Analysis of the prevalence, location and morphology of maxillary sinus septa in a southern Chinese population using cone beam CT

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Background

Sinus pneumatisation and bone resorption occur frequently after posterior maxillary tooth loss, reducing the alveolar ridge dimensions. Sinus floor elevation procedures might be necessary prior to implant placement to treat such bone deficiencies. The presence of maxillary sinus septa may prevent adequate surgical and visual access to the sinus floor, thus increasing the risk of membrane perforation and incomplete elevation and grafting. A thorough preoperative radiographic assessment of the maxillary sinus is necessary in order to prevent surgical complications.^{1,2,3}

Aim

The purpose of this study was to determine the prevalence, location and orientation of the maxillary sinus septa in the Hong Kong

Materials and Methods

CBCT scans of the full maxilla or maxilla and mandible of 395 patients above 18 years old, who visited the Prince Philip Dental Hospital, Hong Kong from 2014 to 2016 were evaluated retrospectively for the presence and type of antral septa. The scans had been taken with a NewTom GiANO device in standard mode and field of view 11cmx13cm or 11cmx8cm and the data were reconstructed with a slice interval of 0.5mm.

Fig.1. Buccopalatal type septum in Axial view

Fig.2. Sagittal type septum in coronal view

Fig.3. Transverse type septum in coronal view

Fig.4. Mixed type septa

Sinus septa with height more than 2.5mm were included in the analysis and were studied according to age, gender, number, side, location (anterior/middle/posterior third of the sinus), orientation (buccal-palatal, sagittal or transverse), type of dentition (dentate or edentulous) and the differences were analyzed statistically. Chi-Square test was used for the descriptive statistical analysis, while the difference in the median of continuous data among groups was estimated with Mann-Whitney U or Kruskal-Wallis test. For left and right comparison, paired analysis by Wilcoxon signed-rank test was conducted. The level of significance for all tests was set to 0.05.

Results

A total of 395 individual patients’ scans were examined, corresponding to 44.3% male and 55.70% female subjects, age ranging from 18 to 86 years old. The prevalence of maxillary sinus septa was 41.27% and 28.86% at patient and sinus level respectively. Septa were most commonly located in the middle region and the majority of the septa were of buccal-palatal orientation. Only 9.20% patients with septa had symmetrical pattern. Younger subjects(age<30) had significant higher prevalence of septa than older (≥60 aged) subjects. Gender was not significantly associated with the presence of sinus septa. There was a significant relationship between full dentate condition with the higher presence of septa in the right posterior and middle regions only. Furthermore, there was a significant difference in the prevalence of septa between right and left side.

Table 1. Location and orientation of the septa

	Location			Orientation			
	Posterior (7D-)	Middle (5D-7D)	Anterior (-5D)	Bucco-Palatal	Sagittal	Trans - verse	Mixed
Total Number of Septa (Right+Left)	50	147	90	165	51	65	6
Percentage of All Septa (n=287)	17.42%	51.22 %	31.36%	57.49 %	17.77 %	22.65 %	2.09 %

Table 2. Relationship between Gender/Age and the Presence of Septa (using Chi-Square Test)

	Presence of Septa		
Subject Characteristics	Number of septa	Percentage %	p-value
Gender			
Female (n=220)	87	39.5%	0.436
Male (n=175)	76	43.4%	
Age Groups			
<30 (n=76)	44	57.6%	0.004*
30-59 (n=227)	87	38.3%	
≥60 (n=92)	32	34.8%	

Conclusions

This is the first study on sinus septa prevalence among a southern Chinese population, which could offer a reference for clinicians, in comparison to results around the world. Taking into consideration that the presence of sinus septa is common, practitioners should be aware of the prevalent factors and perform thorough radiographic evaluation using cone beam CT prior to surgical treatments in the area of the maxillary sinus.

References

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