Radiographic assessment of the level of the floor of maxillary sinus

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ABSTRACT

Background: The depth of the floor of the maxillary sinus is very important to be assessed radiographically prior to commencing any dental procedure that may involve or be in a close proximity to the sinus to avoid unwanted post-operative complications. The aim of the present research was study the following: 1- Individual variation in the level of the floor of the maxillary sinus in both dentate and edentulous alveolar ridges. 2- The relation between the level of the floor of the maxillary sinus and the age, sex

Materials and methods: Two hundred alveolar ridges (154 dentate and 46 edentulous) were studied by viewing 100 panoramic radiographs.

Results: They were as follows:

a- In dentate ridges, the average level of the floor of the maxillary sinus was 10.36 mm (S.D. 3.51), results fell in the following categories: 30 % of the measurements were between 2-8mm. 58.44 % between 8.5-14.5mm. 11.04 % between 15-21 mm.

b- In edentulous ridges, the average level of the floor of the maxillary sinus was 6.99 mm (S.D. 3.49), results fell in the following categories: 67.39% of the measurements were between 2-8mm. 30.43 % between 8.5-14.5mm. 2.17 % between 15-21mm.

Conclusion: This study found that there is relation between the depth of the maxillary sinus floor and the age of the patients in dentate alveolar ridges while there is no relation in edentulous ridges, while There is no relation between the depth of the maxillary sinus floor and the sex in dentate alveolar ridges while there is relation in edentulous ridges. There is difference between the sexes in alveolar ridge resorption after tooth loss.

Key words: Floor of maxillary sinus. (J Bagh Coll Dentistry 2010;22(3):69-73)

INTRODUCTION

The paranasal sinuses, especially the maxillary sinuses located near the dental structures, are important to the dentist. Therefore the dentist should have some familiarity with the normal appearances of the paranasal sinuses. (1)

Part or all of the paranasal sinuses appear on many dental radiographs, for example, maxillary periapical radiographs and panoramic films made for dental treatment. (2)

Ohba et al compared the depth of the maxillary sinus floor on panoramic radiographs between the edentulous and dentate patients. (3) Thirty panoramic radiographs of edentulous female patients and 47 panoramic radiographs of female dentate patients were used for the sample. There was no statistical difference in the depth of the maxillary sinus floor between the right and left sides in the edentulous and dentate jaws. Spyropoulos et al studied the distance of the sinus floor from the alveolar crest in edentulous area, the distance between the floor of the maxillary sinus and the alveolar crest in edentulous areas were studied radiographically. (4) The most important finding is that the mean distance from the alveolar crest to the floor of the sinus in location corresponding to the 1st molars was 5.09 mm.).

Saglam et al studied the vertical height of maxillary bone in panoramic radiographs of dentate and edentulous subjects. (5) The mean ages of the dentate and edentulous groups were 51.05 and 59.98 years, respectively. Guler et al evaluated the vertical height of maxillary bone and the location of anatomic landmarks in panoramic radiographs of edentulous patients for implant dentistry. (6)

The results of his study may guide clinicians to make primer decision of implant insertion area for implant-supported prosthesis in edentulous patients. Xie et al did a quantitative assessment of vertical heights of maxillary bone in panoramic radiographs of elderly dentate and edentulous subjects. (7)

Edentulous women had greater values for percentage reduction in the mandibles than did the men. Packota studied the height of intact alveolar bone on panoramic radiographs of adult patients to estimate alveolar bone height on panoramic radiographs by using constant anatomic landmarks. (8)

The results of the study suggest a difference of as much as 25% among patients in the same ratio in the maxillae. Therefore, the results may not be of significant value as “baseline” data to estimate alveolar bone loss at a given time after tooth loss. However, this method could prove valuable in serial studies where alveolar bone
height for a single patient is compared at different times before and after tooth loss. Kreisler et al in a study to develop a new method for assessing residual ridge resorption in the edentulous maxilla. (9) Comparison of the experimental area with the reference area on serial panoramic radiographs appears suitable for the assessment of residual resorption in the maxilla.

MATERIALS AND METHODS

A total of 200 alveolar ridges (154 dentate and 46 edentulous) were examined by using 100 orthopantomographs from the files of the patients who were visiting the clinics of (Ajman University of Science and Technology. The age of the patients ranged from 15-58 years (mean age 36.5).

All radiographs were made using Kodak films type T-MAT S/RA dental film, 15x30 cm. Exposure of films was done using Panoramic x-ray machine: Gendex / orthoralix 9200. The radiographs were examined by a viewer type star X-ray. Model no. ph 952-500, all extraneous light of the viewer was blocked using black cardboard paper except the light emerging through the panoramic radiographs.

The distance between the lowest point of the inferior border (floor) of the maxillary sinus and the crest of the alveolar ridge in the upper first molar area was measured. The measurement was applied for both sides of the maxillary sinus (right and left)

RESULTS

Figure 1 shows the relation between the depth of the maxillary sinus floor and the age of the patient in dentate (A) and edentulous patients (B).

![Figure 1A](image1.png)

**Figure 1A:** The distribution of data according to the age and the depth in dentate ridges.

![Figure 1B](image2.png)

**Figure 1B:** The distribution of data according to the age and the depth in edentulous ridges.
Figure 2A: The distribution of data according to the sex and the depth in dentate ridges.

Figure 2B: The distribution of data according to the sex and the depth in edentulous ridges.

Figure 3A: The distribution of data according to the side and the depth in dentate ridges.
DISCUSSION

In this study, measurements of the distance from the deepest point of the maxillary sinus floor to the crest of the alveolar ridge in the upper first molar area were taken. Measurements ranged from 2-17 mm in edentulous ridges and from 3.5-21 mm in dentate ridges, (the distance decreases in edentulous area with severe bone resorption).

Measurements in dentate alveolar ridges were as follows:
- 30% of maxillary sinus floors have a distance ranging between 2-8mm.
- 58.44 % with a distance ranging between 8.5-14.5mm.
- 11.04 % with a distance ranging between 15-21mm.

Measurements in edentulous alveolar ridges were as follows:
- 67.39 % with a distance ranging between 2-8mm.
- 30.43 % with a distance ranging between 8.5-14.5mm.
- 2.17 % with a distance ranging between 15-21mm.

1- There is relation between the depth of the maxillary sinus and the age of the patient in dentate ridges, i.e., bone resorption and sinus pneumatization increase by age, but there was no relation between the depth and the age in edentulous ridge, i.e., bone resorption and sinus pneumatization occur after tooth loss despite the age of the patient.

2- There is no relation between the depth of the maxillary sinus and the sex in dentate ridges.

These results of the present study coincide with the study of Guler et. al, which found that in dentate group, there was no statistically significant difference between men and women in the height of the maxilla. (6) In the same study it was found that the reduction in the height of the edentulous mandible and maxilla were significantly more pronounced in women than in men (i.e. there is relation between the depth and the sex in edentulous ridges).

Statistical analysis done in this study was also found that there is a relation between the depth of the maxillary sinus and the sex of patient in the edentulous ridges but there was more reduction in the height in male than in female. 78.13% of males have distance ranging between 2-8 mm while 42.86% of the females have distance ranging between 2-8 mm. This does not coincide with the study of Guler et. al, (6). This could be attributed to many factors such as:
(a) The age of the patients.
(b) Time passed since tooth loss.
(c) Rate of resorption and sinus pneumatization.
(d) The difference in the number of patients examined.

3- There was no relation found between the depth of the maxillary sinus and the side of the sinus examined (right & left) in both dentate and edentulous alveolar ridges. This coincides with study of Spyropoulos et. al. in which there seems to be no difference in the depth of maxillary sinus floor between the right and left sides of either edentulous or dentate jaws. (4)

REFERENCES

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