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## A SIMPLE PATH TO SELF LEARNING

Lorrie Scheller, Au.D.

**Prescriptive fitting formulas are a good starting point for hearing instrument fittings, but many patients still require some degree of fine-tuning before they are satisfied with their devices.**

A patient typically tries initial settings for a week or two and then returns to the office for adjustments. Clinicians are at a disadvantage because they must make fine-tuning decisions based on patient reports, without the benefit of being in the real-world environments experienced by the patient at the time the adjustments are made. This means that some patients require several fine-tuning sessions before they are happy with their hearing instruments.

Dillon and his colleagues (2006) introduced the concept of a trainable hearing aid that could learn the patient's preferred hearing instrument settings in real-world environments. Such an instrument could be truly customized for an individual patient's particular listening environments, involving them more directly in the fitting and removing some of the burden of fine-tuning from the clinician.

A recent consumer survey showed customers were more interested in buying instruments that are easy to use with no extra controls or gadgets (Morla, 2011). In developing an instrument that could learn user preferences, Starkey's goal was to design a simple system that could be used by most instrument wearers. The simplest and most common hearing instrument user control is the volume control. According to a recent survey of U.S. hearing instrument users, nearly 60 percent have a volume control on their instruments, and eight percent have a remote control capable of making volume adjustments (Kochkin, 2010).

Starkey's new Self Learning feature is a volume control (VC) learning system that is easy to use for both the professional and the hearing instrument user. A simple design is desirable because it introduces less complexity for the hearing aid user. Patients can simply change volume as desired in different listening situations. The Self Learning algorithm operates behind the scenes to optimize volume settings.

As the hearing instrument is worn, Self Learning tracks and remembers volume control changes made by the patient. If the same change is made consistently over time, the hearing instrument gradually learns the preferred volume level. For example, Mrs. Jones takes care of her three-year-old grandson while his

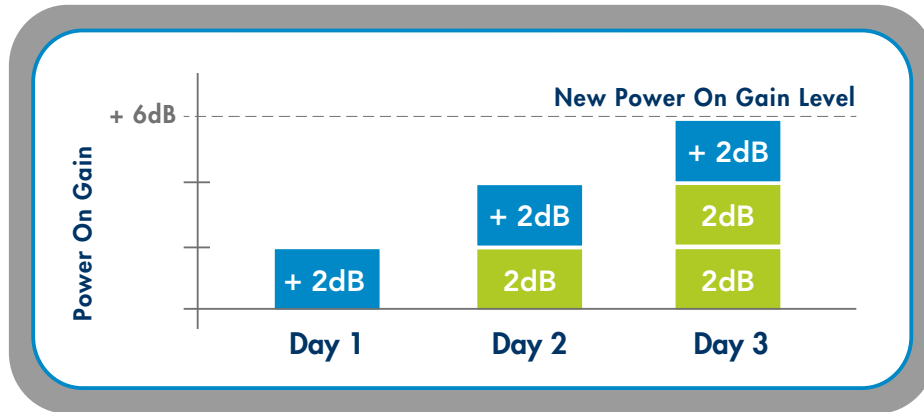


Figure 1: Example of how Self Learning gradually changes the Power On level.

parents are at work. She turns her hearing instrument up by 6dB every day in order to hear her grandson. Over the course of a few days, her hearing instrument will learn the listening level she prefers and gradually adjust her starting gain to that level so she will no longer need to turn up her volume control. This is illustrated in Figure 1.

Use of Self Learning requires no special training or instruction for the patient. The feature works automatically and unobtrusively as the patient makes normal volume control adjustments while wearing the instruments. Volume control changes can be made either with a VC on the instrument or via remote control. Since the learning mechanism is only triggered by persistent changes, infrequent up and down movements of the volume control will have no net effect on learning. The goal of this system is to make the hearing instruments easier for patients to use by reducing the volume adjustments required for optimum sound quality. Over time, the patient will need to make volume control changes less often as the device learns the patient's preferred settings, yet the volume control is always available when needed.

Research has shown that acceptance of hearing aids is dependent on the user's ability to hear well in multiple listening environments (Kochkin, 2007). Self Learning is available for each active Memory Environment in the hearing instrument. This allows the wearer to establish independent volume level preferences in different listening environments.

The Self Learning feature is easy to find in Starkey's Inspire® fitting software. The Self Learning screen can be quickly accessed via a Self Learning button on the QuickFit screen. If learning has occurred since the last time the instrument was connected to Inspire, a small green attention icon will appear on the button to alert the professional to check Self Learning. Figure 2 illustrates these icons.



Figure 2: Attention icon showing that Learning has occurred.

The Data Log option found in Inspire's left navigation bar also allows the professional to view Self Learning information. As illustrated in Figure 3, the screen shows the amount of applied learning for each active Memory Environment.



Figure 3: Self Learning screen in Inspire.

Self Learning can be set to either “Off” or “Automatic” on the Self Learning screen. When the feature is set to “Automatic,” learned changes are applied to the instrument and are visible to the clinician the next time the instrument is connected to Inspire. The learned changes can be removed on the Self Learning screen, if desired, returning the Power On gain to the previously programmed level. The ability to remove learned changes is available independently for each Memory Environment.

As with any advanced feature, Self Learning may not be appropriate for all patients. It is not recommended for those patients who are unable to hear the indicator tones that signal volume changes because they may have difficulty monitoring those volume changes, causing unintended learning in the instrument. Patients with dexterity issues that make it difficult to initiate volume changes on their instruments can still enjoy the benefits of Self Learning with a SurfLink™ Remote Control.

Self Learning is well suited to active patients who are interested in a hearing instrument that

adapts to their preferences. Self Learning simplifies the patient experience while bringing the fitting closer to the ultimate goal: a satisfied patient.

Self Learning is available in the new X Series™ and Wi Series™ hearing aids.

## References

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A global hearing technology  
company headquartered in  
Eden Prairie, Minnesota, U.S.A.

Starkey Laboratories, Inc.  
6700 Washington Avenue South  
Eden Prairie, MN 55344-3476  
800.328.8602

[StarkeyPro.com](http://StarkeyPro.com)