



Research Paper

Assessment of rock musician's efferent system functioning using contralateral suppression of otoacoustic emissions



Prawin Kumar ^a, Vibhu Grover ^a, Sam Publius A ^a,
Himanshu Kumar Sanju ^{b,*}, Sachchidanand Sinha ^c

^a Department of Audiology, All India Institute of Speech and Hearing, Mysuru 6, Karnataka, India

^b Department of Audiology and Speech-Language Pathology, Amity Medical School, Amity University, Gurgaon, Haryana, India

^c Department of Speech and Hearing, Sri Aurobindo Institute of Medical Science, Indore, Madhya Pradesh, India

Received 18 May 2016; accepted 29 November 2016

Available online 23 December 2016

KEYWORDS

Rock musicians;
Contralateral
suppression;
Efferent pathway

Abstract *Objective:* Contralateral suppression of oto acoustic emission (OAE) is referred as activation of efferent system. Previous literature mentioned about the importance of contralateral suppression of OAEs as a tool to assess efferent system in different groups of population. There is dearth of literature to explore the efferent system function in experienced musicians exposed to rock music using TEOAEs and DPOAEs.

Methods: Two groups of participant (14 rock musicians and 14 non-musicians) in the age range of 18–25 years were involved in the study. Contralateral suppression of TEOAEs and DPOAEs were measured using ILO (Version 6) in both groups.

Results: Descriptive statistics showed higher suppression of TEOAEs and DPOAEs in rock-musicians at most of the frequencies in comparison to non-musicians. For DPOAE measures, Mann Whitney *U* test results revealed significantly greater DPOAE suppression only at 1 kHz and 3 kHz in rock-musicians compared to non-musicians. For within group comparison, Kruskal Wallis test results revealed there were significant difference observed across most of the frequencies i.e. at 1 kHz, 3 kHz and 6 kHz. For TEOAE measures, Mann Whitney *U* test results revealed that only at 2 kHz, TEOAE suppression in rock-musician was significantly greater compared to non-musicians. Similarly, Kuskal Wallis test results revealed that within group

* Corresponding author.

E-mail address: himanshusanjuaiish@gmail.com (H.K. Sanju).

Peer review under responsibility of Chinese Medical Association.



Production and Hosting by Elsevier on behalf of KeAi

<http://dx.doi.org/10.1016/j.wjorl.2016.11.006>

2095-8811/Copyright © 2016 Chinese Medical Association. Production and hosting by Elsevier B.V. on behalf of KeAi Communications Co., Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

there were no significant differences observed for most of the frequencies except 2 kHz.

Conclusions: Based on the above finding, present study concludes that rock musicians are having better efferent system compared to non-musicians. No suppression effect at few frequencies probably indicates more vulnerability at those frequencies. Contralateral suppression of DPOAE shows more significant finding in comparison to contralateral suppression of TEOAEs in present study.

Copyright © 2016 Chinese Medical Association. Production and hosting by Elsevier B.V. on behalf of KeAi Communications Co., Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

The auditory efferent system consists neural pathways that transmit information from the lower brainstem to the cochlea.¹ The medial component consists of large, myelinate fibres that originate around the medial nuclei of the superior olivary complex and terminates beneath the outer hair cells (OHCs) of the organ of corti.^{1,2} Some medial olivocochlear neurons project ipsilaterally and some project contralaterally, with most OHCs having binaural input.³ On acoustic stimulation, the medial olivocochlear system (MOCS) inhibits activity of OHCs which can be seen by a decrease in the level of OAEs in normal hearing individuals.^{4,5} The amount of suppression can be measured by subtracting the level of emission in presence of the suppressor stimulus from the level of emission in absence of suppressor stimulus.

The function of MOCS is not completely understood by the researchers but in attempts to further understand its function, various psychoacoustic measures such as loudness adaptation and ability to understand speech in presence of noise have been studied in relation to MOCS.^{6,7} The other approach to uncover its functionality has been to study MOCS differences among different subject population.

Studies very clearly mentioned about the importance of contralateral suppression of OAEs in different groups of population.^{8–12} Since suppression of emissions is referred as activation of efferent system which indicated the amount of protection exists with the individuals. It is well known fact that measuring emissions is less time consuming, non-invasive and precise measures due to which many researchers preferred to use it for evaluating efferent system using this technique. In spite of wide application, there is a dearth of literature to explore the efferent system function in experienced musicians exposed to rock music using TEOAEs and DPOAEs. Though, it has been reported in other electrophysiological studies that musicians have enhanced perceptual skills compared to the non-musicians,^{13–17} combination of TEOAEs and DPOAEs suppression effects is not widely explored in rock musicians. Hence, present study is formulated to measure the functioning of efferent system in experienced rock musicians to know about the role of OCB in these individuals over non-musicians. The aim of the present study is to assess the functioning of efferent system in experienced rock musicians in comparison to non-

musicians using contralateral suppression of TEOAEs and DPOAEs.

Material and method

Participants

Two groups of participant (experimental & control group) in the age range of 18–25 years were involved in the study. Experimental group includes 14 rock musicians (28 ears) (Mean age of 23.3 ± 1.3 year) who had minimum professional experience of 5 years of rock music exposure (Mean duration of 8.4 years), practicing minimum of 15 h per week (Mean = 19.3 h/week). They had started musical training after the age of 10 years. Further age matched 14 participants (28 years) (Means age of 24.7 ± 2.1 years) who were not having any formal training of any kind of music and never participated in any musical related activities strictly served as non-musicians, in the control group. All the participants had pure tone thresholds less than 15 dB HL in both ears, which indicated normal peripheral hearing system in both ears. They had no indication of middle ear pathology on the day of testing as per immittance evaluation. They were ruled out based on structured case history for any history of diabetes mellitus, hypertension, any neurological disorders, smoking, and consuming alcohol. It was insured that participants were not having illness on the day testing.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the All India Institute of Speech and Hearing ethical committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written Informed consents was taken from all participants of this study.

Instrumentation

A calibrated Grason-Stadler Incorporated-61 (Grason-Stadler, Eden Prairie, United State of America) dual-channel audiometer with Telephonics TDH-50P supra-aural headphones, housed in MX-41/AR ear cushions, was used for obtaining air-conduction thresholds. The same audiometer with Radioear B-71 bone-vibrator was used for obtaining bone-conduction thresholds. A calibrated Grason-Stadler Incorporated Tymptstar (Grason-Stadler, Eden Prairie, USA)

Download English Version:

<https://daneshyari.com/en/article/5670722>

Download Persian Version:

<https://daneshyari.com/article/5670722>

[Daneshyari.com](https://daneshyari.com)