

Datalogging: A New Concept in Monitoring Patient Usage of Hearing Instruments

By Joel M. Mynders and Janet J. Karp, MS

The interface between the patient and the fitting in hearing instrument follow-up care has always been characterized by "sketchy" information from most patients that is often difficult to interpret. The techniques used by most hearing instrument clinicians has most often been a follow-up interview, sometimes incorporating a questionnaire. A patient's ability to tell the clinician how they hear in various acoustic environments in which they wear their hearing aids is usually confined to describing those situations where they have had the least success.

Before the advent of digital-programmable hearing instruments, the range of dispenser interventions at follow-up was narrow. Changes to the mold or casing, if a custom aid; venting procedures and adjustable trim-pots were the other primary choices. Until the development of multiple memory digital-programmable instruments, patients were expected to use a single acoustic response for all listening situations. Since the late 1980s, hearing instruments that offer two to eight programs for listening have been available. These multi-program instruments have one, two or three channels for acoustic manipulation. These channels are referred to as compression bands since most of the higher technology digital-programmable instruments are non-linear circuit

designs. The "programs" can be defined as separate and different acoustical patterns designed by the laboratories and hearing instrument clinicians for different environmental situations: i.e., using a telephone in a restaurant, watching television, listening in a lecture hall, playing golf, etc.

Follow-up care in fitting digital-programmable hearing instrument technology includes assessment of the patient's progress in adapting to the increased acoustic possibilities offered by the multi-memory programs. Adjustments are made via the computer on follow-up visits. The actual task of asking patients how they are doing when they have multiple programs is challenging for clinicians, but almost impossible for patients. The idea of asking patients to manually keep track of multiple program usage and to record the results between follow-up sessions is not realistic. Graduate students and paid subjects involved in a study might be asked to perform these tasks, but not most patients. This information is, however, very valuable in maximizing the computer's potential and finding a patient's most effective programs.

Now available are the 3M Multi-Pro hearing instruments which include a specialized memory that electronically "logs" the patient's usage of the various programs in their hearing instruments. Datalogging is described as: "A new concept in hearing instrument fitting and adjustment. This patented technology (U.S. Patent 4,972,487) is a unique feature of the 3M Programmable hearing instruments. The Datalogging system is a memory circuit within the instruments that records information about the usage pattern of the hearing aid. This system was conceived and developed as a means to better understand and refine the fitting process, by providing the clinician with feedback about how the hearing aids are actually being used by the wearer. The system records a variety of information, including the total time of use, the number of times that each

The actual task of asking patients how they are doing when they have multiple programs is challenging for clinicians, but almost impossible for patients. The data provided by Datalogging, combined with the patient's personal verbal input, enables the clinician to refine a fitting in a more accurate manner than was possible in the past.



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of the multiple memories was accessed (switch percentage), the total cumulative time of use for each of the programs (time percentage), and additional hearing instrument data as shown in Fig. 1. This detailed information provides insight into which of the programmed responses are most useful, which responses may require modification, and potential direction for such modifications. The dispenser can use the Datalogging results, in combination with user comments, to customize the instrument for the client by adjusting individual program parameters, as well as adding, moving, or deleting programs. In addition, Datalogging serves as a unique tool for hearing aid research and development, allowing researchers and designers to collect information about the performance and user preference of various fitting strategies under real world conditions." Ref?

In summary, the data provided by Datalogging includes:

- Total time worn, in hours and days;
- Percentage of total time spent switching;
- Percentage of time spent in each program;
- Date current program entered;
- Total number of days since current program was entered.

This data, combined with the patient's personal verbal input, enables the clinician to refine a fitting in a more accurate manner than was possible in the past. The interactive element of the patient seeing the exact tallies of their usage on the computer offers a new dynamic to the follow-up process.

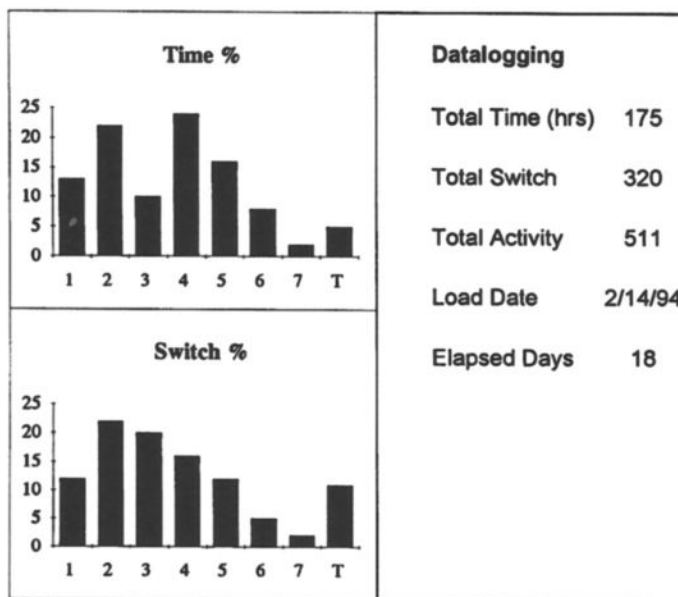


Fig. 1. Reproduction of datalogging on monitor screen of computer.

In our practice, a first follow-up visit is scheduled one week after the fitting of a programmable instrument with datalogging capabilities. At that time, the hearing instruments are read prior to any other intervention. The datalogging is noted to ascertain how often the hearing aids were worn and which programs are preferred. The clinician can then modify responses and refine the fitting by deleting unused programs or perhaps by re-arranging the programs to place the most sought out program in the first position for easier access.

Interaural differences in datalogging patterns can alert the clinician to the possibility that: 1) the patient is not switching both ears, or 2) following telephone usage, the patient is neglecting to return the hearing instrument to an appropriate non-telephone response.

In tracking datalogging from the early post-fitting weeks to a six-month checkup, a trend emerges. Initially the

patient will have a high level of total activity reflecting a tendency to experiment with the various programs in each actual environment. Once the fitting has been finalized and the patient has adapted to the instruments, the total activity decreases. This pattern verifies familiarity with the sound and position of each program and the ability to quickly access the most appropriate response for a given listening environment. Discrepancies in the overall trend can be indicative of too many programs for a particular individual or a lack of patient-discernable differences among the programs.

Most patients react to datalogging in a positive manner. A small percentage of patients may feel that it is an invasion of their privacy to have the hearing instrument "monitor" their usage. In our practice, we present this as an advantage of the digital programmable hearing instrument that incorporates datalogging by explaining that this information is used to refine the fit and that the patient need only follow our phased-usage protocol and enjoy the various listening environments without the need to keep a diary nor to remember which of the multiple programs they prefer. ♦

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