

# Editorial

## The Traditional Audiogram—Can We Do Better?

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As an audiology student, the first clinical test I learned to do was pure-tone audiometry. This test of hearing sensitivity is fairly straightforward and easy to learn. It continues to be the bedrock upon which the majority of our specialties are based (e.g., cochlear implants and hearing aids). My first exposure to the evolution of the audiogram came from our department chair, Bill Rintelmann, at Wayne State University. His course on hearing assessment not only covered the basic and special tests of auditory function, but also how the current audiogram came into being.

What stuck with me from one of his lectures was that through the years, the audiogram changed as new technology to test hearing became available. The audiogram has an interesting history. For example, one of the first documented ways of recording audiometric responses was described and implemented by Arthur Hartmann in 1885. The hearing-testing device of that time was the tuning fork and Hartmann developed an “Auditory Chart” to record responses as a percentage of hearing. This method of recording auditory sensitivity was later revised in 1903 by Max Wien. Wien developed a system to plot auditory function that he called the “Sensitivity Curve.” This method also documented tuning fork responses but included both frequency and thresholds.

Over time there were a number of methods developed to display hearing function on a graph, however, it was in 1922 that the first form of the audiogram as we know it was developed. Fletcher, Fowler, and Wegel presented a graphic form of hearing ability that plotted frequency at octave intervals across the abscissa and intensity of the stimulus on the ordinate to represent the severity of the hearing loss. The authors also referred to this graphic representation of hearing sensitivity as an “audiogram” (Feldmann, 1970). The current state of the audiogram that we use today is based on recommendations from the American National Standards Institute in 1996. Today’s audiogram is based on standards from 21 years ago, in most instances, minimally consists of pure tone air conduction and bone conduc-

tion data, acoustic immittance and speech audiometric information.

Following attendance at several different professional conferences this year, I realized that there are growing numbers of discussions regarding revisiting some of our accepted ways of documenting hearing and speech understanding performance. That is, assessing a listener’s speech understanding in quiet seems limited when compared to the functional and realistic tests that are now available today. Many of today’s audiometers are computerized and can deliver to the patient any type of stimulus that can be imported into the system.

I will never forget when a colleague of mine was assessing a turkey hunter. He imported various turkey calls into the computer and was able to evaluate how that patient could hear and distinguish between the different calls. This type of thinking is what should motivate us to ask what is important to the patient.

Assessing a listener’s performance in noise under headphones or in a free-field environment provides information for the clinician that is distinctly more useful in many situations (e.g., hearing aid counseling). The point is, that with the enormous advances in technology and with the ability to present signals in realistic environments, perhaps it is time to reevaluate what should go on the audiogram. This, of course, depends on the patient and the reason for the audiometric assessment.

In this month’s issue of the *Journal of the American Academy of Audiology*, Musiek and colleagues take us through some of the current limitations of the audiogram as they relate to our patients that suffer from central disorders. Given the new levels of understanding about central auditory processes, as well as newly available techniques to assess auditory function, perhaps we can begin to question whether or not it is time to make space on the audiogram for some new test results.

The audiogram has come a long way since 1885 and we should continue to push the limits of auditory assessment when the science supports the benefits of new tests.

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By leveraging the power of technology, we should be at a point where we can bring assessments that were once only possible to administer in a lab into the clinic. It is in this way that we will be able to provide new insights to our patients, have a better understanding of a patients hearing impairment, and more effectively treat them.

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## REFERENCE

Feldmann H. (1970) A history of audiology; A comprehensive report and bibliography from the earliest beginnings to the present. *Translations of the Belton Institute for Hearing Research* 22.