



Course # 27972

## How to Overcome the Struggles of Pediatric Hearing Loss

Presented by:  
Dr. Mary Humitz, Au.D.  
And Melissa Tumblin



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### Learner Objectives

1. Be able to describe the impact of unilateral hearing loss on the pediatric patient
2. Be able to describe the delays that are often associated with SSD/unilateral hearing loss
3. Be able to describe the different treatment options for the pediatric patient with unilateral hearing loss
4. Be able to explain how the technology of the Ponto can help a child with unilateral hearing loss

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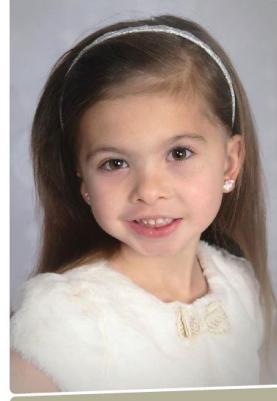
## Outline

1. Introduction
2. Unilateral Hearing Loss
3. Newborn Hearing Screenings
4. Psychological Effects of Having Unilateral Hearing Loss
5. How Ponto has Helped
6. Technical Aspects of Ponto
7. Q & A

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### How the Ponto System Can Help Children



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Ponto – Freedom of choice in bone anchored hearing care

### Help your child hear now – with the Ponto soft band



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## Unilateral Hearing Loss

Is one good ear, good enough?

Can my child hear well enough?

Can one ear hear as well as two ears?

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## Unilateral Hearing Loss

**“The Left and Right Ears Are Not Created Equal”**

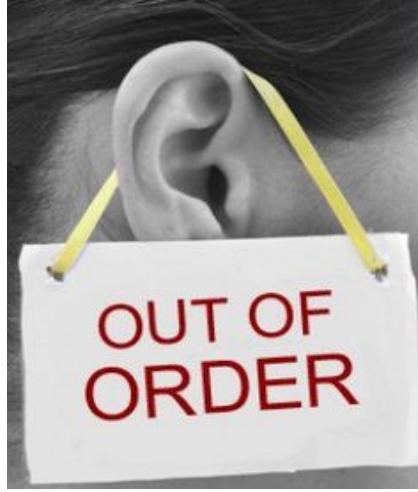
By, Dr. Yvonne Sininger, PhD and Dr. Barbara Cone-Wesson, PhD  
(Science, 10/10/2004)

“We always assumed our left and right ears worked exactly the same way. As a result, we tended to think it didn't matter which ear was impaired in a person. Now, we see that it may have profound implications for the individual's speech and language development.”

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## Unilateral Hearing Loss



Loss of sound localization  
= safety concerns

Auditory Processing Disorder  
= trouble processing spoken language and filtering out noise

Information Processing Issues  
= learning disabilities

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## Unilateral Hearing Loss



### “The Left and Right Ears Are Not Created Equal”

By, Dr. Yvonne Sininger, PhD and Dr. Barbara Cone-Wesson, PhD  
(Science, 10/10/2004)

“We were intrigued to discover that the clicks triggered more amplification in the baby's right ear, while the tones induced more amplification in the baby's left ear....finding that the clicks resembled the rhythm of speech, which produced a greater response in the right ear....showing that sounds coming from the right side were more important for intonation.”

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## Unilateral Hearing Loss

### “Unilateral Hearing Loss – How Serious Is it?”

By, Dr. Jane Madell, PhD., Editor  
(Hearing and Kids, 3/2012)

“Brain research has demonstrated that language is a left brain activity and the majority of fibers from the right ear go to the left side of the brain so, if a child is going to have a hearing loss in one ear, it would be better if it were the left one. (If only we could control this.)”

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## Unilateral Hearing Loss

### “Unilateral Hearing Loss in Children: Challenges and Opportunities

y, Oyler, R. and McKay, S.  
(The ASHA Leader, 1/22/2008)

“Studies show that even before they enter school, children with UHL are at risk for speech and language delays. Although the average age for first words was found to be within normal limits (12.7 months), the average age for the first two-word utterances was found to be significantly delayed in children with UHL (Kiesel-Himmel, 2002).”

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## Unilateral Hearing Loss and Challenges in the School Classroom



Studies have shown that unilateral hearing loss will require 30% of students to repeat a grade level by 3<sup>rd</sup> grade.”

As demonstrated by, Bess et al (1998), Bess et al (1986)  
English and Church (1999)

“Children with UHL were approximately 10 times more likely to fail a grade than their normal hearing peers.”

From, “Unilateral Hearing Loss in Children: Challenges and Opportunities”. See Bess & Tharpe (1984), Oyler, Oyler, & Matkin (1988) and McKay, S. (The ASHA Leader, 1/22/2008)

Good review article: Minimal Hearing Loss: From a Failure-Based Approach to Evidence-Based Practice (2016). By Winiger, Alexander, & Diefendorf (AJA, Vol 25).

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## Unilateral Hearing Loss and Challenges in the School Classroom



“With 30 dB hearing loss, can miss 25-40% of classroom discussion; with 35-40 dB hearing loss can miss as much as 50% (Anderson & Matkin, 1998)”

Anderson and Matkin, 1998.

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## Newborn Hearing Screenings



"Lyla, was born without an ear canal in her left ear. Even though Lyla referred on the new born hearing screening, the staff continued to do the screening until the baby passed....up to three times until Lyla finally passed. While we were not sent to an audiologist or ENT, we eventually met with a pediatrician a week later. The pediatrician not only told us that Lyla may have hearing loss in her left ear, but he was surprised that no one at the hospital referred our family to see an ENT or audiologist for having a closed ear canal alone.

- Nakita, Colorado, (6/2016)

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## Newborn Hearing Screenings



"Noah was born with Microtia and Atresia of his right ear and he passed his newborn hearing test too. Later as a toddler, I realized he was having hearing and speech problems. **We didn't find out he had atresia till he was almost five. Because of that newborn hearing screen I felt that not only did it give a false sense of hope, but it delayed in getting the help he needed."**

- Amanda, Texas (1/2013)

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## Newborn Hearing Screenings



"Joshua referred on his newborn hearing screening. It was explained to me that he had a unilateral hearing loss, but he can still hear well. Josh is now five years old and I have noticed over the years that he doesn't mimic songs very well and is saying "what" a lot. Even after having his hearing checked over the years, finally for the first time, I was told about a hearing device that could help him. If I hadn't been told that he could still hear well, I wouldn't have waited five years to get him the help he needed. No one ever said anything to us about getting him a hearing device.

- Elisabeth, Michigan, (3/2016)

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## Newborn Hearing Screenings and BAHS



"My daughter, Clark, is now 21 months old and has Microtia and Atresia of her right ear. She does not have a BAHA yet, but we are working on it. **It is not "standard practice" with her group of audiologists to treat unilateral loss with a BAHA. We have been told that there is not enough research to support this, but I disagree.** We have an appointment with her ENT on Wednesday, so we hope to get closer.

- Janae, North Carolina (5/2013)

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## Newborn Hearing Screenings and BAHS



"My daughter, Eden, was born with unilateral hearing loss due to Microtia/Atresia in September (2010). **At our first ENT visit ‘the best’ doctor in Omaha wasn’t going to mention a BAHA until I brought it up.** Eden is being fitted for her first BAHA in 2 weeks."

- Jay, Nebraska (9/2010)

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## Newborn Hearing Screenings and BAHS



"Once I found out about a BAHA, I called my hearing center and got a loaner within a month. **The Audiologists say the earlier the better and nobody ever even mentioned a hearing device for babies.”**

- Casey, Texas (11/2012)

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## Newborn Hearing Screenings and BAHS



"Supplement to the JCIH 2007 Positions Statement:  
Principles and Guidelines for Early Intervention After  
Confirmation that a child is Deaf or Hard of Hearing"  
(Pediatrics, Vol. 131, No. 4, 4/2013, pg.9)

"Research indicates that there are sensitive periods for the development of auditory skills and spoken language, specifically, the first 5 years of a child's life are critical for development in these areas. To optimize this short time period of a child's life, families and infants/children who are D/HH require the highest level of provider skills at the very beginning of the child's life."

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## Newborn Hearing Screenings and BAHS



Bone Anchored Hearing Systems and the Softband Head Band can be used on children under 5 years of age



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## Newborn Hearing Screenings and BAHS



Bone Anchored Hearing Devices and Systems  
Softband Head Band

- Standard or personal preference?
- Recommended age?
- Regional?

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## Psychological Affects of Unilateral Hearing Loss

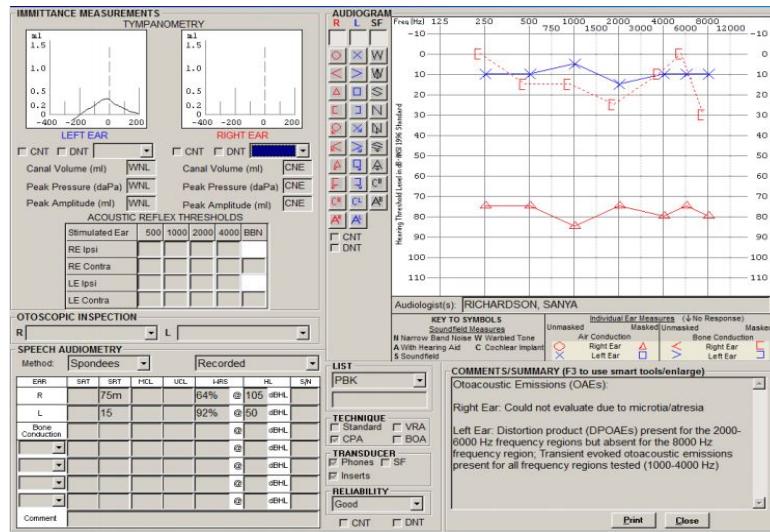


1. Acting out
2. Fatigue
3. Struggles with learning disabilities and delays
4. Social shyness
5. Denial of hearing loss
6. Fear

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## How Ponto Has Helped



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## How Ponto Has Helped

1. Improved hearing
2. Better response
3. Safer
4. More confident
5. Back to par with peers
6. Makes hearing fun again



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## FM Systems and BAHS

- Helps with clarity of sound
- Helps in the classroom setting
- Helps allow children to meet and exceed expectations in the classroom



Pictured: Oticon Medical Ponto processors w/Amigo FM System  
<https://www.youtube.com/watch?v=1l37lzLlgQU>

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## Helpful Tips and Information About Hearing Loss

1. IFSP, IEP, and 504 Plans
2. Early Intervention programs and service providers
3. Support groups

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## Helpful Tips and Information About Hearing Loss



Try not to get frustrated and don't give up!

1. Make it fun
2. Better when in upright position
3. Take the stress out (what's easiest for you works).
4. Stay in control

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## Helpful Tips for Wearing a BAHA



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## Helpful Tools for Understanding Hearing Loss

The critical years of development (birth to 3)

The chart illustrates the range of human speech sounds (yellow area) in terms of pitch (frequency) and loudness (dB). The x-axis represents pitch in Hz (cycles per second), ranging from 125 to 5000. The y-axis represents loudness in dB, ranging from 0 to 120. The yellow area covers approximately 1000-4000 Hz and 20-70 dB. The graph shows the degree of hearing loss (PROFOUND, SEVERE, MODERATE, MILD, NORMAL adult) across different frequencies and ages (child, adult).

*Speech banana chart sourced from the AAA, www.Audiology.org*

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## Helpful Tools for Understanding Hearing Loss

The Ear Community website features a vibrant illustration of children playing outdoors. The main navigation bar includes links for About, Donate, Hearing Loss, Microtia & Atresia, Helpful Resources, Events, Photos, Forum, Contact Us, and Sitemap. The Hearing Loss section is currently selected, displaying information about mixed hearing loss, sensorineural hearing loss, conductive hearing loss, helpful resources, new technology, and bone anchored auditory processors (BAHAs). A search bar and a language translation feature are also present.

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## Helpful References and Resources

- "Five Things You May Not Know About Your Hearing," by, Debbie Clason, (Healthy Hearing, 10/20/2015).
- "Ponto and the School Age Child – A Parent's Perspective," interview with Melissa Tumblin, (AudiologyOnline and Oticon Medical7/25/2016).
- "Advocating for Children With Unilateral Hearing Loss," by, Melissa Tumblin, Ear Community Organization, (Cochlear Americas Hearing Connections Blog, 7/8/2016).
- "Supplement to the JCIH 2007 Positions Statement: Principles and Guidelines for Early Intervention After Confirmation that a child is Deaf or Hard of Hearing" (Pediatrics, The Official Journal of the American Academy of Pediatrics), Vol. 131, No. 4, 4/2013, pg.9.
- "Unilateral Hearing Loss – How Serious Is it?" by, Dr. Jane Madell, PhD, CCC-A/SLP, LSLS Cert AVT, Editor (Hearing and Kids, 3/2012).
- "Understanding Single Sided Deafness: Evaluation and Treatment for Professionals," by, Dr. George Cire, Ph.D, AuD, (Online HOPE Series 8/2012).
- "1-Sided Hearing Loss Lowers Language Skills - Kids With Hearing Loss in 1 Ear Have Lower Speech-Language Scores Than Siblings With Normal Hearing," by, Bill Hendrick (WebMD Health News), reviewed by Louise Chang, MD, 5/10/2010.
- "The Left and Right Ears Are Not Created Equal," by, Dr. Yvonne Sinnerger, Ph.D (Science, 10/10/2004). See also NY Times Article "The Right Ear is From Mars," by Anahad O'Connor, 9/14/2004.

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## Helpful References and Resources



- "Children With Unilateral Hearing Loss Are More Likely To Struggle In School," by, Dr. Judith E.C. Lieu, MD (ENT), Washington University School of Medicine, 7/20/2013.
- The Ear Community Organization, [www.EarCommunity.org](http://www.EarCommunity.org), see all sub links under the Hearing Loss menu tab hearing loss sound simulations.
- "Unilateral Hearing Loss in Children: Challenges and Opportunities," by, Oyler, R. and McKay, S., (The ASHA Leader, 1/22/2008).
- "Why Our Two Ears Process Sound Differently," by, Dr. Neil Bauman, Ph.D, (4/2/2006).
- "Unilateral Hearing Loss in Children: An Update for the 1990s," by English, Kristina, and Church, Gerald. Language, Speech, and Hearing Services in Schools 30 (1):26–31.
- "Single Sided Hearing Loss in Children," educational brief written by the California Ear Institute, <http://www.californiaearinstitute.com/ear-disorders-single-sided-hearing-loss-children-ear-institute.php>
- "Unilateral Hearing Loss," Success for Kids With Hearing Loss, <https://successforkidswithhearingloss.com/resources-for-parents-of-children-with-hearing-loss/unilateral-hearing-loss/>
- Hearing Aid and FM System simulation - <https://www.youtube.com/watch?v=1I37IzLlgQU>

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## Helpful References and Resources

"Itinerant Teachers of the Deaf and Hard of Hearing,"  
<https://www.verywell.com/itinerant-teachers-of-deaf-and-hoh-1046825>

Here's a great article on understanding audiograms, the impact of the speech banana, and sound simulation examples,  
<https://healdove.com/disabilities/The-Best-Hearing-Loss-Simulations-Understanding-Audiograms-and-the-Impact-of-the-Speech-Banana>

For more information about hearing loss and support, contact any of the following organizations and medical professionals:

- HLAA (Hearing Loss Association of America), [www.HearingLoss.org](http://www.HearingLoss.org)
- ASHA (American Speech-Language-Hearing Association), [www.ASHA.org](http://www.ASHA.org)
- EHDI (Early Hearing Detection and Intervention), [www.EHDI.org](http://www.EHDI.org)
- Ear Community Organization, [www.EarCommunity.org](http://www.EarCommunity.org)
- Hands&Voices Organization, [www.HandsandVoices.org](http://www.HandsandVoices.org)
- Contact any school for the deaf in your state.

- Birth to Three Organization, [www.birthtothree.org](http://www.birthtothree.org) or any Early Intervention program provider in your state where you can find help from speech therapy, physical therapy, and occupational therapy professionals, ASL interpreters, and information on IFSP, IEP, and 504 plans.

"Information Processing Issues: What You Need to Know," by, Amanda Morin, reviewed by Ellen Braaten, Ph.D. Jun 23, 2015, [www.understood.org/en/learning-attention-issues/child-learning-disabilities/information-processing-issues/information-processing-issues-what-you-need-to-know](http://www.understood.org/en/learning-attention-issues/child-learning-disabilities/information-processing-issues/information-processing-issues-what-you-need-to-know)

- Always visit with your local ENT and audiologist to learn about hearing loss, hearing device options, surgical options, how to monitor hearing and more!

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## Education is Key

While it is important to be aware of every child's hearing loss, it is even more important to recognize that every child can be affected differently by their hearing loss.  
 Every child deserves to get the help he/she needs.

Together, we can help make things easier for the next family who has a child with unilateral hearing loss/single sided deafness.

Thank you!

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*The Ponto Bone Anchored System*

## Considerations for Unilateral Hearing Loss

Mary Humitz, AuD  
Clinical Specialist



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### Financial Disclosure

**Financial:** I am a paid employees of Oticon Medical, LLC

Course content describes the Oticon Medical Ponto Bone Anchored System



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## Children Need Access to Speech to Develop Their Listening, Language and Learning Skills



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## Educational Considerations



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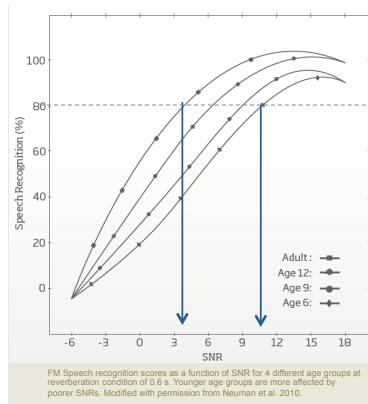


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## Classroom Listening Conditions

- Varying classroom noise results in an equally broad range of SNRs.
- Many studies have shown evidence of a correlation between age and performance in adverse listening conditions.  
(Bradley & Sato, 2008, Klatte et al., 2010, Neuman et al., 2010)



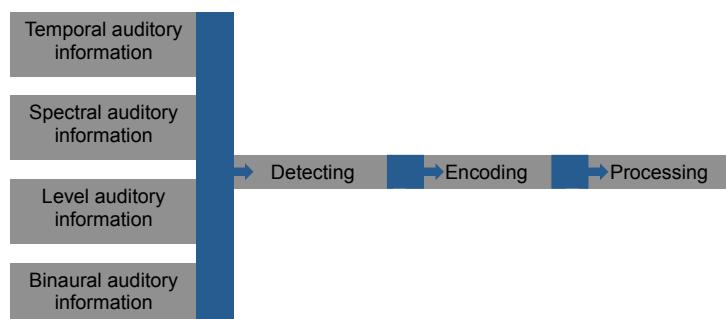
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## Normal Hearing in Both Ears is Not Always Enough

- To cope in complex listening environments children must handle multiple acoustic stimuli simultaneously

(Moore, 2012)



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## Factors That Compromise Listening Under Complex Acoustic Conditions

Factor	Challenge	Reference
<b>Brain immaturity</b>	The late development of pre-frontal connections makes it challenging for children to employ attention control to relevant sound sources in distracting environments.	Hwang et al. 2010
<b>Auditory inexperience</b>	Children need a rich “auditory diet” to practice perceiving and processing sound to become good listeners.	Flexer 2011
<b>Language unfamiliarity</b>	Non-native listeners and second/third-language learners are compromised with respect to phoneme recognition and show poorer performance of speech understanding in noise.	Tabri et al. 2011

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## Factors That Compromise Listening Under Complex Acoustic Conditions

Factor	Challenge	Reference
<b>Unilateral or minimal hearing loss</b>	Audibility and binaural hearing is a prerequisite for optimal spatial separation of competing sound sources in complex listening situations.	Rothpletz et al. 2012
<b>Cognitive or perceptual load</b>	Considerable listening effort is required when listening at SNRs that are typical of the school classroom. As proven by a dual-task paradigm, the availability of cognitive resources impacts a child's ability to perform in noise.	Howard et al. 2010

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## Pediatric Considerations



- “Children are learning language, and do not have the capacity to “fill in the blanks” for sounds that are not audible”
- “Children spend most of their time listening to the speech of other children and women, which has greater high frequency content than that of males”
- “Children who use hearing aids must develop the ability to use information acquired while hearing amplified, processed sound”
- “Children have more demanding listening environments than adults for understanding speech... Enhancement of audibility is required either through increased level, increased SNR, or improvement of the listening environment”

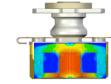
AAA Pediatric Amplification Guidelines, 2013

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## Ponto Plus Processors

- A powerful FAMILY of wireless bone anchored sound processors!
- More High Frequency Gain & Extended Bandwidth provides access to the full pitch range of speech, especially the important high frequencies
  - Speech perception
  - Sound quality
  - Understanding speech in noise
- Speech Guard protects the subtle details of speech
- Inium Wireless Platform with Feedback Management system
  - Developed for power aids and bone anchored device

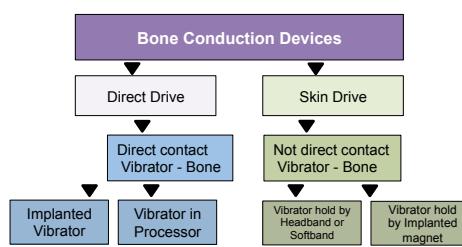


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## Bone Conduction Direct Drive vs Skin Drive Systems

- There are two types of bone conduction devices:
  - Direct Drive devices send vibrations via direct route to bone (percutaneous)
  - Skin Drive devices send vibrations through the skin to bone
    - Transcutaneous
    - Softband and magnet solutions provide similar performance<sup>1</sup>



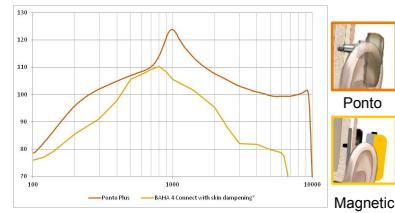
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<sup>1</sup> Briggs (2015) Clinical Performance of a New Magnetic Bone Conduction Hearing Implant System: Results from a Prospective, Multicenter, Clinical Investigation. *Otol Neurotol*. 2015 Jun;36(5):834-41.

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## Sounds are Attenuated in Skin Drive Solutions

- Physical facts with skin drive solutions:
  - There is 10-20 dB sound attenuation in mid to high frequency region<sup>2</sup>
  - These devices have lower perceived output in the mid to high frequency region
  - Similar to using a softband or test headband

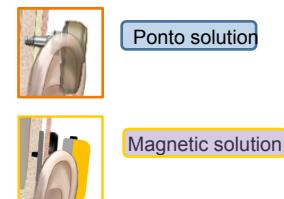
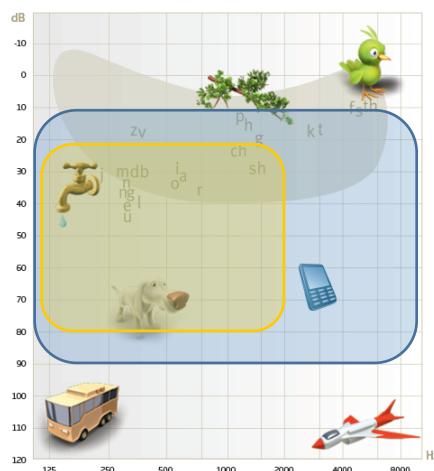


2) Verstraeten et al (2008) Comparison of the audiologic results obtained with the bone-anchored hearing aid attached to the headband, the testband and to the 'snap' abutment. Otolaryngology & Neurotology 30: 70-75

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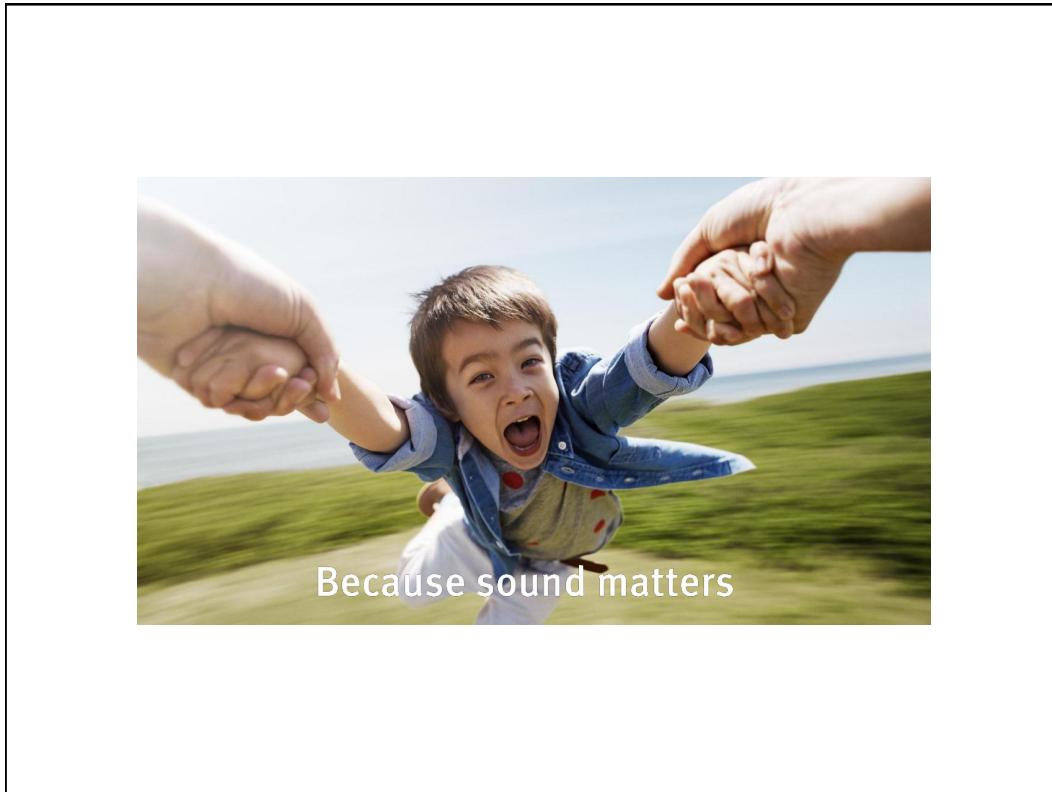
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## Consequence of Skin Attenuation on Speech Phonemes



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## Other AO Ponto Courses for your Reference

- The Newest Generation Ponto System
- Ponto, The Bone Anchored Hearing System: Providing Significantly Reduced Listening Effort As Compared To Skin Drive Solutions
- Minimally Invasive Ponto Surgery – A New Perspective on Bone Anchored Surgery
- Parents' Perspective: The Decision Making Process for Bone Anchored Hearing Systems for Children
- Overcoming Distance and Noise: Strategies for Successfully Utilizing FM with the Ponto System
- Wireless Connectivity in our Daily Lives: Enhancing the Ponto Plus Experience

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## Contact Information



Melissa Tumblin

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Founder of the Microtia and Atresia Support Group on Facebook

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## Thank you!

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