DataLogging- Hearing Aid Behavior in the Real World

Sejal Kuvadia, AuD
Education & Training Audiologist

@Starkey_Sejal

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This session is available for 1 hour / .1 CEU

Must stay logged on for the full session

Must successfully complete a short quiz

Learning Objectives

- At the end of the course, participants will be able to list at least 4 items that can be logged.
- Participants will be able to identify at least two ways of using information in the Data Log to enhance patient counseling regarding amplification.
- Participants will be able to identify at least two ways of using information in the Data Log to make programming adjustments for the patient.

DataLogging- Hearing Aid Behavior in the Real World

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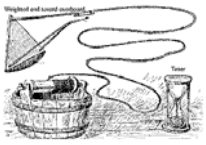
@Starkey_Sejal

Origin of “Data Logging”

“The term ‘logging’ comes from writing things down in a logbook. Sailors used to cast a wooden block, called a log, over the stern of their vessels. The log was attached to a rope with knots in it every 47 feet. By timing how fast the knots passed through a sailor’s hands, the speed of the vessel was determined. This “log data” would be written down in no other place than a ‘logbook’.”



Gus Mueller, 2007

What is hearing aid data logging?

Data logging allows for the collection and analysis of hearing aid data as it pertains to user habits, device integrity, environmental classification and feature engagement.

Purpose of the Data Log

- Provides objective information regarding how hearing aids are being used and the different listening environments users are exposed to on a daily basis.
- Data is used to identify topics for counseling and ways to customize the programming of the hearing aids to best meet the needs of each lifestyle.

Data Log Applications

- Counseling
- Fine Tuning
- Troubleshooting

Counseling

- Sophistication of Technology
- Justification for Expense
- Use Habits
- Need for Advanced Technology

Counseling

Pre-Fitting

- These are intelligent products! Helps justify the expense and provides confidence during the trial period
- The hearing aid will be recording information that will help facilitate collaboration during the adjustment period

Counseling

Post-Fitting

- Analysis of use habits
- Reinstruction on hearing aid features
- Need for more advanced technology

Fine Tuning & Troubleshooting

- Add programs/memories
- Add features
- Adjust feature or signal processing characteristics

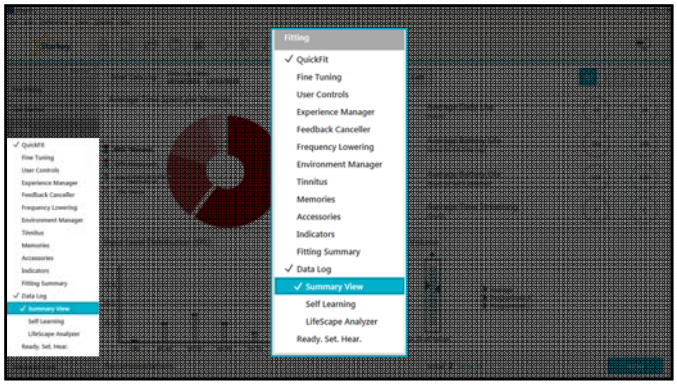
Data Log – Inspire Software

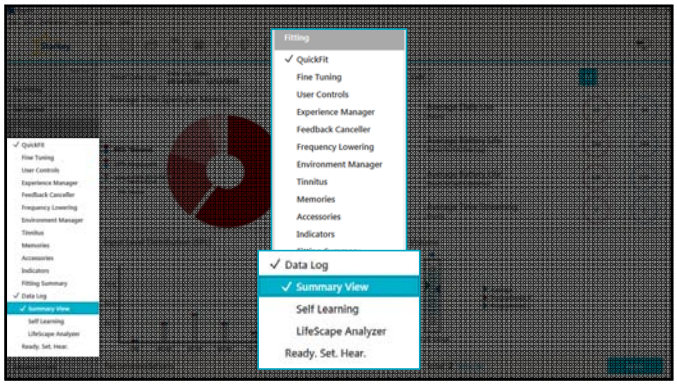
Inspire Software- Data Log

3 sections

- Summary View
- Self Learning
- LifeScape Analyzer

Summary View


Fitting
QuickFit
Fine Tuning
User Controls
Experience Manager
Feedback Canceller
Frequency Lowering
Environment Manager
Tinnitus
Memories
Accessories
Indicators
Fitting Summary
Data Log
Summary View
Self Learning
LifeScape Analyzer
Ready. Set. Hear.


Fitting
QuickFit
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Feedback Canceller
Frequency Lowering
Environment Manager
Tinnitus
Memories
Accessories
Indicators
Data Log
Summary View
Self Learning
LifeScape Analyzer
Ready. Set. Hear.


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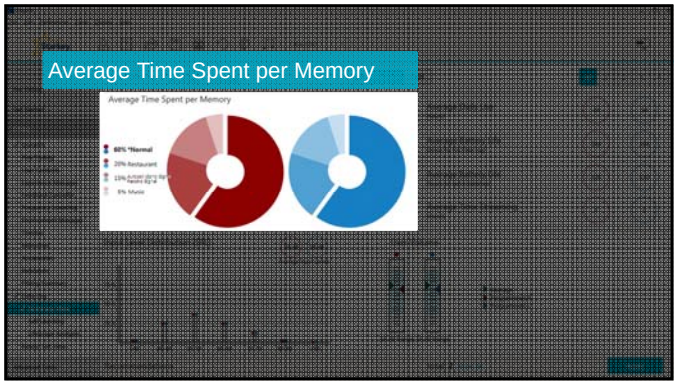
Reset Data Log
Right
Binaural
Left
Average Time Spent per Memory
Average Daily Use
Average Battery Life
Average Battery Life
Average Time Streaming
Input Level Distribution (SPL)
User Volume
Recommendations
total: 2
Apply



Data Log shows that the patient is only using Memory 1 when he has two other programs available.

- Does the patient understand the purpose of different programs?
- Is the patient clear on how to switch memories?
- Are all of the additional programs really necessary?
- How does this compare with the sound classifications of the hearing aid?


All
1
2
3
4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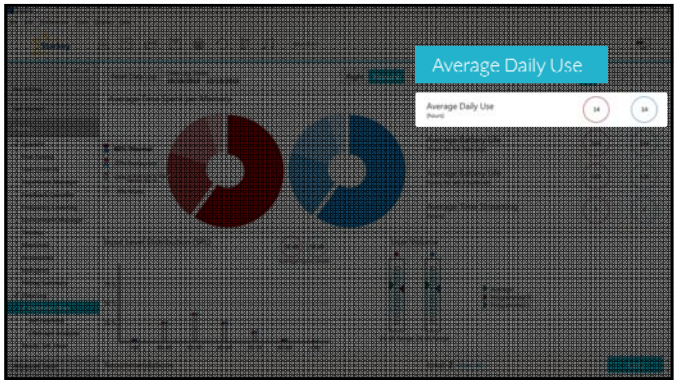
Reset Data Log
Right
Binaural
Left
Average Time Spent per Memory
Average Daily Use
Average Battery Life
Average Battery Life
Average Time Streaming
Input Level Distribution (SPL)
User Volume
Recommendations
total: 2
Apply


Average Daily Use
Average Daily Use

The Data Log shows that the hearing aids are only being used a couple of hours each day.

- Are the hearing aids performing poorly?
- Does the patient have unrealistic expectations?
- Has the patient experienced a change in lifestyle with new communication demands?
- Has the patient been ill?
- Are comfort issues keeping the patient from wearing the aids more?
- Do they have difficulty inserting or managing the hearing aids?

Data Log shows significantly less use than verbally reported.

Why the discrepancy?

- Using a dead battery?
- Trying to please professional or family members?

Data Log shows significantly more use than verbally reported.

Why the discrepancy?

- Neglecting to turn hearing aids off at night or when not using them?

Battery data

For the most accurate analysis of battery life....

- Have the patient wait for the low battery indicator in each instrument prior to changing the battery
- *.....Avoid changing both at the same time!

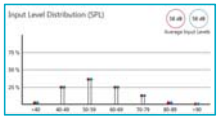
Average Time Streaming

- Muse products: Average time spent streaming from all SurfLink accessories per day
  - Surflink Mobile 2
  - Surlink Media 2
  - Surflink Remote Mic
- Halo 2 products: Average streaming time per day
- Useful for troubleshooting
  - Battery Life
  - Adjustments to StreamBoost Memory

Input Level Distribution

Input Levels into the hearing aid microphones

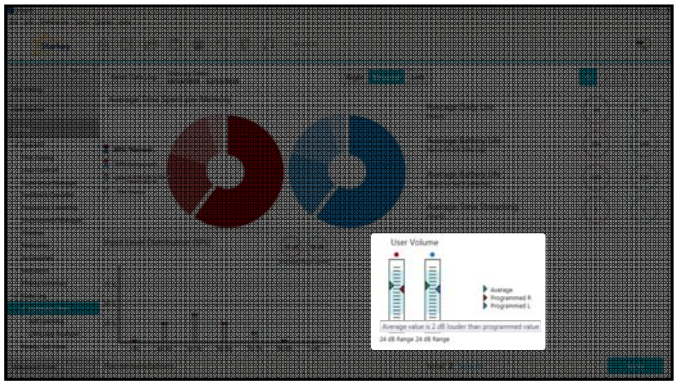
- Levels under 50dB SPL indicative of environments that may have no speech present
- Levels over 80dB SPL can be helpful for discussing hearing protection and noisy environments.

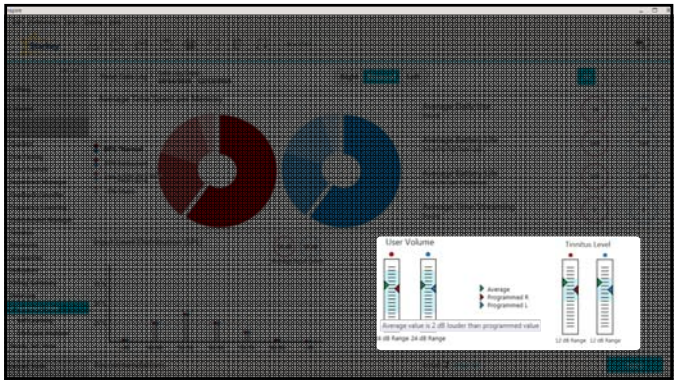


A patient's Data Log indicates that the average input of the hearing aids is over 80 dB SPL.

Inquire About:

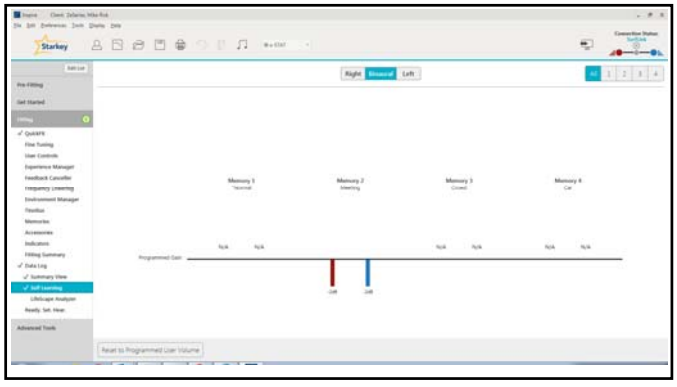
- Annoyance
- Loudness discomfort
- Need for hearing protection





Self Learning

- Gradually and automatically learns patient volume control preferences in each active memory.
  - Normal memory: 12 hour learning window
  - Other memories: 2 hour learning window
  - +/- 2 dB gain adjustments over time
- Data is only available when self learning for the volume control is enabled.
- Ability to reset Self Learning is on this page




Reset to Programmed User Volume


LifeScape Analyzer
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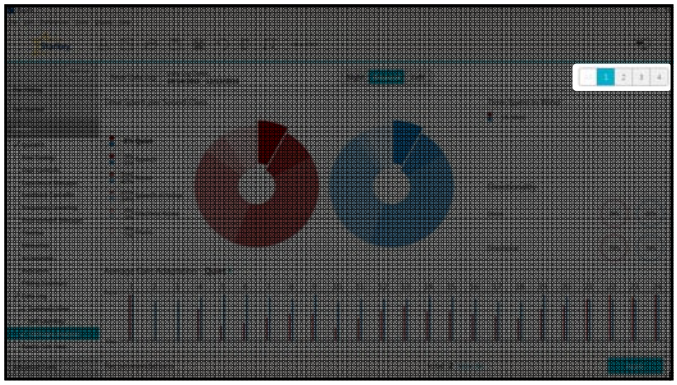
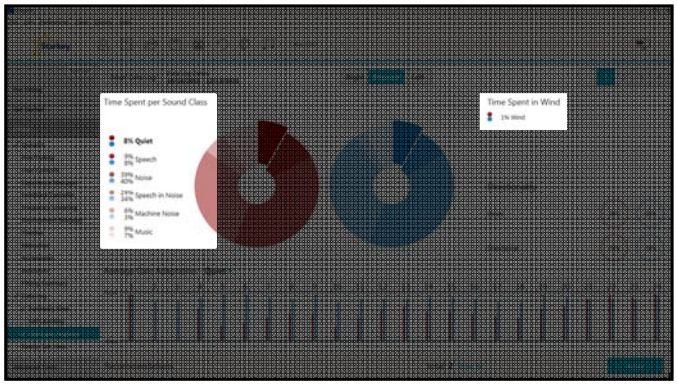
Reset Data Log
Right
Binaural
Left
Time Spent per Sound Class
Time Spent in Wind
Directionality
Average Gain Adaptation - Quiet
Recommendations
total: 2
Apply





Sound Classification


Music


Quiet


Speech


Speech in Noise


Machine Noise

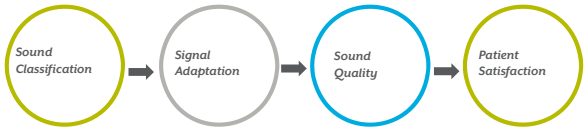

Noise


Wind

Sound Classification

>90% Classification Accuracy

Classification Accuracy



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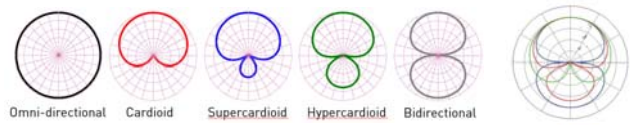
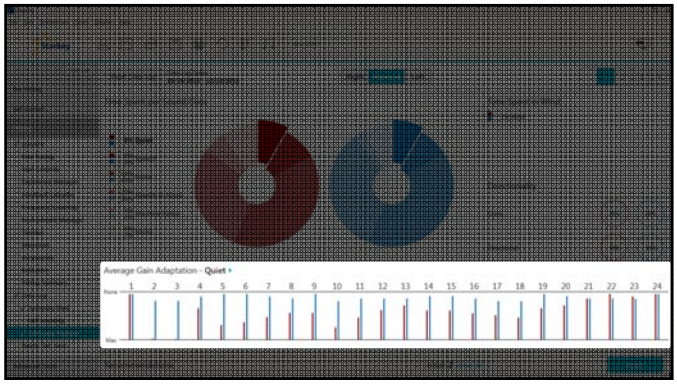
Directionality

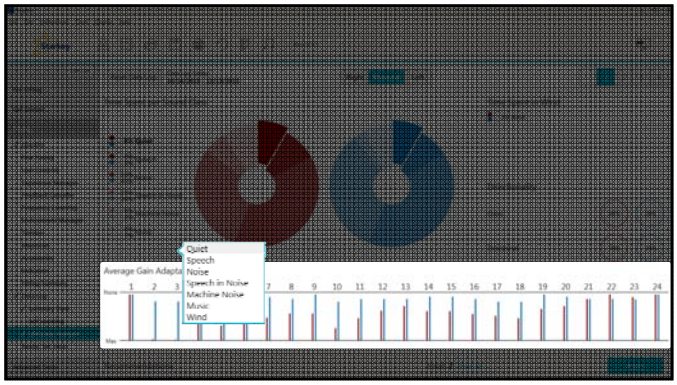
- % time in omnidirectional is going to show amount of time spent in "surround" sound.
- % time in directional is whenever the patient is in any polar pattern besides omnidirectional.



A patient reports having a difficult time hearing a friend she meets out for lunch twice a month. She is wearing Halo 2 i2400 RICs. The Data Log does not reveal a significant percentage of time spent in Noise or Speech in Noise as a result of the infrequency of her lunch outings. The % of time directional microphone mode is applied is low.

- Add a memory with a fixed directional configuration.
- Encourage greater use of a memory employing a fixed directional microphone response.
- Review Comfort Boost on TruLink app.
- Review TruLink app and teach her how to create a TruLink memory for this situation.





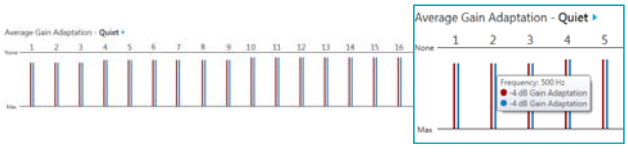
Average Gain Adaptation

Adaptation occurs on a per channel basis

- i2400- 24 channels
- i2000- 20 channels
- i1600- 16 channels

Average Gain Adaptation – Quiet

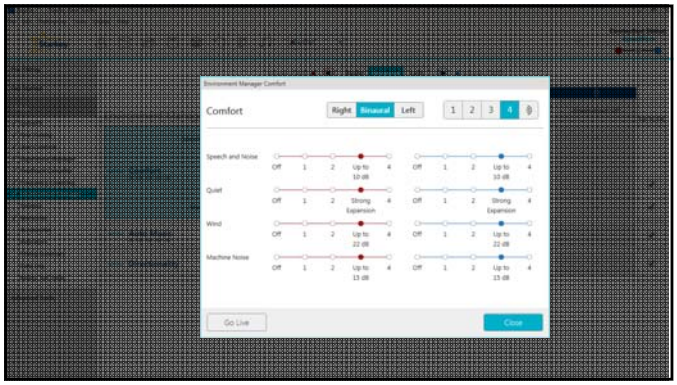
- Used to address bothersome low level noises like a computer fan or refrigerator motor
- Always occurs at or below the default kneepoint in each channel
- Adaptation utilizes the Quiet (Expansion) noise algorithm



The patient reports they're bothered by the computer fan noise, while working from home.

Does the Data Log indicate Quiet is very active?

- If not, increase the Quiet setting by one step.
- If so, gain adjustments may be needed.

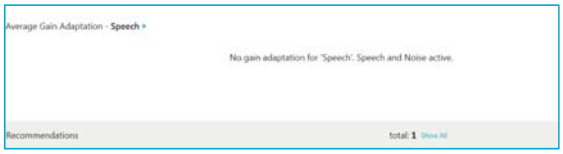


Average Gain Adaptation – Speech, Noise, Speech in Noise

- Speech- Designed to identify the presence of a modulated speech signal.
- Noise- steady state signal
- Speech in Noise- Designed to identify the presence of a modulated speech signal in the presence of steady state noise.
- Classification is based on 3 variables:
  - Signal to Noise Ratio (SNR)
  - Overall loudness of the environment
  - Optimize comfort and ease of listening

Average Gain Adaptation – Speech

- Sound is classified as Speech, when SNR is greater than +5dB.
- There is no gain adaptation for Speech



Average Gain Adaptation – Speech in Noise, Noise

- Adaptation is based on loudness of the environment
  - Louder environment = more gain adaptation
  - Softer environment = less gain adaptation
- Adaptation is accomplished by the Speech and Noise algorithm (Acuity Voice).

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Speech and Noise (Acuity Voice)

- Significantly improves speech clarity even in the noisiest environments
- Reduces listening effort and cognitive fatigue
- Instantly applies variable noise adaptation in all channels between each pause in speech
- Provides up to 20dB of noise reduction

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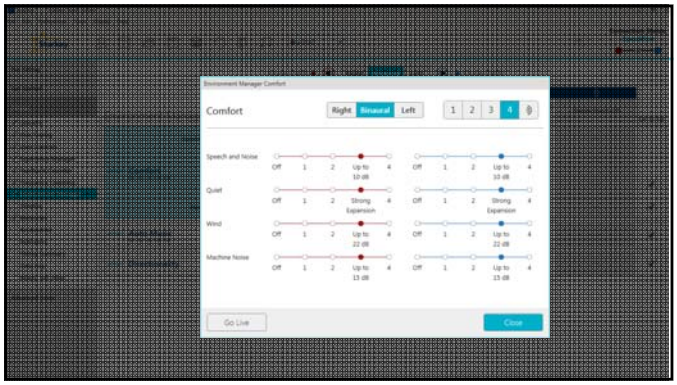
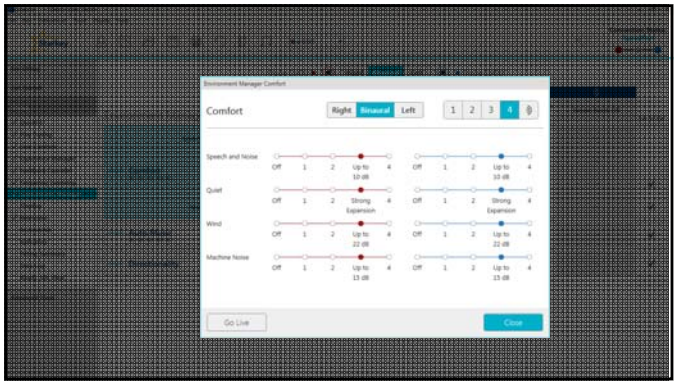
A Muse i1600 user is having a difficult time understanding her grandchildren at the park and at family parties. Data Log shows Speech in Noise and Noise are being classified over 55% of her time.

- Consider fixed directional program
- Engage Directionality Plus
- Consider using this information to counsel on the advantages of upgrading to a circuit with more advanced levels of noise reduction.



Average Gain Adaptation – Machine Noise

- Designed to facilitate comfort in the presence of overwhelming noise or in more complex listening situations.
- Input must be greater than 50dB SPL in order to classify
- Examples of Machine Noise include: vacuum cleaner, lawn mower, blender, etc.

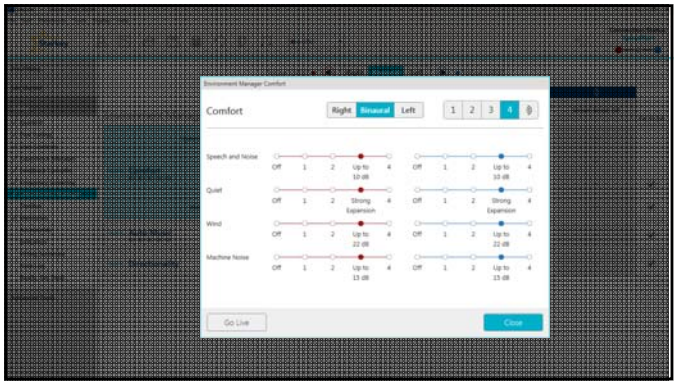


Average Gain Adaptation- Wind

- Wind adaptation occurs in as a result of turbulence over the hearing aid microphone.
- Up to 30 dB of wind suppression in i2400 technology
- Adaptation occurs in channels 1-3

The patient is playing golf regularly, but she reports more exposure to wind noise than what's recorded for Wind Noise in Data Log.

- Consider adding an outdoor program to address that environment more precisely.
- Turn up Wind algorithm by one step

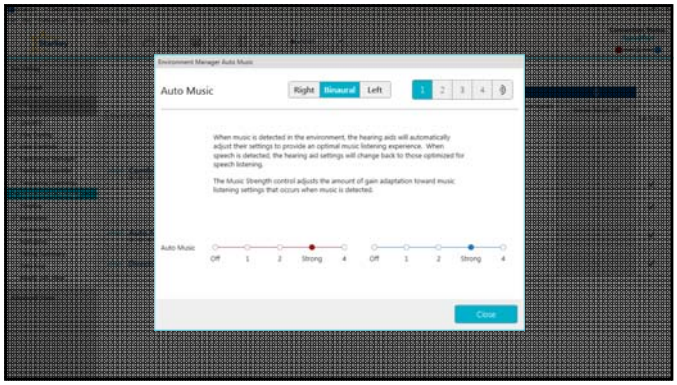


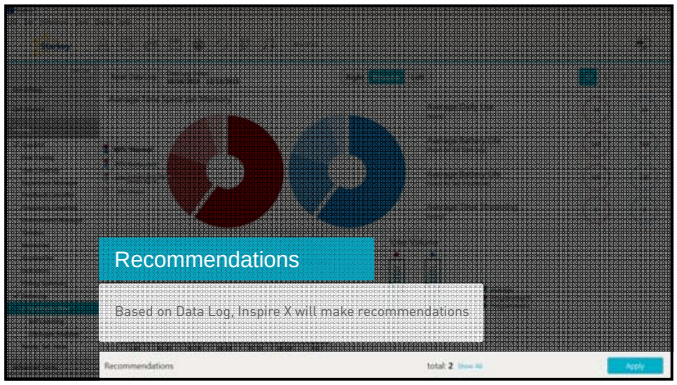
Average Gain Adaptation – Music

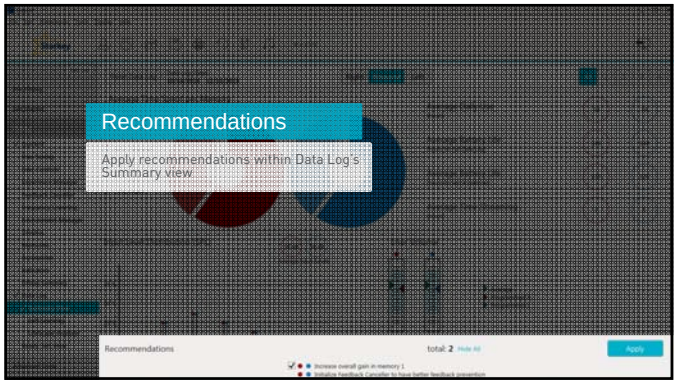
- There is no gain adaptation for music

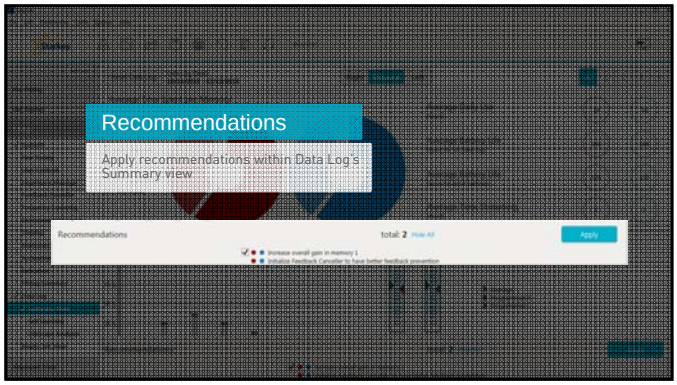
Music Cont…

- Music classification utilizes Auto Music algorithm
  - Auto Music makes background music more robust or less prominent in the absence of speech


Auto Music
Right
Binaural
Left
Close

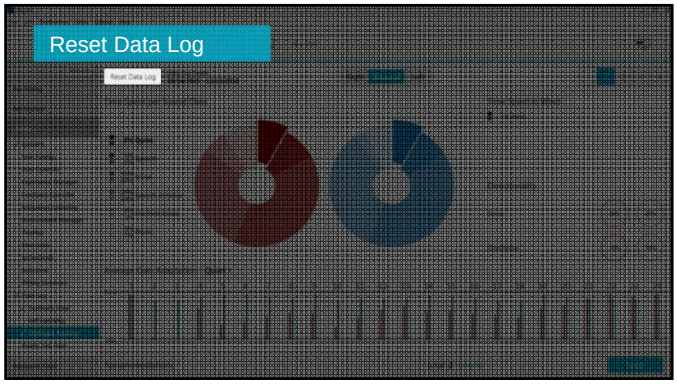

Recommendations
Based on Data Log, Inspire X will make recommendations
Recommendations
total: 2
Apply

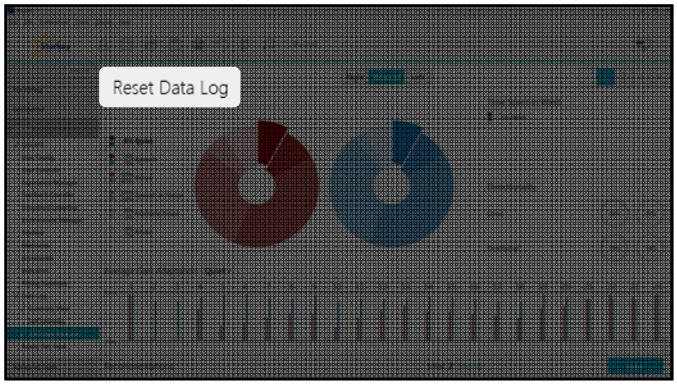

Recommendations
Apply recommendations within Data Log's Summary view
Recommendations
total: 2
Apply



Resetting Data Log

- Reset the Data Log each time you see the patient
- Be sure to reset the Data Log after making programming changes and especially when the noise control settings are adjusted
- The log is cumulative until reset!
- The Data Log is automatically reset during the first fit AutoPath sequence and after a Firmware Update





Patient reports trouble hearing on the phone. She mainly uses a landline phone. She has an Autocoil (left send signal) memory. Data Log shows Autocoil is engaged 0% of the time

- What side does she hold the phone on?
- Does the landline have a strong enough telecoil, or does she need a magnet to attach?
- Does she know how to position the phone to engage the telecoil?

Data Log shows that a patient uses the "Crowd" program 80% of the time, but the classification results show he is in quiet 85% of the time.

- Is there confusion about which program to use?
- Is the patient clear on which program is being used?
- Does the patient know how to change memories?
- Is there something they prefer about the Crowd program even when they're in quiet?

The patient reports having a difficult time hearing in meetings, lectures, and in church with her Muse i24000s RICs. Data Log shows that Speech in Noise is being classified a significant percentage of time. The patient is fit binaurally with Muse i2400 RICS programmed with one memory and no user controls engaged. She has arthritis in both hands.

- Consider increasing the Acuity Voice setting based on the information in Data Log.
- Consider adding a second memory using a fixed directional default.
- Add a SurfLink remote control to aid accessing memories.
- Consider implementing Directionality Plus or Noise Control Boost.
- Add a SurfLink Remote Microphone for easy access to directional microphone mode.

Good to Know

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Troubleshooting Data Log

If Data Log shows discrepancies between the right and left aid…

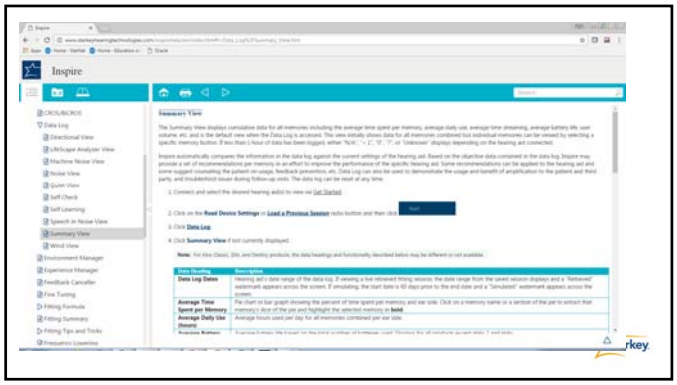
- Is the patient wearing both aids all the time?
  - Not wearing one?
  - Ear infection in one ear causing less wear?
- Was one hearing aid battery dead leading to the asymmetry?
- When was the last time the Data Log was reset?
- Did one hearing aid go in for repair?
  - Was the data log reset when aids were re-united?

Considerations with Halo 2 Data Logging

- Data Log will only show information regarding the Hearing Aid memories (those created by the provider in Inspire).
- No information will be provided on TruLink memories

Professional Support Tools


Made for Life


Inspire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