Who needs intervention? A phonological screening tool for young children with cleft palate

Introduction

Children with cleft palate +/- cleft lip (CP) are at risk of speech and language delay. It is essential to identify children with delays as early as possible in order to offer appropriate intervention. Conversely, it is also important to avoid unnecessary intervention which both adds to the burden of care for the family and socioeconomic cost.

Although there is a strong relationship between early sounds and syllable shapes and later speech and language skills in children without CP (Oiwang et al. 1998), the picture is less clear for children with CP. Nevertheless, post-surgery, number of oral consonants, different oral consonants, true consonants, oral stops, velar consonants, and number and frequency of alveolar stops have been found to predict later speech and language proficiency (Chapman and Willardson 2011; Klintê et al. 2014). In young children, there is a close link between phonology and vocabulary, and a summary of existing studies suggest that until age 2 ½, the developing phonological system affects lexical acquisition to a greater degree than vice versa (Stoel-Gammon 2011). For children with CP, there is some evidence to suggest that as a group, these children have delayed vocabulary development, compared to children without CP: it is speculated that this may be due to phonological constraints (for a summary, see Hardin-Jones and Chapman 2013).

Traditionally, early speech production has been evaluated by phonetic transcription of the child’s utterances occurring during spontaneous interaction between child and caregiver. This is a time-consuming and thus expensive procedure. Ramsdell and colleagues (2012) found that real-time listening is a valid way of estimating a child’s consonant repertoire when compared to both caregiver report and phonetic transcription of consonant inventory. In this procedure, parents’ way of listening to their child’s speech is simulated in order to assess functional phonological categories in control of the child rather than exact phonetic inventory.

As part of a larger intervention study of toddlers with CP, this study aims at developing and evaluating a screening tool for these children in order to determine who need early intervention. Based on a real-time listening procedure, children are assigned to a +/- need for intervention condition based on their use of phonological categories known as early predictors of later speech and language difficulties in children with CP and one productive vocabulary measure (CDI, Fenson et al. 2007). To determine the external validity of this procedure, it is compared to experienced SLPs’ clinical judgment of whether or not a given child needs early intervention.

Method

Participants 21 children with operated CP between ages 17 and 24 months.

Procedures Prior to the first recording session, all caregivers completed the CDI.

The children were video recorded for 2 x 45 minutes in the clinical play with a caregiver on two separate days. All video recordings were separated into two video files of equal length.

Three trained raters listened to the recordings without interruptions and simultaneously registered syllables produced by the child using a software program. Mean number of syllables evaluated per child was 527 syllables (range: 231-662 syllables). Immediately hereafter, the raters reported consonants and syllable shapes produced with enough saliency to be remembered by the rater.

Finally, the video recordings were evaluated by SLPs with years of experience working in cleft clinics who were asked to give their clinical opinion on each child’s need for early intervention. Since the real-time listening procedure does not allow judgment of absolute numbers and frequencies of consonants produced, children were assigned to the “need for intervention” condition if they met at least one of the inclusion criteria (see table 1).

Discussion

Excellent agreement among raters suggests that real-time listening can be used as a screening tool of speech in toddlers with CP. Since all children had oral and true consonants, absence or presence of these categories is not a good predictor. Number of different consonants, different oral consonants, and different true consonants might yield better predictive value and are still possible to assess within the frame of real-time listening.

All SLPs decided that children with absence of oral stops, and children with a CDI score at or below the 10th percentile needed intervention. This was also true for all but one child with absence of alveolar stops. The SLPs had no knowledge of the children’s CDI scores; however, intervention was recommended for all children with a CDI score of or below the 10th percentile. Hence, the CDI might be a good predictor in the early lexicon of toddlers with CP, even though its predictive value is debatable in other clinical populations (Westierlund et al. 2006). Intervention was also recommended for scores above the 10th percentile. Interestingly, for two of these children, the SLPs noted that the need for intervention was specifically due to the child’s phonology and not vocabulary.

Although the raters participating in this study had very high inter rater reliability scores, it cannot be assumed that these scores will apply to all raters. Hence, further evaluation of the screening tool is needed to confirm its applicability to clinical practice.

In conclusion, known early phonological predictors of later speech and language proficiency can be reliably assessed with a real-time listening procedure. Almost perfect agreement between the children selected for intervention with the screening procedure and the clinical opinion of experienced SLPs indicates that the screening procedure is a valid tool for identifying children with CP who need early intervention. Absence of oral stops, and possibly absence of alveolar stops as well as a CDI score of productive vocabulary at or below the 10th percentile seem to be good candidates for a screening tool. This will be further analyzed to look for possible interaction effects among these independent variables.

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