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NORMALISING ORAL-TACTILE SENSITIVITY IN CHILDHOOD APRAXIA OF SPEECH

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Abstract

Children diagnosed with Childhood Apraxia of Speech experience difficulty in the ability to sequence sounds, syllables and words for speech even though there is no muscle weakness, paralysis or other physical limitations. They also show abnormal oral-tactile sensitivity, either hyposensitivity or hypersensitivity. The aim of this study is to normalise oral-tactile sensitivity in children diagnosed with Childhood Apraxia of Speech using a combined method of hands-on oral tactile stimulation program and a hands-off exploratory play session. Our study demonstrates that children who were subjected to the combined method of therapy, restored normal oral-tactile sensitivity within two weeks of intensive program, in comparison to the children who were subjected to only the hands-on stimulation program, who failed to obtain normal oral-tactile sensitivity within the two weeks trial period.

Keywords: *oral-tactile, hyposensitivity, hypersensitivity, apraxia.*

1. INTRODUCTION

Childhood Apraxia of Speech (CAS) is a motor speech disorder in which a child has difficulty sequencing sounds, syllables and words for speech even though there is no muscle weakness, paralysis or other physical limitation. The etiology of Childhood Apraxia of Speech is unknown but can in some cases be secondary to a genetic disorder or a neurological trauma to the brain (Schipley, McAfee, 2017). Often CAS co-occurs with dysarthria, speech delay, fluency disorder, expressive and receptive language impairment, literacy disorder and phonological impairment.

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The American Speech-Language-Hearing Association (2007) stated a series of communicative behaviors that are associated with CAS that can be grouped in six categories such as:

1. Nonspeech motor behaviors (general awkwardness or clumsiness, impaired volitional oral movements, mild delays in motor development, mildly low muscle tone, hyper- or hyposensitivity in the oral area and oral apraxia);
2. Speech motor behaviors (difficulty with repetitions of syllables and diadochokinesis, slow speech development, multiple speech sound errors, reduced intelligibility, reduced phonetic or phonemic inventories, reduced vowel inventory, vowel errors, inconsistency of errors, increased errors in longer or more complex syllable and word shapes, errors in the ordering of sound such as migration and metathesis, in the ordering of morphemes and words, groping, persistent or frequent regression and differences in performance of automatic versus volitional activities);
3. Prosodic characteristics (excessive-equal stress of syllables, syllables segregation, variation in rate, including prolonged sounds and pauses between sounds, syllables or words, reduced range of pitch or variable pitch, reduced range of loudness or variable loudness, variable nasal resonance);
4. Speech perception characteristics (reduced auditory perception, reduced auditory discrimination, reduced auditory memory);
5. Language characteristics (significant language deficits, morphologic omissions, deficits in expressive and receptive language, with expressive consistently lagging behind receptive language, family history of language impairment);
6. Metalinguistics/Literacy characteristics (reduced phonological awareness, difficulty with word identification, poor spelling, increased self-awareness of speech production limitations).

Pamela Marshalla (2000) stated that the most important notion to center on in all of our discussions about developmental apraxia is that at its core, the problem is one of organising sensations, which means that once a sensation is perceived, it is not well integrated with other incoming sensations and it is not properly stored, making children with CAS not able to understand how tactile, vestibular and proprioceptive sensations for producing speech are interrelated. This is one of the reasons why children with CAS manifest oral tactile sensitivity problems such as hyper- or hyposensitivity. An important part of oral motor therapy should in this case be centered on normalising oral tactile sensitivity.

2. OBJECTIVE AND HYPOTHESES

2.1. OBJECTIVE

The objective of this study is to normalise oral tactile sensitivity in children diagnosed with Childhood apraxia of speech using a combined method of hands-on oral tactile stimulation program oral tactile sensitivity combined with a hands-off exploratory play program.

2.2. HYPOTHESES

The hypothesis of this study is that children with CAS who follow an intensive, five days-a-week hands-on oral tactile stimulation program oral tactile sensitivity combined with a hands-off exploratory play program, obtain normal sensitivity within two weeks.

3. METHOD

The participants of this study were 10 children, diagnosed with Childhood Apraxia of Speech, who also showed abnormal oral-tactile sensitivity; 4 children showed hypersensitivity and 6 children showed hyposensitivity. The examination of oral-tactile sensitivity consisted of two parts: 1) examination of client history and 2) direct assessment using hands on techniques, as described by Pamela Marshalla (2000). The case history included information about tooth-brushing, face washing, eating habits, the food textures and temperature eaten, the history of feeding needs, any other prior diagnosis of oral tactile problems or whole body tactile problems, the sensorimotor integrative status, the history of mouthing behaviour and vocal play, the history of oral habits, oral injuries, the history of tooth emergence and the history of oral surgery. The direct assessment included and evaluation of touch responses to: the face and neck, the lips, the gums, the inner cheek walls, the hard palate and the posterior oral-pharyngeal area. For each area we separated the child's responses into three categories: normal response (the child can tolerate stimulation and even enjoy sensations), hyposensitive response (the child did not realise he is being touched, ignored touch, showed little or no reaction, or "craved" for more) and hypersensitive response (the child did not allow touch, show discomfort, pulled away, exhibited fear, facial grimace, lip retraction, or gag). The 10 children were separated in two groups, each group included 5 children, 3 with hyposensitivity and 2 with hypersensitivity. The first group received a five-days-a-week hand-on oral tactile and proprioceptive stimulation combined with hands-off exploratory play program for two weeks, and the second group received only a five-days-a-week hand-on oral tactile and proprioceptive stimulation. We aimed to identify if the combined method of restoring normal oral-

tactile sensitivity used with the first group of children was more efficient as a therapeutic strategy than only the hands-on method used for the second group.

3.1. MATERIALS

We used the following products in our sensory stimulation program: toothbrushes, horns, harmonicas, bubble blowers, whistles, straws, rubber tubing, plastic microphones, lollipop sticks, balloons, baby teething toys, dental floss, tongue depressors, inspiration spirometres, dog chew toys, cocktail straws, small crackers, purees, ice cream, chocolate chips, cake decorations, raisins, dried fruit, water, juice, thick juice. All children received visual input from mirrors during the therapeutic program.

3.2. PROCEDURE

In the general approach to treatment, the most important step is to observe the child's reaction to stimulation. There are several differences between children with hypersensitivity and children with hyposensitivity when applying stimulation. Therefore, when working with children with hypersensitivity it is important to take into consideration that they tend to find broader surfaces of touch more soothing, they tolerate easily a firmer and deeper touch, they find stroking with the grain of hairs calming, and they prefer cold temperatures. Touch with immediate release and without stroking may be tolerated easily by hypersensitive children. Hyposensitive children prefer to be touched in smaller, more isolated areas and they find striking against the grain of hair exciting. They prefer to be touched by the therapist rather than to self stimulate. We used with both hypersensitive and hyposensitive children only familiar stimuli and food with which the children were accustomed.

3.3. INTERVENTION

For each child we created a personalised intervention plan, using the data we collected during the initial assessment. The first group of 5 children were offered both a hands-on stimulation program and a hands-off exploratory play session, for five days-a-week. The second group of 5 children were offered only hands-on stimulation program, for five days-a-week. In our study, we aim to identify if the combined method of restoring normal oral-tactile sensitivity used with the first group of children was more efficient as a therapeutic strategy than only the hands-on method used for the second group. Each stimulation activity was accompanied by verbal labelling and description. It was important to observe the child's reactions to stimulation and to verbalise in consequence, describing also the child's response. The stimulation was maintained until the child showed an aversive reaction, then we stopped because the goal of the therapeutic process was to avoid negative responses and to provide an environment where the child could feel safe.

We began the stimulation starting with the hands, legs, shoulders, then the neck area, face, ears, cheeks, lips, gums, tongue, hard palate and soft palate. The organisational guideline for normalising oral-tactile sensitivity (Marshalla, 2000) we used as a reference tool stated that it is important to work from the least sensitive parts of the body to the most sensitive ones. Therefore we adjusted the order of the stimulation according to each child's initial assessment findings. While stimulating the mouth, we began in the centre of the upper lip, then moved to the left of the lips, then back to the centre, and then to the right on the upper lip. We repeated the process for the lower lip, the upper gum area, the lower gum area. For stimulating the tongue, we also started in the centre, then moved to the tip, and to the back. We observed if the gag reflex occurred, because this is an indicator of an aversive reaction, and stopped. After the initiation of this hands-on stimulation program to all 10 participants to the study, we offered to the first group of 5 children a second session of oral exploratory play, for hands off tactile stimulation. The session was organized as a group session. During this session, we allowed children to self explore the oral area while we imitated them and also used verbal input for describing what the child just did. We gave the children a wide range of materials for exploratory play (horns, whistles, blow toys, infant teething toys, tongue depressors, spoons, straws, dental brushes, ice cubes). We closely observed each activity the child engaged in with the materials we offered and promptly use imitation, labelling body parts involved and the actions we imitated, and we gave some follow-up questions in order to help the child improve his receptive and expressive skills.

Table 1 – sample activities and effects of oral exploratory play

Sample activities	Effects
Blow toys	Facilitate pulmonary capacity, improve jaw, lip and tongue awareness.
Brushes	Strong stimulation to the entire oral cavity
Ice cubes only for maximum 30 seconds at a time	Increase muscle tone and increase sensitivity in the case of hyposensitivity or decrease sensitivity in the case of hypersensitivity
Towels (wet or dry)	Increase awareness to the entire oral cavity
"Peek-a-boo" game	Offers the child the opportunity to explore his head and face with his hands
Eating pudding with the fingers	Hand-to-mouth play
Eating snaks in front of the mirror	The therapist can model chewing and swallowing, the child can receive awareness to the eating act

4. CONCLUSIONS

After the two weeks intensive five day-a-week intervention program, we subjected all 10 children to a final assessment, using the same assessment inventory as for the initial assessment. The 5 children from the first group, who had been exposed to the combined method of therapy showed normal levels of oral-tactile sensitivity after two weeks of intensive program. Only one child from the second group of children, who had had only the hands-on method of intervention, showed normal oral-tactile sensitivity after two weeks of intensive program. The remaining four children still showed sign of either hypersensitivity or hyposensitivity. The results give us confidence to state that the combined method of therapy consisting of a session of hand-on oral tactile stimulation and one session of oral exploratory play is more efficient in restoring normal sensitivity than the use of only hand-on oral tactile stimulation. McCall (1974) described the importance of oral exploratory play in human infants. This type of play can help the child become more aware of his oral abilities and to learn new oral movements. Also, with the involvement of the care-taker, the child care learn early oral-motor imitation skills and can organise and integrate tactile, visual, and auditory perceptions in order to learn how to vocalise and how to produce speech sounds (Bololoi, Rizeanu, 2017).

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