ELECTROPALATOGRAPHY OF NASAL PHONES PRODUCED BY AN ADULT WITH CLEFT LIP AND PALATE

Estudo eletropalatográfico de fones nasais em indivíduo com fissura labiopalatina

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ABSTRACT

This study has the aim of describing the pattern of contact between the tongue and the palate comparing a cleft lip´s speaker in producing nasal consonants phones in Portuguese with a speaker with no articulatory alterations. Through electropalatography, it is examined the nasal consonant phones [m], [n] [ɲ] at the point of maximum constriction, checking the region of articulatory constriction, through palatograms provided by the program of analysis. These data were obtained from a speaker without speech disorder and a speaker with sequel of cleft lip and palate, in order to compare. All the analyzed phones produced by the speaker with cleft showed variations in the region in which articulatory constriction occurred, in relation to the normal speaker. On the phone [m] there was contact between the tongue and the palate, even in case of a bilabial phone; on the phone [n], there was a retreat of the tongue and a constriction in the palatal region and on the phone [ɲ], the constriction occurred in a more anterior region in relation to the normal speaker, that is, with the tongue forward. Such productions were consonant perceived auditory as distorted, but there wasn't a clear characterization of the articulatory adjustments used in its production. The nasal phones can be altered in the case of cleft lip and palate and the use of appropriate technology for evaluation of speech is an important resource for this analysis.

KEYWORDS: Speech; Speech Disorders; Cleft Palate; Diagnosis

■ INTRODUCTION

Speakers with cleft lip and palate have anatomical and functional changes in the lip and palate that compromise adequate production of speech[1]. A cleft palate, even after primary palatoplasty (surgical closure of the palate), can result in a velopharyngeal dysfunction, VPD, causing a speech with nasality and distortion in the production of consonant phones. Speech disorders, presented by this group may be due, or have worsening changes in dental and hearing loss that these individuals are subject[2].

Some of the speech changes imposed by cleft palate are directly related to the coupling of abnormal oral and nasal cavities, as hypernasality, the audible nasal air escape during the production of oral phones, nasal turbulence, as well as the reduction of intraoral pressure in obstruent consonants[3]. These structural changes are called mandatory or functional "passive", "errors". Among the so-called "errors" other speech disorders also fit, resulting in dental changes, surgical sequela, causing distortions in sibilant, alveolar or labial phones, for example[1]. The establishment of production without distortion is dependent on the elimination of the anatomical defect[4].

There are other strategies for speech production, called compensatory "active", "errors" or compensatory articulations that are attempts by the speaker to produce the phones, approaching the acoustic

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result to the normal production, given the limitations imposed by anatomical cleft in the period in which it is open, or even in the presence of residual VPD[4]. We have to consider that the word "error", although widely widespread in international and national literature toward the cleft, must be understood as adjustments/accommodations that subjects perform in an attempt to approach the speech to what people say to be normal. These usually involve articulation points and are known as atypical glottal stop (glottal stop), pharyngeal fricative, posterior nasal fricative, mid-dorsum palatal fricative, laryngeal fricative, pharyngeal affricate, dorsal mid palatal affricate, laryngeal affricate, posterior nasal affricate, dorsal mid palatal plosive, pharyngeal plosive, laryngeal plosive[3,5-9].

This extensive nomenclature expresses the interest of researchers to identify, describe and understand the different articulation settings present in the speech of individuals with cleft palate. For this reason, efforts have been implemented with a view to the use of complementary resources to perceptual assessment, making use of instrumental radiographic assessment[2], acoustic analysis[10], videofluoroscopy and nasoendoscopy[5, 6] and electropalatography – EPG[11,12].

The phones more frequently affected in individuals with cleft lip and palate are the sibilant fricatives and affricates, followed by occlusive, approximants and finally nasal[13]. Note that the nasal phones are considered less affected. The literature suggests that the nasal phone [m] [n] and [ɲ] are used as the reference point of articulation to introduce other phones, in order to facilitate the production of phones that require high pressure as [p] and [b] , [t] and [d] and [k] and [g] [14,15]. In a study using EPG, the author found that two-thirds of the group of children with cleft palate produced the [n] at a point significantly more anterior, next to normal, in relation to the phone [t], which was posteriorly compared to an alveolar articulation point[16]. However, it is noteworthy that descriptions of posteriorly articulation points (*backed production*) during the production of the nasal phone [n] have been presented in the international literature[1].

In cases with cleft palate, speech reflects individual adaptations toward particular sequelas, which means that there is great variation in the speech. They contribute to the specificity of each case type and severity of the cleft, timing and technique of surgical lip and palate, complications related syndromes, hearing loss or other diseases, dental/occlusal abnormalities, social factors of schooling, the opportunity to access treatment, among others[12,17].

The difficulty in categorizing articulatory distortions presented by individuals with cleft lip and palate, adds to the imposed limitation to the evaluation focused only on perceptual-auditive observation of the speech, as studies show that this is not very informative next to instruments that allow objective evaluation of speech[11,12]. In this regard, the EPG has been an important resource in the study of articulation of these cases, complementing the perceptual-auditive evaluation of altered speech, thus allowing the detection of a level of articulatory complexity unidentified in only the hearing tests[11,12].

One author made an extensive review of 23 articles published over 20 years, in which the speech was studied with the use of EPG[11]. From the analysis of the findings seen in different articles, it was possible to identify 8 abnormal patterns of contact between tongue and palate that were recurrently observed in the speech committed by cleft palate, namely: 1) a tendency to present the increased contact of the tongue with the palate in time and space dimension, 2) retreat the tongue in alveolar phones and greater use of the tongue, keeping the posterior part high during articulatory productions; 3) velar phones are produced more anteriorly, decreasing the spatial separation of alveolar and velar sounds; 4) complete lingual contact with the palate with sibilant phones and high vowels, 5) open standard, absent or small lingual contact, involving anterior phones that are produced as pharyngeal and glottal articulations; 6) double articulation which uses simultaneously more than one articulation point; 7) increased articulatory variability in repetitions of the same phone; 8) variation in the articulation time.

Studies using the EPG have shown changes in the articulatory production of the nasal phones [m], [n] and [ɲ] in the speech of people with cleft palate. The phone [n] showed great variability in the speech of adolescents with cleft; noting from an adaptation of production to a production with subsequent constriction involving the dorsum of the tongue and, in some productions, a double articulation[12]. The phone [ɲ] also was abnormal, noting a more posterior articulation with velar/uvular constriction[12], or anterior in relation to the velar point[18]. In the production of the phone [m] it could be seen a double articulation, with labial and lingual constriction[19].

The nasal headphones are considered the least affected in the speech of speakers with cleft, since not require velopharyngeal closure for its production. Thus, few studies and, in particular, at the national level, hold themselves describe them in this population. Therefore, the objective of this work was to describe the pattern of contact between the tongue and palate to a speaker with cleft lip

and palate, in the production of nasal consonants headphones Portuguese comparing it to a speaker without articulatory changes. The expectation is that the description eletropalatográfica these headphones can help understanding, evaluation and speech therapy speech of individuals with cleft palate.

The nasal phones are considered the least affected in the speech of speakers with cleft, as it is not required velopharyngeal closure for its production. Thus, few studies and, in particular, at the national level, take the time to describe them in this population. Therefore, the objective of this work was to describe the pattern of contact between the tongue and palate to a speaker with cleft lip and palate, in the production of Portuguese nasal consonants phones comparing it to a speaker without articulatory changes. The expectation is that the electropalatographic description of these phones can help the understanding, evaluation and speech therapy of speech of individuals with cleft palate.

■ **CASE REPORT**

An adult speaker participated in the survey, one who presents speech without alterations, with normal dental occlusion and no history of hearing difficulties or language. The other speaker, also an adult, 21 years old, has born in Belo Horizonte, presents speech disorders resulting from unilateral cleft lip and palate (unilateral cleft lip and palate on the right). He underwent surgery later in, having the lip surgery at nine years old and palate at the age of ten. In the perceptual auditive analysis of the speech of the patient with cleft palate performed by a pathologist experienced in treating people with cleft palate it was observed articulatory imprecision in different phones, especially noise in the lingual fricatives that seemed to be produced in the more posterior region position in the oral cavity. It was also noticed that the bilabial phones (occlusive and nasal) were co-produced with a lingual contact. The side phones had a nearer articulation than the normal range. It was noted little distinction between the nasal [n] and [ɲ] observing a more posterior position of the tongue in the production of [n] with an approximation of the articulatory [ɲ] which is a palate phone. This patient did not undergo objective tests of velopharyngeal function, but with the use of Glatzel mirror, it can be noted that it has nasal air escape in the blow, in the production of vowels and every consonant tested, featuring a velopharyngeal insufficiency. The patient was transferred and is waiting for the instrumental assessment, nasopharyngoscopy, for determining treatment of IVF (secondary Palatoplasty or prosthetic palate).

According to reports, he took speech therapy for a short period, for about a month, when he was about 10 years old. Currently, after these recordings for evaluation of speech articulation using the EPG, this patient is undergoing speech therapy and also the EPG as a therapeutic resource, i.e., providing visual *feedback* to facilitate perception of how to produce phones that presented altered.

Procedures

For recording of the speech speakers used the artificial acrylic palate that is personal and made in an English lab. The speaker without changes in speech, one of the researchers had experience in the use of the artificial palate, so the recording of the corpus occurred naturally. In turn, for the speaker's adaptation with cleft palate to use the artificial palate, he was instructed to use it for an average of 45 minutes before the shooting, while keeping chatting, reading aloud to get used to its use as described in a previous study[20]. After that, each speaker read 6 times the words containing the following phones: bilabial [m], alveolar [n] and palatal [ɲ] preceded and followed by the vowel [a] in stressed syllable, in the middle of words – *ga**m**ada, sa**n**ada and ga**nh**ada*. Those words were part of a larger group of words containing the occlusive, fricative and lateral phones in the tonic position in the middle of the word, which were repeated in a random order. When we consider the influence of adjacent coarticulatory phones in phone production in the study it was requested that speakers also repeated three times, each of these phones in a syllable sequence – CVCVCV with the vowel [a] (for example – mamama, nanana, nhanhanha). The choice of a single vowel aimed to minimize the coarticulatory effect depending on the vowel.

To obtain the data it was used the EPG through the *EPG Reading system* and for analysis, *software Win EPG* and *articulate assistance*. The acoustic signal was obtained concurrently, allowing synchronization of acoustic imaging (spectroscopy) and articulatory (palatogram). Although the acoustic data has been obtained in the present study, we reported only the information obtained through the articulation palatogram.

The linguopalatal contacts were obtained every ten milliseconds (ms) for each speech sequence using the artificial palate, orthodontic type equipped with 62electrodes or sensors. These electrodes are sensitive to tongue contact with the palate, allowing a spatial representation of the articulation of different phones, in time. Such electrodes are arranged in artificial palate in eight rows and eight columns, and it was considered in this study in the anteroposterior direction, the first two lines as alveolar, lines three

and four as post-alveolar, lines five to seven as palatal and the last as velar. All regions have 16 electrodes, with the exception of alveolar which has 14 electrodes (Each square corresponds to an electrode). Regarding the eight columns arranged in the longitudinal axis, the two columns on each side of the palate in this study were characterized as lateral, left and right, and the four columns of the middle, as central. In palatogram the contact areas considered for the analysis are those that appear in black, showing the contact regions of the tongue on the palate (Figure 1).

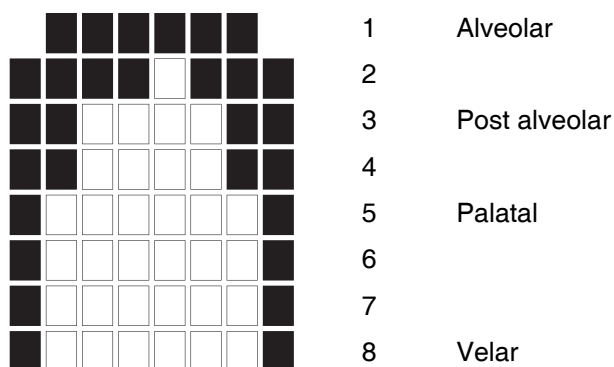|	
1	Alveolar
2	
3	Post alveolar
4	
5	Palatal
6	
7	
8	Velar

Figure 1 – Palatogram showing articulatory contact during the production of the phone [n] and distribution of articulatory regions in the eight lines

Data were analyzed from the visual inspection of palatogram in the point of bigger constriction. At this point one observes the stability of the phone viewed by maintaining the spatial magnitute of the tongue contact with the palate for a certain period of time. There was a general analysis of palatograms considering repetitions of the phone in word and syllable sequence. When there was intra-subject variability in these repetitions, the differences observed were described.

This study was approved by the Ethics and Research Committee from UFMG, under No. 548/09 and the speakers involved signed an informed consent form.

■ RESULTS

As anticipated, the data will be presented considering first the articulatory production of the nasal consonant phones of the normal speaker and then the speaker with cleft palate, based on palatograms sequence obtained during the production of the phone, more specifically, the point of maximum constriction. There were some variations in the repetition of the same phone by the speaker with cleft, which will be referred to when relevant.

In the production of the phone [m] as produced by the normal speaker, there was minimal or no contact of the tongue with the palate, because it is a phone whose constriction is made on the lips and in the vowel phone's positioning that follows. The speaker with cleft when producing such phone in the word and syllable sequence, in the period of maximum constriction, showed complete constriction in the alveolar region and the post-alveolar region, with asymmetry in favor of the left side (columns 1-4). In palatal contact area is limited to the longitudinal axis (columns 1 to 3 and 7 and 8). In the velar region, there is an increasing constriction (Figure 2).
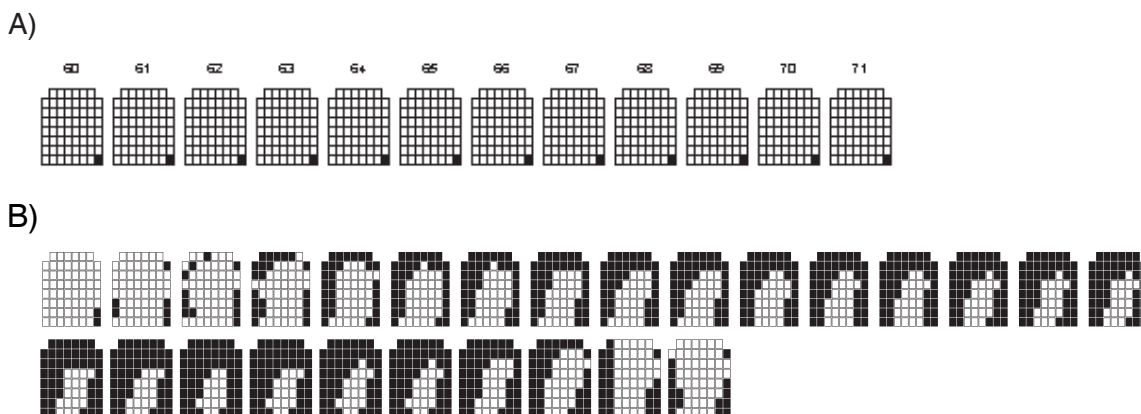
A)

B)

Figure 2 – Sequence of palatograms during the production of the phone [m], by the normal speaker (A) and the speaker with cleft lip and palate (B)

The occlusive alveolar nasal phone [n] was produced by a normal speaker with longitudinal contact from the edges of the tongue from the post--alveolar region to the velar (columns 1 and 8) and only full constriction in the alveolar region, indicating the involvement of the tongue tip in articulation of this phone (Figure 3).

The speaker with cleft showed a greater contact between the tongue and palate during the production of the phone [n] in respect to the normal speaker, both in word and in syllabic repetition. In the period of maximum constriction, the constriction was not complete in the alveolar region but, in the post-palatal. The constriction between the tongue and palate was performed using a standard dorsal closure. In alveolar and post-alveolar regions, there was contact in the left columns (1-4), noting certain asymmetry, with greater contact to the left (Figure 3).

At the point of maximum constriction of the phone [ɲ], produced by the normal speaker, there were contacts of the edges of the tongue to the longitudinal side, a higher concentration of contacts in the palatal and velar region, with a total obstruction in the velar region, evidencing the tongue dorsum elevation possibly to block the passage of the air current into the mouth.

The speaker with cleft showed instability in the production of this phone, making it, sometimes with complete constriction, sometimes without total constriction and this, when present, was produced with the tongue in a more forward position, with more tongue palate contact in the palatal region. The contact in the alveolar region was absent or minimal, restricting itself to a contact on line two and post alveolar region, there was contact in columns one and three on the left side (Figure 4). This pattern of articulatory production also remained in
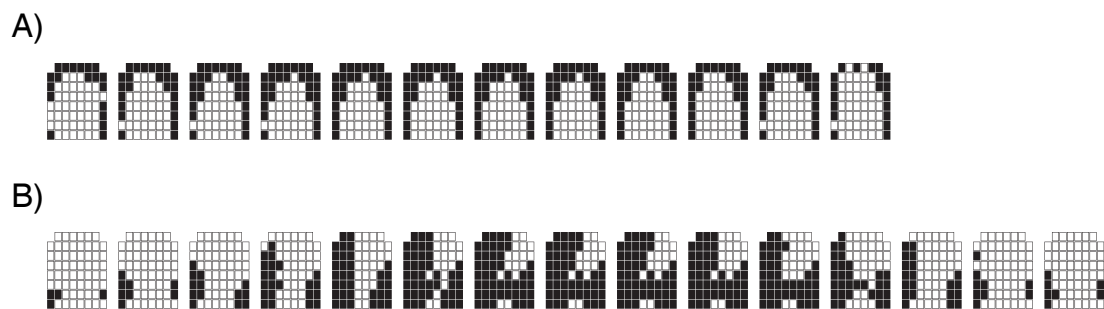
A)

B)

Figure 3 – Sequence of palatograms during the production of the phone [n], by the normal speaker (A) and the speaker with cleft lip and palate (B)

A)

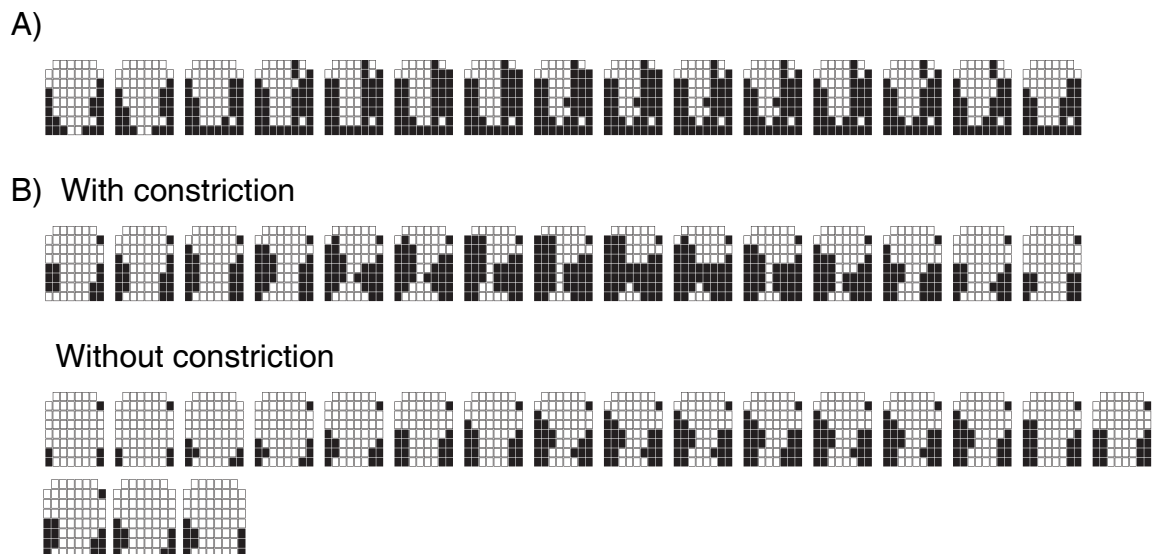B) With constriction

Without constriction

Figure 4 – Sequence of palatograms during the production of the phone [ɲ], by the normal speaker (A) and the speaker with cleft lip and palate (B)

the two phonetic contexts, i.e. in word and syllable repetitions to phone [ɲ].

DISCUSSION

It is considered that the VPD is the main responsible for distortions in the speech of individuals with cleft by hindering the formation of intraoral pressure required to produce occlusive phones[1,2]. Thus, it is natural to consider that nasal phones (especially the phone [m]) are commonly perceived as a production close to the normal range, as it does not depend on an adequate velopharyngeal closure to be produced satisfactorily. The results of this study, however, showed altered production in the three nasal phones evaluated.

The phone [m] was produced by the speaker with cleft with extensive contact between the tongue and the palate initially considered atypical because it is a labial phone. In the analysis of the recordings and even listening to the speech of this patient in spontaneous conversation, a distortion is clear and in certain productions, you hear a buccal *click*, which the speaker refers to it as "estalinho", when referring to his own speech. Such *clicks* are identified in cases with cleft during the production of different phones, including [p], also bilabial[21,22]. This seems to be a more general pattern of production for this speaker which would also reflect in the nasal phones, as seen for the production of other phones, like [p] and [b] that goes beyond the scope of this study.

This pattern with increased contact in the case of this speaker with cleft, may be due to articulatory patterns established during the speech learning, when the cleft lip was still open, which hindered bilabial constriction, causing the speaker to seek another place in the oral cavity to do so. However, we note that currently, the speaker makes a double articulation, also doing bilabial constriction. This behavior can be a developed compensation by the speaker, under the influence of therapies he may have underwent which can have been valued the need for bilabial occlusion for the production of such a phone.

The speaker with cleft showed greater variability in the magnitude of contacts for different phones cavities in different repetitions, when compared to a normal speaker, corroborating other studies[11,12]. The phone [m] may have been performed with different magnitudes for this speaker, leading the listener to understand at certain times the buccal *click* and in other an "acceptable" [m].

In clinical practice, the therapist may possibly have difficulty in evaluating the speech of individuals with cleft before similar productions to this phone [m]. This may happen for expecting this nasal phone to be produced properly as it is not astressed consonant, or if there is a change in the production, which is due to sequelas from the lip surgery, making the bilabial contact difficult and not being what occurs in this case. Adding to this the difficulty in categorizing such error production among the expected compensatory articulation for speech in cleft[2,5-9]. This articulation pattern, however, is described in studies which use EPG, noticing a tendency in the speech of people with cleft to submit the contact tongue palate increased in time and space dimension[11]. However, this increase in the magnitude of the contact is most often mentioned in the literature for the production of stressed consonants, not being the case of the nasal phone [m][11].

The phone [n] was produced with the increased contact tongue palate, in its entire length, with a retreat of the tongue to the realization of the constriction, which occurred in the palatal region. In the production of this phone, only the tip of the tongue contact the alveolus and the edges of the tongue on the palate would be sufficient to produce it distinctly from other aureoles, as seen in speech of the ordinary informant. However, this speaker with cleft makes a different contact, wider, with the back of the tongue touching the middle part of the palate. This pattern can refer to the "mid-dorsum palatal" articulatory compensation[2]. This compensatory articulation may be present in cases of palatal fistulas, and this positioning of the tongue an attempt to occlude the fistula to prevent the air to be directed to the nasal cavity[23,24]. However it is not the case with this speaker that has no palatal fistula. In this case, the realization of the tongue palate contact at a later point to the alveolar region, can be behavior developed when the palate was still open before palatoplasty (performed later, at the age of 10), by the difficulty of establishing the constriction in the ideal region.

Interesting to note that in many cases the distortions in the realization of the phone [n] are perceived as acceptable[12]. So it is important that the auditive-perceptual assessement of speech is combined with objective assessments, allowing one to check whether the nasal sounds are actually being produced properly, or are being accepted/heard as typical as a result of the magnitude of the adjustments of the articulators involved. An impediment to this is about which resourse to use, as in cases with cleft, the most common objective evaluations by speech therapists aim to analyze anatomical and physiological data of the velopharyngeal mechanism as aerodynamic measures and pressure-flow nasopharyngoscopy and videofluoroscopy[25, 26]. This latter, though also allowing the

registration of the movement of the tongue has the drawback of exposing to radiation the speaker[25] during the examination. Acoustic studies currently very useful for the study of speech analysis are not easy in the case of open cleft and/or residual DVF, once the coupling of oral and nasal cavity causes nasal formants and anti resonances impede reading of spectrographic vowel and consonant segments[27]. Thus, EPG, is shown as a privileged resource for the articulatory study of this population. However, the fact that it requires the use of the individual artificial palate with electrodes, whose manufacturing is done only outside of Brazil, hampers, for now, the widespread use of this resource in clinical practice, as it would be desirable.

The phone [ɲ] was produced by the speaker with cleft with the tongue more advanced compared to what occurred in the speech of a normal subject, with constriction, when present in the palatal region, similar to what happened with the phone [n]. This close articulation between the two phones causes to have little difference when them, considering spontaneous speech and recordings that make up this work, especially in syllable repetitions. Such proximity articulation can be explained partly by the fact that [ɲ] is an uncommon phone in the Brazilian Portuguese and therefore, in the context of speech, it is unlikely to be confused with another nasal phone, which allows certain articulatory variability, and are variations in the production of various words (such as "companhia" –company- for example).

Visual inspection of palatograms shows that although the articulatory adjustments are similar between the two phones, there are differences in the magnitude of the same, with the phone [n] a distribution of contact across all the palate and on the phone [ɲ], there was a higher concentration of the contact on the palatal and velar region and enabling the establishment of certain difference between them.

The fact that there is constriction in some of the productions of the phone [ɲ], which occurred randomly between repetitions of words and syllables in the sequence, can be explained by the fact that the patient has a natural nasal quality in the different phones of the language not depending on the obstruction of air flow in the oral cavity to characterize the phone as nasal or *other adjustments could be occurring but it is not identified in the procedures performed in this work which could be verified by other objective measures.*

A natural question before the change in speech is about the organization of the phonological system of that speaker, i.e. phonic contrasts which he kept during the production of nasal phones. The normal speaker contrasts the predominantly with minimal contact between the tongue and palate on the phone [m], previous contact, the alveolar [n] and posterior palatal/velar contact in [ɲ]. The speaker with cleft presented adjustments less differentiated than the subject with typical speech, but it still allowed scoring phonic contrasts between nasal phones produced. In the phone [m] there is a wide touch that adds to the bilabial constriction, in the phone [n] there was greater contact of the tip of the tongue with the palate, although only the left side which did not occur on the phone [ɲ] in which the contact occurred with the dorsum of the tongue. Thus, this speaker with cleft established somehow some contrast between consonant nasal phones and bilabial, alveolar and velar target, seen by EPG.

As it was not done an auditory perception study, there was only a brief comments regarding the perception of the authors to the auditory discrimination between the phones through the text, it is not yet clear whether these differences in visual inspection of palatograms certainly distinguish nasal phones occur in sufficient magnitude to be perceived by the listener. Apparently these are covert contrast which, though present, is not rescued perceptually. These data corroborate studies that show through objective evaluation of speech that this phonemic distinctiveness is perceived[12]. In a study where there was proximity of the alveolar and velar targets /t/ and /k/, listened as mid-dorsum palatal plosive, and statistical analysis revealed through numerical indices provided by the EPG, that there was significant difference between the two targets, although the perceptive evaluation indicated a neutralization of the articulation point[28]. The authors highlight the importance of this fact, as it allows to differentiate "errors" that are phonetic, from those which have phonological base.

It is observed that speakers with cleft palate have a tendency to keep the contrast between oral and nasal phones in the production of vowels and consonants, both in regard to the aspects concerning the aerodynamic and acoustic pressure and flow[26,27]. The restrictions on the size of the palate, surgical sequelae, dental changes can make it difficult to make adjustments in the language of sufficient magnitude within the oral cavity for speech production in order to produce different targets. However, despite these limitations the studies support the fact that these speakers seek to make distinctions between phonemic phones[12,28,29].

It is observed in these articulatory productions presented by this speaker with fissure that, although with altered point, all constrictions occurred in the oral cavity, which brings less speech intelligibility. This must be a common tendency when it comes

to nasal phones, and why such distortions are more acceptable by the listener[12].

The production form of the nasal phones by the speaker with cleft lip and palate in the present study fits in many respects, the patterns presented from data obtained with the use of EPG[11], such as the tendency to have greater contact between the tongue and palate, decline of the language in alveolus phones, double articulation and increased articulatory variability, emphasizing the importance of this descriptive feature for the analysis of speech with changes.

This study has important implications for clinical practice. The speech analysis, based only on perceptual assessment, associated with descriptions of articulatory movements is subject to many limitations. The eyes and ears, though important for clinical diagnosis, are not always able to identify the settings for articulatory speech production[12,23,28]. Comparisons between perceptual and instrumental assessments show the limitations of the first[12,29]. Given the inherent difficulties to the perceptual evaluation to identify what is "inappropriate" in speech production in cases with cleft palate, making use of only this evaluation parameter, can fail to consider important information that can point to the direction of the therapeutic intervention necessary to stimulate the changes in the articulatory pattern. Thus, actions should be implemented to provide therapy resources that allow the speaker to have a greater understanding of what is inappropriate in his speech, what needs to be changed and how to change. The use of electropalatography in the therapeutic process as a resource for visual feedback has been used with very good results[30], and it could mean an alternative to further qualify the speech making, regarding the evaluation, treatment and monitoring of cases.

Future studies involving a larger number of Portuguese speakers with cleft lip and palate, and the production of other consonants and vowels, may help in the understanding of which resources the speaker uses to make himself understood, despite the limitations of the anatomical and functional velopharyngeal mechanism.

The scarcity of studies involving nasal phones in the speech with cleft palate may result from a natural expectation that these phones are easily produced by speakers with cleft because they are not among the stressed consonants. This expectation can be enhanced by auditory impression that these phones are being produced properly, as the simple nasal resonance imposed on them gives them the status of nasal phone not requiring much accuracy as to articulation point in their production so that they are perceived as such. Thus, objective measures of the different parameters involved in the production of the phones of the language, especially in cases with impaired speech, are required in order to better clarify the complexity involved in the articulatory production.

■ CONCLUSIONS

Every analyzed phone, produced by the speaker with cleft showed variations in the region of the articulatory constriction which occurred in relation to the normal speaker. In the phone [m] there was contact between the tongue and palate, even in being a bilabial phone; in phone [n] there was a decrease of the tongue with palatal constriction in the region, and in the phone [ɲ] constriction occurred in a more anterior region than the normal speaker, with advance of the tongue. However, it is also noted that the speaker with cleft palate articulation made adjustments that allowed the realization of contrasts, possibly hidden, between the nasal phones.

This work highlighted the importance of instrumental assessment such as EPG, for speech analysis in cases of cleft lip and palate.

RESUMO

Esse estudo tem como objetivo descrever o padrão de contato entre a língua e o palato para um falante com fissura labiopalatina, na produção de fones consonantais nasais do português comparando-o a um falante sem alterações articulatórias. Por meio da eletropalatografia, são examinados os fones consonantais nasais [m], [n], [ɲ] no ponto de máxima constrição, verificando a região articulatória dessa constrição, por meio dos palatogramas fornecidos pelo programa de análise. Tais dados foram obtidos de um falante com alterações de fala em decorrência da fissura labiopalatina e de outro sem tais alterações, para efeito de comparação. Todos os fones analisados, produzidos pelo falante com fissura, mostraram variações quanto à região articulatória em que ocorreu a constrição, em relação ao falante normal. No fone [m] ocorreu simultaneamente oclusão labial e lingual, com amplo contato, quando o que se espera é coprodução com a vogal que se segue; no fone [n] houve recuo da língua, com constrição na região palatal; e no fone [ɲ] a constrição ocorreu em uma região mais anteriorizada, em relação ao falante normal, isto é, com avanço da língua. Tais produções consonantais eram percebidas auditivamente como distorções, mas não havia uma caracterização clara dos ajustes articulatórios usados na sua produção. Os fones nasais podem apresentar-se alterados na fala de indivíduo com fissura palatina, sendo a eletropalatografia um recurso tecnológico que possibilita a observações detalhada dessas alterações na fala.

DESCRITORES: Fala; Distúrbios da Fala; Fissura Palatina; Diagnóstico

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