

THE FREQUENCY OF ORAL BREATHING AND DENTAL-MAXILLARY ANOMALIES IN A GROUP OF CHILDREN

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Abstract: For a normal growth and development of oral and nasal cavity, the lip orifice at rest should be closed, there should be an anterior contact between the top of the tongue and the lingual surfaces of the upper incisors and the tongue base should have contact with the soft palate. The purpose of this study is to determine the prevalence of incompetent lip seal in a group of children and to contribute to the elucidation of the relationship between the incompetent lip seal and dental-maxillary anomalies. Within the studied group composed of 74 children, boys and girls, I observed an increased prevalence of incompetent lip seal. Dental-maxillary anomalies are more frequent in the children with incompetent lip seal, while the values average of the transversal growth of dental arches is lower in the individuals with incompetent lip seal than in the individuals with competent lip seal.

Cuvinte cheie: incompetența labială, respirația orală, anomalii dento-maxilare

Rezumat: Pentru o creștere și o dezvoltare normală a cavității orale și nazale este nevoie ca în repaus fanta labială să fie închisă, să se stabilească un contact anterior între vârful limbii și fețele palatine ale incisivilor superiori, iar baza limbii să vină în contact cu palatul moale. Studiul de față își propune să determine prevalența incompetenței labiale într-o colectivitate de copii și să contribuie la elucidarea relației care există între incompetența labială și anomaliile dento-maxilare. În lotul studiat, alcătuit din 74 de copii, băieți și fete, am constatat o prevalență crescută a incompetenței labiale. Anomaliile dento-maxilare sunt mai frecvente în rândul copiilor cu incompetență labială, iar media valorilor indicilor de dezvoltare transversală ai arcadelor dentare este mai mică la subiecții cu incompetență labială, comparativ cu cei cu competență labială.

INTRODUCTION

After more than one century of pro and anti arguments and assumptions regarding the influence of oral breathing over the growth and development of the dental-maxillary apparatus, this subject is still debated.

Most of the controversies derive from the impossibility to give a precise definition to the term of oral breathing. The lack of some accurate methods to diagnose the syndrome of nasal obstruction encouraged the performance of new studies related to this subject.

However, there is a unanimously accepted truth: for a normal development and growth of oral and nasal cavity, the lip orifice should be closed, an anterior contact between the top of the tongue and the lingual surfaces of upper incisors should be established and the tongue base should come into contact with the soft palate.

I have chosen incompetent lip seal as a study parameter for the following reasons:

- It is a subjective symptom which could be easily detected taking into account that the selection of the individuals included in this study has been made in their classrooms by visual inspection.
- According to the data existing in the studies of this field, it is a symptom often associated with oral breathing, the term of oral breather being often used to indicate a patient with opened lip orifice.(1,2,3,4,5,6,7,8)

In this study, I aimed at determining the prevalence of incompetent lip seal in a group of children and at contributing to the elucidation of the relationship existing between incompetent

lip seal and dental-maxillary anomalies.

PURPOSE OF THE STUDY

The purpose of this study is to determine the prevalence of incompetent lip seal in a group of children and to contribute to the elucidation of the relationship between the incompetent lip seal and dental-maxillary anomalies.

MATERIAL AND METHOD

74 children (boys and girls) took part in this study, being randomly selected from the second grade pupils of two primary schools from Tg-Mureș city.

Criteria of eligibility: children of both genders, with ages of 8-9 years.

Criteria of exclusion:

- Children who refused to participate;
- Children who have finished or who are following an orthodontic treatment.

Data correction has been done on the basis of the clinical examination and the study cast.

Within the clinical examination, I have appreciated, by visual inspection, the aspect of the lip orifice at rest (opened or closed) and starting from this appreciation, the initial studied group has been divided into two groups:

- The group of individuals with incompetent lip seal (29 individuals)
- The group of individuals with competent lip seal (45 individuals)

By the study cast of each child I, have performed the

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following measurements: back and frontal width of the upper and lower dental arch, back and frontal height of the upper and lower dental arch, height of the hard palate; maxillary interpremolar width (IP); maxillary intermolar width (IM); mandible intermolar width (im); depth of the hard palate.

The diagnosis of dental-maxillary anomalies has been established using the Angle classification:

- Angle class I: neutral relationship at the level of first molars with modifications of frontal teeth.
- Angle class II: distal position of lower first molars relative to upper first molars.
- Angle Class II/1 also named oral breathing type with protrusion of the upper incisors.
- Angle Class II/2 also named nasal breathing type with retrusion of the upper incisors.
- Angle Class III: lower first molars are mesially positioned in relation with upper molars.

The measurements obtained for the two groups after the analysis of the study cast have been compared. The samples did not pass the Kolmogorov-Smirnov test, so the non-parametric Mann-Whitney test was used. The level of significance was set at $p < 0.05$.

RESULTS AND DISCUSSIONS

All average values related to the width of the maxillary and mandible arches at premolar and molar level are lower in the individuals with incompetent lip seal than in the individuals with competent lip seal. The two averages are not statistically different in the two groups. I also obtained similar results regarding the depth of the hard palate. The medium average of the hard palate in the individuals with incompetent lip seal is of 20,27 mm and in the individuals with competent lip seal is of 20,4 mm. Statistically, there is no significant difference between the two values. (Table I)

Table no. 1. Average, standard deviation and statistic test results for the studied parameters in the two studied groups

Measurements	Incompetent lip seal		Competent lip seal		P
	Average	DS	Average	DS	
IP	34,06	2,1	34,8	2,3	ns
ip	36,86	2,4	37,24	1,7	ns
IM	44,06	1,9	44,88	1,9	ns
im	45,37	2,0	46,02	2,4	ns
BP	20,27	2,1	20,40	1,5	ns

IP = upper interpremolar width; measured from the middle of the intercuspidal fold of the left upper PM1 to the one from the right.

ip = lower interpremolar width; measured from the vestibular point of the contact line between lower left PM1 and PM2 to the one from the right.

IM = upper intermolar width; it is measured between the central dimples of the permanent first upper molars.

im = lower intermolar width; it is measured from the top of the vestibular-central cuspid of the left lower permanent M1 molar to the one from the right.

BP = hard palate. Depth of the hard palate; it is measured on a perpendicular line laid on the median raphe between the maximum depth of the hard palate and the line joining the cervical limit of alveolar processes.

ns = not significant

The results obtained are in agreement with the prior studies made on patients of the same age, excepting the depth of the hard palate, where a statistically significant difference has

been observed between the two groups.(9,10)

Related to the entire group, 39% of the individuals present incompetent lip seal, which indicates an increased prevalence of this symptom in the examined children.

We must notice the fact that 97% of the individuals with incompetent lip seal manifest various types of dental-maxillary anomalies, while in the case of the individuals with competent lip seal, maxillary – dental anomalies could appear in 60% of the cases.

As regarding the distribution of various types of anomalies in the two groups, the results are the following: the most frequent maxillary-dental anomaly in the group of individuals with incompetent lip seal is Angle class II/1 (52% in comparison with 11% in individuals with competent lip seal), the following in decreasing order being: Angle class I (31% in comparison with 38%), Angle class III (14% in comparison with 2%), only 3% of the patients have normal occlusion in the group of individuals with incompetent lip seal in comparison with 40% of the individuals with competent lip seal. No patient with incompetent lip seal presented occlusal relations of Angle II/2 class. (Table II)

Table no. 2. Distribution of maxillary-dental anomalies within the two studied groups

OCCLUSION	PATIENTS WITH INCOMPETENT LIP SEAL		PATIENTS WITH COMPETENT LIP SEAL	
	N=29	%	N=45	%
Normal occlusion	1	3%	18	40%
Angle class I	9	31%	17	38%
Angle class II/1	15	52%	5	11%
Angle class II/2	0	0	4	9%
Angle class III	4	14%	1	2%

The terms of incompetent and competent lip seal are used to describe the morphology of lips.

We talk about **competent lip seal** when the patient can bring its lips into contact while the mandible is in repose and about **incompetent lip seal** when the contact between the upper lip and the lower lip is accompanied by the contraction of orbicular and mental muscle with or without the mesialisation of the mandible.(11) These terms are somehow incorrect since no other orifice or valve of the human body is considered “incompetent”, if it is able to fulfil the functions of closing or opening.

The fact that the upper lip and the lower lip are not in close contact does not mean that the patient is an oral breather. There is no equality between the incompetent lip seal and the oral breath. The oral closing may be achieved both from the back side between the tongue and the upper lip and frontally between the dorsal side of the tongue and the soft palate.

The incompetent lip seal and the development of the maxillary arch width have been studied on a group of 450 children who were evaluated annually for 4 years. The authors of the study came to the following conclusions: the degree of incompetent lip seal – related to the same patient – decreases significantly with the age; in both groups of individuals with competent and incompetent lip seal there has been observed an increase in the maxillary arch width transversally, this being significantly higher in the children with competent lip seal in comparison with the children with incompetent lip seal.(12)

The Japanese authors have studied the relationship existing among the lip position and the dental-maxillary anomalies in a group of patients with ages between 7-14 years. They have been divided into three groups according to the

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distance between the upper and lower lip: less than 4 mm, between 4-8 mm and more than 8 mm. As regarding the distribution of the degrees of incompetent lip seal, there are no statistically significant differences among the patients with dental-maxillary anomalies and the patients with normal occlusion. These results – according to the authors – indicate the fact that dental-maxillary anomalies encountered in patients with incompetent lip seal do not depend on the degree of incompetence, but on the muscular unbalance created subsequently to the lip position.(9)

The relationship between the dental arches width and the oral customs has been studied on a group of 1297 pre-school children. In case of children with oral breathing, the authors observed a statistically significant contraction of the maxillary and mandible inter-canine distance, in comparison with nasal breathers. However, the criterion taken into account when classifying children as nasal breathers, was a subjective one, meaning the situation in which children used to have the lip orifice opened.(13)

A recent study analyzed the incompetent lip seal in patients with Angle class II/1 and observed that after finishing the orthodontic treatment, more than one half continued to present this symptom. Therefore, the incompetent lip seal may represent a factor determining the relapse.(14)

CONCLUSIONS

1. The incompetent lip seal has an increased prevalence in the studied group.
2. The dental-maxillary anomalies are more frequent in individuals with incompetent lip seal.
3. The average values of dental arches transversal development is lower in the individuals with incompetent lip seal than in the individuals with competent lip seal.
4. A longitudinal study achieved on a larger group of subjects and the use of some standardized procedures for appreciating the lip position could offer more accurate data.
5. The incompetent lip seal, either supported or not by a diagnostic of nasal obstruction due to the muscular unbalance, produced at the level of maxillary-dental apparatus, needs a combined treatment prescribed by a specialist in orthodontics, a paediatrician and an otolaryngologist.

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