International Journal of Pediatric Otorhinolaryngology 93 (2017) 17–23

Contents lists available at ScienceDirect

International Journal of Pediatric Otorhinolaryngology

journal homepage: http://www.ijporlonline.com/

Audiovisual materials are effective for enhancing the correction of articulation disorders in children with cleft palate

María del Carmen Pamplona [a, b, c, *], Pablo Antonio Ysunza [d], Santiago Morales [e]

[a] Cleft Palate Clinic, Hospital Gea González, Mexico City, Mexico
[b] Hablarte e Integrarte, AC, Mexico City, Mexico
[c] Mexican Medical Advisor Council of Smile Train, Mexico
[d] Ian Jackson Craniofacial and Cleft Palate Clinic, Neuroscience Program, Beaumont Health, Royal Oak, MI, USA
[e] The Pennsylvania State University, Psychology Department, USA

ARTICLE INFO

Article history:
Received 3 December 2016
Received in revised form
12 December 2016
Accepted 12 December 2016
Available online 18 December 2016

Keywords:
Cleft palate
Speech
Therapy
Speech pathology

ABSTRACT

Introduction: Children with cleft palate frequently show speech disorders known as compensatory articulation. Compensatory articulation requires a prolonged period of speech intervention that should include reinforcement at home. However, frequently relatives do not know how to work with their children at home.

Objective: To study whether the use of audiovisual materials especially designed for complementing speech pathology treatment in children with compensatory articulation can be effective for stimulating articulation practice at home and consequently enhancing speech normalization in children with cleft palate.

Materials and methods: Eighty-two patients with compensatory articulation were studied. Patients were randomly divided into two groups. Both groups received speech pathology treatment aimed to correct articulation placement. In addition, patients from the active group received a set of audiovisual materials to be used at home. Parents were instructed about strategies and ideas about how to use the materials with their children. Severity of compensatory articulation was compared at the onset and at the end of the speech intervention.

Results: After the speech therapy period, the group of patients using audiovisual materials at home demonstrated significantly greater improvement in articulation, as compared with the patients receiving speech pathology treatment on – site without audiovisual supporting materials.

Conclusion: The results of this study suggest that audiovisual materials especially designed for practicing adequate articulation placement at home can be effective for reinforcing and enhancing speech pathology treatment of patients with cleft palate and compensatory articulation.

1. Introduction

Children with cleft palate (CCP) often present disorders of speech sound production and resonance [1]. Some speech sound disorders in these cases are related to velopharyngeal insufficiency (VPI) and are known as compensatory articulation errors (CA). Some reports describe that these errors begin due to the structural abnormalities and become incorporated into the system of linguistic and phonological rules that are still in development. These articulatory deficits can be considered at the level of phonological representations involving cognitive components for managing the sounds of Speech [2,3] and are related to other areas of language and higher levels of organization such as the abstract or decontextualized thought [4,5]. In contrast, some clinicians view these errors as phonetic involving inaccurate learning and anatomic and physiologic motor deficits [2,6,7]. Therefore, in general the speech pathology (SP) intervention approach for CA can be a phonologic or linguistic approach or a phonetic or motor – based approach. There is still controversy in the related scientific literature about which approach is more effective. A recent systematic review found little evidence to support any specific intervention

* Corresponding author. Cleft Palate Clinic, Hospital Gea González, Mexico City, Mexico.
E-mail addresses: macamenpamplona@hotmail.com (M.C. Pamplona), antonio.ysunza@beaumont.edu (P.A. Ysunza), Sum260@psu.edu (S. Morales).

http://dx.doi.org/10.1016/j.ijporl.2016.12.011
0165-5876/

[8]. Nonetheless, there seem to be a reliable consensus among clinicians and researchers that non – speech oral – motor exercises are not useful for the SP intervention of CPP [1,3,5,9].

Regardless of the intervention approach, the correction of these disorders often entails a long process and requires considerable amounts of work. Moreover, a phonologic based intervention involves changing the child's previously established linguistic and phonologic rules for speech sound production. This process is costly for the patient and health care systems. The Whole Language Model (WLM) is an approach that considers these broader areas of language and cognitive development [10]. This approach opens the possibility of new perspectives for the treatment of CCP that go beyond the traditional intervention approaches of these patients, which mainly focuses on peripheral aspects of articulation. In contrast, an intervention following a WLM approach considers the content and structure of the message as well as the form of the language used to express the message (e.g., the syntax or articulation within the same event or activity).

Previous research shows that when language and articulation are addressed simultaneously, better results are achieved in the overall communicative performance of these patients in a shorter period of time [3,11].

It should be noted that a WLM intervention in CCP does not leave articulation as a secondary goal. Articulation has been and should be a must when SP treatment is being provided to CCP. However, if articulation and linguistic aspects are considered as a whole, the final outcome is improved and the time of the intervention can be significantly shortened [3,12]. Commonly patients are required to regularly attend intervention sessions, which can involve a long and sinuous process requiring time and financial costs for the patients and their families. These costs can become a significant burden for less advantaged families. For example, in developing countries, it is hard to find SP services in every community and attending treatment sessions often involves hours of transportation, leading families to irregularly attend to treatment. A successful outcome in SP in CCP involves many factors, including the linguistic and articulatory characteristics of the patients, the experience of the clinician, the frequency and length of the intervention sessions, as well as reinforcement and family support at home. It has been extensively reported that frequency of treatment sessions is an important factor. The more frequent and intensive the treatment sessions, the more speech and language are improved [13–15]. However, when families are incapable to assist frequently and regularly to intervention sessions at the clinic, home practice plays an even more important role. Nonetheless, clinicians frequently struggle to find effective and accessible resources for encouraging practice at home.

It is important to find motivating methods for enhancing the involvement of both, caregivers and children in the consistent practice of articulation drills at home. This can pose a challenge because children and their caregivers must engage in deliberate practice in order to improve their speech skills. Deliberate practice requires attention, feedback, and repetition [16], which can become tedious and boring. A more engaging method for deliberate practice at home for CCP can be practicing articulation through music and stories. It has been described that music and language are closely related. They both share many similar characteristics; one of them is that both activities take place at the auditory level. Moreover, some studies show a relationship at other levels as well, including syntax and harmony or semantics and melody [17,18]. The relationship between music and other cognitive domains has been studied in several studies including language and motor skills [17], reading [19], intelligence [20], executive functions [21,22], and language acquisition [23,24]. The use of music as a rehabilitation tool has also been reported [18,25].

The purpose of this paper is to study whether providing parents with audiovisual aids containing songs designed for stimulating articulation in CCP at home, could effectively improve speech performance.

2. Materials and methods

This study was carried out at the cleft palate clinic of the Hospital Gea González in Mexico City. The Internal Review Board (IRB) including the Bioethics and Research Committees of the Hospital approved the protocol and the study had been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki's and its later amendments. Before the inclusion of each patient into the study group, the parents or legal guardians were carefully explained the procedures and the methodology of the protocol. All parents of the patients included in the study group, agreed to participate in the study and gave their informed consent prior to the inclusion of the study.

Sample size was calculated at an Alfa of 95% confidence interval and a Beta power of 80% for a comparative study of two treatment groups. The distribution of the severity of CA across the patients evaluated in our center during the last 2 years was considered. The aim was to detect a difference of at least 20% between groups. According to these calculations, a minimum of 40 patients classified in each group should be included in the study. All cleft palate patients attending the Speech Summer Camp - 2015 in Mexico City were evaluated. The methodology and settings of the Speech Camps have been previously reported [14,15]. To qualify for the study groups, patients had to meet the following criteria:

1. Unilateral, complete cleft of primary and secondary palate (UCLP) [26]. Palatal repair of the UCLP performed according to the surgical routine of the cleft palate clinic. This routine includes: surgical repair of the lip and primary palate between 1 and 3 months and surgical repair of the secondary palate between 6 and 10 months with a minimal incision palatopharyngoplasty [27].
2. Absence of postoperative fistulae.
3. No known neurological or genetic syndromes.
4. Chronological age between 3 and 7 years of age at the time of selection for the study group.
5. No identified severe language disorders according to the SDS-Model evaluation practiced in our clinic routinely and reported previously [11].
6. VPI after palatal repair demonstrated by SP evaluation, videonasopharyngoscopy and multi – planar videofluoroscopy as previously described [28].
7. CA in association with VPI had to be demonstrated during a complete SP evaluation as previously described [11].
8. Normal hearing demonstrated by conventional pure-tone audiometry.

2.1. Patients and procedures

All patients received a complete clinical evaluation of Speech, Language and Voice. It should be pointed out, that such evaluation is considered as the gold standard diagnostic marker of CA [11,29,30].

A total of 88 patients were selected for the study. Six patients stopped attending the camp for different reasons and they were eliminated from the study. All patients were assessed at the onset and at the end of the Speech Summer Camp, including an analysis based on the WLM and basic phonological principles. Special attention was focused on the detection of compensatory