BREATHING FUNCTION IN SUBJECTS WITH DENTOFACIAL DEFORMITIES

Função respiratória em indivíduos com deformidades dentofaciais

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ABSTRACT

Purpose: to characterize the respiratory function in individuals with dentofacial deformities in relation to upper and lower airways, as well as the aspect of breathing focused on phonation. **Methods:** 40 adults, divided in three groups: control group (CG), dentofacial deformity II and dentofacial deformity III, being the last two in orthodontic treatment for orthognathic surgery. The clinical exam of MBGR Protocol was applied for type and breathing mode, nasal airflow, nasal possibility and obtain the score of the protocol; spirometry to assess respiratory capacity; expiratory airflow using graded mirror to calculate the area of haze and measuring the time of phonation of /s/. **Results:** there was a higher incidence of medium/high breathing type for all groups. Was evidenced statistical difference for the breathing mode, with most participants with dentofacial deformities oro-nasal or oral respirators; in the nasal expiratory flow, the dentofacial deformities subjects had unilaterally reduced flow; with regards to the possibility of nasal use, dentofacial deformity II group had a greater number of individuals with prejudice; in the score, the dentofacial deformity II group showed the worst results. Individuals with less possibility of nasal use had lower área of haze of the graded mirror and lower phonation time of /s/. For the mouth breathers was evidenced lower phonation time of /s/. Statistical analysis showed no difference between the groups in objective tests. **Conclusions:** Individuals with dentofacial deformities showed medium/high type of breathing, oral or oro-nasal mode, reduced expiratory nasal flow and respiratory support for phonation; injury in the possibility of nasal use and the presence of oral breathing influenced the use of expiratory air for speech.

KEYWORDS: Respiration; Spirometry; Maxillofacial Abnormalities

INTRODUCTION

The dentofacial deformities (DFD) are severe forms of malocclusion that require a combined orthodontic and orthognathic surgical treatment. These malocclusions can affect one or two bony bases of the face in the vertical, horizontal and transverse planes, both in isolated and combined ways, causing different types of deformities[1]. The adult individuals with maxillomandibular disproportions have specific orofacial myofunctional characteristics according to the type of disproportion they present. These functional imbalances are actually adaptations, considering each pattern of bone bases[2].

Regarding the etiology, there is a hereditary component that determines the dentofacial morphology, which can be modified by the environment before birth[3]. Regarding the developmental defects of unknown etiology[4], the literature reports them as very rare, probably caused by a failure of differentiation in the embryonic period. According to the author, the pre and post natal trauma can result in dentofacial deformities and, after birth, it can occur fractures of the jaws and teeth; microtrauma from parafunctional habits and TMJ trauma too. Besides that, the diet essentially softened seems to perform a role in the etiology of some malocclusions[4].

The influence of the breathing function on the development of orofacial structures has been widely

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discussed. According to the “Moss`s Functional Matrix” theory, the nasal breathing provides adequate growth and development of the craniofacial complex interacting with other functions such as chewing and swallowing. Such theory is based on the principle that the facial growth is intimately associated with the functional activity, represented by different components of the head and neck area[5].

Therefore, nasal breathing represents a fundamental factor in the craniofacial growth and in the maintenance of the balance of the stomatognathic system. The inspiration and expiration movements that promote pulmonary ventilation can be affected in cases of skeletal malocclusion due to an excessive use of the accessory inspiratory muscles, which can cause posture alterations. Factors such as oronasal breathing, apical ventilating pattern, tension and anxiety, common in subjects with this deformity, can be pointed as the main responsible for these alterations[6].

Literature is vast on the association between breathing, facial morphology and dental occlusion. The lack of harmony in the soft tissues causes changes in the craniofacial morphology and induces malocclusion. Some of the alterations that can be caused by mouth breathing[7,8] are: increase in the lower third of the face, atretic and deep palate, retroclined incisors, increase in the lower face width, open bite and crossbite. After resuming the nasal breathing, generally due to medical treatment involving surgery, it is possible that the soft tissues return to normality, but the occlusal disorder remains[3].

Many studies evidence that dentofacial imbalances interfere in the breathing function of these individuals' upper airways, and that the improvement in the nasal area occurred by means of surgical or orthopedic jaw expansion[9-11]. Regarding the lower airways, a study carried out considering the breathing and phono - articulatory characteristics in individuals with DFD found values of maximum phonation time[12].

Keeping in mind that the breathing function has an important influence in the craniofacial growth and development, and that adults with DFD can have oral respiration, it's necessary to study this function in these individuals. Besides, the relationships between the aspects of the upper and lower airways are seldom explored in the literature; this knowledge will enable a better understanding of the breathing conditions of these individuals, impacting on the prognostic.

Therefore, the aim of this study was to characterize the breathing function of individuals with DFD in relation to the upper and lower airways, as well as the aspect of breathing regarding phonation.

METHODS

This is a case-control study approved by the Ethics in Human Research Committee of the Bauru School of Dentistry - Universidade de São Paulo, process number 049/2009. All individuals signed the informed consent form.

We included 40 individuals aged 18 to 40, 20 male and 20 female. The individuals were divided into three groups balanced by gender and age: CG (14 individuals with dentofacial balance, Class I and Pattern I); DFD II (12 individuals with DFD, Class II and Pattern II) and DFD III (14 individuals, Class III and Pattern III); the last two groups were undergoing preparatory orthodontic treatment for orthognathic surgery.

The control group consisted of healthy individuals, considering both general and oral health, with good relationship between the dental arches with vertical and horizontal overlap between 1 and 3mm, natural dental elements up to the second molar, medium facial type and nasal breathing. In addition, they presented no body posture alteration when evaluated by a physiotherapist. All these control group cases were interviewed for the survey of the phonoaudiologic clinical history, as well as for an orofacial Myofunctional evaluation through the use of the MBGR[13] Protocol to verify if they met the inclusion criteria.

The exclusion criteria consisted of phonotypical signs of syndromes, smoking habits, conditions of chronic pulmonary obstructions, rhinitis and/or sinusitis, diagnosis of septum deviation, enlarged pharyngeal and palatine tonsils, intellectual deficits, neurological disorders, psychiatric disorders, rheumatic diseases, history of jaw fracture and individuals with vocal alterations and/or that had undergone previous oral and maxillofacial or larynx surgery. These data were obtained through the reports of the individuals who answered a questionnaire with questions on these aspects.

The research participants were distributed in three groups balanced according to gender and age (average age of 24.9 years). Group I (CG) consisted of 14 young adults with dentofacial balance with Class I and Pattern I. Group II (DFD II) consisted of 12 individuals with dentofacial deformity classified as Class II and Pattern II. Group III (DFDIII) consisted of 14 individuals with dentofacial deformity classified as Class III and Pattern III.

Procedures

All individuals were cared for at the Speech Pathology Clinic in the institution of origin and followed the evaluation protocols proposed by this research, they were also submitted to specific instrumental evaluations as reported later in this paper. Next, we will present the evaluation procedures to which all cases were submitted.

Clinical evaluation of the breathing function

For the clinical evaluation of breathing, all items contemplating this aspect in the MBGR Orofacial Motricity Protocol were analyzed, considering the answer possibilities and the scores attributed by the authors[13].

The breathing type was evaluated through the observation of the individual while resting and standing, by touching the abdominal and thoracic regions; it was classified in three types: upper, in which there is expansion of the upper part of the thoracic cage, causing the shoulders to rise and sometimes causing anterior deviation of the neck; medium, in which there is little upper or lower movement during respiration; lower, in which there is no movement in the upper region, which usually presents itself as hypo developed and with anterior rotation of the shoulders and expansion of the lower region. According to the MBGR Protocol[13], the terminology and the scores for the breathing types used were: lower medium (score 0), upper medium (score 1).

Regarding the breathing mode observed through the observation of the individual while resting for 1 minute, the position of the lips, jaw and tongue was verified, noticing the presence of any sealing point of the oral cavity; it was classified as nasal, oronasal or oral. The individual that remained with the jaw elevated, the lips in contact and/or the tongue in contact with any region of the hard palate during resting was classified as nasal (score zero). When the jaw was lowered, lips were semi-open and there was non-systematic sealing of the oral cavity while resting, the classification attributed was oronasal (score 1). The individuals classified as oral breathers (score 2) presented lips opened while resting, lowered jaw and lowered tongue at the floor of the oral cavity.

To verify the possibility of using the nasal airway for breathing, the individuals were asked to keep a small amount of water inside the mouth for 2 minutes. The time they kept the sip of water inside the oral cavity suggests the possibility of nasal use for breathing, classified as: more than 2 minutes (score zero), between 1 and 2 minutes (score 1) and less than 1 minute (score 2).

The expiratory airflow was also observed by using the millimeter nasal Altmann mirror that was placed under the participants` nostrils. We took care to keep the metal plate cooled with the aid of alcohol applied with a paper handkerchief before initiating the test. The area relating to the nasal expiratory airflow viewed through the haze of the plate was marked with a proper pen. This procedure was carried out during 20 seconds to involve at least 3 breathing cycles and to be sure of the area of haze, which corresponds to the condensation of air particles[14].

From the marks on the mirror, the expiratory air flow was classified as symmetrical (score zero), reduced to the right (score 1) or reduced to the left (score 1). In this study, the measurement was performed without cleaning the nostrils, using the metallic plate cooled with gaze soaked in 70° GL (Gay Lussac) alcohol, placed under the patients nostrils and asking them to breath normally, not forcing the flow. The nasal cycle, a phenomena characterized by the alternation of periods of greater nasal resistance between the nasal cavities[15], was considered for interpreting the data. Therefore, the score referring to normality was attributed to patients that presented one nostril with a flow slightly different from the other, since the nasal resistance remains constant despite the change that occurs in both nasal cavities.

After making the haze measurement on the plate, the design formed was transcribed to a millimetered paper sheet and then digitalized. In order to calculate the area, the records were measured by tracing an exact line over the transcription of the millimetered paper sheet with the aid of the Image Pro Plus software, commonly used for measuring the cells. Thus, it was possible to obtain the measurement of the haze area of the metallic plate in cm².

Instrumental evaluation of the breathing function

The vital capacity was verified through spirometry using the 12 liter Pony FX spirometer. The individuals remained comfortably sat in a chair with feet and arms resting on supports. A mouthpiece, connected to a trachea and to the spirometer was placed in the vestibule of the mouth; the participants were asked to breath normally until they got used to the system[16]. Then, a maximum inspiration was asked followed by a pause of some seconds and a maximum expiration in the form of forced blow. The vital capacity test was performed with the nostrils covered, we asked the patients to expire all the air at the mouthpiece of the tube of the device, performing maximum expiration. During the expiration, the evaluator verbally stimulated the individuals to perform the expiration the longest way possible; the procedure was repeated three times in order to calculate a mean of the three values obtained, in liters.

The air support available, intimately related to the breathing pattern, was evaluated by asking the patient to emit the sibilant sound /s/, by measuring the duration of the sound recorded on the Sound forge 9.0 software (Sony), in a sampling rate of 44.100hz, Mono channel, in 16bit, only once whenever it demonstrated understanding and the result of the exams was coherent. Whenever a lack of understanding was detected, the exam was performed again. The recording happened in an acoustically treated studio directly to the computer through an AKG headset microphone, model C444PP, connected to a Creative sound card, model Audigy II, placed laterally at sixty degrees, 10 cm away from the lips.

For obtaining the measurement (in seconds), the beginning and the end of the phonation were carefully selected. Once the generated image was selected, the program automatically provides a number, in seconds, which is the phonation time of the individual.

Statistics

In the comparison between groups, the Kruskall-Wallis test was used to compare the quantitative variables (MBGR score), while the t-test was chosen to compare the qualitative variables (breathing type and mode, expiratory air flow and possibility of nasal use).

The ANOVA test was used to compare the qualitative variables (breathing type and mode, expiratory air flow and possibility of nasal use) with the quantitative variables (haze area of mirror, vital capacity, phonation time of /s/ and MBGR score).

In addition, the Pearson Correlation analysis was used for the quantitative variables (MBGR score, vital capacity and phonation time of /s/).

RESULTS

The results presented in Table 1 showed that all individuals with dentofacial deformity had medium/upper breathing type, as well as most individuals from the control group. All the CG participants in this research had nasal breathing. While 78.57% of the individuals in the DFD III group had oral or oronasal breathing mode, and all the individuals in the DFD II had oral breathing mode (p=0.001). Regarding the score of the breathing function of the MBGR Protocol, the DFD II group had the highest scores, i.e., the worst results. When compared with the other groups through a statistical test, a value of p<0.001 was found.

Regarding the objective tests (haze area of the Altmann mirror, vital capacity and available air support), the statistical analysis showed no significant difference between groups for all aspects considered (p>0.05). However, it was possible to observe smaller haze areas for individuals with a lower possibility of nasal use (p=0.036). These results are shown in Table 2.

In table 3, when verifying the breathing type and the means of haze area of the Altmann mirror, vital capacity (VC) and phonation time of /s/, we observed a tendency of medium/lower breathers to show a higher mean of vital capacity although no statistically significant difference was reached for this comparison.

When comparing the breathing mode with the objective evaluation (Table 4), we verified a lower phonation time of /s/ for oral breathers (p=0.007).

Table 5 shows the comparison between the symmetric flow and the mean of the vital capacity and the phonation time of /s/, as well as between the reduced expiratory flow, the mean of the vital capacity and the phonation time of /s/. However, the statistical analysis showed a value of p>0.05 for these comparisons.

It was also possible to observe a lower phonation time of /s/ in individuals with a lower possibility of nasal use (p = 0.002), as shown in Table 6.

Finally, Table 7 shows data on the correlation between the MBGR Protocol scores and the results of the vital capacity, as well as between the MBGR Protocol scores and the phonation time of /s/. We observed a negative correlation of moderate strength between the MBGR Protocol scores and the phonation time of /s/, demonstrating that the higher the scores of MBGR, the lower the /s/.

Table 1 - Presentation of the percentage and number of individuals for breathing type and mode, expiratory flow, possibility of nasal use and score corresponding to the breathing function of the MBGR Protocol.

Evaluated aspect CG		Groups DFDII	DFDIII		p-level
Type	Medium/Lower	28.57% N=4	25.00% N=3	14.29% N=2	0.644
	Medium/Upper	71.43% N=10	75.00% N=9	85.71% N=12	
Mode	Nasal	100% N=14	8.33% N=1	21.43% N=3	0.001
	Oronasal	0% N=0	50.00% N=6	71.43% N=10	
	Oral	0% N=0	41.63% N=5	7.14% N=1	
Expiratory air flow	Symmetric	85.71% N=12	16.67% N=2	50% N=7	0.002
	Reduced	14.28% N=2	83.33% N=10	50% N=7	
Possibility of nose breathing	> 2 min	100% N=14	50% N=6	57.14% N=8	0.001
	Between 1 and 2 min	0% N=0	8.33% N=1	35.71% N=5	
	< 1 min	0% N=0	41.67% N=5	7.14% N=1	
MBGR Score	1	28.57% N=4	0% N=0	0% N=0	0.001
	2	54.14% N=8	8.33% N=1	7.14% N=1	
	3	14.29% N=2	8.33% N=1	42.86% N=6	
	4	0% N=0	33.33% N=4	35.71% N=5	
	5	0% N=0	8.33% N=1	7.14% N=1	
	6	0% N=0	35.00% N=3	7.14% N=1	
	7	0% N=0	16.67% N=2	0% N=0	

Statistical test: Kruskal-Wallis for quantitative variable, and t-test for qualitative variables

Table 2 - Presentation of the results reached by measuring the haze area of the Altmann mirror in cm², the vital capacity in ml³ and the phonation time of /s/ in seconds.

Objective evaluation		Groups			p-level
CG		DFDII	DFDIII		
Haze area	Area ± sd	25.57 ± 7.81	19.88 ± 6.29	20.82 ± 9.27	0.169
Vital capacity	Mean VC ± sd	4.25 ± 1.03	3.63 ± 1.02	4.094 ± 0.90	0.272
Time /s/	Air support ± sd	16.42 ± 4.45	11.75 ± 6.70	12.95 ± 4.60	0.072

Statistical test: Kruskall-Wallis

Table 3 - Presentation of the comparison between the respiratory types according to the measures of the haze area of the Altmann mirror in cm², vital capacity in ml³ and phonation time of /s/ in seconds, considering all the evaluated individuals.

	Type		p-level
	Medium Lower	Medium Upper	
Mean area ± sd	22.63 ± 8.41	22.01 ± 8.19	0.842
Mean VC ± sd	4.27 ± 0.94	3.93 ± 1.00	0.374
Mean /s/ time ± sd	12.45 ± 4.16	14.19 ± 5.84	0.410

Statistical Test: ANOVA
sd= standard deviation
VC= Vital Capacity

Table 4 - Presentation of the comparison between the respiratory modes according to the measures of the haze area of the Altmann mirror in cm², vital capacity in ml³ and phonation time of /s/ in seconds, considering all the evaluated individuals.

	Mode			p-level
	Nasal	Oronasal	Oral	
Mean Area	23.98 ± 7.52	22.53 ± 8.34	15.63 ± 7.21	0.088
Mean VC	4.10 ± 1.00	3.97 ± 0.90	3.84 ± 1.31	0.847
Mean /s/ time	16.05 ± 5.43	13.32 ± 5.01	8.35 ± 2.53	**0.007**

Statistical Test: ANOVA
VC = Vital Capacity

Table 5 - Presentation of the comparison between nasal expiratory flow characteristics according to the vital capacity in ml³ and phonation time of /s/ in seconds, considering all the evaluated individuals.

	Flow		p-level
	Symmetric	Reduced	
Mean VC ± sd	4.17 ± 0.93	3.93 ± 1.09	0.538
Mean /s/ time ± sd	14.21 ± 3.82	11.81 ± 5.35	0.587

Statistical Test: ANOVA
sd= standard deviation
VC= Vital Capacity

Table 6 - Presentation of the comparison between the possibilities of nasal use according to the measures of the haze area of the Altmann mirror in cm², vital capacity in ml³ and phonation time of /s/ in seconds, considering all the evaluated individuals.

	Possibility		p-level
	More than 2 min	Less than 1 min	
Mean Area ± sd	24.18 ± 801.12	15.63 ± 721.46	**0.036**
Mean VC ± sd	4.18 ± 0.88	3.84 ± 1.316	0.180
Mean /s/ time ± sd	15.62 ± 5.34	8.35 ± 2.53	**0.002**

Statistical Test: ANOVA
sd= standard deviation
VC= Vital Capacity

Table 7 - Presentation of the results obtained to the correlation of the score of the MGBR Protocol with the measurement of vital capacity and with phonation time /s/.

	R	t(N-2)	p-level
MBGR and VC	-0.23	-1.425567	0.162
MBGR and time /s/	-0.47	-3.313554	0.002

Pearson Correlation Test
VC = Vital Capacity

DISCUSSION

Considering that the breathing function has an important effect on craniofacial growth and development, and that adult individuals with dentofacial deformities may have oral breathing, it's important to study this function in such individuals. In addition, the relations between aspects of upper and lower airways are poorly discussed in the literature and such knowledge is necessary to better understand the respiratory conditions of these individuals, with implications for the treatment plan and prognosis.

Knowing that individuals with dentofacial deformity may have impairments related to the orofacial functions, this study data demonstrated that in the presence of DFD, a higher occurrence of respiratory alterations was found regarding some breathing aspects when compared with the control group.

This study showed that all individuals with dentofacial deformity had upper/medium respiratory type as well as most individuals in the control group. In a study on the vocal aspects of professional voice users, the authors verified that most participants showed a mixed breathing type, which corroborates with our research despite the different population studied and the different classification criteria adopted[17]. According to concepts of physiology, the medium/lower respiratory type is considered the ideal since this pattern enables complete expansion and contraction of lungs, through the diaphragm up and down movements, which vary the volume of the rib cage during the processes of inspiration and expiration, respectively[18]. Therefore, we expected to find the medium/lower breathing type in the CG; a possible explanation for the results obtained is the subjectivity of the evaluation procedure for breathing type, besides the fact that such evaluation was carried out while the patient was resting. While resting, there is no need for a large abdominal and thoracic expansion. The individual inspires only the amount of air needed for gas exchange and oxygen level maintenance for a proper functioning of the organism. In contrast, in the function of speech, while singing, or even in a physical exercise, there is a need of a greater use of air, and the breathing pattern is adapted to the required functional demand. When individuals sing, the breathing process needs to suffer an alteration. While singing, the expiration – a usually passive process - will become an active action, and will take longer than the inspiration, i.e., the breathing needs to be controlled[18]. Thus, possible differences can be found between individuals with DFD and those with dentofacial balance using tests that require breathing control. It's important that future studies consider such aspects.

All control group participants in this study, with dentofacial balance, had nasal breathing. While 78.57 % of the individuals of the DFD III group had oral or oronasal breathing mode, and all individuals of the DFDII had oral breathing. Impairments in the craniofacial growth may be due to several factors, including the presence of chronic mouth breathing among others. Chronic mouth breathing requires posture changes of anatomical parts, resulting in the lowering of the jaw, displacement of the tongue down and forward, as well as influencing the posture of the head, which is protruded above. These alterations may interfere with the growth direction of the mandible and teeth[19], and the oral and oronasal breathing mode can be considered in the etiology of maxillomandibular disproportion presented by individuals in the DFD II and DFD III groups.

Oral and oronasal breathers had a lower possibility of nasal use (<1min) compared with nasal breathers (>2min), which may be related to the breathing mode. In this study, we used the "water test", which considers that individuals who remain for a few moments with water inside their mouths and lips closed don't have any breathing problems. This test aims to understand whether there is nasal obstruction or oral breathing occurs by an installed habit, i.e., if the breathing type is oral and the patient can nose breathe for more than two minutes, it possibly refers to a habit; however, if the time is lower than a minute, there is the hypothesis of nasal obstruction[20]. The authors who proposed the MBGR Protocol, whose breathing evaluation was used in this research, consider that, if the individuals remain with water in the mouth less than a minute, they possibly have some obstructive factor in their nasal breathing. We suggest the Otorhinolaryngology evaluation be considered in future studies, enabling diagnosis of septal deviations, rhinitis, sinusitis and hypertrophy of palatine and/or pharyngeal tonsils. Additionally, for further studies, we suggest to include other instrumental evaluations, such as the acoustic rhinometry, which is a technique of objective evaluation of the nasal patency that allows to determine the cross-sectional area of any point between the nostril and the nasopharynx, providing accurate data[21,22].

Regarding the haze measure of the mirror, related to the expiratory airflow, we didn't find any difference between the groups. However, individuals with a lower possibility of nasal use showed a smaller haze area in the mirror. Regarding this aspect, we found a study in the literature made with children, in which the haze areas of pre and post nasal cleansing were measured, but the authors didn't address any of the issues studied in this research[22]. It is believed that oral breathers present certain disuse of the nasal passage, which explains the relation between the nasal use and the haze area of the mirror.

In addition, the obtained results showed that the smaller the possibility of nasal use, the lower the phonation time of /s/. Likewise, the oral breathers showed a lower oral phonation mean time compared with the nasal and oronasal breathers, i.e., a lower support of air available to phonation. There aren't any similar studies to this research regarding the phonation time and the possibility of nasal or oral breathing. It is believed that the relation between these aspects is explained by the fact that breathing occurs exclusively through the mouth, as while speaking, the individual ends up just expiring, and thus there is an immediate need to inspire again. We can say that there is some kind of competitiveness between the speaking and breathing in oral breathers.

The results of vital capacity, obtained by spirometry, showed that patients with dentofacial deformities had the same performance as the control group. One possible hypothesis to explain this is related to the fact that the test performed during the examination shows a maximum activity of stimulated mode since participants in the different groups studied in this research didn't show pulmonary limitations. What causes the change in vital capacity are lung diseases, especially the chronic obstructive ones as reported in the study carried out with asthmatic oral breathers, who went through physical training; It was possible to find that these individuals have a reduced vital capacity, which was not adequate after physical training[23].

However, when the use of the lung air is requested to the function of speech, which was measured by the phonation time, we observed the use of air is different between the groups. The group GC showed higher phonation time (16.42 seconds) compared with the DFD II (11.75 seconds) and DFD III (12.95 seconds) groups. The same behavior was observed in another study[12], in which there was a statistical difference for the phonation time of /s/ in the comparison made between groups with DFD and the CG: the DFD group showed a lower phonation time of /s/, i.e., less support of air available for the speech function.

Finally, with the results obtained in this research, it's important to discuss the therapy focused on breathing function performed with patients in the clinical practice of Orofacial Motricity. Accordingly, we emphasize that it is not possible to address an orofacial function alone as they all correlate somehow. It is important to expand the therapeutic approach, also considering the function of breathing for speech in individuals with DFD.

CONCLUSION

We conclude the individuals with DFD in this study showed measures of vital capacity within normal parameters, medium/upper respiratory type, oral or oronasal mode, reduced nasal expiratory flow and respiratory support for phonation; the impairments in the possibility of nose breathing and the presence of oral breathing affected the use of the expiratory air for speech.

RESUMO

Objetivo: caracterizar a função respiratória de indivíduos com deformidade dentofacia em relação às vias aéreas superiores e inferiores e ao aspecto da respiração voltado à fonação. **Métodos:** 40 indivíduos adultos, divididos em três grupos: grupo controle, deformidade dentofacial II e deformidade dentofacial III, estando os dois últimos em tratamento ortodôntico para cirurgia ortognática. Realizado exame clínico do Protocolo MBGR para tipo e modo respiratório, fluxo aéreo nasal, possibilidade de uso nasal e obtenção do escore do protocolo; espirometria para avaliação da capacidade respiratória; fluxo aéreo expiratório utilizando espelho milimetrado para cálculo da área de embaçamento e medida do tempo de fonação de /s/. **Resultados:** observou-se maior ocorrência do tipo respiratório médio superior para todos os grupos. Houve diferença estatística para modo respiratório, sendo a maioria dos participantes com deformidade dentofacial respiradores oronasais ou orais; no fluxo expiratório nasal, os indivíduos com deformidade dentofacial apresentaram fluxo reduzido unilateralmente; na possibilidade de uso nasal, o grupo deformidade dentofacial II teve maior número de indivíduos com prejuízo; no escore, o grupo deformidade dentofacial II apresentou os piores resultados. Indivíduos com menor possibilidade de uso nasal apresentaram menor área de embaçamento do espelho e menor tempo fonatório de /s/. Para os respiradores orais foi encontrado menor tempo fonatório de /s/. A análise estatística não evidenciou diferença entre os grupos nos exames objetivos. **Conclusões:** indivíduos com deformidade dentofacial apresentaram tipo respiratório médio superior, modo oral ou oronasal, reduzidos fluxo expiratório nasal e suporte respiratório para a fonação, sendo que prejuízos na possibilidade do uso nasal e a presença de respiração oral influenciaram a utilização do ar expiratório para a fala.

DESCRITORES: Respiração; Espirometria; Anormalidades Maxilofaciais

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