148)

3.11 - CRA - CORTICAL RESPONSE AUDIOMETRY

See ERA

3.12 - ECOCHG - ELECTROCOCHLEOGRAPHY

ECOCHG is a direct procedure for assessing auditory function and it measures the responses that suprathreshold auditory stimuli elicit from the appropriate structures.

IN ECOCHG, there is a characteristic syndhronous discharge of many VIII nerve fibres and can be elicited only by auditory means.

The subject is placed in a reclining position and the target electrode is placed as close to the cochlear nerve fibre source as possible. The most dependable accurate and sensitive site of the electrode is the promontory of the cochlea and if transtympanic placement is not possible, Then recording are taken from the external auditory canal. The ground and indifferent electrodes can be placed on the forehead and mastoid respectively.

Only clicks or tone bursts can be used in ECOCHG as the action potential can be elicited if the rise time of the stimulus is faster than one m.sec.

(9.Pg.120-127)

3.13 - EDA - ELECTRODEMAL AUDIOMETRY

It is a technique used to assess hearing by measure-ing changes in skin resistance associated with the presen-tation of an auditory stimulus.

(44.Pg.304-310)

3.14 - EDR - ELECTRODERMAL RESPONSE

It refers to the change in skin resistance that occurs in response to a stimulus such as an acoustic signal. This response may be conditioned to be used in EDA.

(34.P9.276)

3.15 - EEG - ELECTROENCEPHALIGRAPHIC AUDIOMETRY

EEG is a highly specialized testing technique which is sometimes used when standard pure tone average and speech audiometry are impossible is impractical to use.

With this technique, brain waves are measured to determine whether or not an auditory event has been perceived by the subject.

3.16 - EP - ENDOCOCHLEAR POTENTIAL

Besides the stimulus related electrical events in the peripheral auditory system one can measure a direct current (DC) peralization of the endolymph of the scale media with respect to the rest of the body.

This is known as the endocochlear potential and is approximately +80 mV. This potential apparently originates in a layer of vascular tissue covering the wall of the scale media (stria vascularis).

(16.Pg.29)

3.17 - ERA - ELECTROENCEPHALIC RESPONSE AUDIOMETRY

The procedure whereby the electroencephalic activity is observed as a response to auditory stimulus is known as ERA.

The primary objective in ERA is the estimations of hearing levels in very young subjects. ERA is concerned with 4 classes of responses which involve the brain stem, primary projection area, cortical and surrounding association areas, frontal cortical areas and related functions Pathology in there areas may likely affect the associated evoked responses and this helps in understanding the factors that effect the responses.

(p 90.Pg.311-327)

3.18 - ERA - ELECTRIC RESPONSE AUDIOMETRY

(Also called EEA - Electroencephalic Audiometry)

In this technique the electrical activity in the brain that

occur in response to auditory stimulation are recorded. This electrical activity recorded and averaged over time to cancel the background activity. The resultant waveform is said to have an early response (which occurs within the first 30-50 m.sec. after the stimulus presentation), late response (that observed between 50-300 m.sec) and the contingent negative variation (recorded after 300 m.sec).

(78-Pg.235)

3.19 - GP - GENERATOR POTENTIAL

The generator potential is the electrical activity that triggers the neural impulses in the initial segment of an anon.

The GP has not yet been experimentally identified with certainty and its probable location is in the initial nonmyelinated segment of the auditory nerve.

(16-Pg.28-29)

3.20 - GSR - GALVANIC SKIN RESPONSE

See EDR

3.21 - OCP - ORGAN OF CORTI POTENTIAL

When a recording electrode passes through the organ

of corti it registers a negative potential of the order of -70 mV. This is the OCP and can be a manifestation of the resting polarization of the cells in cortis organ or it might be a dc polarization of the fluid space within the organ.

(16-Pg.29)

3.22 - RP - RECEPTOR POTENTIAL

The receptor potential of the cochlea is generated in a specialized receptor cell in response to external energy.

(16-Pg.28-29)

3.23 - SP - SUMMATING POTENTIAL

The summating potential of the cochlea, is a direct current potential that resembles the envelope of the eliciting stimulus.

The SP persists as long as the stimulation lasts. Like the CM this potential can be measured from any location in the vicinity of the cochlear but its magnitude is greatest in the scale media. Experimental evidence

indicates that the magnitude and the polarity of the SP depend on the complex interaction of intensity, frequency and electrode location.

The time course of the SP is different in scale a media and in the perilymphatic scalae. Depending on the combination of recording site and stimulus parameters the SP can have the same or opposing polarity in the two perilymphatic scalae.

The SP is linear in its relation with intensity and within the physiologically significant intensity range it can reach a magnitude of several millivolts.

(l6.Pg.26)

CHAPTER - IV

HEARING AIDS

HEARING AIDS

4.1 - AGC - AUTOMATIC GAIN CONTROL

It is a means of limiting the hearing aid output to acceptable levels and is in corporated into more and more hearing aid models.

In AGC circuitry part of the electrical signal at the earphone is delivered to a diode or rectifier, an electronic device which changes or rectifies the alternating current (AC) signal at the earphone to direct current (DC). This rectified signal is then delivered or fed back to one or more of the transistors proceding to the output stage in such a way that it will oppose the regular current flow at one or more of the transistors in the hearing aid. When the sound input to the hearing aid is very strong, the electrical signal at the earphone is also considerably larger and it transduced to electrical signal could be uncomfortably loud.

Thus, when the electrical signal at the earphone exceeds a predetermined level, the rectified signal fed back to the preceding amplifying stages is also larger. Its action then is to diminish the current flow of there particular transistor and thereby reduce the magnitude of the amplification they develop for the signals delivered to their inputs by the preceding transistor or by the microphone. The advantage of

output limiting of this type is that it more accurately reproduces the intended signal than does peak clipping.

(72.Pg.36-39)

4.2 - AVC - AUTOMATIC VOLUME CONTROL

(See ABC)

Impression amplification through AVC achieves output limiting without peak clipping and has potential for better speech quality. In AVC there is absence of waveform distortion and also the background noise is reduced proportionally. Also, output is limited at a level below. The amplifier saturation through gain reduction over the entire signal and it permits a wider range of input level to the ear yet still maintains maximum output levels which can be adjusted to the tolerance levels of the hearing impaired. More over the dynamic range, the more important the use of AGC.

(90.Pg.110-111)

4.3 - BOHA - Binaural Hearing with one Hearing Aid

This term was coined by Harford and Musket (1964). They reported improved discrimination in 3 of 8 aided unilaterals when PB lists were directed towards their aided ears, in comparison with an identical unaided condition.

They attributed their findings to restoration of binaural hearing. Raster and Tillman (1964) concluded that binaural superiority was primarily attributable to the reduction of head shadow effect afforded by that position as opposed to monaural listening. This advantage results in a substantial improvement in discrimination.

Disadvantage is that it cannot be used in cases of unilateral losses where the poor ear is rendered unfit for hearing aid use.

(32.Pg.173)

4.4 - BICROS HEARING AID - BINAURAL CONTRALATERAL ROUTING SIGNALS

BICROS hearing aid is the modification of the CROS principle. BICROS aid employs two microphones feeding a single amplifier and receiver mounted in a standard (occluding) ear-piece in the better ear.

BICROS is useful for patients whose poorer ear is not suitable for amplification so signals from both sides of the head are routed to the good ear.

The use of microphones of differing frequency response characteristics should enable the wearer to obtain localization information from a BICROS fitting.

(70.Pg.326)

4.5 - CRISCROS - CONTRALATERAL ROUTING OF IPSILATERAL SIGNALS CROS HEARING AID.

CRISCROS is the name for a binaural POWER CROS. It is used to achieve the benefits of ear level amplification and is utilized by people with moderate or severe loss, who cannot get enough amplification with a conventional ear level instrument without feedback. CRISCROS is used by those who want binaural amplification. The microphone located on the left side of the head feeds a receiver on the right while the microphone on the right side routes its signals to the left ear.

Initially, CRISCROS used to be called DOUBLE CROS but because of a poor image the name was charged.

(32.Pg.185)

4.6 - CROS HEARING AID - CONTRALATERAL ROUTING OF SIGNALS.

In 1965, Harford and Bony provided patients with unilater hearing losses, specially designed head worn aids or CROS Hearing Aids. These aids, picked up signals through a microphone mounted on the side of poor ear and transmitted them electrically to a receiver connected with the good ear. The receiver was coupled to good ear by means of plastic tubing that was held in place in the outer part of external canal by

an 'open' earpiece fitted to the concha, so that the good ear could still function normally and at the same time receive amplified signals from the side of poor ear.

CROS hearing aids were used in care of bilateral high frequency losses as it was observed that the nonoccluding earpiece suppresses the lower speech frequencies while allowing the high speech frequencies to be amplified to the same extent as the standard ear phace.

(70.Pg.325-326)

4.7 - FOCALCROS - FOCAL CONTRALATERAL ROUTING OF SIGNALS TYPE OF HEARING AID

Principle of FOCALCROS was derived from the original apparatus reported by Schaudivischky (1965). He described a CROS type aid in which the microphone was placed in the ear canal of the wearer's poor ear and this placement was important to utilize the sound collecting and the orienting properties of the outer ear. From the microphone signals were transmitted electrically across the head to feed a bone conduction receiver on the side of the good ear. This arrangement left the good ear open to receive unamplified signals.

(32.Pg.175)

4.8 - FROS - FRONT ROUTING OF SIGNALS

FROS aid is housed in spectacle frame. This aid places the microphone on the eyeglasses situated near the midline of the patient's head or atleast near the front of the temple bar on the same side as the hearing. Thereby some separation of the microphone and receiver is achieved. This principle may be used with the patient who requires a little more amplification that can be afforded without feedback using ROS, without placing the microphone pickup completely on the other side of the head.

(32.Pg.186)

4.9 - HICROS - HIGH FREQUENCY CONTRALATERAL ROUTING OF SIGNALS

It is a CROS amplifying system emphasizing high frequencies. The HICROS aid utilizes an open earmould. The microphone is placed on one side and the signal is fed to the opposite ear. The hearing aid is usually houred in a spectacle frame.

The patients using HICROS hearing aids report in addition to better intelligibility of the speech of others that they can monitor their own speech better. There is an increased audibility of the high frequency consonants like sibilants.

(32.Pg.181-184)

4.10 - ILA - INDUCTION LOOP AMPLIFICATION

Description: An ILA system contains a microphone, an amplifier, a coil of wise of placed around the room in any of a number of geometrical configurations. The amplified electrical analog of sound waves is fed to the core of wire. Producing electromagnetic variations in the room. The electromagnetic field then crosses a tiny induc-tion coir in the child's hearing aid and induces an electrica current in the coil. This current is their amplified and reconverted to sound waves by the students hearing aid receiv Aids of this type have a 3-way input switch microphone only, telecoil only or combined microphone - telecoil input Utilization with an ILA arrangement the children theoretically have the advantages of a hardwire system (group reception of the teacher's signal at a favourable S/N ratio) plus the advantages of using their personal hearing aids for improved mobility, self monitoring and child-to-child communication. But practically it may not always be so. The strength of the electromagnetic field emitted from the coil can a usually does show variations in the room with different interactions between separate ILA systems and different hearing aids. In buildings where more than one ILA system is installed, signal: may spill over between rooms masking denied signals and comprising the children.

(84.Pg.233-235)

4.11 - IROS - IPSILATERAL ROUTING OF SIGNALS

IROS hearing aid makes uses of the benefits of an open earmold by coupling a conventional at-the-ear hearing aid to the ear with the openmould.

IROS can be used only for mild losses that require little amplification; otherwise feedback proves to be a hazard.

(32.Pg.186)

4.12 - MINICROS - MINI CONTRALATERAL ROUTING OF SIGNALS. HEARING AID

MINICROS consists of a CROS aid without earmould or sound tube, or with a shortened sound tube that travels only part way to the good ear.

CROS aids are often not accepted by Unilaterals who have normal hearing in one ear partly because even with mild gain and open earmould, too much amplified sound comes into the good ear.

MINICROS alleviates this overamplification (and the head shadow) by more or less spraying some sound of contralateral origin in the direction of the good ear.

(32.Pg.l86)

4.13 - MULTICROS - MULTI CONTRALATERAL ROUTING OF SIGNALS HEARING AID

MULTICROS is a CROS type of aid which is achieved by putting an off-on switch on each microphone of a BICROS aid. -

By manipulating these switches the user can change his aid from CROS to BICROS to conventional monaural aid at will depending upon the type of listening situation he is exposed to.

With training, a perceptive MULTICROS and user should be able to improve his listening situations appreciably by utilizing or eliminating the head shadow at will.

(92.Pg.186-187)

4.14 - OPEN BICROS - OPEN BILATERAL CONTRALATERAL ROUTING OF SIGNALS HEARING AID

The principle of open BICROS utilizes a BICROS aid, but with an open instead of a standard earmould. It may be useful to the patient who has an unaidable ear on one side, but only a mild loss - probably high frequency in nature on the other.

Open BICROS can be used whenever the demands for amplification on the good ear are not great enough to cause a feedback problem.

(32.Pg.186)

4.15 - POWER CROS - POWER CONTRALATERAL ROUTING OF SIGNALS

CROS aid used to achieve the benefits of ear level amplification, instead of a Bodyworn aid, is called POWERCROS. This principle may be utilized increases with moderate or severe loss who cannot get enough amplification with a conventional ear level instrument without feed back.

A standard earmould is used, and a sizable increase in practical amplification results from putting the head between the microphone and receiver. Usually POWERCROS is built into eyeglasses, but the same effect can be achieves using a behind-the-ear aid with an external receiver attache(to a power cord and delivering a signal to the contralateral ear.

(32.Pg.185)

4.16 - RFFM SYSTEM - RADIO FREQUENCY, FREQUENCY MODULATION SYSTEM

This type of FM classroom amplification systems consist of a microphone-transmitter worn by the teacher and an FM

receiver hearing aid worn by the child. The microphone is normally suspended around the teacher's neck, thus ensuing a favourable microphone talker distance with a resulting r good S/N ratio. There microphones provide the requirement of auditory self-monitoring a child to child communication.

, When utilized appropriately, it is true that they would deliver to the child an excellent quality amplified vertion of the teacher's speech are advantage was further evoded by the practice is many devices of substituting hearing aid transducers for the headphones.

The FM and training systems can be used individually or with groups.

With an RF system, the hearing impaired child hears the signal at equal and strength no matter on child position in the room and the activities he is do carrying out.

(84.Pg.235-241)

4.17 - SAV - SELECT-A-VENTS

The SAV, like the variable venting valves (VVV) also allows for modified venting size. This procedure requires a selection of one of six plastic inserts of the following diameters: 3.96 mm; 3.18 mm; 2.38; 1.59mm; 0.79 mm and an

occluding plug. The desired vent size is then inserted into a 4.62 mm diameter vent which is drilled into the earmold. A study by Sung, Sung; and Hodgson (1975) reported increased low frequency attenuation as SAY vent size was increased.

(91.Pg.55-56)

4.18 - SSPL - SATURATION SOUND PRESSURE LEVEL

This value represents the maximum root mean square sound pressure level obtainable in the coupler from an ear-phone of a hearing aid. That is, each hearing aid, has an output ceiling that cannot be exceeded regardless of how far the gain central is turned or how intense the input is made. This maximum output limitation is a safety factor against sounds that might be harmful or uncomfortable. 3 step procedure to measure (l) gain control is turned full on and aid is placed in test position (2) at a given frequency, the freefield SPL is increased until additional increase results is no increase in the coupler SPL (the hearing aid output) (3) the procedure is step 2 may be repeated at enough frequencies a cross the range 200-5000Hz to define the shape of the saturation curve.

(40-Pg.77-78)

4.19 - SSPL-90 - SATURATION SOUND PRESSURE LEVEL-90

The SSPL will not be measured using the point-by-point manual method. Instead the hearing aid gain will be set to full on and a saturation curve will be obtained in the range from2200 to 5000Hz using a constant input SPL of 90 dB. Average saturation sound pressure level will be calculated from the values at the frequencies of 1000, 1600 and 2500Hz. The resultant figure shall be referred to as high frequency (HF) average SSPL-90. The tolerance applied to HF average SSPL-90 is such that the value shall be within $\pm$ 4 dB of the manufacturer's specified value for the model.

(40-Pg.78)

4.20 - VVV - VARIABLE VENTING VALUES

It is a procedure which allows adjustments of vent size is the earmould.

Griffing (1971,1972) describes the VVV as a value which is turned in a 40° rotation allowing full closure to a full open position of about 1.5 mm.

The advantage of VVV is that the listener has control over the output of his hearing aid for the low frequencies by self-adjustment.

Cooper et al (1975) reported that the loudness reduction in phons, afforded by VW was small and concluded thin ability was questionable.

(91.Pg.55-56)

4.21 - WMHA - WEARABLE MASTER HERRING AID

It was developed by Bolt, Beranek and Newman INC. The WMHA can be worn conveniently in a rest pocket ar similar location with leads minning to the ears for connection to conventional hearing aid receivers and microphones. There are 2 separate channels for binaural amplification with a variety of plug in units use modifying the characteristics of the hearing aid. By suitable whoice of plugin units it is possible to changed the frequency response, compression and/or clipping characteristics, gain, MPO and other relevant variables of the hearing aid over a wide range of parameter values.

(49.Pg.223-234)

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CHAPTER - V

MANAGEMENT OF THE AURALLY HANDICAPPED

MANAGEMENT OF THE AURALLY HANDICAPPED

5.1-AAT - AUDITORY ANALYSIS TEST

The AAT is used to tap abilities in short-term memory, auditory analysis, and auditory synthesis.

In this test, the task is complex and is presented is face to face with the child without giving speech reading cues.

Here, the child is asked to repeat back the entire word and then to say the word without the phonemic element(s) in parantheses. For eg. in the practice items, the child is asked to repeat the word 'cowboy' and then asked to repeat the word again omitting the word 'boy'. Testing is discontinued after 4 consecutive errors of the 40 practice items.

It is found that there is good correlation between performance onthis test and reading abilities since learning of reading has a strong auditory basis and requires skills tapped by this test.

(94.Pg.348-350)

5.2 - ARD PROCEDURE - ADMISSION, REVIEW AND DISMISSAL PROCEDURE

It is the process by which a child's diagnostic reports are reviewed and appropriate educational placement is recommended. In addition,the child's 'individual educational plan is written.

(60-Pg.343)

5.3 - ASL - AMERICAN SIGN LANGUAGE

This includes the signs used by the deaf for communication. Each sign is characterized by a specific hand shape, position movement and orientation associated with it. The signs of ASL are observed to be closely related to the French sign than the British sign. The ASL is called the Ameslan.

(10.Pg.22)

5.4 - CAPS - COMMUNICATIVE ASSESSMENT PROCEDURE FOR SENIORS

It was developed by Alpiver and Baker (1983). This scale was designed to assess the communicative status in terms of attitudes and specific communicative situations. The interview format is used and questions assess 5 communication areas general communication; group situations; other persons, self-concept and family. A sixth section is included to evaluate the extent to which a person is interested in and can benefit from remediation. It was suggested that individuals be then own control to assess changes in the communicative status.

(26.Pg.l67)

5.5 - DMO - DEAFNESS MANAGEMENT QUOTIENT

This is used to predict as to which of the children would learn best through auditory oral approach, and which of them would do better with total communication. This may be consider

while integrating the deaf children into normal schools. This quotient is calculated by taking into account the factors of residual hearing, central intactness, intellectual ability, the family constellation and socio-economic status.

(38.Pg.53)

5.6 - DSCF - DENVER SCALE OF COMMUNICATIVE FUNCTION

It was developed by Alpina, Chrevrette, Clascoe, Metz and Olsen (1971). The DSCF focuses on the 'attitudes' or 'feelings' of hearing impaired persons and those with whom they interact. The scale is made up of 25 questions that are answered in a 7 point scale with 'agree' and 'disagree' at the two extremes. The questions cover 4 areas - family-self concept, social vocational, and general communication. The general theme of almost all the questions centres around the respondents 'personal reactions' to a set of limited, but representative situations.

The DSCF is used in assessing rehabilitative programs, hearing aid candidacy, and successful hearing aid use and generating a profile of attitudes toward communicative performance.

(26.Pg.162-63)

5.7 - DSSC - DENVER SCALE OF COMMUNICATION FUNCTION FOR SENIOR CITIZENS LIVING IN A RETIRED SETTING.

Zarnoch and Alginer (1977) modified the original DSCF to render it more applicable to the older citizen. The DSSC centers around attitudes and reactions to having a hearing impairment as opposed to identifying specific communicative problems. Each question is categorized family, emotional, other persons, general communication,self-concept, group situations and rehabilitation.

(26.Pg.166)

5.8 - EFI - ELEMENTARY AGE FULL INTEGRATION

There are children of elementary age who have moderate hearing losses who are candidates for integration into a regular classroom either on a fulLtime or part time basis.

The minimum requirements for full integration of the elementary level were (1) no greater than a moderate (70 dB HL pure tone average hearing loss (2) no greater than a severe (90 dB HL) high frequency average (HFA, the average of the thresholds at 4000 and 8000 Hz). (3) functioning of 62% or better correct response to a specially designed test of sentence and paragraph understanding. (4) oral functioning of 78% or better on a test similar to that cued to assess

aural functioning (5) An English background (6) Parents who had a high school education and more (7) Good parental contact with the school (8) An ICs of no less than 90 and (10) diagnosis of hearing impairment no later than age 7, with a hearing aid being fitted to later than age 8.

(3.Pg.208)

5.9 - EIH - ELEMENTARY AGE WITH INITERANT HELP

These are the hearing impaired children of elementary age who are to be integrated but who need initerant help side by side. There are some criteria for partial integration of the elementary age children (1) severe hearing losses in the care of pure tone averages (2) Profound higher frequency averages (3) Slightly lower aural functioning (58%) (4) Slightly lower intelligence (5) Slightly younger age (5.5 years) for a hearing aid fitting.

(3.Pg.208-209)

5.10 - EPSDT - EARLY PERIODIC SCREENING, DIAGNOSIS & TREATMENT

The EPSDT, established in 1967 under Title XIX of the Social Security Act, is a federally sponsored medicaid enactment. It is administered by each state in which Medicaid eligible families may volunteer to participate

and may be managed by the health department or the welfare department. The program is intended to provide a comprehensive range of health care services to children of Medicaid eligible families. The program provideds basic health screening and treatment. Hearing testing is included in the screening and also in the treatment scheme.

(18.Pg.153-154)

5.11 - FSLAR - FEASIBILITY SCALE FOR LANGUAGE ACQUISITION ROUTING

This like the DMQ was used to determine whether a given child would learn better with the auditory oral approach or with the total communication. Seven factors are considered to make these prediction; amount and configuration of residual hearing, age of the child, parental interaction, other possible handicaps. General behaviour in testing situation subjective response to amplification and present form of communication.

(38.Pg.53)

5.12 - FSPAU - FEASIBILITY SCALE FOR PREDICTING HEARING AID USE

This procedure combines the use of auditory and non-auditory measures in evaluating the need and success of the rehabilitative process.

(26.Pg.l68)

5.13 - HHIE - HEARING HANDICAP INVENTORY FOR THE ELDERLY

It was designed by Weinstein and Ventry (1982) to assess the social and emotional effects of hearing impairment in the noninstitutionalized older person. It consists of two subscales, an emotional section of 13 items and a social section of 12 items. Scoring involves a 3 point scale. The total score can range from 0-100 where the higher the score, the greater the self-assessed hearing handicap.

(26.Pg.167)

5.14 - HHS - HEARING HANDICAP SCALE

The HHS developed by High, Fairbanks and Glorig(1964) is the most familiar self-assessment instrument used for assessing hearing handicap. The HHS consists of two forms of 20 items each. The question represent several common communicative situations including listening on the telephone and in the presence of background noise. The respondents are asked to rate the frequency with which they believe they experience difficulty in the situation described A 5-point scale is provided. The total point values for all responses are obtained and a single percentage score is obtained to signify degree of handicap.

The major limitations of the HHS lies in its narrow scope. The items comprising the two forms lean heavily on hearing sensitivity difficulties.

(26.Pg.159-161)

5.15 - HMS - HEARING MEASUREMENT SCALE

It is an important self-assessment instrument used for assessing hearing handicap developed by Noble and Atherly (1970). It has a considerable expanded scope compared to that of the HHS. The HMS not only assesses the hearing handicap but also includes a broad representation of hearing disorders which would also address listening problems typically associated with persons with a sensorineural hearing impairment. As a result, the HMS represents an expansion of both in terms of the nature of the items included and in philosophical orientation. The questionnaire is composed of 42 items arranged in 7 subjects. The seven subtests were on (1) Speech hearing (2) Hearing for non-speech sound (3) Special localization (4) Emotional response (5) Speech distortion (6) Tinnitus (7) Personal opinion. The hearing impaired person's responses and scored on a 5 point scale and each item is weighed separately to increase the sensitivity of the test.

(26.Dg.161-162)

5.16 - HPI - HEARING PERFORMANCE INVENTORY

The HPI was developed by Giolas, Owens, Lamb and Schufert in 1979. It was developed to provide a systematic procedure for identifying the problem areas experienced by persons as a result of their hearing impairment. The overall goal was to create a measuring instrument with sufficient scope to yield a profile of hearing performance in a variety of everyday listening situations. The obtained profiles could be used to organize rehabilitative programs, plan initial rehabilitative activities and suggest a more meaningful progression of management activities. The inventory items are divided into 6 sections - understanding speech intensity, response to auditory failure, social, personal and occupational. It was hoped that such an inventory would provide (a) hearing impairment as a communicative problem (b) A detailed analysis of the communicative breakdown (c) Aquantitative measure of performance. The HPI consisted of 158 items divided into the above mentioned 5 sections.

The HPI has the greatest clinical utility ability in assisting the clinician when planning and assessing nonmedical rehabilitative procedures.

(26.Pg.l63)

5.17 - HPI - HEARING PROBLEMS INVENTORY - ATLANTA

This was a self-assessment instrument developed by Hutton (1980). The inventory consists of 51 items many of which were selected from other instruments and modified to fit the HPI-A format.

(26-Pg.l66)

5.18 - M-A SCALE - MoCARTHY ALPINER SCALE OF HEARING HANDICAPPED

The M-A scale was designed (Alpiner, 1982) to develop a measuring tool which would validly and reliably assess the psychologic social and vocational effects of adult hearing loss. The scale consists of 34 items presented in a format that allows the person to respond by checking 'always' 'usually' 'sometimes' 'rarely' or 'never' with the response representing the greatest handicap equal to 5 points

(26.Pg.165-166)

5.19 - MARRS - MAINSTREAM AMPLIFICATION RESOURCE ROOM STUDY

The title VI, ESEA, developed and implemented in 1977, in three Southern Illinois Public Schools in Grades 4,5 and 6 of the two objectives of MARRS, the first was to determine whether students with minimal hearing loss actually

experienced educational deficits. For this study, minimal hearing loss was defined as (1) PTA thresholds of 15 dB HL or greater, with no thresholds greater than 40 dB HL (2) Failure to response to 6 out of 14 frequencies 250 Hz through 8000Hz at 10 dB HL with no PTA thresholds greater than 40 dB HL. The second objective of MARRS, was to determine whether educational deficits Bound on standardized achievement tests, could be remedied within the mainsteam of a regular school program. In this objective, 2 types of intervention strategies were used. The first employed a sound field amplification system to increase the intensity teachers voice in a standard classroom. Each classroom required one special unidirectional microphone, one wireless transmitter, one wireless transmitter receiver, one power amplifier and/12" loudspeakers specifically designed for the s speech and audio range. The curricula, teacher setting materials and scheduling are eventially the same as they would have been without project intervention. The second, employed the schools standard curriculum in a resource from instructional setting. The MARRS teacher consulted regularly with the students and their classroom teachers in order to determine the academic areas in which the student were having problems. The classroom teachers were asked to define the care tasks for the subject area in which the

students were having difficulties.

Data obtained subject that 20-25% of the school population have academic difficulties consisting with minimal hearing loss.

(88.Pg.263-272)

5.20 - NHHHI - THE NURSING HOME HEARING HANDICAPPED INDEX

Schow and Nerbonne (1977) developed the NHHHI in an attempt to create an instrument more sensitive to identifying communicative problems of persons living in nursing homes. The NHHHI consists of 20 items divided into 2 equal sections. The first 10 items are directed toward the nursing home residents, and the remaining 10 items are directed towards the staff members who work with residents. The NHHHI is bared upon the premiss that combined input from there 2 groups is superior to either one alone and the items were selected from the HHS, HMS and DSCF. A 5 point scale similar to the one used in HHS was employed.

(26.Pg.167-168)

5.21 - PAT - PERSONAL ADJUSTMENT TRAINING

This program, which is a part of the rehabilitation program of the deaf, aims at training for satisfactory personal - social functioning. The areas covered are Communication skills, basic educational skills, personal hygeine, marriage and family relation :

citizenship, to independent living skills, consummer services, community services etc. The two methods of instruction are individual training and small group lectures.

(13 - Pg.140)

5.22 - PEP - AUDITORY PERCEPTUAL ENHANCEMENT PROGRAM

It is a commercially available program for development of listening skills. It includes recordings of environmental noises, tasks with speech in quiet and noise.

(68.Pg.288)

5.23 - PIAT - PEABODY INDIVIDUAL ACHIEVEMENT TEST

It is a test to estimate academic performance during the comprehensive evaluation which allow. The examiner to observe how well the child handles academic material in a one-to-one testing situation. The report of results describes how the child handles different types of problem solving as well as areas in which there is difficulty. Difficulties should be analyzed in light of deficits observed in auditory, verbal and visual motor areas. The PIAT takes approximately 45 minutes to administer to older or very bright children, with younger or slower children requiring about 30" to complete the test.

The PIAT tends to overestimate when the results are compared with the teacher administered achievement tests.

(4.Pg.221)

5.24 - PRWAD - PROFESSIONAL REHABILITATION WORKERS WITH THE ADULT DEAF

The PRWAD has compiled a volume 'Deafness', of papers and reports of Research and professional training programs or Deafness. It contains contributed materials selected for ±ta pertinence to the problem of deafness like a classic delineation of the deaf person, early diagnostic difficulties treating the education and maturation of the deaf child and his adult achievements and problems.

The PRWAD worked on this project with the cooperation of many agencies in the Department of Health, Education and Welfare (HEW).

(71

5.25 - PSE - PIDGIN SIGN ENGLISH

It includes the intermediate sign language variaties on the continuous between sign (Ameslan) and English. Pidgin English shares some of the characteristics of Ameslan and some of English, although the grammar of each language is reduced to a certain extent.

(10.Pg.22)

5.26 - SEE 1 AND SEE 2 - SEEING ESSENTIAL ENGLISH 1 & 2

They consist of signs used in place of English words to be used in the same order as English words are used. These are contrived to represent the English language.

(10.P9.22)

5.27 - SFI - SECONDARY-AGE FULL INTEGRATION

There are the hearing impaired children of secondary age groups who are Candidates to be considered for full integration.

The minimum requirements for candidates for SFI are:- (1) Slightly highly oral functioning (86%) for all the secondary groups (2) Slightly older age for hearing aid fitting (age 9years) (3) Profound high frequency average losses.

(3.Pg.208-209)

5.28 - SHHI - SOCIAL HEARING HANDICAP INDEX

Ewertsen and Birk-Nielsen (1973) designed the SHHI, following the basic rationale underlying the development of the HHS, for use in Denmark. The questions in the SHHI were written so as to require a yes or no response. The

responders are not encouraged to guess and are instructed to respond with I don't know' if they are not sure. This is to reduce the bias.

The SHHI consists of 21 items centering around the following situations (1) conversation with one person (including a quiet, noise, indoors, and outdoors)? (2) group conversations and (3) communication through telephone TV or radio. The scoring procedure allows for a weighting system, and the score is adjusted to the decimal system and yields an index scale from 0 to 100 where 0 means no handicappand 100 means a minimum handicap. Ewertsen and Birk-Nielsen reported that there is a strong relationship between scores obtained on the SHHI and SRT, but the SHHI produces a measure independent from SRT.

(26.Pg.16l)

5.29 - SIH - SECONDARY AGE WITH INITERANT HELP

There are the hearing impaired children from secondary age groups who are candidates to be considered for integration with initerant help side-by-side.

The minimum requirements for candidates for SIH are:- (1) Profound high frequency average losses. (2) Slightly higher oral functioning (86%) (3) Slightly higher intelligence (IQs of 97) (4) Slightly later age of diagnosis (9 years) (5) slightly higher age of hearing aid fitting (age 9 years).

(3.Pg.208-209)

5.30 - SPI - SECONDARY AGE PARTIAL INTEGRATION

There are the hearing impaired children who are candidates to be considered for partial integration into a regular classroom.

The minimum requirements for there candidates are:-

1. Severe hearing losses in the care of pure tone averages.
2. Profound UFA losses for all the four groups.
3. Slightly higher oral functioning (86%).
4. Slightly higher intelligence (IQs of 95).
5. Slightly later age of diagnosis (9 years).
6. Slightly later age for hearing aid fitting (age 9 years).

(3.Pg.208-209)

5.31 - TAC - TEST OF AUDITORY COMPREHENSIONS

It was designed to assess the auditory discrimination of suprasegmentals and segmentals, memory, sequencing, story comprehension and figure - ground relation. It is employed to test hearing impaired children.

(45.Pg.196)

5.32 - TORCH CONCEPT

TORCH is an acronyn for the various pre- and post-natal infections that give rise to similar symptoms in the prenatal stage. It may be expanded as follows:-

T-Toxoplasma, R-Rubella, C-Cytomegalovisus, H-Herpes simplex Types I and II and O-others (eg.syphlis).

(8.Pg.99-101)

5.33 - TSA - TEST OF SYNTACTIC ABILITIES.

It is a test devised for one with a hearing impaired population. It consists of a screening test and 20 individual paper and pencil tests covering mine of the major syntactic structures of English. It was designed to be criterion-referenced, and hence systematically would explore in depth the hearing impaired child's knowledge of a number of syntactic constructions, and also norm-referenced in depth diagnostic battery, appropriate for 10-19 year old hearing impaired youngsters. The constructions that are evaluated are relation, conjunction, determiners, question formation, verb processes, pronominalization, relativization, complementation and nominatization. The reliability of this test in terms of internal consistency, test-retest-reliability is high and there is evident validity. The TSA has a related curriculum, the TSA syntax program which was designed and fie! tested for teaching the major structures of English evaluated by the TSA.

(45-Pg.204-205)

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CHAPTER - VI

NOISE

NOISE

6.1 - AI - ARTICULATION INDEX

It is a measure used to assess the intelligibility of speech in the presence of noise. Noise levels at one third octave intervals are plotted on a graph with the frequency on the x-axis and the intensity on y-axis. This is compared with the upper curve of the reference graph. The number of dots between this curve and the graph drawn for a given noise is divided by 100 to calculate the AI.

An AI of 0.3 indicates an unsatisfactory condition for communication. An AI of 0.5 to 0.7 is considered to be good and above 0.7 is said to provide a very good condition for communication. The minimum and maximum limits for AI are 0 and 1 respectively.

(52.Pg.153-154)

6.2-ASDS - AIRCRAFT SOUND DESCRIPTION SYSTEM

It is the arithmetic summation of the time that an aircraft noise exceeds a specified level, the latter usually being 85 dBA. ASDS is expressed in minutes.

(52-Pg.219-221)

6.3 - A$S - ASYMPTOTIC THRESHOLD SHIFT

It is observed that in some experimental animals (eg. Chinchilla), thresholds increases upto a point, following noise exposure. Further exposure to noise does about a corresponding increase in threshold. This is known as the ATS.

The level of ATS appears to be independent of pre-exposure hearing level.

The potential importance' of the ATS phenomenon in the development of noise exposure standards is that, the ATS for a given noise level and spectrum may represent an upper limit on the NIPTS (Refer NIPTS) that can be produced by that noise, regardless of the duration of exposure.

(11-)

6.4 - B-TOTAL NOISE LOAD

This is used while measuring air-craft noise. It is the average of AL (taken on a modified energy basis), taking into account the number of fly-over events and the time of day.

(52-Pg.220)

6.5 - CNEL - COMMUNITY NOISE EQUIVALENT LEVEL

It is used to measure community noise. Here, all the A-weighted sounds at a given point that exceeds a prescribed value are taken into account. High weightage is placed on those events that occur during even hours (7 p.m. to 10 p.m.) and even greater importance is given to those events that occur during night (10 p.m. to 6 a.m.).

6.6 - CNR - COMPOSITE NOISE RATING

This quantifies the total air craft noise in the environment by taking into account the air craft operations at an airport.

To calculate the CNR value, the noise levels of each aircraft fly-by is measured. To add the weighting factors each night-time operation is considered to equivalent to ten day operations.

6.7 - CTS - COMPOUND THRESHOLD SHIFT

In experimental studies, it has been observed that after 8 hours of noise exposure, threshold shifts reach a maximum of 60-80 dp. Subsequent shift recorded were lower than these values. This phenomenon is referred to as the CTS, which includes both temporary and permanent threshold shifts.

(30-Pg.337-343)

6.8 - DRC - DAMAGE RISK CRITERIA

It specifies the maximum level of noise to which an individual may be exposed for a given duration and length of time without the risk of acquiring hearing loss. The values specified vary depending upon the type of noise whether continuous or interrupted etc.

For every 3 dB increase in noise level, the duration of exposure must be halved.

(41.Pg.65-67)

6.9 - EIU - ENVIRONMENTAL IMPORTANCE UNITS

This system was used in a project on environmental impact assessment. It includes a weighting procedure in which values are given for a list of possible impact areas.

A total of 1000 parameter importance units (PIU) are distributed among the 78 different parameters. The environmental quality of each parameters is predicted for a given project on the basis of value from 0 (worst) to 1 (best). EIU is the product of the environmental quality of each parameter and the PIU value for that parameter.

A(52.Pg.l00)

6.10 - EPNL -

This measure is used for estimating the effective noise of a single noise event such as an aircraft fly-over.

It is derived from the instantaneous PNL values by applying corrections for any pure tones that may be present and for the duration of the noise EPNL = PNL + C + D where 'C is the tone correction and D is the duration correction.

The unit used is EPN d3.

EPNL evaluates four factors of the aircraft noise-absolute level, broadband frequency distribution (spectrum), maximum tone and flyover duration.

(52-Pg.218)

6.11 - FAR - FEDERAL AVIATION REGULATION

FAR is comprised of 5 significant noise control regulations which have been prescribed by the Federal Aviation Association and have a substantial influence on the design, development and operation of aircraft. The part numbers of the 5 noise control regulations of the FAR are FAR 36, FAR 91-55, FAR 21.183 (e), FAR 36 amended, and FAR 21.

(52.Pg.225)

6.12 - FDC - FREQUENCY DEPENDENT COMPRESSION

The FDC system in the new input compression system. Unitron Aid-905w, has a wide stable frequency response which emphasizes the critical speech frequency range. It is very sensitive to mid-to-high frequencies with the activation level or threshold designed to be progressively higher in the lower frequencies.

6.13 - FNL - FLEET NOISE LEVEL

The FNL is a single number evaluator of the noise generated by a fleet of airplanes referred to each of the three noise measuring points sidelines? take off and approach.

FNL is expressed as the logarithmic average of the noise level of each type of airplane and the number of operations performed by that type of plane over the previous year.

(52.Pg.230-232)

6.14 - HCA - HEARING CONSERVATION AMENDMENT

This amendment was issued by OSHA in 1983. It requires that all workers receiving noise exposures at or above the action level must be included in a hearing conservation.

This program campuses of five components which are exposure, monitoring, audiometric testing, hearing protection, employee training and record keeping. The requirements of the standard are primarily performance oriented.

(6.Pg.7)

6.15 - HCP - HEARING CONSERVATION PROGRAM

It includes plant noise surveys, pre-employment and periodic hearing tests, interpretation of hearing tests and official record keeping of noise exposure and hearing tests.

(14.)

6.16 - HFI - HIGH FREQUENCY IMPAIRMENT

The hearing impairment at high frequencies of the audible range is termed as HFI. It is observed to me more frequent among older than younger children. Significantly greater number of boys than girls are observed to have HFI.

(15.

6.17 - IIC - IMPACT INSULATION CLASS

It is a single figure rating that is intended to permit the comparison of the impact sound insulating the merits of floor ceiling assemblies in terms of reference contour.

6.18 - ITTS - INTEGRATED TEMPORARY THRESHOLD SHIFT

It is a measure for the physiological stress on hearing. An individual's ITTS is a measure of the individual's susceptibility to noise induced hearing loss.

ITTS at TTS dt.where t_0 is time period of noise exposure and tr the time period of recovery (see TTS).

(96.Pg.255-263)

6.19 - L_{dn} - DAY NIGHT EQUIVALENT SOUND LEVEL

(also known as DNL - day-night sound level).

L_{dn} is the L_{eq}(equivalent level) for a 24 hours period with a correction of 10 dB added tothe single event noise levels (AL) occuring in the night time (10 p.m. to 7 a.m.) (See L).

(52.Pg.219)

6.20 - L_{eq} - LOUDNESS EQUIVALENT QUOTIENT

Often individuals are exposed to noises whose levels vary with time (eg. environmental noise). The level of such a noise may be quantified using a single measure known as the L_{eq}. The L_{eq} concept is based on the equal energy principle.

It is the level of a continuous A-weighted noise that would cause the same sound energy to be experienced in a given day as that resulting from the actual noise exposure.

It is used primarily to assess exposure to continuous noise although some opine that it could be used for estimating the exposure to impact noise.

It must be noted that there are other single number measures but L_{eq} is the most commonly used. (See SEL)

L_{eq} could be considered as a measure of noise dose.

6.21 - LL - LOUDNESS LEVEL

It is estimated from the sound level of a standard pure tone of specified frequency, which is assessed as the Modal value of the judgements of normal observers,as being equally loud.

6.22 - N - ISOPSOPHIC INDEX

It is based on the average (on an energy basis) of the maximum PNL, taking into account the number of flyover events and by giving appropriate weightings for evening and night time noise exposure.

(52.Pg.219-220)

6.23 - NEF - NOISE EXPOSURE FORECAST

Guidelines for use in connection with airports are prepared by means of this scale. The basic measures of magnitude for individual noise events is EPNL expressed in EPN dB. Effect of duration per event is also included.

6.24 - NI - NOISE INDEX

It is the average on an energy basis of tone-corrected AL modified for duration, time of day and season of the year.

(52.Pg.220)

6.25 - NIC - NOISE INSULATION CLASS

It is a single number rating derived in a prescribed manner from the measured values of noiseiBduction. It provides an evaluation of the insulation between two enclosed spaces that are acoustically connected by one or more paths.

6.26 - NIL - NOISE IMMISSION LEVEL

NIL's were derived from acoustic measurements and from estimates of exposure duration from the patient's case histories.

(2.Pg.l96)

6.27 - NIHI - NOISE INDUCED HEARING IMPAIRMENT

It is the difference between the total hearing impairment HI and the hearing impairment solely due to increasing age. It may be written as NIHI - HI - HI , where both HI and HIa may be calculated using formulae. Upto the age of 62 years, the NIHI will be identical to the total HI, since the hearing impairment due to increasing age HI is zero upto this age.

(96.Pg.293-296)

6.28 - NIHL - NOISE INDUCED HEARING LOSS

It refers to slowly progressive inner ear hearing loss that results from exposure to continuous noise over a long period of time.

6.29 - NIPTS - NOISE INDUCED PERMANENT THRESHOLD SHIFT

It is the difference between the total shift PTS_t and the age conditioned shift PTS_a ($NIPTS = PTS_t - PTS_a$).

NIPTS is also defined as the hearing loss produced by the effects of noise as a result of accumulation of noise exposure which are repeated on a daily basis over a period of many years.

(96-Pg.252)

6.30 - NNI - NOISE NUMBER INDEX

It is a measure based on PNL and with factors added to account for the number of noise events. It is used for rating the noise environment near airports.

6.31 - noy

It is a unit of perceived noisiness. A sound is said to have a noiseness of noy when it is judged to be subjectively equal in noisiness to an octave band of random noise centred around 1 KHz , with a sound pressure level of 40 dB.

(52. Pg.48)

6.32 - NPL (or L_{NP}

It is a measure of total community noise which is applicable to both traffic noise and aircraft noise.

6.33 - NR - NOISE REDUCTION

NR between two areas or two rooms is the numerical difference in dB of the average sound pressure level in those areas or rooms.

A measurement of NR combines the effect of transmission loss, performance of structures separating the two areas or rooms - plus the effect of acoustic absorption present in the receiving room.

6.34 - NRC - NOISE REDUCTION COEFFICIENT

It is a measure of the acoustical absorption performance of a material calculated by averaging its sound absorption coefficient at 250, 500, 1000 and 2000 Hz expressed to the nearest integral multiple of 0.05.

6.35 - NRR - NOISE REDUCTION RATE

It is a single number descriptor of a hearing protective device. To obtain NRR several procedures are employed. The key point to remember is that the NRR is subtracted from the measured unprotected weighted sound level to yield an effective, A weighted sound exposure for the employee.

(7)

6.36 - OHL - OCCUPATIONAL HEARING LOSS

A hearing loss that is causally related to one's occupation.may be termed as an occupational hearing loss.

6.37 - PTU - See EIU

8.38 - PN dB

It is a unit of perceived noisiness. A sound is said to have a noisiness of 40 PN dB when its noisiness is equal to that of narrow band noise centred at 1000 Hz presented at 40 dB SPL.

6.39 - PNC - PREFERRED NOISE CRITERIA

They specify the noise levels indoors. The levels of noise should be low enough as not to interfere with speech communication or disturb the occupants. PNC values for concert halls, drama theaters hospitals etc. were given by Beranek et al (1971).

(52-Pg.l41)

6.40 - PNL - PERCEIVED NOISE LEVEL

It is obtained by having some Ss listen to two stimuli. One is the reference sound which is a pink noise with a bandwidth of one octave with a centre frequency of 1 KHZ. The other stimulus is noise which is compared with the reference sound. The temporal characteristics such as rise-decay time and the duration must be identical.

Subjects' task is to judge whether the noisiness of the two stimuli is the same in which case the PNL (Judged) of the noise is numerically equal to the maximum overall SPL of the reference signal.

(52.Pg.45-52)

6.41 - PTS - PERMANENT THRESHOLD SHIFT

It refers to the hearing loss following noise exposure from which recovery is not possible (See NIPTS)

6.42 - Q MEAN ANNOYANCE

It is based on the average of AL (on a modified energy basis), over a specified time period.

(52.Pg.219)

6.43 - RNPC - REGIONAL NOISE PROGRAM CHIEFS (of EPA)

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For the implementation of the tech center program by the environmental protection agency (EPA) and the office of Noise Abatement and Control (ONAC) the opinion of the EPA's Regional Noise Program Chiefs were solicited together with other individuals and organizations involved with environmental noise control.

The RNPC's input was given importance as they were aware of the needs of their regions.

The 10 Tech centers which were then established by the EPA/ONAC would act under the direction of their respective EPA Regional Noise Program Chiefs. The RNPC/Tech center program afforded the possibility for bringing about major changes in this country's ability to control noise.

(20.Pg.390-391)

6.44 - RTOC - REDUCED TAKEOFF AND LANDING AIRCRAFT

This has been devised in care of short-haul aircraft and the runway length for RTOC is considered as 4000 ft (1219n

^'

The FAR 36 rules though are developed for conventional aircraft are also applied to short have aircraft but due to significant differences in their ranges of performance parameters, short haul aircraft may be noisier for comparable runway length operating ability.

(52.Pg.236)

6.45 - RW - REAL WORLD

When ear protective devices are tested for their performance in actual industrial environment, the results are considered to be indicative of RW performance.

(7)

6.46 - SEL - SOUND EXPOSURE LEVEL

This like the L_{eq} is a single number measure of noise exposure. This is used when exposure to transient noise is to be measured (eg. air-craft flyover, car pass-by.

SEL is used whenever the influence of measurement duration study be eliminated. Here, the total sound energy is integrated over the measurement period, as in the case of L_{eq} . However, instead of averaging it over the measurement period, a reference duration of 1 sec. is used. SEL is therefore measure of the total sound energy while L_{eq} is the quantification of average sound pressure.

SEL may be used to calculate corresponding L_{eq} or to exposure to transient noise compareexposure.

6.47 - HLS - HEARING LOSS FOR SPEECH

It is interpreted as the some of a loss class A (attenuation) characterized by a reduction of the levels of both speech signal a noise and a low class D (distor= tion) comparable with a decrease in signal to noise ratio.

SHL - is (hearing loss in quiet) and SHL- is (Hear- ing loss at high noise levels) increase progressively above the age of 50.

(77)

6.48 - SIL - SPEECH INTERFERENCE LEVEL

It is a measure of the handicap/difficulty experienced in perceiving speech in the presence of noise. It may be obtained as follows:-

The average sound pressure levels at various frequencies at octave intervals is obtained. Frequency in the range of 350 to 2850 Hz are considered.

6.49 - PSIL - PREFERRED SIL

Here noise levels are measured only at preferred bands. The average of the levels of noise bands centred at 500, 1000 and 2000 Hz is computed.

PSIL = SIL + 3.

6.50 - SIR - SPEECH IMPAIRMENT RISK PERCENT

It represents the damage effect on hearing of a wide variety of noise environments and can be used for specifying noise exposure limits that would be rated as tolerable for that criteria.

(47)

6.51 - SLC - SOUND LEVEL CONVERSION

It is a single number rating for the assessment of attenuation provided by ear protective devices. It is the difference between the C-weighted sound level impinging on the ear protector and the A-weighted sound level reaching the Wearer's ear.

6.52 - SLC-80

It includes a mean minus the standard deviation correction to protect 80% of the wearers of ear protective devices, by a certain degree of attenuation. The subscript '80' here, refers to the percentage of protection rate.

6.53 - SST - SUPERSONIC TRANSPORT

These are aircrafts that fly at a speech greater than the velocity of sound. The fly-over of these aircrafts

results in the generation of sonic booms. These booms are shock waves generated by the accumulation of air particles when a source of sound moves faster than the velocity of propagation of the disturbance. The boom of a single SST at a cruising altitude can cover an area of about 50 sq. miles.

(70.Pg.363)

6.54 - STC - SOUND TRANSMISSION CLASS

It is a single figure rating that is employed to give an estimate of the sound insulation properties of a partition or a series of partitions. It is intended for use when speech or office noise is the principal source.

6.55 - STL - SOUND TRANSMISSION LOSS

It is a measure of sound insulation provided by a structural configuration.

It is equal to 10 $\log_{10}$ sound transmission coefficient of the configuration.

6.56 - STOL - SHORT TAKE-OFF AND LANDING AIRCRAFT

It is used in cases of short haul air craft and the recommended runway length for STOL is 2000ft.

(52.Pg.236)

6.57 - STI - SPEECH TRANSMISSION INDEX

By means of an instrument developed it is possible to assess the quality of speech communication systems. It comprises of a signal source which replaces a talker and an analyzer which replaces the listener. Every measurement yields an index in terms of percentage of intelligibility. This index is known as the STI. A particular value of STI indicates a given amount of speech intelligibility irrespective of the nature of disturbance (eg. noise, peak clippin band pass limiting etc.).

(37)

6.58 - TTD - TEMPORARY THRESHOLD DRIFT

It is a temporary deviation from the normal thresholds. The TTD may be associated with a tone decayas observed on a tone decay test or with a disparity between the trackings for continuous and pulsed tone.

(31.Pg.177)

6.59 - TTS - TEMPORARY THRESHOLD SHIFT

It is a temporary elevationin the threshold of hearing following exposure to noise. The hearing functions then recover gradually.

$TTs_{(C)}$ - TTS measured using click stimuli

$TTS_{(t)}$ - TTS measured 't' minutes after cessation of noise.

TTS_2 - TTS measured two minutes after cessation of noise exposure.

TTS_4 - TTS measured four minutes after cessation of noise exposure.

(57-Pg.63-65)

6.60 - TWA - TIME WEIGHTED AVERAGE

An 8 hours time -weighted average sound level is the sound level that would produce a given noise dose if the individual were to be exposed to that sound level continuously over an 8 hour work day.

(7)

6.61 - VTOL - VERTICAL TAKE-OFF AND LANDING AIRCRAFT

It refers to short haul aircrafts and the recommended runway length is 1000 ft.

(52.Pg.236)

CHAPTER - VII

ORGANISATIONS IN THE FIELD OF AUDIOLOGY

ORGANIZATIONS IN THE FIELD OF AUDIOLOGY

7.1 AAOO - AMERICAN ACADEMY OF OPTHALAMOLOGY AND OTOLARYNGOLOGY

AAOO's method of computing percentage hearing impairment is used extensively in medio-legal cases. It is calculated by considering the loss in the speech frequency.

(7O-Pg.113)

7.2. AAMD - AMERICAN ASSOCIATION OF MENTAL DEFICIENCY

According to AAMD, an individual can be classified as mentally retarded only if he/she is found to be subnormal both in terms of intelligence and adaptive behavior.

Adaptive behaviour is defined as the effectiveness with which the individual copes with the natural and social demands of the environment. The two aspects of this definition are: I) the degree to which the individual is able to function independentlly and (2) the degree to which he/she meets the culturally imposed demands of personal and social responsibilities.

(45-Pg.206)

7.3 ADC - AUDIO DEVELOPMENT COMPANY

ADC of the several manufacturers who produced audiometers in the late 1940's or early 1950's, one of the companies was the audio development company.

The first ADC audiometer (Model-50) was introduced in 1947.

(73-Pg.45)

7.4 AFR - AIR FORCE REGULATION

The U.S. air force began a hearing conservation program including monitoring audiometry. The procedure to carry out this program is specified in the AFR-160-3. The aim of this program is to ensure that no individual sustains a hearing loss and 15 dB for pure tones at 500, 1000 and 2000 Hz. It also recommends ear protection when sound pressure level exceeds 85 dB at any of the form octave bands in the range of 300 Hz to 4800 Hz. Ear protection is mandatory when the level exceeds 95 dB at any of these bands. These recommendation apply to continuous exposure of 8 hours deviation.

7.5 AFT - AMERICAN FEDERATION OF TEACHERS

This federation has approved a policy supporting and encouraging the concept of mainstreaming and was recommended by psychologists, special education teachers, class room teachers and administrators.

(38-Pg.58-60)

7.6 AMA - AMERICAN MEDICAL ASSOCIATION

AMA had prescribed a specific method of calculation of percentage of hearing loss. This was modified by AAOO (See AAOO).

(70-Pg.lll)

7.7 ANEP - AIRPORT NOISE EVALUATION PROCESS

EPA has proposed a methodology so that the air port proprieter can effectively carry out the noise abatement planning and implementation. This method is based on the use of Ldn which is the same as the one recommended for community noise surveys.

(52-Pg.238)

7.8 ANSI - AMERICAN NATIONAL STANDARDS INSTITUTE

It publishes specifications for the manufacture of instruments and for test procedures. Relevant ANSI standards for Speech and Hearing are those related to audiometers, hearing aids, back ground noise levels, calibration, procedure for obtaining articulation curves. These documents priced publications. They are also available at ISI library for reference.

Formerly known as American Standards Association (ASA).

(70-P9.93)

7.9 ASHA - AMERICAN SPEECH AND HEARING ASSOCIATION

This was founded as the American Academy of Speech Correction in 1925. The name ASHA (American Speech and Hearing Association) was adopted in 1947. In late 70's the new name ASLHA was coined. It publishes the following journals.

J.S.H.D - Journal of Speech and Hearing Disorders.
J.S.H.R. - Journal of Speech and Hearing Research.
A.S.H.A. - Journal of American Speech and Hearing Associative

These are available to the members. Different types of membership are available. It accredits training programs and clinical services. It has a certification program for clinical services in speech pathology and in audiology, separately.

The goals of ASHA are (1) to encourage research in relation to 9peech, Hearing and Language (2) to promote investigation of communication disorders (3) to improve clinical procedures used with of these disorders and (4) to stimulate exchange of information among individuals and organizations engaged in these activities.

(70-Pg.320)

7.10 BEH - US BUREAV FOR THE EDUCATION OF THE HANDICAPPED

This came into being in 1967. It protects the interest of handicapped children from random and arbitrary periodic administrative re-organizations. It is responsible for the total program for the education of handicapped children. It has established a national advisory committee for the handicapped to assisted the bureau in its development.

(98-Pg.9)

7.11 CAOHC-COUNCIL FOR ACCREDITATION IN OCCUPATIONAL HEARING CONSERVATION

It conducts training programs for personnel taking part in hearing conservation. This program meets the guidelines of the inter society committee on audiometric technician training.

These training programs are directed by a professional holding an instuctor's certificate issued by CAOHC. All personnel conducting industrial tests should have accreditation as occupational hearing conservationists from the CAOHC.

(52-Pg.l63)

7.12 CEQ - COUNCIL ON ENVIRONMENTAL QUALITY

This is an advisory body in the office of the US President. Its purpose is to advise the President on the impact of various federal activities on the national environment and to maintain continued supervision on such activities. It is required to establish a system for monitoring indicators of environmental quality. Maintenance of comprehensive records on the status of the environment and ensuring the maintenance of comprehensive data which may be required for taking decisions on environmental problems.

(52-Pg.97)

7.13 CHABA - COUNCIL ON HEARING BIOACOUSTICS AND BIOMECHANICS:

This was established as a result of a request by the office of Surgeon General of U.S.Army to reevaluate the damage risk criteria based on new information available. CHABA established the basic criteria of the acceptability of noise exposures that would result in NIPTS after 10 years, of almost daily exposure. The NIPTS values were 10 dB at 1 KHz. and below, 20 dB at 2 KHz, 30 dB at 3 KHz and above. A series of damage risk contours from which the maximum allowable time per day for exposure to steady state intermittent noise could be determined.

(70-Pg.270)

7.14 - DER - DEPARTMENT OF ENVIRONMENTAL REGULATIONS

During the period from 1973 to 1978 the Florida Department of Environmental Regulation carried out a program wherein the DER funded six of the state universities to assist communities and countries in the development of noise control programs.

Included in these activities were noise ordinance development surveys to support ordinances training, some equipment loans and support or particular problem. This program, organised by the DER proved to bean interesting model in the preparation of the nationwide effort.

(20-Pg.390)

7.15 - EPA - ENVIRONMENTAL PROTECTION AGENCY

This agency is primarily concerned with the noise omitted by machines and vehicles. The EPA is expected to publish regulations and noise emission standards which must be performance standards. Once these are published the manufacturers must inform the customers that the products meet the federal noise standards. The products must be labeled so that the prospective customers are advised of the level of the noise the product

will emit. The product on sale for noise reduction properties must be labeled to describe the effectiveness. Also, in importing equipment conformity to the specifications must be ensured. The requirements of the EPA have been published as the noise control act 1973. In case of violation legal action may be taken by private individual.

(79-Pg.21-27)

7.16 - ESEA - US ELEMENTARY AND SECONDARY EDUCATION ACT

Originally a separate bill for the handicapped that paralleled the ESA was introduced. Eventually the legislation was brought as title 6 for ESEA.

(98-Pg.9-10)

7.17 - FDA - FOOD AND DRUG ADMINISTRATION

The FDA has proposed regulations on hearing aids. They cover four aspects (i) the types of information to be included in labelling, to provide the professionals and patients into adequate directions for safe and effective use of hearing aid (ii) the technical performance data to be included (iii) sale of hearing aids restricted only to those patients who have undergone medical evalua-

tion within the past six months (iv) cancellation of purchase within 30 days of sale.

(80-Pg.40-41)

7.18 - FTC - FEDERAL TRADE COMMISSION

Established in 1949, this commission evaluates the franchise system of hearing aid industry. The FTC has been putting out 'cease or desist' orders to companies for false advertising, misinterpretation, false claims, 'bait' advertising etc.

(15-Pg.l5)

7.19 - HAIC - HEARING AID INDUSTRY CONFERENCE

The HAIC has specified methods for the measurement of electroacoustic characteristics of hearing aids, such as gain, maximum power output, frequency response has also given definitions of terms related to the same.

HAIC standards for audiometric zero for bone conduction are also available.

(70-Pg.322-323)

7.20 - ISO - INTERNATIONAL STANDARDS ORGANIZATION

This organization behaviour representatives from

various countries, attempts at the development of international standards. ISO has published a number of standards related to audiometer, its calibration, measurement of characteristics of ear protective devices etc.

(70-Pg.93)

7.21 - NACED - US NATIONAL ADVISORY COMMITTEE ON EDUCATION OF DEAF

This committee advised the secretory of Department of Health, Education and Welfare (DHEW).

(98-Pg.8-9)

7.22 - NAEL - NATIONAL ASSOCIATION OF EARMOLD LABORATORIES

The NAEL has specified the homenclature to be used with various types of earmolds.

(67-Pg.236)

7.23 - NAL - NATIONAL ACOUSTIC LABORATORIES
(Australian Government)

This agency has published a number of documents related to noise.

7.24 - NEA - NATIONAL EDUCATION ASSOCIATION

It is a teacher organization that advocates mainstreaming, but has specified seven qualifiers on the

procedure for maintenance and monitoring of mainstreamed children. Mainsteaming is supported only if (i) handicapped and regular students benefit from the experience, (ii) regular and special educators share their work equally, (iii) these teachers are adequately trained, (iv) appropriate materials and services are provided to teachers and pupils (v) class size, schedule and curriculum are modified (vi) program development is systematically evaluated and (vii) the funds are exclusively used for the purpose of mainstreaming.

(38-Pg.58)

7.25 - NIOSH - NATIONAL INSTITUTE FOR OCCUPATIONAL HEALTH SAFETY AND HEALTH, U.S.A

NIOSH publishes materials related to occupational health such as reports on health hazard evaluation, technical assistance, educational and training materials etc. Many of NIOSH's activities are concerned with ear protective devices.

U.S. Department of Health and Human Services Public Health Service, Centre for Disease Control.

N.I.O.S and H
Division of Technical services Cincinnati Ohio 45226

(46-Pg.76)

7.26 - ONAC - OFFICE OF NOISE ABATEMENT AND CONTROL

Since its beginning the ONAC along with EPA, has carried out a continuing program of assessment and documentation of the noise control problem in the U.S. In 1977, 1974, 1978 comprehensive studies of state and local needs were carried out which were useful in defining both noise problems as well as the types of assistance which they needed.

It seeked to provide effective noise control measures, noise program guiddiness, instrumentation and enforcement procedures.

(20-Pg.390)

7.27 - OSHA - OCCUPATIONAL SAFETY AND HEALTH ACT

One of the functions OSHA is to ensure compensation for workers suffering from occupational hearing loss.

7.28 - RSA - US REHABILITATION SERVICES ADMINISTRATION

It worked to increase the effective educational and rehabilitations services to deaf children.

(98-Pg.l4)

7.29 - SRA - SCIENTIFIC RESEARCH ASSOCIATES (SRA) ACHIEVEMENT SERIES

The SRA achievement series, formed one of the battery of academic tests and included reading comprehension, vocabulary, math concepts, math computations, language usage and spelling subtests.

(88-Pg.265)

7.30 - UAF - UNIVERSITY AFFILIATED SOCIETY

The societies are located in various parts of the Us. They serve as resources for advanced interdisciplinary education, clinical training, research experience for Speech, Language pathologists, audiologists and profe-ssionals involved with communication disorders.

(80-Pg.36)

7.31 - USOE ACT - US OFFICE OF EDUCATION

This has a division for handicapped children and youth to administer program for the handicapped. To start with the programs were limited. Presently a number of functional operational units are included in this group.

(98.Pg.9)

CHAPTER - VIII

SPECIAL TESTS IN AUDIOLOGY

SPECIAL TESTS IN AUDIOLOGY

8.1 - ABLB - ALTERNATE BINAURAL LOUDNESS BALANCE

ABLE is a binaural test for measuring recruitment devised by Fowler (1936). The test is used with cases having unilateral sensorineural hearing loss.

Loudness balances are obtained for a given frequency. For this, the level of the tone in the better ear is kept constant. The level of the tone inthe poorer ear is varied either by the subject himself or by the tester, till the two tones give rise to a sensation of equal loudness.

The test is usually begun at 20 dB SL. Loudness Balances are their obtained at various levels of presentation in the better ear. The resultant graph of the loudness balances at various levels is called the ladder gram.

The ABLB test may also be carried out with the poorer ear as the reference ear in which case the test is called the modified ABLB test.

8.2 - ART - ACOUSTIC REFLEX THRESHOLD

ART is the threshold at which, there is bilateral and consensual contraction of the stapedius muscles whenthe ear is exposed to high intensity sounds.

In case of normals for pure tones, the ART is around 85 d3B HL but for white noise the ART is about 65 dB HL.

ART is useful in clinical audiology as it helps in the detection of middle ear pathology,sensory pathology, neural pathology, central pathology, hearing threshold level and nonorganic hearing loss.

(22.Pg.363-370)

8.3 - BADGE - BEKESY ASCENDING DESCENDING GAP EVALUATION

It is a test for the identification of non-organic hearing loss. The patient is asked to trace his thresholds for three stimulus conditions: (a) continuous tracing with the signal beginning at a level well below the threshold (continuous ascending) (b) pulsed signal tracing beginning well below the threshold (pulsed-ascending) and (c) pulsed signal tracing beginning well above the threshold (Pulsed descending).

(24.Pg.78)

8.4 - BIDS - BINAURAL INTEGRATION OF DISTORTED SPEECH

The BIDS is similar to the tests of binaural integration of filtered speech as described by Matzker (1959) and Willeford (1976). In this test, narrow bands of speech centred around 500-2000 Hz are used with a filter rejection rate of approximately 18 dB/Oct. In this test, monosyllable words from the CID-W22 list (2A) are used.

(94-Pg.35O)

8.5 - BOA - BEHAVIOURAL OBSERVATION AUDIOMETRY

This is used to test young difficult to test children and infants. The use of this technique requires a calibrated sound field system and a diagnostic audiometer. The child is placed in a chair or in the mother's lap in a sound treated room and the stimuli are presented through calibrated loudspeakers. The levels of stimuli that elicit various behavioral responses are noted, reinforcement may be given for correct responses.

(81-Pg.84)

8.6 - BOEL - BLICKEN ORIENTERON EFTER LJUD

This Swedish term means 'Look orients after sounds' The hypothesis underlying the formulation of the test is that, when a child is capable of shifting his attention from a visually attractive stimulus to an auditory stimulus then it indicates that he possess one of the essential requirements for the development of communicative skills i.e. hearing.

The sources of sound in the BOEL kit, are small enough to be hidden in a clenched fist. These consist of four small silver bells to be fastened to the ring and fore

fingers, by means of adjustable silver rings. The visual stimulus is a red, stick called the 'gripper' and silver spinner. The frequencies generated by the bells range from 4 KHzzto 12.5 KHz when not shielded by hand and from 5 KHz to 10 KHz. When shielded, when kept at a distance of 20 cm. from the receiver. The level of the signal is around 30 to 35 dB.

(93-Pg.l42)

8.7 - CAA (CENTRAL AUDITORY ABILITIES) COMPETING MESAGES SUB KIT TE

This is a subtest of the Flowers - Coistello test of CAA to (1970) assess auditory figure ground.

A single speaker gives the test items while the same voice is telling a children's story. The child points to a line drawing representing the appropriate completion of a sentence. Norms are provided in terms of rawscore means, standard deviations selected percentate paints (10th, 25th and 50th) for grades Kg through VI.

(43-Pg.l65)

8.8 - CAPT - CONCEPTUAL AUDITORY PERCEPTUAL TEST

It is used assess the figure-ground discrimination against competing signals of music and speech. The tasks are made progressively difficult by varying the background distractions, the length and kind of words, the S/N ratio etc.

(43.pg.165)

8.9 - CAT SCAN - COMPUTERIZED AXIAL TOMOGRAPHY SCAN

It is a non-invasive radiographic technique that utilizes scintillation detectors and a computer to calcuate small changes in the radiodensity. Using this technique it is possible to detect the presence of a pathology condition and its composition haemonhagic, cystic, necrotic or solid.

(97.Pg.27)

8.10 - CA-VR - CONDITIONS AUDIO-VISUAL RESPONSE

A plastic toy is illuminated whenever a signal is presented. The child is conditioned to respond to the signal by turning to the toy. Correct responses are reinforced. The child's hearing thresholds are thus obtained by observing these conditioned responses.

The technique is also known as VRA or visual, reinforcement audiometry.

(70.Pg.208)

8.11 - CI (CRITICAL INTENSITY) PROCEDURE

The CI Procedure was conceived originally by Ruedi (1954) and later used by ward (1965-1968).

In the traditional CI paradigms the subject was exposed a fatiguing stimulus which increased successively in level until a criterion amount of TTS was observed. As in the early investigations by Reudi (1954) and Ward (1965-68). The only time intervening between successive exposure was that required for threshold determination.

There is no recovery period employed, so a modified prodedure was adopted by Humes and Bess. Their procedure was to determine the CI at which maximum TTS shifts upwards in frequency from the exposure frequency to one half octave the exposure frequency and they allowed recovery periods between exposure levels.

(39-Pg.3l)

8.12 - CID -W-l

This is a list of thirty-six spondees developed at the Central Institute ,r;for the Deaf, to be used for speech reception threshold measurements. The spondees in this list are recorded at a constant level.

It is commercially available. A calibration tone is recorded 10 dB above the word level. The carrier phrase "say the word" precedes the spondee, and is at the level of the calibration tone.

(35.Pg.144-145)

3.13 - CID W-2

This list consists of the same spondees as the W-l. But this is an attenuated recording. Or the level is attenuated by 3 dB after every three spondees.

(35.Pg.144-5)

8.14 - CID-W-22

This is a monosyllabic word list consisting of fifty words. The words are phonetically balanced.

These lists are used to assess the speech discrimination abilities of an individual.

(27.Pg.153-154.)

8.15 - COR - CONDITIONED ORIENTATION REFIEX AUDIOMETRY

This method is used to evaluate hearing in children. The child's localization responses are observed. Whenever the child correctly locates the loudspeaker through which the signal is presented, the response is reinforced by illuminating.

(50.Pg. 9-10)

8.16 - CTM - CONTINUOUS TONE MASKING TEST

Here, the test signal is split. The pulsed component is fed through the patient operated channel of the audiometer and the continuous signal is routed through the tester operated channel. It is then mixed and presented through headphones. Four fixed frequency tracings are obtained for each frequency, with the continuous masking signal completely attenuated and with its level being 10, 20 and 30 dB SL.

Individuals with cochlear lesions demonstrate improved hearing thresholds with CTM.-Sensitivity is observed to decrease in cases with retrocochlear lesion. Individuals withcconductive impairment are also observed to have a better sensitivity under CTM.

(24.Pg.80)

8.17 - DFA - DELAYED FEEDBACK AUDIOMETRY

In this technique, the subject is asked to tap a particular pattern on a key. This results in the generation of pure tones which are presented through headphones to his ears Using an electronic circuit, delays of various durations are brought about in the presentation of these tones. Such a delay in feedback is found to disrupt the rhythm/pattern of

tapping if the level of presentation is at or above the threshold of hearing.

DFA is used to identify functional hearing loss.

(70.Pg.l65)

8.18 - DIDI - DIFFERENTIAL DETECTABILITY INDEX

The measure of psychometric functions width has been tentatively called the differential detectability Index. (Bass-Hamilton-1971).

The DIDI was calculated upon using the 2 IFC procedure. This method estimated several points on the psychometric function and it was therefore possible to use the results to give also a measure of the width of the psychometric function.

This index was able to separate out cases of cochlear lesions with a reliability of about 80%.

(95-Pg.34-35)

8.19 - DIP TEST - DISCRIMINATION BY IDENTIFICATION OF PICTURE TEST

This is a test to assess the auditory discrimination. It does not require a'same' or 'different' response. Instead it involves a picture pointing response to stimulus words.

In this test, the pictures represent words that are phonetically similar, these word pairs are presented orally and the child must demonstrate the ability bear the differences in words. The test includes 2 picture plates showing bear/pear? fan/man; pup/cup etc.

The above test should be used for children beginning at age 3.

(43.Pg.165-166)

8.20 - DLD TEST - DIFFERENCE LIMEN DIFFERENCE TEST

It is a diagnostic test to detect cochlear pathology. The patient is asked to report if the two signals presented to him are different in terms of loudness. Difference limen is thus determined at the intensities viz. 4 dB SL and 44 dB SL. In case of normal hearing subjects, the difference in the DL_S at the two intensities is large. This difference is very small in those patients with cochlear lesions.

This test is also called the DLI test (difference Limen for intensity).

(54.P9.179)

8.21 - FFR - FREQUENCY FOLLOWING RESPONSE

FFR is one of the direct procedures for assessing children's auditory function.

It was first reported by Marsh and Worden (1968). In FFR procedure, target electrode is usually fined at the vertex and indifferent electrodes have sometimes been fixed to each earlobe and a ground electrode to the leg, of the subject. A high gain and a high frequency response pre-amplifier is necessary with a lower frequency unit set, to allow for passage of the low frequency synchronous discharges

The response is most obvious to tones of 500 Hz and below, and can be elicited to a tone whose rise time is as slow an 4-5 m.sec.

FFR is ascribed to frequency locked synchronous discharge of many fibres in the auditory nervous system to low stimulating frequencies. In addition to the characteristic place away of fibres, neural elements will discharge at even multiples of stimulating frequencies. In addition, there are many fibres that will discharge at the reciprocal of their most sensitive frequency.

eg: A 250 Hz tone can elicit a group of synchronous fixings from units at the cochlear level every 4 m.sec (4m.sec being the period of a 250 Hz signal).

Source of FFR is not clear but it may be closely related to the 5th wave in the BSER complex.

(9.Ph.133-135)

8.22 - FIST - FREQUENCY INCREMENT SENSITIVITY TEST

The FIST was devised by Campbell (1970). It is similar to short increment sensitivity index (See SISI). But in this case, unlike in SISI, the intensity is kept constant and frequency is varied.

People with normal cochlea, can detect even 1% increment whereas people having cochlear lesions require atleast 2% increment to detect the difference in frequency.

8.23 - the GFW - AUDITORY DISCRIMINATION NOISE SUBTEST

(Goldman - Friscoce - Wood cock).

This test is administered to assess auditory figure ground and it was a taperecording of speech in the presence of competing background speech or noise, but maintaining the S/N ratio such that the test should not become a masking test.

The above test cues a picture pointing test to words recorded at a +9dB S/N ratio. The competing background is cafetaria noise.

(43.Pg.165)

8.24 - GFW - (GOLDMAN-FRISCOE-WOODCOCK) SELECTIVE ATTENTION TEST.

This is a test to assess auditory figure ground. It is administered using a tape recording of speech in the

presence of competing background noise or speech but maintaining the S/N ratio such that it means uses different auditory skills.

This test uses a picture pointing response to words recorded at a +9dB S/N ratio. The competing background noises are fanlike noise, cafetaria noise and speech.

(43.Pg.165)

8.25 - 2IFC - TWO INTERVAL FORCED CHOICE TECHNIQUE

In this technique,two time intervals are indicated to the subject by lights. An auditory stimulus is presented in one of them. The subject has to report in which interval he heard the signal.

The particular advantage of this technique is that it eliminates the psychological factor which is present in conventional procedures.

(95.Pg.34)

8.26 - MAB - MODIFIED ASCENDING BEKESY

Frisina - Johnson (1966) developed a modified ascending Bekesy (MAB) technique which required the subject to make a single depression of the response key upon perception of the auditory stimulus. When the response key was depressed, a timer automatically attenuated the stimulus for a specified

time and reinitiated the stimulus man ascending presentation. The investigators used a step-by-procedure for acquiring stimulus control.

It was also found that once vibrotactile to auditory generalization had been accomplished, intervening instruction or generalization between frequencies was not necessary.

(24.Pg.93)

8.27 - MLB - MONAURAL LOUDNESS BALANCE

MLB is a test for recruitment and is used with patients who have bilateral sensorineural hearing loss. It was devised by Reger (1936).

In this test, loudness balance procedures are obtained as in the case of ABLB, but comparison is made between stil: of two different frequencies presented to the same ear.

The difference in the pitch of the two signals may complicate the task of the patient.

(15.Pg.164-165)

8.28 - M-R (MODIFIED RAINVILLE)TEST

The M-R test was a modification of the Rainville test reported by Lightfoot (1960).

Measures were made of the effects of bone conduction masking upon thresholds for an air conducted tone, white noise, which serves as the masking agent, is presented through an oscillator that is placed upon the forehead. Measures are made of the level of noise just required to mask out the pure tone presented through an air conduction receiver.

The obtained results are compared with those obtained with a format hearing group. The difference between the two levels is the patients bone conduction hearing loss. It is possible with this technique to obtain a measure of sensorineural loss.

In this test, poorer thresholds are obtained for lower frequencies for conductive and mined hearing loss which may be due to the occlusion effect produced by the placing of earphones over the ears while noise is being presented through the bone osscillator.

(73.Pg.68-71)

8.29 - MRT - MODIFIED RHYME TEST

This is a speech discrimination task making use of a closed response paradigm. Each list has 50 items of which 25 items test the discrimination in initial position, and 25 in the final position. The subject is given a

choice of six rhyming words of which are is the stimulus word. Subject's task is to listen and indicate which of these words he heard.

8.30 - MTDT - MODIFIED TONE DECAY TEST

Some patients with retrocochlear lesions experienced loss of tonality before loss of audibility on/ihe tone decay test. Thus, Green (1960) modified the instructions given with the shortened 1-min version of the Carhart test (Green,1963).

The patient is seated in an armchair and told to maintain elbow contact with the armrest while he is signaling. He is trained to raise his arm perpendicular to the armrest if he perceives the stimulus as tonal, to lower it to a 45* angle if the stimulus losses tonality but remains auditory and to lower his arm to the rest position is the sound become completely in audible.

(28.Pg.190)

8.31 - NDT - NOISE DETECTION THRESHOLD

The NDT needs to be calculated in the Doefler-Stewart Test which was developed to detect binaural pseudohypacusis where the test compares responses to speech versus noise.

NDT is determined following simple instructions to the patient such as 'I am introducing a noise in your ears again Raise your hand as soon as you hear the noise even if it is very faint, put your hand down when the noise goes away. The noise is increased from -10 dB HL in 5 dB steps, and should be interrupted before each increase. After obtaining an ascending, descending and ascending threshold for the noise, the reading is accorded as NDT.

(36.Pg.293-195)

8.32 - NIL - NOISE INTERFERENCE LEVEL

The NIL needs to be calculated in the Doefler-Stewart test which was developed to detect binaural pseudohypacusi where the test compares responses to speech versus noise. NIL is established by raising the noise level from OdB HL and is brought up in 10 dB steps until a level 20 dB below the SRT, +5dB is reached (which is another value calculate for the test). Then the increments may be in steps of 5 dB/spondee until the patient ho longer repeats spondees. The point at which he does not repeat any of the spondees is the NIL.

(36-Pg.292-395)

8.33 - PARF - PLAY AUDIOMETRY REINFORCEMENT USING A FLASH LIGHT

This is one of the play audiometric techniques used

to screen the evaluate hearing of very young and in difficult to test children. In this procedure, the child is first conditioned to response to a light stimului presented for one or two seconds. This visual stimulus is presented by means of a flash light. This is then replaced by an auditory stimulus delivered through an earphone. To begin with, a 1000 Hz tone is presented at 50 dB HL. Intensity of the signal is then gradually decreased. Screening is then carried out at 2000 and 4000 Hz at 20 and 25 dB HL.

(82.pg.137)

8.34 - PAL PB LISTS - PSYCHOACOUSTIC LABORATORIES PHONETICALLY BALANCED WORD LISTS

Theses lists are used to test the speech discrimination ability of an individual. Each list consists of fifty monosyllabic words. These words are phonetically balanced i.e. the frequency of occurence of the various sounds in the list is kept proportional to their distribution in the given language.

(35-Pg.149-154)

8.35 - PEG - PNEUMOENCEPHALOGRAPHY

The PEG is a radiologic study of the ventricular system and subarachnoid spaces (in terms) PEGs uses air as a contrast medicion. Air is injected through the lumbar

puncture to fill the pathways of the cerebrospinal fluid The air outlines the ventricles and cisterns. A mass lesion will produce assymmetry and distortion of there structures. The PEG technique can detect the lesions in the posterior fossa and enlargement of the ventricular system. It can also detect the supra tentorial lateralize mass lesions.

(97.Pg.27)

8.36 - PIWI TEST - PUPPET IN THE WINDOW ILLUMINATION TEST

This is one of the techniques used for the evaluation of hearing in children. Here, localization responses are elicited from the child. These responses are reinforced b the illuminating a puppet in an adjacent window. The responses are then generalized to stimuli presented throug headphones.

(33.Pg.402)

8.37 - PPVT - PEABODY PICTURE VOCABULARY TEST

The PPVt is a receptive vocabulary test that has been standardized on the normally hearing population. In this tests a word is spoken, and the examinee is expected to select the appropriate corresponding picture. When admini-

nistered to hearing impaired children in the prescribed fashion, the test becomes as much a test of speech reading and auditory processing as a test of vocabulary. If a simultaneous form of communication is used, inflated scores may result since the iconic nature of the signs may induce a correct response without actual lexical knowledge. PPVT is less sensitive to higher order language skills. The PPVT may be useful in measuring extensiveness of vocabulary and degree of cultural assimil-tion of children Costellow described the PPVT as a screening instrument for children who have a limited expressive vocabulary or who are verbally inhibited. It should be used in conjunction with other tests of general abilities.

,(45.Pg.205)

8.38 - PVT - PHYSICAL VOLUME TEST

Some of the instruments for impedance measurements have a provision to determine the PVT. A 'C, reading is taken with positive pressure in the ear canal, to arrive at the PVT value. PVT values in the range of 1 to 1.5 ee and 0.6 to 0.8 cc is considered normal in case of adults and children respectively. A high PVT value indicates a perforated tympanic membrane.

(81-Pg.94)

8.39 - RASP - RAPID ALTERNATING SPEECH PERCEPTION TEST

It is useful in identifying lesions in the lower brain stem usually those in trons. It is a binaural test making use of sentences. The same sentence is presented to both ears but is rapidly alternated between the two ears (once in 200 m.sec). These sentence: are presented at 50 dB SL(re:SRT). A score of 90-95% is obtained when normal hearing subjects are tested with these sentences patients with brainstem tesions obtain very poor scores due to the difficulty in the fusion of messages delivered to the two ears.

(41.Pg.239)

8.40 - RT - RHYME TEST

Fairbanks devised the RT which is a completion type of test requiring the subject to supply the initial consonant to a 'stem' and the subject has the list of 50 stem. He writes the missing letter as he hears the words pronounced by the speaker. The words are selected so that there are atleast 5 thyming choices the subject can make for each word.

With this test, it is easy to categorize the constant errors the subject makes.

(70.Pg.126)

8.41 - SAI - SOCIAL ADEQUACY INDEX

The social adequacy index is a measure developed at the Central Institute for the Deaf, which is based on speech audiometry and represents the degree of handicap as far as hearing and understanding speech are concerned.

The SAI is computed from the results of the speech reception threshold and articulation tests. It can be found by means of a table in which the two dimension are SRT and discrimination loss. In the original research on SAI, each patient was given three PB tests. One at a level of 33 dB, one of 48 dB and one at 63 dB all levels in relation to zero SRT. These three hearing levels had been empirically defined as the average levels of faint, average and loud conversational speech respectively. The scores made by the patient on there 3 tests were averaged and the result was called the SAI.

(70.Pg.116-117)

8.42 - SAL - SENSORINEURAL ACUITY LEVEL

The SAI test was a modification of the Rainvitle technique, made by Jerger and Rillman (1960). In this test, measures were made of air conduction thresholds for the frequency range from 250 to 4000 cps. The measurements were then repeated with white noise being presented through

an oscillator positioned in the centre of the forehead. The noise was presented at a fixed level.

The SA1 was computed by subtracting the shift that occured index comparable testing conditions with normal ears.

Tillman in evaluating the SAL test found that for subjects with sensorineural hearing loss who were tested for frequencies above 1000 cps the bone conduction measure ments were lower for the SAL test than for conventional bone conduction audiometry. It was also seen that poorer thresholds were obtained for lower frequencies in the test for conductive and mixed hearing losses. This appears to be due to the occlusion effect. When none is presented

(73-Pg.69-71)

8.43 - SAT - SPEECH AWARENESS THRESHOLD

It is the lowest level at which an individual is able to detect speech. It is determined whenever spondee thresholds cannot be obtained.

This level is called the speech detection threshold (SDT)

(8l.Pg.79)

8.44 - SDLB - SIMULTANEOUS DICHOTIC LOUDNESS BALANCE TEST

This method has been given by Hood. The tone is presented simultaneously to both, the comparison ear and the adapting ear, for 15 sec. each to achieve the pre-adapted balances find preadapted balances 3 or 5 times and find the average. Then the adapting stimulus is presented continuously, for example if the tester wants to know adaptation after 3 mins, the tone is presented for 3 mins, and after the end of 3 mins, the stimulus is presented in the comparison ear for 15 sec. and again simultaneous loudness balances are taken.

The amount of adaptation at the end of 3 minutes of exposure

- intensity of the comparison stimulus required for equal loudness balance during preadapted balance.
- the intensity of stimulus required for balance at the en of 3 min exposure.

In SDLB, balances are made in the process of adaptation and is called as conc tant adaptation or perstimulatory adaptation.

8.45 - SDT - SPEECH DETECTION THRESHOLD

Refer SAT.

8.46 - SISI - SHORT INCREMENT SENSITIVITY INDEX

It was described by Jeriyer, Shedd and Harford (1959).

This test is used to detect the presence of recruitment. Here, twenty ldB increments are superimposed over a carrier tone presented at 20 dB SL. To familiarized the individual, larger increments say, 5 dB increments may be used and then gradually reduced to smaller increments. The number of times an individual can detect these changes is converted to obtain the SISI score. A score of 70 to 100% is said to indicate cochlear lesion.

However, it has been observed when the signal is presented at high intensity levels (60dB SPL) even subjects with normal cochlea can detect these changes. It has therefore been suggested that the test be carried out at a high score on the modified SISI test is not considere to be diagnostically significant, while abnormally low scores are said to indicate a retrocochlear lesion.

(54.Pg.179-186)

8.47 - SPAR - SENSITIVITY PREDICTION FROM ACOUSTIC REFLEX

It is observed that the reflex thresholds for pure-tones using an electroacoustic impedance bridgd are at

higher levels than those for noise. This observation is made use of, in or predicting the hearing sensitivity from the acoustic reflex thresholds. A number of methods have been suggested to calculate the SPAR.

(53.Pg.369)

8.48 - SPIN - SPEECH INTELLIGIBILITY IN NOISE

It is a complete and rationalized sentence test developed by Kalikow, Stevens and Elliot, (1977). The SPIN test, tests the listeneis ability to utilize both the linguistic situational information contained in sentences with the acoustic phonetic discriminations which must be made to identify low probability words embedded in sentenc

(85-Pg.535)

8.50 - SET - SPEECH RECEPTION THRESHOLD

It is the minimum level at which an individual can repeat atleast 50% of the words or speech stimuli presented This is usually determined by presenting spondees. Hence the name Spondee Threshold (ST) is also used.

(35.Pg.141-148)

8.50 - SSI - SYNTHETIC SENTENCE IDENTIFICATION

This test makes use of third order approximation to real sentences. The number of words and the sentence length in the list is approximately equal. The patient's task is to identify the sentence and indicate the number (usually by pushing appropriate button or switch).

As this test is observed to be very easy in quiet, it is usually presented with ipsilateral competing message (ICM). Scores on the SSI-ICM is observed to useful in detecting senson neural hearing impairments.

(27.Pg.154-155)

3.51 - SSW TEST - STAGGERED SPONDAIC WORD TEST

It is a test to identify central auditory dysfunction. The Items in this test consist of binaurally competing spondaid words. The second half or monosyllable of the first word and the first half of the second word overlap. The patient's task is to repeat both the spondees in the same sequence as during the stimulus presentation.

C-SSW - The corrected SSW (C-SSW) accounts for lowered discrimination scores.

A-SSW - The adjusted - SSW (A-SSW) offers compensation for non-auditory errors (such as response bias).

(41.Pg.141-145)

8.52 - ST - SPONDEE THRESHOLD

The ST is a means use of auditory threshold sensitivity for speech. The standard procedure in obtaining the ST is to use spondee words. The main function of the ST is to confirm the pure tone thresholds, in addition it serves as a reference for the level at which word Discrimination testing is performed. The primary frequencies used to discriminate speech sounds are between 300-3000Hz. The three octave frequencies tested within 300-3000Hz range are 500, 1000 and 2000 Hz . Together there 3 frequencies are used to calculate the pure tone average (PTA)

(81.Pg.79)

8.53 - STAT - SUPRATHRESHOLD ADAPTATION TEST

This test for tone decay is based on the hypothesis that abnormal adaptation (in pathological conditions) appear first at high intensity levels. The tone is presented at 110 dB HL in the presence of contralateral masking noise (white noise) at 90 dB SPL. The duration of presentation is 1/min. The test is carried out at 500, 1000 and 2000 Hz. The sesults are considered positive, if the listener reports a cessation of stimulus even before the completion of /min

(28.Pg.19I)

8.54 - SWAMI - SPEECH WITH ALTERNATING MASKING INDEX

Here, PB words are presented simultaneously to both ears at 40 dB SL(Re:SRT). 0.5 sec bursts of white noise is presented at 20 dB above speech level and this is alternated between the two ears.

A normal hearing individual can easily discriminate the words, as it is lateralized to the centre, while noise is heard alternately at the two ears.

On the other hand an individual with central auditory dysfunction performs poorly as he experiences difficulty with spatial separations of the signal from noise.

8.55 - TOM TEST - THRESHOLD OCTAVE MASKING TEST

This is a test to determine the susceptibility of the subject to Noise Induced hearing loss.

TOM maybe explained using an example. Introduce a 2 KHz tone at threshold level. Then introduce to the same ear a 1 KHz tone and find the intensity required to mask the 2 KHz tone. This intensity is the TOM value for 2 KHz. The 1 KHz tone will be able to mask the 2 KHz by producing harmonics.

Thus the normative data can be collected by finding average TOM values for Normal subjects. If a given subjects'

TOM values is less than the average TOM value it could b said that he is more susceptible to noise induced heari loss.

(39.Pg.3l)

8.56 - TROCA - TANGIBLE REINFORCEMENT OPERANT CONDITIONING AUDIOMETRY

This technique employed in the assessment of hearing in children, employs operant conditioning principles. Correct responses are reinforced with tangibles items such as a candy, trinket etc. Appropriate reinforcer should be deetermined for a given child before the procedure is begu

(50.Pg.10-12)

8.57 - VASC- VERBAL AUDITORY SCREENING FOR CHILDREN

It consists of 4 lists of spondees each contain 12 words. They coveR a range from 15 dB to 51 dB are attenuated at the rate of 4 dB per three words. The child ha to respond by pointing to a picture that represents the test word. In order to pass the test the child has to identify atleast 2/3 words at 15 dB.

(70.Pg.231-232)

8.58 - VAT - VERBAL AUDITORY TEST

Meyerson (1956) constructed a verbal test for measuring the hearing of children. It is a recorded test consisting of words of spondaic stress that were selected and equated for homogenity as regards basic audibility, familiarity to preschool children, and distribution of speech sounds. The response, material for the preschool children consisted of whomed pictures that corresponded to the stimulus words mounted on individual response boards. Older children made a written response to black and white reproductions of picture

The reliability of the VAT as measured by the test-retest and alternate form procedures was found to be high.

(73.Pg.265)

8.59 - VRA - VISUAL REINFORCEMENT AUDIOMETRY

Liden and Kankulken (1969) used the term visual reinforcement Audiometry (VRA) to describe a modified COR. procedure which they developed. In short, VRA refers to ahead-turn response upon auditory stimulation, coupled with visual reinforcement.

(Also see CA-AR)

(61.Pg.177-213),

8.60 - VRISD - VISUALLY REINFORCED INFANT SPEECH DISCRIMINATION

This technique is used to study the developmental changes in speech discrmination. One syllable of a recorded contrastive stimulus fair is presented at a repetition rate of one syllable per second at 50 dB SPL. When the child's attention is centred along the midline, the syllable is changed. The infant is reinforced for a headturn an hearing the change in the signal. Activation of an animated toy is used as the reinforcement.

(61.Pg.201.202)

8.61 - WDS - WORD DISCRIMINATION SCORE

To compute the WDS, (SRT+40dB) is the presentation level generally chosen. The level is not altered during testing.

The examiner checks the subjects responses either oral or written, with the corresponding list of the PB words presented to the subject.

If the full 50 words of any list are used, the examiner then subtracts 2% for each error from the total 100% to compute the WDS.

(5.Pg.245)

It is of diagnostic importance to compare the WDS with the results of pure tone audiometry.

(5.Pg.245).

8.62 - WIPI - WORD INTELLIGIBILITY BY PICTURE IDENTIFICATION

This is a speech discrimination test used with children Twentyfive monosyllabic words which can be represented through pictures constitute each list.

The child is provided with alternative pictures for each stimulus word. The child responds by pointing to the picture.

(56.Pg.15l)

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INDEX

ACRONYMS FROM GENERAL TOPICS IN AUDIOLOGY

ELECTROPHYSIOLOGICAL INDICES AND TESTS

HEARING AIDS

MANAGEMENT OF THE AURALLY HANDICAPPED

NOISE

ORGANISATIONS IN THE FIELD OF AUDIOLOGY

SPECIAL TESTS IN AUDIOLOGY