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Feature Needs for Super Power Patients

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You.

Hi everyone and welcome to today's course feature needs for Super Power Users presented by Beltone. We are so pleased to welcome back one of the very best presenters I've ever had, Dr. Laura Schachtel. Laura, I'll hand things over to you. Thanks Kimberly. Hi everyone.

Welcome to our course again on the feature needs for Superpower users. For those that don't know me, I'm Dr. Laura Schachtel, Beltone's product training development manager. And today we're going to talk about all the unique hearing aid features that have been designed sort of for this patient population in mind. So as Kimberly already stated, there are several handouts for today. Most are similar to the ones that you might have downloaded if you joined me yesterday, but the notes handout is different for today.

Otherwise, if you're unable to find these handouts, you can always find them on our homepage, which is beltonuniversity.com so hoping that after today's session you'll be able to list the characteristics of this patient population, be able to explain the features designed for this patient population and then when you would adjust those specific features and then lastly list the factors deemed most important when upgrading this patient into new hearing aids. Just real quickly, these are the risks and limitations of this course, so please view them as needed. So, kind of a little bit about this patient population. Approximately 11% of individuals with hearing loss fall into the severe to profound category and this spans all age groups. So young to kind of middle aged to extremely old.

Those requiring amplification need powerful hearing aids that can provide significant gain and output. Although this population is pretty small, they heavily rely on their hearing aids for daily functioning, explaining the almost 70% adoption rate. And I really believe the other kind of 30% is either in that capital D deaf world, so they're not going to be aided by anything, or they probably have some form of cochlear implants. So even small advances in hearing aid technology can greatly impact these patients

who unfortunately have the lowest quality of life scores. Now this group of patients, while wanting new technology, might be the group that's the most hesitant to get new hearing aids.

Now, while your practice may frequently see experienced wearers that are seeking replacements, they are not the only demographic that you might see. Now you may encounter new superpower users. So either individuals new to amplification or those transitioning from lower power devices. Now, it can be extremely challenging for someone to experience further hearing loss to this degree or to just suddenly require superpower hearing aids. Therefore, dedicated counseling and support are critical Audiological services for these patients.

Now, in terms of fitting needs and strategies, they share similarities with other hearing aid users that you see, and they would likely benefit from wide dynamic range compression, with high end technology being particularly appealing. Especially if this was a hearing aid user in the past and now they're just new into the superpower category. They probably had an RIE that had all of these high end technologies. So experienced nonlinear super power users may have started with digital technology in the past, or they've now successfully transitioned from that analog technology into digital. This group may be a little bit easier to work with again because they are now familiar with digital technology and that sound quality and they won't require you to help them with that transition period.

And they are generally more open to trying new technology. Again, because this isn't the first kind of dip their toe into digital, they've at least worn them before. However, it's still essential to remember that they are super power users and they're highly dependent on their hearing aids. Now, amongst the three types of superpower patient, the experienced linear patient will present the most challenges. I think we all can agree these individuals likely have had significant hearing loss for many years, possibly since childhood.

Now, this is probably a time when hearing was detected before digital technology or when digital technology was expensive. So you might see that this person is using powerful low end btes with full shell ear molds and minimal venting. They might have had multiple pairs of hearing aids or they've worn that same pair of hearing aids for years, which makes them very familiar with their hearing loss and their hearing aids. So when it's time to replace their hearing aids, they may experience new devices and they may expect their new devices to really resemble what they're currently wearing. And they may really strongly resist adapting to newer technologies and that they prefer that their new hearing aids, quote, sound like their old ones.

The distortion that many of us perceive as negative holds significance for them. So consequently, for this particular group of patients, they're very rarely influenced by any type of claim of new or best. So with all that said, what are superpower patients in general looking for when upgrading their hearing aids? Well, we asked them and here's what they told us coming in. Number one is good sound quality.

And this goes beyond just a high quality processing chip. It includes features that ensure clear sound even at high gain levels. They want reduced feedback. So even this patient population dislikes whistling from their hearing aids. So effective feedback management is crucial given the high gain that they are going to require.

Kind of rounding out the middle Here our latest features. So while superpower patients are often hesitant to change from what is already working for them, they do appreciate advanced features typically found in RIE hearing aids. However, again they may not be easily swayed by the claims of New Orleans best physical comfort and reliability are fourth on the list. Since these patients wear their hearing aids consistently, comfort and durability are essential to minimize the need for repairs. And lastly, when looking to upgrade, this patient population is looking for connectivity they want and can very much benefit from direct streaming accessories and AuraCast.

And I just read somewhere that this group of patients actually know what ORACAST is like. They've researched it out. So taking all of this under consideration, what do these patients need as far as what's in a hearing aid? So these users need powerful amplification and they cannot accept any compromise on gain and a proven feedback management system that does not reduce gain to stop feedback flexibility with compression, meaning having the ability to have wide dynamic range compression or linear processing if needed. They might need or want frequency lowering technology to restore speech clarity that they are missing with just gain alone.

And they would like to if possible, have better understanding in noise and all around listening and again, comfort and connectivity. So let's talk about how Beltone Boost Max S delivers on all of these points. So of course the primary goal of treating hearing loss is to ensure audibility of speech sounds. People with severe to profound hearing loss require more gain for their hearing aids to ensure speech sounds are audible. However, they often have a reduced dynamic range with a very narrow gap between sounds that are audible and those that are uncomfortable.

Hearing aids have a limited amount of headroom as illustrated here in output view where significant gain is close to or at the MPO showing little to no headroom between 2 and 4 kilohertz. In this instance, a patient might complain that their hearing aids are not loud enough, muffled or distorted. Now, before increasing gain or trying different fitting rules, you might consider making a change to how the MPO of the hearing aid is set. So a recent update in Solus Max allows you to choose how the MPO affects fitting parameters and headroom. You can choose to use the prescribed MPO which is calculated from the audiogram, or use instrument MPO which utilizes the full capacity of the hearing aid.

In output view, the added headroom is much more apparent along with the higher MPO numbers. Now that red line indicates the MPO setting and you can see the additional separation from the output curves. When using instrument mpo. This separation avoids over compression and and sound

distortion which is why we recommend using instrument MPO with patients that have a small dynamic range. And let me explain why a little bit further.

So let's say you have a patient that enjoys going to music concerts with these current settings. Will he be able to enjoy the concert? So, to answer that, we need to do a little bit of some math. So assuming that the concert reaches 100, 100 or so DB HL, that would be the input, we will Refer to our G90 curve to see how much gain we're going to add to that. So if we average up all the frequencies of our G90, we're going to add about 8dB HL of gain, and that results in an output of 108dB HL, which translates to approximately 117dB split.

Remember, when we talk about MPO that is measured in DB spl, not hl. So given these current MPO values, we can see that they are not sufficient enough for this patient to enjoy his concert because none of them is anywhere near 117dB. So it's likely that this patient's going to experience sound that's compressed and distorted. And when we look at the output view, we can very clearly see why that prescribed MPO is limiting or compressing our G90 curve down. And in that highlighted box, you can very clearly see that where the dotted line, which is our target, is above the red line.

So the hearing aid is compressing that G90 down to basically be on top of the G60, 70 target and gain, so causing a lot more compression than you would have realized. So feedback remains a significant challenge for this patient group, particularly if there are restrictions on gain. In our internal study, we evaluated the stable gain that leading competitors superpower hearing aids could provide, measuring how quickly they could eliminate feedback and whether gain had to be reduced to achieve this. Our findings revealed that the Beltone Boost Max S was the only hearing aid capable of quickly eliminating feedback without reducing gain and still be able to add 6dB more stable gain than the others. So let me take a moment to explain in more detail how our Feedback Eraser 2 feature works.

Feedback Eraser 2 consists of two systems, a static and a dynamic system, both working together, formulated or coming out of that MSG calibration. The static system addresses feedback caused by unchanging factors such as the physical properties of the hearing aid, like venting, microphone and receiver placement, and the patient's own ear geometry. The dynamic system, on the other hand, manages feedback resulting from moving factors that significantly alter the feedback pathway, such as placing a phone or hand up by the Ear giving someone a hug or chewing. This dynamic system continuously monitors movement for any type of feedback and it hopefully will handle it because of the calibration that you ran. Now, just reminding you that the results of the MSG calibration can be displayed on the gain graph and that shows you the maximum available feedback free gain for that patient specific ear anatomy.

But remember, in order to see this MSG curve, you need to check the box for it under display options. Now, you might be wondering what you're actually adjusting when you're making a change to feedback eraser 2. And that adjustment is related to the aggressiveness of a third system called Gain Stabilization. This system works alongside the two systems generated from the MSG calibration, meaning that Feedback Eraser 2 operates with three different systems simultaneously to help control feedback for your patients. So here's how it works.

When the calibrated system cannot control feedback on its own, gain stabilization steps in to control it. So for example, if feedback is within the dynamic systems range, then gain stabilization remains inactive. And as you can see here in the diagram, as long as feedback is within those dotted lines, then we do not need gain stabilization to activate at all. But if the patient places their hand over their ear, feedback is likely to occur as indicated here by the red line. That red line falls way outside of the dynamics ranges system.

And so in this case, gain stabilization will activate to the degree that you selected in the fitting software. So a mild setting provides gain stabilization pretty infrequently only in extreme conditions when the dynamic pathway is significantly different from the calibration, such as this image when that patient brought their hand up to their ear. In contrast, a stronger setting such as strong with whistle stop will trigger gain stabilization even when the calibrated system could have controlled the feedback. So it's kind of stepping over another system and this can lead to overcompensation, reduce gain and potentially interfere with sound quality. So we recommend that you only use strong or strong with whistle stop when the gain settings are well within or exceeding the MSG curve.

So individuals with severe to profound hearing loss are heavily reliant on their hearing aids and are typically very comfortable with the sound they provide. Given the importance of specific sound quality for this population, and considering their reduced dynamic range, it is critical to have the tools necessary to adjust compression parameters to facilitate their transition to new technology. These tools may include sound processing, compression limits and time constants. So this patient population might desire different sound processing or compression modes. But these preferences cannot be predicted solely from audiometric information.

Solus max Supports wide dynamic range compression, semilinear or linear processing when fitting Ultra Power receivers and Power and super power BTEs. These settings can be adjusted in the fitting screen under the gain handles and can be adjusted by ear and individual programs. Now the default mode is determined by the selected patient experience on the patient screen with a default setting of Experience linear resulting in linear processing, which makes sense while all other profiles will default to wide dynamic range compression. Wide dynamic range compression automatically adjusts gain to ensure audibility for soft sounds, comfortable levels for conversation, and prevents loud sounds from becoming overwhelming. This setting is recommended for users who are currently using wide dynamic range compression.

Semilinear processing provides a little bit less compression when you compare that back to wide dynamic range compression and it's recommended for previous users of linear amplification as kind of a transitional stepping stone getting them ready and into wide dynamic range compression. So it's that in between range linear setting provides prescribed gains that are equal for all input levels and is recommended for previous users of linear amplification who just happen to prefer this sound processing. Additionally, linear signal processing allows for either hard or soft peak clipping, enabling the Beltone Boost Max S to replicate the sound of their older kind of analog hearing aids. So when using linear sound processing, peak clipping is used as the output limiting method to help achieve the desired loudness. These patients are used to from previous analog linear technology, but keep in mind, peak clipping causes sound distortion and by distortion I mean the presence of frequency components in the output of the hearing aid that were not present in the input signal.

And it's often described as like a scratchy or crackly sound quality. So you might be asking what is peak clipping? And it's a very simple method of limiting the hearing aid's output when it reaches the hearing aid saturation point or the mpo. When this occurs, the sound signal is reduced or clipped off. Compression limit mode offers two peak clipping options, soft or hard clipping.

The default is soft peak clipping, which is represented by the blue lines in the diagram. When the input signal combined with the hearing aids gain pushes the output beyond the hearing aids mpo, the peaks of the waves are reduced. This reduction of the peaks is rounded instead of just cut off, maintaining a more similar shape to that of the original waveform. This results in a little bit less distortion as it tames down the peaks more gradually as they approach the limit. This results in a warmer, smoother sound.

This mode is recommended for patients with mixed or or severe to profound hearing loss who like linear amplification again, could sort of be that stepping stone trying to transition them into wide dynamic range compression. Now, hard peak clipping is represented here by the orange lines and it cuts off or

literally clips off the peaks of the sound wave as it reaches the saturation point. This provides the highest amount of output, but changes the shape of the original waveform. So it's really not rounded, it's more like square waves. And this results in a more aggressive, gritty type of distortion.

This setting is recommended for patients with profound hearing loss that were fit previously with linear amplification or if your patient is requesting more power when you're using linear compression. Our last compression characteristics are attack and release times, essential parameters in compression that determine how quickly a compressor responds to audio signals. So attack time controls how quickly the compressor starts reducing gain after a signal exceeds a specific threshold, while release time controls how quickly the compressor stops reducing gain or when we go back to normal gain after the signal falls below a specific threshold. So within Solus Max, these can be adjusted from the feature called time constants. In the all around program, the time constants will be set to syllabic, which is set to prioritize speech, understanding and communication needs.

In the hearing noise program, the time constants is set to slow, which is best when in reverberant and noisy environments. Now, another tool that can help those with severe to profound hearing loss is frequency lowering, which is a sound processing strategy that moves information from higher frequency areas with few or no functioning inner hair cells to lower frequency areas where the hair cell function is better. The idea behind frequency lowering is that audibility of these sounds, even when they are moved to a lower register or lower frequency band, is more beneficial than no audibility at all. In Solus Max, Sound shifter is our frequency lowering feature that utilizes frequency compression. It is off by default, but you have the options of very mild, mild, moderate or strong.

The number associated with each option indicates where the frequency compression ends. So when turned on, a black line with a gray overlay will be shown over the frequency area of the gain curves to illustrate that compressed area. This feature is recommended when gain cannot reach the high

frequency targets. The patient reports high frequency sound distorted. And for those that had previous experience with frequency compression, for patients with known cognitive issues, we strongly recommend not to use this feature.

So our updated 360 chip and our Bell Tone Boost Max S allows for advanced features like Crosslink Directionality 4, Clear Focus and our Environmental Classifier. Again, Crosslink Directionality 4 takes advantage of our advanced 4 microphone beamforming technology. Providing improved access to surrounding sounds. In a clinical study, we discovered that 90% of participants who had severe to profound hearing loss preferred listening with crosslink directionality. Four In a variety of real world situations, patients can also utilize our narrowest beamformer Clear Focus, where in that same study that I just mentioned we measured a 2.7 dB signal to noise ratio improvement when using clear Focus over smart beam directionality.

And let's not forget our environmental classification strategy that continues to set us apart, delivering an impressive 91% accuracy outperforming competitors in real world listening situations. Now we know that Superpower hearing aid users depend on their hearing aids every day to support their hearing needs. This underscores the necessity for hearing aids that are comfortable enough to be worn for extended periods of time without causing discomfort or irritation, which is why the Beltone BoostMax S was designed to perfectly adapt to the ear's shape. While the size of the hearing aid is a consideration, the comfort of wearing it is paramount. Users prioritize how the hearing aid feels in and on their ears as a comfortable fit can significantly enhance their overall experience and willingness to wear their hearing aids consistently.

Now rechargeability has been one of the most impactful features in hearing aids in terms of functionality, but we know that this patient population might be a little hesitant as they truly do rely on their hearing aids full time and need all day battery. When we interviewed Super Power users, they

stated they would be willing to switch to rechargeable hearing aids if they can provide them with all day power. So not only does Beltone Boost Max S provide up to 28 hours of use, they get battery fresh hearing each morning. We also know this patient population wants connectivity and we'll talk about that next. So streaming is important to them.

And we all know that streaming with Zinc Air batteries very much shortens the battery life. But with Beltone Boost Max S patients have up to 20 hours of use when streaming for 50% of the time. But again, it's not just battery life that's keeping the hearing aids functioning. So having field exchangeable microphone filters and an IP68 rating helps keep the hearing aids working so these patients can hear all day long with very minimal downtime for any type of repair. Last on our list of features is connectivity, so having the ability to stream calls directly to their hearing aids is a huge advantage for Beltone Boost Max S users.

This feature not only enhances communication, but also ensures that conversations are crystal clear when used in conjunction with video call so they can hear stream through their hearing aids and then visually see and get that lip reading ability. But we know it's not just phone calls that are being streamed, it's also music and podcasts and videos. Technologies like oracast offer new levels of accessibility, especially for those with severe to profound hearing loss. And did you know that people with severe to profound hearing loss use their hearing aid accessories daily? Overall, it's not just about the tech, it's about life changing moments.

As one of our interviewees put it, to be able to enjoy a concert experience is something I have dreamt of. Connectivity isn't just a feature, it's a way to reconnect people with the world around them. And speaking of accessories, as a quick reminder, both our Multi Mic plus and TV Streamer plus are compatible with Beltone Boost Max S. Each accessory offers easy one touch pairing, auto streaming abilities, multiple controls in the Hearmax app, and both accessories can be used as an auracast

transmitter. And just another reminder that within the Beltone Hearmax app we have the world first AuraCast assistant. This means that every phone that is compatible with our Hearmax App can find AuraCast streams so your patients can intuitively connect to and switch streams with a simple touch of the button.

So it's really the clearest Bluetooth experience ever. So just to summarize, this patient population encompasses all ages, has about a 70% adoption rate, but only makes up 11% of all hearing loss cases and they are also the group with the lowest quality of life scores. Features designed for this patient population include sound shifter, the ability to change compression characteristics and ample headroom. When looking to upgrade technology, this patient population wants good sound quality, no feedback, the latest features comfort, reliability and connectivity. So with that I just want to thank all of you for taking 30 minutes out of your day to learn a little bit more about the features to help support the need of your super power users.

If you want more information on these features on BoostMax S, on the Hearmax app, the Solus Max or on the new feature Multi Connect, please take the associated Beltone University course. But if you do have other questions, please feel free to type that in. Otherwise I understand. If you need to run and take that next appointment, go ahead. Again, thank you all for joining me.

Thanks everyone. Enjoy the rest of your day.