

METHODS OF SEPTUM SURGERY (SEPTOPLASTY) WITH CRESTO- AND SUTUROTOMY

High frequency of a combination of such symptoms as a curvature of a nose septum (NSC) dento-maxillary anomalies (DMA), high standing of the palatum, reduction of the horizontal and vertical sizes of a cavity of a nose are united and named as Khasanov rhinomaxillary (orthodontic rhinological) symptom complex. The operative intervention - septum surgery with crestosuturotomy is prescribed to patients with Khasanov symptom complex. The musculomucosal graft is detached, a cartilage is separated from the bottom of a nasal cavity and moved in the opposite side. Thus the nasal crest of a palatal shoot of the top jaw becomes visible and it is removed with a grooved chisel (crestotomy). Suturotomy is made to sutura palatina mediana of the bony palate which is from 2- to 5-mm deep and up to 3-4-mm wide in the form of a trihedral trench.

Our experience shows that, patients with Khasanov symptom complex after surgical correction of the nasal septum and osteotomy of the nasal crest of a palatal shoot of the top jaw, the orthodontic disclosing of a palatal stitch occurs several times faster, anomaly relapses of dento-maxillary systems decrease.

Keywords: Septum operation, septoplasty, nasopharyngeal obstruction, rhinopharyngite maxillofacial malformations, maxillofacial anomalies, dentofacial complex, septum nasal submucosa resection, crestotomy, suturotomy, dento-maxillary system

UDC: 616.212.5; 616.314.21-007.53; 616.314.21-007.54; 616.314.25-007.481; 616.314-089.23

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Topicality of the issue

One of the frequent pathologies encountered in practice of the doctor-otorhinolaryngologist is the curvature of a nasal septum (NSC). Mladina et al. (2008) conducted studies in 17 ENT centers of the world (14 countries) and stated that among ENT patients NSC is encountered in 89.2 % of cases. Thus, the geographical arrangement of the country does not influence frequency of distribution of the given pathology. Among women the straight septum was registered in 15.4 % cases, among male - the indicator has made 7.5 %. The analysis of supervision has shown that deviations of a nasal septum from median position among children is met in 34-95% of all surveyed schoolboys (Subarić and Mladina, 2002; Yildirim and Okur, 2003; Zielenik-Jurkiewicz and Olszewska-Sosinska, 2006)

The discipline, connected with otorhinolaryngology - orthodontia, counts the problem of malocclusion the most widespread. Morphological deviations in dento-maxillary system, developed as a result of growth and development disturbance of a child, are named as dento-maxillary anomalies (DMA). As it is known, the malocclusion worsens aesthetics of a face which inevitably causes the person feel unconfident, reduces self-esteem, leads to occurrence of complexes. It directly affects health of teeth, dento-maxillary system and all organism as a whole. Such dento-maxillary anomalies are met, according to different researchers, in 33.7%-74.0% of surveyed children (Persin, 1996; Khoroshilkina, 1999). Prevalence of DMA is considerably higher among children, suffering other diseases and having bad habits: sucking and biting lips, tongue, cheeks, objects (Okushko, 1975). According to Malygina (1976), 40% of patients with anomalies of occlusion have a malfunctioning of dento-maxillary systems - chewing, speech, breath and swallowing.

As Bresolin et al. (1983), Smith and Gonzalez (1989) inform, the frequent reason of dento-maxillary deformations are the pathologies influencing development of nasofrontal gristle of appendage of the top jaw, the front part of malar arches and area of the superior nasal meatuses. They include allergic reaction of a nasopharynx, adenoids, hypertrophy of palatine tonsils, choanal atresia, hypertrophic rhinitis, etc. It is proved that they cause narrowing of the top jaw and teeth protrusion. According to Linder-Aronson (1970), Obratsov et al. (1986), Makhsudov and co-authors (1995, 2001), there is a correlation between oral breath and anomalies of jaws. Researchers experimenting with primates (Harvold et al., 1981), cats (Makhsudov, 2002) proved that experimental nasal cavity obstruction and the influenced oral breath causes DMA, since the nasal septum relates to formations of the median zone of the facial skeleton, their development and growth are interconnected. Their interaction in case of obtained pathological deviations is obvious and inevitable. Philo- and ontogenetic unity of bones of the top and median part of the face causes their common development. It is known that at the end of the second month of pregnancy there is an anlage of organs of maxillofacial area and at the end of 3 months in cartilaginous skeleton rudiments there are first sites of ossification. This difficult formogenetic period is connected with development of the palate, nasal septum, formation of tongue, rudiments of teeth, glands and other structures (Khoroshilkina, 1999).

Makhsudov (2002) has determined that 61% of DMA develop owing to rhinopharyngeal obstructions. The reason for obstruction in 70% of cases is related to nasal septum curvature. After orthodontic treatment without otolaryngological intervention in 60% of cases DMAs were observed as a consequence of incomplete disclosing of a palatine suture. Therefore in order to avoid relapses of dento-maxillary anomalies he offers close cooperation with otolaryngologists, sanitization of ETN organs, and if necessary - septum surgery before orthodontic interventions.

As a prototype offered by us crestosuturotomy - some orthodontists use the Derikhsweiler's device for disclosing of the palatine suture and expansion of the top jaw. In the literature positive results are noted in cases of its application at the age before 17-18 years. Other authors in cases of sharply expressed dento-maxillary-facial anomalies, especially with teenagers, for acceleration of orthodontic treatment and achievement of steady results before application of regulators recommend compact-osteotomy (corticotomy). Corticotomy has been known for a long time (Wassmund, 1902; Bruhn, Kantorowicz, and Partsch, 1930). The principle of operation consists of removing the compact layer of a bone at a certain extent that weakens resistance of the bone fabric to influence of orthodontic devices. Such operation was conducted by authors in the conditions of hospital and was traumatic. Limberg (1960) stated essentially new estimation of the notion of compact-osteotomy. He specified that main aspect is not mechanical easing of the bone fabric, but the biological reaction of inflammation arising in it in response to the big or small trauma. As a result, demineralization of the bone fabric is observed, then reparative processes are activated that facilitates reorganization of fabrics under the influence of orthodontic devices. In 60-70th years. Dunaevskiy et al. by experimental and clinical researches confirmed Limberg's opinion and received positive results of treatment, related to reduced volume of surgical intervention. Instead of removal of a compact layer of the bone fabric they recommend to punch it in staggered order in the area inter-socket septa over fangs and in the field of buttresses. But these orthodontic ways of expansion of the top jaw are considered traumatic and ineffective.

Considering that in case of submucous resections of nasal septum the specified median palatine suture and the nasal crest are bared from the side of nasal cavity, in our opinion it would be more expedient to make crestotomy and suturotomy (a prototype of compact-osteotomy) in endonasal way at the time of septectomy. Thus biomechanical anti-force would decrease and disclosing of a palatine suture would be facilitated. This is the main principle of the given research.

Thus, the question on influence of the nasal septum curvature on development of a children's organism as a whole and dento-maxillary systems in particular, is still little studied and remains a disputable subject. There is no common opinion about the character of influence of NSC on growth and development of dento-maxillary system and time of occurrence of DMA. Frequency, kinds and pathogenesis of dento-maxillary anomalies, observed among children with NSC remain unstudied. The tactics of otolaryngologist and volume of surgical intervention on nasal septum incases of nasal septum curvature combined with DMA is not studied either.

Aim and objectives

On the basis of the above stated an aim has been set - to investigate changes of the upper dento-maxillary complex due to chronic difficult nasal breathtaking and optimize method of combined otorhinolaryngological and orthodontic treatment.

The following objectives are set in order to achieve the aim:

1. On the basis of detailed otorhinolaryngological and dental survey of the children to figure out the frequency, onset time, specific symptoms and DMA development mechanisms in case of nasal obstruction.
2. to determine the nature of the pathology of the upper dento-maxillary complex in cases of nasal septum curvature of the hospitalized patients of the ETN-clinic of Tashkent Pediatric Medical University.
3. to ground the possibility of new method of operative intervention - septum surgery (septectomy) with crest- and suturotomy of the nasal crest and median palatine suture in case of NSC together with DMA.

Material and methods of research

To reach the decision of set objectives all-round profound investigation of 1610 children at the age from 6 to 15 including (schoolboys of 1-9 classes, patients addressed to orthodontic office and patients with disturbance of nasal breath, arrived to treatment in children's ETN-CLINIC of Tashkent Pediatric Medical University in the period from 2004 to 2009) has been carried out.

General otolaryngological and stomatologic survey were applied, together with tests for definition of type of breath and degree of disturbance of nasal breath, a photo denti-upper-alveolar complex (front and profile), profile tele-X-ray study of skulls (under indications), biometric studying of models of jaws. Special attention is paid to the form and sizes of a hard palate and the sizes of nasal cavity.

Results

889 schoolboys of 1-9 classes of 97 schools of Tashkent city (1992-2002 of birth) for 2008-2009 have been surveyed. Of them - 462 boys (52.0%), 427 girls (48.0%). For statistical reliability from each class identical quantity of pupils(nearby 100) has been selected. Of the surveyed (889 schoolboys) 760 (85.5%) had these or other deviations of nasal septum revealed. In an age cut frequency of NSC fluctuated from 75.5 to 91.3%.

It is necessary to emphasize that deformation of nasal septum, accompanied by difficulty of nasal breath or reflex action on a mucous membrane of nasal cavity constituted 5.3% (47 children). It coincides with the data of other researchers.

Considering that among patients hospitalized in ETN-CLINIC for septum surgery (n=194) of nasal septum curvature in 88% cases (172 children) malocclusion is revealed, we had a question, whether there is a correlation connection between NSC and kinds of

DMA? Kinds and frequencies of revealed dento-maxillary anomalies among children with deformations of nasal septum are demonstrated in the table.

Table 1. Kinds and frequencies of dento-maxillary anomalies among children suffering Nasal septum curvature hospitalized in ETN clinics of Tashkent Pediatric Medical University

Pathology kinds	Number of observations n=194
1. NSC	194 (100%)
2. Malocclusion:	172 (88.7%)
a) Upper retrognathism	62 (32.0%)
b) Upper jaw constriction with dense location of front teeth	32 (16.5%)
c) Prognathism with upper jaw constriction	25 (12.9%)
d) Open bite	10 (5.2%)
e) Other not classified ones	43 (22.2%)
3. High palate	106 (54.6%)
4. Decreased vertical size of nasal cavity	108 (55.7%)
5. Decreased horizontal size of nasal cavity	111 (57.2%)

According to the table it is possible to notice that among all cases deformation of nasal septum the most frequently observed dento-maxillary anomaly was upper retrognathism - 62 (32%) cases, on the second place was constriction of the top jaw with protrusion of front teeth - 32 cases (16.5%), on the third place was prognathism of the upper jaw - 25 cases (12.9%). Open bite was diagnosed among 10 (5.2%) patients. In addition, about 56 % of patients have high palate, reduction of the horizontal and vertical sizes of nasal cavity revealed. All these symptoms are united and named *Khasanov rhinomaxillary (orthodontic rhinologic) symptom complex*.

It is known that disturbance of nasal breath on account of nasal septum curvature was restored by septum surgery. Radical submucous resection of nasal septum by Killian or more rational sparing conservative operation by V.I.Voiachek is made. The simplest of them is the operation by Killian. Under partial resection of septum we understand submucous removal of only its separate deformations - hillocks (tuber septi nasi), thorns (spina septi nasi) and crests (crista septi nasi).

Under our preliminary data, the curvature of nasal septum is often (in 88 % of cases) combined with dento-maxillary anomalies. This circumstance even more emphasizes timeliness of an offered way of septum surgery with crestosuturotomy in order to avoid relapses of dento-maxillary anomalies after orthodontic interventions. Patent search and the analysis of references have demonstrated the absence of such approach of interventions in case of given combined pathology.

Septum surgery technique with crest- and suturotomy of nasal crest and median palatine suture to avoid dento-maxillary anomaly relapses after orthodontic interventions

Position of the patient, the doctor and assistants, toolkit arrangement are the same as in other intranasal operations.

General anaesthesia is applied. 0.25% solution of Novocain with addition of one drop of adrenaline on each 10 ml of a solution is locally injected under mucous, or exactly, under periosteal-perichondrium on all nasal septum and the bottom of nose. Besides total anaesthesia and anaemization, in this way, according to authors applying it, we obtain partial separation of mucous, and also its thickening facilitating separation with elevator.

We consider the most expedient in all cases to do a cut on a left-hand side, even at displacement of the first line or a dislocation of a quadrangular cartilage. The cut is usually made in front - on the edge of a cartilage of nasal septum. Skin, being more dense fabric,

is not broken off and prevents through punching. Too far behind cut strongly complicates all operation and ruptures of the mucous are often observed. Furtherly with sharp elevator or an eye scalpel we begin separation of the mucous left-hand side. It is extremely important to separate mucous from the very beginning together with perichondrium which is the strongest part of the cover of a cartilage. At correct processing, the smooth surface of a cartilage deprived of any vessels should be visible. A cartilage separated from the bottom of nasal cavity and removed an opposite side. Thus the nasal crest of a palatine gristle of the top jaw became visible. We believe the curvature of the given crest is also the main starting moment in genesis of the nasal septum curvature. Children's septum cartilages are thin and elastic. In genesis of curvatures of gristle department of nasal septum the bone frame plays a dominant role. At crestotomy the rigidity of this frame is eliminated. Therefore septum surgery without crestotomy is considered insufficient since it is principal cause of relapse of a curvature of nasal septum. Septum surgery without crestotomy is considered insufficient since it is the principal cause of relapse of a curvature of nasal septum. The given nasal crest of a palatal cartilage is removed with the help of grooved chisels (crestotomy). If the shape of the septum resisted to correction, it was necessary to remove small bent and thickened fragments of a cartilage of nasal septum. Consequently, by means of a swallow-like chisel suturotomy of sutura palatina mediana of the bony palate was made whose depth varied from 2 to 5 mm, the width to 3-4 mm and the form reminded a trihedral trench. It is necessary to consider that front departments of the given suture are thick enough and caudally it gradually gets thin.

On the front end of a median palatine suture, behind alveolus of incisors, is located the incisory aperture, foramen incisivum (the nerves with the same name and vessels pass through it), conducting into incisory channel, canalis incisivus. The channel opens on the top (nasal) surface of a hard palate with two apertures, each of which settles down on the sides of crista nasalis. Lesions of vessels of incisory channel are not fraught with consequences since the artery is very thin, and blood supply of nasal septum is extremely rich and has two sources: internal and external carotids (trellised and rear-nasal arteries).

Conclusion

High frequency of combination of such symptoms as nasal septum curvature, dento-maxillary anomalies (DMA), high palate, reduction of the horizontal and vertical sizes of nasal cavity are united and named S.A. Khasanov rhinomaxillary (orthodontic rhinologic) symptom complex.

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Patients with Khasanov symptom complex are prescribed operative intervention - *septum surgery (septectomy) with crest- and suturotomy*.

Our experience shows that, patients with nasal septum deformations combined with DMA after surgical correction and osteotomy of the nasal crest of a palatal shoot of the top jaw orthodontic disclosing of a palatine suture occurs several times faster and anomaly relapses of dento-maxillary systems decrease considerably.

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Medical and Health Science Journal
Volume 13

2012/13

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Printed in Czech Republic

ISSN 1804-8884 (Print)

1805-5014 (Online)

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Volume 13, November 2012

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