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Maxillary sinus pneumatization and its relationship with vitamin D deficiency: A cross sectional study

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Objectives: To identify any correlation and its severity with the levels of serum vitamin D with the level of maxillary sinus pneumatization.

Study design: Descriptive cross-sectional survey.

Setting: OPD, Oral and Maxillofacial Department, Fatima Memorial Hospital, Lahore.

Materials & Methods: Patients were independently recruited using random sampling. A sample size of 100 subjects met the inclusion criteria of serum vitamin D levels of the patients was done using liquid chromatography tandem mass spectrometry, also known as LC/MS/MS. While level of sinus pneumatization was recorded according to Sharan and Majdar classification of maxillary sinus pneumatization. Data was collected and entered into the statistical package for social science (SPSS) version 25.0 for analysis. Parametric analysis was performed that included the pearson's chi-squared test to determine an association between excessive maxillary sinus pneumatization and hypovitaminosis. A p-value of <0.05 was defined as the level of significance.

Results: The ages of patients ranged from 20 to 40 years while the mean age patients recruited was 26.03±6.72 years. 56% of the participants were found to be severely deficient in vitamin D levels. While 32% were deficient followed by only 12% having insufficient levels of vitamin D. Whereas, level 4 excessive sinus pneumatization was the most common with 40% patients. Second highest level of sinus pneumatization were seen in level 2 which were 31% followed by level 1 pneumatization which was 18% of the total subjects in which the least levels of pneumatization were seen in level 3 with only 11% of the total subjects. There was no statistically significant relationship of age or gender with levels of maxillary sinus pneumatization and hypovitaminosis D (p>0.05). However, a statistically significant relationship was found between levels of hypovitaminosis and levels of pneumatization with a chi square value to be 0.002 (p<0.05).

Conclusion: There is a significant relationship between levels of hypovitaminosis and levels of pneumatization.

Fig. 1: Schematic illustration and panoramic images of 5 classifications of maxillary posterior teeth roots in relation to the inferior wall of the sinus. 0) The root is not in contact with the cortical borders of the sinus. 1) an inferiorly curving sinus floor, with the root in contact with the cortical borders of the sinus ; 2) an inferiorly curving sinus floor, with the root projecting laterally on the sinus cavity but with the root apex outside the sinus boundaries; 3) an inferiorly curving sinus floor, with the root apex projecting on the sinus cavity; 4) a superiorly curving sinus floor enveloping part or all of the tooth root.

Table: 1

Relationship of hypovitaminosis D and excessive maxillary sinus pneumatization

Levels of hypovitaminosis D	Frequency of maxillary sinus pneumatization					P value
	Class 1	Class 2	Class 3	Class 4	Total	0.002
Insufficient (20-4 ng/dl)	1	0	1	0	12	
Deficient (10-20ng/dl)	12	11	3	6	32	
Severely Deficient (0-10ng/dl)	6	19	6	36	56	

Test utilized: Pearson's Chi Square Test

Recent Publications

1. Riben C and Thor A (2012) The Maxillary Sinus Membrane Elevation Procedure: Augmentation of Bone around Dental Implants without Grafts-A Review of a Surgical Technique. International Journal of Dentistry 105483.
2. Iqbal R and Khan A H (2010) Possible causes of vitamin D deficiency (VDD) in Pakistani population residing in Pakistan. The Journal of the Pakistan Medical Association 60(1):1-2.
3. Bener A A-AM, and Hoffmann G F (2009) High prevalence of vitamin D deficiency in young children in a highly sunny humid country: a global health problem. Minerva Pediatrica 61(1):15-22.
4. Elsammak M Y, Al-Wossaibi A A, Al-Howeish A, Alsaeed J (2011) High prevalence of vitamin D deficiency in the sunny Eastern region of Saudi Arabia: a hospital-based study. Eastern Mediterranean Health Journal 17(4):317-22.
5. Shahbazian M, Xue Dong, Yuqian Hu, Johan Van and Cleynenbreugel R J (2010) Spiral computed tomography based maxillary sinus imaging in relation to tooth loss, implant placement and potential grafting procedure. J Oral Maxillofac Res. 1:1-7.

Biography

Sana Rauf studied and graduated with a Bachelor of Dental Surgery from Lahore Medical and Dental College in 2017. During her under graduation she was a Founding Member of 'Sehat Organization', which joined hands with multiple NGOs across the region to provide free medical and dental healthcare in poverty struck areas of Punjab. After completing her foundation year in 2018, she went on to join a research externship at Agha Khan University, Karachi to dive into the world of research, epidemiology and public health. She is currently working as a Registrar at Akhtar Saeed Medical and Dental College in Oral and Maxillofacial Surgery Department and plans on pursuing her master's in public health in the near future.

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