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The effects of contralateral stimulation on DPOAE fine structure

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The activity of the medial olivocochlear efferents is assumed to be detectable by measuring the change of the level of distortion product otoacoustic emissions (DPOAE) during ipsilateral or contralateral acoustic stimulation (CAS), the so-called medial olivocochlear reflex (MOCR). The reliable detection of the MOCR is of some interest since the absence of MOCR could give an indicator for vulnerable ears. However, the DPOAE level changes according to CAS show a broad range of variability. This variability may suggest a complex interaction of the effects due to MOCR with the two sources/mechanisms of DPOAE generation. Such an interaction would make the correct interpretation of DPOAE level changes at isolated frequencies during CAS rather difficult. The interaction of the two DPOAE sources is reflected in the characteristics of DPOAE fine structure (DP-gram over a broader frequency range with high frequency resolution). Therefore, in the current study we investigated the influence of CAS on DPOAE fine structure. This approach may allow a more detailed interpretation in respect of the value of DPOAE level changes as MOCR indicator than previous studies.
DPOAE fine structures were measured with and without CAS for different primary and suppressor levels using (a) a “classical” frequency discrete DPOAE paradigm (highest frequency resolution: 3 Hz) and (b) continuously sweeping primary frequencies for an improved frequency resolution and reduced measurement duration.
Across the most frequencies CAS causes a reduction of DPOAE level. Most subjects show a slight shift of DPOAE fine structure towards higher frequencies during CAS. Around sharp DPOAE fine structure minima this leads to a strong “pseudo” enhancement or suppression of DPOAE level for some isolated frequencies.
Overall, the current findings suggest that DPOAE level changes at isolated frequencies are a rather arbitrary and inadequate indicator for the reliable detection and quantification of the MOCR. Alternatives will be discussed.

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