

## The Elusive Road to Binaural Hearing Aids

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The majority of hearing aids worn today are binaural (two ears), rather than monaural (one ear). However, this was not always the case, and the road to binaural took a circuitous route populated with hearing professional reversals, much like navigating Lombard Street on the Russian Hill in San Francisco. Positions taken in the early years pitted the hearing aid dispenser, in favor of binaural amplification, against the audiologist, who questioned the efficacy of binaural hearing aids. Who would have thought!

Early observations and investigations (from about 1790 to the mid 1970s) summarized binaural listening advantages,<sup>1</sup> such as:

- Improved sound localization
- Binaural squelch
- Binaural summation
- Ease of listening
- Better auditory spatial organization, and
- Better sound quality

Early research had shown that two normal ears perform better than one.

The basic question, however, was not whether “two normal ears are better than one”, but rather, “are two hearing impaired ears coupled to two hearing aids better than one?”

### An Opportunity Advanced, and Then Questioned

The statement below is from Newby's (1964) textbook on audiology. This was a primary text for audiology education at that time and describes the positioning in the late 1960s and much of 1970s between the audiologist and the hearing aid dealer relative to binaural hearing aid amplification.

“With the advent of head worn aids, the use of true binaural hearing became practicable. While binaural aids almost double the cost of monaural aids, there are many hard of hearing individuals who believe that the improved hearing abilities they obtain with stereophonic amplification is worth the expense. In theory, binaural hearing aids should provide many advantages such as improved localization, better discrimination of speech in the presence of noise and improved quality of sound.”<sup>2</sup>

But then, the audiological caveat ? Newby adds: “Research investigations, however, fail to demonstrate that patients perform appreciably better with binaural fitting. Many patients who had procured binaural aids after wearing monaural instruments report that they obtain superior benefit from binaural aids, but it is difficult to determine whether they are really deriving benefits or are simply rationalizing their investment in more expensive instruments.”

## The Road to Two Amplified Ears

And thus, the “battle lines,” so to speak, were drawn, and rather distinct in the 1960s and 1970s about the recommendation for monaural versus binaural amplification. This situation may have been best summarized by Berger and Millin.<sup>3</sup> They noted that clinicians (audiologists who were not selling hearing aids at that time) suspected that dispensers often tried to sell binaural hearing aids to double their profit, and the dispenser, in turn, wondered why audiologists could not appreciate the value of binaural hearing aids, even when users often reported greater satisfaction with their use.

Numerous studies were conducted in the 1960s and 1970s comparing monaural to binaural amplification. That no consensus had been reached was evident in the Final Report to the United States Federal Trade Commission (16 CFR Part 440) by the Bureau of Consumer Protection, which stated:

“Binaural amplification is generally considered appropriate only for people with a relatively symmetrical hearing loss although some industry representatives dispute the point. Manufacturers and dispensers are understandably enthusiastic supporters of binaural amplification, since it means the sale of two hearing aids, rather than one. Audiologists are less enthusiastic principally because of the dearth of clinical evidence of binaural superiority.”<sup>4</sup>

Despite the studies comparing monaural and binaural hearing aid use in the 1960s and 1970s, the determination of binaural hearing aid advantage remained elusive, as evident in the oft-quoted conclusion of three premiere audiologist researchers, Jerger, Carhart, and Dirks.<sup>5</sup>

“In general, the results fail to demonstrate the marked superiority of binaural amplification...the results climax a series of experiments from this and other laboratories all pointing to the same inevitable conclusion. Binaural amplification produces little or no objectively demonstrable improvement in the ability to understand speech in quiet or in noise against competing sentences or competing discourse, whether the speech material be isolated words or meaningful sentences in spite of subjective clinical observations of dramatic improvements in the performance of some patients with binaural aids there remains little concrete evidence that binaural amplification actually produces any significant improvement in the ability to understand speech.”

These researchers were not denying binaural amplification, but were seeking confirmation that the use of two hearing aids led to significant positive *measurable* results. Unfortunately, some audiologists read this to mean that no advantage to binaural amplification existed, and that fitting of two instruments was ethically wrong.

That binaural amplification was not of significant interest to audiologists even in the early 1970s is supported by a survey of the hearing aid evaluation procedures of 214 ASHA certified clinics, none of which even mentioned binaural hearing aids.<sup>6</sup> Most of the audiology texts of the sixties and seventies treated binaural hearing aids in cursory fashion.

Certainly, documentation of the advantage of binaural over monaural hearing aids was available during this time. What was lacking among the groups, however, was some official recognition that binaural hearing aid use, under specific conditions, could be most advantageous. Much of the interaction between the “camps” was engaged in discrediting the other’s contribution of the level of understanding of the problem.<sup>7</sup>

## The 1980s Transition

By the early 1980s, the consensus among audiologists and dispensers who recommended and/or fitted hearing aids started to swing toward binaural amplification as the rule, rather than the

exception (Figure 1). The basis for this shift was founded on philosophy, physiological/psychoacoustical evidence, experimental studies, and clinical experience.

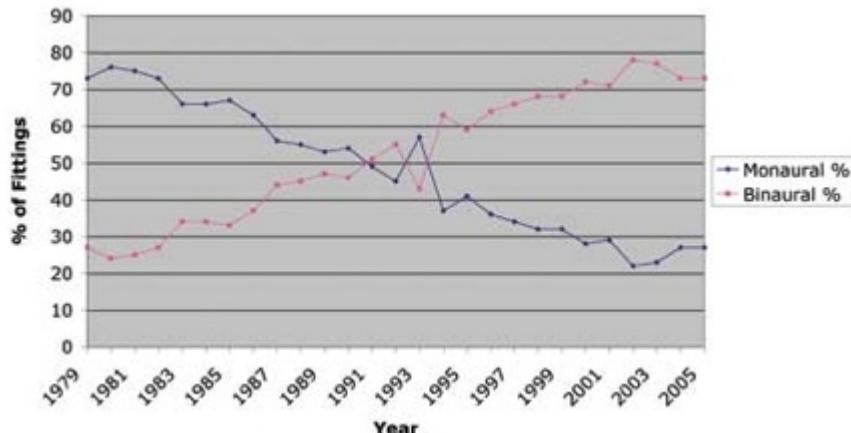


Figure 1. The shift and trend from monaural to binaural hearing aid amplification. The crossover at 50% was reached around 1992, with the majority of hearing aids fitted binaurally in excess of 80% (Figures based on United States data, although it is expected that Canada followed a similar trend). Figure from *The Hearing Review*, November 2007.

### Writer's Note

*As an aside, one of the first presentations I was asked to speak on in a professional capacity was “Monaural vs. binaural Hearing Aid Recommendations.” This was to the North Dakota Hearing Aid Dealers Association in 1968. I recall presenting the “arguments,” both pro and con, concluding that there was no conclusive evidence of a binaural hearing aid advantage. Driving back to Grand Forks (about 300 miles) with the local Beltone dealer, who was wearing two hearing aids, I was provided with “first hand” commentary and “in the car” demonstrations about how two hearing aids positively affected his ability to hear. This was one of my “ah ha” and non-institutional learning moments. It taught me to listen to what the patient was telling me, and not to depend just on pre-conceived notions based on what I had been taught in school. “Thank you” to Lee Dattlebaum, who has long passed away, for helping to educate me.*

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