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Prevention, Detection and Diagnosis of Expressive Oral Language Disorders in Premature Infants

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Summary

The current tools for very early detection preterm born children with language disorders are very sensitive but not specific. From 2½-3 years it is possible to have an accurate measure of the four components of the language which are the lexicon, the phonology, the morphosyntax, and the understanding. The interpretation of the language dynamic profile of the child can lead us to suspect constraints that prevent the implicit development of its language. Systematic analysis of these constraints or co-requisite by a specific assessment analysis would differentiate children in need of rehabilitation from those requiring stimulation or just an oversight.

To prevent language disorders in a vulnerable population we must understand that the language development is a multisensory and above-modal integration with specific neurodevelopmental period, some of which remain to study.

Premature births present more difficulties at school than other populations [1,2]. The academic learning require fundamental in oral language, visual spatial attention in praxis and to control a common base made up of school learning to read, writing and arithmetic.

The oral language development is done according to time of neuro developmental time for which information was recently confirmed in children born preterm [3,4]. The end of the ability to discriminate all unskilled way sound is independent of the word and occur around 9 months corrected age [5]. Receiving or neuro developmental integration of the language elements necessary precedes production, why we always check the same absolute quality and 10 dB hearing repeatedly in the very early stages of development because the quality of phonological spectrum in neurologically is done during those crucial years [6,7]. In other words if the infant hears only 20 dB bilaterally will miss him a fine discriminating quality in what is called the succession of more or less similar sounds (phonology) that will prove much later [8].

Quality Infant visual attention paid to the mouth, particularly on oral facial movements of his interlocutor, is also fundamental for those first years to be able to reproduce it. If this skill is innate in infants born at term [9,10] premature births can be more frequently constrained in this skill by oral or facial hypotonia early disorder oro facial sphere. Indeed the driving competence of newborn and infant to repeat the same oral facial movements would correlate synchronized with the maturation of the arcuate fasciculus connecting the predetermined areas of the human brain oral language. The leading role of these articulations or pre-verbal elements is part of the language skills which will prove much later [11]. The quality of the auditory and phonological discrimination will be very early stabilized by the quality of oral facial production. This is pre-modal maturing chronologically.

More recently the knowledge on "dysoralité" [12] as a disorder of proprioception mouth annoying sucking and swallowing disorders, be correlated with the least ability to make rapid and complex movements of the face and mouth. An ongoing study in the service, identify and analyze the "dysoralités" and most common sucking and swallowing disorders in children with SLI with major violations oral facial praxis followed by the CRTA.

All these elements led to think the development of language as a secondary production to the quality of integration of different sensorialités and especially transmodalités necessary language at very specific times.

We now understand that to prevent disorders of language development, it is necessary not only to strictly check the quality of hearing, vision and interactions as what is done in the usual way, but also to analyze all these prerequisites to language development (sucking and swallowing disorders, oral facial praxis ..)

The locating and screening tests of language "early" will evaluate, as the production with a major inter individual variability. The IFDC type of parental questionnaires Kern at 12, 24 and 30 months are limited by nature self assessment of parents. Recent work in the service showed the limit of this being used for 4 years [13] despite its general interest which fell within the overrepresentation of language deficits 12 and 24 months [14]. The precise knowledge of all the elements and the test items is necessary to understand that the French De Communication Inventories (IFDC 12,24,30 months) do not evaluate the quality of phonological words but only the amount of words and this assessment is highly dependent on the socio-cultural level of the parents. Many parents report no language difficulties their child whereas there are obviously for the practitioner when consulting or reassuring it when the child remains mute. By IFDC will be against "abnormal" for extremely attentive and demanding parents and / or always very anxious neurocognitive development of

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their children born prematurely for which they have been informed of potential trouble. Our study showed the unreliability between the results of IFDC to 24 months and the balance sheet speech therapy to 3 years with twenty children. Two reasons seem plausible. The first is that the development of phonology (sounds close following) is double articulation with the lexicon. In other words, it is better to assess the ability to say something that a number of words in a large amount sometimes unintelligible outside the inner circle. The number of word says is constrained by the ability to produce the grammatical forcing phonology that is to say the sentence. However jargon language understood by parents give a normal IFDC while the 3-year test will assess vocabulary skills but also phonological and morphosyntactic and may be pathological and set a specific spoken language disorder by achieving oral facial praxis. The second explanation is that the parental questionnaire was not standardized in premature population at its French version by the Kern team [15]. The American original (MacArthur Bates) does not appear to have incorporated vulnerable populations such as premature.

Also in structural spoken language disorders, called "Speech Language Impairment" or dysphasia, no babbling by nine months or his offbeat appearance is a good predictive sign of specific language impairment [16]. This last argument that reported for longer confirms the assumptions of fundamental driving action of oro facial movements in the construction of phonology.

Tracking tests of language disorders are often available in France little or too sensitive and not specific. This may be due to the many inter-individual variations in the production of this elaborate cognitive competence particularly as the child is young, but also by ignorance of the said monitoring elements corequisites. Typically the production of at least a few words at 12 months, the association of two words to two years and three words or sentence to 3 years are not satisfactory given the greater prevalence of difficulty in the population of premature infants. This higher prevalence is understandable by the various component elements of the potential damage the architecture in a first silent time of production. So should be available tests assessing the quality of these pre-verbal elements regardless of the production of the child. So to the same number of words said we could quantitatively reassuring about the different elements-modal components. Some children would thus support and others just to watch. We have developed a battery of 2 years and a half evaluating potential constraints to the development of oral language. The goal is, outside the measurement "vector" of the various components of the language to measure any correlation with these constraints. These constraints Sensory motor (COSMO) repeat the elements of psycholinguistics development Bates [17]. The modal shift capacity is an innate component in children [18] proprioceptive versus visual selection which is essential to language. A newborn early marker if there is an inconsistency between the articulation movement of a person and the sound heard. These skills modal shifts from normal to the term infant are more variable in children born premature [19]. It is therefore to check these transmodalités. The COSMO battery tests transmodality perception vision and proprioceptive integration.

The evaluation of dynamic and static oral facial praxis allow us to define the level of integration. If a face is reproduced only when it is performed before the child but not on picture is that there is not praxis individual memory which can be a constraint for further linguistic development. The assessment on identical syllables or not said by the computer lets us know if the child perceives and sets this difference.

This assessment of the constraints is regularly used in dysphasic children even larger to clarify the precise prejudice "structural". We used it in our national PHRC LAMOPRESCO in addition to the standardized language assessment on small BILO computer [20]. Our three-year study ends and the main purpose is to measure the effect of a specific short taking charge and therefore precise protocol in children with language weaknesses versus, randomized arms, the lack of specific rehabilitation but stimulation in a language bath as currently recommended. The first results showed different profiles of children at the balance sheets of inclusions. Some had fragilities language with constraints violations COSMO and others showed no restraint. The vast majority of children have increased but children included randomized non reeducated have improved in line with the socio educational level of parents. This preliminary partial result that should help us to provide a parental guidance such as that currently evaluated in EPILANG when there are no constraints. The final results of LAMOPRESCO allow us to assess whether COSMO is sufficiently sensitive and specific from 3 years and if certain constraints can evolve through early rehabilitation. We showed that in a population of preterm language ½ to 3 years depended on socio educational level of the parents as what is well known, but that the constraints were not altered by it. In other words there was a normalization of "surface" of spoken language through family stimulation but the co-required or constraints partly explain the difficulties of failed implementation of language later wrote [21,22]. At 6 the more complex understanding is reached and is significantly correlated with the persistence of oral facial praxis constraints [23].

Tracking and disorder screening or language delay in premature requires increased and more precise monitoring of sensory and especially multimodal integration. Conventional tests are not enough if one wants to do in terms of our current neuro developmental knowledge. It would be desirable to involve the binding components of the language at two years to determine which child must intervene or not.

Thus, schematically we could offer more sensory controls:

At 12 months IFDC has the advantage of measuring pre-verbal sensorimotor type elements that are ideational praxis and idéomotrices nevertheless co-builders of language. We could follow the natural course or offer a supported psychomotor or speech therapy.

A two-year IFDC should be systematically complemented by COSMO to assess the quality of co-requisite (constraints) and towards parental guidance or reeducation.

A three-year systematic BILO with COSMO allow to accurately assess the child's profile and program monitoring. The type of rehabilitations incorporating parents' say and do "supporting the joint visual attention and stimulating the double joint (Lexicon/phonology) associated with prosody and redundancy should be preferred.

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