Articulation Development of Children with a Hearing Loss: Results from an Auditory-Oral Program

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Child's Voice

an oral school for children who are deaf or hard of hearing

Agenda

- Demographics of Child's Voice
- Comparison of articulation development of the children who received Early Intervention (EI) at Child's Voice to:
  - Children who did not receive EI services at Child's Voice
  - Previous research on children with hearing loss
  - Typical Development

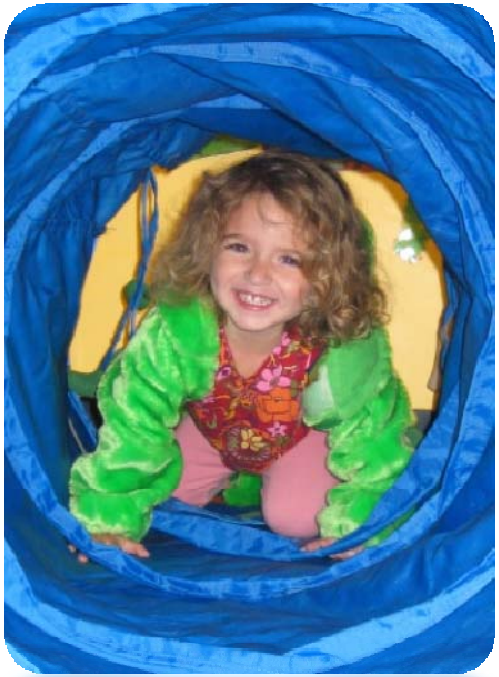
Child's Voice School

- Moog curriculum auditory-oral school
- Founded in 1996 by three families
- Provide children with a learning experience that nurtures self-esteem, independence, creativity, and problem-solving skills while developing listening, speech, and language skills
- We strive for our students to successfully mainstream into their home school district

Demographics

Children in the school based program (43)

- 14 did not receive any EI services at Child's Voice (32.5%)
- 15 received EI services for <17 months at Child's Voice (35%)
- 14 received EI services for >18 months at Child's Voice (32.5%)
- **67.5% of the children enrolled in our school program have attended some EI services at Child's Voice**



Age of Diagnosis

Children in the school based program (43)

- Age of amplification ranges from 2 months to 5 years, 7 months
  - 26 children were amplified before 2 years of age (60.5%)
  - 6 children were amplified between 2 and 3 years of age (14%)
  - 11 were amplified after 3 (25.5%)

Device(s) Used

Children in the school based program (43)

- Bilateral Cochlear Implants (CI): 15 (35%)
- Hearing Aid (HA): 14 (32.5%)
- Unilateral CI: 9 (21%)
- Binaural Amplification (CI/HA): 5 (11.5%)

Professionals Providing Services

Early Intervention and School Team

- 1 Executive Director (LSLS Certified AVEd)
- 1 School Coordinator (LSLS Certified AVEd)
- 1 EI Coordinator (Speech Language Pathologist)
- 1 Pediatric Audiologist
- 1 Developmental Therapist-Hearing
- 4 Speech Language Pathologists
- 13 Teachers of the Deaf (3 LSLS Certified)

Goldman-Fristoe Test of Articulation – 2nd Edition (GFTA-2) Trends

GFTA-2

- All 43 children were given the GFTA-2
- Method of assessing an individual's articulation of the consonant sounds in Standard American English
- 34 pictures plates and 51 target words
- Elicits the articulation of 61 consonant sounds in all positions and 16 consonant clusters in the initial position
- Average standard score is 85-115

Findings

- Children who received EI services at Child's Voice for greater than 18 months had an average standard score of **85**
- Children who did not receive EI services at Child's Voice had an average standard score of **71**

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EI Services Provided

Home-based Therapy:

- Help parents become confident facilitators of their child's listening and spoken language
- Therapy includes working with parents and other therapists to implement the strategies stated in the Individualized Family Service Plan (IFSP)

EI Services Provided

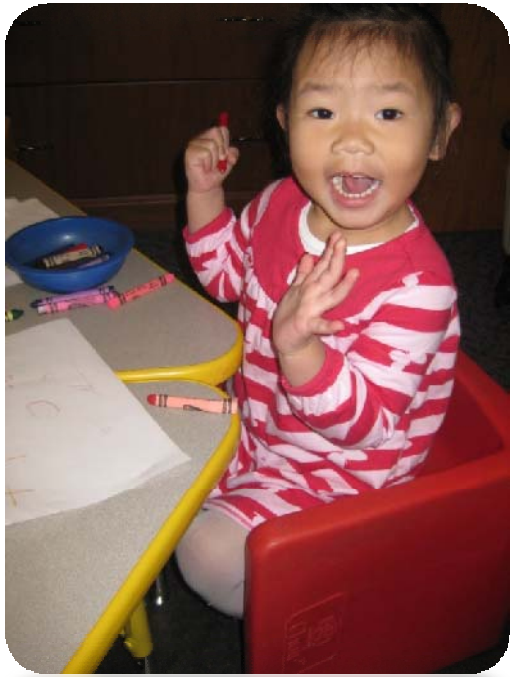
Center-based therapy (Group Individual)

- Ages 18 months to 3 years old
- Attend Group Aural Rehabilitation (AR) 2-3 mornings per week for 150-210 minutes
- Group AR is designed to enhance speech, language, auditory, and social skills
- Receive individual AR and/or Speech Therapy
- Parent education

Demographics

Children who received EI services at Child's Voice for greater than 18 months (14)

- Age range: 2:10 to 5:10 (average age 4:0)
- Gender: 4 Girls, 10 Boys
- Age of amplification ranges from 2 months to 23 months
- All were amplified before 2 years (100%)



Device(s) Used

Children who received EI services at Child's Voice for greater than 18 months (14)

- Bilateral CI: 6 (43%)
- HA: 4 (29%)
- Unilateral CI: 3 (21%)
- Binaural Amplification (CI/HA): 1 (7%)

Trends in Articulation Development

Previous research on children with hearing loss

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Trends in Articulation Development

Previous research on children with hearing loss

1. Errors producing/t, d, s, z, “sh”, “ch”, “dz”/
   Only /d, t, s, “sh”, “ch”/ are mastered or emerging by 4
2. Decreased accuracy producing less visual sounds
3. Final consonant deletion
4. Substituting stops for fricatives and liquids
5. Substituting voiced for voiceless sounds
6. Confusion of oral and nasal consonants

#1 Errors producing
/d, t, s, "sh", "ch"/

Sounds emerging by 4	% in error
/d/ *mastered by 4*	23.81%
/t/	14.29%
/s/	57.14%
"sh"	30.95%
"ch"	30.95%

Our children are still having difficulty producing /d/ and /s/

#2 Decreased accuracy producing less visual sounds

Sounds mastered by 4	% of Errors
/p, m, n, w, b, f, d/ *visual sounds*	15.79%
/k, g/ *less visual sounds*	11.67%

Our children did not have a decreased accuracy producing less visual sounds

#3 Final consonant deletion

Type of Error in Final Position	% of Errors
Omission	50%
Distortion	11.82%
Substitution	38.18%

Our children continue to omit final consonants

#4 Substituting stops for fricatives and liquids

Manner	**Substituting stops** (*p, b, t, d, k, g*)
Fricatives *f, s, "sh"*	12.69%
Glides/Liquids *w, "y", l, r*	2.68%

Our children are not following this articulation trend

#5 Substituting voiced for voiceless sounds

Of the errors on voiceless sounds (*t, k, p, f*) **15%** were substitutions of voiced sounds (*d, g, m, n, b*)

#6 Confusion of oral and nasal consonants

Of the errors on oral consonants

1.63% were substitutions of nasal consonants (*m, n, "ng"*)

Trends in Articulation Development

Typical Development

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Trends in Articulation Development

Typical Development

Sounds mastered by 3: /h, m, p, w, n/

Sounds mastered by 4: /"y", k, g, b, d, f/

Sounds emerging by 4: /t, "ng", r, l, s, "ch", "sh", z/

Mastery is the age level at which 90% of all children are consistently producing the sound

Trends in Articulation Development

Typical Development

Sounds mastered by 3	% in error
/h/	0.00%
/m/	4.76%
/p/	7.14%
/w/	7.14%
/n/	11.90%

Trends in Articulation Development

Typical Development

Sounds mastered by 4	% in error
"y"	7.14%
/k/	11.90%
/g/	11.90%
/b/	16.67%
/d/	23.81%
/f/	30.95%

Trends in Articulation Development

Typical Development

Sounds emerging at 4	% in error
/t/	14.29%
“ch”	30.95%
“sh“	30.95%
“ng“	32.14%
/r/	45.24%
/s/	57.14%
/l/	64.29%

Trends in Articulation Development

Typical Development

Age of mastery	% in error
3	6.19%
4	16.96%
Emerging by 4	39.29%

Our children follow patterns similar to their typically developing peers

We are seeing higher accuracy producing earlier developing sounds (h, m, p) and decreased accuracy producing later developing sounds (r, s, l)

References

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