

Case reports

Intensive therapy for speech rehabilitation of a patient with cleft lip and palate: a case report

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ABSTRACT

Intensive therapy is an alternative to accelerate the therapeutic process of individuals with cleft lip and palate. The purpose of this study is to describe an intensive speech therapy program and compare the results before and after the program on a child with previously operated right unilateral cleft lip and palate and velopharyngeal insufficiency, using a speech bulb. Sixty therapy sessions were carried out over a 4-week period. Before and after, anamnesis, speech assessment and evaluation of the velopharyngeal function with nasofibrosocopy, were performed. The patient presented with adequate resonance and speech intelligibility, reduction of obligatory disorders and compensatory articulations, after intensive therapy with the speech bulb and reduction of velopharyngeal gap, after intensive therapy with and without the speech bulb. Progress was achieved with the intensive speech therapy.

Keywords: Cleft Palate; Velopharyngeal Insufficiency; Speech Disorders; Speech Therapy

INTRODUCTION

Even after surgery, the speech quality of patients with cleft lip and palate can be affected, mainly, due to velopharyngeal dysfunction (VPD)¹. VPD can occur due to velopharyngeal insufficiency, velopharyngeal incompetence or learning error¹. Speech alterations can be identified as obligatory or passive disorders and compensatory or active disorders, altering speech intelligibility and social interaction².

Primary surgery of the palate ensures proper functioning of the velopharynx in about 70% of cases³. There are several techniques that can be used as a secondary procedure, and surgical treatment is effective in approximately 50% of the cases⁴. When a surgical option is not considered as a possibility, the speech bulb can be used as an alternative to help with speech normalization, as it occludes part of the velopharyngeal gap^{4,5}.

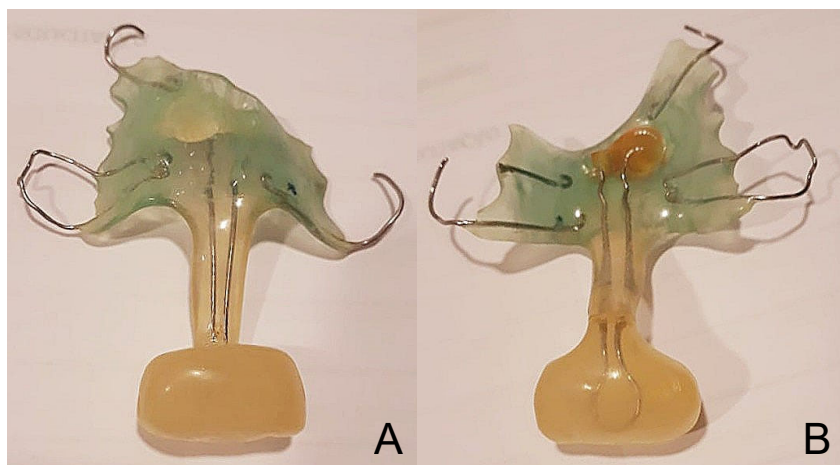
To obtain an adequate speech pattern, a speech therapy approach is essential to the rehabilitation of the patient². The success of the therapeutic process depends on various factors, which are more feasible to achieve in intensive speech therapy programs. Intensive care is an alternative intervention to start before conventional therapy, as it encourages patient adherence to the treatment, because of the frequency of the daily sessions, and because it provides noticeable results in less time³. Although the strategies are adequate in conventional therapy, there is no constant training to adapt to a new habit³.

The purpose of this study was to describe and carry out an intensive speech therapy program on a child with an operated unilateral cleft lip and palate, and velopharyngeal insufficiency, using a speech bulb, by comparing the results before and after the treatment.

CASE PRESENTATION

This study was approved by the Research Ethics Committee of the College of Ceilândia, University of Brasília (CEP/FCE/UnB), Brazil, CAAE-03333118.4.0000.8093, number 3.067.282. Additionally, an informed consent form was signed.

The study was performed between January and February 2019, at the University Hospital of Brasília (HUB). The case study was of an 8-year-old girl, who was born with a right unilateral cleft lip and palate. The participant underwent primary cheiloplasty when she was 3 months old and primary palatoplasty when she was 1 year old at the Hospital for Rehabilitation of Craniofacial Anomalies of the University of São Paulo (HRAC-USP), where she has had follow ups every six months since she was 3 months old. She had speech therapy in her home town from 1 to 8 years of age, twice a week, for 50 minutes but with no apparent development. When she was 8, she was recommended to use a speech bulb, which was made by a team of specialists at the HRAC-USP (Figure 1). After making the speech bulb, the patient was referred to HUB to take part in the intensive care program.



A: Top view of the speech bulb. B: Bottom view of the speech bulb.

Figure 1. Upper and lower view of the speech bulb used during the intensive therapy process

At the beginning of the speech therapy follow-up, the patient underwent anamnesis, speech assessment of speech and assessment of the velopharyngeal function by nasofibroscope. To compare results, after intensive therapy the above assessment procedures were repeated at the end of the program. The speech assessment and reassessment was done using a specific protocol adapted from HRAC-USP⁶, which was used mainly to assess speech intelligibility, resonance, hypernasality and nasal air emission. To assess the presence of obligatory disorders and compensatory articulations, the service protocol was used. In performing nasofibroscope, before and after speech therapy, the same protocol was also used, in addition to the emission to blowing task, isolated plosive and fricative phonemes and associated with vowels. Nasofibroscope was performed with a device that has a flexible fiber tube and a Machida® camera at the end that can travel from the nose to the larynx. The exam was performed by an otolaryngologist from HUB accompanied by a speech therapist from the cleft lip and palate service. During the examination, the flexible fibrous tube ran from the nose to the nasopharynx in order to visualize the velopharyngeal closure. The anamnesis, speech assessment and the speech therapy sessions were performed by the same therapist.

The intensive care program was carried out in 4 weeks, from Monday to Friday of each week

totaling 20 days. There were 3 sessions per day with 2-hour intervals between each session. A total of 60 sessions, therefore, were performed, lasting from 30 to 45 minutes, in a more expanded format than those used in other studies about intensive therapy^{7,8}, with the objective of achieving maximum development and eliminating and/or minimizing the time required for conventional therapy for speech automation and systematization of velopharyngeal closure.

The objective of the proposed intensive therapy was to establish adequate speech intelligibility, balanced resonance and eliminate obligatory disorders and compensatory articulations. The sequence of intensive training was programmed to the patient's development, but the altered oral phonemes were initially worked on, taking into account the speech hierarchy (Table 1), according to the approach used in intensive therapy studies^{3,6}. Auditory cues were used (flexible silicone tube with one end facing the nostril and the other towards the ear), visual cues (scape-scope, Glatzel mirror and filming as a therapeutic resource) and tactile-kinesthetic cues (closing the nostrils in oral emissions and the back of the hand placed in front of the mouth), which were gradually removed, encouraging speech monitoring and control⁹.

Table 1 shows the sequence of intensive training, according to the speech hierarchy.

Table 1. Stages of the intensive care program⁶

Stages	
1 st STAGE	Finding a carrier phoneme through therapeutic testing
2 nd STAGE	Selection, adaptation and installation of altered phonemes through isolated and modified blowing and plosion
3 rd STAGE	Production of the target phoneme, plosive or fricative, in syllables with and without a whisper
4 th STAGE	Production of the target phoneme associated with the carrier phoneme in words without meaning
5 th STAGE	Production of the target phoneme in meaningful words with the installed phonemes
6 th STAGE	Production of the target phoneme in sentences with the installed phonemes
7 th STAGE	Production of the target phoneme in texts with the installed phonemes
8 th STAGE	Production of the target phoneme of speech conducted with various contexts
9 th STAGE	Production of spontaneous speech
10 th STAGE	Automation

The progress of the therapy was also linked to exercises which were to be performed at home, with parental help, who were instructed in person on how to perform the training. Once a week, one of the guardians had to attend the therapy sessions, participate in care and obtain information for carrying out training at home. The guidelines were also offered online, through audio and/or demonstrative videos, when necessary. Two workouts per day were determined from Monday to Friday, 4 workouts on Saturdays and 4 on Sundays, all lasting 15 minutes. Therapeutic exercises were chosen according to the demand presented during the therapies. To monitor training at home, a table should be filled daily by the facilitating family member. This table should inform the trained phoneme, how

many times the training was carried out, if there were any problems and which facilitating cues were used. The video recordings of the home training sessions were shown daily to the therapist in order to guide and control the exercises.

RESULTS

Table 2 shows the results of the speech assessment by the speech pathologist, before and after intensive care with the speech bulb, taking into account speech intelligibility, resonance, hypernasality, nasal air emission, presence of obligatory disorders and compensatory articulations. There were no differences in development in relation to these aspects when the patient didn't use the speech bulb.

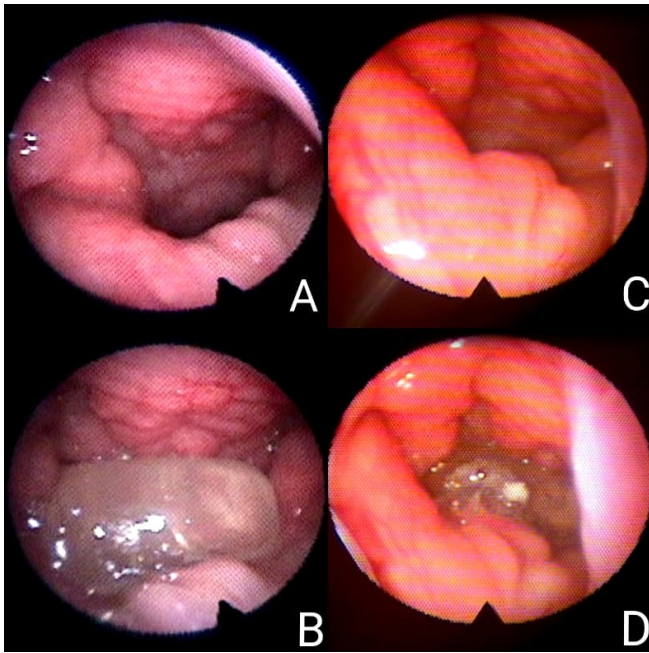
Table 2. Comparison of the results of the evaluations before and after intensive care with speech bulb

	Speech Intelligibility	Resonance	Hipernasality Test	Nasal Air Emission (NAE)	Obligatory disorders and compensatory articulations
Pre-intensive therapy with speech bulb	Mild deviation	Mild hypernasality	Alteration in 9/10 words and in /i/	NAE present in the phonemes: /p/, /b/, /t/, /d/, /k/, /g/, /f/, /s/, /z/, /ʃ/, /ʒ/, /v/	Weak intraoral pressure: /v/, /s/, /z/, /ʒ/, /tʃ/, /dʒ/ Velar Fricative: /s/, /z/, /ʃ/, /ʒ/, /tʃ/ e archiphoneme {S}
Post intensive care with speech bulb	Adequate	Balanced	Alteration in 3/10 words and in /i/	Absence of NAE	Weak intraoral pressure: /s/, /ʒ/ Velar fricative: archiphoneme {S} assystematically

Figure 2 shows the upper view of the velopharyngeal sphincter during nasofibroscopy, and production of the syllable /pa/ before and after speech therapy (without and with the use of the speech bulb). There was a reduction in the velopharyngeal gap after intensive therapy with and without the use of the speech bulb,

compared to the velopharyngeal gap before intensive therapy with and without the use of the bulb.

The family were instructed to carry out daily exercises at home, but unfortunately they did not adhere to either the frequency or number of exercises recommended by the speech therapist.



A: velopharyngeal closure before intensive care without the speech bulb.
 B: velopharyngeal closure before intensive care with the speech bulb.
 C: velopharyngeal closure after intensive care without the speech bulb.
 D: velopharyngeal closure after intensive care with the speech bulb.

Figure 2. Top view of the velopharyngeal closure. Comparison between the results of nasofibroscopy before and after the intensive therapy program, with and without the speech bulb, with production of the syllable /pa/

DISCUSSION

Intensive therapy to achieve speech adequacy in patients with cleft lip and palate require effective strategies, since patient adherence to the treatment program is one of the main aspects that leads to the improvement of speech^{1,3,9}.

This study recommended 60 therapy sessions, a more expanded format than those used in previous studies^{6,8}. The objective of this was to achieve the maximum improvement for the patient and minimize time in conventional therapy. This way, the comparison of results obtained before and after the therapy demonstrated the influence of intensive treatment on the rehabilitation of the patient's speech, as well as reports by previous studies, which suggest intensive speech therapy as an alternative method for the rehabilitation of speech disorders resulting from velopharyngeal dysfunction^{1,8}. The evaluation after the intensive care program showed development in the patient's speech, regarding speech intelligibility, hypernasality, nasal air emission and compensatory articulations, which

corroborated previous studies^{1,7,8,10-12} that used a speech bulb⁸.

It was evident that the use of the speech bulb was important to the development of the patient's speech, because of the perceived differences in the patient's speech when she was using the prosthesis and not using it. This finding reinforces the fact that the treatment of speech disorders in patients with cleft lip and palate, through a structured intensive care program, combined with a speech bulb, proves to be an effective method for speech rehabilitation^{8,10}.

The effective use of the speech bulb contributed to the increase in intraoral pressure, airflow direction, monitoring of nasal air emission and hypernasality, promoting the action of the pharyngeal walls, with a reduction in the velopharyngeal gap after intensive therapy (Figure 2)¹³. The reduction of the velopharyngeal gap seen after speech therapy with and without the use of the speech bulb supports the findings of a previous study that correlated speech symptoms (hypernasality, audible nasal air emission and nasal snoring) with the dimensions of the velopharyngeal area. This showed a significant correlation between the degree of hypernasality and the degree of velopharyngeal closure, in addition to a significant relationship with audible nasal air emissions, indicating that in the presence of the symptom, the velopharyngeal gap tends to be bigger¹⁴.

Although the speech quality of the patient in the study showed improvement in the aforementioned aspects, at the end of the speech therapy it was found that some inadequacies persisted, such as compensatory articulations and more accentuated hypernasality in spontaneous conversation, that is, a single intensive therapy module did not solve all of the alterations in spontaneous speech. Likewise, intensive programs from previous studies did not cater to all speech alterations of the participants^{1,3,12}. In this context, intensive therapy is suggested as an initial treatment module to that of conventional therapy¹.

Control of home training is essential to the development of the patient's speech, as caregivers and even the patient may not notice the obligatory disorders and/or compensatory articulations and continue training which can result in reinforcing the error and it may consequently be necessary to resume work with previous phonemes. An innovative way to maintain control is through applications developed to enrich speech training and provide assistance in speech therapy, speech recordings, generating feedback,

monitoring errors and enabling the improvement of pronunciation in a playful way¹⁵.

There are five elements of family responsibility during the rehabilitation process of a family member with cleft lip and palate: keeping commitments, carrying out recommendations from the team, reporting problems, supporting the team through out the child's rehabilitation and taking an active role in the rehabilitation process. However sometimes there may be problems such as difficulties understanding the procedures, insufficient knowledge, emotional factors, conflicting demands and even a lack of interest¹⁶. It is essential, therefore, for the therapist to understand the situation of the family of a patient with cleft lip and palate, and to provide guidance whenever necessary concerning the approach to speech therapy and the importance of the family in the rehabilitation process.

It is important to emphasize that the poor level of family commitment to help with the recommended exercises at home and the absence of daily control proposed by the therapist were limiting factors for this study and that this in turn may have influenced the final results of the therapeutic process, because intensive treatment and the direct participation of the responsible family members are essential for the development of the new speech¹. The application of the intensive speech therapy program and speech therapy evaluation before and after therapy were performed by the same therapist and considered in the interpretation of the results.

The intensive care program proved to be an advantageous approach because it enables a more agile treatment that encourages patient adherence to the program and allows for daily exercises, favoring a marked development in less time compared to the conventional approach. These factors made the case relevant as it is a current and effective form of therapy.

FINAL CONSIDERATIONS

After describing and carrying out the intensive speech therapy program and in view of the results achieved in 60 sessions, the intensive care program was considered to be effective and represents an alternative for improving the speech of patients with cleft lip and palate. It is essential, however, to continue with conventional speech therapy for the final process of automation.

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