

Assessment of Knowledge and Application of CBCT Among Dental Professionals – A Questionnaire Study

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Abstract

Background: CBCT is an imaging technique which uses a cone shaped radiation that is focused on a 2D detector. It has been widely accepted in practice in radiology as well as academic and hospital settings. The present study is aimed to assess the knowledge and application on CBCT among dental professionals.

Materials and Methods: A validated questionnaire was distributed among 250 dental professionals.

Results: Most of the respondents were unsure about the radiation exposure of CBCT when compared to other types of imaging and all of them were willing for a CBCT hands on.

Conclusion: We concluded from our study that unfamiliarity with the use of CBCT among dental professionals due to insufficient curriculum and decreased practical exposure. So we recommend that by increasing the number of education programs, the knowledge on CBCT and its application should be increased to improve dental health care practice.

Keywords: CBCT; Imaging; Detector; Exposure; Radiation; Dentists; Knowledge of Dental Professionals

Introduction

Cone beam computed tomography (CBCT), sometimes referred to as cone beam volumetric imaging (CBVI). It is a three dimensional dental and maxillofacial imaging modality. The technology involves imaging a volume that allows either the entire maxillofacial skeleton or a restricted dento-alveolar region involving a few teeth to be imaged [1].

The use of CBCT was testified for the maxillofacial region imaging in 1988 by Mozzo., *et al.* and in 1999 by Arai., *et al.* Since then there is a rapid growth in cone beam technology and its maxillofacial application [2].

CBCT has been shown to be an excellent diagnostic modality for maxillofacial imaging as well as numerous applications in dentistry. The ability to provide a rapid scan and reduce the radiation dose in comparison with CT and the presence of interactive display modes offers maxillofacial imaging and multi-planar reformation images. These make them more useful tool at the work place of dental practice even though it is an extensively used modality. Most of the professionals have limited knowledge about CBCT. Hence the present study was to assess the knowledge on application of CBCT in dental professionals.

Materials and Methods

A validated questionnaire survey with 15 questions was carried among 250 dental professionals, to assess their knowledge on application of CBCT. The study protocol was reviewed and validated.

Prior consent was obtained from participants and their confidentiality was maintained. The completed questionnaire was collected and the results were tabulated.

Results

The study consisted of 250 participants and knew about CBCT as a useful diagnostic modality, out of which 75.6% (N = 189) hold a MDS qualification and 64% (N = 160) were females and 36% (N = 90) were males.

89.6% participants come across the term CBCT through lectures and 4.8% (N = 12) through seminars, 3.6% participants (N = 9) through colleagues and 2% (N = 5) from internet. However only 88% (N = 220) have not used CBCT for diagnostic purpose in their practice and only 12% (N = 30) have used, with none taken more than 5 CBCT within a month.

All the participants felt CBCT can be used in implant dentistry, evaluation of cyst and tumors. 6% responded (N = 15) for evaluation of impacted teeth and 12% (N = 3) for orthodontic assessment. 22.4% (N = 56) had no knowledge about the advantage of CBCT over other diagnostic techniques 18% (N = 45) said image processing easier due to limited beam. 17.6% (N = 44) think that short scanning time and data reconstruction can be performed on a personal computer. 16% (N = 40) think that lower radiation dose compared to medical CT.

93.2% of the responders were dependent on radiologist for interpretation of CBCT images, 3.6% relied on an OMR specialty and 0.8% (N = 2) interpret by themselves and none of the responders said that medical professionals seek opinion on CBCT in maxillofacial region in interpretation. All the participants were interested to have hands on course on CBCT. 86.8% (N = 217) of the participants said that CBCT will not be commonly used as routine practice and 13.2% (N = 33) said that CBCT is useful for selected dental application. 50.8% responded that lectures on CBCT should be included in the clinical phase, 47.6% (N = 119) said that it should be included in the doctoral phase, 1.6% (N = 4) said there is no need of it.

92.8% (N = 232) predicted the cost of CBCT would be between 1000 - 1500, 6% thought more than 1500, and 12% thought less than 1000. All the participants of the study thought there is a need for CBCT unit in their institution.

Discussion

Imaging has experienced a paradigm shift from conventional to the advanced in the recent years with the advent of numerous imaging modalities which technically converted 2-D image into 3-D life like images making interpretation and diagnosis more accurate [3]. As mentioned earlier, CBCT finds its application in almost all areas of dentistry and is one of the most widely accepted imaging modality from the past few years. Owing to its recent recognition as an imaging modality, it often found that little is known about its application and especially about interpretation of the images. Hence the present study was conducted to assess the knowledge and application of CBCT among dental professionals.

In our study we found that most of the participants were females (64%). 75.6% hold a post graduate qualification. All the participants was aware of CBCT in dentistry similar to Yalcinkaya SE., *et al.* study and 89.6% came across the term CBCT through lecture similar to Balabaskaran k., *et al.* [4,5].

In our study 88% of the participants have not advised CBCT for their diagnostic purpose and all the participants have advised less than 5 CBCT a month. This is attributed to the cost and unavailability of CBCT at the institution. This is in accordance with Reddy, *et al.* and Kumburoglu., *et al.* on Turkish dental students which highlighted difficulties with acquiring knowledge without practical experiences, thus the lack of CBCT unit at the institution may constitute a significant factor contributing to unfamiliarity with this technology [6,7].

All the participants of the study felt CBCT is a useful diagnostic tool in in dentistry which was found similar to Balabaskaran., *et al.* study [5]. In our study 100% of the participants responded that CBCT can be used in implant dentistry, evaluation of cyst and tumor, 6% said that it can be used for impacted teeth and 1.2% for orthodontic evaluation which was in accordance with Dolekoglu., *et al.* among Turkish dentists where, they were referring for CBCT for same as seen in our study and supported finding of Arnheiter, *et al.* study [8,9].

In another study by Yalcinkaya, *et al.* he found that 82.4% used CBCT for cyst and tumor, 71.6% for implant planning and 50% for trauma [4].

In our study 22.4% of participants have no idea of advantage of CBCT over other diagnostic technique and data reconstruction similar to Reddy, *et al.* study where they stated that it may be due to lack of practical experiences and unfamiliarity with image characteristics in image acquisition [6].

86.8% of the participants responded that CBCT will not be commonly used in routine practice and 13.2% responded that it will be for selected dental applications as it is not cost effective. More than half of the participants said that lectures on CBCT should be included in clinical phase (50.8%) and doctoral phase (47.6%) as they start diagnosis and do treatment planning at this phase. And all the participants of the study feel necessity of having CBCT in dental institution similar to Ram Shetty, *et al.* Kumburglu, *et al.* and Reddy, *et al.* [6,7,10]. All the participants of the study were interested to attend hands on course on CBCT.

Q. How did you come across the term CBCT	N	%
Seminars	12	4.8
Lectures	224	89.6
Internet	5	2
Colleagues	9	3.6
Total	250	100
Q. For What causes would you like to use CBCT?	N	%
Orthodontic assessment	3	1.2
Implant dentistry	250	100
Evaluation of cysts and tumors	250	100
Evaluation of impacted teeth	15	6
Q. Advantage of CBCT over other diagnostic technique	N	%
Lower radiation dose compared to medical CT	40	16
Short scanning time	44	17.6
Image processing easier due to limited beam	45	18
Less expensive	38	15.2
Data reconstruction can be performed on a personal computer	44	17.6
No Idea	56	22.4
Q. Interpretation of CBCT images	N	%
Self-interpretation	2	0.8
I rely on an OMR specialty	9	3.6
A and B	6	2.4
I rely on radiologist's report	233	93.2
Total	250	100

Table 1

Conclusion

The study result concluded that unfamiliarity with the use of CBCT among dental professionals may be due to insufficient curriculum and decreased practical application. So we recommend that by increasing the number of education programs, regarding the knowledge on CBCT and its application should be increased to improve dental health care practice.

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