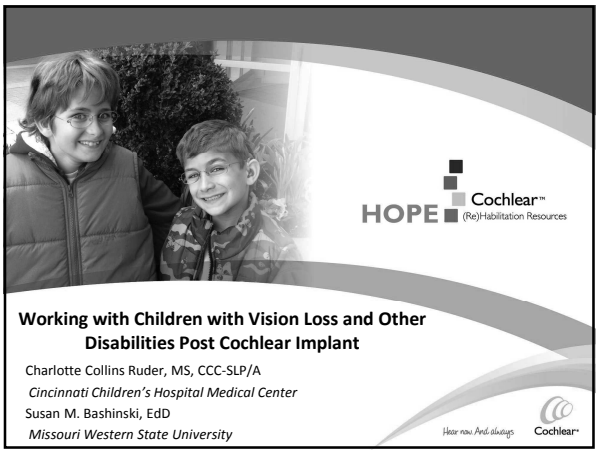

Working with Children with Vision Loss and Other Disabilities Post Cochlear Implant

Charlotte Collins Ruder, MS, CCC-SLP/A
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Susan M. Bashinski, EdD
Missouri Western State University

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Introduction

What is HOPE?

Helping Cochlear's implant recipients achieve their personal best.

www.Hope.CochlearAmericas.com

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Our Presenters

HOPE Cochlear™ (Re)Habilitation Resources

Susan Bashinski, EdD

- Professor, Missouri Western State University
- Author/co-author of numerous publications with topics relevant to low-incidence disabilities
- Site Principal Investigator for two national research projects regarding cochlear implants
- Recognized lecturer nationally and internationally

Charlotte Ruder, MS, CCC SLP/A

- Speech-Language Pathologist at Cincinnati Children's Hospital Medical Center
- Professional focus on the development of speech, language and listening in children with hearing loss
- Co-author of numerous publications related to her professional focus
- Recognized lecturer nationally and internationally

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National Cochlear Implant Studies (2004 – 2012)

"Influencing Outcomes for Children Who Are Deaf-Blind with Cochlear Implants", intervention research funded by the U.S. Department of Education, Steppingstones of Technology Innovation. [1]

- Teaching Research Institute / Western Oregon University
  Kathleen Stremel Thomas & Mark Schalock
- East Carolina University
  Susan M. Bashinski, EdD
- Cincinnati Children's Hospital Medical Center
  Susan Wiley, MD & Charlotte Ruder, CCC SP/A

2011 National Child Count for Children Who Are Deaf-Blind [2]

- A total of 9,387 children and youth were identified as experiencing deaf-blindness in last year's census
- Just under 90% of these children and youth have other disabilities, in addition to DB; over 42% experience four or more additional disabilities
- Overall, 4,354 children and youth have a mod-severe, severe or profound sensorineural hearing loss (46.4% of the total population)
- States increased their identification of children and youth with implants from 167 in 2005, to 695 in 2011 (though still a small subgroup, this number has increased 400% over the past four years)
- An increased number of children are receiving bilateral implants

Children Who Are Deaf-Blind [3]

- Deaf-blindness imposes many limitations that affect a child's *internal* understanding of the world
- DB varies in regard to what a child can see, hear, and touch; the greater the loss of hearing and vision, the more dependent the child is on others
- Just under 90% of children and youth with deaf-blindness experience other disabilities: motor, cognitive, medical, behavioral, and / or social

Children Who Are Deaf-Blind

- Inability to see and hear may limit a child's motivation and opportunity to communicate with others [4]
- Dramatically reduced input to children who have DB requires thoughtful and well-planned input [3]
- Limited opportunities to interact with objects and people results in the need for others to label objects, people, and experiences using multisensory input [3]
- Inability to hear vocal speech and see the speaker's mouth well limits the matching of lip movements for the development of articulation skills [3]

Deaf-Blindness Affects All Areas of Development [4]

Skills related *directly* to communication / language development:

- Communication skills: having meaningful communication with others, including: facial expression, pointing, gestures
- Language skills: understanding through listening, speaking, reading, and writing
- Vocabulary learning: pairing object seen with verbal word/sign

Research Studies

- Study A – What effect does age at implant and hearing age have on child outcomes?
- Study B – What are the differences in the caregiver's verbal interactions before and after implant?
- **Study C – What are the outcomes of individualized interventions carried out by the caregivers, post-implant, in natural environments?**

National Cochlear Implant Studies:

- Participating States, overall (Total 27 + DC)
- Participating States, **this study** (Total 5)

Arizona	Maryland	Oklahoma
California	Massachusetts (Perkins)	Oregon
Delaware	Mississippi	Pennsylvania
Florida	Missouri	South Carolina
Georgia	Nebraska	Tennessee
Illinois	New Jersey	Texas
Indiana	New York	Virginia
Kansas	North Carolina	Washington
Kentucky	Ohio (CCHMC)	Wisconsin

Children with DB and CI Need Multimodal Therapy Approaches

- Level of vision, hearing, and time in sound must be considered in all communication. CI must be worn!!
- All therapy approaches need to be individualized – *in consideration of both the child AND the care provider*
- Every interaction needs to be in spoken words, regardless of what the targeted communication mode is for the child
- Auditory-verbal therapy needs to be adapted when implemented with children who experience deaf-blindness and have received a cochlear implant

General Adaptations for Children Who Have Deaf-Blindness

- Present information consistently
- Present information slowly
- **Wait** for a reaction, from the child, that indicates perception or understanding; children and youth with deaf-blindness might need as much as 20 – 30 seconds of "extra" time, in order to process information
- Look for anticipation in the child that may be **subtle,** but suggests understanding
- Develop keen observation skills—practitioners and family members / care providers

General Adaptations for Children Who Have Deaf-Blindness

- Utilize routines to teach communication skills
- Augment communicative input:
  - Touch cues: systematic touches, made on the child's body, to convey meaning (e.g., touch corner of mouth to elicit vocalization)
  - Object cues: objects / partial objects utilized to convey meaning (bubble wrap handed to child, to indicate, "Time to take a break")

Many children with DB, who receive CI's do not demonstrate prior pre-linguistic skills.

- Early gestures indicate intention in context (i.e., open handed reaching, reaching to be picked up, pointing, specific gestures of refusal)
- Gesture skills are **basic** to the development of symbolic language skills
- Representational gestures are symbolic and indicate an object or action
- The ability to produce a gestural or vocal symbol is dependent on development of basic skills of: intentionality, recall memory, concept formation, the ability to imitate, and reciprocal communication

Study C – An Overview of the Intervention Study and Its Outcomes

Intervention Study Design

- Strategies and methodology piloted with one parent/child dyad
- Intervention study completed with eight care-provider/child dyads
- Three phases implemented during intervention process
- At the study's outset, a written description of *each* phase was provided to the care-provider and discussed
- Twelve to fifteen in-home sessions were conducted, across the intervention period, with care provider and child (mean = 13.3; mode = 14)

Intervention Study Design

- Emphasis focused on demonstrating for, and coaching, the parent/care provider working with the child in the context of familiar routines, in the child's home (routines were chosen jointly by parent and researcher)
- A weekly routine worksheet was supplied for the parent/care provider by the researcher, which included goals, intervention strategies, and a listing of potential dialogue
- Video collected during the course of the study was viewed jointly by researcher and care provider, as the vehicle for coaching and providing feedback

Intervention Study Design

- Video was collected during baseline (pre-training) and intervention (post-training) for each of the three phrases of the study
- Targeted behaviors of parent/care provider were formally analyzed from these videotapes, utilizing *The Observer®* software by Noldus, Inc. [5]
- To establish reliability, 20% of all videotaped sessions were double-coded

Intervention Study Design

- At the conclusion of the third phase of intervention, a social validation survey was conducted with the parent/care provider of each participating dyad
- Sixteen survey questions were standard across-participants; answers were provided through an interview process, completed via telephone at a mutually agreeable time
- All surveys were conducted by the same member of the project staff—an individual who was *not* directly involved in any of the intervention sessions

Phase 1:
Intervention Strategies

Phase 1 –Intervention Strategies

- Encourage Partial Participation
- Follow the Child's Lead ("Responsiveness")
- Provide Narrative Description

Phase 1 – Intervention

Strategy #1: Encourage Partial Participation

- Provide opportunities for *active* "partial participation," by helping your child assist in a routine activity (i.e., pull the tray onto her chair, turn on water)
- Response to manipulation – full assist (i.e., placing child's hand on toy and helping her to push it)
- Response to touch (i.e., touching her hand-*under*-hand to get her to pick up something; touching back of her hand to cue pushing a toy)

Partial Participation

- Clip 1 Addison Partial Participation

Partial Participation

- Clip 2 Addison Partial Participation

Phase 1 – Intervention Results

Strategy #1: Encourage Partial Participation

- 86% of dyads improved, by the conclusion of Phase 3 of the intervention, to missing 1 *or fewer* opportunities for the child to partially participate (during each entire intervention session)

Phase 1 – Intervention

Strategy #2: Follow the Child's Lead- "Responsiveness"

- Interpret **eye gaze** (Verbalize what you *think* she wants)
- Interpret **facial expressions** (Verbalize what you *think* she is telling you)
- Respond to ALL forms of the child's *potential* communication: **body movement, reaching, gestures, sounds, words**
- **Imitate** the sounds the child makes
- **Imitate** and **expand** her vocalizations (i.e., child says "mmmmm," interpret as "more" or "wa" as "water")
- Respond directly to the **intent** of the child's initiated communication (honor intent, if appropriate)

Follow Lead – "Responsiveness"

- Clip 3 Payton Responsiveness

Follow Lead – "Responsiveness"

- Clip 4 Addsion Responsiveness

Phase 1 – Intervention

Strategy #2: Follow the Child's Lead- "Responsiveness"

- Only 14% of parent/care providers responded to the child's *apparent communicative intent* during Phase 1 baseline. At the study's conclusion, 80% of parents/care providers *consistently* responded to intent
- 100% of parents/care providers responded to a greater diversity of the child's communicative forms, in following the child's lead
- All but two parents/care providers also increased the frequency of their responsiveness [range = 15% - 49% increase; mean = 30% increase]
- Parents'/care providers' demonstrated responsiveness **improved throughout the duration of the study**

Phase 1 – Intervention

Strategy #3: Narrative Description

- Describe a motor action that is occurring: of your child, yourself, others (i.e., "Suzie walking, walking – pushing, good pushing," "Mommy opening cereal," etc.)
- Make a verbal comment, related to (i.e., "Suzie's so happy today," "Daddy's home!")
- Describe an action / activity, pairing it with an object (i.e., While putting on shoe, get child's attention, bring shoe to your face and say, "Shoe, shoe, shoe, put on shoe.")

Narrative Description

- Clip 5 Payton Narrative Description

Narrative Description

- Clip 6 Payton Narrative Description

Phase 1 – Intervention <u>Results</u>

Strategy #3: Narrative Description

- All but one (1) parent/care provider broadened the type of narrative descriptions used to comment on interactions with the child, during the course of the study
- One (1) parent increased her use of narrative description by over 300% - from Phase 1 through Phase 3 of the study
- Parents'/care providers' narrative description (e.g., of the child's action, of self, of other aspects of the communication context) **improved throughout the duration of the study**

Phase 1: Parent/Care Provider – Child Comparison

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Parent

- Provides opportunities to participate
- Follows child lead in behavior, vocalizations, nonverbals
- Descriptive talk regarding objects and actions
- Gives word to non-verbal communication

Child

- Learns to participate, even to a small degree, in activities
- Child learns to initiate, make choices
- Learns to listen and notice what is being described in activity
- Learns basis for communicative intent

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Phase 2: Intervention Strategies

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Phase 2 - Intervention Strategies

HOPE Cochlear™ (Re)-habilitation Resources

- Cue Response to Environmental Sound
- Implement Auditory Sandwich (to facilitate child's **COMPREHENSION**)
- Incorporate Critical Elements in Speech (specific words)

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Phase 2 – Intervention

Strategy #1: Response to Environmental Sound

- Point out sounds that naturally occur in the environment (e.g., fan on heating unit, humming sound of computer / refrigerator)
- Call attention to "episodic" sounds that take place within the child's earshot (i.e., "I hear Daddy's car," "noisy dog," "telephone is ringing!")

Environmental Sound

- Clip 7 Addison Environmental Sound

Phase 2 – Intervention Results

Strategy #1: Response to Environmental Sound

- Frequencies with which parents/care providers called the child's attention to sounds that occurred within the environment was very low. This was, however, limited by the opportunity with which such episodic environmental sounds occurred.
- Parents/care providers rarely missed the opportunity to point out a noticeably occurring environmental sound.

Phase 2 – Intervention

Strategy #2: Auditory Sandwich - COMPREHENSION

- Utilize the auditory sandwich within the context of joint attention and joint activity routines
- During an interaction with a child who has received an implant, **lead with speech alone—then PAUSE!**
- **If no response,** implement visual, tactile, and / or kinesthetic stimuli (i.e., touch cues, object cues, gestures, movement, or manual sign) to augment linguistic input- then **PAUSE**
- Repeat spoken language directly in the interaction with the child, *after* other modality support has been provided

Auditory Sandwich - Example

- **Lead with speech!** Say "Get your shoe…" (1x or 2x—NO MORE)
- **WAIT** for a response to this verbal cue (5 sec - narrative description; 15 secs or more - directive that requires a response)
- **Support** with tactile cue / gesture / object cue, movement, and / or manual sign, while repeating the auditory "Get your shoe…" (1x)
- **WAIT,** then say again and **end with speech only**, "You have your shoe!"
- Assist child if no response within approximately 15 seconds

Auditory Sandwich COMPREHENSION

- Clip 8 Addison Auditory Sandwich

Auditory Sandwich COMPREHENSION

- Clip 9 Auditory Sandwich

Phase 2 – Intervention Results

Strategy #2: Auditory Sandwich - COMPREHENSION

- 100% of participating parents/care providers attempted to use the auditory sandwich to facilitate their child's comprehension of spoken language
- Only two parents who participated in the study mastered the technique, to some degree

(It appeared as though parents/care providers *might* have simply required *more time to practice* this technique, prior to its becoming "comfortable"/"automatic.")

Phase 2 – Intervention

Strategy #3: Incorporate Critical Elements

- Speak child's name to seek his attention or a response
- Use child's name while providing reinforcement
- Speak own name to child, to identify self or call attention to own turn
- Provide preparatory cues for child, prior to moving /touching his body or removing / giving an object to child
- Provide **specific** words for objects and actions
- Helps child not just listen, but understand words ***within the context of routines***

Critical Elements in Speech

- Clip 10 Addison Critical Elements

Phase 2 – Intervention Results

Strategy #3: Incorporate Critical Elements

- One-third (33.3%) of participating parents/care providers demonstrated a significant increase in the frequency with which they incorporated critical elements in their speech:
  Examples:
  - Lily's parent increased from using a targeted critical element in her speech 1x every 4 minutes to including such an element 1x approximately every 2 minutes
  - Arthur's parents increased from using a targeted critical element in their speech 1x every 2 minutes to including such an element more than 1x each minute
- Two-thirds (66.7%) of participating parents/care providers demonstrated a greater diversity in the nature/type of critical elements used, though their rates remained the same (th/out study)

Phase 2: Parent/Care Provider – Child Comparison

Parent

- Gives directions (Pauses, provides assistance, if needed)
- Auditory sandwich – Auditory-visual-auditory for objects / actions
- Models gestures / pointing, provides choices with assistance

Child

- Responds to directions with / without support; increases turn-taking
- Increases receptive language and vocabulary
- Increases assisted gestures, toward intentional communication

Phase 3:
Intervention Strategies

Phase 3 - Intervention Strategies

- Provide Opportunity for Imitation
- Offer Choice
- Implement Auditory Sandwich
- (to facilitate child's EXPRESSION)

Phase 3 – Intervention

Strategy #1: Opportunity for Imitation

- Provide **models** and opportunities for the child to communicate *by imitation*
- Shapes child's communication forms to the next level of complexity (i.e. reaching to pointing, vowel to CV, one word to two)
- Child is expected to listen, to respond, to communicate—via body movement; contact, distal, or representational gesture; single or repetitive vocalization; word approximation; total communication; speech

Opportunity for Imitation

- Clip 11 Opportunity for Imitation

Phase 3 – Intervention Results

Strategy #1: Opportunity for Imitation

- 87% of parents/ care providers offered the opportunity for imitation at a stable rate throughout Phase 3 of the study
- One child's parent significantly increased the rate at which she offered imitation opportunities to her child: imitation opportunities were nonexistent in the Phase 3 baseline condition, but increased to an average of just over 60 such opportunities in a 20 minute session, during Phase 3 intervention

Phase 3 – Intervention

Strategy #2: Choice

- Shift from giving directions or automatically providing objects to offering choices (i.e., "Which one do you want?)
- Offer choice through visual, tactile, and / or kinesthetic modes
- Begin with choice of preferred, with "nothing" alternative
- Move to providing choice between preferred and non-preferred
- Present choice among two or more preferred items / objects / foods / activities

Choice

- Clip 12 Addison Choices

Phase 3 – Intervention Results

Strategy #2: Choice

- Implementation of choice was the strategy with the second-lowest utilization rate in this study (NOTE: lowest rate was associated with correct implementation of the auditory sandwich technique)
- 40% of participating parents/care providers demonstrated a significant increase in the frequency with which they offered choices to their child:

Examples:

1. Ethan's parent increased from, essentially, not offering choice to including such an element 1x approximately every 2 minutes
2. Ray's parents increased from, essentially, not offering choice to including such an element 1x approximately every 1 minute and 20 seconds

Phase 3 – Intervention

Strategy #3: Auditory Sandwich - EXPRESSION

- Make direct request for child response, utilizing the "auditory sandwich"
- Augment verbal input with movement, touch or object cues, gesture, and / or manual sign
- Provide opportunity for child to use a variety of communicative **functions**: reject, protest, request (action, object, attention, continuation), greet, comment, offer, ask / answer a question

Auditory Sandwich - EXPRESSION

- Clip 13 Payton Auditory Sandwich Expression

Auditory Sandwich - Expression

- Clip 14 Addison Auditory Sandwich Expression

Auditory Sandwich - Expression

- Clip 15 Joshua Auditory Sandwich Expression

Phase 3 – Intervention Results

Strategy #3: Auditory Sandwich - EXPRESSION

- 100% of participating parents / care providers attempted to use the auditory sandwich to facilitate their child's language expression

  (It appeared as though parents / care providers *might* have simply required *more time to practice* this technique, prior to its becoming "comfortable" / "automatic.")
- 60% of parents / care providers who participated in the study *did* successfully learn to implement the technique of making a direct request to their child utilizing an object cue to supplement their spoken language

Phase 3: Parent/Care Provider – Child Comparison

Parent	Child
• Uses concentrated model of vowel & CV's (for imitation) • Provides more gestures to be imitated • Provide opportunities for word imitation • Uses "Up the ante" in cueing strategies	• Begins to imitate more sounds • More gestures to request objects / actions, protest; use of gestures more consistently • Approximates more simple words: "wa/water," "ou/out" • Changes body movement to gestures, word approximation

Study C – Findings

Study Findings: At BASELINE

Care providers (i.e., interaction partners) often:

- Did not lead a communicative interaction with the child with speech
- Acted on the child's body *without* talking to him / her
- Did not seek to secure the child's attention before Talking to him / her
- Did not talk about here and now
- Talked to the child at a level well above his / her level of understanding

Study Findings: At CONCLUSION of Intervention Sessions

Areas of Parents' / Care Providers' Growth:

- Increase in the number of opportunities provided for the child to communicate
- Provision of narrative description related to child, self, another aspect of the present context (e.g., another person, family pet)
- Incorporation of critical elements in spoken language (e.g., child's name, partner's name, preparatory cues *prior to* touching / interacting with child)
- *Overall* implementation of the auditory sandwich technique—though only a few parents / care providers demonstrated mastery of this strategy

Study Findings: At CONCLUSION of Intervention Sessions

Area of Parents' / Care Providers' MOST SIGNIFICANT Growth:

- Demonstrating **RESPONSIVENESS to a wider variety** of the child's behaviors (even if, for a few dyads, frequency of responsiveness did not change):
  - Imitating the child's vocalizations
  - Responding to the child's facial expression
  - Recognizing and responding to the child's body movement
  - Assigning meaning to the child's gestures
  - Noticing *AND* following the child's apparent communicative intent

Study Findings: At CONCLUSION of Intervention Sessions

Areas of Parents' / Care Providers' LEAST CHANGE:

- calling the child's attention to / pointing out environmental sounds
- offering choice to the child
- Appropriate implementation of the auditory sandwich technique, *particularly in regard* to its use for increasing the child's COMPREHENSION

Study Findings: At CONCLUSION of Intervention Sessions

Areas of MOST EXTREME VARIABILITY in Parents' / Care Providers' Behaviors:

- Expansion of critical elements in the child's spoken communication

  NOTE: One possible explanation for this result is the wide range exhibited in spoken communication by the child participants, themselves (e.g., few to none vocalizations through fairly intelligible, clearly articulated speech)

Social Validation Survey

- Care providers interviewed included: parents, nurse, siblings
- During the time of the last home visit (i.e., intervention and videotaping session), the researcher informed the care provider that he / she would receive a call about completing a survey regarding satisfaction with the study
- A letter and copy of the 16-question survey were given to each care provider by mail / email in advance

Caregiver Social Validation Survey
General Effectiveness

	ALL	Majority	Some	None
The routines selected were convenient (a good fit)	100%	0%	0%	0%
Embedding skills within the family routine was effective	100%	0%	0%	0%
The skill selected was important	88.8%	11.1%	0%	0%
Child learned all the skills taught	45.4%	54.5%	0%	0%
The intervention strategies taught were easy to implement	77.7%	22.2%	0%	0%

Caregiver Social Validation Survey
General Effectiveness

It was easy to implement:	Very easy	Easy	Some what difficult	Difficult
Using "Descriptive Talking"	22.2%	77.7%	0%	0%
Providing opportunities to respond to environmental sounds	16.6%	66.6%	16.6%	0%
Using responsiveness and imitating vocalizations	66.6%	22.2%	11.1%	0%
Providing opportunities for partial participation	88.8%	0%	11.1%	0%
Using the Auditory Sandwich	11.1%	77.7%	11.1%	0%
Proving opportunities to communicate	55.5%	33.3%	11.1%	0%

Caregiver Social Validation Survey
General Effectiveness

Useful, Effective, Helpful, Important	All Very	Most Majority	Some	None
Intervention strategies taught were useful	100%	0%	0%	0%
Strategies were effective in teaching your child	77.7%	22.2%	0%	0%
Procedures used to teach you were helpful in your learning	77.7%	22.2%	0%	0%
Procedures used to teach you were effective	88.8%	11.1%	0%	0%
Importance of overall experience to you and your child	100%	0%	0%	0%

Study C –
Overall SUMMARY
of Findings

Summary of Findings

- Parents/care providers varied tremendously in the degree of structure and "directedness" they required from the researchers in order to implement intervention strategies effectively/appropriately with their child.
- Strategies for teaching intervention techniques to the parents / care providers, as well as methods for providing instructive feedback, were of necessity individualized for each participating dyad in this study.

Extrapolated Findings

- Children who did not have fairly extensive pre-linguistic communication skills appeared to require more intensive intervention before they began to respond to speech or to verbalize
- NOTE: At the completion of the study and at a parent's request, the researchers met with the child's teachers about the intervention strategies, the child's progress, and needs. For some school programs, wearing the cochlear implant was NOT a priority.

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Thank You!

- **Charlotte Ruder:** charlotte.ruder@cchmc.org
- **Susan M. Bashinski:** sbashinski@missouriwestern.edu

http://www.kidsdbci.org/

Children Who are Deaf-Blind with Cochlear Implants

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Questions

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Upcoming Online Sessions

Next Up:

Thursday, January 24th, 3:00 pm ET

An Itinerant Teacher's Work is Never Done: Supporting Mainstream Educators (Professionals)

Judith S. Sexton M.S., C.E.D., LSLS Cert. AVEd, Director, Clarke Schools for Hearing and Speech/Pennsylvania

Thursday, January 31st, 3:00 pm ET

Meeting the Listening and Spoken Language Needs of Children and Adults through Telepractice (Professionals)

K. Todd Houston, PhD, CCC-SLP, LSLS Cert. AVT, Professor
The University of Akron

Contact Cochlear Americas

- For inquiries and comments on this seminar or a HOPE program, please contact: hope@cochlear.com
- For a Certificate of Participation, please send your completed Feedback Form to: hopefeedback@cochlear.com