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ORIGINAL STUDY

Clinical implications of septal deformities

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ABSTRACT

Nasal septal deformities are one of the most common disorders in humans. In the vast majority of cases the final shape of the nasal septum is a result of irregular development of the naso-maxillary complex and far less frequently than it is generally believed they are the consequence of the trauma to the nose. However, today we know very well that some of the nasal deformities are inherited, transferred directly from one generation to the other. Regardless of how some septal deformity develop, all of them can influence normal nasal breathing and can cause further health disturbances. The author presents the types of the septal deformities and their clinical implications.

KEYWORDS: nasal septal deformities, nasal breathing, septal deformities types

INTRODUCTION

Nasal septal deformities (NSD) are one of the most common disorders in humans. The incidence of NSD in adult humans was shown to be very high, more than 90%[1]. In the vast majority of cases, the final shape of the nasal septum is a result of irregular development of the naso-maxillary complex and far less frequently than it is generally believed they are the consequence of the trauma to the nose. Kowalski et al. emphasized the importance of nasal trauma during the birth. They found that the incidence of the nasal septum deformities was 22% in children born by spontaneous delivery vs. children delivered by Cesarean section in which the septal deformities were registered in 3.9% of them only.

However, today we know very well that some of the nasal deformities are inherited, transferred directly from one generation to the other[2,3]. However, regardless of how some septal deformity develop, all of them can influence normal nasal breathing and can cause further health disturbances.

According to well known classification of septal deformities in seven precisely defined types[4], some clinically important implications have been stressed out during decades of experience.

Figure 1 *Type 1*. Left sided type 1 septal deformity. The anterior valve angle is still free

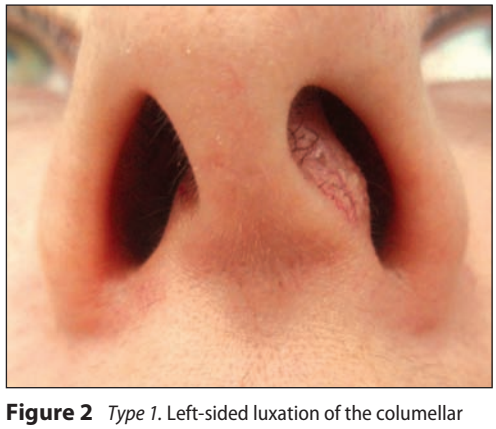

Figure 2 *Type 1*. Left-sided luxation of the columellar septal edge narrowing the entrance of the air-stream through the left nostril

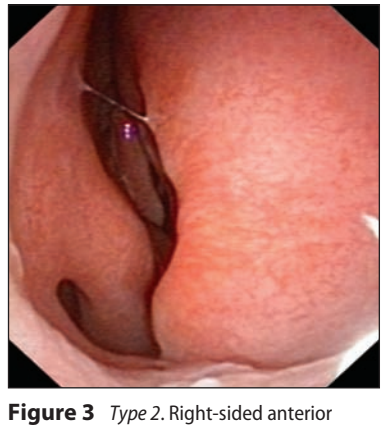

Figure 3 *Type 2*. Right-sided anterior vertical septal ridge. The anterior valve angle is not any longer free

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Type 1 (Figure 1) means a mild unilateral vertical ridge in a valve area which does not interfere with the function of the nasal valve, so in most of the cases has no considerable clinical importance except when connected to subluxation or even luxation of the columellar septal edge. The subluxation or luxation could bother patient both in aesthetic and functional sense.

As to the functional aspect, it can narrow the ipsilateral nostril thus causing unilaterally impaired nasal breathing, particularly when nasal ala is thin and lax and therefore prone to be aspirated during the deep inspiration through the nose (Figure 2).

Type 2 (Figure 3) means unilateral vertical ridge. This one could be much more emphasized, i.e. being in close touch with the anterior nasal valve and thus remarkably impairing the quality of nasal breathing to the respective side of the nose. On the other side, because of naso-thoracal reflex which begins in the anterior valve area, in most of the cases of type 2 septal deformities one can expect the patient to suffer also from disturbed pulmonary breathing. This has been proven by body pletismography measurements in many cases[5].

Type 3 (Figure 4) means unilateral vertical deformity, i.e. unilateral convexity next to the anterior edge of the head of the middle turbinate. Nasal cavity is very narrow on this side and very wide on the opposite one. One can find a pneumatized middle turbinate at the wider side in more than 91% of all cases. Type 3 seems to be the most frequent septal deformity in general population and in all cases of chronic sinusitis.

It has been shown how septal deformities strongly influence histological structure of the nasal mucosa[6]. Once changed from typical respiratory mucosa into squamous cell one (Figure 5), it does not serve as it has been naturally predicted (mucocilliary system), but as an inert surface where any kind of mucus produced by surrounding areas of normal respiratory mucosa can not move forward towards the nasopharynx, but stays and serves as microbiological agar, giving a chance to the microbes to produce chronic inflammation in the region.

This type of septal deformity, if emphasized enough, can also produce the "C" or "Reverse C" shaped external nose thus causing not only functional, but an aesthetic problem as well (Figure 6).

Type 4 (Figure 7 a and b) is a bilateral vertical deformity consisting in fact of previously mentioned types, type 2 at one side, and type 3 at the other (so called S-shaped septum, or reverse "S"). Clinically, it summarizes all negative clinical implications of both types.

Type 5 (Figure 8) is again unilateral deformity, this time a horizontal crest which is as more lateral as deeper in the nose, in most of the cases resulting in an impaction of the crest at the region of the sphenopalatine ganglion. Clinically, it always means unilaterally impaired nasal breathing, but sometimes could also provoke ipsilateral intermittent attacks of headache (typical hemicrania or Sluder's headache) characterized by a sudden attack of diffuse pain in only one half of the head, always the same side in a particular patient since the deformity is always at the same side. The attack is immediately followed by ipsilateral edema of the nasal mucosa and by watery secretion from the same side of the nose. There are not scintillations, nausea or other prodromal signs, typical for vascular headaches like migraine and others. Today we know that physiological nasal cycle is the promoting factor for the onset of Sluder's hemicrania based on type 5. Namely, nasal mucosa works hard as to

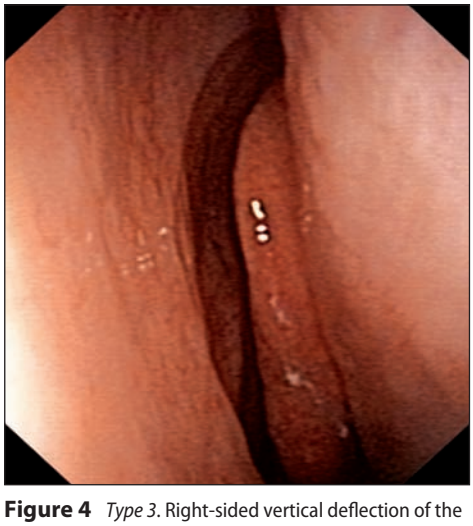

Figure 4 *Type 3*. Right-sided vertical deflection of the nasal septum, partially covering the anterior edge of the ipsilateral middle turbinate

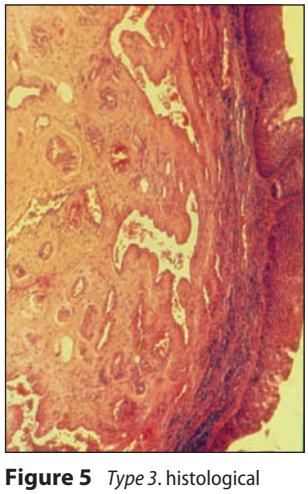

Figure 5 *Type 3*. histological appearance of the medial side of the right middle turbinate: squamous cell epithelial methaplasia

Figure 6 *Type 3*. Left-sided skolyosis of the external nose. Severe type 3 septal deformity to the left was found inside the nose

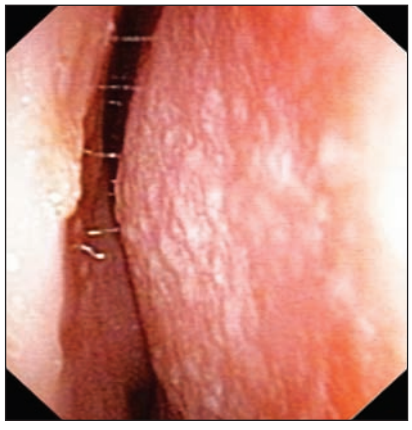

Figure 7a *Type 4*. Right side septal appearance (type 3) in an otherwise combined, bilateral deformity presenting clinically as type 4

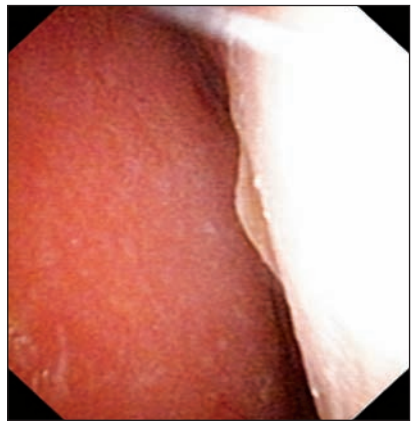

Figure 7b *Type 4*. Left nasal cavity: very anterior, left-sided vertical deformity, so characteristic for type 2

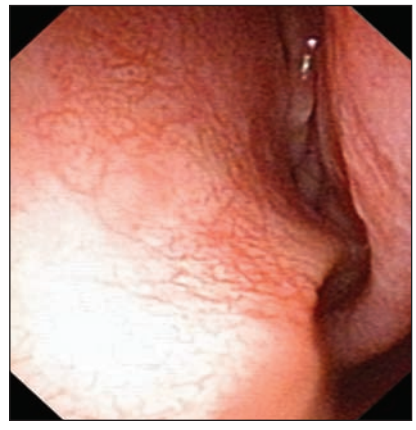

Figure 8 *Type 5*. Unilateral, horizontal deformity resembling a crest. The top of this crest touches lateral nasal wall even after the decongestion of the nasal cavity

maintain normal respiratory function of the nose. The physiologic background is so demanding and complicated that the nose needs some rest for its mucosa, usually side by side. So, the parasympathetic mucosal reaction (vasodilatation) on one nasal side always means the side which is relaxing, taking rest, whereas sympathetic reaction which causes vasoconstriction on the other side, means the activity of this part of mucosa.

Vasodilatation leads to the mucosal edema which, in addition, makes the contact between the most lateral part of the septal deformity and lateral nasal wall more and more tight. The deformity now pushes on the region of sphenopalatine ganglion and if the pressure is adequate, the headache starts immediately.

Type 5 theoretically could also influence the development of chronic otitis media since it mechanically disturbs normal direction of mucous drainage from the ostiomeatal complex to the nasopharynx directing it more superiorly, i.e. towards the Eustachian tube orifice.

Type 6 (Figure 9 a and b) is also a horizontal deformity, consisting of an anteriorly positioned basal septal crest, frequently touching mucosa of the inferior turbinate on the same side of the nose. At the other side, there is a massive wing of the intermaxillary bone, which sticks laterally, thus creating a deep gutter between the rest of the nasal septum and the wing itself. Clinically, this type is seen in more than 86% of all children suffering from cleft lip/palate, and in more of 67% of at least one of their parents[7,8,9].

Additionally, in subjects without manifest cleft palate one should palpate hard palate as to check for possible submucosal, hidden cleft and should also take a precise look to the uvula which in cases of hidden clefts is bifid. The analysis of the subject's hearing abilities and the middle ear compliance (tympanogram) in these cases are considered obligatory since submucosally hidden cleft palate could also mean irregular function of both levator velli palatini and tensor velli palatini muscles. The changes in the function of these two muscles could directly lead to the impairment of the Eustachian tube

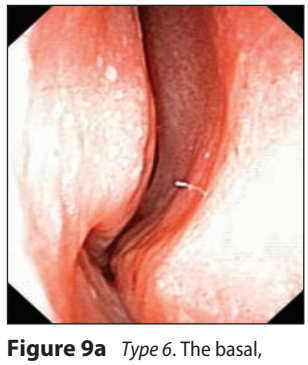

Figure 9a *Type 6*. The basal, almost horizontal, anterior crest in the right nostril

Figure 9b *Type 6*. An anterior, very characteristic, deep horizontal gutter between the undeveloped left wing of the intermaxillary bone and the palatal edge of the nasal septum

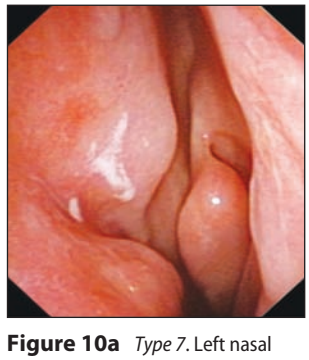

Figure 10a *Type 7*. Left nasal cavity. Two irregular convexities of the left septal side with a relatively deep gutter between them, resembling the one characteristic for the type 6

Figure 10b *Type 7*. Right nasal cavity. A slight anterior vertical deformity at the level of the anterior nasal valve (type 1) and emphasized type 5 staying in a close contact to the lateral nasal wall

orifice function, ventilation and drainage of the middle ear, which in some cases could cause the ipsilateral conductive hearing impairment.

Type 7 (Figure 10 a and b) is very variable and presents a combination of previously mentioned types with all their negative clinical implications.

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