

# Fitting Tips

## Recipe for Gain and Output

- 1) Complete the Verification Equipment Readiness Procedure (Table 1).
- 2) Perform otoscopy.
- 3) Insert the probe microphone into the patient's ear.
- 4) Place the hearing aid into the ear, ensuring it is turned on and that all features, including noise reduction, are activated.
- 5) Select the test that allows visualization of the patient's dynamic range—the area between the hearing thresholds and uncomfortable levels (UCLs).
- 6) Enter the appropriate fitting target rule (eg, NAL, DSL, etc), the patient's audiometric thresholds, and any other options that are applicable (transducer, bone conduction, UCL, RECD, and monaural/binaural).
- 7) Conduct the first test with a standardized/calibrated speech signal and soft input level (50-60 dB SPL).
- 8) Ensure the output is in the lower range of audibility (ie, just above the patient's hearing thresholds); fine-tune the hearing aid in the fitting software as necessary.
- 9) Conduct the second test with an average input level (65-70 dB SPL) with the same speech stimulus used in Step 7.
- 10) Ensure the output is in the middle of the audibility range and is comfortable to the patient; fine-tune the hearing aid in the fitting software as necessary (Figure 1).
- 11) Conduct the third test with an MPO stimulus.
- 12) Ensure that none of the tones are overly uncomfortable to the patient and that none of the points of the curve

## Recipe for Directionality

- 1) Complete the Verification Equipment Readiness Procedure (Table 1).
- 2) Perform otoscopy.
- 3) Seat the patient facing away (180° azimuth) from the loudspeaker.
- 4) Insert the probe microphone into the patient's ear.
- 5) Position the hearing aid in the ear, turn it on, and enable directionality in the fitting software. If desired, you may also turn off other hearing aid features in that program at least temporarily to focus exclusively on the directional response. To get the most reliable response, a fixed directional setting is recommended.
- 6) Select a customizable test on the real-ear equipment.
- 7) Choose a noise-like stimulus at a moderate level (65-70 dB SPL).
- 8) Start the test and capture the resulting curve.
- 9) In the fitting software, turn off directionality so the response is omnidirectional.
- 10) Start a second test and capture the curve.
- 11) Observe the amount of directionality provided across the frequency range. An omnidirectional response will have both curves superimposed on each other. A directional response will show one curve separated from the other. The curve obtained with directionality “on” should have a smaller amplitude than the curve obtained with directionality “off.” This indicates that the hearing aids are wired correctly, so as to be directional to the front (0° azimuth).
- 12) Save and store the results in the patient's file.

## Recipe for Noise Reduction

- 1) Complete the Verification Equipment Readiness Procedure (Table 1).
- 2) Perform otoscopy.
- 3) Insert the probe microphone into the patient's ear.
- 4) Position the hearing aid in the ear, and ensure that it is turned on and in a program with noise reduction activated. To show the greatest potential for noise reduction in a hearing aid, enable noise reduction at its highest or strongest setting and turn off other features in that program.
- 5) Select a real-ear test designed to measure noise reduction.
- 6) Choose a steady-state and/or modulated noise-like stimulus at a high enough level to initiate noise reduction in the specific hearing aid tested. It may help to start with a louder level, such as 75 dB SPL.
- 7) Start the first test, waiting for about 20 seconds to allow the noise reduction feature to fully activate in the hearing aid.
- 8) Capture the resulting curves. Most equipment will provide a start and end curve, showing the amount of noise reduction that occurred during the course of the test. Some will also show a difference curve to quantify the amount of reduction (Figure 2).
- 9) For the second test, you may choose a speech or speech-like signal, such as the International Speech Test Signal (ISTS),<sup>8</sup> that will show whether noise reduction will affect speech intelligibility. The ISTS is available as a possible stimulus in several commercially available real-ear systems.
- 10) Observe and capture the resulting curves for a speech or speech-like signal.
- 11) Save and print the results to store in the patient's file.

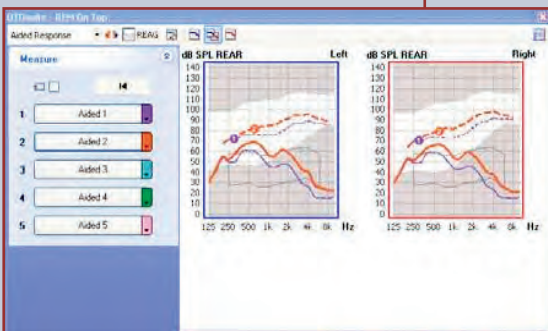


Figure 1. Audibility testing in the Aurical FreeFit<sup>4</sup> for soft and average input levels. Dotted lines represent targets and solid lines show real-ear response curves.

exceed the patient's UCLs; fine-tune the hearing aid in the fitting software as necessary.

- 13) Store the results to a jump drive and/or print them from the equipment for filing in the patient's chart.

*Note:* Some directional hearing aids have a bandsplit, such that only high frequencies are processed as directional, while low frequencies are processed as omnidirectional. If this is the case, you will observe a corresponding omnidirectional response in the low frequencies only.

*Variation:* Some real-ear systems contain a specific directional test, which enlists the use of a back speaker. To take this measurement, seat the patient facing the front speaker and select a test that delivers speech and noise. If the hearing aid is directional, there should be separation between the front (speech) and back (noise) curves.

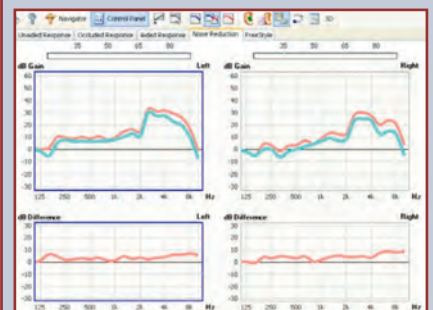


Figure 2. Bilateral noise reduction results, including difference curves, on the Aurical FreeFit.<sup>4</sup>