



ORIGINAL ARTICLE

Setting of an endoscopic nasal reference point for surgical access to the anterior base through an anatomical study on cadavers[☆]



Andressa Vinha Zanuncio^{a,*}, Paulo Fernando Tormin Borges Crosara^b,
Helena Maria Gonçalves Becker^b, Celso Gonçalves Becker^b,
Roberto Eustáquio dos Santos Guimarães^{b,*}

^a Universidade Federal de São João del-Rei (UFSJ), Campus Centro-Oeste, Divinópolis, MG, Brazil

^b Universidade Federal de Minas Gerais (UFMG), Faculdade de Medicina, Departamento de Oftalmologia e Otorrinolaringologia, Belo Horizonte, MG, Brazil

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KEYWORDS

Skull base;
Endoscopic surgery;
FESS;
Paranasal sinuses;
Facial sinuses

Abstract

Introduction: Diseases of paranasal sinuses, nasal cavity, and skull base can be treated by endonasal operations using a nasal rigid endoscope. When conducting this kind of surgery, anatomical references are critical for safety.

Objective: To measure the distance from the posterior wall of the maxillary sinus to the skull base, according to socio-demographic characteristics, and to detail an anatomical reference point for paranasal sinus operations and for an access to the anterior skull base, comparing anatomical variations between right and left sides, gender, height, weight, age, and ethnicity in cadavers.

Methods: Measures were taken from the 90° angle (the starting point where deflection of the skull base begins to form the anterior wall of the sphenoid, also known as $\Delta 90^\circ$) to the upper, middle, and lower points of the posterior wall of the maxillary sinus. This study used 60 cadavers aged over 17 years, and evaluated these bodies with respect to age, height, BMI, weight, gender, and ethnicity, comparing measurements of right and left sides.

Results: The measurements were >1.5 cm in all cadavers and did not vary with age, height, weight, gender, and ethnicity on their right and left sides. The lack of association between the measurement from $\Delta 90^\circ$ to the upper, middle, and lower posterior walls of the maxillary sinus (categorical or quantitative) is noteworthy, considering the characteristics studied.

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* Corresponding authors.

E-mails: zandressa@gmail.com (A.V. Zanuncio); resguimaraes@gmail.com (R.E. Guimarães).

PALAVRAS-CHAVE

Base do crânio;
 Cirurgias
 endoscópicas;
 FESS;
 Seios paranasais;
 Seios da face

Conclusion: The methodology defined the nasal point of reference, considering an absence of variation in the cadavers' characteristics.

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Definição do ponto de referência endoscópica nasal ao acesso cirúrgico à base anterior por estudo anatômico em cadáveres

Resumo

Introdução: Doenças dos seios paranasais, cavidades nasais e doenças da base do crânio podem ser tratadas com operação endonasal utilizando-se endoscópio rígido nasal. Referências anatômicas são importantes para a segurança durante a realização dessas operações.

Objetivo: Medir a distância da parede posterior do seio maxilar à base anterior do crânio de acordo com características sócio-demográficas. Detalhar um ponto de referência anatômico para operações dos seios paranasais e acesso à base anterior do crânio comparando variações anatômicas entre os lados direito e esquerdo, gênero, altura, peso, idade e etnia em cadáveres.

Método: Medidas do ângulo de 90° (ponto onde inicia a deflexão da base do crânio para formar a parede anterior do esfenóide, chamado de ângulo de 90° – Δ90°) aos pontos superior, médio e inferior da parede posterior do seio maxilar. Foram utilizados 60 cadáveres com idade acima de 17 anos, e avaliados com idade, altura, peso IMC, gênero e etnia, comparando-se as medidas dos lados direito e esquerdo.

Resultados: As medidas foram maiores que 1,5 cm em todos os cadáveres e não variaram com a idade, altura, peso, gênero e etnia nos lados direito e esquerdo dos cadáveres. Destaca-se falta de associação entre a medida do Δ90° à parede posterior superior; média e inferior do maxilar (categórico ou quantitativo) com as características estudadas.

Conclusão: A metodologia empregada definiu o ponto de referência nasal por não variar com as características dos cadáveres.

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Introduction

Endonasal surgery guided by a nasal rigid endoscope (called endoscopic sinus surgery) is used for the treatment of diseases of paranasal sinuses, nasal cavities, and skull base diseases. Thus, one must have a detailed knowledge of nasal anatomy; a CT scan of facial sinuses and a nasolaryngoscopy study are indispensable for this procedure. The anatomy of the sinuses varies individually.¹⁻³

Functional endoscopic sinus surgery is used to treat chronic rhinosinusitis with or without nasal polyps, for resection of nasal and paranasal sinus tumors, in malformations of the nasal cavity such as choanal atresia, in various inflammatory and infectious diseases of nasal cavity and paranasal sinuses, and in skull base diseases, with less morbidity/complications. Skull base surgery and revision procedures with distorted anatomy are the procedures most in need of precise anatomical references.⁴⁻⁶

Knowledge of fixed measures (with slight variation in characteristics such as gender, ethnicity, age, weight, and height) such as the distance from the posterior wall of the maxillary sinus to Δ90° (starting point where the deflection of the skull base begins, to form the anterior wall of the sphenoid) in the anterior skull base, would provide

greater safety to surgeons. With such knowledge, iatrogenic complications to the posterior sinuses could be minimized. These measures have not been described in the literature, and will be presented in this article.⁷⁻⁹

The aim of this study was to measure distances from three points of the right- and left-side posterior wall of the maxillary sinuses to the anterior skull base (Δ90°) and compare them with the sociodemographic characteristics of interest; set other benchmarks for endoscopic surgical access; compare the anatomical variations of the reference points measured in relation to gender, height, weight, age, and ethnicity on cadavers; and to detail a new anatomical reference point to perform surgeries of the paranasal sinuses and anterior skull base in a safer environment.

Methods

This study was approved by the Research Ethics Committee of the institution under protocol No. 0591.0.203.000-8.

The nasal cavities (right and left) were dissected in 60 cadavers, all aged over 17 years, of varying age, ethnicity, height, and gender. The medial wall of the maxillary sinus was opened, and anterior and posterior ethmoid sinuses and the sphenoid sinus were dissected to make it possible to

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