

Prematurity and Language Development

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Clinical Scenario:

- A 2 year-old girl with a history of premature birth at 34 weeks gestation, is exhibiting delayed speech development. Delays were first reported by parents and then confirmed by Right Track personnel through comprehensive testing. No abnormalities were found on her hearing screening according to Right Track personnel and she did not have any post-natal medical complications. She is otherwise healthy and shows no signs of delayed physical development.

Clinical Question:

- In infants born prematurely, compared to those at full term, what is the likelihood of speech and language delays?

Articles:

Fasolo, M., D'Odorico, L., Costantini, A., & Cassibba, R. (2010). The influence of biological, social, and developmental factors on language acquisition in pre-term born children. *International Journal Of Speech-Language Pathology*, 12(6), 461-471. doi:10.3109/17549507.2011.486445

Jansson-Verkasalo, E., Ruusuvirta, T., Huotilainen, M., Alku, P., Kushnerenko, E., Suominen, K., & ... Hallman, M. (2010). Atypical perceptual narrowing in prematurely born infants is associated with compromised language acquisition at 2 years of age. *BMC Neuroscience*, 11(88).

Summary and Appraisal of Key Evidence:

- The Results:
 1. Study found premature infants continued to be able to discriminate native and non-native phonemes from 6-12 months of age, while the full term infant group gradually lost their ability to discriminate the non-native phonemes (Jansson-Verkasalo, Ruusuvirta, Huotilainen, Alku, Kushnerenko, Suominen, & ... Hallman, 2010).

At the 14 month analysis it was found that there were not significant differences in the use of gestures and pre-linguistic skills between the pre-term and full-term infants. At the 24 month assessment there did not appear to be a significant difference between toddler that were born pre-term and full-term, in their vocabulary size. Looking at these results it can be concluded that there is not a very large developmental gap at this age due to prematurity. However, significant results were discovered at the 30 month assessment. At 30 months there significant disparities between the pre-term and full-term groups in both grammatical competence and vocabulary size. This finding was also true for the 36 month assessment (Fasolo, D'Odorico, Costantini, & Cassibba, 2010).

2. The inability to discriminate between native and non-native phonemes by age 2 years is directly associated with language development and skills of this age group. Specifically: less production of words, had shorter MSL (MSL= mean length of the longest three utterances) that translated to mean fewer morphemes produced in a sentence structure, and less developed morphological structures within the sentences in the premature children (Jansson-Verkasalo, Ruusuvirta, Huotilainen, Alku, Kushnerenko, Suominen, & ... Hallman, 2010).

Typical relationships between vocabulary size and grammatical competence are shown in pre-term and full-term children at toddler ages. This study found that these relationships showed pre-term children to have delayed development in the area of language, but not necessarily atypical development. Although atypical development can perpetuate delayed development (Fasolo, D'Odorico, Costantini, & Cassibba, 2010).

3. This study's findings suggest that speech and language problems may originate in part from this early stage of tuning into native versus non-native phonemes. Prematurity appears to be associated with not being able to discriminate between native and non-native phonemes during this developmental stage (Jansson-Verkasalo, Ruusuvirta, Huotilainen, Alku, Kushnerenko, Suominen, & ... Hallman, 2010).

The aim of this study was to analyze language development of pre-term children and compare them to full-term children. The study found that there was

significant differentiation of the pre-term and full-term children in the language development's advanced stages in the toddler years (Fasolo, D'Odorico, Costantini, & Cassibba, 2010).

- Validity of Results:

1. Parents filled out MacArthur Communicative Development Inventories appropriate to their child's age, at 12 months of age (CDI Words and Gestures) and again at 24 months (CDI Words and Sentences). Therefore, detracting from any bias on the part of the researchers in regards to obtaining and recording this information. The same amount of questionnaires were not returned by parents for both the premature infants and the full term infant groups; questionnaires were not returned for two children from each group (Jansson-Verkasalo, Ruusuvirta, Huotilainen, Alku, Kushnerenko, Suominen, & ... Hallman, 2010).

Instruments used in this study: the Bayley Scales of Infant Development, with specific utilization of the Psychomotor Development Index (PDI) and the Mental Development Index (MDI); and the Italian version of the MacArthur Communicative Development Inventory, the Italian version is very similar to the English version in overall format, type and number of lexical categories and its number of items (Fasolo, D'Odorico, Costantini, & Cassibba, 2010).

2. Stimuli used was native and non-native language sounds in the Finnish language (Finnish was the study participants native language in this study). EEG measurements were taken while stimuli was presented to the children (Jansson-Verkasalo, Ruusuvirta, Huotilainen, Alku, Kushnerenko, Suominen, & ... Hallman, 2010).

Study Participants were assessed during 4 separate sessions at specified ages of 14 months, 24 months, 30 months, and 36 months of age. These assessments were done at the Department of Psychology of the University of Bari in Italy (Fasolo, D'Odorico, Costantini, & Cassibba, 2010).

3. 13 full-term infants and 11 premature infants were included in this study. For this study premature was defined as a gestational age of 32 weeks or less at birth (Jansson-Verkasalo, Ruusuvirta, Huotilainen, Alku, Kushnerenko, Suominen, & ... Hallman, 2010).

18 full-term infants and 18 premature infants (at varying levels of prematurity; were divided into 3 separate groups within the prematurity group for further analysis) were included in this study (Fasolo, D'Odorico, Costantini, & Cassibba, 2010).

4. All of the children participating in the study had normal hearing and auditory brainstem activity. All study participants were monolingual (Jansson-Verkasalo, Ruusuvirta, Huotilainen, Alku, Kushnerenko, Suominen, & ... Hallman, 2010).

Inclusion criteria for prematurity included: birth weight between 750 and 1600 grams, a gestational age of 37 weeks or less, and the absence of pre-natal and post-natal medical complications. All study participants were monolingual (Fasolo, D'Odorico, Costantini, & Cassibba, 2010).

Clinical Bottom Line/Application to practice:

Pre-term children do appear to have a higher likelihood of being developmentally delayed in the area of speech and language. It would also appear that there is a cascade affect that begins during the earliest stages of language development and that this may be where a delay in language has its beginnings. However, delays can be overcome and pre-term children can “catch up” to their full-term counterparts in language and speech development, with the appropriate interventions during their toddler years. Pre-term children would benefit from early assessment and identification of being at risk for delayed language development, so that the appropriate interventions could be instituted as early as possible when indicated. Both articles used for this critical appraisal topic were evidence Level B, nonrandomized clinical trials.