Project Number: CC023

Title: Consonant inventories of children born with cleft palate at the age of 18-24 months in the UK

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Scientific Outline:

The Cleft Collective provides an ideal dataset to investigate the early speech development in children born with cleft palate. It provides a dataset of speech sound acquisition for children born with cleft palate at age 18-24months for over 250 children. This will enable an analysis of the range of consonant inventory (i.e. number and range of consonants used) for children born with cleft palate at this age.

We will consider the findings for this cohort in English and compare with the existing literature in English and other languages for this population. Different languages use different speech sounds. There are some common ones – for example, /m/ and /d/ and /b/ and /p/ - these are relatively easy sounds for children to make and also make up the words for 'mum' and 'dad' in most languages around the world. But across languages, different consonant and vowel sounds are used in speech (for example, the sound /th/ is not present in many other European languages including Italian and French). There is a need therefore to identify speech patterns in children born with cleft palate in the UK and compare them with those from other studies which have considered speakers of other languages to determine to what extent the problems we are seeing are universal and to what extent they are language specific. Understanding these patterns can provide us with information about what is happening in the oral cavity and also how to manage the problem (surgery yes/no and which type and/or SLT and which type).

The analysis outlined in this proposal will address the following research questions:

1. How does consonant inventory (in terms of number and type of consonants) vary according to cleft subtype for children born with cleft palate in the age range 18months to 24months?
2. Do associations exist between size of consonant inventory and cleft subtype for children born with cleft palate in the age range 18months to 24months, when known confounders (age, gender, socio-economic status, syndromic status) are taken into consideration?

Quantitative analysis will consist of descriptive statistics exploring the measures of central tendency and variability of the data by cleft subtype. A series of Kruskal Wallis tests will be used to explore associations between size of the consonant inventory (measured as a discrete variable - N of consonants reported heard during the assessment and/or by parent report) and candidate variables as listed above. If our outcome is kept as a discrete variable, we will use Poisson regression analysis to further analyse our data to explore associations whilst taking confounders into consideration. There is potential for our outcome to be converted into a binary variable detailing whether there is

clinical concern based on the number of consonants being reported, a binary logistic regression will be used to explore our outcome as a binary variable.

A secondary qualitative analysis will be conducted to investigate the type of consonants by manner (i.e., plosives, fricatives, nasals, glides, liquids) and place of articulation (i.e., labial, dental, alveolar, palatal, velar, pharyngeal) associated with each cleft type. Subsequent quantitative analyses could look for associations between the exposure variables and presence/absence of consonant types (e.g. presence or absence of low-pressure consonants (plosives and fricatives) in inventory)