Pro Fit Advanced Tools: A Deeper Look at Starkey's Fitting Software

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Hello, my name is Dr. Natalie Hein and I'm a member of Starkey's Education and Training team. Today we are going to focus on profit, particularly a deeper dive into the software so that after today you can feel comfortable with programming and troubleshooting the current starheat product portfolio.

There we go. And if you would like to ask questions during the presentation, please click on the Q and A area. Type in your question. Of course, just click Send. I will address all the questions at the end of the session.

I believe we also might have another member of the Education and Training team on to answer those questions in real time as well, but if she's not available I will answer them at the end, so feel Please feel free to enter them as they come to mind. A PDF handout of this presentation is available for you through your pending courses on Audiology Online or by clicking on the link in the chat within the classroom Today there will be one hour of CEU for this session if you participate in the CEU program offered by Audiology Online. After completing the course, just go to your pending courses on AO and pass that short multiple choice exam. Keep in mind that you do have seven days to complete the quiz when viewing live courses and 30 days when viewing recorded ones. And finally, if you need any technical assistance, please stay logged in and request help by using the Q and A window or by calling or emailing Audiology Online.

You are welcome to review the risks and the benefits that are applicable to all courses offered through Audiology Online. So I will give everyone a moment to review the information on the slide and it will also be available in the handout.

And today we have three learning outcomes which include I hope that participants will be able to discuss troubleshooting tools provided within the PROFIT software, be able to discuss case related programming next steps, and be able to identify where to find discussed tools within the PROFIT software.

So let's get started. We knew the true art in fitting hearing aids comes from the skilled hands of a hearing professional and to find the best solution that can be tailored to a patient's hearing needs. With our Profit Fitting software, it has never really been easier to program Starkey hearing aids quickly and effectively. We designed the PROFIT hand in hand with professionals and we continue to do this. The software team continues to do interviews to make sure that this software is easy to use as we move forward and always wanting to make continuous improvements.

The goal of PROFIT is to provide that faster fitting with greater satisfaction so that you can spend more time with your patients and less time in the Software because we know it is always fun to talk about the weather with our patients and of course the time it takes to counsel. And you know from firsthand experience that most of your days are jam packed with patients from 8am to at least 5pm and it is because of this it is paramount that when you are using any fitting software it is as fast and intuitive as possible so you can get in and out and on with your appointments. The PROFIT features an organizational style and provides quick easy access to the most used fitting screens, minimizing the number of mouse clicks when you have to do and when you have to get around. And it is overall designed to be more intuitive when it comes to, for example assigning RIC hearing aids as right and left. You don't have to do it.

The system is smart enough to know how to and lastly, we know there are days when you need support either within a clum complex fitting or just a simple question. So we provide easy access to several different support tools from any screen. So when you do need that assistance, you aren't wasting that time looking for what you need. And of course you can always call as well the Starkey staff human answering the phone with the most audiologist of any manufacturer.

And as I mentioned, we did design Profit hand in hand with hearing care professionals and we continue to do this to ensure the software is convenient and easy to use as we move forward and continue to

make upgrades and improvements. So PROFIT is truly designed for professionals, by professionals to easily fit within your daily clinic flow and optimize that hearing aid fitting process.

Now let's look at the specific screens associated with programming Starkey devices.

Profit will require the use of the NOAA Link 1 or 2 when programming all wireless hearing aids, including the Omega AI, Edge AI, Genesis AI and the Signature Series CIC rechargeable. The non wireless CIC and IIC are compatible with the wired programmers you see here with of course that beloved purple cables and orange Flex strips and Starkey Pro Fit features Minute Fit and Smart Connect. Minute Fit refers to our methodology that allows you to go from box to best fit in just four clicks, which is big. That one's a huge one. Smart Connect automatically advances you to the exact session you need the moment you connect the hearing aids so you can start using the most utilized screens for the specific types of appointments that you are in.

And many providers have requested the ability to retrieve monaural settings and push them into the hearing aids from a binaural session. This is often the case when a single hearing aid is sent in for repair. This has always been possible within ProfID. The messaging within that software was not clear and seemed to be interpreted by providers that would lose the binaural connection between the devices if they continue with the monaural program. So the messaging has been updated to help providers better understand what happens when they push the settings from a binaural session into a monaural connected hearing aid.

Here you can see the updated messaging associated with the connected monoral device to a previously binaural session. There is also a secondary message after completing the connection process to again reiterate that the monaural hearing aid has successfully been connected to profit and binaural pairing information remains intact.

And here you can see the scenario from programming monaural hearing aids that are part of a binaural set following a repair. If we are able to maintain the programming within the hearing aid following repair, providers may choose to simply pass the hearing aid on to the customer without the need for programming. In this case, the hearing aid would need to be powered cycled to sync with the other device of that binaural pair. If the provider wishes to make programming adjustments to the monaural device, they can do so without needing that other device. This will not impact the connection of that other device, but again the hearing aid must be power cycled to restore that binaural connection.

How they access profit will not affect this process and providers will see an updated messaging if programming is not able to be maintained. Again, if it is not able to be maintained within the repaired hearing aid, then both hearing aids should be connected to profit to be reestablished as that binaural set. So please note that in this scenario discussed, phone pairing and accessory pairing will also need to be re established.

And many of the patient complaints that we deal with daily can be dealt with by thinking back to the basics of compression. So I do want to take the next few slides to do a quick overview of what is compression and then some patient complaints that you may hear from your patients and highlight some different ways to fix them.

So compression is a topic that is not always the easiest to understand and many times students struggle with compression basics in graduate school. And even for professionals who fit amplification every day, this topic can sometimes be confusing in terms of how to apply compression to a fitting and how and when to make adjustments to that compression setting. I know it takes a few blinks for me when we start to think about compression and when training on it, but compression is an important topic to review and refresh because it is fundamental to the way hearing aids function. How compression characteristics are set within a hearing aid really is that foundation to a patient's success,

to the ability to hear and understand incoming speech and how pleasant the sound quality is for that patient. Now, it also is the basis of all of our other advanced processing features, such as our noise reduction algorithms.

They are all dependent on a strong compression architecture.

And if we think about what our goals are when fitting a person with hearing technology, we want to restore the world of sound as best as we can to that individual with their hearing loss. The world of sound is quite vast, and it is truly amazing how dynamic the range of the human ear is, from those leaves rustling in the wind, to friends and family conversing during a meal, and to music and loud concerts like that Taylor Swift that set off the Richter scale and said there was an earthquake happening. So it is quite that dynamic range. And I use the term dynamic range to describe hearing, but I need to further define that for you. So, dynamic range is that difference between our loudness discomfort level, which is a level at which sound begins to become uncomfortable or even painfully loud, minus our hearing threshold.

And this is the illustration demonstrating the dynamic range in a person with normal hearing. The blue bar represents the full dynamic range. And the bottom of the bar is that threshold. That top of the bar is that loudness discomfort level. The white pieces of the bar represent the range of environmental sounds, including those below our thresholds that we can't hear and those above that loudness discomfort level that are painful to us.

But you can see that that dynamic range in this example really allows this person to hear a lot comfortably, including soft, moderate, and intense sounds.

And here is that same picture we saw before. But now we are showing what dynamic range looks like for someone with a sensorineural hearing loss. You can see that they're represented here in our blue

bar once again. And one of the most common complaints associated with hearing loss is the inability to hear soft sounds. And if we look at the bottom of the blue bar, we can see that the threshold has shifted.

So that now what should be a relatively easy to hear sound is more strained to hear, and weak sounds are not audible at all. And it is important to note that that loudness, discomfort level, that top of the blue bar, it has not moved. So the point at which sounds become uncomfortable in this particular example is the same, Despite a loss of hearing sensitivity to soft and moderate sounds, meaning our range is reduced.

And looking at it this way, we are more accustomed to an audiogram. We see a person with normal hearing can have that dynamic range as wide as 110dB. This is indicative of a healthy inner ear. Those non linearities of the cochlea and the tonotopic organization of that auditory system.

And then relating this to an audiogram of a flat mild hearing loss, you see in this case that that loudness discomfort level has not shifted, although the threshold has in comparison to the normal audiogram shown just before illustrating that reduced dynamic range. What is happening physiologically is the outer hair cells due to the damage now function in a more linear fashion. And as we see, the dynamic range of course is reduced.

Now the dynamic behavior of hearing aids is related to that time constant for compressive processing. Fast or slow. When we think of the dynamic compression, we need to think in terms of time constants. Time constants relate to changes over time or changes in compression throughout the duration of signal processing. Faster time constants have have the ability to compress things more.

This may be beneficial to some who experience a smaller residual dynamic range, but conversely may contribute to distortion of speech sounds and lead to reduced speech intelligibility. Slower time

constants have the ability to be less compressive and may be advantageous for those who experience cognitive impairments.

And in a wide dynamic range compression, the hearing aid provides different degrees of amplification depending on that input level. Soft sounds are given more amplification than louder sounds. Again to account for that reduced dynamic range in which usually, although soft sounds are no longer heard, loud sounds still remain loud. So by using this, we are able to do our best to reproduce a full dynamic range in the world of that reduced dynamic range listener.

So what does this mean for Starkey hearing aids Omega AI hearing aids use two independent compressors that run in parallel and calculate that gain independently based on the measure of the input. The two gains are then added together, hence the name additive compressor. And the key driver behind this new compression system was the leverage of the benefits of of both compressors that each process sound differently. With the goal to achieve that better perceptual outcome than we've had before. As there is empirical evidence that supports this.

So what are those two compressors in our compression architecture? Again, we have both a slow compressor and a fast compressor running in tandem to calculate that gain independently based on their measures of the input. The two gains are then added together again with that name additive compressor. And that goal of the additive compressor is to account for the loss of the function of the inner ear by using fast compression. Starkey is aiming to help with the loss of sensitivity and frequency selectivity, which mimics that frequency specific compressive Amplification of our outer hair cells.

By using the slow compression, we are looking to replicate the signal resolution to mimic the processing of those inner hair cells.

Now we're going to take a dive into each compressor with more detail. The slow compressor accounts for that audiogram to ensure that the environmental input is within the patient's dynamic range. This means again that soft sounds are soft, but audible, average sounds are comfortable and loud sounds just are not too loud. The slow compression has been used in hearing aids historically because they provide great perceptual outcomes for patients, Meaning the patients like the sound quality associated with a slower compressor, even if it misses key components of a speech signal.

Now, that second compressor for additive compression is that fast compressor. And the fast compressor operates on that dynamic, fast moving broadband components of an input signal, providing better audibility for soft components while reducing the contrast between the louder and quieter portions of our speech signal. This means that more gain for soft sounds like consonants. The goal of adding this with the slow compressor is to bring clarity and access to those low level speech sounds that would be missed for using slow compression alone, and thus improving speech intelligibility for our patients.

And with Starkey's compression architecture in mind, I do want to highlight a few programming scenarios that may need special attention from a compression standpoint. And this is programming specifically for a restaurant or for example, an H VAC system at home. We are starting with a 2cc coupler view and profit or soft, moderate and loud input curves all overlaid on each other. I know this is not how we typically look at things, but I think this view will help solidify what I'm discussing. So generally speaking, if the patient is reporting that a specific environment is too soft, then you want more compression for the soft sounds and less for the loud.

You can see here, when we increase the gain for the soft inputs, but not touching the other input curves, that increases the compression ratios for the adjusted frequencies, which is what we are looking for. Now, on the flip side, if a patient is reporting an environment is too loud, then you want less

compression for soft sounds and more compression for the loud. So by dropping the loud input curve, we are increasing that compression ratio.

Now let's put it into practice for a specific patient complaint. This patient is reporting trouble with comfort and clarity in a restaurant environment. If you think about the restaurant acoustics, it is generally a loud environment. So we as people, naturally we raise our voice in an attempt to overcome that environment. If you're trying to program for comfort by dropping the loud input curves, this will provide the comfort a patient is looking for, but it could smush speech and result in poor clarity.

So instead consider looking at the soft input curves and having the aids be more linear between 150 and 750Hz and between 4000 and above. There's not much usable information from a speech standpoint within these frequency ranges in a restaurant. So by going more linear for those frequencies and providing compression with the speech focused frequencies of 1000 to 3900 Hz, we can provide more comfort without sacrificing that clarity.

Now, typically H VAC systems are above expansion but below the knee point. So the quiet algorithm, it might not touch these. The machine algorithm could, but this is the one if you still need to make some adjustments. From a frequency standpoint, machine is reducing the noise across the entire frequency range. So as soon as speech becomes present, it will disengage and prioritize that speech.

So this does lead to gain fluctuations from quiet to loud with speech focus back to quiet again. If you target things from a compression standpoint, then you get less overall environmental gain fluctuation. So instead consider looking at the soft input curves and having the aids be linear between 150 and 700 Hz and again between 4000 and above and providing compression with the speech focused frequencies of 1000 to 3900 Hz. This will allow for the sound from the H Vac system to be better managed from a compression standpoint without large gain fluctuations and will also allow speech to maintain clarity and that stronger sound presence. For the hearing aid wear.

Starkey's Profit software features three different smart session types that provide you a really nice workflow for each appointment type. We all know there are more fitting screens or tools that you might need at any given time. So this next section of today's talk is going to focus on the advanced tools that you might need.

So there might be a time where you need to either best fit or Target match your Starkey hearing aids. So I do want to provide a quick reminder on the differences between these. Best fit will reset gain to targets as well as resetting all sound manager algorithms and other features back to default. Target match will only set gain back to target. So my example for best fit is if you do loaner aids.

If you're doing loaner aids and you're changing out between patients, I'm going to best fit them between each. My example for target match is a really poor reporter. You have a patient come back in and says, I just don't, I don't like how it sounds. And they can't give you more than that. If you want to start back over but not mess with your wind controls, any of those sound manager algorithms, that's when I'm going to hit Target Match.

Now, another example here. From the user control screen you have the option to adjust power on delay for the hearing aids when taking them out of the charger or closing the battery door. The default delay is short when which is five to seven seconds, but it can be lengthened to medium or long in case your patient needs additional time to get their aids on in place. I tend to use the long setting when I'm working with a patient with custom devices. That way they're not pushing the buttons as they're trying to put them in.

They like to hear the tone and they're not getting as much feedback as they're putting it in. So that is one of the one changes I make every time.

And the media player, this is an excellent tool for troubleshooting different complaints with specific sound examples directly built into the software. You can access this from the Tools menu and select a media player. From there you can see the difference. So I'm going to go ahead and show you that and the different categories of sound and it can list all the available sounds. So I loved using this with my music patients because because I would go into their music programs, play one of the music samples, and then often make adjustments to get that sound quality in line with the patient's preferences.

You can also use this with different speech and noise complaints or to highlight the importance of patient positioning with background noise in lower levels of technology that don't have the advanced noise management controls.

Now, if you need to do a quick visual comparison of multiple programs, multicurve allows for that easily. You simply right click on the fitting graph and select Multi curve. You then have that solid green line will be the patient's personal program and the dashed line will be the secondary program. If you select one of the patient's secondary programs, that line will become highlighted in green but remain dashed. This stacked view will also show you the moderate input curves for each of the patient's programs except for that music programs as that one is a completely different compression architecture and therefore not included in that multi curve view.

To end the multi curve view, you're going to simply right click and deselect Multi Curve and return to that standard display view.

Your different display options are 2 cc coupler gain. Your settings are displayed with reference to 2 cc coupler gain and then your 2 cc coupler output. That setting is displayed with reference to again that 2cc coupler output your predicted insertion gain. Those settings displayed with reference to the predicted insertion gain. Real ear Response the settings are displayed with references to predicted real ear output or the response measured in the patient's ear.

This is the default view but can be changed if you're interested via the general preferences. You can also change your input type away from speech to sinusoid if that is your preferred view as well.

Now Vent Model optimization and Feedback Canceller are completely separate features that run simultaneously so that feedback cancellation margins are separate from vent model optimization. So if you manually adjust the gain to a setting what may cause feedback, an alert will signal on that left menu bar of our feedback cancellation system will effectively manage any potential feedback just like it always has. Now Vent optimization measures the amount of sound leaking out of the ear canal back into the hearing aid microphone. If the default model predicted less leakage than the individualized measurement shows, the gain targets will need to be increased to compensate for that additional sound leaking out of the ear. The reverse is true.

So if you do rerun feedback tests that pop up to optimize the vent will only trigger again if you have changed the acoustics of the fitting, which is leading to changes in that expected sound leakage, or if you do not select to optimize your fitting for the venting on the initial running and Starkey's feedback cancellation system automatically suppresses feedback before it happens, with the primary goal of maintaining audibility Running the feedback cancel initialization is recommended every time first fittings to ensure personalized settings are unique to that patient's ear canal. And I should also note and many of you know this, when you run our feedback canceling, I want it in their ear so not sitting on that table. That amount of maximum stable gain, the MSG is measured at each frequency while automatically applying the best settings for the patient's fitting to mitigate that risk of feedback. Now that maximum stable gain measurements help the professional gauge how much I like to say room there is prior to feedback concerns in each frequency channel. However, subsequent gain adjustments during fitting sessions might increase that risk of feedback.

Now if everything looks like it should on your feedback screen but patients are reporting random feedback chirps, I recommend checking the gain adaptation section in the data log screen. If you see a feature engage, then there is a large gain adaptation visible on the screen. This could be leading to the feedback chirp when the feature disengages. So for example, if a specific occurrence is leading to a 10dB gain reduction, when that 10dB of gain comes back to patients, they might be reporting that chirping. If this is the case, you can reduce the aggressiveness of the corresponding feature from the Sound Manager screen.

The amount of gain adaptation that occurred is displayed on that tooltip just by pointing to that channel bar. Now we are excited to have Real Ear Match Target Match as part of our Profit Tools. This feature allows you to verify hearing aid fittings using Real Ear equipment and the Profit fitting software. It provides a real quick and easy streamlined process for automatically matching real ear targets to provide an accurate and efficient fitting experience.

And the Real Ear Match Target Match is fully integrated into that profit workflow and again allows you to perform binaural real ear measurements and automatically match your hearing aid and frequency response to that prescriptive formula and Targets without ever leaving profit and Real Ear Match Target Match again is an automatic real ear measurement tool that allows the hearing aid professional to quickly and automatically fit hearing aids using that unique acoustics of the client's ear. The fully integrated workflow via the Real Ear Match Target Match tool allows for live displays of that simultaneous binaural real ear adjustments relative to the targets and automatic target matching for both the E stat 2.0 proprietary and as well as standard prescriptive formulas. Real Ear Match facilitates direct communication between most of the popular real ear measurement systems including VeriFit1 and 2, MEDARX, Avant, Ventus, Trumpet and the Oracle Free Fit. Our clinic research has shown the Relayer Match Target Match to significantly reduce fitting time compared to the traditional relay layer match measurements while maintaining that speech intelligibility index, so really ensuring for that

optimal fitting for that patient. So that research was showing about 7 minutes of time saved doing verification which can definitely be used for counseling patients on that back end.

And these last few slides are some relayer mesh measurement tips and tricks.

So these are the good to know items with the Verifit systems. So that will include the listed here. If calibration has been completed daily or weekly, the calibration prompts will be skipped and the user will be prompted to start aided measurements. If the binaural sound field assist is skipped using the VeriFit two measurements will be run monaurally until the measurements are completed and when it comes to VeriFit1 it will only run monaural measurements one ear at a time. The measurements will automatically switch between ears until all the measurements are complete.

With Verifit 2 it will run simultaneous with that binaural measurement and there might be times a professional wants to clear that Real Ear Match Target Match measurement. To do this you will simply go to the Tools section, choose Clear Real or Match Target Match and then select OK Real or Match Target Match. Tools will always Target Match to experience level three. That's our 100%. If the experience level is set to a level other than 3 realer match target match will adjust gain to match that experience level.

After the target match is complete.

And once you exit that Relayer Match Target Match tool, there isn't a way to access the real ear match measurement curve again. So if you re enter that tool, the system will assume you wish to repeat that measurement process. Printing and fitting report graphs before closing is definitely recommended.

And for professionals using NOAA to make sure that the measurements are visible in their fitting report, we do want you to make sure that you turn on NOAA Fast Data. And if you're not familiar with NOAA

Fast Data, to do this you'll go to Preferences, then General and select NOAA Fast Data. It's a little box you're gonna check off there. And as you saw, hearing professionals can select the loudness level at which the system will automatically stop measuring. It may be useful to align and that it will be specific to the Verifit systems and specific to NAL NL2 bone conduction thresholds must be entered at 500 and 2000 Hz.

If not entered into NOAA, the real ear system will fail to launch. Professionals who do use The Verifit and NAL and L2 frequently will be more accustomed to this requirement.

Now the Audiometer tool. This is used when you're looking to perform in situ audiometry for your fitting. You can quickly and easily navigate through the different frequency ranges and intensity levels to present pure tones through the hearing aids to verify what the patient is hearing through their aids. If you wish to make programming changes based on the results, you can do that directly from this screen as well by selecting Best Fit in situ. The audiometer is a great, great troubleshooting tool.

Audiometer effectively captures the effective transmission line acoustics. So an example, maybe you made some programming changes and the patient reports the opposite of what you expect. Or perhaps you increase the size of the vent and they report no sound quality change. If you run in situ it is and it is wildly off receiver is pointed right at the canal wall or no true vent effect because it is pointed at that wall. So if you suspect a true change in hearing, then a full hearing test in the booth may be warranted.

So it is a nice tool to make sure before you Jump back in that booth. It is needed. I've also used it in our telehear system for patients that cannot come into clinic due to, for example, being on hospice. So making those changes using this feature has been a really big win for me clinically. Now, let's take a look at the controls and how to operate that audiometer.

You can quickly and easily navigate through the different frequency ranges and intensity levels to present pure tones through the hearing aid to verify what the patient is hearing through the aids. If you wish to make programming changes based on the results, you can do that again directly in this screen as well. Now, when you do go to the screen, it is important that you know the hearing aids will mute right away. To unmute the hearing aids and to speak with your patient, you will need to select the microphone icon that you do see here. I've got a nice little yellow box around it.

And to conduct the test, it is important the room remain as quiet as possible. And I'm sure you guys know that similar to the instructions for a diagnostic pure tone test, you will simply instruct your patient to raise their hand when they hear a tone through the hearing aids. The goal again being, of course, to identify the softest detectable level of the stimulus. And that audiometer test is a monaural function and starts on the right ear in a binaural fitting. You could of course, click on the left ear if you would like to test that ear.

Then you simply select the audiometric symbol or the frequency you wish to test, and you click on the presentation button to present the pulsed Similis as appropriate. Use the up and down arrow to increase or decrease that level of the stimulus, and the right and left arrows will move you to the next frequencies.

And now, based on the results from the audiometer tool, you can determine your next steps. If a major change in threshold is noted, it does not necessarily represent a change in hearing. It can result from the ear anatomy or receiver placement like, like I mentioned before. But it also is really susceptible to room noise, which can show up in a significant change in lower frequencies. So it is important to be cognizant of this when interpreting changes.

Based on the changes, you can reprogram based off those new thresholds, or you may use this information to inform the change transmission line acoustics, including the venting size, style of the

earbuds, or switching to a custom.

And this is just going into more detail of what I just rattled off on that last bit. And if changes are noted, you may best fit the aids to the new thresholds. Or Target Match. We talked about those two features a little bit earlier in the presentation and I'd like to highlight the difference again between those options. Best Fit will change both frequency response and features, including the streaming configuration.

And any changes made within that Sound manager and Target Match will only alter the frequency response and not the features within Sound Manager. So we'll give you the option to include streaming configurations. You can additionally select whether to apply this to current programs for all programs. So a lot of flexibility there. And we're going to put this into practice with a specific patient.

This patient is reporting that sounds are too loud in the right ear only when you move to the audiometer view. I see that the patient is already really limited in that UCL in place, indicating that they have a tolerance issue in that right ear. So I can perform in situ audiometry and even verify that that UCLA through in situ as well. After I see what the patient's thresholds are within the hearing aids in place and turned on, I can best fit to the audiometer results and proceed with a more comfort based fit.

All right. Next tool. So the next tool we'll look at is Verify Comfort, which is used to confirm if loud and soft inputs sound satisfactory to the patient. To me, this is often an extension of that audiometer tool we just discussed as I often use both in targeting overall comfort and this is a feature often used by those who do not have relayer systems and is a way quickly and easily to verify comfort with different inputs without any setup. This tool is available during an in person or live remote programming fitting.

However, tones can only be presented in that personal program and for the 50dB curve, you. You don't want any sounds below threshold. And for the 90dB curve, sounds should be loud but not exceed that comfort level.

And the tones can either be presented in an upward or downward sweeping method across the entire curve, or a pre selected range of frequencies or presented at a single frequency. The sweeping speed in which tones are presented can also be changed. You have a lot of flexibility when it comes to our profit software, which is, as a hearing care professional, very important for me. And you can pause the sleep at any time to adjust specific frequencies up or down as needed. And these changes will apply to your hearing aid frequency response automatically.

And this is a monaural test, so if you want to use it, you do need to run curves on both the right and the left ear individually.

And then we have speech mapping. Speech mapping allows you to illustrate your patient to how the hearing aid is processing speech or any other input in real time by capturing curves and displaying them for easy understanding and verification of performance. It also allows you to provide counseling. I used it a ton for counseling and then fitting and troubleshooting support. During the initial fit and follow up fittings, you can copy up to seven captured curves and be printed for references.

So whether it is using this to share and counsel with a patient and their partner of how loud their speech is, or if your patient swears they can whistle exactly at 2k and prove you wrong, that's a way to use speech mapping as well.

And speech mapping is that great tool for troubleshooting as you can use it a variety of stimulus and get graphic representation again in real time for loudness. Maybe someone's voice is too loud or too soft and you're going to use that in live voice. Maybe certain sounds cause discomfort and you're going to use that live demonstration or media file of that specific sound. I had a patient that could not stand a specific spoon that she would use eating her cereal with her hearing aids. I told her to bring in the bowl and the spoon and we had breakfast together and we made adjustments Utilizing speech mapping for

feedback, you can try to elicit feedback from a situation and see what frequency it occurs.

For noise again you can use speech mapping to help determine if the noise is internal, AKA circuit or external by gradually decreasing the response and frequencies exceeding that targets and if a patient experiences pumping. Use sounds that elicit this and then adjust settings until they go away or perhaps certain loud sounds seem to cause the hearing aid to shut off. Use these sounds and adjust that MPO or other parameters. So a wonderful tool.

Now it is only available during live fittings and those curves can either be captured via speech mapping or any fitting screen with a graphical view. Accept frequency lowering hearing aid test and verify comfort so that speech mapping allows you to see controls for the captures that have been made while using this tool and the input monitors will show the average input level being picked up by the hearing aid microphones and the display controls will allow you to customize the various targets you would like visualization of. Once that speech mapping is activated, the frequency response graph changes to display the real time information of the hearing aid or hearing aids via bars or lines for speech input. In addition, tinnitus stimulus is temporarily disabled in all enabled programs while you are in this screen.

And different options to create captures. So camera for instance that feedback for example. That is a great option when you're trying to find that or record a 10 second average. This is that great example when Working with a patient and their partner of the live voice. When assessing that audibility, the play pause button activates and ends that speech mapping.

And here you can see a video of speech mapping in action. This particular patient is struggling to hear their spouse's voice. My initial recording is showing that the spouse is speaking very softly. So I counsel the spouse that they do need to make and speak with their normal strong tone of voice. But I am also able to make some targeted adjustments to boost the patient's aids for audibility.

You can see that with the second recording post adjustments, I'm able to have the speech frequencies match that 65 db SPL target curve and thus really maximize that audibility when the patient is speaking with their spouse. So let me go ahead and play that for you.

And now let's take a look at frequency lowering using a frequency translation method. Frequency lowering takes high frequency input when detected and replicates it in a lower frequency range for increased audibility, therefore not compromising the extended frequency range that is so important for so many other signals. No compression is used in the frequency range. Frequency lowering features are smart candidacy criteria that will default if the feature on if the hearing loss meets specific criteria. And I will say the default is on but not if you are in a VA or dod.

So that will default off if you are again in a VA or dod. And I like to think of it as copy and paste in real time. That is my easy way of remembering our frequency lowering. And that smart candidacy criteria were developed from research with the help to identify individuals who are likely to be ideal candidates for frequency lowering. So these will include a slope that is greater than 25dB for octaves starting at any octave or interactive between 250 and 4000Hz.

All thresholds below 1000Hz should be 55dB HL or better. And then got two more here any threshold from 1000 to 3000Hz again is 55dB or worse. And number four here is all thresholds between 4000 and 8000Hz should be 55Db or worse. So that is the criteria, the smart criteria. And there are two shaded regions that populate on all fitting graphs when frequency lowering is engaged.

The green shaded region is that source region. This area will show the range of frequencies where speech shift is dynamically searched for high frequency speech information to copy. Once identified, spectral cues are then copied to then be recreated in those lower frequencies where hearing sensitivity is better. So like I mentioned, copy and paste in real time. The target region shown in yellow displays the Location where the copied high frequency information was.

In addition to the source, the target regions, the frequency lowering screen offers an optional thin green line to display spectral energy. So for an S sound at input or before, frequency lowering is applied, so you're going to see that dark green line represents spectral energy for that S sound. Then the output of that frequency lowering is applied and then a comparison of the two. So now let's take a look at the professional controls available in the software. Along that left navigation panel there is a tab labeled frequency lowering.

At the bottom of that fitting screen there are three professional controls. These controls can be used to enable or disable the feature and adjust that signal processing characteristics. So let's look at them in a little more detail. So as mentioned before, the frequency lower and bandwidth control is a multi parameter control that allows a professional to adjust that range of frequencies comprising the source and targeted region. There are seven discrete settings based on those audiometric values.

Here you can see the effect of changing the bandwidth setting from 1 to 7 and subsequent adjustments to the source and the target regions. The frequency lowering gain control regulates the amount of that recreated signal energy in that final output. The Range extends from 0 to 10dB and can be changed in that 1dB. Increment changes will be reflected in the high frequency speech output or dark green curves on that frequency lowering fitting graph. So I do want you to keep in mind that actual gain values will differ by frequency based on the long term average spectrum or that spectrum of speech and the fitting formula used.

The effect of the gain control is best seen at the response peak on that fitting graph.

And the fourth professional tool offered through the software are customized best fitting settings. So when frequency lowering defaults on the most appropriate best fit settings are implemented based on the individual automatic trick information. Frequency lowering bandwidth and gain settings are then

customized for each patient and provide really an excellent starting point for this feature. A bandwidth setting of 3 and a gain setting of 3 are the default settings for moderate to moderately severe high frequency hearing losses where Any threshold from 4000 to 8000 Hz is between 55 and 65 db hl and a bandwidth setting of 5 and a gain setting of 3 are the default settings for severe to profound hearing losses where that hearing threshold from 4000 to 8000Hz or 70dB or greater and the bandwidth and the gain settings may be adjusted as needed and we'll talk more about specific adjustments considerations and validation strategies here in a bit.

And frequency lowering may be manually enabled or disabled on a per memory basis and the setting can even be configured differently in different memories to allow customization and flexibility in meeting patients preferences. So some considerations for enabling or adjusting by memory might include one that individual suffers from recruitment in the high frequencies, frequency lowering may take edge off that higher frequency or help facilitate that comfort or two Perhaps a patient suffers from tinnitus and they derive some degree of benefit relief with amplification across the entire hearing aid bandwidth with frequency lowering off, but also derive benefit with improved word recognition ability with the feature on.

I do want to emphasize one important consideration with regard to giving a patient two memories, one with frequency lowering on and the other with it off. All frequency lowering strategies alter the sound quality of the original signal to some degree. So when first introduced there is a period of adjustment or acclimatization that follows for some individuals. Many patients will not be able to commit to a recommended trial or schedule of use if they have the option to toggle back and forth between what they're used to and what they think things should sound like and what's different, even if what's different is actually better for them. So do consider that before enabling disabling frequency lowering on a person memory basis.

On a positive note, because of the way the speech shift protects the harmonic nature of speech, frequency lowering is usually very well received. And finally, also know that frequency lowering is not available in that dedicated music memory. Due to the unique nature of how music signal is optimized with unique gain and compression characteristics and to assist with validating the benefit of frequency lowering, we have developed an easy to use tool with the S test in mind. This task has listeners identify the presence and absence of the final S or Z sound with and without frequency lowering engaged. Not only is the tool helpful for validating the benefit of frequency lowering, it can be used to find the best bandwidth and gain sound settings and help you counsel that patient.

So it is effective, fast and easy.

So here is the protocol you're going to turn frequency lowering off, mask lip reading cues, present a sample word list. The word list randomly includes, excludes that final S or Z sound and have the patient repeat the word they hear and score the percentage correct. If the patient score is greater than 80% with frequency lowering off, turn that frequency lowering on and repeat the same steps. The goal is to see an improvement in word recognition ability with the feature on versus off. So keep in mind that 80% is suggested criteria as word recognition ability is typically considered good or excellent at that point or above.

Individuals scoring 80% or better with the feature off likely do not need frequency lowering. Although that may make a difference for some patients and the audiogram report prints. This is for the patient's most recent audiogram stored in NOAA or patient Base. Audiograms for both the right and left ears print along with numeric and speech MCLS UCL test results. In addition, notes and the tester's name can be handwritten on the report.

However, if notes were entered with the audiogram during the current session in Patient Base, these notes print on the report the report header options selected via reports and preferences on that top

ribbon in the software determines the logo, text and patient information that prints at that top of the report so you can customize it to your clinic needs.

And the fitting report. Details regarding a live or simulated fitting include indicators, configuration, audiogram programs, graphs and etc. Only the data applicable to the hearing aid prints on that report. So if the feature is supported and enabled either a check mark or on prints, but if it is disabled either dashes or off print. If the feature is not supported or enabled, such as a telephone indicator, mute indicator, N A prints in the fitting binaurally, each hearing aid prints on its own page.

However if a fitting a CROs or Bicros device, only the receiver aid prints the report header option selected via that report preferences I mentioned determines the logo and text and patient information that prints at the top of the report and whenever a session is saved in profit it if we've included NOAA FS data, remember how we get there that is going to be checked in general preferences as well a PDF containing the first page of the fitting report and again if check the real ear match target match graph for all ears and sides saved in noaa. So a lot of information there and your data log report that's going to print an overview of the patient's data log including the battery life, average input level, directional usage, percent of time spent per sound class. Only the data applicable for the hearing aid, directional streaming et cetera prints on that report. So if you are fitting binaurally, each hearing aid prints on its own page. Except if you're fitting a cross by cross device, only the receiver aid will print the report header.

Again if you set that up to be specific to your clinic will determine that logo text at the top and the patient's information that prints on that top of the form.

Another report is your verification port that prints data for up to seven captured curves on a graph based on real ear response. In addition, details regarding the hearing aids configuration audiogram adaptive features for those selected programs print on that report. If fitting binaurally each hearing aid

prints on its own page. Again if you're printing across or by cross only, the receiver aid prints and that header will be matched to your clinic needs and again will also provide you with the patient's information. At the top you have the hearing loss simulator as well and very similar you're going to have the different screen selections to assist on counseling a patient.

So this is going to be really helpful for counseling and you can customize it to your clinic needs as well and then your audiogram report. So this is going to be the patient's most recent audiogram stored in NOAA or patient audiograms for both the right and left ears print along with the numeric speech MCL UCL test results and and those notes that we mentioned earlier.

I've given you a lot of information today so I want to wrap up with some resources. For helpful resources on everything Starkey product and Software, please visit StarKeyPro.com to view our quick tips and research based white papers associated with different features and tools within that software.

And I want to remind you of two amazing tools within profit and highlight the differences between them. So Starkey AI Assist is a generative AI tool that allows you to ask specific questions and receive answers pulled from pertinent Starkey publications and Help for Profit allows you to see deeper information based off the screen of Access. Now, Starkey AI Assist will not tell you where to go to dinner, but it will tell you what the different colors of masking mean. So again, for example, if you have a question about candidacy for frequency lowering, asking Sticky AI Assist will be a great way to quickly and easily see the basics of frequency lowering and the publication that may provide deeper information. So it gives you a source of its information.

Help for Profit, when activated from the frequency lowering screen is a good tool and it goes through the mechanics of this screen and it breaks down the different visuals and what can be activated and manipulated from a programming need.

So that completes the course today. Thank you so much for spending part of your day with me. I really do appreciate your time and attention and hope you have a wonderful week. So thank you again.