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Evaluation the effects of adenoidal hypertrophy on occlusion and indexes of face and jaw in 6-12 years old children.

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Abstract:

Adenoid hypertrophy is one of the most prevalent disorders in childhood that affects on many of human organs, functions and disturbed them.

The causes of the adenoid hypertrophy have not been clearly known, but perhaps frequent infection, allergy, rhinitis and chronic sinusitis have role for it.

The purpose of this study was evaluating the effects of adenoid hypertrophy on occlusion and some indexes of the face and jaw. For this purpose, 48 children (6-12 years) with adenoid hypertrophy (case group) and a control group chosen from Khorasgan Faculty of Dentistry, private dental offices, and Isfahan medical sciences hospitals in a simple random method. Then 48 children of the case group were compared with 48 children of the control group. For statistical analysis we used SPSS software, T and chi - square tests. The results showed that children with adenoid hypertrophy had more mouth breathing, greater overjet and lesser overbite and posterior cross bite, anterior open bite, abnormal dental class, and rhinolalia than the control group.

Key Words: adenoidal hypertrophy, mouth breathing, snoring, overjets, overbite, dental class and rhinolalia.

Introduction:

The body image of children affects on their emotional and psychological status (1). Growth of craniofacial structures and dental occlusion is affected by multiple factors. Upper respiratory obstruction and adenoid hypertrophy are the most common etiologies that cause mouth breathing and snoring (2).

Long period airway obstruction during childhood causes some structural changes in faces and teeth, like adenoid face. Upper respiratory obstruction can result in increasing airway resistance followed by mandible displacement, increasing distance between teeth and divergence of tongue in to bottom of the mouth to increase the airways' space. The great distance between anterior teeth results in overgrowth of posterior teeth, that pushes down the mandible(3). Displacement of mandible to posteroinferior (like direction of clock's hand movement), the height of the inferior part of face will increase. On the other hand the new position of tongue will make it without contact with palate. It seems the natural growth and expansion of maxilla is related to the forces of the tongue.

On the new situation decrease of lateral forces of the tongue along with the contraction forces of the

face muscles will increase the height of the face and decrease the width of palate which is followed by the posterior cross bite (4). Obstruction of airway also change the anatomy of the mouth as narrowing and deepening of hard palate and flattening of nasolabial folds will depressed of naris, low jaw will become long, prominent anterior part of maxilla and lengthen of the mandible cause high overjet, low overbite, posterior crossbite, open mouth, rhinolaly. These patients often present swallowing and speech problems, oral breathing, "adenoidal face", elongated and narrow face, small and triangular chin, mandibular retrognathia, highly-arched palate, decrease of the intermolar distance and protrusion of superior incisor teeth, with several types of dental malocclusion.(5)

Because airway obstruction has extensive complications especially in the area of mouth and jaw and face it is important to study the reasons and complications of it. So the specialists pay more attention and if possible encourage the specialist to resolve it with early treatment.

The purpose of this study was investigation of adenoid hypertrophy effects on mouth breathing, overjet, overbite, dental class, rhinolalia and snoring in the children between 6 - 12 years old.

Materials and Methods:

This is a cross sectional descriptive analytics study which has been done in two groups (case and control) each group include 48 child the age 6-12 years old.

The case groups were children 6-12 years old with adenoid hypertrophy who have been visited at clinics of Department of otolaryngology (E.N.T) of Isfahan University of medical sciences, Isfahan, Iran and were selected by simple convenient method the control group were children who has been visited at clinics of school of dentistry, Isfahan University of medical sciences, Isfahan, Iran due to dental problem had visited and had not any sign of E.N.T problems and matched for age and gender with the case group.

In this study adenoid hypertrophy was independent variable and clinical indexes (mouth breathing over jet, open bite, over jet, over bite dental class and posterior cross bite, snoring) were dependent variable.

Data were analyzed by chi square through SPSS software. P value < 0.05 was considered significant.

Results:

In this study in each group 22 boys and 26 girls been examined and finding revealed that 38(79.2 %) of

children in case group and 19(39.6 %) of children in control group had open mouth and chi- square test with $P < 0.001$ showed the different between two groups was statistically significant.

29 (60.4 %) of children in case group and 5(10.4) % of children in control group had rhinolalia and chi-square test with the P value < 0.001 showed the different was statistically significant. In the case group 17 (35.4%)of children had gingivitis,44 (91.7 %) mouth breathing and in the control group 2 (4.2 %) and 17(35.4 %) of children had gingivitis and mouth breathing respectively and chi-square test with P value <0.001 revealed the difference were statistically significant.

Also finding revealed in over jet distribution 20(45.45)% of children in the case group and 8(18.18 %) of children the control group had increasing over jet and in over bite distribution aspect 19(43.18 %) of children in the case group and 12(27.27 %) of children in the control group had low over bite.

Posterior cross bite were 8 (16.7%)in the case group and only 1(2.1) % of child in the control group, chi – square test with P value < 0.001 showed these differences are statistically signification. Also findings revealed 14(29.2) % of children in the case group and 4(8.3 %) of them in the control group had anterior

open bite and chi- square test with P value < 0.001 showed the difference is statistically significant. Finally findings showed the 41(85.4 %) and 39(81.2 %) of children in the case and the control group respectively had teeth class I, but these value for class II were 7(14.6 %) and 8(18.8 %) in the case and the control group respectively and chi - square test will

P > 0.05 showed this difference is not statistically significant.

The frequency of snoring in the case group was 30(62.5 %) and in the control group was 2(4.2 %) 37(77.1 %) of children in the case group and 8(16.7 %) in the control group had past history of frequency common cold and chi – square test with P value < 0.001 revealed these differences were significant Table(1).

Table 1, Distribution of clinical sign in the two groups.

Group Sign and Symptom	Case Number	Case (%)	Control Number	Control (%)	P value
Open mouth	38	79.2	19	39.6	<0.001
Rhinolalia	29	60.4	5	10.4	<0.001
Gingivitis	17	35.4	2	4.2	<0.001
Mouth Breathing	44	91.7	17	35.4	<0.001
High overjet	20	45.45	8	18.18	<0.001
Low over bite	19	43.18	12	27.27	<0.001
Posterior cross bite	8	16.7	1	2.1	<0.001
Anterior open bite	14	29.2	4	8.3	<0.001
Teeth class I	41	85.4	39	81.2	> 0.05
Teeth class II	7	14.6	8	18.8	>0.05
Snoring	30	62.5	2	4.2	<0.001
Frequent common cold	37	77.1	8	16.7	<0.001

Discussion:

Findings revealed frequency of open mouth in the case group was more than the control group, so adenoid hypertrophy could results in airway obstruction and open mouth during days and nights awake and sleep. Study of Pourhashemi revealed 93.6

% of children with mouth breathing had open mouth at nights (6).

The frequency of mouth breathing in the case group was more than the control group and due to airway obstruction the children make up have mouth breathing. The study of Behlfelt (1990) showed 62.58 % of children with adenoid hypertrophy

had mouth breathing during days and 84.78 % during nights (7).

The more frequency of rhinolalia in the case group (60.4 %) in comparison with the control group is due to airway obstruction. Pourhashemi reported the prevalence of this disorder in children with mouth breathing was 48% (6).

In this study the frequency of gingivitis in the case group was significantly more than the control group, so gingival dryness and the hydration due to open mouth can result in microbial plaque formation and gingivitis (10). The study Gulati and et al (1998) had the same result (11).

The incidence of over jet was more in case group than control group and this difference was significant. Bresolin and et al investigation show over jet in the group with mouth breathing was $5.2 \pm 2.9\%$ and in the control group with normal breathing was $3.6 \pm 1.3\%$ (8).

Also Behlfelt study showed more over jet in children with adenoid hypertrophy (9). And our study had the same results. Low over bite was more common in the case group than the control group. Thus airway obstruction due to adenoid hypertrophy make the patient to put his head back and open the mouth during breathing, so posterior teeth grow more than normal and mandible diverge down and back

and bite open in the anterior and size of overbite decrease. Investigation of Behlflet and Linder (1989) had the same results (9).

There was not significant difference between teeth classes of two group (class I and class II malocclusion). Brozelin and Collaborators investigation (1983) have shown significant difference between class I and class II in children with nasal breathing and mouth breathing (8). Pourhashemi investigation (1997) on children at the east of Tehran who had mouth breathing show that more than half of the children had malocclusion of class II (64.1%) (6). Which his study result is different from present study, the difference is due to samples and the method of investigation.

In the case group frequency of anterior open bite was significantly more than the control group. It shows that air way obstructions causes opening of mouth, mandible divergence down and bite opening in anterior part. Behlflet and Linder study (1990) and Pourhashemi study (1997) confirm this matter (6).

Posterior cross bite in the case group was more than control group (16.7%). Growth of maxilla is affected by the balance between power of tongue's and face's muscles. and in adenoid hypertrophy the tongue has not been at its normal position (12) and is at lower position therefore

imbalance between tongue and mandible causes narrowing of maxillary arch and high arch palate that follow by cross linguallly (13).

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