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Stochastic resonance on the intensity of DPOAE's

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Many normal-hearing people show a threshold fine structure, i.e. a ripple effect in their hearing threshold of up to 15 dB. There are strong indications in the literature that fine structure may be a measure for cochlear vulnerability. Therefore a method for detecting fine structure may be relevant (1) for further investigating the nature of fine structure and (2) as a tool in the field of clinical diagnostics. In general, current methods are very time consuming and lack a thorough testing. In this study a FINE-Structure Screening (FINESS) method is presented which is an improved version of the procedure that was introduced on last year's DGA and ICAud conferences. The procedure FINESS measures the threshold with a high frequency resolution. The duration is kept short by using a tracking procedure and controlling the repetitions of a measurement in a flexible way. An automatic detector („FINESS-detector“) identifies regions exhibiting fine structure, thus providing an objective measure of fine structure for an easier comparison of fine structure data between clinics and labs. The method has been tested on 20 subjects by performing test–retest measurements and comparing the measured thresholds to thresholds obtained by a psychoacoustical standard procedure, i.e. an adaptive alternative forced choice (AFC) procedure. The results show that (1) the thresholds can be measured with a high reproducibility (correlation of 0.9 between test–retest data), (2) fine structure is accurately measured (correlation of 0.9 between FINESS and AFC results) and (3) there is no trend due to potential bias effects with respect to the absolute thresholds across frequency. The average measurement time is just above 10 minutes per octave. In conclusion, the FINESS procedure together with the FINESS-detector provides a fast, reliable and user friendly method for the detection of threshold fine structure.

