MANSA e-bulletin

EDITION 2020

Dual language e-bulletin with:

10 Short articles

3 Long articles

MANSA
Malaysian National Society of Audiologists

Message from the President

Dear MANSA Members

It is with great pleasure to present MANSA's very first issue of e-bulletin!

Since the inception of MANSA, it has always been our aim to produce a bulletin for the audiology fraternity to share knowledge, experiences and as an avenue for audiologists to showcase their good work as well as writing skills. As the saying, better late than never, we finally has our first issue of the bulletin.

I would like to thank and congratulate Dr. Nor Haniza Wahat, our Executive Committee for Research and Development for spearheading this effort together with her hardworking team members. It is not an easy task to make sure all articles or sharing in the bulletin are of good quality and fulfils the needs for all audiologists, especially our members.

I hope more good works for this e-bulletin will continue and be the mainstream knowledge and experience sharing for all audiologists in Malaysia. We welcome more contribution of articles and sharing of knowledge to ignite the further success of future issues.

Hope all members, audiologists and student audiologists will fully benefit from this e-bulletin.

Thank you.

Kind regards,

Patrick Tan

President
Malaysian National Society of Audiologists
2018-2020

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Message from the Chief Editor

Dear MANSA Members

MANSA has been part of the professional development journey in most Malaysian audiologists since the year 2010. For the very first time, MANSA e-Bulletin is finally here! In conformity with one of MANSA's mission, i.e. to promote excellence in audiology, which include gaining up-to-date knowledge, this dual-languages e-Bulletin covers ten short and three long articles.

I would like to thank all the editorial board members for their immense hard work. Not forgetting our creative and committed designer, and most importantly, thank you to all contributing authors for making this happen.

I am positive that more articles will be contributed in coming e-bulletin and we hope to receive more contributions from the industrial players.

Cerita P. Ramlee tak pernah jemu
Disebut jauh disebut dekat
Cintai guru cintai ilmu
Hidup pasti bertambah berkat

Kind regards,

Nor Haniza Abdul Wahat

MANSA e-Bulletin Chief Editor &
Research and Development
Executive Committee

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Short article

Signal to Noise Ratio as a Guideline to Obtain Valid Auditory Brainstem Response Results

Ahmad Aidil Arafat Dzulkarnain
Corresponding author: ahmadaidil@iium.edu.my

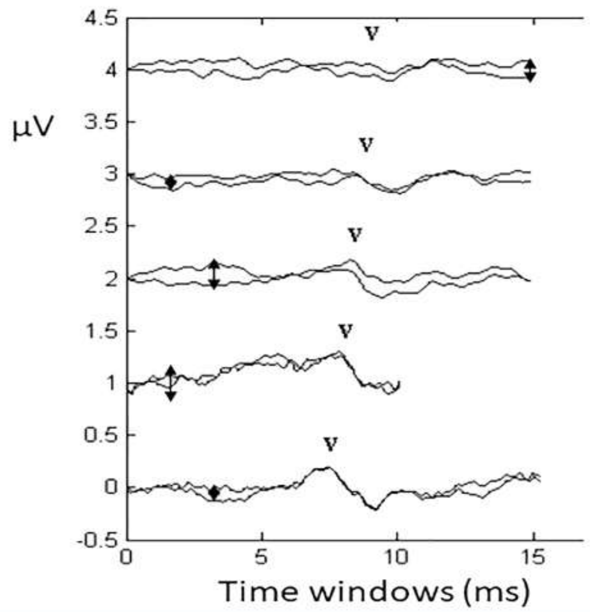

Figure 1. Repeated ABR waveforms recorded from a normal hearing individual are shown. The arrow in each ABR reflects the gap between two ABRs that can be used to estimate the noise amplitude of the recordings. The equipment display scale setting (µV/ms) can be used as a guideline for estimation.

Auditory brainstem response (ABR) is regarded as one of the important tests to assess the auditory brainstem function and to estimate behavioral hearing thresholds. Whilst ABR is considered objective from the patient's point of view, the interpretation of the ABR requires substantial knowledge from the perspective of an audiologist. The whole processes of ABR interpretations are complex. The first important aspect of interpreting the ABR findings is to identify whether an ABR is present or absent.
Typically, the technique used to identify a true ABR is by using response replication analysis. In this technique, ABRs are repeated twice under identical test conditions. Given a large area of overlap between the two repeated ABRs, the clinician ill have a high level of confidence that a true ABR is identified. This technique can also be used in conjunction with other techniques, such as tracking the ABRs by observing the change in latency/amplitude as a function of intensity levels. In certain auditory evoked potential systems, the response replication analysis is provided statistically, also known as cross-correlation. In cross-correlation, the recorded ABRs are separated into two recording buffers and the response from each buffer will be statistically compared. If the percentage of relationship is higher (e.g. more than 70%), it indicates a high probability that both recorded ABRs are highly correlated enhancing the confidence level of the ABR detection. Although response replication is still considered a valid method to identify ABR, it has at least one limitation. There is a potential that noise or artifact can mimic the morphology of the ABR and be repeated at almost the same latency. This may lead to false identification and misdiagnosis of ABRs among the clinicians.

One of the recommended techniques to strengthen the response replication analysis is to measure the recorded ABR signal-to-noise ratio (SNR). The ABR SNR can be computed manually or using a certain type of analysis provided by the auditory evoked potential system. An example of an automated SNR analysis includes the F-ratio at single or multiple points (1). The F-ratio values will gradually increase when the estimated noise level from the selected points of the ABRs is lower than the amplitude of the ABR. Typically, an F-ratio of 3.1 indicates that the ABR is present (with 99% confidence) and well above the recorded noise level. Without this algorithm, clinicians need to manually calculate the SNR. According to the British Society of Audiology (2), a minimum acceptable limit of ABR amplitude is equivalent to 0.04 µV with a minimum ratio between ABR and the noise level of 3:1. The measurement of ABR amplitude is very straightforward, i.e., by just simply plotting the peak of wave V and its following trough (at peak of SN 10). To estimate the noise, clinicians need to observe the gap between two superimposed ABR waveforms and manually compute the noise amplitude based on the appropriate display scale (3). Therefore, they should only stop the ABR recording if the SNR is equivalent to 3:1 or higher (if the ABR is present). Some latest evoked potential systems may provide on-going residual noise levels to the clinicians, which can be used as a guideline. Figure 1 illustrates the technique to identify the gap between two ABR waveforms and to estimate its residual noise level.

Besides identifying ABR as present, clinicians also need to decide if ABR is absent. Based on their own experience, the question to decide whether ABR is considered as present or absent is often raised because of the poor quality of the recording. Clinicians may get confused whether to accept the ABR that contains a substantial amount of noise versus the true ABR. Whilst this issue is not the aim of the paper, they should employ correct strategies to reduce the amount of background noise during the recording to ensure valid interpretations. An absent ABR is defined as a waveform that is flat with a reasonably lower residual noise level, that again can be assessed by observing the gap between two superimposed ABR waveforms or by the estimated residual noise levels provided by the respective equipment. The recommended minimum residual noise level to stop an ABR recording ranges from 0.025 μV to 0.04 μV (2).

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