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Research Article

Radiographic Prescription Trends among Palestinian Dentists for Dental Implant Placement – A Cross Sectional Survey

Abstract

Background: In this present era implant dentistry has seen exponential growth and its success mainly depends upon a proper treatment planning and its execution. Radiographic imaging has a pivotal role in the planning of implant placement and follow up of implant survival.

The Context and Purpose of the Study: To study the radiographic prescription trends for dental implants among Palestinian dental practitioners. A sample of 150 dentists chosen at random in a dental conference received a questionnaire.

Results: 114 dentists returned full questionnaires. It was observed that the majority of the surveyed dentists prescribe panoramic radiographs for dental implant assessment based on its availability. The motivating factors for prescribing the specific radiologic examination was Availability (42.99%), availability + cost(17.53%), Cost + Measurement precision(3.51%), Cost + Radiation Dose(10.53%), Measurement precision(25.44%).

Conclusions: The majority of surveyed dentists prescribe panoramic radiographs for dental implant assessment based on its availability and only a small number strictly adhered to the recommended guidelines of the international associations with regards to cross sectional imaging.

Abbreviations

IOPAR: Intra Oral Periapical Radiograph; OPG: Orthopantomography; CT: Computed Tomography; CBCT: Cone Beam Computed Tomography; AAOMR: American Academy of Oral and Maxillofacial Radiology; EADMFR: European Academy of Dentomaxillofacial Radiology; EAO: European Association for Osseo Integration; ICOI: International Congress of Oral Implantologists; ALARA: As Low As Reasonably Achievable

Introduction

Dental Implants are being widely used for the replacement of missing teeth. Dental practitioners have remarkably taken up this treatment modality and adapted to the advancements in oral rehabilitation. The main criterion in assessing the success of oral implants has been the marginal bone loss evidenced by the radiological examination [1-3]. The imaging objectives aids the clinician in providing the cross-sectional views of the dental arch for visualization of spatial relationship of anatomic structures of the maxilla and mandible, the quality and quantity of available bone, the presence of infra-bony lesions, the occlusal pattern and the number and size of implants as well as prosthesis design, all which are essential for successful implant treatment planning and evaluation of the ongoing implant functioning [4]. Many types of radiographic modalities are used in implantology namely Intra-Oral Periapical Radiography (IOPAR), Orthopantomography (OPG), occlusal radiography, Conventional tomography, Computed Tomography (CT) and Cone-Beam Computed Tomography (CBCT). Usually, it is up to the practicing clinician to decide which modality best suits their needs [5-7]. The recent position paper on the use of radiology in dental implantology put forward by the AAOMR recommended that cross-sectional imaging be used for the assessment of all dental implant sites and that currently CBCT is the imaging method of choice, at present, to gain this diagnostic information [8]. There is an extreme scarcity worldwide regarding the literature stating the radiographic prescription trends among the implant practitioners worldwide and whether they adhere to the recommendations put forward.
by professional bodies like AAOMR, EADMFR, EAO and ICOI [9].
Hence looking at the need of the hour, an attempt was made to
survey the radiographic prescription trends among the dental
practitioners.

Materials and Methods

150 close ended questionnaires were distributed to the
dentists who participated in a dental conference in Ramallah
Palestine, in 2015. Out of 150 participants, 114 dentists (65
males, 49 Female) completed the survey. The questionnaire
was formatted in a way to enquire about their radiographic
prescription methods for pre and post-operative assessment
in their implantology practice and data collected regarding the
radiographic prescription practices for pre- operative implant
assessment and follow up, such as Panoramic Radiograph
(OPG), Intra oral Periapical radiograph (IOPAR) and Computed
Tomography (CT). The study received ethical approval under
the file 9/REC/18. They were also asked whether combination
modalities were used in the assessment. The questionnaire
also enquired on motivating factors for choosing the radiographic
examination, whether they have problems with over or
underestimated measurement in panoramic X ray and its
frequency, usage of CT for implant imaging and its frequency
and the usage of Periapical radiographs. The data collected
from the survey were analyzed using Graph Pad Prism software
and the results were determined.

Results

The survey was carried out on 114 dentists having clinical
experience of more than 10 years (16.67 %), 6-10 years
(79.82 %) and 1-5 years (3.51 %). The Gender distribution of
radiographic examinations more often prescribed for dental
implant assessment were shown in Figure 1. Approximately
59% of dentists prescribe panoramic x-ray whereas 41% of
the dentists prescribe a combination of Panoramic X ray + CT
imaging.

The motivating factors for prescribing the specific
radiologic examination was Availability (42.99%), Availability
+ Cost (17.53%), Cost + Measurement precision (3.51%)
Cost + Radiation Dose (10.53%), Measurement precision
(25.44%), Figure 2. Tables 1,2, depict the percent population
having problems in measuring Panoramic X ray (OPG) and
its frequency respectively. It was observed that 34 % of the
dentists recommend CBCT Figure 3, with overall medium
frequency of 76%, low 3% and minimal 0%. The usage of
periapical radiography and the reason for its usage has been
shown in Figure 4.

Discussion

The main objective to survey the current radiographic
prescription in dental implant assessment was in order to
determine the prescription pattern among the experienced
dentists and whether dentists are using imaging modalities
for implant placement as recommended by the AAOMR. Many
options are available, from which the dentist can choose from.
However, the choice of radiography is determined by the
advantages and disadvantages of each modality [10,11]. The
pattern of radiographic choices and number of years of experience
was similar to that observed in a study done by McCrea [12].
In the present study, the panoramic radiograph was the most
frequent radiographic examination prescribed for treatment
planning of Osseo-integrated implants. Approximately, 59%
of dentists prescribed the panoramic radiograph, as a single
examination technique and 41% of dentists combined it with a
computed Tomography examination. The results of this study
was in agreement with those obtained by Beason and Brooks
[13], Sakakura, et al. [14], De Morais et al. [15].
The panoramic radiograph gives useful information in the initial evaluation for pre-operative planning, but owing to its large horizontal magnification varying regionwise. Another limitation is the lack of information in the third dimension [6-8]. An important aspect to be considered in the implant imaging prescription is the radiation dose. However in this study only 11% dentists looked on this reason for prescribing radiologic examination and the most observed reason for choosing the radiologic examination was its availability following by the measurement precision. This results are in consistent with that obtained by Majid et al. [16]. Although panoramic radiograph requires only a small radiation dose, it does not provide information in the third dimension, which is considered necessary by some [17]. Following the ALARA principle, for cross-sectional imaging the AAOMR [8], recommends conventional tomography for one to seven implant sites and CT for eight or more implant sites. The Cone Beam Computed Tomography (CBCT) is one of the more recent trends being used in radiography for implants [18].

When comparing the frequency of over-and underestimated measurements of Panoramic radiography it was found that 50 % of dentists tends to underestimate and 34 % dentist overestimate the measurement. This fact can be explained by the presence of different levels of magnification and distortion related to anatomical regions and lack of cross-sectional images [19,20]. Also, PAN presents a 2-dimensional image with no information about buccal-lingual thickness [1]. The image magnification and the low reproducibility of alveolar canal diagnosis can increase the risks of anatomical structure damage to the inferior alveolar [13-15].

Our study also interviewed the % dentists using periapical radiographs and its reason. It was found that only a small percentage of dentists uses it during surgery and follow up whereas as majority of them tends to avoid it Peñarrocha M et al. [21], suggested that conventional periapical radiographs and digital radiographs were more accurate than panoramic radiographs in the assessment of peri-implant bone loss. Periapical radiographs requires less radiation dose; produces minimal magnification and a minimally distorted relationship between the bone height and adjacent teeth [8], making it a more convenient diagnostic tool in clinical practice. However it was overlooked by most of the dentists in our study.

Within the limitation of smaller sample size our study tries to emphasize the current radiographic prescription trends in the studied population.

Conclusion

This study has shown that the majority of dentists sampled prescribe panoramic radiographs for dental implant assessment based on its availability and only a small number strictly adhered to recommended guidelines of the world associations with regards to cross sectional imaging.

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