

## Three-Dimensional Radiograph Revealing the Big-Nose Variant before Dental Implant Surgery in Posterior Maxilla: A Rare Case Report

Masoumeh Khoshhal<sup>1</sup>, Fariborz Vafae<sup>2</sup>, Sepideh Seyedzadeh Sabouchi<sup>1</sup>,  
Shabnam Seyedzadeh Sabouchi<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Periodontology,

<sup>2</sup>Assistant Professor, Dental research center, Department of Prosthodontics,

<sup>3</sup>Assistant Professor, Dental research center, Department of Dental Public Health,  
Faculty of Dentistry, Hamadan University of Medical Sciences, Hamadan, IRAN.

### ABSTRACT

Clinical and radiographic examination of the surgical site before implantation is very important. This rare case report points out the importance of obtaining three-dimensional radiograph for assessing the posterior maxilla and detecting the big-nose variant before dental implant insertion. In a 60 year old man seeking for prosthetic rehabilitation supported with dental implants both panoramic and Cone Beam Computed Tomography (CBCT) radiographs were obtained. The CBCT radiograph revealed that the radiolucent area in the maxillary upper right and left quadrants on the panoramic view were actually nasal cavities and therefore the treatment plan was switched from performing closed sinus lift to using shorter diameter implants. Based on this finding one of the advantages of obtaining three-dimensional radiographs is determining the nasal cavity location in relation to maxillary sinus which could prevent planning the sinus lift procedure when it is contraindicated.

### INTRODUCTION

In implant dentistry prosthetic anchorage is obtained from osseointegrated dental implants. Best results in dental implant treatment plan mostly depend on existence of adequate quality and quantity of bone in the implantation site which could be determined before implantation by clinical and radiographic examination of the surgical site<sup>1</sup>. Dental or panoramic radiographs are the conventionally used radiographs for evaluating bone height in the implant insertion site. However for evaluating bone quantity in cases with severe resorption or proximity to important anatomical structures such as the maxillary sinus, mandibular canal or the nasal cavity a three-dimensional radiological assessment of the site becomes necessary<sup>2</sup>.

In this rare case report we point out the importance of obtaining a three-dimensional radiograph for assessing the posterior maxilla detecting the big-nose variant before implant insertion. The incidence of this condition found in the CT scans has been reported to be only 3%<sup>3</sup>.

### CASE REPORT

A 60-year-old male patient was referred to dental office for prosthetic rehabilitation supported with dental implants. Teeth 13-17, 36 and 47 were missing. The patient had no medical history of systemic diseases and the intra oral and extra oral examination findings were normal.

The panoramic radiograph revealed generalized bone loss in all

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### \*Correspondence to:

**Dr Sepideh Seyedzadeh Sabouchi,**

Department of Periodontology,

Faculty of Dentistry,

Hamadan University of Medical Sciences, Hamadan, Iran.

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four quadrants. Decreased alveolar bone height in the upper left and right regions was evident and teeth 24, 25 and 26 were hopeless. Three-dimensional CBCT radiograph was obtained for studying the maxillary sinuses in more details and to assess the region accurately for performing closed sinus lift operation with least complication.

After evaluating the CBCT radiograph (Fig.1) it was discovered that the radiolucent cavity which was comparable to the maxillary sinus on the panoramic view, as on the follow-up panoramic view (Fig.2), was actually the nasal cavity extending in the right quadrant from teeth region 11 to 17 and in the upper left quadrant from teeth region 21 to 26. With the information found out by the three-dimensional radiograph the treatment plan was switched to using shorter diameter bone level SPI implants (Switzerland, Grenchen, THOMMEN) instead of performing sinus lift procedure which was contraindicated. Three implants were inserted in the upper right quadrant with the length of 9.5 in the region of teeth no. 15, 16 and 17. In the region of tooth no.13 an implant with the length of 11.5 was inserted. In the upper left quadrant two implants were inserted with the length of 9.5 in the region of teeth no. 24, 26 and in the region of tooth no.25 an implant with the length of 11 was inserted. After 3 months of healing, in the second stage surgery the healing abutments were connected and the final restoration was delivered to the patient 4.5 months after the implant placement surgery. In the mandible tooth 37 was hopeless

and three implants in the region of 36, 37 and 47 were inserted. After 5 years of follow-up the implants functioned well and the

follow-up panoramic view (Fig.2) revealed there were no complications regarded to the nasal cavity or maxillary sinuses.

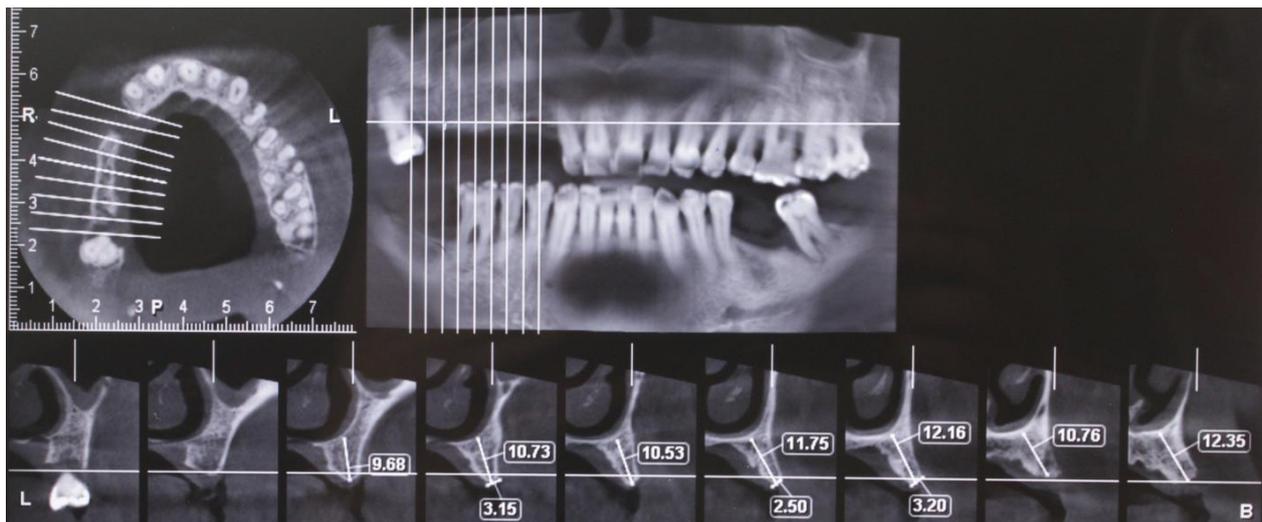


Fig 1: CBCT view of the maxillary right quadrant



Fig 2: Follow-up Panoramic View

## DISCUSSION

Panoramic radiographs are useful radiographs for obtaining an overview of the orofacial complex. However the inherent limitations such as geometric distortion or unequal magnification make these radiographs unsuitable for measurement accuracy and depiction of anatomy and pathology findings<sup>4</sup>. Furthermore with the overlapping adjacent structures such as the cervical spine, misdiagnosis could occur and on the other hand there is possibility that the clinically important structures not be viewed because of their location outside of the plane of focuses (the image layer) or appear distorted<sup>4</sup>. Another disadvantage of panoramic radiographs is that the pathologies of the medial wall of the maxillary sinus cannot be visualized and in overall obtaining panoramic radiographs is not a reliable method of detecting sinus pathologies<sup>5</sup>. Taninada et al. compared two-dimensional and three-dimensional radiographic imaging for evaluating the maxillary sinus prior to dental implant insertion. Their results showed that three-dimensional CBCT radiograph was significantly more reliable in the detection of sinus pathology than panoramic radiograph<sup>6</sup>. In addition, specialized software accompanying the

three-dimensional radiographs provides the opportunity for obtaining important volumetric information about the quantity and quality of bone in the palatal region<sup>7-10</sup>.

For many years, conventional CT was preferred for the three-dimensional evaluation of the maxillary sinus prior to implant placement<sup>5</sup>. However limitations in availability and also having higher radiation dose and cost has restricted its use in routine dental practice. With the advent of cone-beam computed tomography (CBCT) these limitations have been overcome and hence three-dimensional images with high resolution could be obtained with lower radiation doses<sup>11</sup>. These advantages along with the low cost have made CBCT the modality of choice for preoperative evaluation of implant sites especially in complex cases which three-dimensional assessment of the area of interest is mandatory<sup>12</sup>.

Before performing sinus lift surgery, CBCT radiograph could be used for assessing the maxillary sinus floor, presence of sinus septums, thickness of the lateral maxillary sinus wall, location and diameter of the alveolar antral artery, relation of Schneiderian membrane with the roots of the adjacent teeth and the quality of

subantral bone<sup>13</sup>. Additionally as it was shown in this case report the other advantage of obtaining CBCT radiograph could be assessing the location of the nasal cavity related to the maxillary sinus. On rare occasion the inferior third part of the nasal cavity pneumatizes within the maxilla and resides over the alveolar residual ridge (Big-Nose Variant). If this happens the location of the maxillary sinus is lateral to the edentulous ridge which is difficult to observe on a panoramic radiograph. In this case sinus graft does not increase available bone height and is contraindicated. Care should be taken in these patients because the implant can be placed into the nasal cavity if accurate diagnostic images are not obtained<sup>3</sup>.

## CONCLUSION

For evaluating the posterior maxilla with reduced bone height prior sinus lift and implant insertion, three-dimensional radiographs are helpful to locate the nasal cavity in relation to maxillary sinus. This could prevent planning the sinus lift procedure when it is contraindicated.

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