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Whispering in your ear: a recent history of subminiature transducers

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For 50 years, the history of hearing aid transducer development could be read in a simple photograph and timeline, where the size of the transducer was inversely correlated to the year it was developed. This size curve corresponds to hearing aid development over the same time period, progressing from body-worn aids in the 40's to large behind-the-ear (BTE), smaller BTE's, in-the-ear (ITE), and successively deeper in-the-canal (ITC) devices through the 90's. Although size still matters, in the last decade there has been less effort in reducing the size of hearing aids and more on increasing features, usability, and comfort. Development of hearing aid transducers has become similarly multidimensional. This paper charts the progress from the linear smaller-is-better design model to lower vibration, higher acoustic output, lower current draw, reduced radio frequency interference, wider bandwidth, and other multifaceted challenges of modern hearing aid transducer design.