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(54) Title: VIRTUAL ELECTROACOUSTIC AUDIOMETRY FOR UNAIDED, SIMULATED AIDED, AND AIDED HEARING EVALUATION

(57) Abstract

Digital filtering (18) of one or more signal sources according to selected models and digitally controlled signal processing parameters, including audio sources, spatializing coordinates, acoustic boundaries, signals representing one or more simulated hearing aids, and individualized body/external ear transfer functions synthesizes a simulated three-dimensional acoustic condition for presentation to hearing-impaired person (20) for objective and subjective hearing evaluation via an intracanal prosthesis (22) that is positioned in the ear canal (21), and that incorporates a microphone probe to measure in-the-ear-canal responses at a common reference point near the tympanic membrane (26) during unaided, simulated aided, and aided hearing evaluation. A virtual electroacoustic audiometer (19) computes the electroacoustic parameters of a hearing aid based on the results of the unaided audiometric evaluation and reference measurements that included the acoustic response near the tympanic membrane. The system then synthesizes acoustic signals reflecting the combined selection of audio signal model, spatialization model, acoustic boundaries model, as well as computed hearing aid model in the case of simulated aided condition.

