Data Article

Data of contralateral suppression of transient evoked otoacoustic emissions for various noise signals

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A R T I C L E   I N F O

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A B S T R A C T

The data presented in this article is related to our research article titled “contralateral suppression of transient evoked otoacoustic emissions for various noise signals” (Kalaiah et al., 2017) [1]. The contralateral suppression of transient evoked otoacoustic emissions (TEOAE) was measured from 19 young adults with normal hearing sensitivity. To measure the contralateral suppression, TEOAEs were recorded using clicks in linear mode with and without presenting noise to the contralateral ear. Initially, the TEOAE was recorded without presenting noise to the contralateral ear of participants referred to as ‘baseline’ TEOAE. Following this, the TEOAE was recorded by presenting noise to the contralateral ear, referred to as contralateral noise conditions. Noises used in the present study included white noise, amplitude-modulated noise, and real-life noise signals. All recordings were completed on the same session in single probe-fit condition. The data reported here include the global amplitude of TEOAE, noise-floor level, and signal-to-noise ratio across baselines and contralateral noise conditions and the magnitude of contralateral suppression for various noises. Further, the data includes the amplitude of TEOAEs and suppression magnitude across eight 2 ms time bands between 2 and 18 ms.

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Specifications Table

| Subject                  | Hearing sciences          |
|--------------------------|---------------------------|
| Specific subject area    | Otoacoustic emissions     |
| Type of data             | Datasheets (.xlsx files)  |
| How data were acquired   | The TEOAEs were recorded using the Echoprt ILO292-II otoacoustic emission system (Otodynamics Ltd., Hatfield, UK) |
| Data format              | Raw data                  |
| Parameters for data collection | Stimuli: Clicks      |
|                          | Recording mode: Linear mode |
|                          | Number of stimuli: 400    |
|                          | Intensity: 60 dB peSPL     |
|                          | Intensity of noise in the contralateral ear: 60 dB SPL |
| Description of data collection | The TEOAEs were recorded in one session from 19 young adults in single probe fit condition. It was recorded by presenting various noises to the contralateral ear of participants and without presenting noise to the contralateral ear. |
| Data source location     | Institution: Kasturba Medical College, Mangalore. |
|                          | City/Town/Region: Mangalore |
|                          | Country: India            |
| Data accessibility       | Repository name: Mendeley Data |
|                          | Data identification number: doi: 10.17632/ytxmkyzgr4.1 |
| Related research article | M. K. Kalaiah, J. F. Nanchirakal, L. Kharmawphlang, S. C. Noronah, Contralateral suppression of transient evoked otoacoustic emissions for various noise signals, Hearing, Balance, and Communication. 15(2) (2017) 84–90. http://dx.doi.org/10.1080/21695717.2017.1311504 |

Value of the Data

- The present data would be useful for understanding the role of efferent pathways in real-life situations.
- The present data could be useful for scientists or researchers in the field of hearing sciences, speech perception.
- Useful for carrying out advanced analysis such as time-frequency analysis and wavelet analysis of TEOAEs.
- The present data could be useful for measuring intra-session reliability of TEOAEs, intra-session reliability of contralateral suppression of TEOAEs, individual variability of TEOAEs, and individual variability of contralateral suppression of TEOAEs.

1. Data Description

The supplementary files (spreadsheet) provided in this data article consists of processed TEOAE data in “.xlsx” format. The supplementary file labeled ‘TEOAE_global_amplitude’ includes the global amplitude of TEOAEs (in dB SPL), noise floor (in dB SPL), and signal-to-noise ratio (SNR) across conditions. The values provided in the above supplementary file were recorded from the ILO v6 analysis software. The first column in the supplementary file represents participant ID. The amplitude of TEOAE for baseline and various noise conditions are provided in separate columns. Further, the data of each participant are provided in one row. The column labelled ‘BL’ includes the amplitude of TEOAE in the baseline condition. Further, columns labelled
‘WN,’ ‘AM4’, ‘AM50’, ‘AM100’, ‘2T’, ‘4T’, ‘6T’, ‘CF’ and ‘CT’ represents contralateral noise conditions white noise, 4 Hz, 50 Hz, and 100 Hz amplitude-modulated noise, 2-talker, 4-talker, and 6-talker speech babble, cafeteria noise, and traffic noise, respectively. Columns 2 to 11 include the average amplitude of TEOAE, obtained by computing the mean of all recordings in each condition. The amplitude of TEOAE of each recording is provided separately in successive columns. The columns labelled ‘BL_1’, ‘BL_2’, and ‘BL_3’ include the global amplitude of TEOAE in baseline condition for first, second, and third recording, respectively (the number in suffix indicates the order of recording). Similarly, the amplitude of TEOAE for various contralateral noise conditions for each recording is provided separately. The amplitude of noise floor and SNR across conditions are provided in two separate sheets, and headings are the same as described above.

The supplementary file labelled ‘TEOAE_global_suppression’ consists of the magnitude of suppression of TEOAE for various contralateral noise conditions; it was computed using the global amplitude of TEOAE. It was obtained by subtracting the amplitudes of TEOAEs in each contralateral noise condition from the baseline condition. The labels used for columns in the supplementary file are the same as described above. The supplementary file labelled ‘TEOAE_band_amplitude’ includes the average amplitude of TEOAE for various 2 ms duration time bands across eight-time bands between 2 and 18 ms. This analysis was performed using the EchoMaster software program [2] (available at https://www.oae.it/old/index_1024.html). The average amplitude was obtained by computing the mean of all recordings as described above. Each column in the supplementary file is labelled as described above. In addition, the labels for each column consisting of a suffix (e.g., BL_4-6, BL_6-8, etc.) which indicates the time band in ms. The supplementary file labelled ‘TEOAE_band_suppression’ includes the magnitude of suppression of TEOAE for various time bands across contralateral noise conditions. It was obtained by subtracting the amplitudes of TEOAEs in each contralateral noise condition from the baseline condition. The labels of the column headings are similar to the supplementary file consisting of the amplitude of TEOAE for various time bands. The raw data is available at doi: 10.17632/ytxmkyzgr4.1

2. Experimental Design, Materials and Methods

2.1. Participants

The data was collected from 19 young adults aged between 18 and 23 years. Amongst them, 10 participants were males, and the rest were females. The air conduction hearing thresholds were less than 15 dB HL in both ears at octave frequencies between 250 and 8000 Hz for all the participants. There was no history of otologic or neurologic problems and exposure to ototoxic medications or hazardous noise. All participants had an A-type tympanogram [3] with acoustic reflex thresholds at normal levels. The acoustic reflex threshold for broadband noise was greater than 70 dB SPL for all participants. The acoustic reflex threshold was measured with contralateral stimulation. All the procedures used in the study adhered to the institutional ethical committee guidelines and followed the principles of the Declaration of Helsinki. The participants were provided with details of the study, following which informed consent was obtained.

2.2. Noise

To measure the contralateral suppression of TEOAE, various noises were presented to the contralateral ear of participants. The noises included white noise, amplitude-modulated noise, speech babble, and real-life noise signals. White noise and amplitude-modulated noise were generated using MATLAB with a sampling rate of 44,100 Hz and 16-bit amplitude resolution, respectively. Amplitude-modulated noise was obtained by sinusoidally modulating the amplitude of white noise at modulation rates of 4 Hz, 50 Hz, and 100 Hz and 50% modulation depth. Speech babbles used in the present study included two-talker, four-talker, and six-talker babble (all female talkers). Traffic noise and cafeteria noise formed the real-life noises.
2.3. Recording of TEOAE

The TEOAEs were recorded using Echoport ILO292-II otacoustic emission system (Otodynamics Ltd., Hatfield, UK) with ILO v6 analysis software. Participants sat comfortably on a reclining chair while TEOAEs were recorded. They were instructed not to move their head. All the TEOAEs were recorded from the right ear of the participants. The OAE probe was snugly fitted, and a total of 400 clicks were presented in linear mode at 60 dB peSPL to record TEOAE. At the beginning of the recording session, a baseline TEOAE was recorded without presenting contralateral noise. After the baseline TEOAE recording, the TEOAE was recorded by presenting various noises to the contralateral ear of participants (i.e., white noise: 4 Hz, 50 Hz, and 100 Hz amplitude-modulated noises; two-talker, four-talker, and six-talker speech babble; traffic noise and cafeteria noise). The TEOAEs were recorded twice when each type of noise was presented to the contralateral ear. These noises were delivered using ER-6A insert phones at 60 dB SPL. The order of presentation of noises was randomised across the participants. In addition, two additional baseline TEOAEs were obtained, one in the middle of the recording of TEOAEs and the other at the end of the recording of TEOAEs. Thus, the recording of TEOAEs always started and concluded with baseline TEOAEs. All the recordings were completed in one session without disturbing the placement of the OAE probe. The recording session took around one hour for each participant.

2.4. Data analysis

The overall amplitude of TEOAE, referred to as global amplitude of TEOAE, and noise-floor level were noted from ILO V6 analysis software. The TEOAEs were considered to be present if the global SNR was at least 6 dB in the baseline condition. The global amplitude of TEOAE in various contralateral noise conditions was subtracted from the baseline condition to obtain the magnitude of contralateral suppression of TEOAEs for each noise condition. In this, the amplitude of TEOAE in three baselines was averaged. Similarly, the two recordings of TEOAEs in each noise condition were also averaged. In addition, the contralateral suppression was also calculated for eight, 2 ms time intervals between 2 and 18 ms to examine the time-varying changes in suppression. The amplitude of TEOAE for short intervals was calculated using the EchoMaster software program [2].

Data Availability

Contralateral suppression of TEOAE for various noises (Original data) (Mendeley Data).

Ethics Statement

The study was approved by the Institutional Ethics Committee of Kasturba Medical College, Mangalore (Protocol number: IEC KMC MLR 11-13/217).

Informed consent was obtained from all the participants before they participated in the study.

CRediT Author Statement

Mohan Kumar Kalaiah: Conceptualization, Methodology, Data curation, Investigation, Supervision, Validation, Writing – review & editing; Usha Shastri: Writing – original draft, Writing – review and editing.
Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have or could be perceived to have influenced the work reported in this article.

Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.dib.2021.107367.

References

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