

Introduction

The otoacoustics emissions measurements may be influenced by potential standing waves generated in the external auditory canal, when using a stimulus in dB SPL. This effect may impact the Medial Olivocochlear Reflex (MOCR) record, as it is a measure of small magnitude that may not be captured with stimuli calibrated in SPL.

To mitigate this effect, calibration using decibel forward pressure level (dBFPL)¹ can be used to compensate for the influence of ear canals on OAE responses. Maxim et al.² studied the combined use of calibration in FPL and the use of EPL (emitted pressure level) to compensate for the variability in OAEs. The study revealed a significant effect on intrasubject OAE variability.

Objective

To Investigate the variation in the level of Transient Evoked Otoacoustic Emissions (TEOAE) under the effect of activation of the efferent pathway (medial olivocochlear reflex – MOCR) by a stimulus calibrated in decibel Forward Pressure Level (dB FPL).

Method

Participants

- 9 (aged between 20 -24 years)
- Hearing thresholds better than 15 dB HL.
- A-Type Tympanograms
- TEOAE presents
- Were excluded participants with incomplete test.

Procedures

- PTA (250 to 8000 Hz, octave interval).
- Acoustic immittance Measurements.
- WBT (reflectance)
- TEOAE (80dB p.e.)

Meeting Inclusion Criteria

10 Trials

- OtoStat 2.1; HearID system, calibrated in situ for dB FPL.
- Stimulus 50 dB SPL calibrated in situ for dB FPL

- Each trial alternating presence of 60 dB SPL CAS noise or without noise, performing ten measures for each condition.

MOCR -

Results

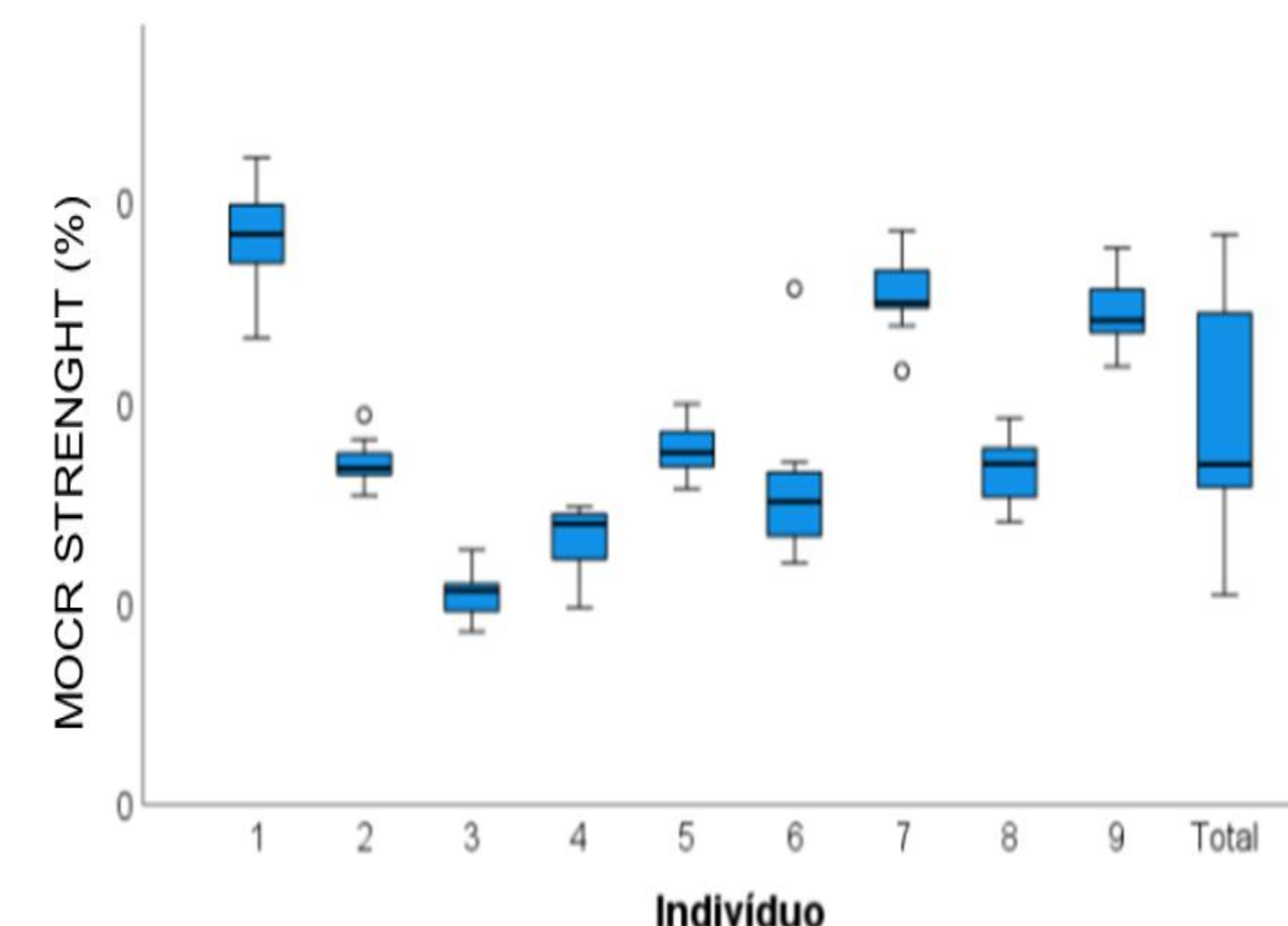


Figure 1: MOCR % for each participant.

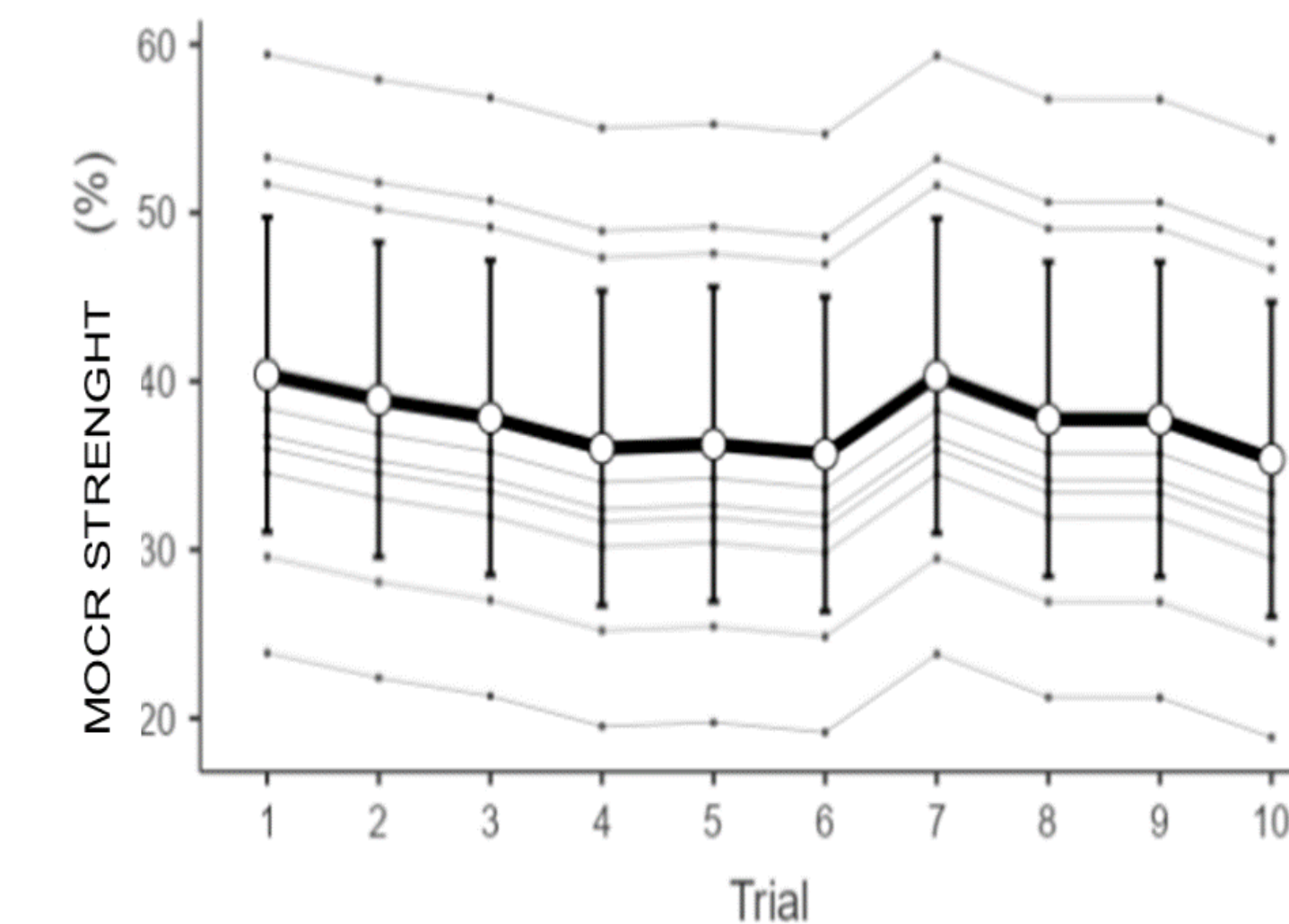


Figure 2– MOCR Strength (mean±SD) for each Trial

The average value obtained for MOCR Strength in this study was 37,63%. The MOCR values obtained in each of the ten measurements were compared between subjects and no significant difference were found.

The results found indicate MOCR Strength as a possibility to analyze the inhibitory effect of the efferent auditory pathway through the MOCR

Conclusion

In situ calibration-FPL of the stimulus for TEOAE has a promising future for evaluating the MOCR

Références

- 1- Lapsley-Miller JA, Reed CM, Marshall L, Perez ZD, Villabona T. A clinically viable medial olivocochlear reflex assay using transient-evoked otoacoustic emissions. *Ear Hear* 2024; 45(1):115–29.
- 2- Maxim T, Shera CA, Charaziak KK, Abdala C. Effects of forward and emitted-pressure calibrations on the variability of otoacoustic emission measurements across repeated probe fits. *Ear Hear* 2019; 40(6):1345–58
- 3- Guinan JJ Jr. Olivocochlear efferents: Their action, effects, measurement and uses, and the impact of the new conception of cochlear mechanical responses. *Hear Res* 2018; 362:38–47
- 4- Marshall L, Lapsley-Miller JA, Guinan JJ, Shera CA, Reed CM, Perez ZD, et al. Otoacoustic-emission-based medial-olivocochlear reflex assays for humans. *J Acoust Soc Am* 2014; 136(5):2697–713.
- 5- Jedrzejczak WW, Pilka E, Pastucha M, Skarzynski H, Kochanek K. Magnitude of medial olivocochlear reflex assayed by tone-burst-evoked otoacoustic emissions: reliability and comparison with click-evoked emissions. *Int J Audiol* 2023; 63(5):293–9.

The MOCR responses were calculating considering the 2 conditions: without (PQ) and with contralateral noise at 60BSPL (PN), in according to:

$$MOCR_{TE} = 100 \left(\frac{\sqrt{\sum |P_N - P_Q|^2}}{\sqrt{\sum |P_Q|^2}} \right)$$

The results were submitted to descriptive and inferential analysis. The significance level of 0.05 was adopted.