



The Incidence of Inferior Turbinate Hypertrophy in a Brazilian Population

Corresponding Author:

Prof. Sergio E Cury,
DDS PhD, Oral Pathology - UniFOA - University of Volta Redonda, 27.310-060 - Brazil

Submitting Author:

Prof. Sergio E Cury,
DDS PhD, Oral Pathology - UniFOA - University of Volta Redonda, 27.310-060 - Brazil

Other Authors:

Mr. Raphael Cury,
Dental Student, Oral Pathology - UniFOA - University of Volta Redonda - Brazil
Mrs. Claudia Gioseffi,
Dental Student, Oral Pathology - UniFOA - University of Volta Redonda - Brazil
Mrs. Elaine Andrade ,
Dental Student, Oral Pathology - UniFOA - University of Volta Redonda - Brazil
Prof. Maria Dorotea Cury ,
MDS DDS PhD, Oral Pathology - UniFOA - University of Volta Redonda - Brazil

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The Incidence of Inferior Turbinate Hypertrophy in a Brazilian Population

Author(s): Cury R, Gioseffi C, Andrade E, Cury M, Cury SE

Abstract

Objective: The aim of this study is to verify the incidence of inferior turbinates hypertrophy in a Brazilian population.

Methods: Two thousand and four hundred panoramic radiography from the files of the Oral Pathology Department of the school of Dentistry UniFOA, Volta Redonda, Rio de Janeiro, Brazil, were evaluated for the presence of images compatible with inferior turbinate hypertrophy.

Results: Out of 2,400 panoramic radiography studied, 6.83% (n = 164) showed images with features of inferior nasal turbinate hypertrophy. Out of 164 cases found, there was a tendency for individuals of male gender totaling 65.2% of cases (n = 107) compared to females with 34.8% (n = 57), a ratio of 1.87 X1. The age ranged from 7 to 62 years, mean 24.5 years, with a higher concentration in the age group between 10 and 40 years (n = 149)

Conclusions: The occurrence rate found (6.83%) is low compared to literature. The main etiologic factor found was allergic rhinitis (79.9%), which may be associated with the air quality of the city.

Introduction

Nasal breathing is the only mode of breathing considered physiological and it plays an important role in the functions of heating, filtration and humidification of inhaled air.^{1,2}

Nasal turbinates are arched bone structures distributed in the anterior-posterior nasal cavities. They are of great importance for nasal physiology with regard to the balance of temperature and humidity of the inhaled air as well as filtration of suspended particles. Pathological changes that lead to chronic nasal obstruction such as allergic rhinitis, which is most prevalent, involve basically the lateral wall of the nasal cavity, changing the mucosa and submucosa of the nasal turbinates.³ Hypertrophy of turbinates happen because of chronic inflammation of the nasal

mucosa triggered by allergic processes, nasal irritants, medications, hormonal changes, pollution and sinusitis. It results in nasal obstruction, mouth breathing, snoring and retention of secretions.^{2,4,5}

Nasal obstruction is one of the most frequent complaints faced by otorhinolaryngological surgeons and it is proportionally related to the resistance of the nasal cavities. In addition, it is mainly caused by hypertrophy of the inferior turbinates, especially in their anterior region, which makes the nasal valve area the smallest upper airways air column diameter.⁶⁻¹⁰ When prolonged, it may induce mouth breathing leading to an adverse change in craniofacial growth, which could cause the development of a set of functional, dental alveolar and skeletal changes, with a strong relationship between nasal breathing obstruction and craniofacial growth pattern.^{2, 11, 12}

According to Lima (1998)¹³, nasal obstruction given the role of the inferior nasal turbinate can be caused by: 1) bone hypertrophy with normal mucosa, as a result of an anomalous or traumatic development; 2) hypertrophy with abnormal thickening of the mucosa of the turbinate, which should be due to edema caused by acute or chronic inflammation, or more commonly allergic rhinitis, vasomotor and medication, as well as the vicarious hypertrophy of the inferior nasal turbinate associated with contralateral septal deviation and chronic sinusitis.

Gupta (2001)¹⁴ stated that the hypertrophy of the inferior turbinates is a common cause of nasal airway obstruction and also that some chronic inflammatory nasal diseases, such as allergic rhinitis or vasomotor result in hypertrophy of the turbinates because there is a deposition of collagen in the basement membrane of the nasal mucosa, as well as gland hyperplasia and hypersecretion. However, the most common causes of hypertrophic turbinates are related not only to allergic rhinitis, but also to the non-allergic and infectious.¹⁵ Both components (bone and mucous) may, separately or jointly (most common), be responsible for hypertrophy of the inferior turbinates which manifests clinically by nasal obstruction.¹⁶

It occurs mostly in the age group 20-60 years, due to anatomical or vasomotor, endocrine, allergic or irritant factors. Epidemiological investigations in Europe have reported rates ranging from 10% to 20% of the population who had some type of respiratory allergy.^{17,18}

Dutra and Marchiori (2002) assessed 71 children between 1 and 7 years with sinusitis using a computed tomography. Among the findings, the authors reported that 14.1% had inferior turbinate hypertrophy

Duarte, Zavarezzi and Soler (2005)¹⁹ studied 20 patients with chronic nasal obstruction, aged 14 to 51 years, treated in the Otolaryngology outpatient unit of the Nossa Senhora de Lurdes hospital, São Paulo. The authors found that 16 patients (80%) had turbinate hypertrophy.

DiFrancesco et al. (2006)²⁰ studied 80 patients at random, treated in a private clinic in the city of São Paulo, Brazil. The subjects underwent anamneses and physical examination (rhinoscopy, and Otoscopy Oroscopy). Through anamneses, it was observed the complaint of nasal obstruction, confirmed or not confirmed by physical examination. Four patients (9.8%) had nasal turbinate hypertrophy. The authors concluded that importance should be given to the investigation of nasal obstruction, emphasizing multidisciplinary treatment.

Fonseca et al. (2007)²¹ stated that the allergic rhinosinusitis is among the major chronic respiratory pathologies, due to its high prevalence, the association with asthma and sinusitis and the impact on patients' quality of life. Patients with allergic rhinosinusitis have type 1 hypersensitivity reaction with persistent inflammation of the nasal mucosa. The nasal hyperactivity is manifested by the appearance of symptoms such as rhinorrhea, itching and nasal obstruction which may regress spontaneously or with treatment. The authors conducted a study in 39 patients with spontaneous complaint of allergic rhinosinusitis, nasal mucosal inflammation, and at least one of the following symptoms: nasal congestion, hyposmia, rhinorrhea, sneezing or itching. When evaluated through external rhinoscopy and nasal sinus video-endoscopy, one of the main findings were obtained (80%) with nasal turbinate hypertrophy.

Panoramic radiography is a current and practical radiographic method which provides an overview of the maxillomandibular complex, all the dentoalveolar region and adjacent structures, among them the pits, the septum and the turbinates. It is a procedure that captures the image in a single radiographic film in short time and with less biological exposure to radiation for the patient.^{2,22}

The lower turbinate composed of an internal bone and covered by cartilage along with mucous membrane has a coronal image in the anterior region and a sagittal image in the posterior region of the panoramic radiography. These structures can appear with large

areas of homogeneous density compatible with soft tissue overlapping the maxillary sinuses and occasionally in the anterior nasopharynx.²³

In panoramic radiography evaluation can be considered the degree of inferior turbinate hypertrophy, which helps in establishing initial diagnosis of hypertrophy, including compensation when there is, for example, a septal deviation.²⁴

Lima (2006)² conducted a study to assess the validity of panoramic radiography in the diagnosis of nasal obstruction due to hypertrophy of the turbinates. To obtain a sample, the author selected 42 individuals, Brazilians of both genders, aged 7-15 years who underwent panoramic radiography and were diagnosed as having hypertrophic turbinates. After the radiographic diagnosis, patients were referred to nasal fiber optic examination. The author reports that 40 patients had turbinate hypertrophy in radiographic examination, and all were positive in optical endoscopy. In conclusion it was found that both panoramic radiography and endoscopy examinations were reliable for the diagnosis of the of pathological change.

Methods

Two thousand and four hundred panoramic radiography from the files of the Oral Pathology Department of the school of Dentistry UniFOA, Volta Redonda, Rio de Janeiro, Brazil, were evaluated for the presence of images compatible with inferior turbinate hypertrophy.

For evaluation, It was used a negatoscope mesh composed of white light emitting diodes (LEDs) Model Driller (VK Driller - Brazil), and a 60 mm diameter handle, 2x magnification, model LP-60 magnifying glass (Western - Brazil).

Radiography was initially evaluated by the students participating in the research, and later by the Professors. After surveying the cases with changes, we investigated the medical records of patients in order to ascertain the etiology of the change.

Results

Out of 2,400 panoramic radiography studied, 6.83% (n = 164) showed images with features of inferior nasal turbinate hypertrophy. Out of 164 cases found, there was a tendency for individuals of male gender totaling 65.2% of cases (n = 107) compared to females with 34.8% (n = 57), a ratio of 1.87 X1.

The age ranged from 7 to 62 years, mean 24.5 years, with a higher concentration in the age group between 10 and 40 years ($n = 149$) (Table 1).

The right side was more affected (49.39% $n = 81$), with a small margin compared to the left (44.51% $n = 73$). The image compatible with lower turbinate hypertrophy located on both sides was found in 6.1% of cases ($n = 10$) (Table 2).

Allergic rhinitis was found in 79.9% of cases ($n = 131$), being the main etiological factor observed, followed Infectious Rhinitis in 20.1% of cases ($n = 33$).

Another radiographic change associated with the side of the hypertrophy was also studied, with the majority of cases ($n = 99$) showed no change. Among the changes observed, the deviation of the nasal septum was found most frequently ($n = 43$), totaling 26.22% of the cases (Table 3).

Discussion

The inferior turbinate hypertrophy was attributed to abnormal thickening of the turbinate mucosa caused by frames hypertrophic rhinitis, chronic medication rhinitis or compensatory hypertrophy, when there is, for example, a septal deviation.^{15, 16, 28}

Several authors reported the clinical importance of nasal obstruction due to turbinate hypertrophy, which impacts on the quality of life of individuals causing discomfort, impaired sleep quality, interference with olfactory acuity and taste,^{2,4} mouth breathing and diseases of the nasal mucosa and paranasal sinus,¹² and, in children, the mouth breathing may eventually affect the facial morphology and the shape of the dental arches.^{1,2,13,14}

The most appropriate diagnostic method according to the literature is the panoramic radiography that in spite of inevitable distortions and overlapping anatomical structures, has some advantages such as allowing visualization of the jaws, temporomandibular joint and surrounding structures, including nasal turbinates in a single film.^{2,25-27} It is also simple to implement in a short time, having low levels of radiation, good image quality and low cost.^{2,25}

The rate of occurrence found (6.83%) is below described in the literature (10 to 20%)¹⁹⁻²¹ It should be noted that researches were carried out in other continents such as Europe and North America, where climate is different from Brazil, which may explain the difference. The same view applies to the results found by DiFrancesco et al. in 2006²³ (9.8%), this study

conducted in the São Paulo State where the climate and humidity of the air are different from Rio de Janeiro State. Another factor would be the age, because studies in children, tend to have a greater outcome because they are susceptible to temperature changes, pollution and humidity.

Another factor would be the period of implementation of radiography. It is known that in periods of low rainfall and increased air pollution, allergic processes intensify. However, this data can not be assessed as it is not in the database of images when the tests were conducted.

The incidence of 80% reported by Duarte, Zavarezzi and Soler (2005),²² could not serve as a parameter, because it is a study with a small number of individuals and performed in the Otorhinolaryngology unit where the patient was already with some alteration in the respiratory system.

The age group (10-40 years) found (Table 1) is slightly below the reported in the literature. This is due to increased demand for young patients to orthodontic treatment, which took place over the study period. So, this is not relevant to the study.

In relation to the affected side (Table 2), It was not found any mention of this fact in the literature studied. In the present study, the right side was the most affected with a small margin compared to the left, a fact considered as a mere coincidence. It is important to point out the occurrence of 10 cases (6.1%) on both sides, since it may represent a greater response of the patient to the etiologic agent.

Only two etiological agents were found in the study: Allergic rhinitis (79.9%) and inflammatory rhinitis (20.1), which is consistent with reports in the literature studied, which was cited allergic rhinitis as the main causal factor for turbinate hypertrophy.^{3,5,15-17} It is worth mentioning the air quality in the city of Volta Redonda, where the biggest National Steel Company in Latin America operates and where, due to particulate pollution, allergic cases may be present.

Other radiographic changes concurrent with hypertrophy were also studied (Table 3), but the vast majority of cases ($n = 99$) showed no change. The deviation of the nasal septum was the main change found, having been found in 29.2% ($n = 43$). Within these subjects, 36 had a deviated septum on the same side of occurrence of hypertrophy, suggesting a compensatory response of the mucosa to accompany this change.

Conclusions

The occurrence rate found (6.83%) is low compared to literature. The main etiologic factor found was allergic rhinitis (79.9%), which may be associated with the air quality of the city.

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Illustrations

Illustration 1

Table 1 - Age

Table 1 - Age

AGE	<i>n</i>	%
1 a 10	1	0,61
10 a 20	69	42,1
20 a 30	58	35,36
30 a 40	22	13,40
40 a 50	6	3,65
> de 50	8	4,88
TOTAL	164	100

Illustration 2

Table 2 - Affected side

Table 2 - Affected side

SIDE	<i>n</i>	%
RIGHT	81	49,39
LEFT	73	44,51
BOTH	10	6,1

Illustration 3

Table 3 - Another radiographic change

	<i>n</i>	Same lado	Different side
DEVIATED NASAL SEPTUM	43	36	7
MAXILLARY SINUS EXTENSION	10	10	0
MAXILLARY SINUS OPACIFICATION	1	1	0
MAXILLARY SINUS PNEUMATIZATION	4	4	0
ANTRAL PSEUDOCYST	7	4	3
WITHOUT RADIOGRAPHIC CHANGES	99	-	-
TOTAL	164	55	10

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