

A. M. Hosseinpour

RELATIONSHIP BETWEEN MAXILLARY MOLARS AND THE MAXILLARY SINUS FLOOR

Scientific advisors: prof. Kabak S. L., MD

assos. prof. Melnichenko Y. M., PhD

Department of Human Morphology,

Department of Radiology and Radiotherapy

Belarusian state medical university, Minsk

Resume. *This study was conducted to assess the vertical relationship between the root apices of the maxillary molars and the maxillary sinus floor using cone beam computed tomography.*

Keywords: *maxillary molar, maxillary sinus, cone beam computed tomography.*

Relevance. The maxillary sinus varies in its extension. It is essential to understand the anatomic relationship between the maxillary sinus floor and the root of the maxillary molar for planning preoperative treatments for maxillary posterior teeth [3]. Because of the close proximity between the roots and the maxillary sinus floor, extension of periapical infections may result from the introduction of endodontic instruments and materials beyond the apices of teeth, into the sinus during root canal treatment [2]. Knowledge of the topographical relationship between the roots of the posterior maxillary teeth and the floor of maxillary sinus is important for the prognosis of orthodontic tooth movement [1].

Aim: To investigate the relationship between the root apices of the maxillary molars and the maxillary sinus floor using cone beam computed tomography (CBCT).

Objectives:

4. To detect the type of vertical relationship between the roots of the maxillary molars and the maxillary sinus floor.

5. To establish the distance between the apices of the molars and the sinus floor.

Material and methods. Ninety nine CBCT scans of randomly selected patients who visited dental outpatient hospitals of Minsk, Belarus during the period from 2012 to 2017 were retrospectively analyzed. Of the 99 patients, 47 were women and 52 men, mean age: 30.3, SD: 11.2. All selected participants were 18-60 year-old, had maxillary premolars and first and second molars present at least on one side, had no radiographic signs of trauma and artifacts or technique related image defects. Reformatted computerized tomograms from 198 sinuses were analyzed using imaging software. Type of vertical root apex-sinus relationships and distance between root apices and sinus floor type were identified. In Type 0 and Type 3, the distance between the apices of the molars and the sinus floor was measured.

Results and discussion. The vertical relationship between each root of the molar and the sinus floor was classified into four types: Type 0, the root was not in contact with the sinus floor (Figure 1A); Type 1, the root was in contact with the sinus floor (Figure 1B); Type 2, the root apex was in contact with the sinus floor making small elevation into the sinus cavity (Figure 1C); and Type 3, the root apex was projecting into the sinus cavity (Figure 1D). Frequency of different types of vertical relationships of maxillary sinus floor and root apices of maxillary molars is presented in the table 1.

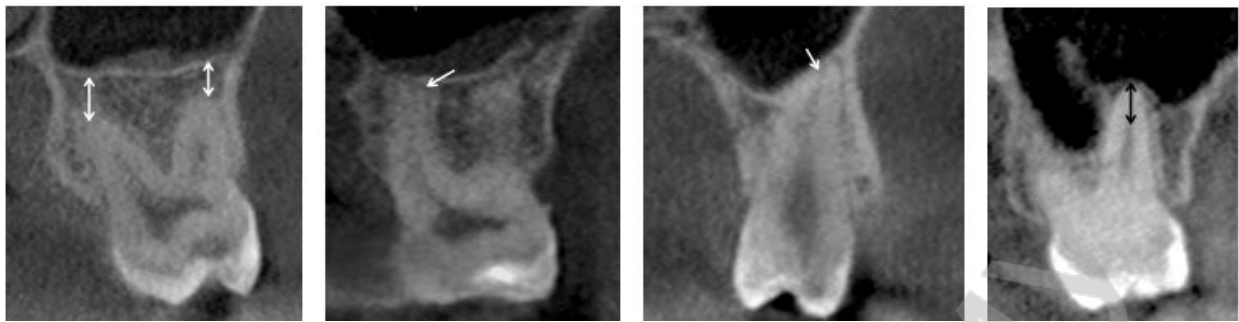


Figure 1. – A – Type 0 (the maxillary sinus floor is located above the root apex); B – Type 1 (the root apex touches the floor of maxillary sinus); C – Type 2 (the root apex is in contact with the sinus floor making small elevation into the sinus cavity); D – Type 3 (the root apex is projecting into the sinus cavity)

Table 1. Types of vertical relationship of maxillary sinus floor and maxillary molars

Tooth	Root	Type 0, %		Type 1, %		Type 2, %		Type 3, %		Total N
		N	%	N	%	N	%	N	%	
First molar	Mesiobuccal	27	14,7	68	36,9	59	32,1	30	16,3	184
	Distobuccal	31	16,9	79	42,9	53	28,8	21	11,4	184
	Palatal	23	12,4	93	50	49	26,3	21	11,3	186
Second molar	Mesiobuccal	8	4,4	58	32,0	58	32,0	57	31,6	181
	Distobuccal	19	10,5	64	35,4	59	32,6	39	21,5	181
	Palatal	33	18,1	94	51,6	35	19,2	20	10,9	182

Data about the distance between apices of molar roots and sinus floor is presented in Table 2.

Table 2. Distances from root apices to maxillary sinus floor in type 0 and type 3 Me (Q25 %;Q75 %), max-min

Tooth	Root	Type 0	Type 3
First molar	Mesiobuccal	2.80 (2.13;4.00), (1.49-11.08)	2.40 (2.01;3.66), (0.98-4.71)
	Distobuccal	2.09 (1.38;3.57), (0.95-12.58)	2.92±1.93*
	Palatal	3.18 (2.44;4.74), (0.94-11.96)	1.95 (1.28;2.67), (0.83-2.67)
Second molar	Mesiobuccal	3,61±2,35*	3.26 (2.07;4.53), (0.78-8.53)
	Distobuccal	2.60 (1.59;3.30), (0.95-8.07)	2.45±0.98*
	Palatal	3.12 (2.30;4.70), (1.66-9.07)	2.29 (1.50;3.40), (1.05-6.37)

*- M±SD

Conclusions:

1. The root apices of the maxillary molars can be located below the maxillary sinus floor, contact with the sinus floor or project into its lumen.
2. Root apices of 31.6% of mesiobuccal and 21.5% of distobuccal roots of second molar were projected into the sinus lumen. Root apices of 76.3% of mesiobuccal and 70.8% of palatal roots of second molar were in contact with sinus floor.
3. The results of the performed study are relevant for endodontic treatment of the first and second maxillary molars and surgical procedures in the posterior maxilla.
4. Cone-beam computed tomography very useful to study relationship between the roots of the maxillary molars and the maxillary sinus floor in detail.

References

1. Fuhrmann, R. Radiological assessment of artificial bone defects in the floor of the maxillary sinus / R. Fuhrmann, A. Bucker, P. Diedrich // *Dentomaxillofacial Radiology*. – 1997. – Vol. 25. – №. 2. – P. 112-116.
2. Hauman, C. H. Endodontic implications of the maxillary sinus: a review / C. H. Hauman, N. P. Chandler, D. C. Tong // *International Endodontic Journal*. – 2002. – Vol. 35. – №. 2. – P. 127-141.
3. Jung, Y. H. Assessment of the relationship between the maxillary molars and adjacent structures using cone beam computed tomography / Y. H. Jung, B. H. Cho // *Imaging Science in Dentistry*. – 2012. – Vol. 42. – №. 4. – P. 219-224.