

OVERVIEW

Orthodontic Diagnosis of Nasopharyngeal Obstruction

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(Editor's Note: In this quarterly column, JCO provides a brief overview of a clinical topic of interest to orthodontists. Contributions and suggestions for future subjects are welcome.)

Nasal breathing is the first physiological function developed at birth. Responsible for the processes of air conditioning—warming, humidification, and filtering—it serves as protection for the respiratory tract.^{1,2} It is also important in the development and determination of facial morphology,³ and it helps establish equilibrium among functions such as suctioning, breathing, chewing, swallowing, and speech articulation.⁴

On the other hand, oral breathing can interfere in the craniofacial growth of the developing child.⁵ It can alter dentofacial morphology and have negative effects on cognitive and psychosocial development.⁶ It can also lead to maxillary atrophy, dental protrusion, and excessive vertical

growth,⁴ which is undesirable in dolichocephalic patients.

A mouthbreathing patient must be evaluated and treated by a multidisciplinary team, including the physician, speech pathologist, and physical therapist.⁷ The orthodontist can contribute to the initial diagnosis of many nasopharyngeal obstructions that can result in a predisposition to mouthbreathing.

Orthodontic Diagnosis of Obstruction

Although the physician is the health professional responsible for the diagnosis of nasopharyngeal obstruction,⁸ the orthodontist can contribute through the use of lateral cephalograms and panoramic x-rays. Regular contact with the patient also allows constant evaluation of the patient's treatment needs and facial growth.⁹

The cephalogram can reveal many obstructive processes in the nasopharynx,¹⁰ including hypertrophy of the nasal or inferior turbinates, maxillary sinus radiopacity or cystic lesions, hypertrophy of the adenoids or tonsils, and the status of the nasopharyngeal airway.

Ianni Filho and colleagues compared two otorhinolaryngologists' radiographic diagnoses, showing that their agreement was "perfect" when interpreting the middle turbinate and "substantial" when interpreting the inferior turbinate.^{2,11} This means clinically that the cephalogram provides a view of the turbinates, but cannot reveal with certainty whether they are truly hypertrophic (Fig. 1).

Despite these limitations, if an orthodontist can associate the information obtained from the cephalogram with a good clinical questionnaire,



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and can evaluate the color, volume, and texture of the mucosa in the front of the nasal cavity, he or she can suggest an initial diagnosis of allergic rhinitis or chronic hypertrophic rhinitis with associated hypertrophy of the nasal turbinates. The diagnosis can then be confirmed or overruled by the otorhinolaryngologist. Special attention must be paid to the caudal portion of the inferior turbinate, because hypertrophy of this turbinate can obstruct the posterior nasal cavity and impede normal nasal breathing.

The lateral cephalogram can also be useful in an analysis of the paranasal sinuses, especially

the maxillary sinuses. Sinusitis is suggested when radiopacity is observed. A valid diagnostic agreement between endoscopic and radiographic findings has been found in observing the severity of adenoid hypertrophy and, in particular, the patency of the nasopharyngeal space.^{2,11}

The panoramic x-ray can indicate an initial diagnosis of, for example, an anterior septal deviation (Fig. 2). This may be corroborated in clinical examination simply by lifting the tip of the nose with the fingers (Fig. 3). A more accurate evaluation can then be made by the otorhinolaryngologist with anterior rhinoscopy.

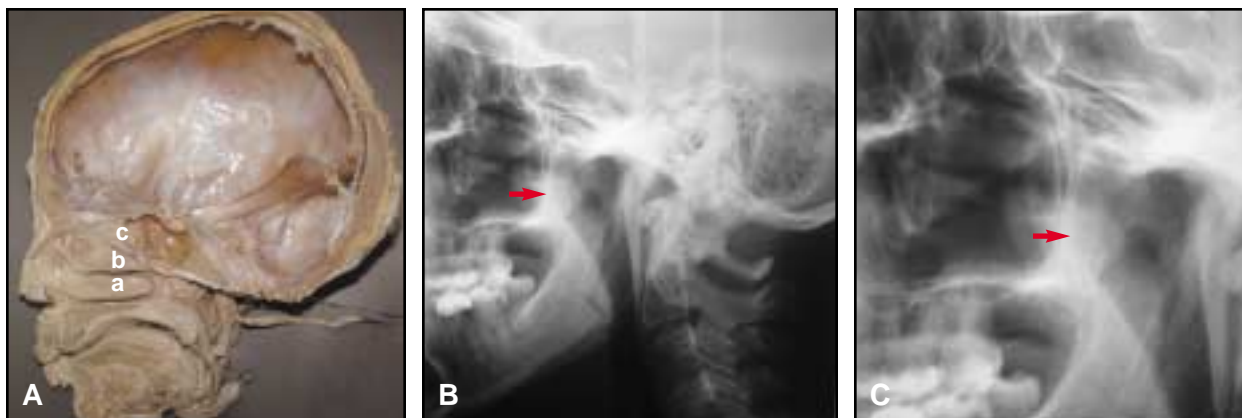


Fig. 1 A. Sagittal median slice of cadaver's head displaying nasal turbinates—inferior (a), middle (b), and superior (c)—and critical caudal region of inferior turbinates, where hypertrophy can obstruct choanal and impede nasal breathing. B. Lateral cephalogram showing caudal region of inferior turbinate (arrow). C. Detail showing relationship of caudal inferior turbinate and choanal.

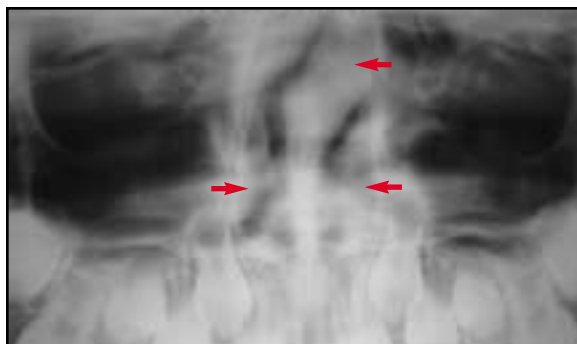


Fig. 2 Panoramic x-ray indicating deviated anterior septum and hypertrophic head of inferior turbinates (arrows).



Fig. 3 Anterior septum deviation toward left nostril confirmed by clinical examination.

The panoramic x-ray can also reveal the severity of hypertrophy of the inferior and middle nasal turbinates in the frontal region (Fig. 4). Such hypertrophy can be a consequence of chronic hypertrophic rhinitis, medicational rhinitis, or a compensatory hypertrophy, as with a deviated septum. The otorhinolaryngologist can perform a nasopharyngeal video endoscopy to validate the initial diagnosis suggested by the orthodontist (Fig. 5).

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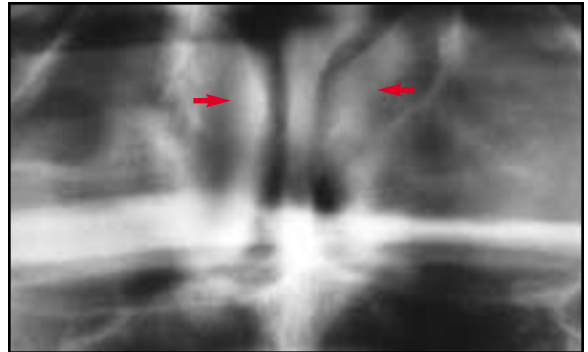


Fig. 4 Panoramic x-ray indicating hypertrophy of frontal portion of inferior turbinates (arrows).

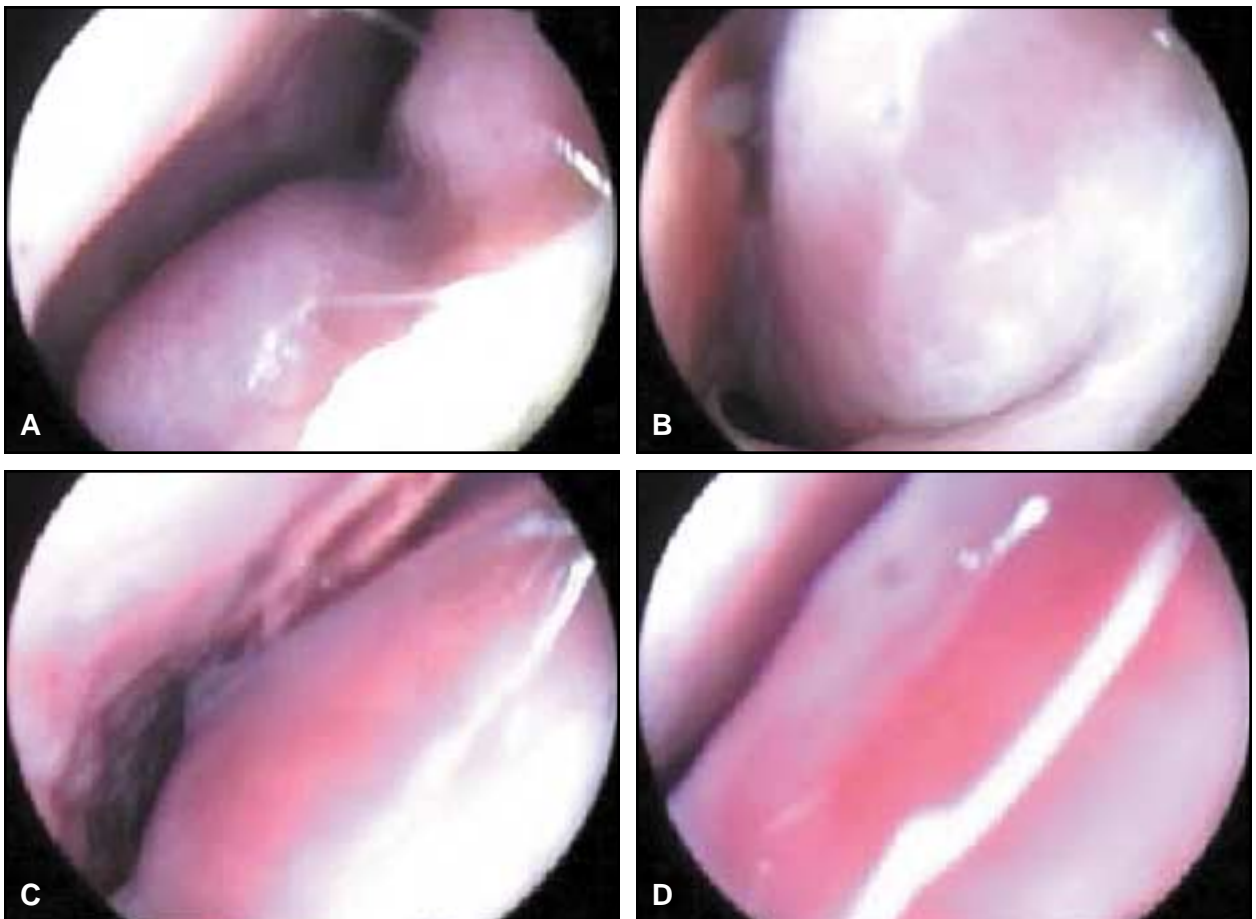


Fig. 5 Video endoscopic images. A. Hypertrophied frontal portion of inferior turbinates. B. Detail of hypertrophied frontal region. C. Hypertrophied body of inferior turbinate. D. Detail of hypertrophied body, almost totally obstructing inferior meatus.

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REFERENCES

1. Almeida, M.F.B.: Assintência ao recém nascido normal, in *Rotinas Médicas: Disciplina de Pediatria Neonatal da Escola Paulista de Medicina*, ed. M.F.B. Almeida and B.I. Kopelman, Editora Atheneo, São Paulo, Brazil, 1994, pp. 3-9.
2. Ianni Filho, D.: Estudo comparativo entre videoendoscopia nasofaríngea e telerradiografia cefalométrica lateral no diagnóstico das obstruções da nasofaringe, master's thesis, Faculdade de Odontologia UNESP, Araraquara, Brazil.
3. Bresolin, D.; Shapiro, P.A.; Shapiro, G.G.; Chapko, M.K.; and Dassel, S.: Mouth breathing in allergic children: Its relationship to dentofacial development, *Am. J. Orthod.* 83:334-340, 1983.
4. Justiniano, J.R.: Respiração bucal, *J. Bras. Ortod. Ortop. Maxilar*, 1:44-46, 1996.
5. Mocellin, M.: Estudo de alterações do esqueleto facial em respiradores bucais, doctoral thesis, Escola Paulista de Medicina, São Paulo, Brazil, 1986.
6. Paiva, J.B.; Arrair, A.; Bianchini, E.M.G.; Nunes, I.C.C.; and Cudizio, F.O.: Identificando o respirador bucal, *Rev. Assoc. Paul. Cirurg. Dent.* 53:265-274, 1999.
7. Schinestsck, P.A.N.: A relação entre a maloclusão dentária, a respiração bucal e as deformidades esqueléticas, *J. Bras. Ortod. Ortop. Maxilar* 1:45-55, 1996.
8. Lund, V.J.: Office evaluation of nasal obstruction, *Otolaryngol. Clin. N. Am.* 25:803-816, 1992.
9. Rubin, R.M.: The orthodontist's responsibility in preventing facial deformity, in *Naso-Respiratory Function and Craniofacial Growth*, Craniofacial Growth Series, vol. 9, ed. J.M. McNamara Jr., University of Michigan, Ann Arbor, 1979.
10. Holmberg, H. and Linder-Aronson, S.: Cephalometric radiographs as a means of evaluating the capacity of the nasal and nasopharyngeal airway, *Am. J. Orthod.* 76:479-490, 1979.
11. Ianni Filho, D.; Raveli, D.B.; Raveli, R.B.; de Castro Monteiro Loffredo, L.; and Gandini, L.A. Jr.: A comparison of nasopharyngeal endoscopy and lateral cephalometric radiography in the diagnosis of nasopharyngeal airway obstruction, *Am. J. Orthod.* 120:348-352, 2001.