Evidence for a bipolar change in distortion product otoacoustic emissions during contralateral acoustic stimulation in humans.

The aim of this study was to investigate the activity of the medial olivocochlear (MOC) efferents during contralateral (CAS) and ipsilateral acoustic stimulation (IAS) by recording distortion product otoacoustic emission (DPOAE) suppression and DPOAE adaptation in humans. The main question was: do large bipolar changes in DPOAE level (transition from enhancement to suppression) also occur in humans when changing the primary tone level within a small range as described by Maison and Liberman for guinea pigs [J. Neurosci. 20, 4701-4707 (2000)]? In the present study, large bipolar changes in DPOAE level (14 dB on average across subjects) were found during CAS predominantly at frequencies where dips in the DPOAE fine structure occurred. Thus, effects of the second DPOAE source might be responsible for the observed bipolar effect. In contrast, comparable effects were not found during IAS as was reported in guinea pigs. Reproducibility of CAS DPOAEs was better than that for IAS DPOAEs. Thus, contralateral DPOAE suppression is suggested to be superior to ipsilateral DPOAE adaptation with regard to measuring the MOC reflex strength and for evaluating the vulnerability of the cochlea to acoustic overexposure in a clinical context.