


## Early Identification, Intervention and Family Supports for Deaf and Hard of Hearing Kids on a Listening and Spoken Language Journey

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## Disclosures

- Employees of Ohio Valley Voices
- No financial disclosures



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## Learner Objectives

- The participant will be able to identify the major milestones of the EDHI timeline and explain their importance
- The participant will be able to briefly describe auditory cortex development and how synaptic pruning can impact language learning
- The participant will be able to list the most common emotions experienced by caregivers upon learning their young child has a hearing loss
- The participant will describe a way to convey the impact of hearing loss to the caregivers of a newly-diagnosed infant
- The participant will name at least one etiology of childhood hearing loss and why it's important to identify it early in a child's journey
- The participant will be able to describe different strategies to support listening and language development in the home



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## Intro

- Ohio Valley Voices is an early intervention program located in Southwest Ohio that teaches children with hearing loss to listen and speak through the use of hearing aids and cochlear implants.
- Onsite audiology clinic and LSL-certified speech language pathologists



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## Identification and Diagnosis

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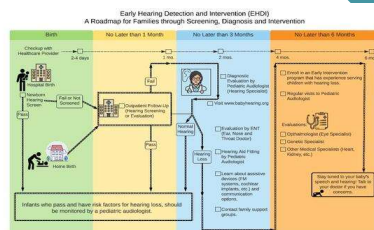
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## EDHI timeline



Screens no later than 1 month of age  
Diagnosis no later than 3 months of age  
Early intervention no later than 6 months of age



Adapted from the American Academy of Pediatrics, Learning About Hearing Loss: A Roadmap for Families.  
Further information may be found at: [www.audiology.org](http://www.audiology.org)

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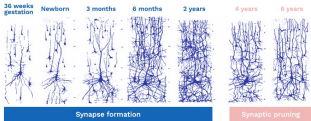
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## Why is earlier better?

- The number of synapses per neuron grows from 2,500 to 15,000 between birth to three. After that, synaptic pruning kicks in
  - Critical window of language learning



The diagram illustrates the timeline of synaptic formation and pruning. It shows a progression from 28 weeks gestation to 6 years of age. The first phase, 'Synapse formation', occurs from 28 weeks gestation to 2 years, showing a dense network of synapses. The second phase, 'Synaptic pruning', occurs from 2 years to 6 years, showing a reduction in the number of synapses. The Ohio Valley Voices logo is in the bottom right corner.

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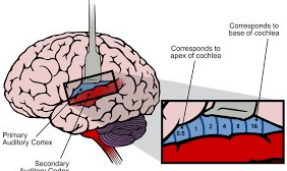
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## Auditory Development

- All sound reaches the primary auditory cortex, but the brain needs practice and repeat listening to reach the secondary auditory cortex
- Primary auditory cortex = detection
- Secondary auditory cortex = understanding and meaning



The diagram shows a cross-section of the brain with the primary and secondary auditory cortex highlighted. The primary auditory cortex is labeled as 'Primary Auditory Cortex' and the secondary as 'Secondary Auditory Cortex'. A callout shows the cochlea with labels: 'Corresponds to apex of cochlea' and 'Corresponds to base of cochlea'. The Ohio Valley Voices logo is in the bottom right corner.

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## Diagnosing hearing loss

- Immediate referral to ENT
  - Genetic testing, CMV testing, MRI/CT
  - Medical clearance for devices
- Immediate referral to HMG (EI)
- Confirmation ABR
- Referral to ophthalmology by 2 years old



The photo shows a young child wearing an ABR (Auditory Brain Response) device, which is used to measure the brain's response to sound. The Ohio Valley Voices logo is in the bottom right corner.

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### Understanding diagnosis

- Familiar sounds audiogram
- Hearing loss simulators
- Appropriately fit devices
- Limitations of hearing aids

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### Audiological counseling and family goals

- What are your communication goals for your child?
  - Dual language learning? ASL and spoken language together?
- Audiological appointments are a lifelong journey
- Troubleshooting/Device Education
- Devices are only as good for how much the child wears them
  - Retention strategies

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### Why Cochlear Implant Wear Time Matters

Child A Listens	Child B Listens	Child C Listens
100% of Waking Hours	60% of Waking Hours	20% of Waking Hours
Normal spoken language at age 3	Delayed spoken language at age 3	Severely delayed spoken language at age 3

More speech in: More speech out

Children implanted over 12 months need to listen more than 80% of their day for normal spoken language scores.

Ogline, S.B., Edwards, R., Brown, K.D., and Paul, S. R. (2012) The impact of cochlear implantation wear time on spoken language outcomes at age 3 years. Journal of Deaf, Language and Hearing Research, 34 (3), 1348-1375

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### Emotions and grief

- Luterma (2004) explains that chronic grief is experienced daily and is often "triggered" by events or milestones.
- Blaska (1994) describes grief that is cyclical.
- Caregiver emotions: shock, overwhelmed, anger, depression, loneliness and guilt.

#### Cyclical Grieving Model

Figure 1 Inner Circle- Shattered Dream  
Middle Circle- Recurring Emotions  
Outer Circle- Intermittent Grieving

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### Intervention and Supports

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### Creating a therapy plan

- Device check/troubleshoot
- Ling six sounds
- LSL strategy
- Practice & review
- Home programming
- Wrap up





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### LSL Strategies at Home

- Make listening easier
- Point out sound "I hear that!"
- Auditory First
- Auditory sandwich
- Narrate
- Sabotage/keep them on their toes
- Expand/extend utterances

Hearing First [www.hearingfirst.org](http://www.hearingfirst.org)



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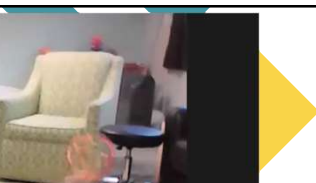
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Leslie Raulie





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### Things to consider

- Etiology is key!
  - Risk of progression = CMV, EVA
  - Syndromic or non-syndromic?
- Vestibular dysfunction
  - Common in meningitis, EVA, Ushers
  - Not walking at 15 months = Immediate referral
- Secondary diagnoses
  - Sensory processing, ADHD, etc.

#### Indicators of Vestibular Impairment in Children Who Are D/HH

- Delayed head control
- Delay in sitting independently
- Late onset of walking
- Clonus
- Unsteady
- Uncoordinated
- Frequent falls
- Difficulty walking on uneven surfaces (grass, mulch, gravel)
- Blurry or double vision
- Difficulty reading
- Difficulty riding a bike, scooter, or using roller skates
- Difficulty walking in low light areas
- Dizziness/vertigo

NCHAM, 2020



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### Things to consider

- ESL
- Financial concerns
- Parental grief & emotions
- Transportation
- Wear time
- Medical management

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### Transition from EI to preschool

- ETR/IEP team members
  - TOD
  - Educational Audiologist
- In-services on device troubleshooting
- HAT system
- Device Independence/Advocacy



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# Thank you



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# Resources

- Blaska, J. K. (1998). Cyclical Grieving: Recurring Emotions Experienced by Parents Who Have Children with Disabilities.
- Luterman, D. (2004). Counseling Families of Children with Hearing Loss and Special Needs. *The Volta Review*, 104(4), 215-220.
- Luterman, D., & Ross, M. (1991). *When Your Child Is Deaf*. York Press, Inc.
- LSL Strategies and Techniques - Hearing First Resources - Hearing First - Hearing First. (n.d.). [www.hearingfirst.org](http://www.hearingfirst.org). <https://www.hearingfirst.org/m/resources/176>
- Negandhi, Jalna. (2012). Resting Neural Activity Patterns in Auditory Brain Areas following Conductive Hearing Loss.



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