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| <ul style="list-style-type: none">▪ On a Mac<ul style="list-style-type: none">▪ Open PDF in Preview▪ Click File▪ Click Print▪ Click dropdown menu on the right “preview”▪ Click layout▪ Choose # of pages per sheet from dropdown menu▪ Checkmark Black & White if wanted. | <ul style="list-style-type: none">▪ On a PC<ul style="list-style-type: none">▪ Open PDF▪ Click Print▪ Choose # of pages per sheet from dropdown menu▪ Choose Black and White from “Color” dropdown |
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Belton Hearing Aid Features

Beltone Learning

Objectives

- ✿ Explain how to utilize different forms of directionality in Beltone products.
- ✿ Describe how to change the mixing point frequency with band-split directionality.
- ✿ Explain how to adjust Smart Gain and Sound Cleaner Pro to automatically adjust in specific situations.
- ✿ Discuss how to utilize specific features to enhance the patient's overall listening experience.

Curvilinear Rapid 17™



What it Does:

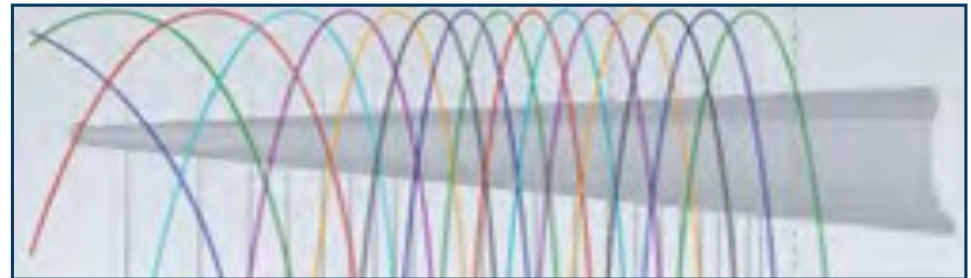
Replicates the way a normal ear divides sound into distinct pitches.



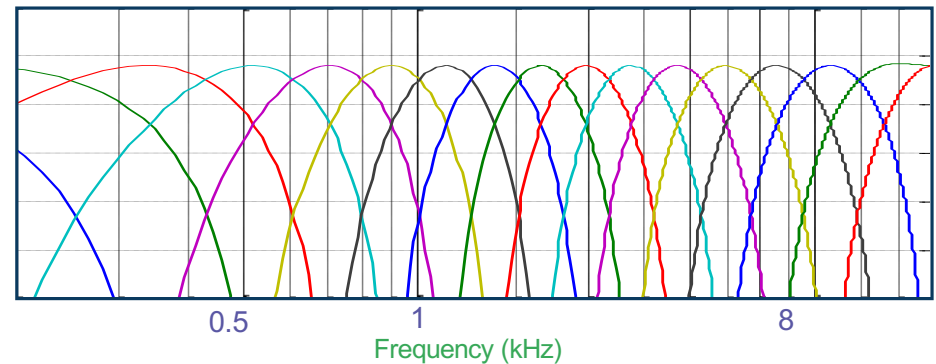
Patient Benefit:

Essentially distortion free and remarkable sound clarity.

Auditory Filters



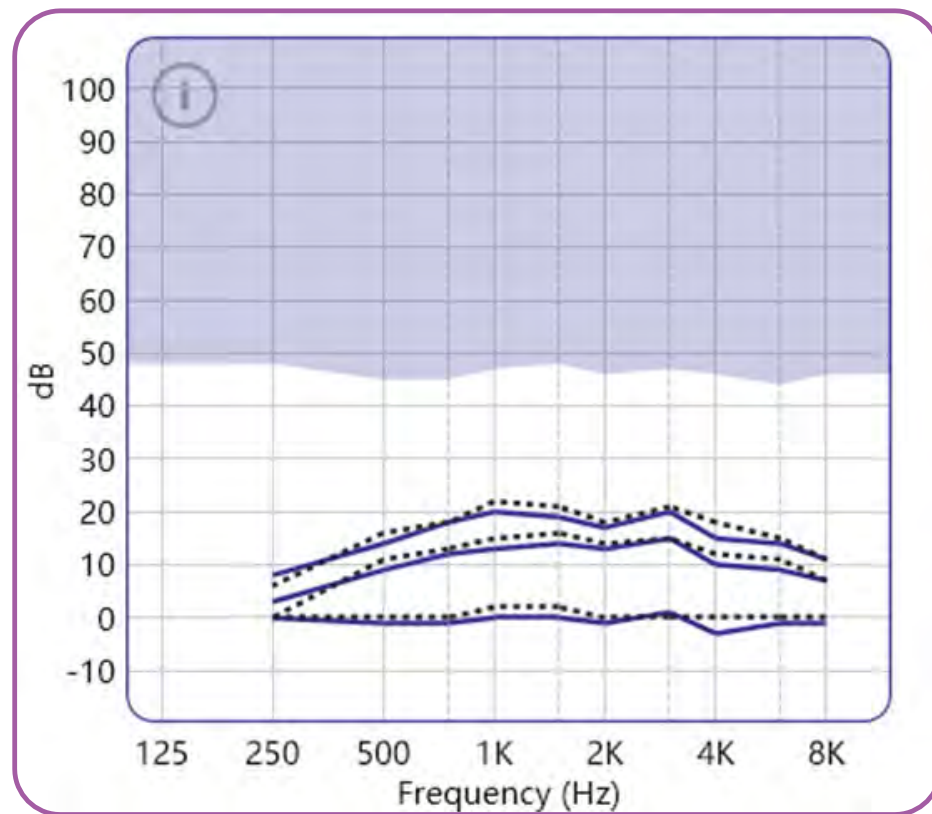
Curvilinear Rapid17™





All	250	500	750	1K	1.5K	2K	3K	4K	6K	8K
50	8	15	19	21	21	19	21	17	14	13
70	3	10	13	14	16	14	15	11	10	9
90	0	-1	0	2	2	-1	1	-2	-1	0
CR	1.2	1.9	2.3	2	2.3	2.6	2.7	2.1	1.9	1.5
MPO	97	105	106	108	110	112	114	114	110	113

Handles:



Omnidirectionality



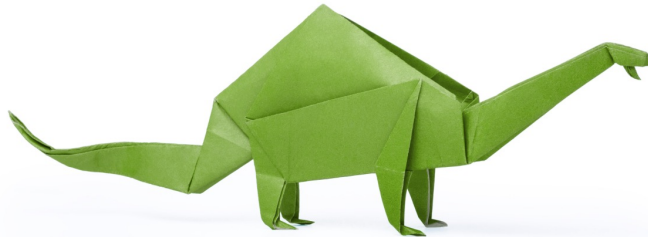
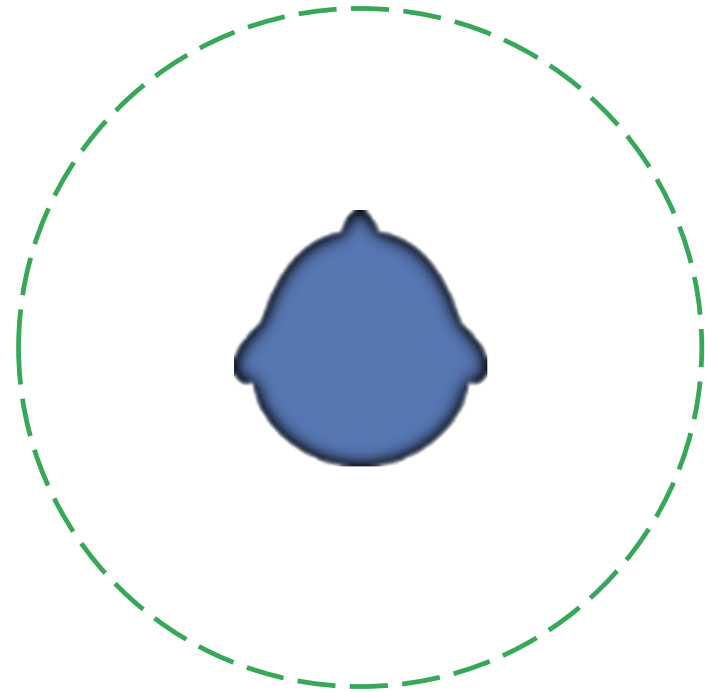
What it Does:

Provides equal hearing from all around.



Patient Benefit:

Can hear sounds from all directions in any environment.



directionality



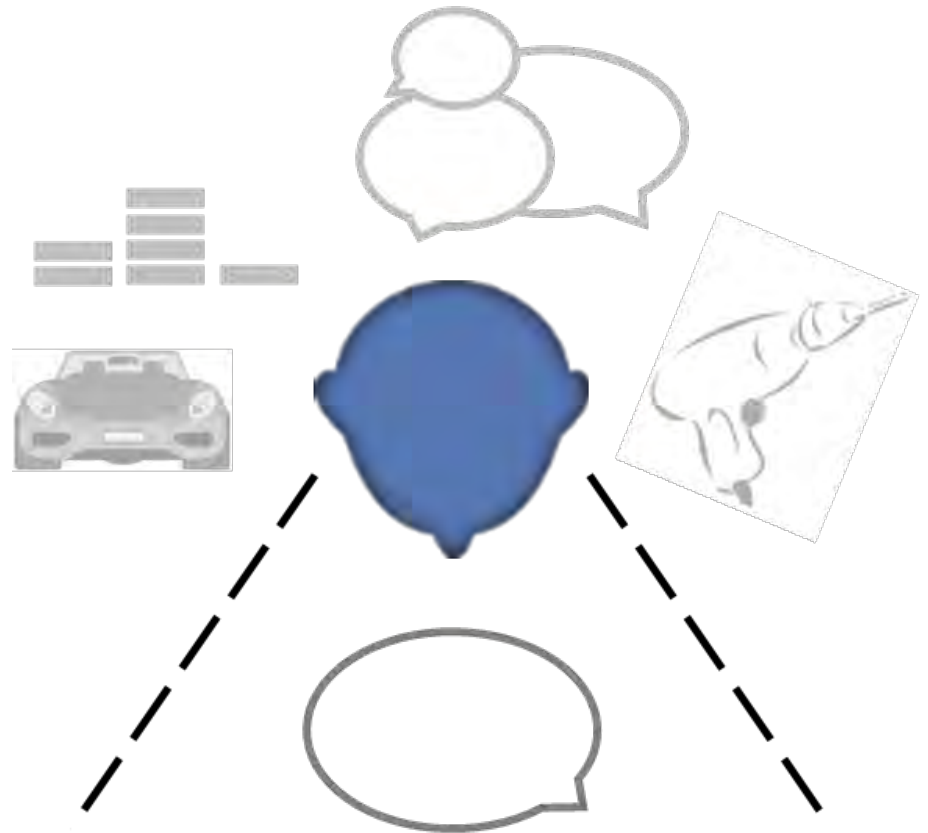
What it Does:

Improves SNR by reducing the amplification of sounds coming from behind the wearer.



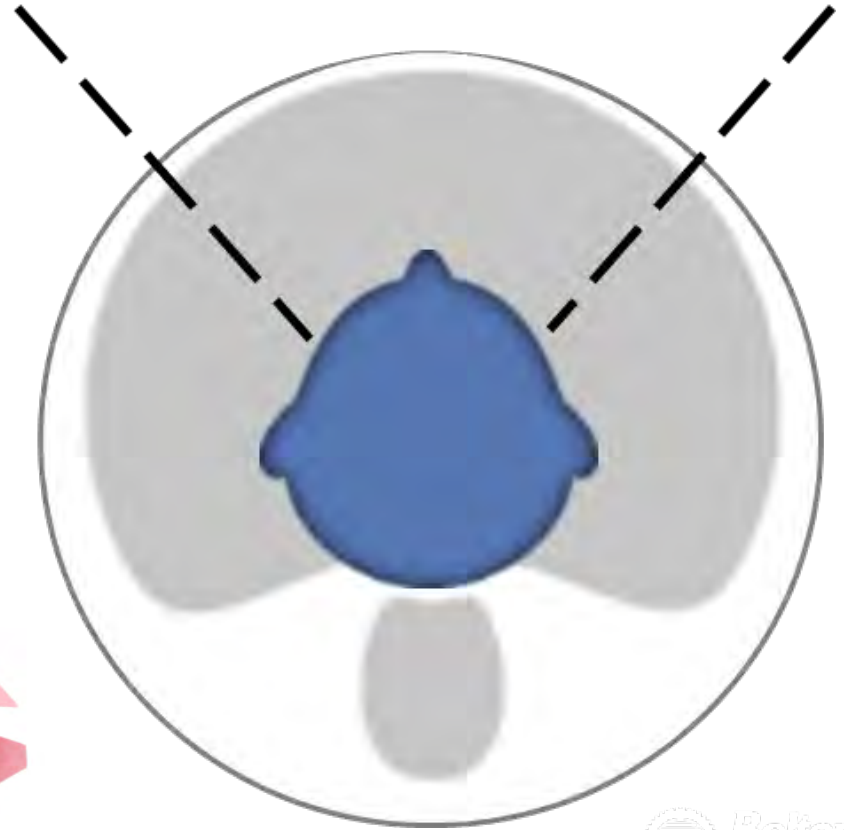
Patient Benefit:

Improved speech intelligibility in noisy situations.



Fixed Hypercardioid

- ✿ Sounds from the front will receive amplification while those from the back will receive less amplification
- ✿ This directional pattern is stationary and will not change even if the noise source does



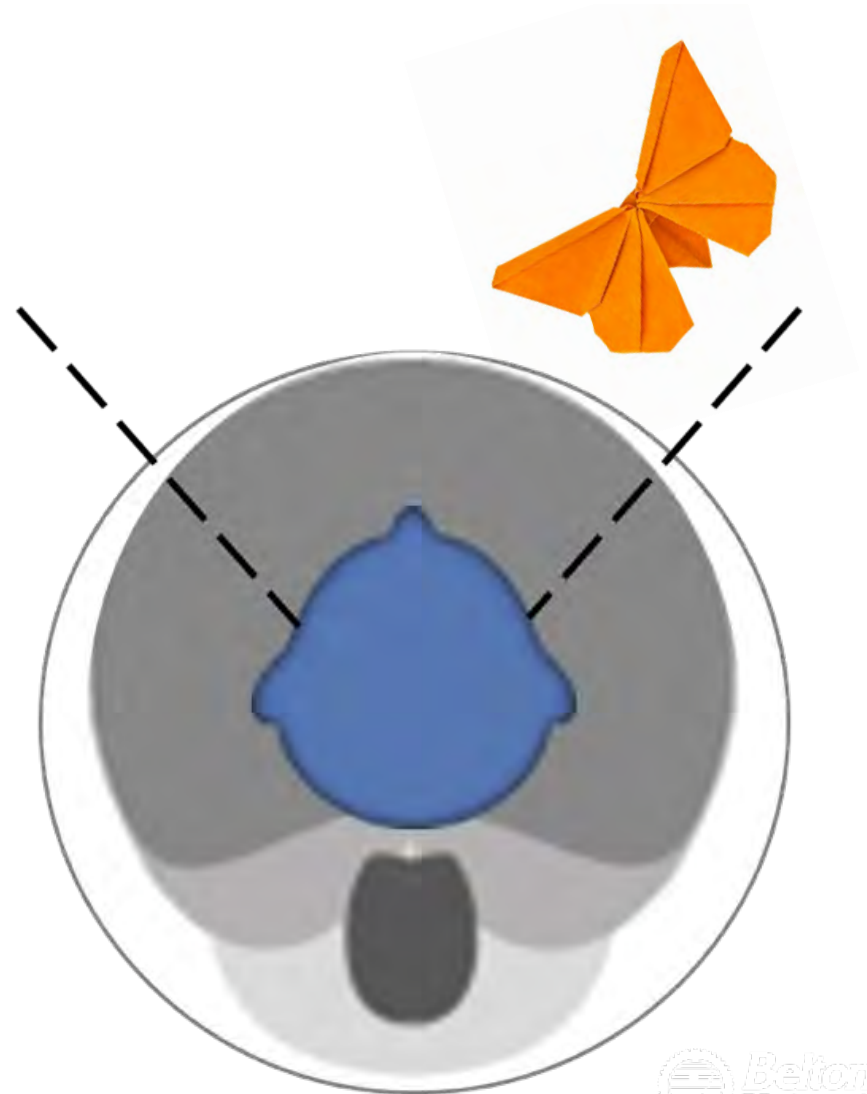
Adaptive directionality



This directional pattern changes based on the signal-to-noise ratio and location of the noise source.

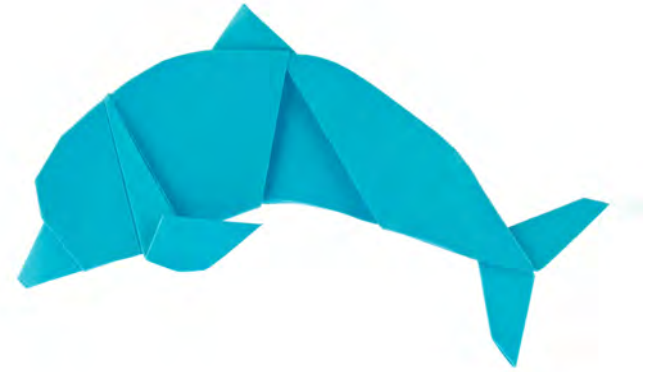


This system identifies and tracks noises as they move to keep them at reduced levels relative to the speech coming from the front of the listener.



Smart Beam

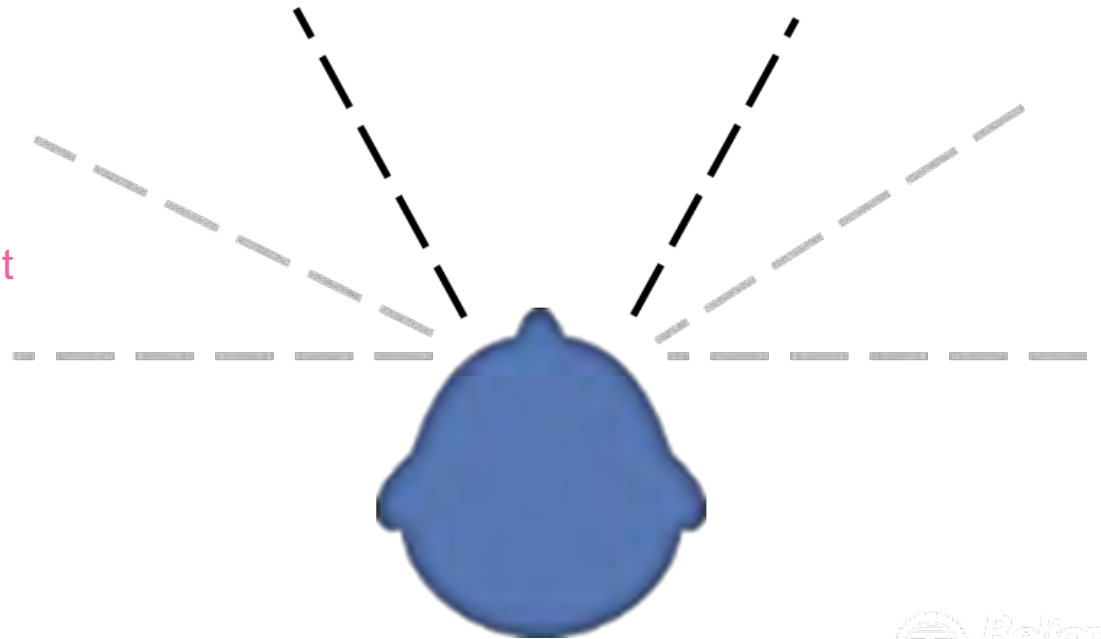
directionality



Option for almost all technology levels



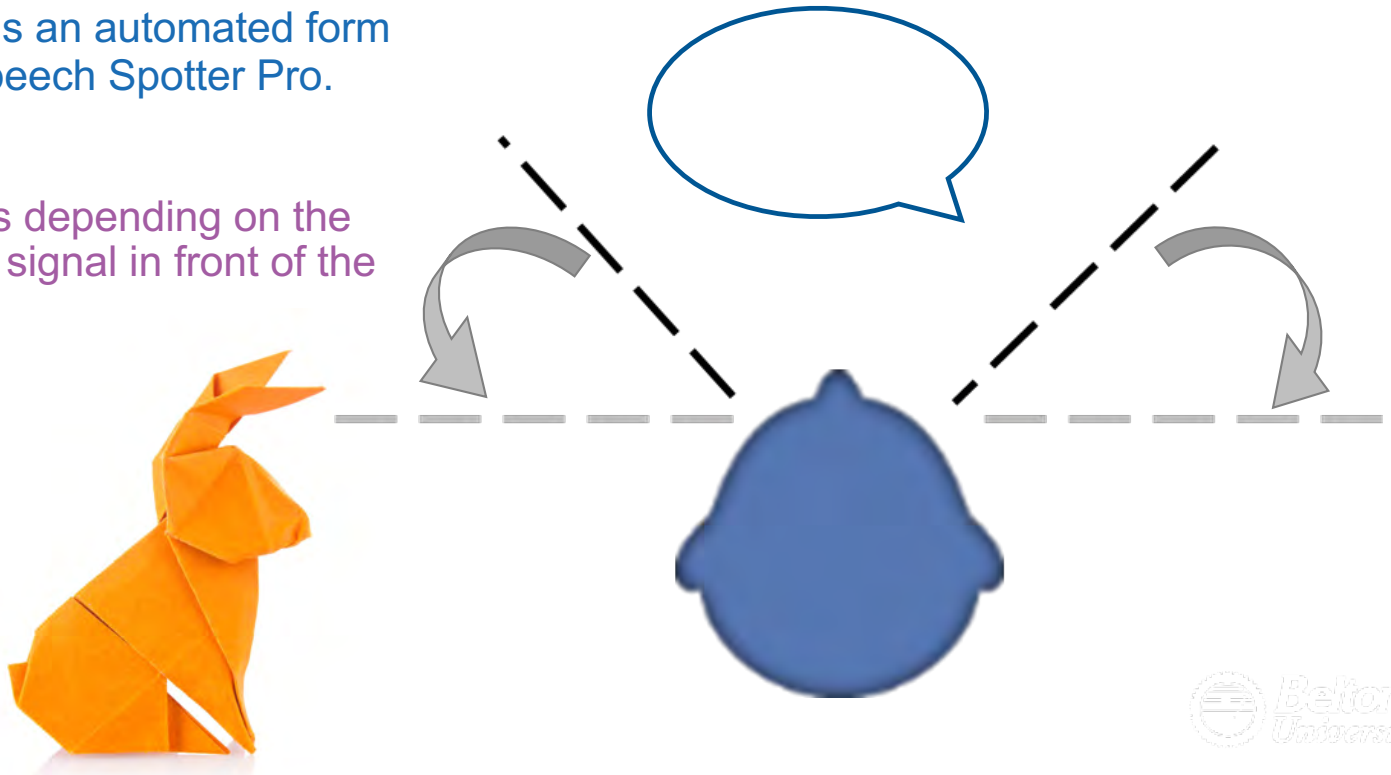
Smart Beam acts just like adaptive directionality BUT allows for adjustment of the directional beam width.



beam Steering

Smart Beam Steering is an automated form of Smart Beam and Speech Spotter Pro.

The beamwidth adjusts depending on the strength of the speech signal in front of the wearer.



Band-Split directionality



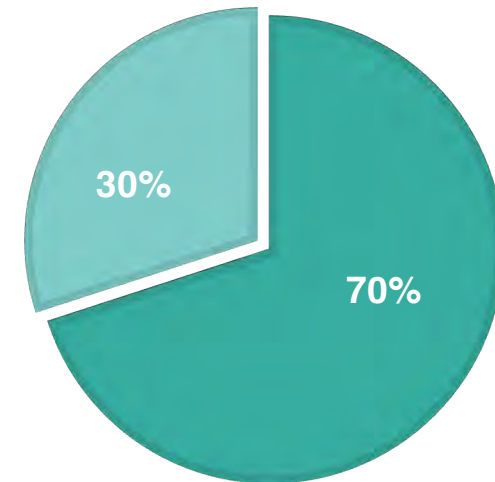
What it Does:

Processes low and high frequencies differently, with directionality being applied to high frequencies, while low frequencies always remain in omni.



Patient Benefit:

Rich sound quality and enhanced ability to understand speech while retaining awareness of their surroundings.



- Band Split Directionality Preferred
- Full Bandwidth Directional Preferred

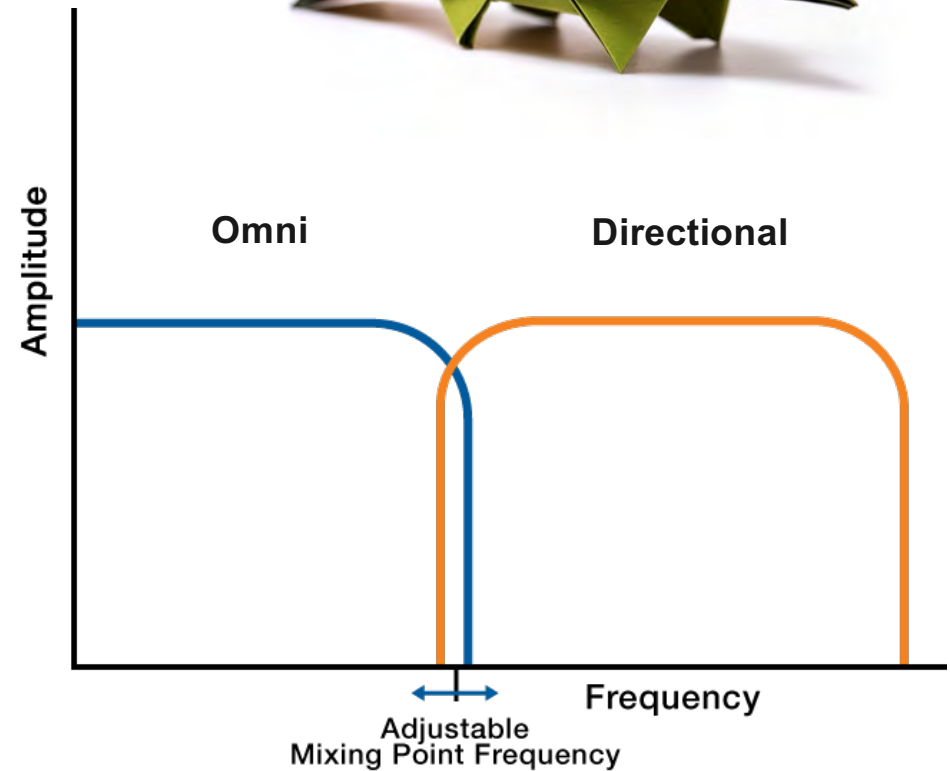
Mixing Point Frequency



A higher mixing point frequency means that more of the signal is processed in an omnidirectional fashion.



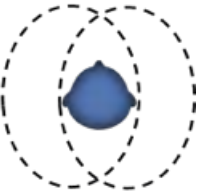
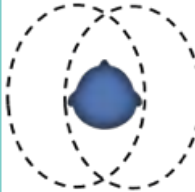
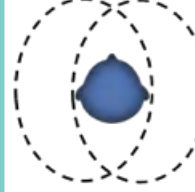
A lower mixing point frequency indicates mostly directional processing.



Speech Spotter

* What it Does:

Switches the hearing aids between omni and directional mode so wearers can select and focus on whatever sound they are interested in, without requiring them to change programs.

Front	Speech	Speech	Speech	Noise	Noise
Rear	Quiet	Speech Babble	Noise	Noise	Noise
Microphone Response					
	Omni	Directional	Directional	Omni	Omni

* Patient Benefit:



Natural and unobtrusive way to ensure their hearing aids are in a directional mode when needed.

Spotter Pro



Allows the hearing aids to automatically choose the best microphone mode to help improve communication for an environment.



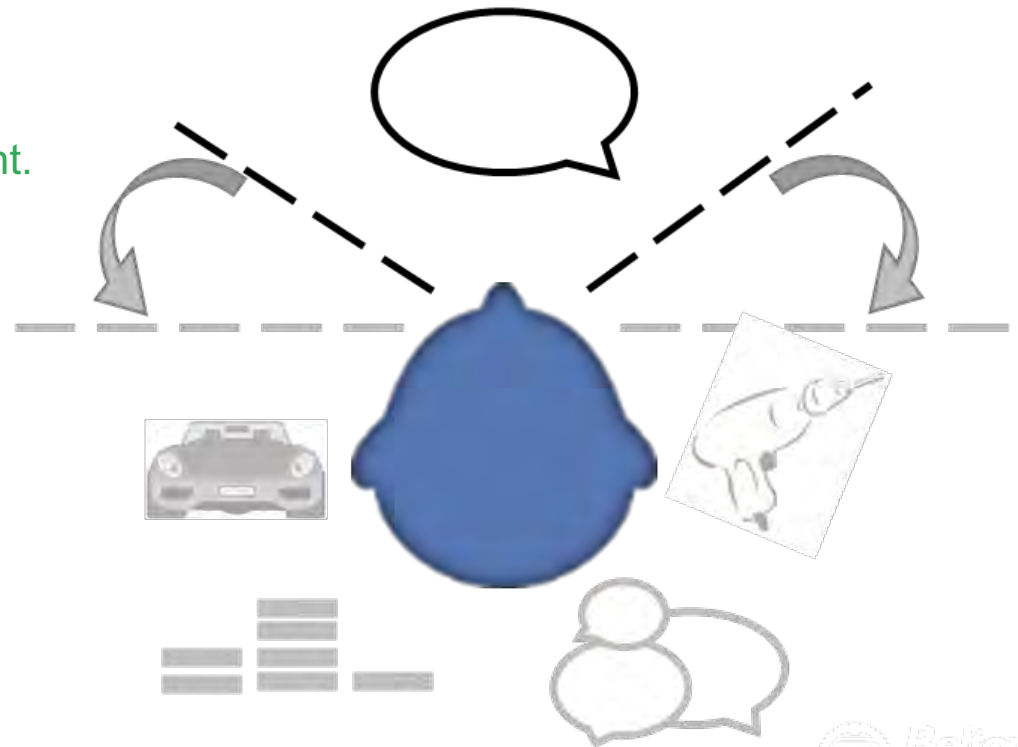
The Beam Width can be set to;

Narrow

Medium

Wide

Smart Beam Steering



Spatial

directionality



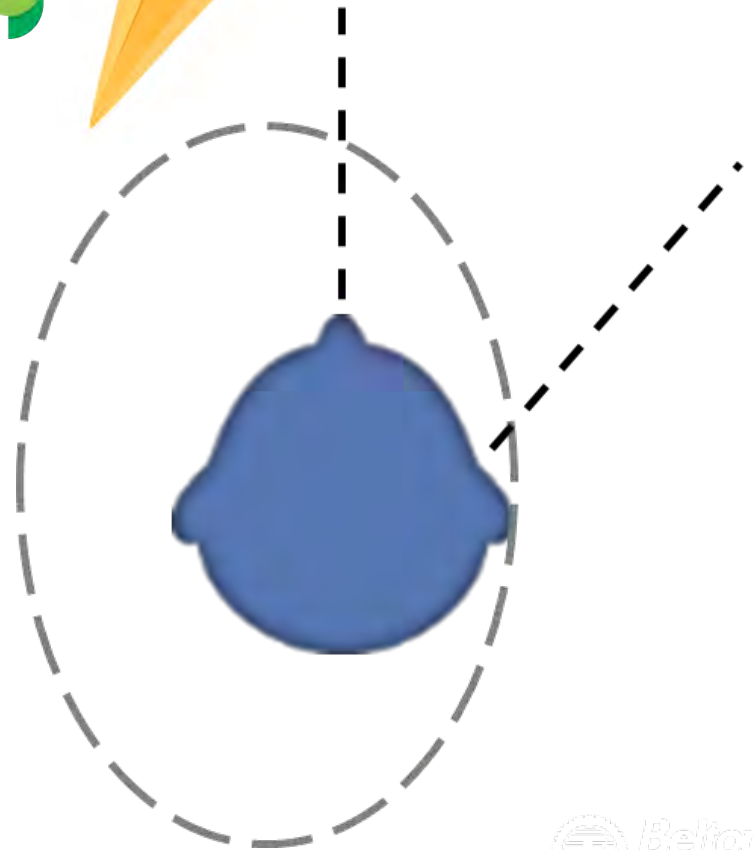
What it Does:

Using these two microphone options in coordination allows the brain to process sound similarly to a healthy hearing system.



Patient Benefit:

Receives directional benefit required for better hearing in noise, while experiencing the environmental awareness necessary to fully engage in one's surroundings and increases ease of listening.

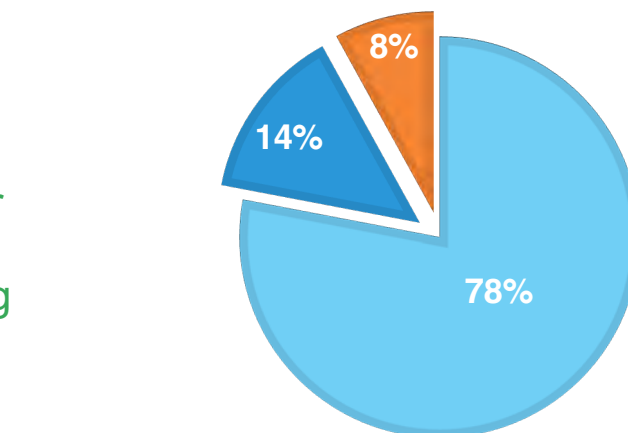
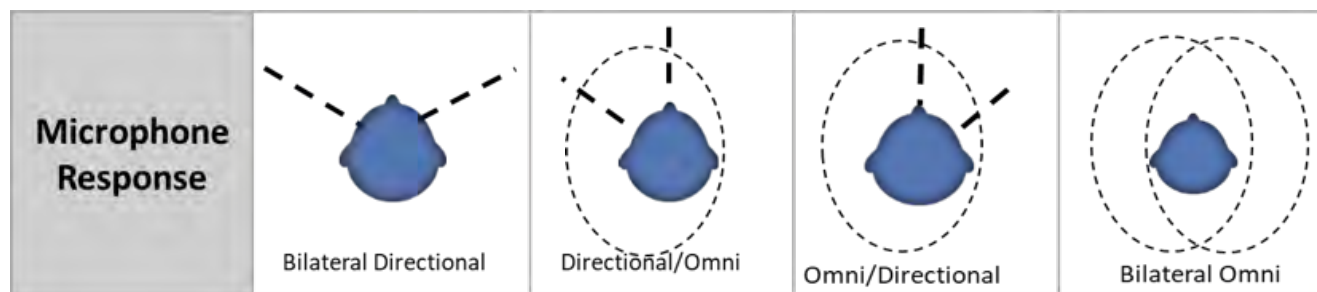


CrossLink

directionality

✿ A binaural fitting strategy that takes advantage of Ear to Ear communication to select the optimal microphone mode for each ear so the strongest voice signal is clear without losing the ability to perceive the surroundings and other speakers.

✿ The possible combinations are:



■ Omni ■ Omni/Directional ■ Bilateral Directional



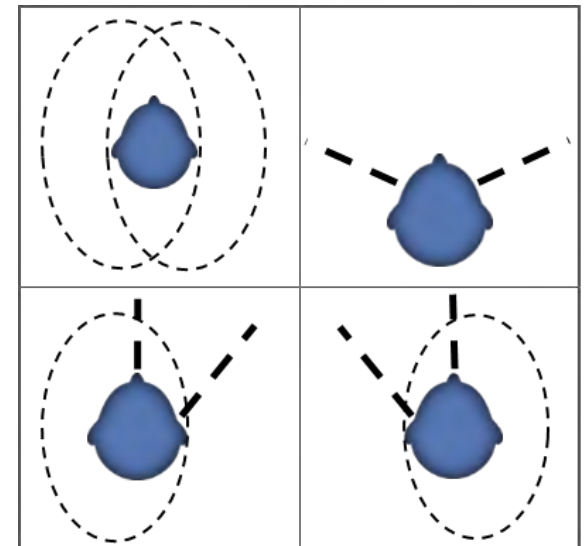
CrossLink with Personal Sound ID

What it Does:

Replaces spatial cues that are disrupted due to the hearing aid placement behind the ear.
Personal Sound ID is a combination of two algorithms, pinna restoration and the interaural level difference (ILD).

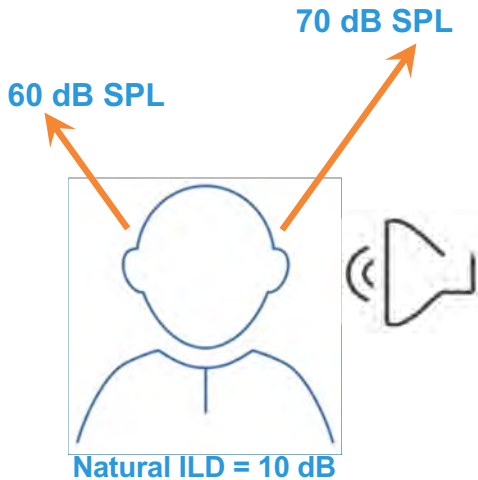
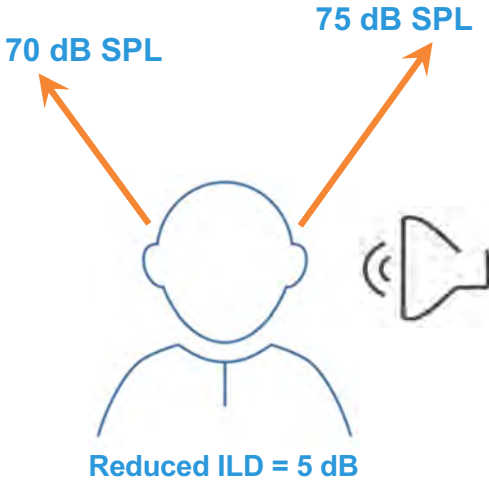
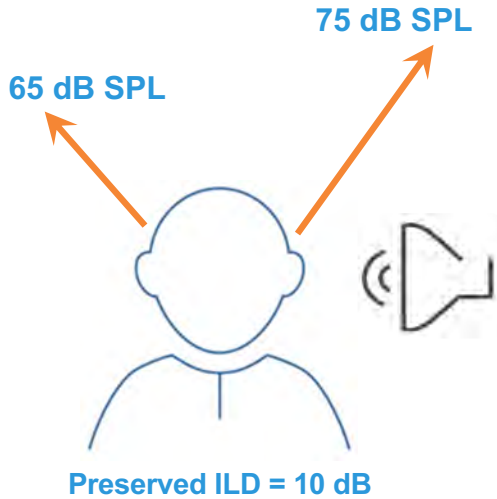
Patient Benefit:

Vivid spatial awareness with exceptional sound quality.





Sound ID: Interaural Level Difference

Without Amplification	With WDRC Amplification	With WDRC AND Personal Sound ID
 60 dB SPL 70 dB SPL Natural ILD = 10 dB	 70 dB SPL 75 dB SPL Reduced ILD = 5 dB	 65 dB SPL 75 dB SPL Preserved ILD = 10 dB

CrossLink directionality 2

with Personal Sound ID



CrossLink Directionality



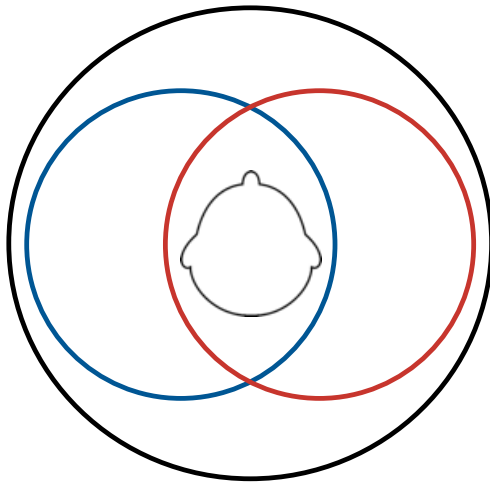
CrossLink Directionality 2

CrossLink

directionality 3

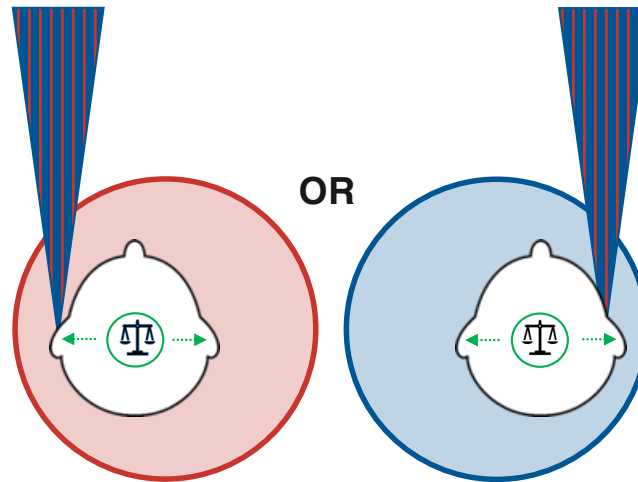


Bilateral Omni



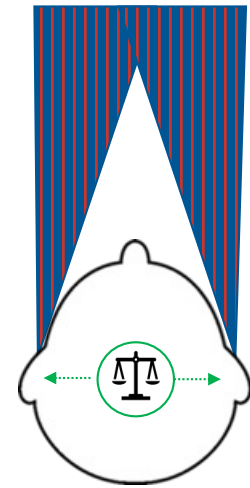
Spatial Cue
Preservation

Asymmetrical Mode



Binaural
Listening

Bilateral Directional



Speech
Intelligibility



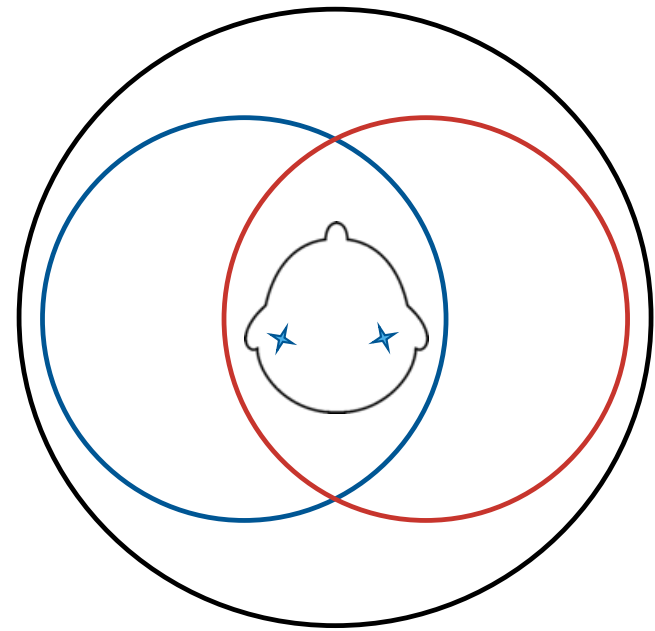
What it does:

Provides an improved omnidirectional response by using the third microphone to pick up sounds from the ear canal to deliver sound in a more natural way.

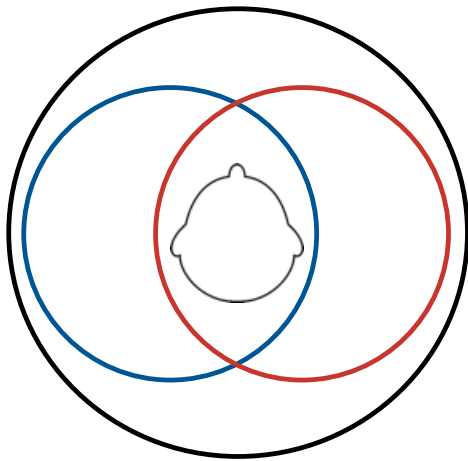


Patient Benefit:

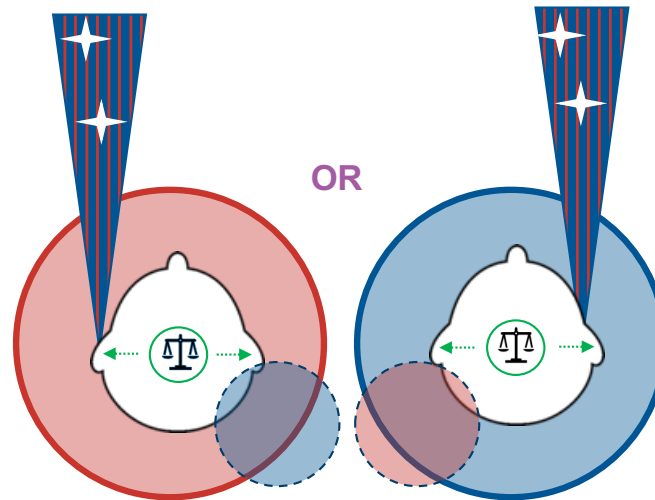
More natural sound quality.



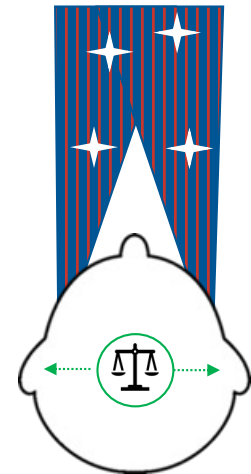
CrossLink directionality 4



Spatial Cue Preservation



Binaural Listening



Speech Intelligibility

CrossLink directionality 4



Wider sound
environment mapping



Faster processing
detection and selection



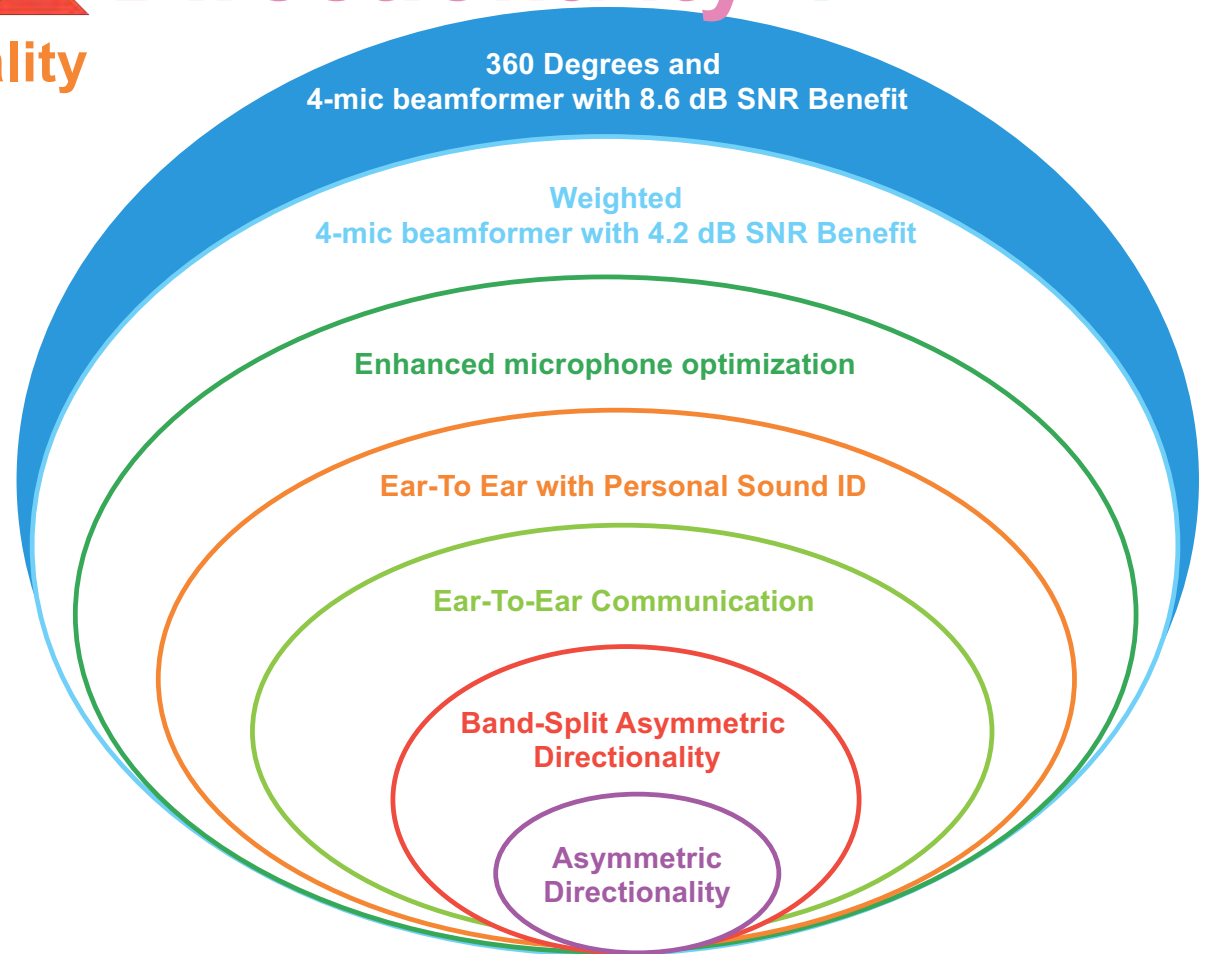
More precise
beamforming



Directionality 4

7th generation of directionality

Beltone Serene /Achieve	CrossLink Directionality 4
Beltone Imagine	CrossLink Directionality 3
Beltone Amaze Beltone Trust	CrossLink Directionality 2
Beltone Legend	CrossLink Directionality with Personal Sound ID
Beltone First/Promise	CrossLink Directionality
Beltone True	Spatial Directionality
Beltone Reach	Monitored Directionality



Ultra Focus

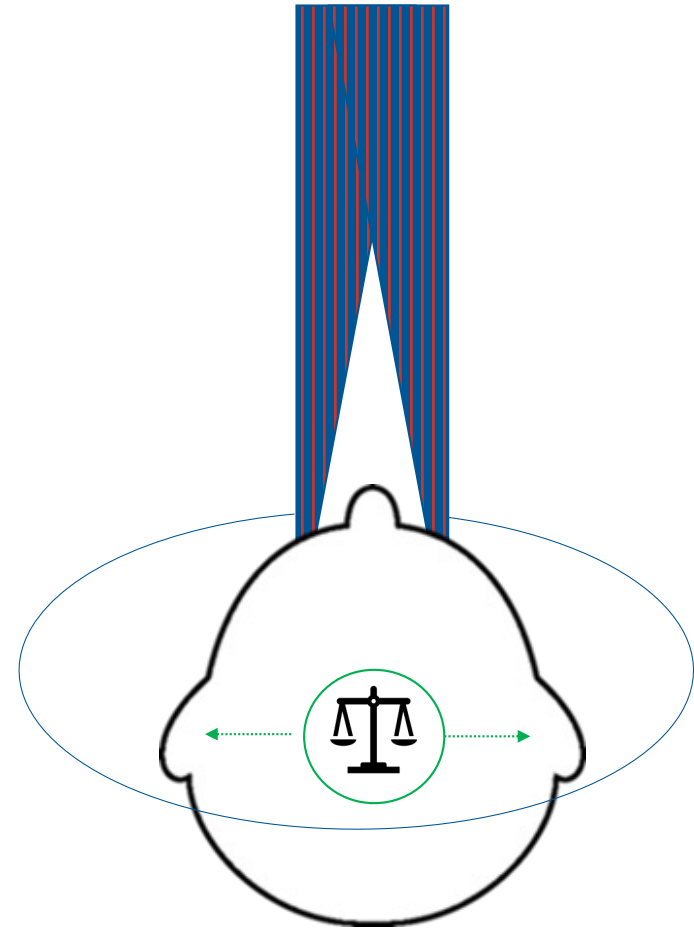


✿ What it does:

Uses a powerful directional beam to focus on the person in front when in a very noisy room.

✿ Patient Benefit:

Can hear the wanted speech from the front while remaining connected to the sound environment.



Ultra FOCUS 2

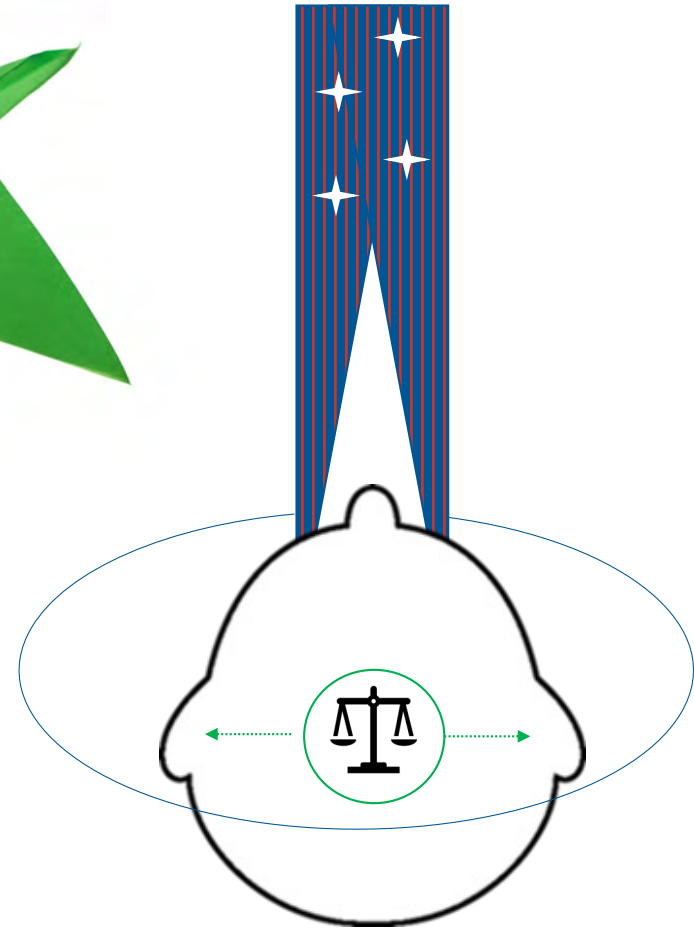


What it does:

Uses a powerful directional beam with increased frequency resolution to focus on the person in front when in a very noisy room.

Patient Benefit:

Improves 1:1 communication, while preserving situational awareness.



Environmental Classifier:

7 environments



Quiet

< 54 dB



Soft
speech

< 60 dB



Loud
speech

> 60 dB



Speech in
moderate
noise

< 75 dB



Speech in
loud
noise

> 75 dB



Moderate
noise

< 75 dB



Loud
noise

> 75 dB

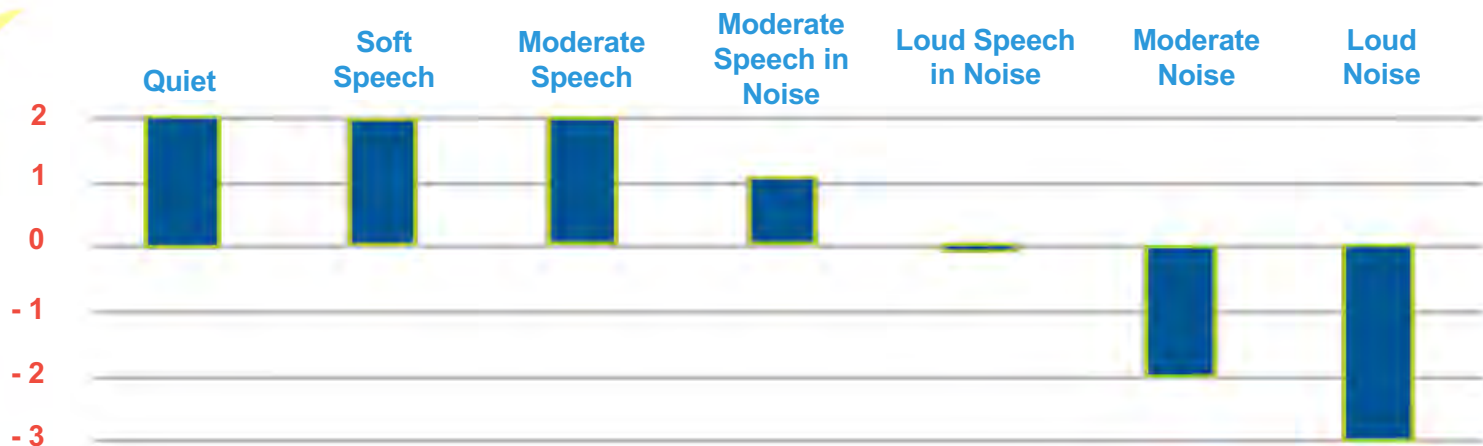
Smart Gain

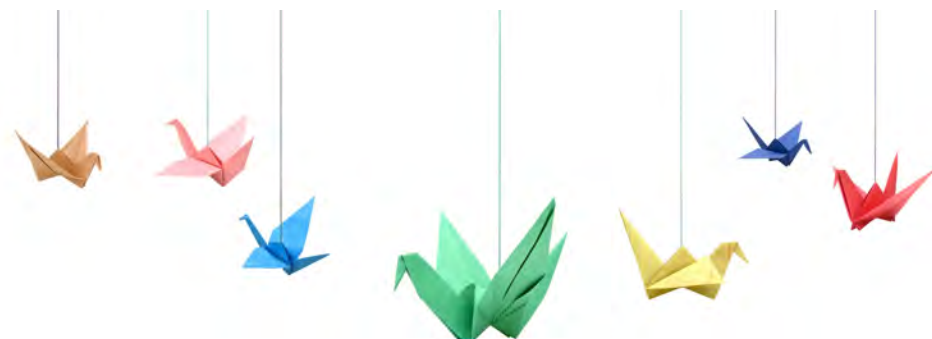
* What it Does:

Provides automatic adjustment of hearing aid settings.

* Patient Benefit:

Enjoying optimal audibility and listening comfort even when moving through rapidly changing sound environments, and without needing to make frequent manual adjustments.





Frequency

or



If frequency is the issue:
it will always be a gain change

If volume is the issue:
Question, is it consistent or specific?



If consistent most likely a gain change



If more specific more likely a
Smart Gain change



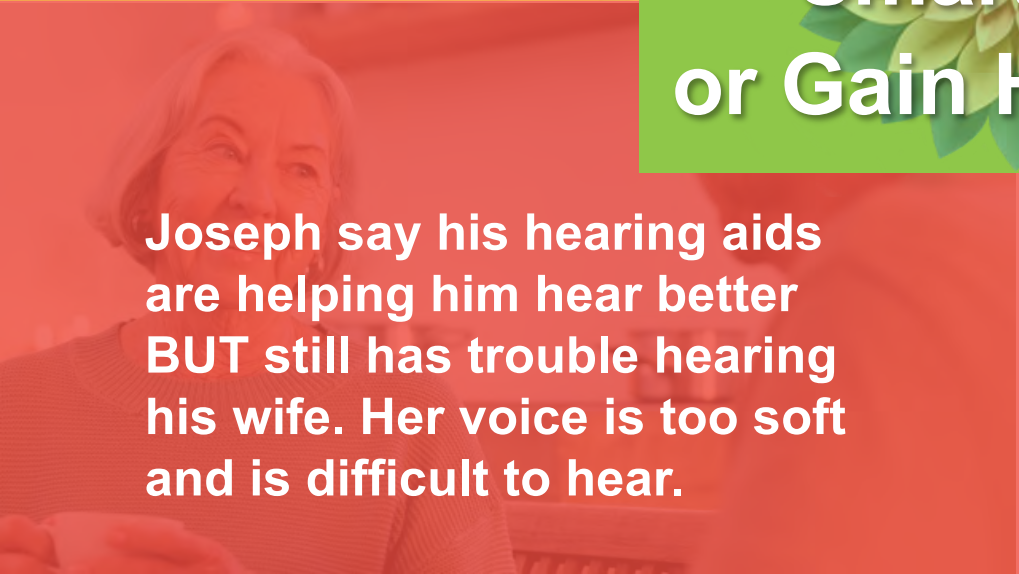
Linda continues to have difficulties hearing conversation when she goes to BINGO.



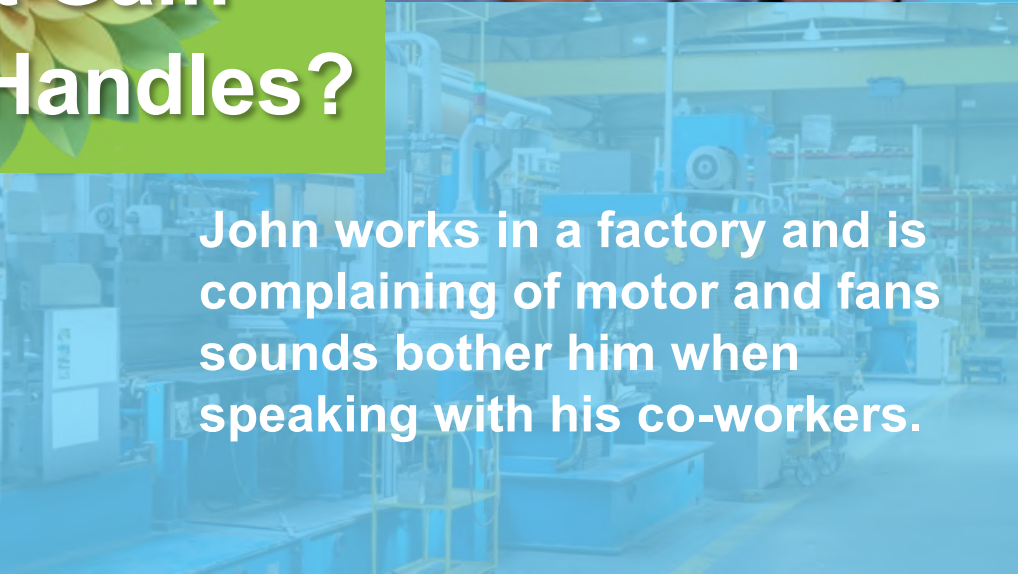
Kimberly is complaining of speech being too sharp especially on “s” or “sh” sounds.



Do you adjust Smart Gain or Gain Handles?



Joseph says his hearing aids are helping him hear better BUT still has trouble hearing his wife. Her voice is too soft and is difficult to hear.



John works in a factory and is complaining of motor and fans sounds bother him when speaking with his co-workers.

Sound Cleaner Pro



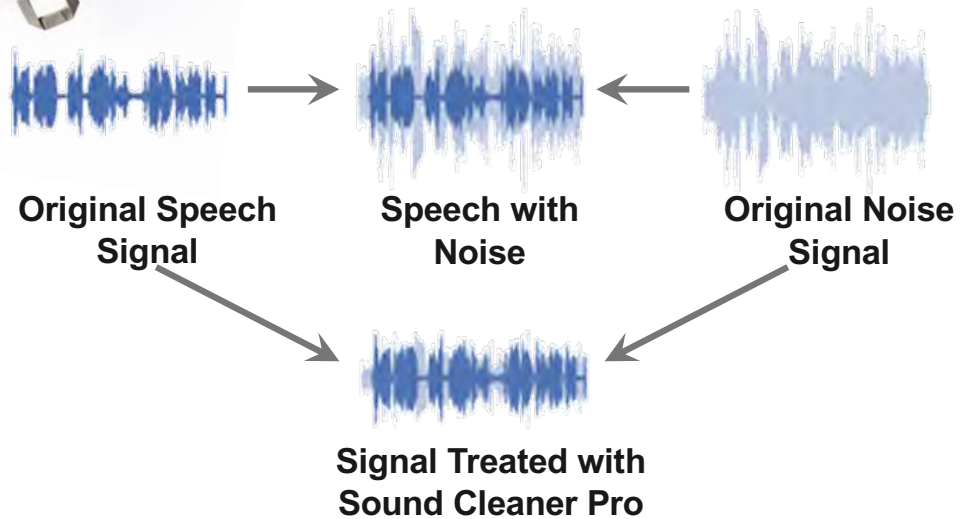
What it Does:

Reduces disturbing background sound without affecting speech audibility.

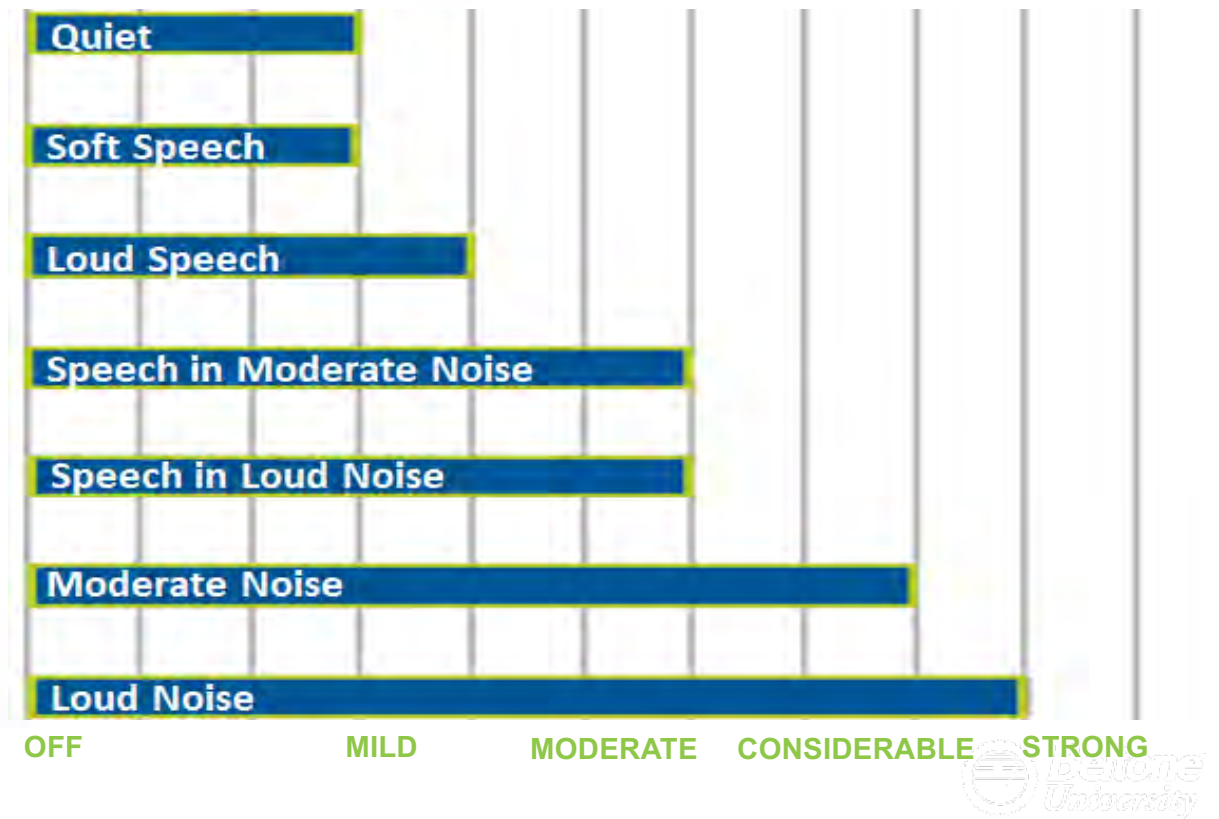


Patient Benefit:

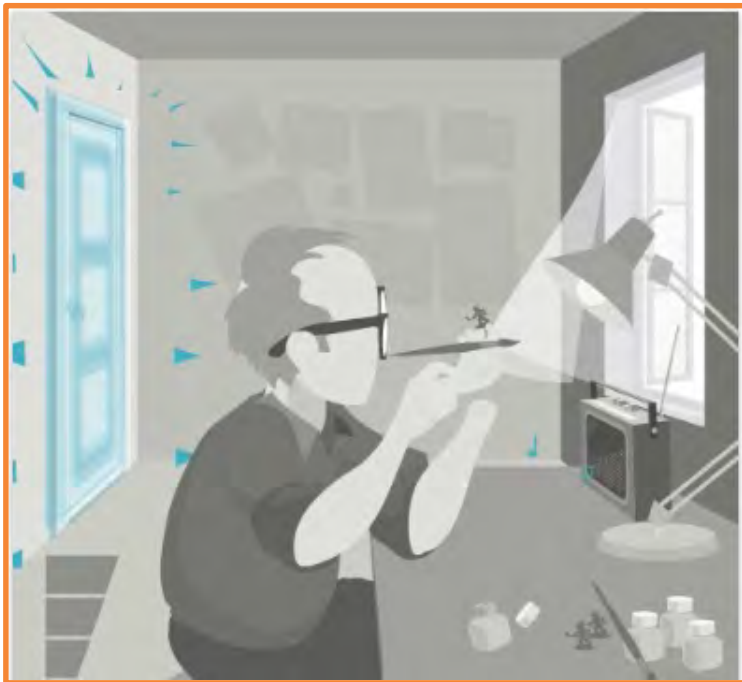
Improves listening comfort without compromising speech understanding.



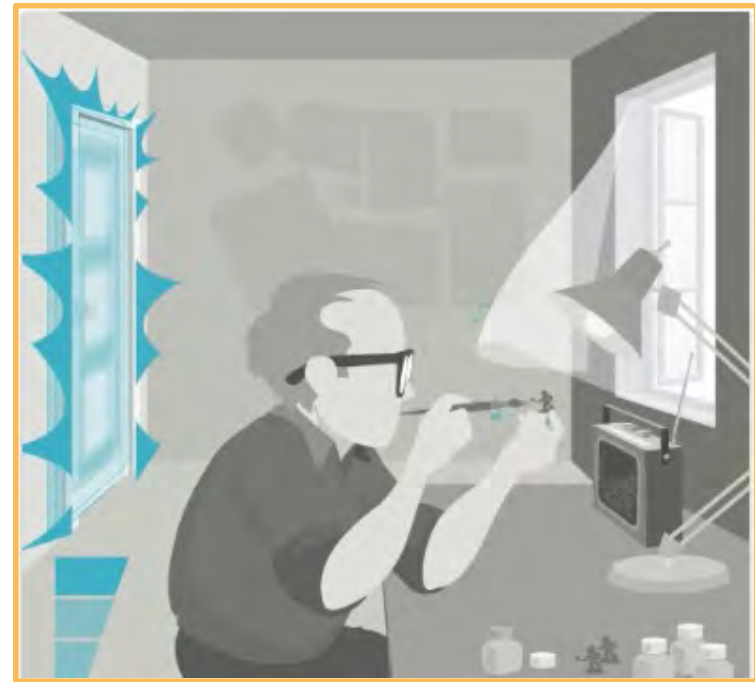
Sound Leener Pro



Impulse Noise Reduction



Impulse Noise Reduction



No Impulse Noise Reduction

Wind Noise Reduction



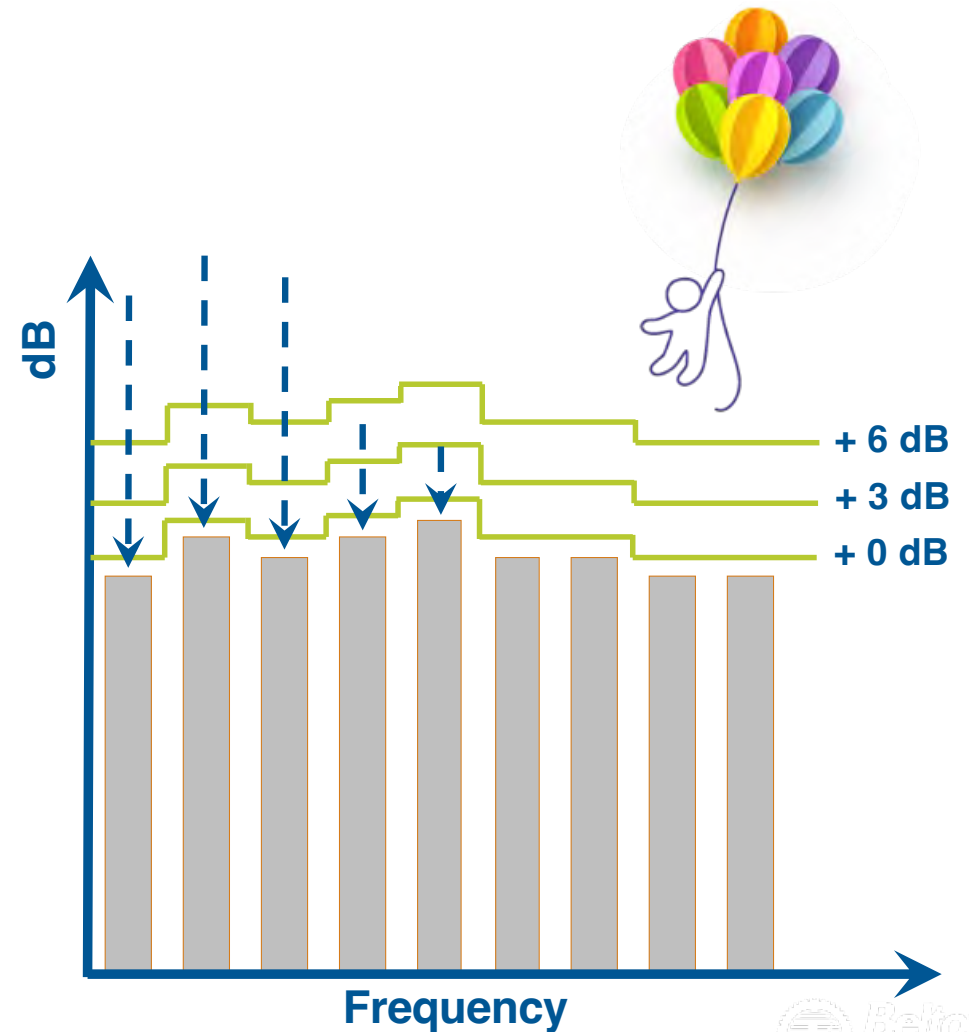
What it Does:

Accurately detects wind noise and adaptively reduces it.



Patient Benefit:

A natural sounding experience with soft wind awareness in the background and minimal impact on audibility of other sounds in the environment.



Time



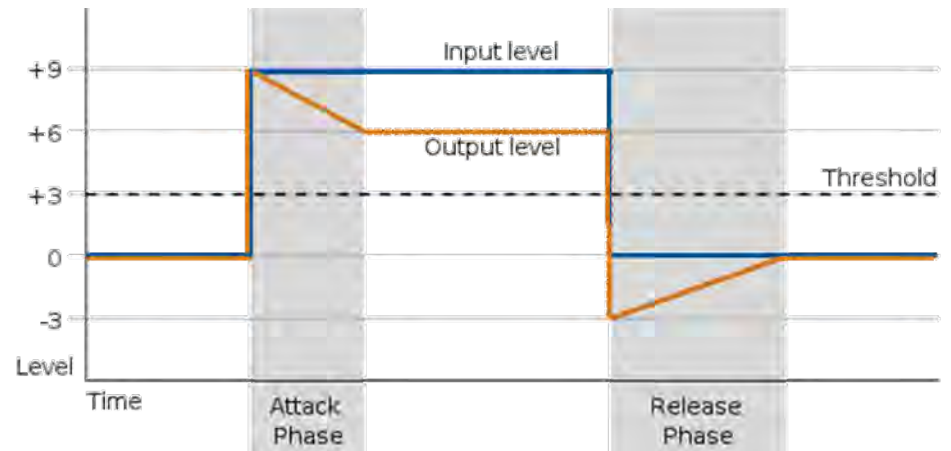
These are the attack and release compression times.



The attack time is the delay that occurs between the onset of an input signal loud enough to activate compression and the resulting reduction of gain.



The release time is the delay that occurs between the offset of an input signal loud enough to activate compression and the increase of gain.



Time Constant Chart

Options:



Syllabic



Fast



Moderate



Slow



Time Constant Scheme	Attack Time	Release time	User Profile	Best Situations
Syllabic	12 ms	70 ms	Active, demanding communication needs, prioritizes speech understanding	Meetings and other gatherings
Fast	12 ms	200 ms	Everyone	Varying environments, television and radio broadcasts
Moderate	30 ms	200 ms	Everyone	Varying environments, television and radio broadcasts
Slow	30 ms	4000 ms	Quiet lifestyle, less demanding communication needs, prioritizes comfort	Music, reverberant and noisy environments



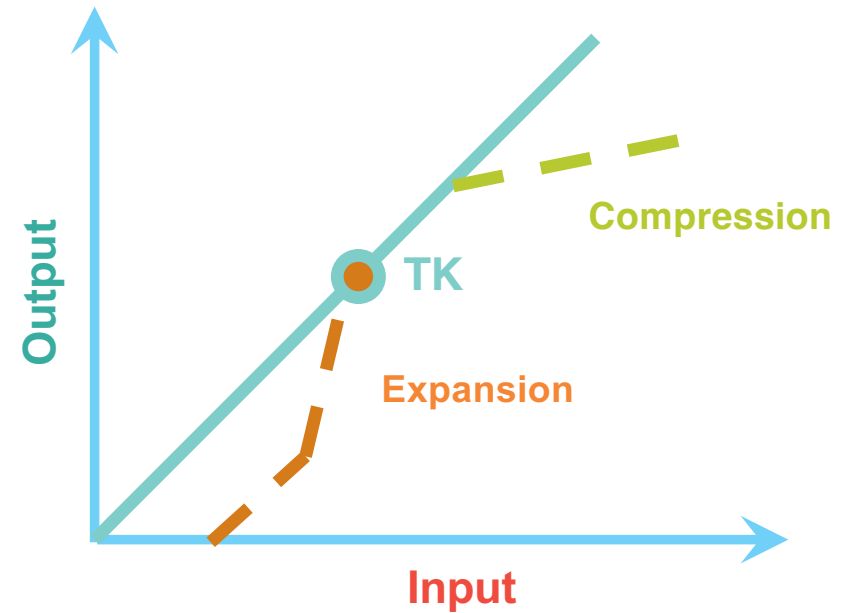
What it Does:

Reduces amplification for very soft sounds which aren't of interest to the wearer, such as very low level environmental sounds or noise generated internally by the hearing aid.



Patient Benefit:

Sounds such as soft background noises and noise from the microphones are no longer distracting, providing the best backdrop for pleasurable listening.



Thank you



*Beltone*TM
UNIVERSITY