

AUTOMATIC EXPERIENCE MANAGER:

Acclimatizing New Hearing Aid Users to Amplification



Carreen Pederson, M.A., & Alyson Gruhlke, Au.D.

➤ According to Merriam-Webster, acclimatization is the process of adjusting or adapting to a new climate, place or situation. The purpose of Starkey Hearing Technologies' Automatic Experience Manager is to facilitate the acclimatization of a new hearing aid user to his or her new hearing aids. Initial gain settings are reduced relative to prescriptive, final gain settings to promote spontaneous acceptance of amplification and to facilitate willingness to wear the devices consistently during the trial period. Gain settings automatically increase gradually over time, up to final settings that provide audibility as determined by the hearing professional.

In addition to a study by Keidser, Dillon, Carter and O'Brien (2012), sales and clinical experiences have demonstrated that new hearing aid users prefer less gain, particularly at the initial fitting, as compared to experienced hearing aid users. What sounds "natural" to a new user is his or her hearing loss, so providing enough gain in the hearing aids to ensure audibility often sounds too harsh or loud to this group of individuals. It typically takes time for the new user to become accustomed to hearing amplified sound. By emphasizing comfort at the initial fitting and providing the automatic gain transition necessary to encourage initial spontaneous acceptance of hearing aids, the professional can help a new user continue to become accustomed to hearing new sounds with the devices, which ultimately yields greater audibility over time. Failing to provide this transition could potentially result in the new user returning the hearing aids.

The Automatic Experience Manager feature is designed to automate the process of moving new hearing aid users from initial, lower gain settings, to final, higher gain settings (fitting target-based or simply increased gain relative to initial settings) over a period of time (several weeks to several months, as determined by the hearing professional). The gain adjustment happens gradually and automatically based on patient usage; therefore, the professional does not need to see the patient for multiple follow-up fitting sessions to manually adjust gain over time.

AUTOMATIC EXPERIENCE MANAGER FEATURE DESIGN

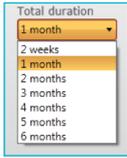
The Automatic Experience Manager feature automates the current manual Experience Manager settings in Inspire®. The gain settings for the Inexperienced setting (Level 1) provide approximately 75 percent of target gain, while the Familiar setting (Level 2) provides approximately 85 percent of target gain. The Experienced setting (Level 3) corresponds to full gain as prescribed by the selected fitting formula targets.

The recommended fitting process is for the professional to adjust the final, Level 3 gain settings according to real-ear measurements or other verification methods. The Automatic Experience Manager feature can then be enabled, and the desired starting gain settings can be determined by presenting Level 1 and Level 2 to the patient to determine patient preference. For example, Level 1 might be used for an inexperienced hearing device user, whereas Level 2 might be used for an individual who has some familiarity with amplification but may be wearing Starkey Hearing Technologies hearing aids for the first time.

As shown by the Inspire screen captures in Figure 1, the professional can select the duration of gain adaptation from initial to final settings from six options, which range from two weeks to six months. The default duration is one month.



Figure 1: Inspire screen capture showing the Automatic Experience Manager feature enabled, as indicated by the checkmark on the screen, as well as six total duration options over which the automatic acclimatization process can occur.



At follow-up visits, the professional can view the progress of Automatic Experience Manager in days remaining, as well as current response settings (bold curves) relative to final response settings (dotted curves; Figure 2). The professional is able to make fine-tuning adjustments at any point before, during or after the acclimatization process is complete. If current settings are adjusted while the feature is active, final settings will also be adjusted such that the remaining gain offsets between current, intermediate and final settings are maintained.

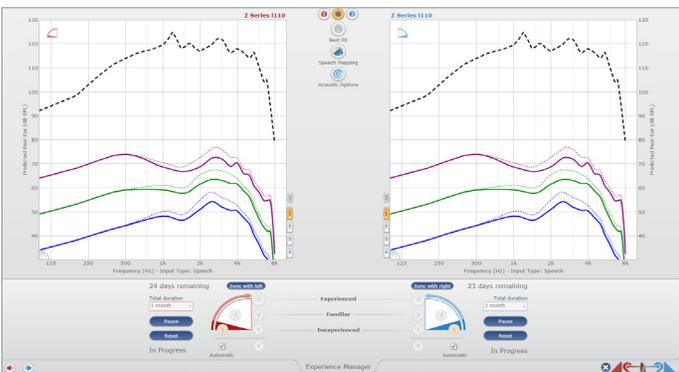


Figure 2: Inspire screen capture showing current response settings (bold curves) relative to final response settings (dotted curves).

At any time during the acclimatization process, the Automatic Experience Manager can be paused so that gain settings do not continue to change. This is helpful in a situation where one hearing aid needs to go in for repair. If progress differs between binaural hearing aids due to differences in patient wear-time, the professional also has the option to sync the progress between the devices at a follow-up fitting (Figure 3).



Figure 3: Inspire screen capture showing the Pause and Sync buttons.

As shown in Figure 4, when the Automatic Experience Manager has reached final gain settings, the status will display in Inspire as “Complete” with zero days remaining. This status will persist as a reminder that the Automatic Experience Manager was used for the fitting.

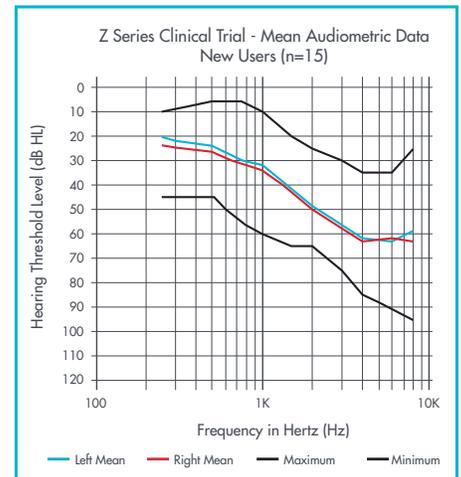


Figure 4: Inspire screen capture showing control settings at the completion of the automatic acclimatization process.

CLINICAL TRIAL RESULTS

A clinical trial of the new Z Series™ hearing aids, which incorporated use of the Automatic Experience Manager for new hearing aid users, was conducted to validate feature performance. Sixty-four individuals participated in the clinical trial and 15 of 64 participants were first-time hearing aid users. The clinical trial consisted of four to five visits over a total of six to 10 weeks. The mean age of the new hearing aid users was 65.2, with a range of 47 to 81 years. Mean audiometric data, as well as group minimum and maximum thresholds, are shown in Figure 5.

Figure 5: Mean audiometric thresholds for right and left ears are displayed by red and blue lines, respectively. Black lines represent group minimum and maximum thresholds.



Participants were fit with either standard (receiver-in-canal or behind-the-ear) or custom hearing aids, and venting was selected based on degree and configuration of hearing loss. All hearing aids were Best Fit to Starkey Hearing Technologies’ proprietary e-STAT® targets at the initial fitting session, and real-ear aided response measurements (REAR) were completed using the Audioscan Verifit system (Scheller & Rosenthal, 2012). The International Speech Test Signal (ISTS) was presented at levels of 50, 65 and 75dB SPL, with a purpose of measuring the output of the devices in the

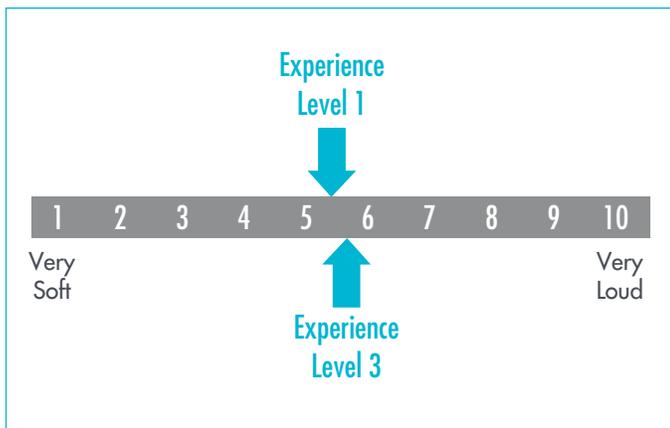


Figure 6: Mean ratings of loudness at Experience Level 1 versus Experience Level 3. Results indicate that loudness ratings did not change over the course of the automatic acclimatization process.

ear canal and ensuring audibility. The Automatic Experience Manager was then set to the Inexperienced setting (Level 1) in Inspire, with a one-month (28-day) duration over which automatic acclimatization would occur, and the gain and frequency response of the devices were adjusted based on participant preference. For the purposes of this study, no additional fine-tuning measurements were made at follow-up visits until the acclimatization process was complete. Participants were, however, informed that the hearing aids would be making automatic adjustments over time.

During the study, first-time hearing aid users were asked to rate the loudness of the hearing aids at Level 1 (lower gain settings) during their first two weeks of wearing the devices. Participants answered the question using a scale of 1–10 with one equal to “Very Soft” and 10 equal to “Very Loud.” At the time, the average rating was 5.5 (Figure 6). Participants were then asked the same question when the acclimatization process was complete approximately four weeks later (Level 3 with gain settings closer to the e-STAT targets), and the average rating was 5.6. This demonstrates that first-time hearing aid users were just as comfortable with the overall volume of their hearing aids at the final session as they were at the beginning of the clinical trial, even though gain had increased over that period of time. Additionally, real-ear measurements indicated greater audibility for speech signals with the final settings relative to the starting settings.

Participants were also asked to complete the Communication Confidence Profile (CCP) once at the beginning of the study (unaided) and a second time at the conclusion of the study (aided with Z Series hearing aids). The CCP is a 12-item questionnaire that measures an individual’s confidence “on a wide range of auditory communication skills either with or without hearing aids”

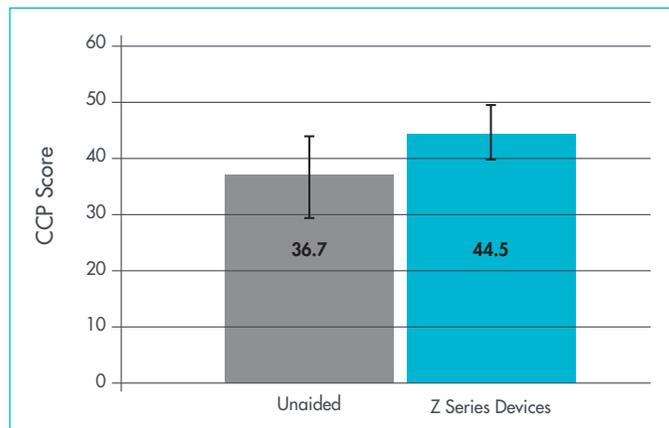


Figure 7: Mean Communication Confidence Profile (CCP) scores for new hearing aid users. Communication confidence with the Z Series devices was rated as significantly better than communication confidence without hearing aids.

(Sweetow & Henderson Sabes, 2010). Figure 7 shows mean CCP scores for the unaided versus aided conditions. CCP results revealed that this group of participants had significantly higher communication confidence while wearing the hearing aids.

CONCLUSION

Starkey Hearing Technologies’ new Automatic Experience Manager feature, available in Z Series products, provides the clinician with an easy-to-use tool to facilitate new hearing aid users acclimatization to amplification. Initial gain settings can be selected to prioritize patient comfort and acceptance of amplification, and as the patient wears the hearing aids, gain settings gradually increase until final settings, which prioritize audibility, are achieved. The patient, who will be more likely to wear his or her new hearing aids, now has the opportunity to become accustomed to hearing better slowly over time without multiple visits to the professional’s office for manual gain adjustments.

REFERENCES

- Keidser, G., Dillon, H., Carter, L., & O’Brien, A. (2012). NAL-NL2 Empirical Adjustments. *Trends in Amplification*, 16(4), 211-23.
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