Optimizing Your Patient Outcomes Using a Complete Solutions Approach

Phonak Naída V & Roger

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Disclosures

- **Cheri Hebeisen, Au.D., CCC-A**
- Cheri Hebeisen, has been an audiologist for over 15 years. She earned her Doctor of Audiology degree in 2003 from the University of Florida and her Masters of Communication Disorders in 2000 from Louisiana State University Health Science Center in New Orleans. Prior to working as a clinical trainer for Phonak, her clinical experience included diagnostics for pediatrics through geriatrics, hearing aid and FM fittings and evaluations, as well as, auditory processing disorder evaluations.

- *Financial-Phonak employee who receives a salary for employment*
- *Nonfinancial-No relevant nonfinancial relationships exists*

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Learner objectives

- Participants will be able to describe the solutions based approach for a patient with severe to profound hearing loss.
- Participants will be able to describe the new features and benefits of Phonak Naida V and Roger technology.
- Participants will be able to outline characteristics of the patient profile that can be fit with Naida V as well as the benefits associated with wearing Naida V.

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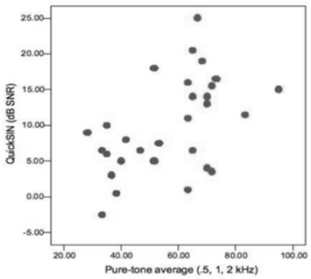
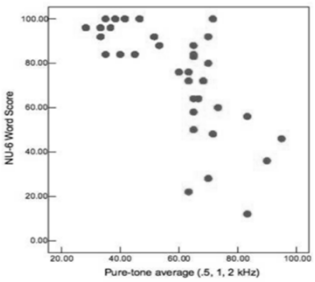
Significant variability in performance in noise and in quiet



Speech in noise (SNR) vs pure tone average



Speech in quiet (% correct) vs pure tone average

- Mild to Moderate
- Moderately Severe to Severe

Souza, P. (2009). Severe Hearing Loss Recommendations for Fitting Amplification. *Audiology Online*, *January 19*

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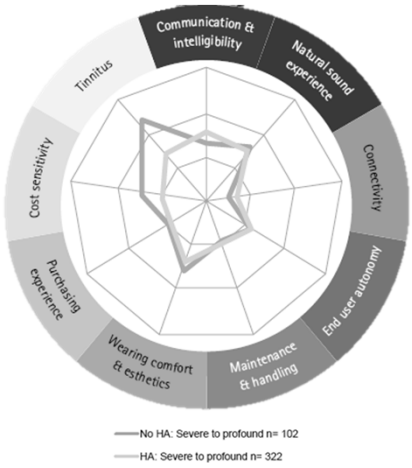
Defining the power patient

By the patient need?

- **Comfort** and **durability**
- **Natural** sound quality and clarity
- Hearing in **quiet, near field** is a challenge – in **noise** and over **far field** seem impossible without technology
- A hearing aid that can **adapt** to changing environments



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Seeing the whole patient

A holistic approach:

1. Hearing and listening needs assessment, including the situations most important to the patient
2. Full audiological assessment
3. Recommend a complete solution that aims to meet the listening and communication needs of the patient and their communication partners

A complete solution often includes elements beyond the hearing aids. A solution that not only solves face to face communication but helps patients navigate hearing at home, at work, with family and in their social life.

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A history of POWER INNOVATION

1994 | **AudioZoom:** Pioneering multi-microphone technology

2002 | **Supero:** First super high power digital product

2003 | **Multi-frequency FM:** First frequency FM system

2007 | **Dynamic FM:** First adaptive FM

2008 | **Naída:** Introduced SoundRecover

2011 | **Naída S**

2013 | **Roger:** First to use adaptive wireless transmission at 2.4 GHz

2013 | **Naída Q**

2016 | **Naída V**

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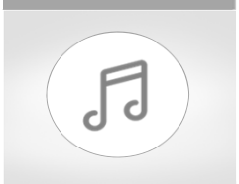
Phonak Portfolio of Solutions

NEW!

Bolero V
3 new designs

Music Performance



Virto V

Naída V

Roger EasyPen

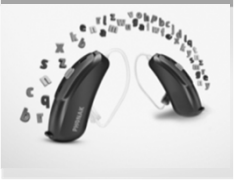
Venture Chip

Audéo V
4 designs

AutoSense OS

30% less battery consumption

CROS II
2 new designs



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Phonak Power Portfolio: Naída V

Naída V

Naída V-UP | Naída V-SP | Naída V-RIC

Naída V + Roger

Naída V-UP **Roger 19** | Naída V-SP **Roger 18** | Naída V-RIC **Roger 18**

All with Volume Control, Push Button, Telecoil and EasyPhone

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Colors for Naída V and Roger receivers

Hair & Skin

Fashion

Traditional

Same color palette as Audéo V and Bolero V

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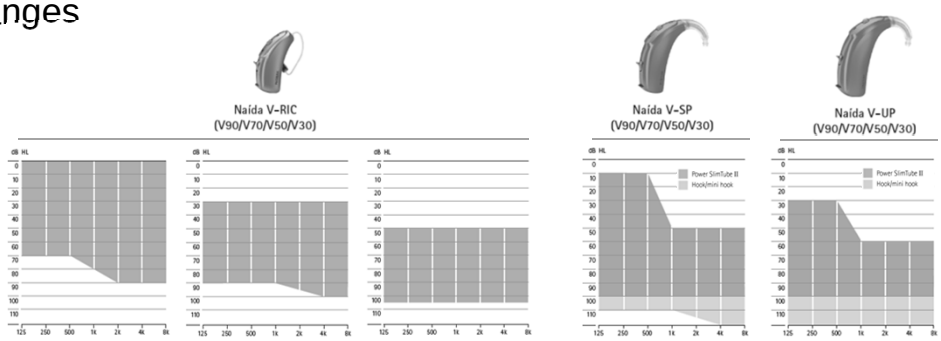
Naída V fitting ranges



	xS	xP	xUP	HE11 680	HE11	HE11 680	HE11
Maximum Power Output (dB SPL)							
2 cc coupler	111	124	130	133	139	135	141
Ear simulator	122	132	136	139	143	140	145
Maximum gain (dB)							
2 cc coupler	46	57	66	74	81	77	82
Ear simulator	56	65	72	77	83	81	85
Frequency range – Ear simulator (Hz)	<100 – 9200	<100 – 6400	<100 – 5800	<100 - 5000	<100 – 5100	<100 - 5100	<100 – 5100

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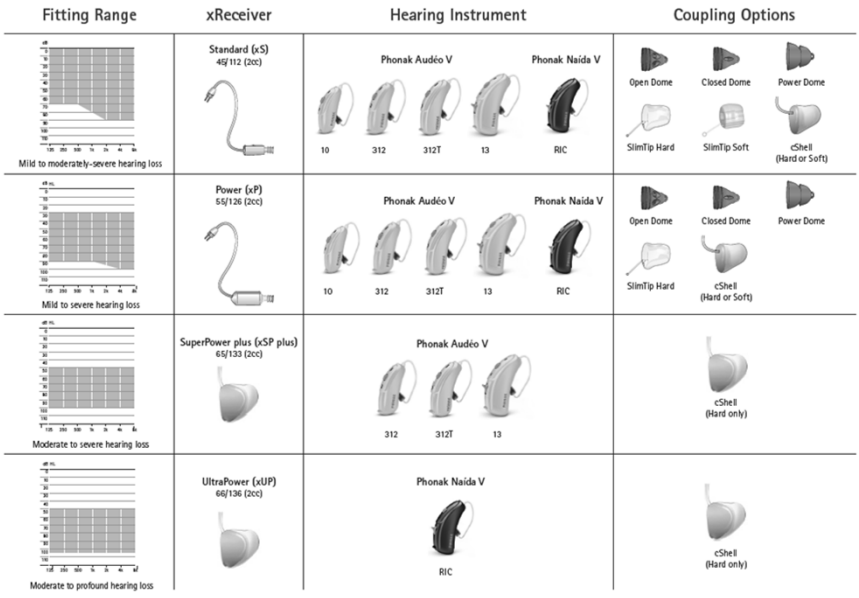
Acoustic coupling for Naída V-RIC



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Simply ingenious solutions you already know

AutoSense OS
Improved speech understanding by 20%.

Music
Fuller, richer, more natural listening experience.

Better Battery Life
Reduced power consumption by up to 30% while streaming.

Tinnitus Balance Noise Generator
Flexible tinnitus solution in all performance levels.

Speech in Loud Noise
1.5 dB SNR improvement over static StereoZoom.

CROS II
The smart solution for single sided hearing loss.

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4 performance levels

** AutoSense OS

* Binaural VoiceStream Technology™

90 – Premium

- Speech in Car**
- Speech in Loud Noise**
- Comfort in Echo**
- Music**
- Comfort in Noise**
- Speech in Noise**
- Calm Situation**
- Speech in Wind*
- Speech in 360° *
- StereoZoom *
- EchoBlock
- WindBlock
- SoundRelax
- SNR-Boost
- FlexControl
- Flex Volume
- DuoPhone*
- WhistleBlock
- NoiseBlock
- QuickSync
- SoundRecover
- Tinnitus Balance
- auto Acclimatization
- UltraZoom Premium
- User Preference Tuning
- 20 channels
- WCP compatible
- CROS II
- AOV

70 – Advanced

- Music**
- Comfort in Noise**
- Speech in Noise**
- Calm Situation**
- Speech in 360° *
- StereoZoom *
- WindBlock
- SoundRelax
- SNR-Boost
- FlexControl
- Flex Volume
- DuoPhone*
- WhistleBlock
- NoiseBlock
- QuickSync
- SoundRecover
- Tinnitus Balance
- auto Acclimatization
- UltraZoom Advanced
- User Preference Tuning
- 16 channels
- WCP compatible
- CROS II
- AOV

50 – Standard

- Comfort in Noise**
- Speech in Noise**
- Calm Situation**
- SNR-Boost
- FlexControl
- Flex Volume
- DuoPhone*
- WhistleBlock
- NoiseBlock
- QuickSync
- SoundRecover
- Tinnitus Balance
- auto Acclimatization
- UltraZoom Standard
- User Preference Tuning
- 12 channels
- WCP compatible
- CROS II
- AOV

30 – Essential

- Speech in Noise**
- Calm Situation**
- WhistleBlock
- NoiseBlock
- QuickSync
- SoundRecover
- Tinnitus Balance
- auto Acclimatization
- UltraZoom Essential
- User Preference Tuning
- 8 channels
- WCP compatible
- CROS II
- AOV

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Naída V Benefits

Enhanced Hearing Performance	Increased confidence and reliability	Smaller devices for more people
• Improvement in high frequency audibility (with SoundRecover2) • Increased audibility: - up to 5 dB more output with BroadbandBooster - up to 6 dB more output with xUP receiver	• 60% more robust with high tech composite material • IP68 – water and dust resistant	• More power allows for broader fitting ranges in smaller devices (xUP receiver and BroadbandBooster) • 25% slimmer hearing aids

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Goals of Non-Linear Frequency Compression

- Increase audibility for high frequency phonemes and sounds, specifically ‘s’ and ‘sh’
- Improve detection, recognition and perception of high frequencies
- Overcome high frequency receiver output limitations

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Results of Non-Linear Frequency Compression

“Clinical field studies have shown that the use of SoundRecover restores high frequency audibility and results in high spontaneous user acceptance, quick acclimatization, and improvements in the wearer’s own voice quality.”[1,2,3]

“SoundRecover increased the pleasantness of sound and of the subject’s own voice, resulting in a highly satisfactory overall impression.” [4]

15+
peer and non-peer worldwide field studies

1 Simpson A, Hersbach AA, McDermott HJ: Improvements in speech perception with an experimental nonlinear frequency-compression hearing device. IJA 2005;44(5):281–292.

2 Scollie S, Glista D, Seewald R: Speech quality ratings of nonlinear frequency compressed speech by normal and hearing-impaired listeners. Ear Hear (submitted).

3 Bagatto M, Scollie S, Glista D, Pasa V, et al.: Case study outcomes of hearing-impaired listeners using nonlinear frequency compression technology. Audiol Online, 2008.

4 Nyffeler, M. (2008). Study finds that non-linear frequency compression boosts speech intelligibility. The hearing journal, 61(12), 22-24.

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SoundRecover2

Restores access to high frequency information while preserving high frequency discrimination and sound quality

Retains the essence of our SoundRecover strategy, while allowing lower cut-off frequencies with weaker compression ratios

Maintains the familiarity of low and mid frequency sounds

Extends the benefits of SoundRecover to:

- more profound losses
- left corner audiograms
- ski-slope audiograms

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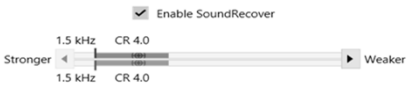
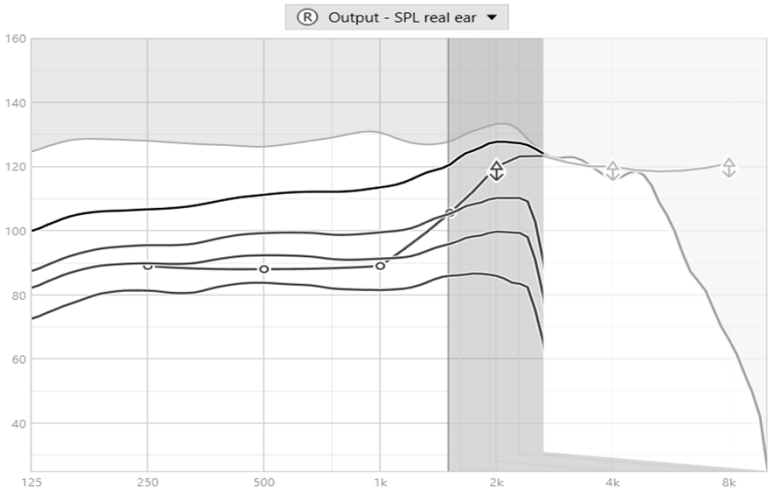
A specific look at those with more profound hearing loss

- Audiogram with no response about 2000 Hz
- Even with SoundRecover (original) enabled, high frequency audibility is not possible due to the lowest possible cut off frequency of 1500 Hz





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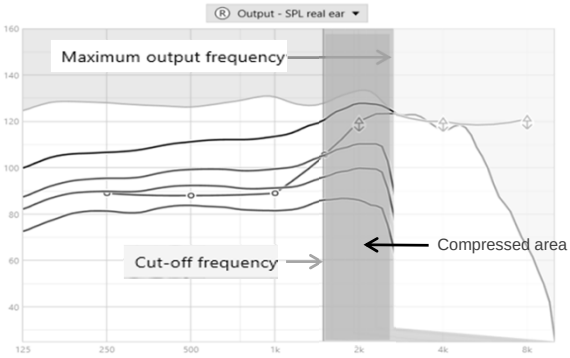
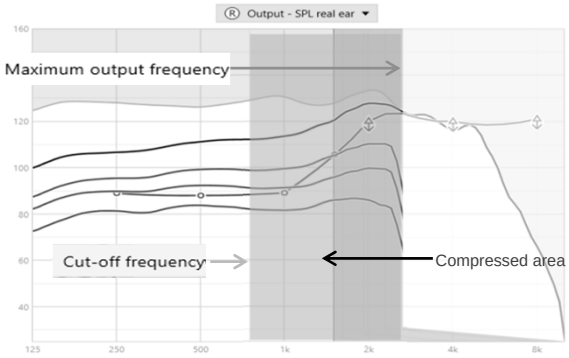
SoundRecover rules – severe to profound hearing loss

Increase the compression ratio to try to make more sounds audible in a smaller bandwidth?



Not the solution: could create a negative impact on sound quality

Lower the cut-off (CT) required to improve audibility?



Lowering the CT below 1.5 kHz could result in distortion of vowels

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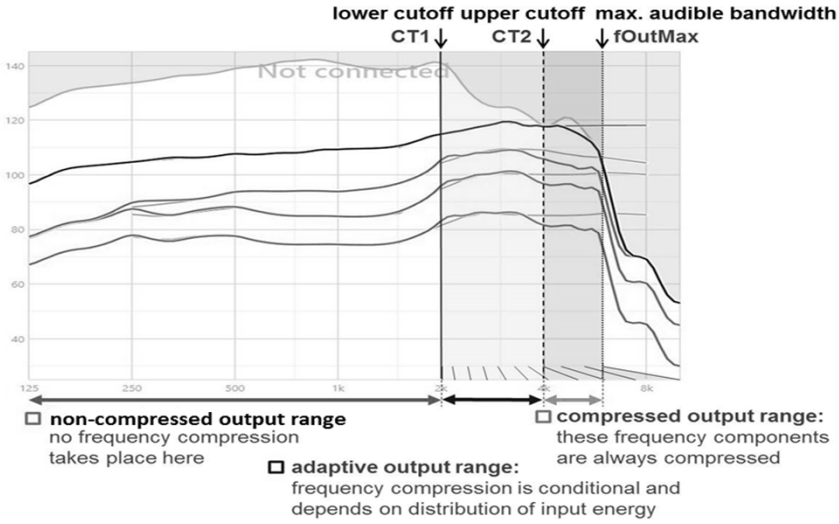
The solution is SoundRecover2 - adaptive frequency lowering algorithm



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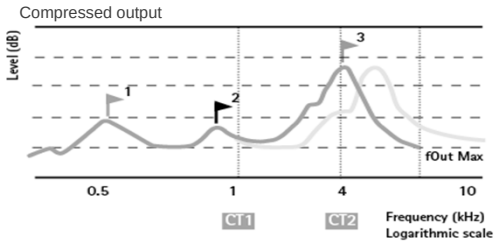
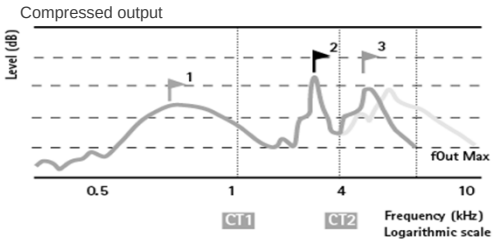
Adaptive nature of SoundRecover2

Input with significant **high frequency** energy present



Input with significant **low/mid frequency** energy present



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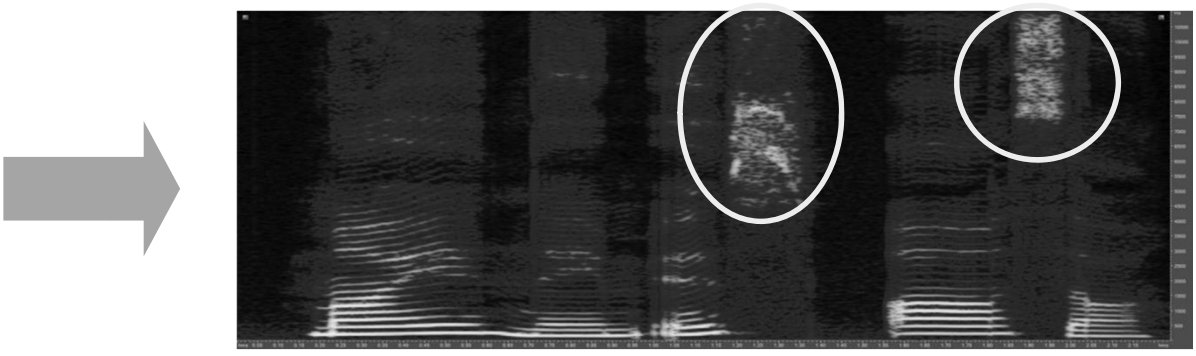
Original sound spectrogram



My name is Asa

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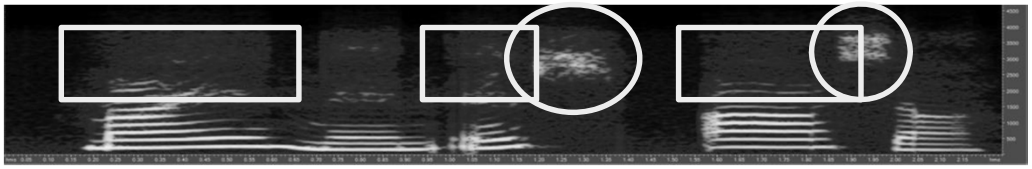
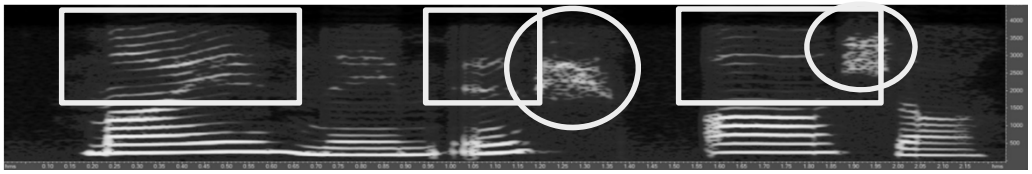
SoundRecover vs SoundRecover2

SoundRecover at strongest settings



My name is Asa

SoundRecover2



My name is Asa

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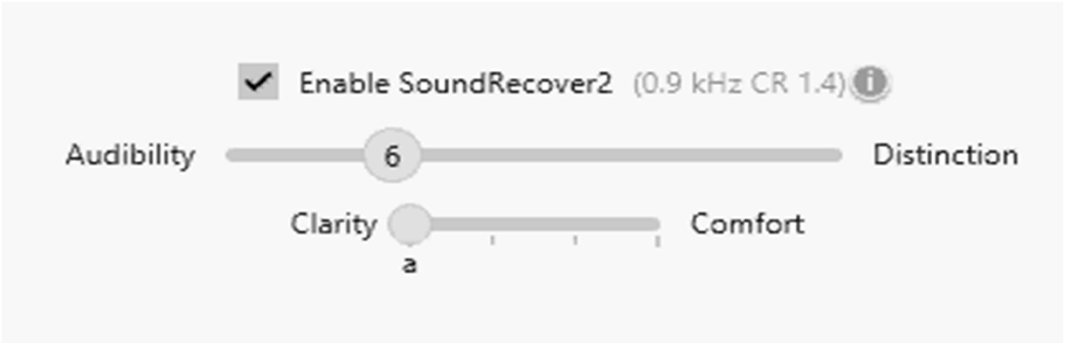
Adjusting SoundRecover2 in Target 4.3



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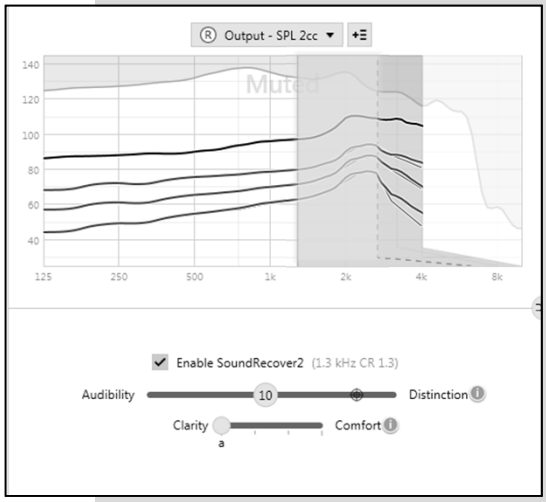
SR2 Controls

- CT1 @ 1.3 kHz
- CT2 @ 2.7 kHz
- Maximum output frequency (fmax) @ 4 kHz

← Adjustment toward “Audibility”
- Lowering of CT1, CT2 and fmax
- “Stronger” frequency lowering

→ Adjustment toward “Distinction”
- Raising of CT1, CT2 and fmax
- “Weaker” frequency lowering

Adaptive frequency compression



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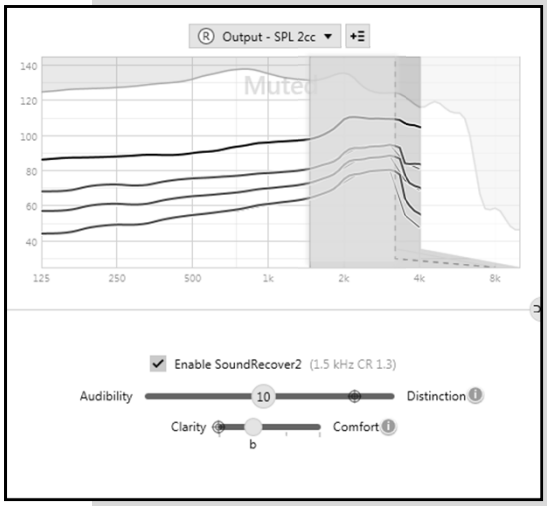
SR2 Clarity/Comfort

- CT1 @ 1.5 kHz
- CT2 @ 3.2 kHz
- fmax @ 4 kHz

Adaptive frequency compression



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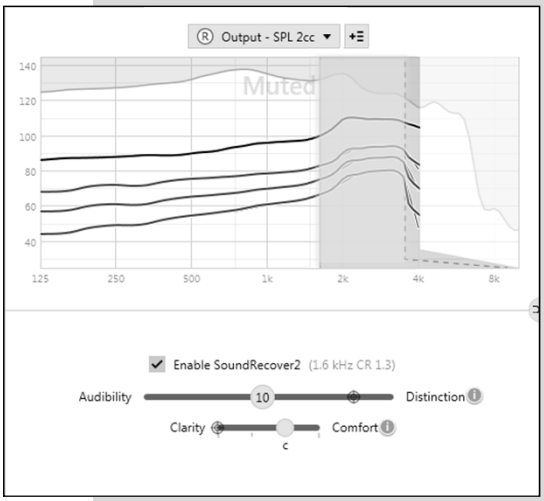
SR2 Clarity/Comfort

- CT1 @ 1.6 kHz
- CT2 @ 3.5 kHz
- fmax @ 4 kHz

Adaptive frequency compression



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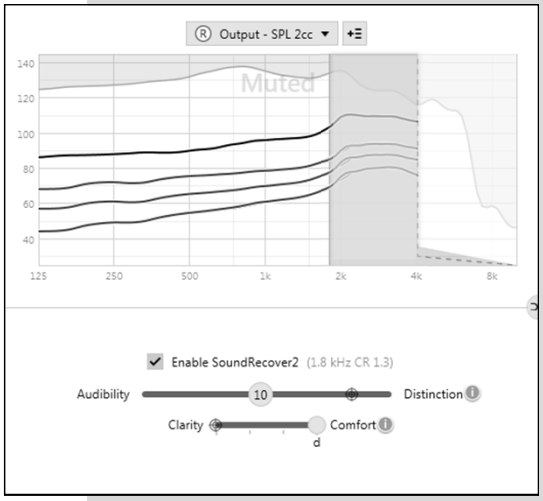
SR2 Clarity/Comfort

- CT1 @ 1.8 kHz
- CT2 @ 4 kHz
- fmax @ 4 kHz

Total area of frequency compression is in adaptive region between CT1 and CT2

Adaptive frequency compression



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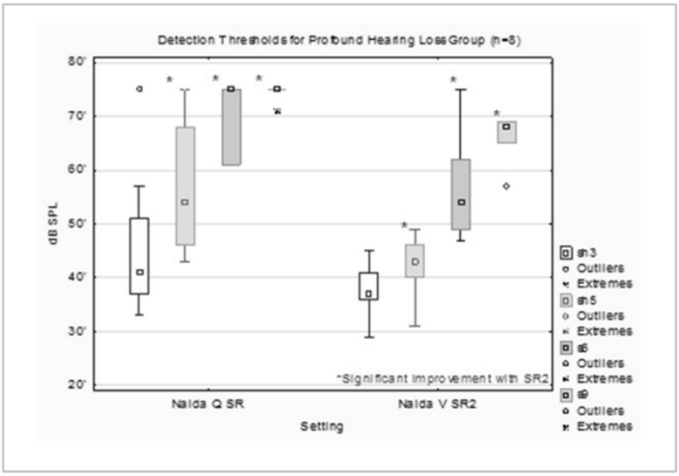

Figure 4: Phoneme perception test: median detection thresholds for profound hearing losses, Naída Q SR (original SoundRecover)[2] vs Naída V SR2 (SoundRecover2). Detection of 3 out of 4 stimuli tested (sh5, s6, s9) was significantly better with SoundRecover2.

- 8 male hearing impaired adults
- Profound, symmetrical, sensorineural or mixed loss
  - Average loss >90dB 250Hz-8kHz
- Phoneme Perception Test
  - Significantly better detection for 3 out of 4 tested stimuli

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Baumann, Silvia; Jha, Siddhartha; Rehmann, Julia. Phonak Insight 2016. "SoundRecover2 – the first adaptive frequency compression algorithm."

Benefits of SoundRecover2 pre-calculation

Maximize stimulation of the hearing nerve by setting the **Maximum Output Frequency** at the upper limit of the individual's audible bandwidth.	**Protect the low and mid frequencies** by setting the upper cut-off (CT2) high enough so that audibile speech (without compression) is <u>not</u> affected.	**Extend the benefits to severe-profound losses** by combining a lower starting point for compression (CT1 or lower cut-off) with a weaker compression ratio.
No risk of deprivation	No risk for distortion of low and mid frequencies	Overcomes the constraints of SoundRecover and provides benefit for more users

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BroadbandBooster: What is it?

When activated, BroadbandBooster increases the overall level of the broadband output of the hearing instrument by up to 6 dB.

- The gain-frequency response and MPO are not changed.
- When activated, the BroadbandBooster setting may vary between 0 to 10, where 0 equals no boost and 10 equals the largest boost in output.

When do you use BroadbandBooster?

1. You need the output of an xP receiver but only an xS will fit in a narrow ear canal.
2. You have already maxed-out a Naída V-UP BTE or a RIC with xUP receiver and still need more broadband output.

Naída V	DEFAULT setting
RIC xS	Off
RIC xP	Off
RIC xUP	**On**
SP BTE	**On**
UP BTE	**On**

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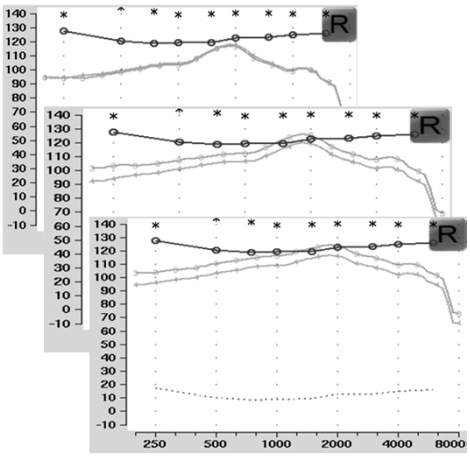
BroadbandBooster in the test-box

Pink Noise
boost on (blue)
boost off (yellow)

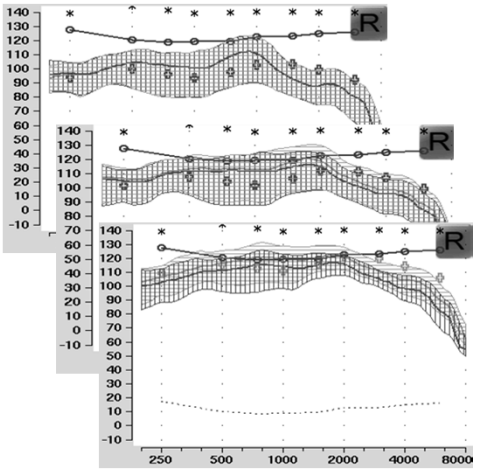
55 dB SPL

65 dB SPL

75 dB SPL



Speech (male voice)
boost on (green)
boost off (purple)



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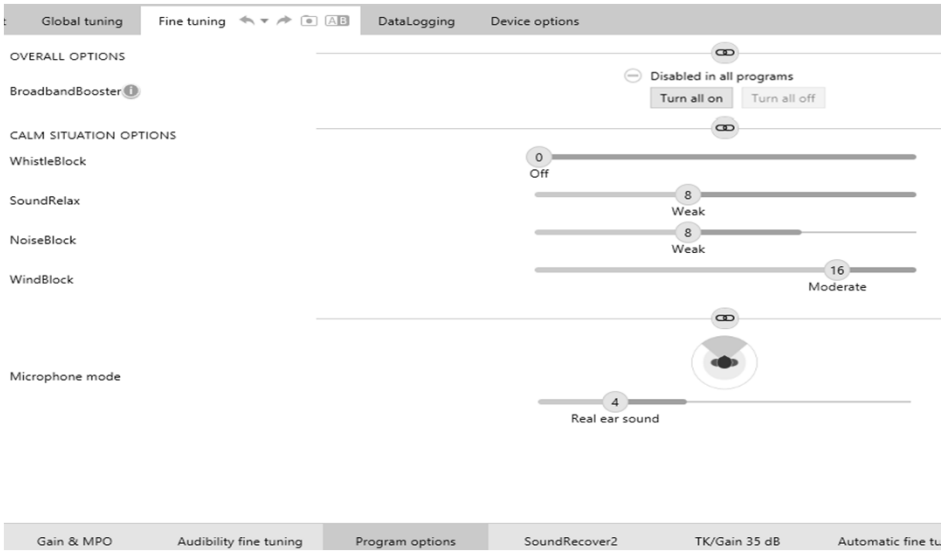
BroadbandBooster in Target 4.3



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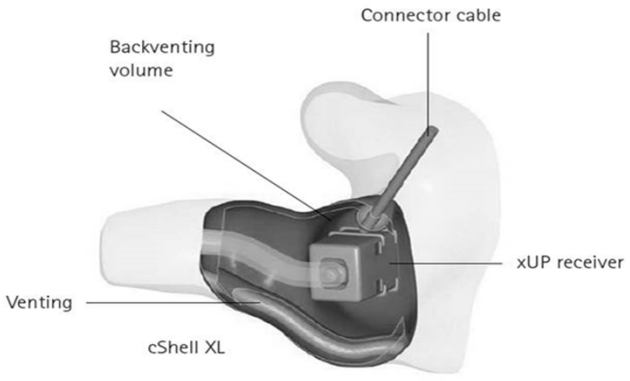
xUP UltraPower receiver – backvent

Venting from the back cavity into the shell

Reduces the stiffness of the membrane

Increases the amplitude of the membrane vibration without feedback



*Requires a custom cShell

- Up to 6 dB more output in the low frequencies
- Significantly less battery consumption by the receiver compared to non-backvented receivers

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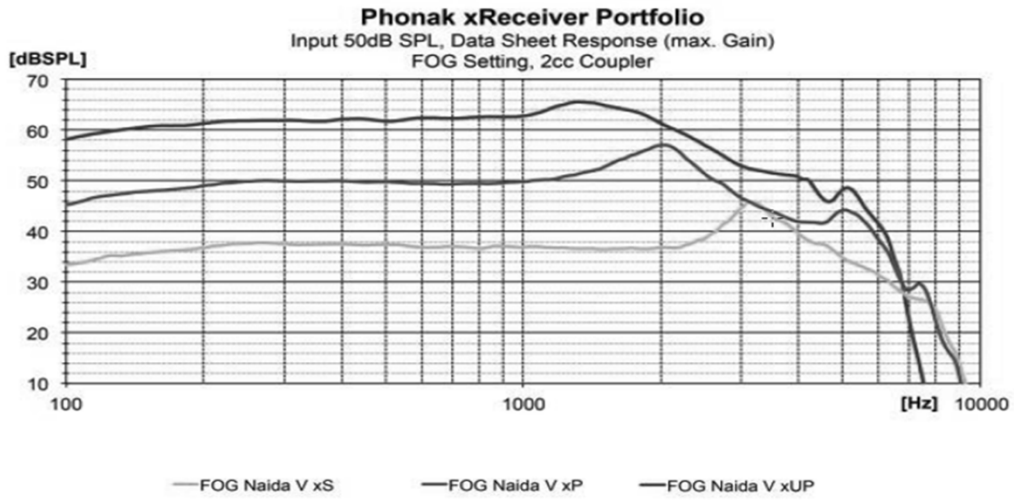
xUP UltraPower receiver: The most powerful RIC receiver from Phonak



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Naída V Benefits

Enhanced Hearing Performance	Increased confidence and reliability	Smaller devices for more people
• Improvement in high frequency audibility (with SoundRecover2) • Increased audibility: - up to 5 dB more output with BroadbandBooster - up to 6 dB more output with xUP receiver	• 60% more robust with high tech composite material • IP68 – water and dust resistant	• More power allows for broader fitting ranges in smaller devices (xUP receiver and BroadbandBooster) • 25% slimmer hearing aids

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Naída V: 60% more robust and IP68

NEW!

More Robust

- Naída V features a new composite housing material.
- Pressure test validation found that 60% more pressure was needed to damage the housing of the instrument compared to its predecessor.

IP68

- Naída V achieves an ingress protection (IP) rating of 68, the highest possible rating for hearing instruments.
- IP68 rating is maintained when Roger 18 and Roger 19 receivers are attached.

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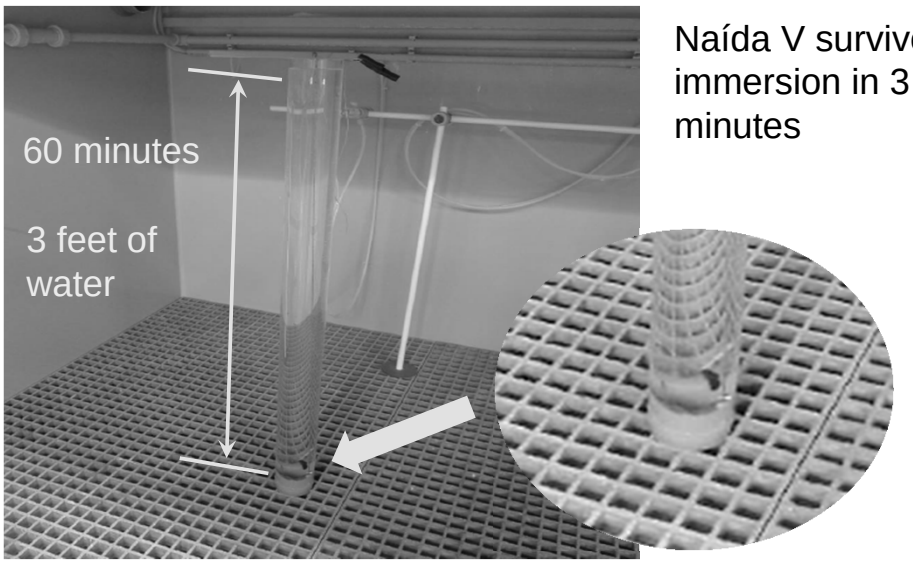
Naída V tested in the water



Naída V survives continuous immersion in 3 feet of water for 60 minutes

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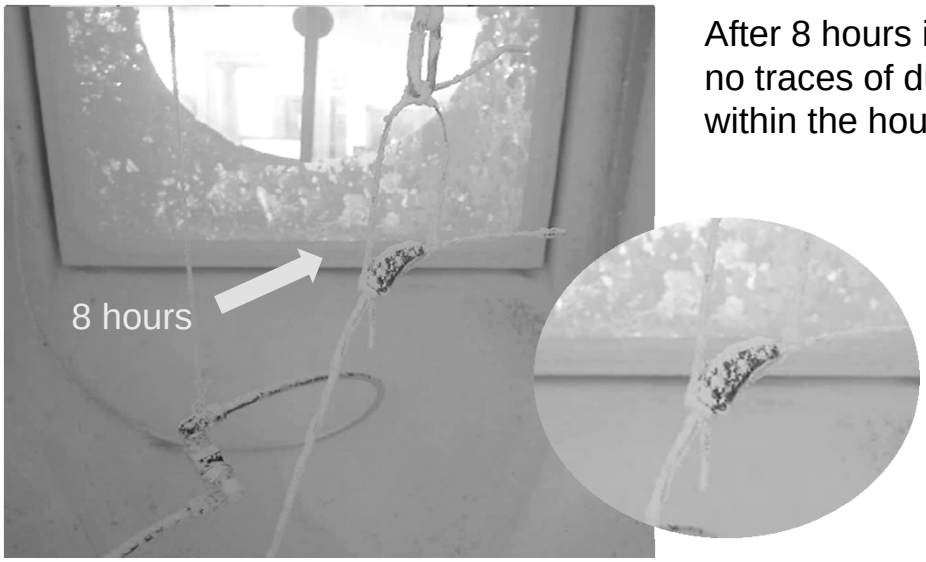
Naída V tested in the dust chamber



After 8 hours in a dust chamber no traces of dust were evident within the housing

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Naída V Benefits

Enhanced Hearing Performance	Increased confidence and reliability	Smaller devices for more people
• Improvement in high frequency audibility (with SoundRecover2) • Increased audibility: - up to 5dB more output with BroadbandBooster - up to 6dB more output with xUP receiver	• 60% more robust with high tech composite material • IP68 – water and dust resistant	• More power allows for broader fitting ranges in smaller devices (xUP receiver and BroadbandBooster) • 25% slimmer hearing aids

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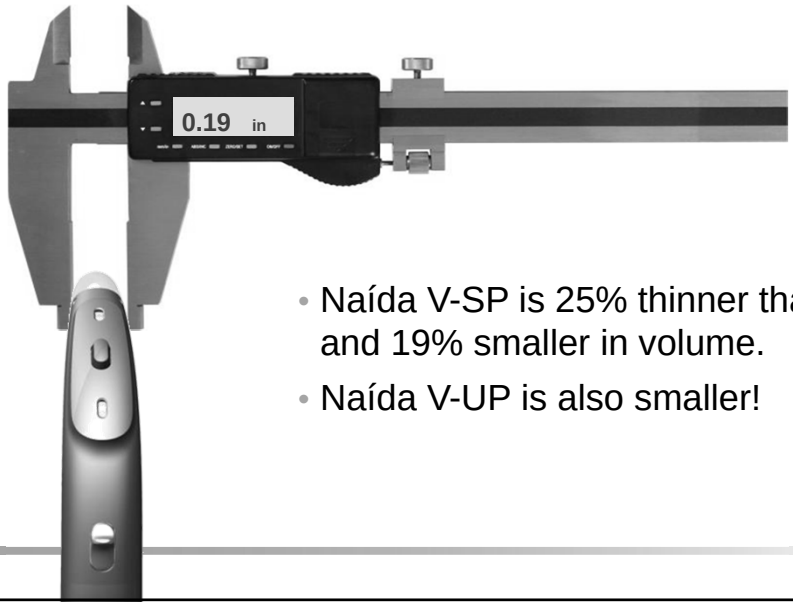
Severe to profound clients want small hearing instruments too!



- Naída V-SP is 25% thinner than Naída Q-SP and 19% smaller in volume.
- Naída V-UP is also smaller!

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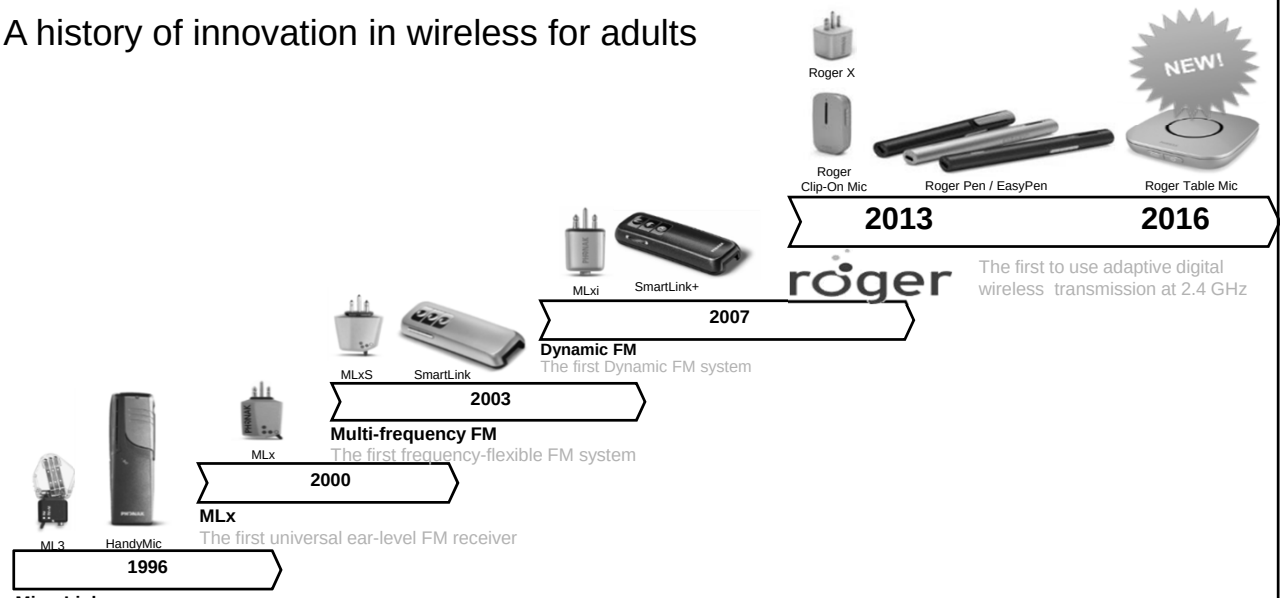
A history of innovation in wireless for adults



roger

The first to use adaptive digital wireless transmission at 2.4 GHz

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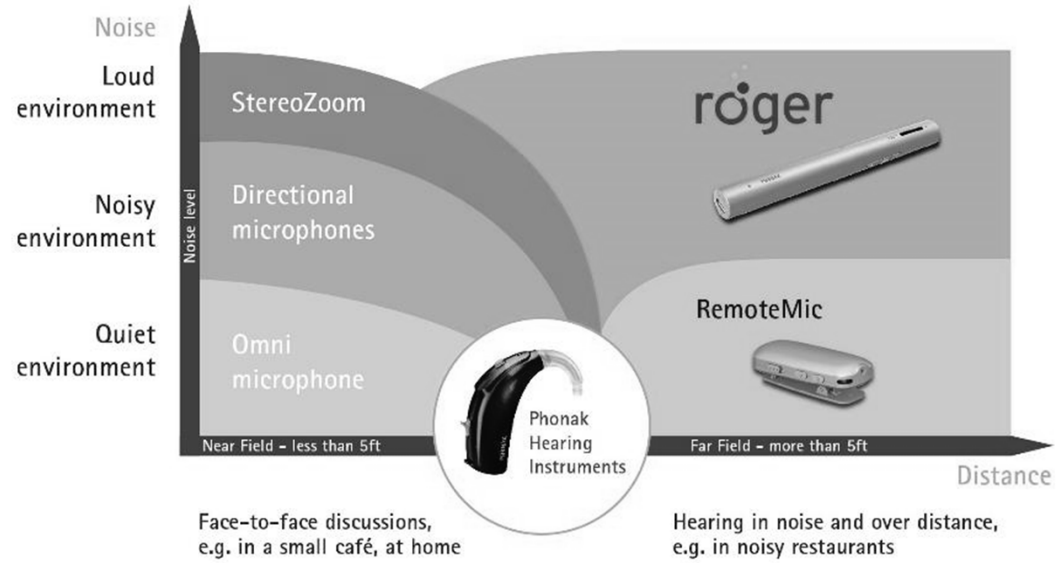
Why Roger?



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What is a Roger system?

- A Roger system consists of **one or more Roger microphones** with accompanying **Roger receivers**
- The Roger system functions by **picking up the voice of a speaker and wirelessly transmitting it to the listener** while reducing background noise

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Roger Microphones

Roger Pen	Roger EasyPen	Roger Clip-On Mic
A discreet, wireless Roger microphone that delivers superior speech-in-noise and over distance performance. It's the ideal solution for an all-inclusive listening experience including Bluetooth™ connectivity.	An easy-to-use wireless microphone for one-on-one or group conversations, featuring full Roger speech-in-noise and over distance performance.	A discreet and lightweight stand-alone microphone for a conversation partner, with industry leading speech-in-noise and over distance performance.

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Roger Table Mic

- Roger Table Mic is a **dedicated** microphone for meetings
- Designed purely for use on a **table**
- Extending the existing Roger for adult portfolio including Roger Pen, Roger EasyPen and Roger Clip-On Mic
- **Simple** - only two buttons
- Combining multiple Roger Table Mics will make it possible to cover large meeting rooms with many participants

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Roger Receivers

Roger Design Integrated

Roger X

Roger MyLink

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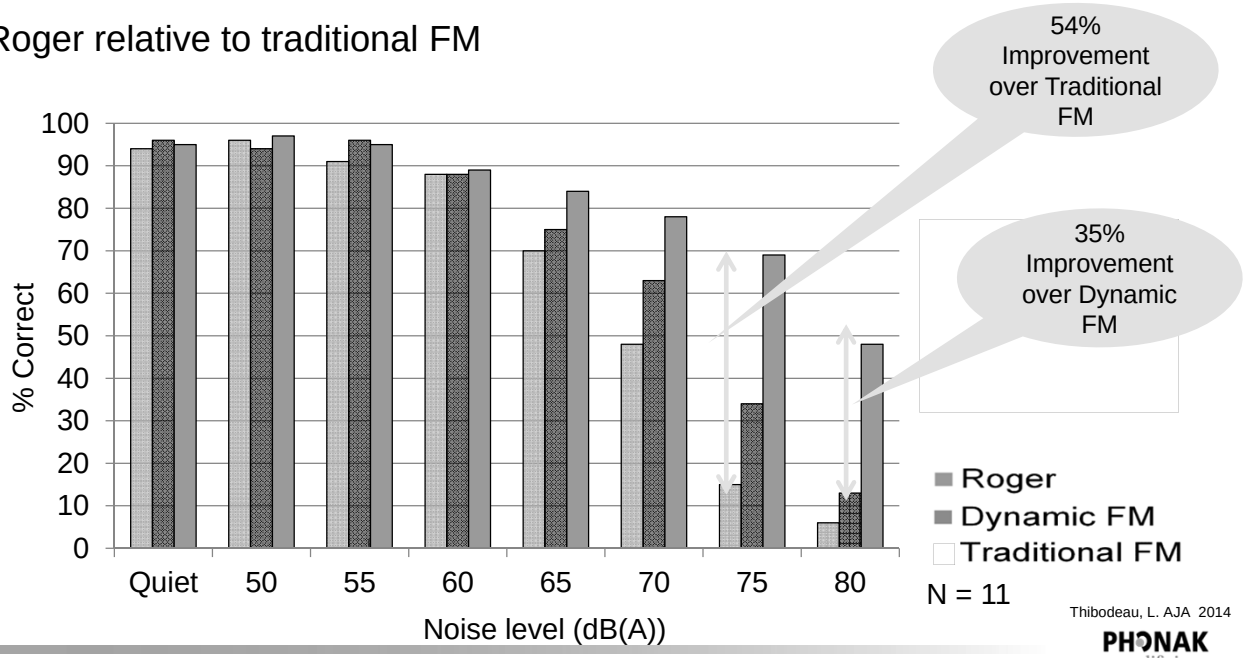
Roger relative to traditional FM



Thibodeau, L. AJA 2014

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Roger benefits

DESIGN AWARD 2016

Performance	Ease of Use	Multi-functionality	Design
• Sound Quality • Speech understanding in noise and over distance • Adaptive behavior • **Roger Directional** NEW!	• Simple - No programming required • Automatic mic mode • **RogerReady** NEW! • No frequency planning - 2.4 GHz	• One device for everything • TV/multimedia connectivity • Wideband Bluetooth (Roger Pen) • Expandable multi-talker network	• Discreet • Cool design • Appealing colors

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RogerReady

RogerReady

NEW!

- The Roger/DAI + Mic program is always in the program structure
- No additional programming required
- Simple 2 step process: Attach the Roger receiver(s) and switch on the Roger microphone

Ensures every power user's Naída V hearing aids are ready for Roger

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RogerReady - Automatic activation of Roger

100% of the time!

- Transmission from the Roger microphone activates the Roger program
- Automatic switching into the Roger program occurs in <400ms
- Switching out of Roger program occurs after ~50 seconds of no transmission
- Available in AutoSense Sky OS and Roger/DAI + Mic
- RogerReady now enabled by default for all Junior mode fittings in Phonak Target

Field Study News, RogerReady: Automating the Roger Experience, April 2016

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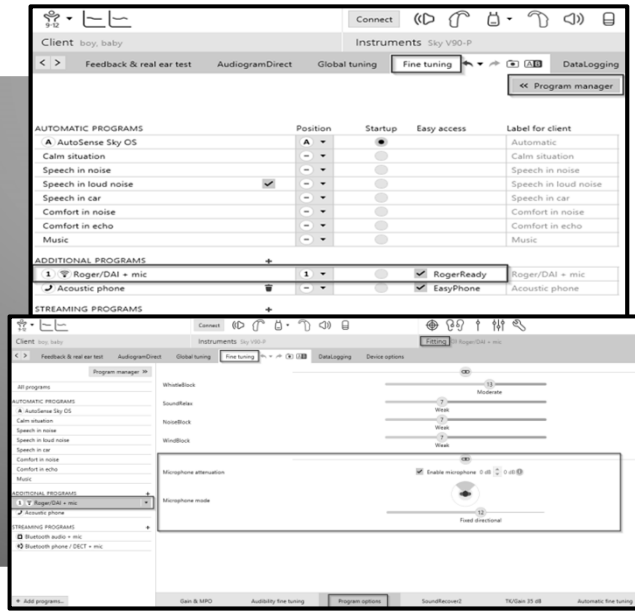
RogerReady

- Roger/DAI+Mic program is on by default and cannot be deleted from the program structure
- RogerReady is checked as default in the (Program manager)
  - Replaces EasyRoger
  - Can be unchecked – warning message if no manual program
- Hearing instrument microphone is always enabled by default
  - Can be disabled or attenuated



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The best of both worlds: Roger + Directional

- Now Naída V has directional microphones active when using a Roger microphone
- Patients wearing Naída V with Roger + Directional will be able to enjoy the benefits of the hearing instrument directionality in the near field and the Roger microphone in the far field

- Roger + Directional setting offers 3 hearing instrument microphone modes:
  - **Omni**: always omnidirectional microphone
  - **Real Ear Sound:** always Real Ear Sound
  - **Fixed directional:** adaptive activation of fixed beamformer

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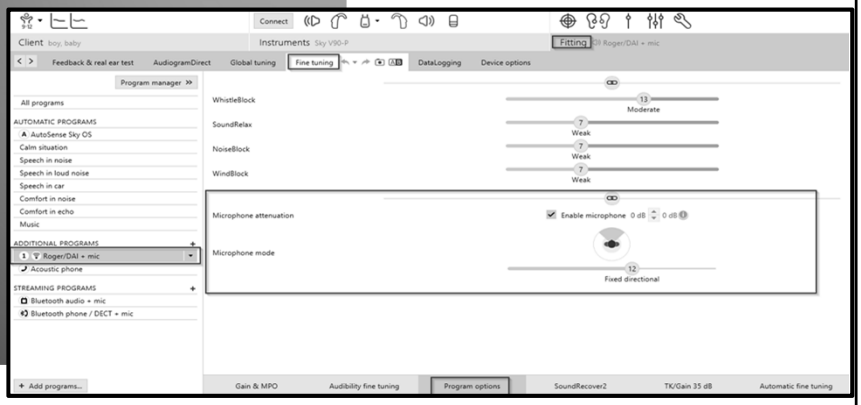
Program options in Target 4.3

NEW!

- Roger/DAI+Mic program has three microphone mode settings
  - Omni-directional
  - Real Ear Sound
  - Fixed directional



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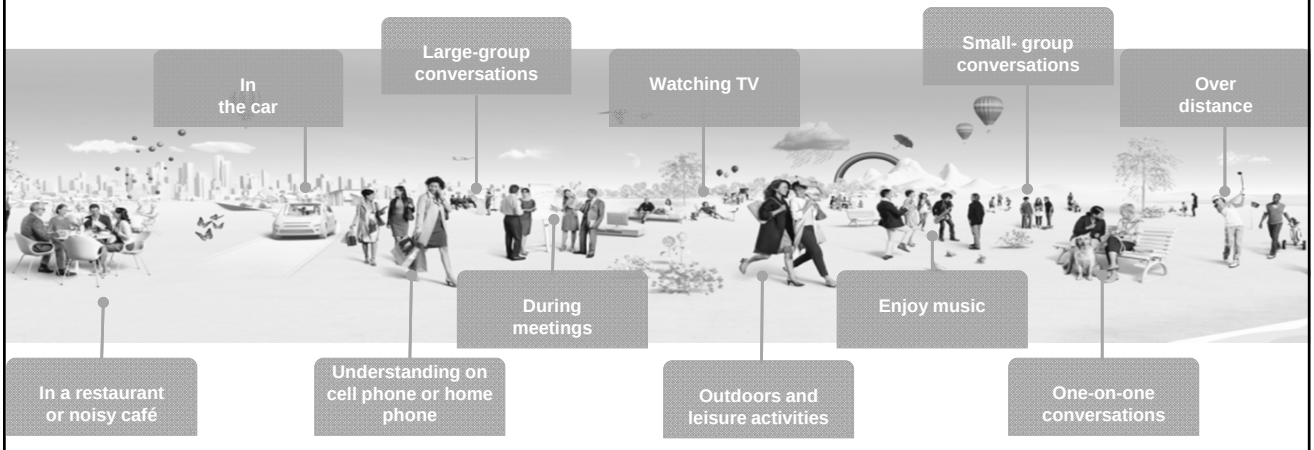

The Phonak power hearing solution covers <u>all</u> listening situations and communication needs in the near and far field

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A solutions approach

- A complete solution that is aimed to meet all the listening and communication needs.
- For power patients, a single product solution is unlikely to meet all of their needs.
- Support encompasses *more* than just hearing aids and involves *more* than just the person with hearing loss.

Timing is everything: To drive adoption, the complete solution must be recommended at the same time.

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Subjective Needs Assessment | Objective evaluation | Recommendation

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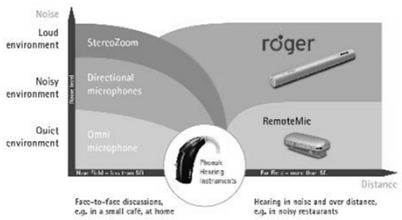
Indication for Roger based on need

- Patients who express improvements in any of these situations:
  - Hearing in noise
  - Hearing in quiet or noise at a distance
  - Listening to a passenger in a car, train, plane or bus
  - TV / Multimedia (computer, music player, etc.)
  - Cell phone
  - Landline phone
  - Business meetings
  - Conferences/lectures



Naída V + Roger is the best solution to address these situational needs.
In quiet and in noise, near and far.

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Thank you

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