

# PREVALENCE OF MAXILLARY SINUS SEPTA IN 1024 SUBJECTS WITH EDENTULOUS UPPER JAWS: A RETROSPECTIVE STUDY

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Maxillary sinus floor augmentation has been routinely performed to optimize dental implant placement in the posterior maxilla. However, complications during a sinus grafting procedure, such as perforation of the Schneiderian membrane, have been reported. This complication is generally associated with the presence of maxillary septa. Therefore, the aim of this retrospective study was to evaluate the prevalence of maxillary sinus septae in completely edentulous subjects by means of panoramic radiography. A total of 1024 panoramic radiographs were evaluated by 3 calibrated examiners. From these radiographs, 307 maxillary septa were detected in 221 subjects (21.58%); 86 (8.40%) of the subjects showed maxillary septa in both maxillary sinuses. Logistic regression failed to detect any correlation between the presence of maxillary septa, age, and gender ( $P > .05$ ). Within the limits of the study, the prevalence of maxillary septa in this Brazilian population was shown to be moderate, indicating that dentists must be aware of the presence of this anatomic structure during maxillary sinus elevation grafting.

**Key Words:** dental implants; maxillary sinus graft elevation; maxillary sinus septa; posterior maxilla; edentulous subjects

## INTRODUCTION

**D**ental implant therapy has become an excellent and safe treatment modality for a conservative and esthetic alternative to solving partial and total edentulism.

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However, the placement of dental implants in the posterior maxilla is complicated by the existence of the maxillary sinus above the surgical site, into which implants may project.

The maxillary sinus grafting procedure has been used for occlusal rehabilitation with prosthetic appliances placed over dental implants in the posterior maxilla.<sup>1,2</sup> Several studies have evaluated different bone grafting materials inserted in the maxillary sinus cavity.<sup>3-6</sup> Several complications during and after completion of a sinus grafting procedure have, however, been reported in the literature.<sup>7-10</sup> During the surgical procedure, the most common complication is perforation of the Schneiderian membrane.<sup>8,11</sup> This complication is generally associated with the presence of maxillary septa that make it difficult to elevate the Schneiderian membrane. The maxillary septa, also called Underwood's septa, divide the floor

TABLE

Comparison among the assessment scores of the presence of maxillary sinus septa in 1024 subjects

Variables*	Scores†		
	0	1	2
No. (%) of subjects	803 (78.42%)	135 (13.18%)	86 (8.40%)
Gender (m:f)‡	310:493	54:81	30:56
Mean age (years)	62.45 ± 12.21	60.57 ± 9.12	63.98 ± 16.45

\*Friedman test  $P > 0.05$ ; not statistically significant.

†Score 0 = no septa in both maxillary sinuses; score 1 = septa in one of the maxillary sinuses; score 2 = septa in both of the maxillary sinuses.

‡m indicates men; f, women.

of the maxillary sinus into several chambers.<sup>11</sup> In addition, the septa may have different heights and orientations. Pneumatization of the maxillary sinus after tooth loss leads to the formation of antral septa in edentulous maxilla more frequently than in dentate maxilla. Consequently, it is becoming increasingly important to have detailed knowledge of this anatomic variation, such as its location, morphology, and height, during maxillary sinus grafting procedures.<sup>1,2,7-9,11-15</sup>

The prevalence of maxillary septa in both partially and totally edentulous subjects ranges from 16% to 31.7%.<sup>8,11,15-20</sup> To date, however, no studies report this prevalence in a Brazilian population. Therefore, the aim of this cross-sectional study was to detect the presence of maxillary septa in totally edentulous Brazilian subjects.

## MATERIAL AND METHODS

### Study population

The study population was based on radiographic data from 1024 Brazilian subjects (630 women and 394 men; mean age, 62.34 ± 12.60 years) with edentulous upper jaws. The radiographic data was obtained from the Oral Implantology Clinic of Guarulhos University, São Paulo, Brazil. Radiographic examinations that suggested any pathology of dental or respiratory system origin and subjects without pneumatization of one or both maxillary sinuses were excluded from this sample. This study methodology was approved by the local Human Research Ethics Committee.

### Panoramic radiographs

All panoramic radiographs were obtained using the same Orthopantomograph Model OP5 (Siemens, Bensheim, Germany), at the voltage setting of 55 to 60 Kv, and using Siemens Titan 2 HS screens.

### Intra- and interobserver agreement and septae evaluation

All examinations were performed by 3 calibrated dentists. Evaluations were made twice with an interval of 5 days. The inter- and intraobserver agreements were calculated with 2 different evaluations by the Kappa-light test ( $P < .05$ ), which takes into account the contribution of agreement by chance. Next, the panoramic radiographs were submitted to 3 independent and previously calibrated examiners (examiner 1 × 2: kappa = 0.77; examiner 1 × 3: kappa = 0.87; examiner 2 × 3: kappa = 0.80; the intraobserver agreement ranged from 0.80 to 0.95 for the 3 examiners), who evaluated the presence of maxillary septa in accordance with an index system proposed by the authors: score 0 indicates no septa in both maxillary sinuses; score 1 indicates septa in one of the maxillary sinuses; score 2 indicates septa in both maxillary sinuses.

When the evaluations were performed, the assessments from each observer were compared, and the visibility of the maxillary septa was judged by majority decision. In cases where none of the observers had awarded the same score, a new interpretation and a common decision was made by the 3 examiners.

### Data analysis

The frequencies of maxillary septa were calculated on the basis of the results of the scores obtained by the examiners, and the percentage of maxillary septa positive subjects was determined. Difference in the prevalence of septa between the genders and among the scores was tested by  $\chi^2$  test and Friedman test, respectively. Multivariate logistic regression was used to evaluate the relationships among the variables, such as age, gender, and the presence of maxillary septa. The level of significance was set at 5%.

## RESULTS

A total of 307 maxillary sinus septa were detected in 221 (21.58%) edentulous subjects (see the Table and the Figure). Of these, 135 (13.18%) subjects presented one maxillary septa (score 1) and 86 (8.40%) subjects presented maxillary septa in both maxillary sinuses (score 2).

In addition, among subjects who presented with maxillary sinus septa, no differences were observed with regards to gender or age ( $P > .05$ ). The logistic regression results showed no association between age ( $\chi^2 = .67$ ;  $P = .345$ ) and gender ( $\chi^2 = .12$ ;  $P = .893$ ) with the maxillary sinus septa for the evaluated population.

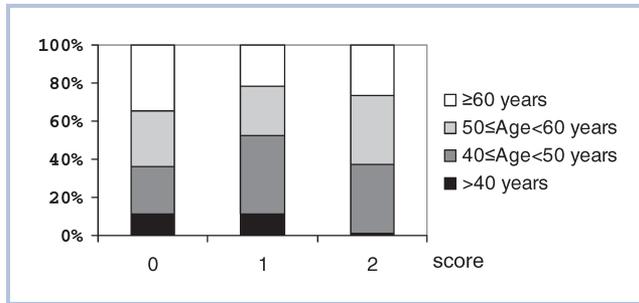


FIGURE. Proportions of each score categorized by ages. Friedman test  $P > .05$ . Legends: Score 0 = no septa in both maxillary sinuses; score 1 = septa in one of the maxillary sinuses; score 2 = septa in both of the maxillary sinuses.

### DISCUSSION

The present study evaluated the prevalence of maxillary sinus septa in Brazilian edentulous subjects. Previous studies have reported the prevalence, height, and localization of the septa.<sup>8,11,15,18</sup> The authors believe simple detection of the presence of the septa in the radiographic examination before maxillary sinus floor elevation is crucial information required by oral surgeons, irrespective of the size or location of the septa. This information is very important to enable dentists to alter their surgical strategy, either by cutting out the maxillary septa or aborting the surgery. Presence of maxillary sinus septa has been associated with perforation of the Schneiderian membrane.<sup>8,9,11</sup> The main complication as a result of perforation of the membrane is the development of maxillary sinusitis.<sup>7,15,20</sup>

Prevalence of maxillary sinus septa in the present study agrees with previous studies performed in edentulous maxillae. Prevalence of more than one septa (score 2) in the present study was almost as twice high as that reported in previous studies.<sup>8,11,15,18,19</sup> This difference may be attributed to the difference between the radiographic examinations: panoramic × computerized tomography.<sup>21,22</sup> Several studies have shown that computerized tomography is the preferred radiographic method for detecting maxillary septae. A recent study performed by Sakakura and coworkers,<sup>23</sup> however, demonstrated that 63.8% of Brazilian dentists use panoramic radiography for preoperative assessment of the implant site. Panoramic radiography must be used with caution in evaluating anatomic structures because of to the inherent distortion in the acquired panoramic radiographs.

Within the limits of the present study, the prevalence of maxillary septa in this Brazilian population was found to be moderate, indicating that dentists must be aware of the presence of this

anatomic structure during the maxillary sinus elevation grafting procedures.

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