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Hearing with Two Ears

Maximizing Success in School for Children with Cochlear Implants

Everyone knows that hearing with two ears is better than one. It's not just common sense, it's supported by scientific research.¹⁷⁻¹⁹ Hearing with two ears provides a more balanced and focused representation of sounds. We hear better with two ears because the brain naturally integrates and uses information from both sides to understand speech and locate sounds in our environment.

In order for children with unilateral cochlear implants to reach their full potential, they should also take advantage of the natural way the brain interprets sounds from both ears. A true hearing solution should take sound from both sides into consideration. This is why many children have received a cochlear implant in each ear. Bilateral implantation helps to maximize success by taking advantage of the way the brain integrates sounds.

What about children who are unable to receive a second cochlear implant? These children are at a disadvantage and may have a difficult time locating where sounds are coming from and hearing well in noisy situations. These children should be fit with assistive hearing technology that enables them to hear sound from both sides.

For the first time, children who use an Advanced Bionics' Naída CI in one ear and are unable to receive a second cochlear implant have a complete range of solutions to provide a fuller, richer hearing experience. These children can take advantage of either the **Naída Link Bimodal Solution** or the **Naída Link CROS Solution** and wear devices that work together and allow them to hear sound from both sides. Additionally, to provide children with the opportunity to hear their best from their cochlear implant side, AB also offers the **Naída CI All-In-One Solution**. This guide provides an overview of each option and explains the benefits, technology, and real world advantages of these solutions. For more information visit www.AdvancedBionics.com.

NAÍDA LINK BIMODAL SOLUTION BIMODAL HEARING BASICS

Definition: Bimodal Hearing is the use of a cochlear implant in one ear and a hearing aid in the opposite ear.

Many people wonder how hearing with a hearing aid differs from hearing with a cochlear implant. Ultimately, both devices have the same goal: to improve hearing. Although the mechanics may be different, these devices can work together to provide children with significant benefits and optimal outcomes.

The Difference Between Hearing with a Hearing Aid and a Cochlear Implant

Hearing Aid

A hearing aid acoustically amplifies and delivers sounds to the auditory system through sound waves. The sounds delivered must pass through the damaged parts of the auditory system before reaching the brain for processing. The greater the damage, the more severe the hearing loss. For many people hearing aids are sufficient to improve hearing to an acceptable level of benefit. Cochlear implantation is considered for individuals who require access to sound that a hearing aid can not provide.

Cochlear Implant

A cochlear implant delivers electrical signals that represent sounds directly to the auditory system. The electrical signals bypass damaged areas of the auditory system and stimulate the hearing nerve directly. Cochlear implants are usually recommended for ears with severe to profound hearing loss and can significantly improve hearing.



Why is Bimodal Hearing becoming the standard of care for children with one cochlear implant?

Over the past 10 years, more children have been implanted who use hearing aids. This change has led to a growing population of children who have usable hearing in their non-implanted ear. These children stand to benefit from hearing aid use in combination with a cochlear implant.

Which school-age children may benefit from Bimodal Hearing?

Children who have usable residual hearing in the unimplanted ear and exhibit any of the following at school may benefit from Bimodal Hearing:

- Difficulty following conversation in the noisy cafeteria²⁻⁶
- Trouble identifying where sound is coming from on the playground or during gym class¹⁻³
- Fatigue by the end of the day¹⁶
- Lack of interest in music^{5,7,8}
- Difficulty hearing other students' comments during class discussions²⁻⁶

BIMODAL HEARING TERMINOLOGY

Binaural Hearing Advantage: the positive outcome that occurs when the brain is able to integrate and use information from both ears to improve access to important sounds, like speech, resulting in better hearing

Contralateral Ear: the ear opposite of the cochlear implant

Sound Localization: use of different loudness and timing cues between ears to determine what direction sound is coming from

BIMODAL RESEARCH

Does research demonstrate that adults and children who use one cochlear implant benefit from Bimodal Hearing?

Numerous studies have documented the benefits of Bimodal Hearing compared with the use of a single cochlear implant. These benefits are realized because hearing in both ears provides the brain with additional cues that improve listening across various situations.

Research suggests that Bimodal Hearing may provide improvements in the following:

- Sound localization¹⁻³
- Speech understanding in quiet and noise²⁻⁶
- Music perception and enjoyment^{5,7,8}
- Acquisition of auditory and language skills⁹⁻¹¹
- Ability to hear low pitch sounds¹²⁻¹³

AB Makes It Simple for Schools

Want to learn more details about how a cochlear implant processes sound and stimulates the auditory system? Visit [AdvancedBionics.com/TFS](https://www.advancedbionics.com/TFS) and click on Tools for Learning about Hearing Loss and Cochlear Implants to download the "Becoming Familiar with a CI" pdf.

Bimodal in the Real World

"My AB Hearing Aid (Naída Link) was activated last Wednesday, and it is WONDERFUL!! My family, friends, and I are so happy with my hearing using the implant, and the compatible hearing aid makes it even better! I have a new confidence hearing conversations in public settings and also using the phone."

— Annie, AB recipient

What are the qualitative benefits of Bimodal Hearing?

- Reduced effort to hear
- Feeling balanced
- Enhanced sound quality
- Improved awareness of environmental sounds
- More confidence and spontaneity in social situations^{2,3,14}
- More likely to initiate conversations with both familiar and unfamiliar speakers^{2,3,14}
- Less need for repetition in conversation^{2,3,14}
- Preservation of the auditory pathway on the contralateral side through continued auditory stimulation
- Nonsurgical alternative for the contralateral ear if bilateral implantation is not an option

Bimodal in the Real World

"With both the Link and Implant, I am able to hear sounds that I haven't heard since my hearing loss began (including my cat's incessant meowing which I'm not sure I missed...) I'm able to capture wonderfully clear sounds and speech with just the implant itself, but the addition of the Link adds such a richer sound to my surroundings, adding a more natural tone."

— Jessica, AB recipient

AB Makes It Simple for Schools

Tips for Bimodal Success:

- Keep a log of the specific technology the child uses in each ear.
- Be sure to have contact information for the audiologist(s) who manage both the cochlear implant and the hearing aid.
- Learn if any program numbers have been designated for special listening situations, such as a noisy cafeteria or an auditorium.

Need help keeping track of your student's equipment?

Visit [AdvancedBionics.com/TFS](https://www.advancedbionics.com/TFS) and click on Bimodal Hearing to download the Bimodal Technology Tracking Form.



BIMODAL HEARING TECHNOLOGY

Who are the professionals involved in the Bimodal fitting process?

The cochlear implant audiologist may fit both the cochlear implant and hearing aid or may work in conjunction with a hearing aid audiologist or specialist.

Can any hearing aid be used for a Bimodal fitting?

Yes, any type of appropriately fit hearing aid can be worn on the contralateral ear and provide Bimodal hearing. However, for children who have an AB cochlear implant, there are advantages to using a Phonak Naída Link™ hearing aid. The Link hearing aid in combination with AB's Naída CI sound processor provides a unique Bimodal Hearing Solution and optimizes Bimodal benefit.

How does the Naída Link Bimodal Hearing Solution maximize the benefits of Bimodal Hearing?

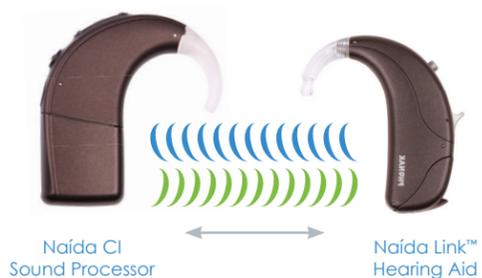
The Naída Link Bimodal Hearing Solution from AB and Phonak provides the first hearing aid specifically designed to work with a cochlear implant system. It features the AB Naída CI sound processor and Phonak Naída Link hearing aid. Because they use the same platform, the Naída CI sound processor and Naída Link are able to communicate with each other in a way no other hearing aid and cochlear implant combination can match.



Naída CI Sound Processor

Naída Link Hearing Aid

Bimodal fitting with the Naída Link Bimodal Hearing Solution



The Naída CI sound processor and Naída Link hearing aid use the same platform, process sound in a similar way, share sound signals, and communicate with each other.

Standard Bimodal Fitting



The Naída CI sound processor and hearing aid work as two separate systems.

BIMODAL HEARING TERMINOLOGY

Naída Link Bimodal Hearing Solution: use of a Naída CI sound processor in one ear and a Naída™ Link hearing aid in the other ear for optimal Bimodal benefit

Bimodal Streaming: the ability to simultaneously receive auditory input in both the Naída CI and a compatible Phonak hearing aid wirelessly

Binaural VoiceStream Technology™: allows the Naída CI and the Naída Link to share sound signals and communicate with each other in real time to maximize hearing performance.



ComPilot: a versatile accessory that can be used as a remote control* or to stream audio input wirelessly to the Naída CI and/or a compatible Phonak hearing aid

Naída CI: cochlear implant sound processor

Naída Link Hearing Aid: a behind-the-ear hearing aid specifically created to work with the Naída CI

*Available with SoundWave 3.0

What are the distinct advantages of the Naída LinkBimodal Hearing Solution?

Easy to Hear

The Phonak Naída Link is the only hearing aid designed to treat sound in the same way as the Naída CI sound processor, making it easy for children to hear with them together. Specifically, the devices share sound processing technology, volume behavior, and program alerts. Studies show that individuals experience greater listening comfort and a proven advantage for hearing in noise compared to using a cochlear implant and any other hearing aid.¹⁵

School Advantage: Children feel that their hearing is balanced between both ears as they walk into the auditorium for a lecture and both Naída devices adapt similarly.

Easy to Use

Both the Naída CI sound processor and Naída Link use the same advanced automatic technology to react to and adjust in the same way and at the same time to changing sound situations.

Shared automatic technologies include:

QuickSync** Provides one-touch control of the child's processors for easy, instant, simultaneous adjustments to volume and program settings on both ears.

SoundRelax* Softens sudden loud sounds, such as slamming doors or clanging dishes.

UltraZoom* Focused listening on a small group of voices in front while reducing distracting noise for improved communication in noisy environments.

WindBlock* Reduces wind noise to improve comfort and ease of listening in windy conditions.

School Advantage: Children can enjoy focused listening with classmates for a small group assignment while the chatter from other small groups around them is reduced.

*Not approved for pediatric use in the United States
 **Available with SoundWave 3.0



Easy to Communicate

The Naída CI sound processor and Naída Link do not process sound independently like other Bimodal systems. Through Binaural VoiceStream Technology™ these devices are able to share sound signals and communicate with each other. They work together to intelligently focus on the most important sounds while significantly reducing unwanted noises. This breakthrough technology allows children to hear clearer sound simultaneously in both ears.

Binaural VoiceStream Technology Includes:

DuoPhone** Automatically streams phone calls to both ears for stereo hearing and easier conversations in noise while using the telephone.

School Advantage: A child can call their parent for a ride home from the noisy locker room after basketball practice and easily hear the conversation in both ears.

StereoZoom** Extraction of a single voice from a noisy crowd so one-on-one conversation requires less effort. Requires a Naída Q90 sound processor.

School Advantage: A child can listen to their best friend in the cafeteria while background noise is reduced.

ZoomControl** Focused listening on a speaker to the front-back or right-left for improved communication in noisy environments.

School Advantage: A child can talk with a friend seated next to them on the bus.

*Not approved for pediatric use in the United States.
+Available with SoundWave 3.0.

Easy to Connect

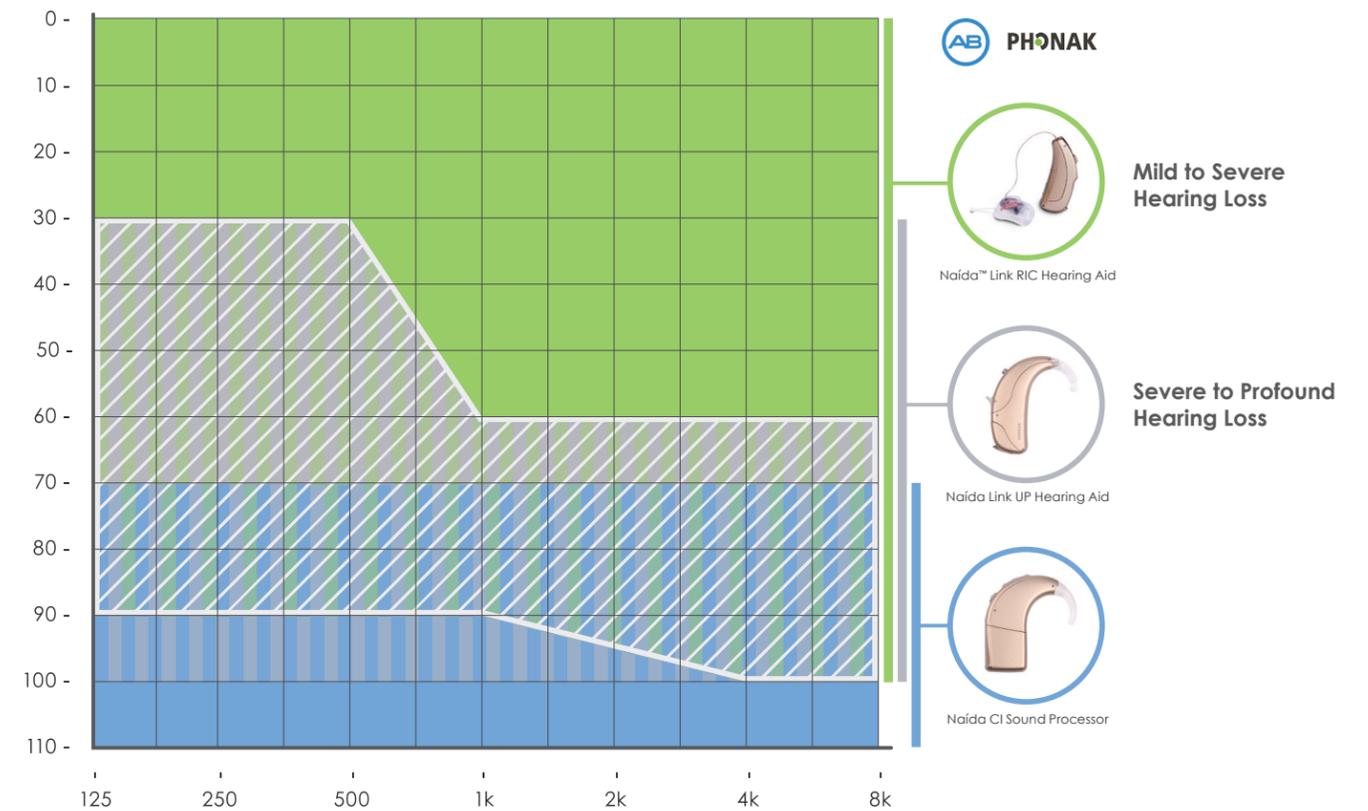
Children can wirelessly stream music, television, cell phone calls, Roger™/FM, and input from tablets to both ears, and enjoy the benefits of stereo hearing. There is a wide selection of Phonak wireless accessories that stream audio directly to both devices for effortless hearing.

School Advantage: A child can wirelessly stream audio to both ears while completing an assignment on a school tablet.



*Visit phonak.com for details on the benefits each accessory provides.

Bimodal Hearing Solution Fitting Range



Bimodal in the Real World

"I can carry on conversations in a restaurant with ease, hear my boyfriend calling me from another room, and even talk on the phone with the T-Mic or my Roger pen streaming into both ears. It's astounding how clear I am able to localize sounds through these intelligent and cohesive devices; two ears are definitely better than one!"

— Jessica, AB recipient

How can I keep track of my student's Bimodal system?

Advanced Bionics has created a simple form you can use to keep track of your student's technology. Visit AdvancedBionics.com/TFS and click on Bilateral and Bimodal Resources to download the Bimodal Technology Summary Flyer.



Phonak ComPilot Accessory

A remote control* and streamer that wirelessly connects audio input from any Bluetooth-enabled device to a Naída CI sound processor and/or a compatible Phonak hearing aid.

*Available with SoundWave 3.0



THE NAÍDA LINK CROS SOLUTION

Children who cannot receive a second cochlear implant and do not have enough hearing to benefit from the Naída Link hearing aid can take advantage of hearing from both sides with the Naída Link CROS Solution. The Naída Link CROS Solution is use of a Naída CI in one ear and Phonak Naída Link CROS hearing aid in the other.



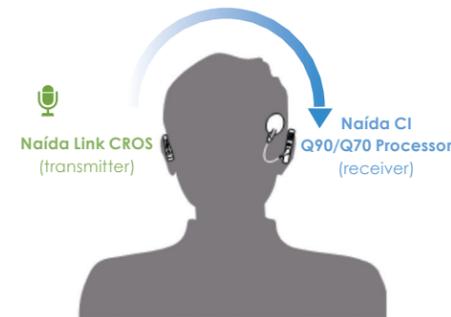
How does the Phonak Naída Link CROS hearing aid work?

The Phonak Naída Link CROS hearing aid sends sounds wirelessly from the non-hearing ear directly to the Naída CI enabling sound to be heard from both sides.

Why is it important for children to have access to sound from both sides?

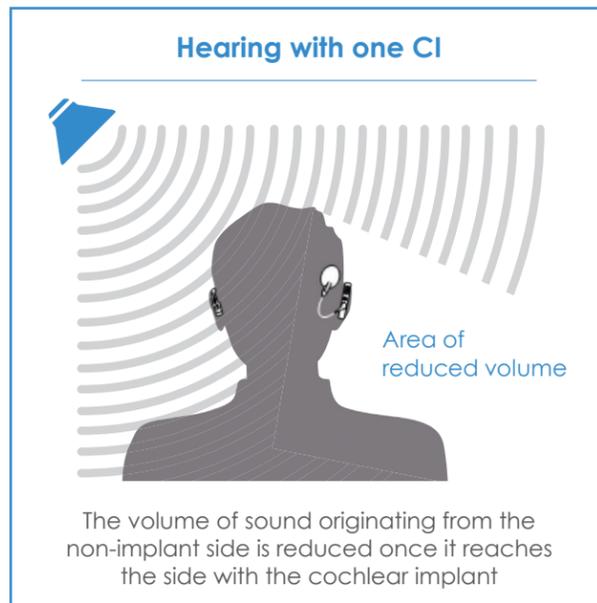
The challenges of listening with only one ear are well documented and include:

- Difficulty understanding speech in noisy situations
- Difficulty understanding speech while riding in a car
- Trouble identifying where sound is coming from
- The constant need to reposition to hear out of the ear with hearing
- Fatigue and exhaustion

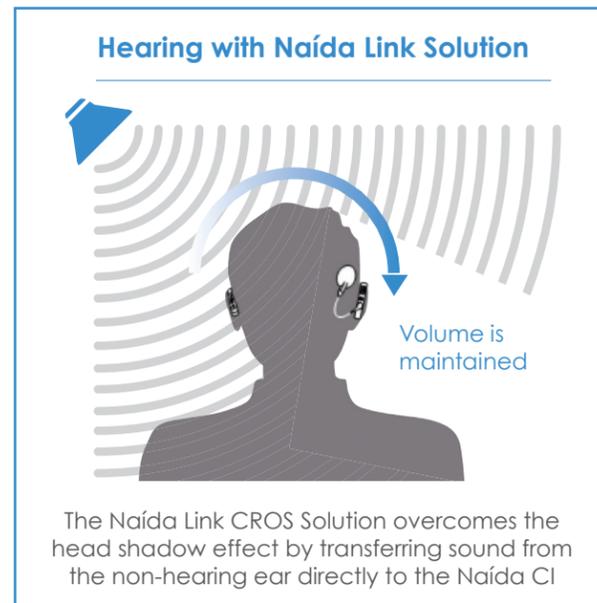


Why is it more challenging to hear with only one ear?

When listening with only one ear, it is more difficult to hear because sound traveling from one ear to the other ear is obstructed by the head. This is called the head shadow effect, and it results in an area of reduced volume.



"I had a WHOA moment in a restaurant. I deliberately sat between two people so that I could enjoy having conversation on both sides."
– Jennifer T.



"The biggest benefit is that I don't worry about making sure folks are on my CI side."
– David M.

Who is a candidate for the Naída Link CROS solution?

Candidates for then Naída Link CROS include bilaterally deafened unilateral cochlear implant users who:

- Are age 36 months or older
- Have no functional hearing in the ear opposite the cochlear implant (no benefit from low-frequency amplification).
- Are an AB recipient
- Currently use a Naída CI Q90 or Q70 sound processor

What are the benefits of using the Phonak Naída Link CROS solution?²⁰⁻²³

- Input is provided from the non-hearing side to the Naída CI to increase awareness of all sounds
- Removes the head shadow effect
- No need to re-position relative to the speaker to hear
- Better able to determine where sound is coming from
- Provides consistent performance, no matter where the sound originates
- Provides better performance in noise
- Enhanced sound quality
- Reduced fatigue as it requires less effort to hear
- Provides the benefits of bilateral speech perception in quiet and in noise for unilateral implant recipients
- More confidence in any listening situation

CROS in the Real World

"I can sit anywhere at the table and enjoy the conversation."

— Jill K., AB recipient and Naída CROS user

What is the fitting process for the Naída Link CROS Solution?

The Naída Link CROS is ready to use right out of the box. No programming is required.

What technologies can children using the Naída Link CROS benefit from?

Children who use the Naída Link CROS can take advantage of proven noise management features described earlier such as UltraZoom, auto UltraZoom, and StereoZoom, and comfort features such as SoundRelax, WindBlock, and EchoBlock.

IMPROVE SPEECH UNDERSTANDING IN NOISE!

AB recipients who use the Naída Link CROS, for the first time ever, have access to StereoZoom! Stereo Zoom enables the microphones on both devices (Naída CI and Naída Link CROS) to work together to focus on a speaker directly in front while reducing background noise. Research shows that individuals using this technology understand front-originating speech in noise better than when using just their CI alone.²³





How are the Naída CI and Naída Link CROS devices able to communicate with each other?

Phonak's Binaural VoiceStream Technology™ allows the Naída CI and Naída Link CROS to communicate with each other. The devices work together, automatically and in real time. They intelligently focus on the most important sounds maximizing speech understanding in any environment.

Is it difficult to manage the Naída Link CROS?

The Naída Link CROS is simple to manage. The device turns on when the battery is inserted and automatically monitors the environment for sound on the non-implant side. The Naída Link CROS microphone also adapts automatically to use the same microphone setting as the Naída CI giving children a simple way to hear more.

Can children continue to use Roger in the classroom if using Naída Link CROS?

Yes, children will hear input from all three devices: Naída CI, Naída Link CROS, and Roger.* This combination allows children to overcome the head shadow effect and to experience an improved signal-to-noise ratio providing optimal listening in the classroom.

Can other accessories be used with the Naída Link CROS?

Yes, children can use Phonak wireless accessories, such as ComPilot, TV Link, RemoteMic, EasyCall, or DECT Phone, with the Naída Link CROS Solution. The input from these accessories will be heard instead of Naída Link CROS when streaming is occurring. When the accessory is turned off, Naída Link CROS will automatically resume streaming.

*Mixing ratio setting must be managed by the CI audiologist

THE NADIA CI ALL-IN-ONE SOLUTION

The Naída CI All-In-One Solution enables children who have usable hearing in the low frequencies to use a cochlear implant and hearing aid in the same ear.

How Does the Nadia CI All-In-One Solution Work?

The Naída CI Q90 sound processor integrates both acoustic and electric sound processing through a modular attachment called the Naída CI Q90 Acoustic Earhook. Phonak's proven hearing aid technology provides acoustic amplification in the low frequencies when the acoustic earhook is attached while AB technology provides electric stimulation along the full range of the implanted electrode.



"It makes the music sound richer and notes are a little more distinct. It is more noticeable with more complex types of music. Beethoven sounds really good."
— Dwayne C. AB Recipient

Naída All-in-One in the Real World

"I can participate in conversations, even with bigger audiences and in noisy environments."

"My family is surprised that I can hear even very soft sounds."

— Nadine, AB recipient

What are the characteristics of the Acoustic Earhook?

The Acoustic earhook has three primary components. The earhook itself, a Phonak xP receiver, and an earpiece for insertion. The Phonak xP receiver provides low frequency acoustic amplification (up to 1600 Hz) and up to 53 dB of gain.

What is the fitting process for the Naída All-In-One Solution?

A cochlear implant audiologist uses the software that is currently used to program the cochlear implant to fit the Naída All-In-One Solution.

Can children continue to use Roger in the classroom if using the Naída All-In-One Solution?

Yes, children can continue to use Roger to improve speech understanding in noise and over distance for optimal hearing in the classroom.

Can other accessories be used with the Naída All-In-One Solution?

Yes, children can use Phonak wireless accessories, such as ComPilot, TV Link, RemoteMic, EasyCall, or DECT Phone.

Only AB and Phonak provide a complete portfolio of solutions allowing for all individuals to benefit from hearing their best with two ears.

THE COMPLETE RANGE OF HEARING SOLUTIONS for every recipient



Naída CI Bilateral Solution



Naída™ Link CROS Solution



Naída Link Bimodal Solution



Naída CI All-In-One Solution

Do you want to learn more about these solutions right now?
 Contact hear@advancedbionics.com to connect with an Advanced Bionics hearing health specialist.