



Relationship between permanent maxillary canine and floor of the maxillary sinus through aging

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Abstract

The maxillary sinus are pyramidal shaped cavities in the mid-facial aspect of the skull; they are bilateral structures, located beside each nasal fossa. Knowledge of the relationship between the root apex and the inferior wall of the maxillary sinus is crucial for diagnosis and treating a sinus pathosis as well as in assisting dental implantation, endodontic procedures and orthodontic treatment. Thirty patients attending Al-Ma'moon dental centre were selected in this study according to a special criteria. Four digital periapical x –rays were taken for each patient using dental x – ray machine two views demonstrated both right and left permanent canines to measure the length of each tooth by direct double click technique, the other two views were taking with concentration on the apical area of each tooth, to measure the exact distance between the apex of the tooth and the floor of the maxillary sinus. Results of this study found that the distance between the apices of right permanent maxillary canines and the base of maxillary sinus was greater than that of left side and the distance between the canine apex and the floor of maxillary sinus increasing with increasing age.

Keywords: Maxillary canine, digital radiography, maxillary sinus

Introduction

The maxillary sinus are pyramidal shaped cavities in the mid-facial aspect of the skull; they are bilateral structures, located beside each nasal fossa. Each sinus extend posteriorly near the roots of maxillary posterior teeth and for this reason, parts of the floor of the maxillary sinuses may appear in many of the maxillary periapical projections⁽¹⁾. Radiographic landmarks may be anticipated from the relation of maxillary sinuses and adjacent structures as nasal cavity, forming the antral Y or inverted Y formation that formed by the

intersection of the floor of the nasal cavity and the anterior wall of the maxillary sinus. Such landmark often seen in periapical projections of canine region^{(2),(3)}.

Knowledge of the relationship between the root apex and the inferior wall of the maxillary sinus are crucial for diagnosis and treating a sinus pathosis as well as in assisting dental implantation, endodontic procedures and orthodontic treatment⁽⁴⁾. Therefore, identifying the proximity between the root apex and the inferior wall of the sinuses and clarifying the cortical

thickness of the inferior wall of the sinuses is essential for determining of the topography of a spreading dental infection into the maxillary sinuses⁽⁵⁾.

Large number of studies regarding this vital relationship was carried out utilizing different radiographic techniques including conventional, computed tomography and digital radiography^(6,7,8,9,10). In a review study in 2000, the distance from the apices of the roots of the first molar tooth to the sinus floor was found to be 0.5mm or even less in one third of all cases, and sometimes there is no bone between the root apex and the sinus⁽¹¹⁾.

In comparison to the conventional radiography, digital radiography having a significant advantage in providing instant, or nearly instant images that are archivable and retrievable at the press of a button or click of a mouse all without the mess or the bother of the dark room⁽¹²⁾.

Most of researches in the literature study the relationship between maxillary sinus floor and the apices of maxillary canine in general and only few of these researches deals with the relation of individual tooth roots to the floor of the maxillary sinus. So the aim of the present study is to determine the relationship between the root apices of the permanent maxillary canine and floor of the maxillary sinus and its relation to age.

Materials and methods

Thirty patients attending Al-Ma'moon dental centre were selected in this study according to a special criteria which are:

- Presence of both upper vital canines.
- Normal and healthy maxillary sinus.
- No previous history of surgical procedure in the sinus.
- No root curvature (straight root).

The age range of those patients was between (21 – 65) years of both

sexes. The sample were divided into three equal groups according to their age with equal number of patients in each group.

1st age group range between (21 – 35) years old

2nd age group range between (36 – 50) years old

3rd age group range between (51 – 65) years old.

Two digital periapical radiographs were taken for each patient using dental x – ray machine two views demonstrated the both right and left permanent canines with concentration on the apical area of each tooth, to measure the exact distance between the apex of the tooth and the floor of the maxillary sinus. The resultant measurement were arranged into tables and statistical analysis has been applied for these results, then comparative significance were detected by using t- test.

Results

The results of this study was demonstrated that the mean distance between the apices of permanent maxillary canine and the base of maxillary sinus was (2.9 mm) for right side and (2.2mm) for left side in first age group, (3.4 mm) for right and (3.0 mm) for left for second age group and finally it was (4.6 mm) for right and (3.4 mm) for left in the third age group. More statistical results have been shown in table (1) and chart (1). In more detailed figure, regarding the right side, the results showed that there was a non significant differences between the 1st and 2nd age group, while there was significant differences between 1st and 3rd groups and non significant between 2nd and 3rd age groups. In the left side all the above mentioned comparison were found to be non significant between the 3

different age groups. More statistical details were shown on table (2).

Discussion

The relation and estimation of the distance between the apices of the teeth and the normal anatomical land marks have a great benefits in order to prevent any possible complications that may results from surgical procedures that are done in the oral cavity like apicectomy and one of the important landmarks are the maxillary sinuses and its relation to the upper posterior teeth and canines.

In this study, it was found that the distance between the apices of right permanent maxillary canines and the base of maxillary sinus was greater than that of left side. This came in agreement with many studies in the literature ⁽¹³⁾. Unfortunately, this difference was found to be unexplainable, but it may be related to the habit of chewing on one side that may lead to some differences between both sides regarding the possibility of tooth resorption and bone deposition in addition to the fact that there is a difference in the periodontal space between both functional and non functional tooth that affect the distance between the tip of the maxillary canine and the maxillary sinus.

The results also found that the distance between the canine apex and the floor of maxillary sinus increasing with increasing age. This can be simply explained by the fact that the aging process result in decreasing the size of the maxillary sinus in all directions ⁽¹⁴⁾, also may be due to the fact that the possibility of root resorption is increase with through aging that cause increasing in the distance between them.

In more detailed study carried out in Japan was fond that the maxillary sinus size of individuals with complete

set of teeth was found to be largest at 20 years of age and its reduced as age increases to 50 or more ⁽¹⁵⁾

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Table (1): The mean distances between maxillary canine apices and the maxillary sinus in millimeter (mm)

	Age group-year	No.	Minimum	Maximum	Mean	Std. Deviation
Right	21 – 35	10	1.00	7.00	2.9000	1.91195
	36 – 50	10	1.00	6.00	3.4000	2.01108
	51 – 65	10	4.00	7.00	4.6000	1.26491
Left	21 – 35	10	1.00	5.00	2.2000	1.39841
	36 – 50	10	1.00	5.00	3.0000	1.56347
	51 – 65	10	2.00	6.00	3.4000	1.83787

Table (2): Comparison of distances between the apices of root maxillary canines and the floor of the maxillary sinus in different age groups (statistical analysis)

	Age group	Mean difference	Std. deviation	Std. error mean	T	Df	P-value *
Right	1 st & 2 nd Group	-.50000	3.50397	1.10805	-.451	9	.662 NS
	1 st & 3 rd Group	-1.70000	2.11082	.66750	2.547	9	.031 S
	2 nd & 3 rd Group	-1.20000	2.48551	.78599	1.527	9	.161 NS
Left	1 st & 2 nd Group	-.80000	2.61619	.82731	-.967	9	.359 NS
	1 st & 3 rd Group	-1.20000	2.48551	.78599	1.527	9	.161 NS
	2 nd & 3 rd Group	-.40000	1.89737	.60000	.667	9	.522 NS

* p < 0.05 highly significant , P>0.05 Non significant

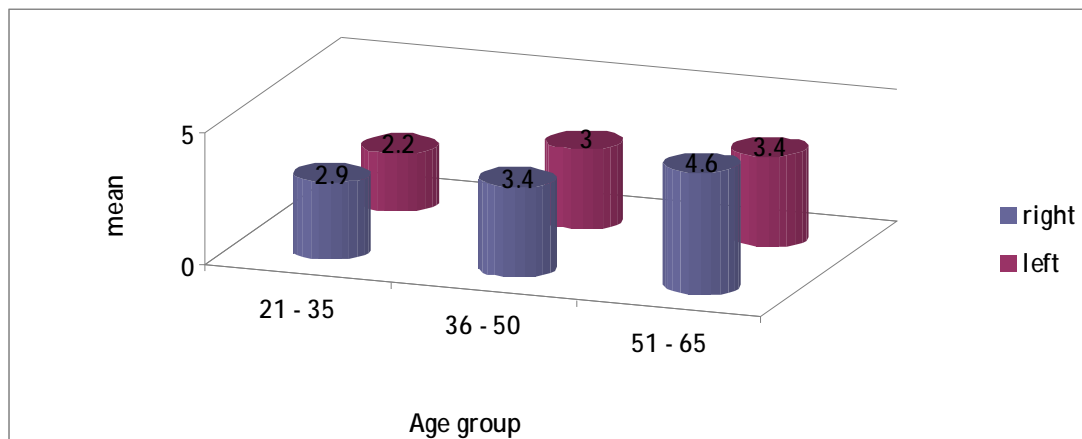


Fig (1): The mean distances between maxillary canine apices and the maxillary sinus