

Influence of the Quality of Life on the Formation of the Upper Jaw in Children with Pathologies of the Respiratory System

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ABSTRACT

Defects and deformations of the dentition are often the reasons for the development of functional, morphological and aesthetic disorders in the dento-maxillofacial region (DMFR), and in the presence of anomalies of occlusion, the existing deviations are aggravated. The main functions of the DMF are breathing, swallowing, speaking and chewing. With deformities of the dentition, narrowing of the dental alveolar arches (DAA) of the jaws is frequent in 30.5%-58% of cases, narrowing of the jaws, especially the upper one, is often combined with other dento-maxillofacial anomalies (DMFA). The relationship between narrowing of the jaws and impaired nasal breathing (NB) has been studied by many specialists. Facial attractiveness plays a huge role in the social life (SL) of people, being an essential psychosocial factor. The face largely determines its attractiveness and is the main means of identification and non-verbal communication.

Key words: Diagnostics, Defects and deformations of the dentition, Disorders in the dento-maxillofacial region, Telerentgenografiya, Ortopantografiya

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INTRODUCTION

Facial attractiveness plays a huge role in the social life (SL) of people, being an essential psychosocial factor. The face largely determines its attractiveness and is the main means of identification and non-verbal communication. According to the results of the study [1], 63% of patients believe that their problems with appearance negatively affected their personal life, and 44% on SL [2]. Very often, it is the desire to improve the aesthetics of teeth and face that is the main reason for visiting an orthodontist [3,4].

Defects and deformations of the dentition are often the reasons for the development of functional, morphological and aesthetic disorders in the dento-maxillofacial region (DMFR), and in the presence of anomalies of occlusion, the existing deviations are aggravated. The main functions of the DMF are breathing, swallowing, speaking and chewing. With deformities of the dentition, narrowing of the dental alveolar arches (DAA) of the jaws is frequent in 30.5% - 58% of cases [5-11]; narrowing of the jaws, especially the upper one, is often combined with other dento-maxillofacial anomalies (DMFA). The relationship between narrowing of the jaws and impaired nasal breathing (NB) has been studied by many specialists [9,10,12].

However, the opinions of experts on the reasons for the violation of NB are ambiguous. A number of experts indicate that narrowing of the upper jaw (u/j) causes a

violation of NB (Poole MD 1998) [10], others believe that violation of ND is the cause of DAD [9,13], at the same time it is believed that pathology bite does not depend on the type of breathing [14], other authors claim adenoids serve as an obstacle to the passage of an air stream, and also cause stagnation in the mucous membranes (MM) of the nose and often in its paranasal sinuses [15], there are also a number of scientific works that assert the quality of life (QOL) of children also plays a very important role for the formation of DAA and DAD in children [9,16,17].

The frequency of DAA increases every year of a child's life, especially noticeable with the onset of a change of teeth, when incorrect teething and narrowing of the dentition prevail.

Self-regulation of these disorders is not observed [18-23]. A number of researchers have established a direct relationship between QOL in children and the prevalence of dental caries, gingivitis, dental anomalies, etc. [9,16,24-27].

Thus, the literature data indicate an increase in the number of dental anomalies, the prevalence of incorrect teething, disorders in the structure of the dentition and QOL in children.

The aim of the study

Was to study the effect of the quality of life on the formation of congestion in the u /j in children with pathologies of the respiratory system.

MATERIAL AND METHOD

To determine the child's quality of life, we used a questionnaire- OralHealth - Related QualityofLife (OHRQoL), proposed by JonuM.Tefal (2002) and PahelB.Tefal (2007) modified by Yariev O.A. (2019) in 300 children and with disorders in the maxillo(jaw)facial region (MFR), a retrospective analysis of 150 case histories of patients aged 7-15 years observed in 2015-2019 was carried out in the "Dentistry" center on the base of the Bukhara Medical Institute and the regional children's dental clinic.

The assessment of the reliability of the study revealed that the results were obtained on certified equipment: a panoramic X-ray machine (ORTHOPOS XG); for measurements of anatomical structures, the computer program Universal Desktop Ruler was used with preliminary calibration of measurements against a calibration ruler.

Of 43 the examined children, the analysis of data from clinical and additional research methods was carried out; complaints, anamnesis, examination were collected; photometric analysis of the face was studied; cephalometric; anthropometric; determination of the state of the airways with the help of a specialist otorhinolaryngologist: To determine the degree of narrowing of the u/j, we used the measurement of the trans-palatal width according to the method of J. McNamara - the distance between the points of the first permanent molars of the u/j. At a distance less than 35 mm-narrowing of the u/j, from 36 mm-normal width. The photographs of the face were taken with the natural position of the head and the shape of the face was determined using the IZARD G facial index. In addition, 43 panoramic radiographs (PR) and the telerradiograph (TRG) with a visual assessment, a description of the position of the roots of the incisors in the u/j, the state of the maxillary sinuses and the nasal septum were carried out.

For an objective assessment of nasal breathing, the method of anterior active rhinomanometry (AARM) was used, on the Rhinomanometer-300 with the help of the otorhinolaryngologist.

The results obtained were introduced into the database using the Excel program, then processed using the Stat graphics 3.0 and Statistics 5.0. The average value of the analyzed indicator, the standard deviation, the middle error and criterion significance of the Students were calculated. Differences were considered significant at $P < 0.05$.

RESULTS AND DISCUSSION

The obtained results on clinical disorders of DAS, somatic and ENT pathology in children with narrowing u/j in 43 children of 7-11 years old with varying degrees of narrowing u/j were divided into 2 groups, for further continuation of the therapeutic measure: 22 children with habitual mouth breathing (MB), with a expressed narrowing of the u/j, in which the distance between the

palatal surfaces of the first molars of u/j was less than 35 mm (main group-MG); and 21 children with nasal breathing, with a sufficient width of u/j (comparison group-CG) were identified. The patients' mental and physical development did not differ from the average characteristics.

From the medical history, the anamnesis, analysis of RG and OPG were analyzed. The analysis of the questionnaires did not reveal a significant difference in the state of health of the patients of the main and the comparison group. Particular attention was paid to the presence of diseases of the ENT organs, their severity and duration. The main complaint presented by patients (parents) in the MG and CGs- is aesthetic disorders (100%) associated with the position of the incisors. Parents note that MG children (46%) get tired quickly during physical exertion and after school. There is a violation of lip closure (28% and 10% in MG and CG, respectively), a violation of the purity of the pronunciation of speech sounds (28% and 14%). In 22% of children of MG, parents noted a nasal tone of speech, despite the performed adenotomy in preschool age. From the anamnesis, it was found that in 62% of children of MG, ENT diseases were established in the anamnesis. In the CG, this parameter was 28% of cases. Violation of NB, caused by chronic diseases of the nasopharynx, persisted for a long period of time in MG in 46% of patients, in CG- in 10%.

Children with narrowing u/j is typical a face with an elongation of the gnathic part, narrow, convex, with tense closing of the lips. There is lethargy of facial expressions, smoothing of nasolabial folds, flattening of the upper lip, weakness of the circular muscle of the mouth, retraction of the wings of the nose, "adenoid" facial expression. For patients with impaired NB, narrowing of the dentition is typical, often the upper dentition is V-shaped, and the lower one is evenly narrowed. The deep palate in the shape of the letter "V" indicates skeletal insufficiency of the u/j. When measuring models in 56% of cases in MG, a sharp narrowing of the u/j was established, the trans-palatal width (McNamara) in these cases was on average only 30.5 mm.

Skeletal insufficiency of the width of the u/j in the MG was evidenced by bilateral exo-occlusion in 52% of cases, unilateral exo-occlusion with displacement of the l/j was observed in 30% of children, which in half of the cases was combined with exo-occlusion. In children CG, the narrowing of the upper dentition was not sharp, the dome of the palate was shallow, and the lateral teeth had an inclination to the palatal side, which is characteristic of the narrowing of the upper dentition of dent alveolar origin. In 30% of cases, unilateral exo-occlusion with displacement of the l/j was observed. There were no cases of severe exo-occlusion, including bilateral, in this group. Distal occlusion with disocclusion of the anterior teeth in the CG was diagnosed in 29% of children.

The upper incisors in children with narrowing of the upper jaw were located crowded, in the position of protrusion, which is associated with insufficient pressure

of the lips during mouth breathing. In its turn, the protrusion of the incisors prevented lip closure at rest (34% and 13%, respectively). The Pont method was used

to determine the size of the narrowing of the upper dentition, the data are presented in Table 1.

Table 1: Pont method.

Parameters	MG(n=22)	CG (n=21)
The amount of narrowing of the upper dentition in the premolar region (mm)	9.20 ± 1.8	4.4 ± 0.90
The amount of narrowing of the upper dentition in the molar area (mm)	8.88 ± 1.89	4.20 ± 0.51
The amount of shortening of the dentition (mm)	10.6 ± 2.3	2.8 ± 0.71
p	0.03	0.03

Thus, a comparative analysis of the sizes of the u/j of the dentition showed its narrowing and shortening in patients with narrowing of the u/j and disorder of NB. Due to the narrowing of the u/j, the place in the dentition decreases, which leads to a typical eruption or retention of the teeth in the u/j.

Analysing one of the etiological factors contributing to the formation of narrowing of u/j, it can be stated that the deformation is the result of a complex interaction of many factors that affect the myodynamic balance in the MFR. Violation of uniform pressure on the jaws and teeth affected both the growth of the jaw and the position of the teeth. Due to the violation of the closure of the lips, mouth breathing, the tongue did not adhere to the palate, alveolar processes and teeth in u /j and l/j while the pressure of the cheeks led to a narrowing of the upper and lower teeth. The mutual influence of mouth breathing on the development of the airway and the effect of the width of the airway on the development of the airways is clearly demonstrated by a clinical example from the exhaust gas.

On the basis of a retrospective analysis of the questionnaires on the state of health, concomitant somatic pathology in children was determined. The questionnaires were filled out by parents when they went to the orthodontist. Analysis of the questionnaires did not reveal a significant difference in the health status of patients in MG and CG. According to the survey, it was determined that in 6% of cases the parents considered their children somatically healthy, in 24% of cases there was a periodic decrease in blood pressure, diseases of the gastrointestinal tract - 12%.

Children of both groups were examined by a doctor -

orthorhinolaryngologist. In children of MG in 100% of cases and in 48% of CG of cases, there were pathological changes in the ENT organs. Endoscopic examination of the upper respiratory tract in children in MG revealed pharyngeal tonsil hypertrophy of I degree in 32% of cases, II degree - in 36% and III - 32% of cases. In the CG, 42% of children had degree I and 7%-II degree of pharyngeal tonsil hypertrophy.

Thus, an endoscopic examination of the nasal cavity and nasopharynx in children with a narrowing of the v / h of varying degrees revealed that difficulty in nasal breathing is associated with hypertrophy of adenoid vegetation's. In accordance with the severity of the violation of ND, the ineffectiveness of conservative treatment, there were indications for surgical treatment of hypertrophy of the nasopharyngeal tonsil. Adenotomy in preschool age in OH was performed in 30% of cases, of which 10% of children had a relapse of adenoid vegetation's. Among the pathological changes in the intranasal structures in 93% of cases of OH, curvature of the nasal septum was found (GS-28%), in 64.0% of cases in children with MG, hypertrophy of the turbinates was observed (HS - 28%). Such changes in the structures of the nose cause a narrowing of the lumen of the nasal passages and indicate the presence in children of a long-term violation of NB. Changes in the maxillary sinuses (CG - 12%) in the form of edema of the maxillary sinus were revealed in 24.0% of cases in children in MG. The above-mentioned features of clinical data and clinical examples allow us to say that the imbalance of teeth and dentition is caused by a violation of "function - form". The development of l/j of the dentition is due to the influence of the size of the u/j of the dental arch. Table 2 shows the development of the incisal section of the u/j in children of 7-11 years old.

Table 2: Development of the incisal section of the u/j in children of 7-11 years old.

Investigated parameters of u/j	MG(22)	CG (21)	T	Differences are valid
Width of the incisor / base of the nose (Cl - Cr)	26.9	28.18	2.6	Differences are valid
The width of the left half of the incisal region of the u/j (Cl-M)	13.1	13.1	1.5	Results are random
The width of the right half of the incisal region of the u/j (M-Cr)	12.7	14.58	2.19	Differences are valid

Thus, the lumen of the airways according to TRG data in the group of children with narrowing u/j (MG) is significantly less (38%) than in children with in CG (46.2%). R-signs according to OPG data: Narrowing of the nasal passages, curvature of the nasal septum, convergence of the roots of the upper permanent incisors are symptoms of narrowing of u/j and should be taken into account when planning orthodontic correction. The width of the incisal section of the upper part of the nasal base (Cl-Cr) with a general narrowing of u/j is significantly less than with its sufficient width. An orthodontist, using the analysis of TRG and OPG, can determine the degree of violation of NB, which will help interdisciplinary planning of treatment for children with narrowing of u/j and MB. Based on the results of a clinical and anthropometric study of patients with narrowing of u/j, we identified symptoms of disorders of MFR, the elimination of which makes it possible to create conditions for the harmonious development of the face and improve the condition of the airways. The crowded upper permanent incisors with the convergence of their roots, affects the development of the frontal section of u/j, supports a decrease in the lumen of the airways and MB. The described methods for the analysis of TRG and OPG can be used in a comprehensive examination of children with narrowing of u/j and disorder in NB. An orthodontist, using the analysis of TRG and OPG, can determine the degree of disorder in NB, which will help interdisciplinary planning of treatment for children with narrowing of u/j and MB.

The influence of QOL of children on the formation of DAA in children showed that the analysis of QOL in the group of children, the expansion of u/j of which was carried out in the changeable bite (MG), revealed narrowing of u/j and difficulties in NB, at the time of the visit to the orthodontist, there was a decrease in the quality of life in all sections of test. There was a significant decrease in physical comfort, functional disorders were noted, which was associated with a violation of NB, dryness in the OC, a violation of taste, nasal speech in some children: Physical discomfort and functional disorders -2.6; emotional well-being -2.2; social well-being - 2.4; family well-being - 2.66 points; that is, emotional and social comfort were reduced due to aesthetic, speech disorders that accompany anomalies in the position of the teeth during narrowing of the upper jaw and the MB.

Results of assessment of QOL in children by age from 7 to 12 years old - 36.6%, from 12 to 17 years old - 42.3% parents gave a positive answer. The QOL of the examined children, depending on the emotional state, was slightly different, that is, the lowest QOL according to the respondents' answers was observed in children from 12 to 17 years old. Parents, with their affirmative answers, assessed the social state of their children, which, according to the analysis of the results obtained, turned out to be relatively the worst in children 5-7 years old (on average 50.7%) and relatively best in children 12-17 years old (on average 18.1%).

The parameters of family well-being of children depending on the presence of dental problems showed

that most parents of children aged 5-7 years old when asked "Are you upset because of your child's dental problems?" answered in the affirmative - accordingly, on average, 51.4%, parents of children over 7 years of age answered this question positively, relatively fewer in relation to other age groups. In the examined children 5-7 years of age, QOL was noticeably lower - respectively, on average 0.71 units (on average 201 points) than in children 7-12 years old). We have found that the more parents are upset about dental problems in their children, the lower the QOL in these children. Answering the question "Do you feel guilty towards your child because of dental problems he has?", The results show that the tendency of changes is very similar to the previous case, that is, the older the child, the less guilt the parents have in front of him for dental problems - respectively, by age groups of children on average; 34.0% and 38.3%. The assessment of the QOL of children gave the same result, that is, the older the child, the higher the QOL - respectively, for age groups of children, on average 0.79 units. (on average 223 points); 0.52 units (on average 274 points).

Thus, the indicators of the family well-being of the examined children, depending on the presence of dental problems, showed that certain patterns were revealed when analyzing the data obtained: first, it was found that the more parents were upset about dental problems in their children, the lower the QOL in these children; secondly, the older the children are, the less parents were upset about dental problems in their children; third, the parameters of parents' concern about dental problems in their children are inversely proportional to the child's QOL level; fourthly, parents' sense of guilt towards their child due to dental problems gradually decreases with increasing age of the child; fifth, the parents' feeling of guilt towards their children due to dental problems in their children is inversely proportional to the children's QOL level.

Another indicator of the family well-being of children is certain financial costs of the family for solving dental problems in children: To the question "How often did you spend big amount of money from the family budget to treat dental problems in a child?" a sufficient number of parents answered positively. So, if on average in children 5-7 years old, this parameter reached 0.61 units (on average 173 points).

Thus, according to research data, the frequency of narrowing of /j among children, ranges from 55% to 63.2% of the total number of DAA. From the period of temporary occlusion and the beginning of the change of teeth, there is a negative effect of the narrowing of u/j on the development of DAS and the body as a whole.

The relationship of DAA with diseases of the nasopharynx, MB is noted by a number of authors, who indicate that with prolonged MB the number of disorders increases significantly. Habitual MB as a component of the symptom complex of orofacial dysfunctions: anterior position of the tongue, absence of a closure reflex, habitual MB.

At MB, there is a narrowing of the u/j, a high "gothic" palate is formed, which affects the volume of the nasal cavity. In the literature, it is noted that to identify orofacial dysfunctions, it is necessary to involve all specialists working with children, but the clinic does not underestimate the role of an orthodontist in solving the problem of NB disorders.

In connection with aesthetic disorders in deformities of the DAS, an orthodontist is often the first specialist who accepts children with NB disorders. The methods of the R-th examination used at orthodontic reception give information that allows assessing the state of the airways.

In the international literature, there is an agreement that lists DAA that require early treatment, which does not include the narrowing of u/j. However, in the clinic, there are manifestations of narrowing of u/j, which negatively affects the formation of DAS, the functions and health of the child. In our opinion, a comprehensive approach to the diagnosis and correction of the narrowing of the u/j associated with impaired NB at an early age allows to ensure the normal development of children.

From the anamnesis, we found that children with significant narrowing of u/j in 64% of cases had ENT diseases in the anamnesis. A clinical analysis of these cases showed that children quickly fatigue during physical exertion and after school (40%), a disorder of lip closure (32%), a violation of the purity of the pronunciation of speech sounds (24%). Disorder in NB caused by chronic diseases of the nasopharynx persisted for a long period of time in 48% of patients. When determining the facial index of Izard G., we found that children with narrowing of u/j are more often characterized by a "narrow face", which indicates a tendency to an increase in the height of the face with prolonged MB in children. Bilateral exo-occlusion in 52% of cases, unilateral exo-occlusion with displacement of the l/j in 28% of children indicate skeletal insufficiency of the width of the u/j in the MG.

Children with narrowing of u/j (MG) were identified pathological changes in the ENT organs in 100% of cases. During endoscopic examination of the upper respiratory tract, 68% in MG-1 children showed hypertrophy of the pharyngeal tonsils of II and III degrees, in 28% of cases mechanical obstruction of the pharyngeal opening of the auditory tubes was observed due to adenoid vegetation, which led to conductive hearing loss of I-II degrees.

Discomfort in the teeth, mouth and jaws were experienced by less than half of children (43.7-44.0%). QOL of these children was also relatively the worst - 0.96 units. Emotional state relatively the worst QOL is detected in children from 12 to 17 years old (average 0.84 units), in whom the emotional state was often disturbed. The percentage of parents reporting high costs for solving their children's dental problems increases with the age of the children.

The number of parents of older age groups who gave an affirmative answer on this matter was 1.6-2.1 times

greater than that of younger age groups. The number of parents who answered positively about high costs is directly proportional to the state of the child's QOL. Another regularity has been established - with increasing age of children, family expenses for solving dental problems also increase, which is closely related to the deterioration of the child's quality of life. Thus, an orthodontist can determine the etiopathogenesis and degree of impairment of NB by analyzing TRG, OPG and studying the QOL of children, which will help interdisciplinary planning of early diagnosis and treatment of children with DAA, including narrowing of u/j and MB.

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