NORMATIVE DATA FOR CLINICAL ABR AUDIOMETRY

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ABSTRACT

The use of Clinical Instrument for diagnosis purpose necessitates norms. The following paper postulates norms for ERA, TA-1000, using 2 KHz logon tone at two intensity level 80 dB and 100 dB for absolute latencies I to V, Absolute Amplitude I, III and V, Interwave latencies I-III, III-V andV-I, and relative amplitudes I/III, III/IV, and I/V, based on 20 individuals tested.

Several clinics use ABR audiometry in audiological and otoneurological diagnosis. Abnormalities along the auditory pathways result in temporal and morphological variations from the normal pattern, enabling reasonably accurate diagnosis of acoustic neuroma, cerebropontineangle tumor, etc. Many attempts have been made to establish norms for ABR but failed to, as each laboratory has different stimulus, starting point of recording, regarding techniques, etc. More or less they can be compared if most of the variables are Similarly controlled, hence there is the need for each laboratory on ABR recording system to have its own norms.

Recognition of abnormal responses from the normal makes diagnosis possible. Generally three ABR parameters are looked for, they are morphology, latency and amplitude. The latter two are further classified, latency-absolute and interwave ; amplitude-absolute and relative.

Latency is time relationship between any response and the stimulus eliciting that response. Absolute latency is the time relationship between stimulus onset and associated response. For clinical purpose generally peak I to V are considered. Interwave latency refers to time difference between two component waves eg. the I-V interwave latency, their valves are typically specified in milliseconds. Clinically the most valuable interwave latencies are I-III, III-V and I-V intervals.

In ABR, response amplitude refers to the height of the given wave component, and it is usually measured in microvolts (uV) from the peak of the wave to the following trough (assuming that vertex positive wave are displayed as upward deflection). The relative amplitude is the ratio of the absolute amplitudes for two ABR waves- For practical purposes the ampli-

tude was not converted into uV but kept in centimeter only, but the conversion is easy. For example, if a trace feature is 2.5 division high and marker is 1 divison high and the scale switch is set to 2 uV/div., amplitude can be calculated as TXS=2.5X2=.500v). Thus to avoid meticulous calculat-
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ions amplitude was measured in cms, but a conversion table was prepared to convert the value from cm (.01-5.00 cm) to uV (Gupta, 1983).

Subjects:

20 normal hearing (20 dB HL ANSI 1969; subjects with the age range of 18 to 25 years (mean age 20.5 years). Ten males and 10 females selected were etologically and neurologically NAD.

Equipment:

The equipment used was electric Response Audiometer, model TA-1000, consisting of SLZ 9793 desk-top console, the SLZ 9794 preamplifier and accessories.

Procedure:

Prior to every test the stabilizer (I.T.L. model SUS-ZOOL) out put was checked to ensure a constant voltage of 200 volts.

The subject was to lie in relaxed recumbent position on a medical examination table. Option was given for pillow to avoid head-neck tension and to make muscle artifact negligible. Subject was informed that three electrodes would be placed and then a earphone from which he could hear click like sound in the right ear. He or she was asked to be in a relaxed state and could go to sleep. Rest placement of the electrode and settings were as per operation manual of the instrument.

The stimulus frequency was 2 KHz, 20 pulses per second wtih 10 MS sample time. The scale was an 2048 samples and 0.2 uV/DIV stimulus intensity was 80 dB HL and then 100 dB HL.

When adequate samples (2048, excluding rapidly averaged) wereo bserved final recording were done, absolute latencies were noted on the instrument itself with, latency cursor and other parameter ware calculated from oscilloscope traces recorded on the plotter by tubular pen. Amplitude of ABR was determined from plotter in centimeters, the marker amplitude M, was noted in division of 1, 2 or 4 for finer analysis each division was further divided into

10 divisions. From this basic data relative amplitude and inter-wave latencies were calculated. The following norms are proposed:

L FOR ABSOLUTE LATENCIES

Intensity dB		Peaks in MS I	II	III	IV	V
	v					
80	X	1.20	2.21	3.17	4.33	4.95
	SD	.15	.20	.13	.16	.21
	X	.92	1.88	2.90	4.11	4.76
100	SD	.10	-24	.17	.23	.19

2. FOR ABSOLUTE AMPLITUDE

Intensity dB		Peaks in cms I	III	V
80	X	0.61	0.86	1.43
	SD	.27	.39	.36
100	X	0.80	0.94	1.56
	SD	.35	.49	.43

3. FOR INTERWAVE LATENCIES

Intensity dB		Waves in MS I-III	III-V	V-I
80	X	1.92	1.80	3.52
	SD	.23	.18	.27
100	X	1.77	1.87	3.85
	SD	.19	.20	.19

4. For Relative Amplitude

Intensity dB		waves I/Ill	III/V	I/v
80	X	1.52	1.98	2.77
	SB	.68	1.10	1.38
100	X	1.27	1.97	2.20
	SD	.67	1.08	.88

REFERENCE:

GUPTA, J. Normative data for Clinical Auditory Brain-Stem Response : Effect of sex and Intensity. Unpublished M.Sc, Independent project. Mysore: A1ISH. 1983.