

Article

## Panoramic View among Other Radiographic Investigations for Dental Implant Surgery, Dentists' Perspective

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Available from: <http://dx.doi.org/10.21931/RB/CSS/2023.08.03.51>

### Abstract

**Objectives:** To determine the factors that could influence the use of OPG in dental implant surgery from a dentist's perspective. **Methods:** A Google form questionnaire was circulated electronically as a google form to dentists of different dental specialties and practical backgrounds. Data were collected and analyzed using SPSS Ver.25. Statistical significance has been set at  $P < 0.05$ . **Results:** Most participating dentists use OPG as a preoperative diagnostic tool in dental implants. Only 13 (15.1%) dentists do not use OPG in dental implant treatment. The Chi-Square Test showed a statistically significant relationship ( $P = 0.042$ ) between the reason for OPG request and dentists' qualifications. The overwhelming majority of PhD and Fellowship degree holder dentists (71.4%) request the OPG to view the relationship between the implant site and the vital anatomical structures. The Chi-Square Test showed a highly significant relationship ( $P = 0.000$ ) between the type of additional radiographic investigation and the dental specialty. Surgeons, compared to general practitioners (43.8%) and other specialties (52.6%), are favorably interested (91.4%) in CBCT as an additional diagnostic aid to OPG. **Conclusions:** Dentists agree on the preliminary diagnostic value of OPG in dental implant surgery. PhD and OMFS Fellowship holders seem more interested in the relationship between the dental implant position and jaw anatomical landmarks on the OPG. Oral surgeons appear to appreciate the role of CBCT as an additional preoperative diagnostic tool.

**Keywords:** dill seeds, broilers, productive performance, carcasses.

### Introduction

Panoramic radiography nowadays is an essential element in dental radiographic diagnosis 1. It can provide a comprehensive view of the mandible, mandibular condyles, maxillae, and related vital anatomical structures, such as the inferior alveolar nerve, maxillary sinuses, and nasal cavity; 2. In dental implant surgery, panoramic view (OPG) helps provide a general view of the supporting jaws and related teeth. It can be used to assess vertical bone height, implant position, and its relation to anatomical landmarks 3. However, digital periapical radiography (PA) and CBCT have superiority over other radiographic investigations in terms of accurate dimensional registration 4,5. Hence, the choice among these radiographic modalities is open to personal preference. Hansé might be helpful to investigate the factors that

may influence the dentist's use of OPG in dental implant surgery. The study aims to determine the factors that could influence the use of OPG in dental implant surgery from a dentist's perspective.

### Materials and Methods

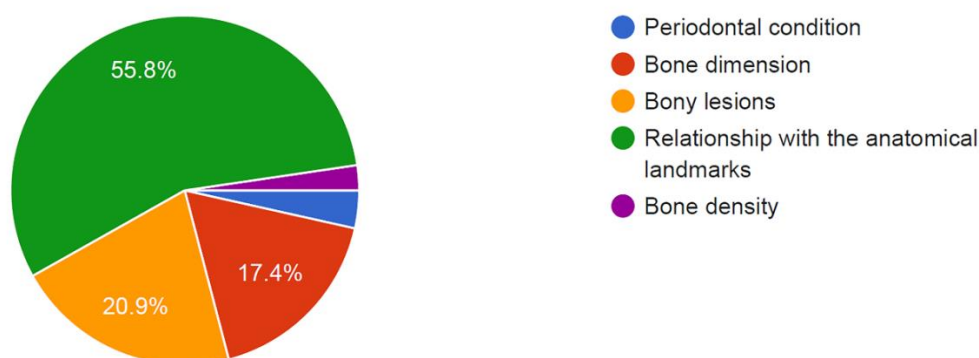
This The study was approved by the Scientific Committee, Oral Medicine Department, College of Dentistry, Al-Mustansiriyah University (23.11.2021). This study is a questionnaire-based (specifically designed) cross-sectional study with 15 items. It has been circulated electronically as a Google form (Appendix) to dentists of different dental specialties and practical backgrounds. The dentists were approached using different social media. Data were collected and analyzed using SPSS Ver.25. descriptive and inferential statistics were considered. The Chi-Square Test was used to determine the relationship between the nominal variables. Statistical significance has been set at  $P < 0.05$ .

### Results

Eighty-six dentists agreed to participate in the study. Out of 86 participants, nineteen were females (22.1%), whereas 67 (77.9%) were males. About 78% of the dentists were either surgeons or general practitioners. Thirty-five participants were surgeons (40.7%), followed by 32 general practitioners (37.2%). The remaining 32% of the dentists represent other specialties (restorative dentists 9.3%, periodontists 5.8%, prosthodontists, and radiologists 3.5%). About a third of the participants are PhD or Fellowship degree holders. Apart from the general practitioners, the remaining third of the participants had HDD or MSc qualifications.

The vast majority of the participating dentists use OPG as a preoperative diagnostic tool in dental implants. Only 13 (15.1%) dentists do not use OPG in dental implant treatment.

Figure 1 shows the reasons for requesting OPG in dental implants. Forty-eight out of 86 participants requested OPG mainly to determine the relationship between the dental implant site and anatomical landmarks. The presence of bony lesions was the second most important reason for OPG (19 dentists), followed by bony dimension estimation (15 dentists). The periodontal condition was the reason for OPG (3 dentists, 3.5%), followed by bone density estimation (1 dentist, 1.2%).

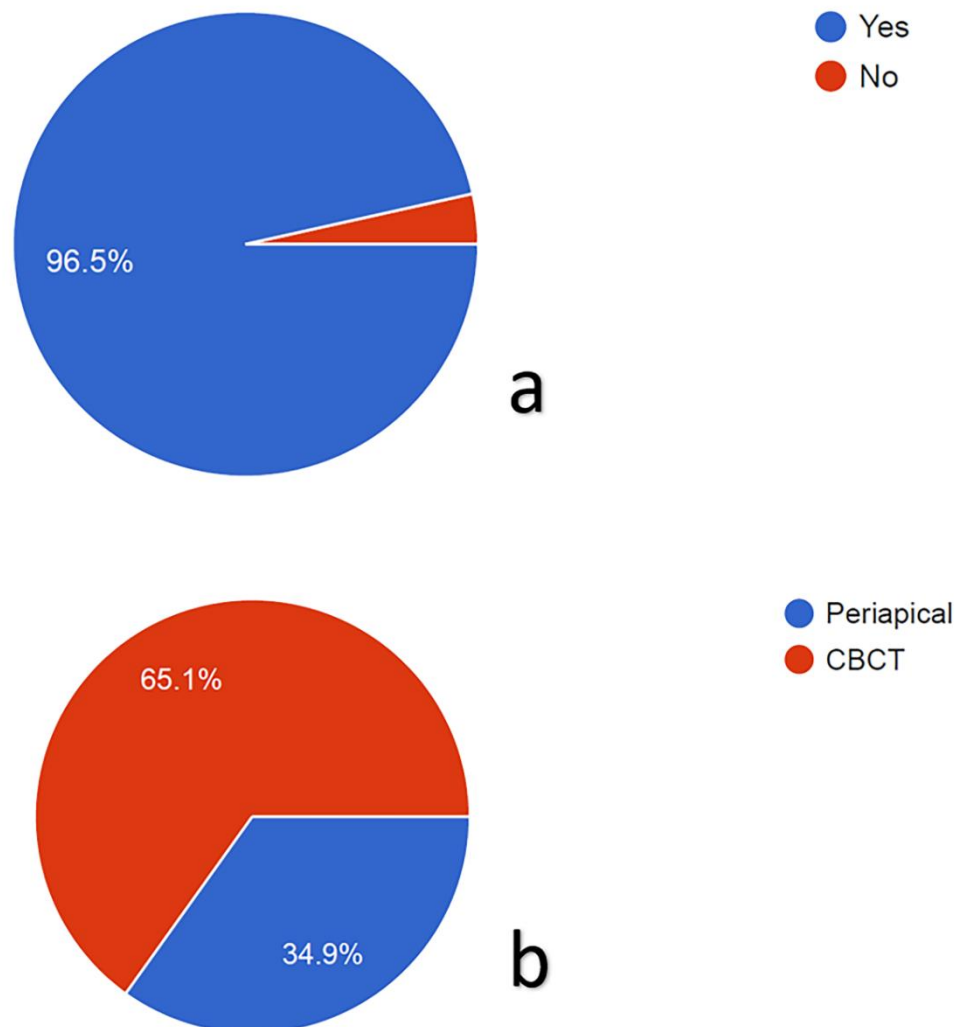


**Figure 1: Relevant information provided by OPG.**

The Chi-Square Test showed a statistically significant relationship ( $P=0.042$ ) between the type of information in OPG and dentists' qualifications. The overwhelming majority of PhD and Fellowship degree holder dentists (71.4%) request the OPG to view the relationship between the implant site and the vital anatomical structures. Diploma and Master's degree holders, compared to general dentists and PhD degree holders (13% and 10.7%, respectively), seem more interested (37.1%) in seeking information regarding the presence of undiagnosed bony lesions. The

Chi-Square Test did not show a significant relationship ( $P=0.131$ ) between dental specialty and the reason for OPG investigation.

As evident in Figure 2a, only 3 (3.5%) out of 86 participants do not use other radiographic investigations besides the OPG. Fifty-six dentists used CBCT beside the OPG, whereas 30 used periapical radiography (Figure 2b). This means that approximately all dentists do not depend on OPG alone for investing in implants.

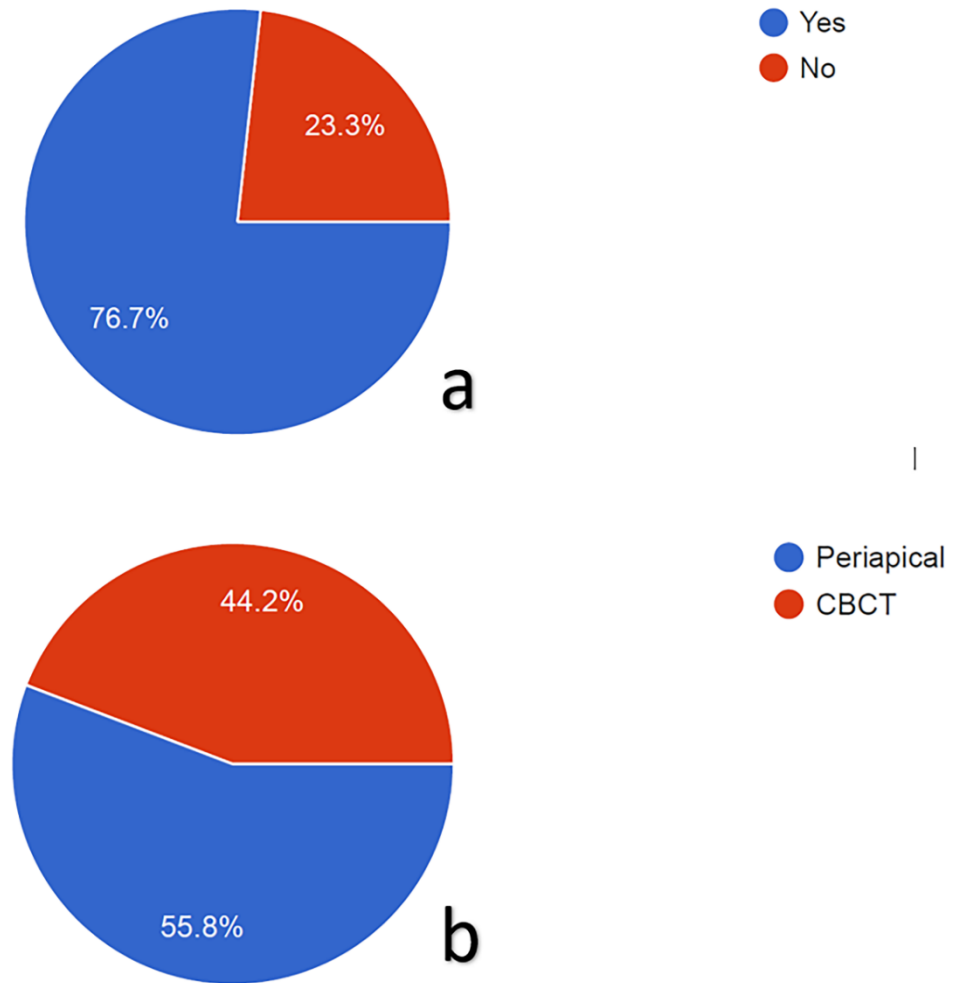


**Figure 2: (a) the need for additional radiograph investigation, (b) the type of additional radiographic modalities.**

The Chi-Square Test showed a highly significant relationship ( $P=0.000$ ) between the type of additional radiographic investigation and the dental specialty. Surgeons, compared to general practitioners (43.8%) and other specialties (52.6%), are favorably interested (91.4%) in CBCT as an additional diagnostic aid to OPG. Of 35 oral surgeons, only 3 dentists (8.6%) use PA radiography as an additional investigation, whereas 18 general practitioners (56.3%) use PA radiography. The other 14 (43.8%) use CBCT as an additional radiographical investigation.

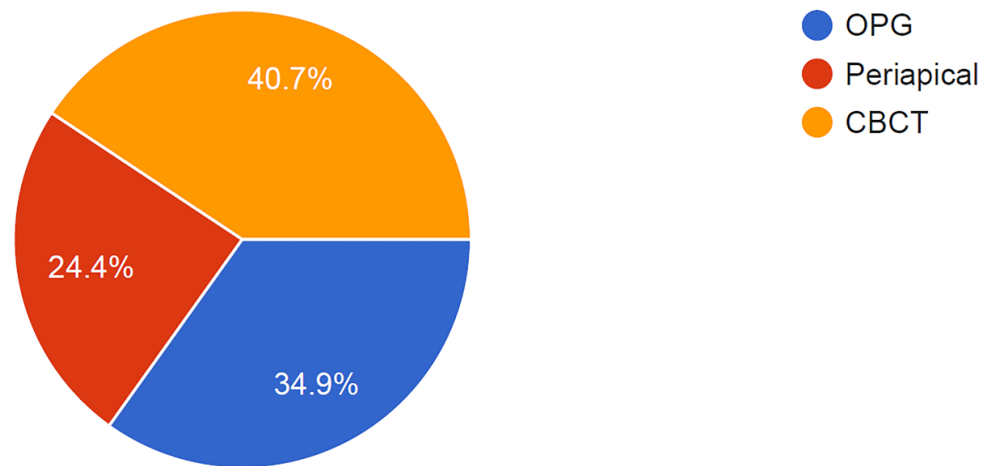
The Chi-Square Test did not show a statistically significant relationship ( $P=0.75$ ) between the choice of additional radiography and dentists' qualifications.

Figure 3 reveals that 66 out of 86 dentists depend entirely on OPG in the follow-up of implants. Dentists who do not depend on OPG in the follow-up rely more on PA (48 dentists) than CBCT (38 dentists). No statistically significant relationship existed between the use of OPG and dental specialty or dental qualification ( $P=0.5144$ ,  $P=0.425$  respectively).



**Figure 3: (a) the use of OPG for implant cases follow-up, (b) alternative radiographic modalities for follow-up.**

Figure 4 demonstrates that OPG is the source of information in about 3rd of dental implant failure cases reported by the study participants. This percentage is slightly lower than CBCT. Interestingly, PA radiographs were the least relied-on imaging modality by the dentists in these cases. The Chi-Square Test showed no significant relationship (between the choice of radiographic investigation in dental implant failure and dental qualification nor the dental specialty ( $P=0.137$ ,  $P=0.995$  respectively)).



**Figure 4: Radiographic modalities for cases of dental implant failure.**

### Discussion

The study data showed that the majority of the respondents were either surgeons or general practitioners. Other specialties were not considerably involved in dental implant practice. In undergraduate studies, dental implant is a major topic in oral surgery education 6,7. Surgery plays an essential role in dental implant practice. This makes dental implantology primarily a major surgical topic 8.

The appropriate radiographic investigation for dental implant treatment should consider information vs cost balance 9. This could explain why the vast majority of the dentists involved in this study use OPG in dental implant treatment. OPG provides most of the needed information regarding the implant site and the surrounding structure, and it has a reasonable cost. It also reflects the diagnostic value of Panoramic radiographs in dental implant treatment, which has been acknowledged by literature 1, 2, 3, 10, 1, 11. Panoramic radiographs can provide satisfactory vertical measurements for dental implant treatment planning 12, 13. This explains the complete reliance of some dentists on OPG, especially for routing dental implant cases 14 or when CBCT is unavailable.

Dentists' responses indicate the preliminary diagnostic investigation of OPG in implant surgery. This has been shown through the need for additional diagnostic imaging by almost all the participants. The bi-dimensional nature of the OPG with related superimposition of anatomical structures may interfere with the precision of the interpreted information 2. Besides, it provides a less accurate measurement than a digital periapical radiograph and CBCT. CBCT might be necessary when exact measurements are required 15,16 because it is free of magnification and superimposition 17. This is an essential prerequisite of the radiographic image near vital structures 17. More than one radiographic modality is commonplace in dental implant practice 18, 19, 20.

The most essential information requested by the OPG varies among the participants. The main focus for most of the participants was the relationship between implant position and anatomical landmark. Others were more interested in bony dimensions, the presence of bony lesions, and periodontal conditions. The request for OPG to examine the jaw bones for undiagnosed lesions and patients' periodontal condition has been mentioned in the literature 21, 10, 13.

As the study data shows, dentists with PhD and Oral & Maxillofacial Surgery (OMFS) Fellowship degrees are keener to know the relationship between the implant site and vital structures (maxillary sinus and inferior alveolar canal). This is related to their awareness of the complications that arise when these structures are

violated. This reflects the influence of the gained knowledge during postgraduate dental studies 22.

Oral surgeons appear to favor CBCT over PA as an additional investigation of the OPG. CBCT provides precise three-dimensional radiographic information 23. Despite the acknowledged accuracy of PA over OPG in small areas 4, it does not overcome information deficiency on the buccolingual and Bucco-palatal dimensions, which could influence the implant position on the maxillary sinus or Inferior Alveolar Canal in certain situations.

Despite CBCT enabling proper assessment of the surgical site for better surgical planning and outcomes 8, CBCT is an investigation of the need for dental implant treatment 22, 24. It is requested when other radiographic modalities fail to provide specific information. Even though PA gives only a two-dimensional representation of the examined area, it can still provide a better image definition and more accurate measurement than the OPG 9. That is why most participants rely on it as an additional radiographic modality in treatment follow-up.

The reliance on OPG and PA radiographs compared to CBCT in dental implant follow-up cases indicates that conditions do not require detailed information before treatment. According to the dentists in this study sample, OPG and/or periapical radiographs appear satisfactory. This agrees with Alnahwi et al, finding 18. The literature did not prioritize a single radiographic investigation in dental implant follow-up 25. However, some studies rely on OPG and CBCT for preoperative and postoperative evaluation without using PA view 26.

This study has a limitation, which is the number of participants. It might not reflect the number of dentists who practice dental implant surgery in Iraq, but it sheds light on their attitude toward the research area.

### **Conclusion**

Dentists agree on the preliminary diagnostic value of OPG in dental implant surgery. PhD and OMFS Fellowship holders seem more interested in the relationship between the dental implant position and jaw anatomical landmarks on the OPG. Oral surgeons appear to appreciate the role of CBCT as an additional preoperative diagnostic tool.

### **Acknowledgment**

The authors thank the participants for sharing their information and experiences.

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Received: May 15, 2023/ Accepted: June 10, 2023 / Published: June 15, 2023

Citation: Mahmood, Sanaa; Alnuaimy, Amaal; Alhamdani, Faaiz. Panoramic View among Other Radiographic Investigations for Dental Implant Surgery, Dentists' Perspective. *Revis Bionatura* 2023;8 (3) 51. <http://dx.doi.org/10.21931/RB/CSS/2023.08.03.51>

## Appendix

1. Age

2. Gender

3. Qualification

BDS                      Master/diploma                      PhD/Fellowship (OMFS)

4. years of experience

5. Specialty

General practitioner                      Surgeon                      Others

6. Do you have OPG in your Clinic /Center?

Yes                      No

7. Do you use OPG in dental implant?

Yes                      No

8. In your opinion, what is the most important information provided by OPG:

Periodontal condition                      Bone dimension                      Bony lesions Relationship with the anatomical Landmarks                      Bone density

9. Do you use additional radiograph with OPG for investigation?

Yes                      No

10. If yes, what is the additional radiograph

CBCT                      Periapical radiograph

11. Do you use OPG for implant case follow-up?

Yes                      No

12. If no, what do you use instead?

CBCT                      Periapical radiograph



13. In cases of dental implant failure, what view do you use?

OPG

Periapical

CBCT