

An Evaluation of CBCT Perception Amongst Orthodontic Post Graduates and Practitioners in India

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ABSTRACT

Aims and objectives: Assess some of the current trends of CBCT use in orthodontic post graduate training programs and orthodontic practice in India and to discuss possible future CBCT implementation trends. The purpose of our study was to assess some of the current trends of CBCT use in orthodontic post graduate training programs and orthodontic practice in India and to discuss possible future CBCT implementation trends.

Material and methods: An e- survey containing 13 multiple choice questions was created using Google Forms. Over a three-month period, two e-mail requests were sent, and a final e-mail request to each of the orthodontists that had not yet responded. Finally, 934 orthodontists responded. Survey data were compiled using Excel (Microsoft, Redmond, WA). Descriptive statistics was calculated in terms of frequencies and percentages using the SPSS software (64 bit) 20.

Results: All the participants of the survey were aware of CBCT and considered it to be a useful diagnostic tool in dentistry. The study also highlighted that adequate teaching is not imparted regarding CBCT in educational institutions but were willing to attend courses and update knowledge on CBCT if provided. Dental practitioners should prescribe CBCT imaging only when they expect that diagnostic yield will benefit patient care, enhance patient safety or improve clinical outcomes significantly.

Conclusion: Dental practitioners should prescribe CBCT imaging only when they expect that diagnostic yield will benefit patient care, enhance patient safety or improve clinical outcomes significantly.

Keywords: CBCT, survey, diagnosis.

INTRODUCTION

In the past decade, development of cone-beam computed tomography (CBCT) systems has led to increased clinical use in dentistry and its specialties.¹ The introduction of three dimensional imaging characterized by cone beam computed tomography has a tremendous impact on the diagnosis and treatment planning in orthodontics. The tomographic nature of CBCT provides thin slices at much higher inherent detail than what is

achievable with 2d projection radiography, which in turn allows for a better delineation of the bone and soft-tissue boundaries and a deeper appreciation of the intricate interrelations of the complex anatomy in the maxillofacial region. Cone beam computed tomography (CBCT) scanners capture the entire maxillofacial region by a single rotation of the x-ray tube and detector around the patient's head while providing sub-millimeter resolution²⁻⁵

Received: Apr. 7, 2016: Accepted: June. 21, 2016

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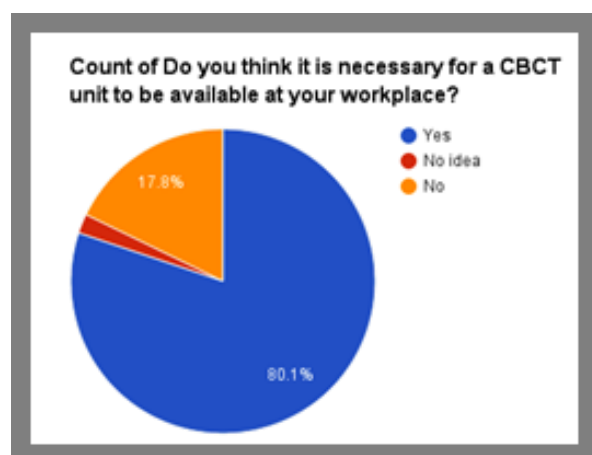


Fig 1: Count of Do you think it is necessary for a CBCT unit to be available at your work place.

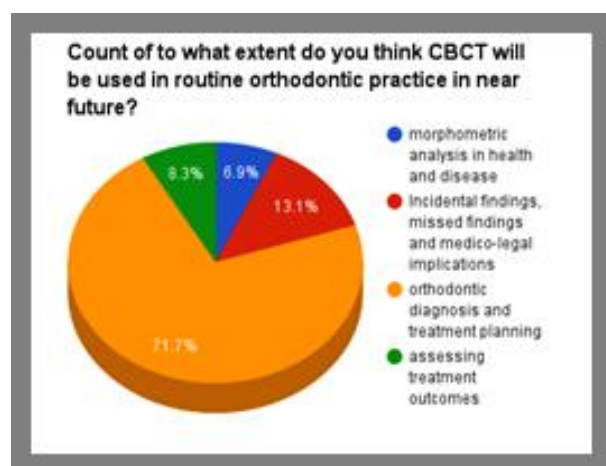


Fig 2: Count of to what extent do you think CBCT will be used in routine orthodontic practice in near future?

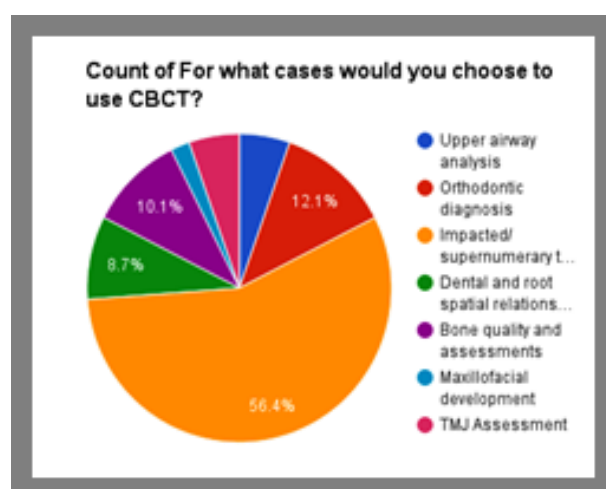


Fig 3: Count of what cases would you choose to use CBCT.

In orthodontics, CBCT has been used to augment or replace traditional two-dimensional (2D) radiographs. CBCT imaging has been shown to be more reliable than panoramic radiographs at evaluating root resorption.⁶ Also; it has been used in temporomandibular joint (TMJ) evaluation, airway analysis, craniofacial abnormalities, post orthognathic surgery evaluations, cleft lip/palate cases, and canine impactions.⁷⁻⁸

Despite of the wide spectra of benefits that CBCT provides in diagnosis and treatment planning, the extent to which post graduate students and orthodontic practitioners incorporate CBCT into everyday practice is still unknown. The purpose of our study was to assess some of the current trends of CBCT use in orthodontic post graduate training programs and orthodontic practice in India and to discuss possible future CBCT implementation trends

MATERIAL AND METHODS

An e- survey containing 13 multiple choice questions (table 1) was created using Google Forms. An e-mail link to the survey was sent to 1281 orthodontists including orthodontic post graduates around India. The e-mail link was personalized to each program so follow-up e-mails and calls could be sent to only those that had not previously responded and so multiple responses were not allowed. Over a three-month period, two e-mail requests were sent, and a final e-mail request to each of the orthodontists that had not yet responded. Finally 934 orthodontists responded. Survey data were compiled using Excel (Microsoft, Redmond, WA). Descriptive statistics was calculated in terms of frequencies and percentages using the SPSS software (64 bit) 20.

RESULTS

Out of 934 participants, 42.9% were practitioners, 44.2% post graduates and 12.9% were associated with college 54.4% orthodontists claimed that they have a CBCT center within 5kms of their workplace, 16.1 % had a CBCT center within 10kms of their workplace whereas for 29.5% orthodontists the center was inaccessible. In comparison of CBCT and medical CT, 76% mentioned shorter scanning time as the main advantage. Around 90% participants were aware

Table 1: Questionnaire

1)	What is your area of work?
a.	Orthodontic Practice b. Association with a college c. Post Graduate Student
2)	Is there a CBCT center around your work place?
a.	Within 5 kms b. Within 10 kms. c. Not accessible
3)	Have you ever referred your patients for CBCT?
a.	Yes b. No
4)	Have you attended any workshop(s) regarding CBCT?
a.	Yes b. No
5)	For what cases would you choose to use CBCT?
a.	Orthodontic diagnosis b. Impacted/supernumerary teeth c. TMJ Assessment
d.	Upper airway analysis e. Maxillofacial development f. Bone quality and assessments
g.	Dental and root spatial relationships and dento-alveolar morphometrics
6)	According to you, what are advantages of CBCT over medical CT?
a.	Lower radiation dose b. Shorter scanning time c. Less expensive
7)	To what extent do you think CBCT will be used in routine orthodontic practice in near future?
a.	morphometric analysis in health and disease b. Incidental findings, missed findings and medico-legal implications
c.	assessing treatment outcomes d. orthodontic diagnosis and treatment planning
8)	CBCT offers enhanced diagnosis at lower dose than CT?
a.	Yes b. No c.No idea
9)	Do you have any idea on radiation dose and involved risk of CBCT over conventional CT?
a.	Higher b. Lower c. No idea
10)	Do you think it is necessary for a CBCT unit to be available at your workplace?
a.	Yes b. No c. No idea
11)	Which year of dental education should include lectures on CBCT?
a.	Preclinical phase b. Clinical phase c. Doctoral phase d. There is no need
12)	Are you planning to include CBCT in your practice/research in near future?
a.	Within 6 months b. Within 12 months c. Within 24 months d. Not Sure about it
13)	Are you satisfied with the use of CBCT?
a.	Yes b. no

Table 2: Answers to below mentioned questions.

Q. What is your area of work?		
Orthodontic Practice – 42.9%	Association with a college- 12.9%	Post Graduate Student- 44.2%
Q. Is there a CBCT center around your work place?		
Within 5kms-54.4%	Within 10kms-16.1%	Not accessible- 29.5%
Q. According to you, what are advantages of CBCT over medical CT?		
Lower radiation dose-76%	Less expensive-15.8%	Shorter scanning time -8.2%
Q.CBCT offers enhanced diagnosis at lower dose than CT?		
Yes – 89.5%	No -2.6%	No idea- 7.8%

Q. Do you have any idea on radiation dose and involved risk of CBCT over conventional CT?		
Higher – 2.6%	Lower -82.1%	No idea-15.2%
Q. Do you think it is necessary for a CBCT unit to be available at your workplace?		
Yes -79.3%	No-18.7%	No idea – 18.7%

Table 3: Answers to different below mentioned questions.

Question	Yes	No
Have you ever referred your patients for CBCT?	76.7%	23.3%
Have you attended any workshop(s) regarding CBCT?	50%	50%
Are you satisfied with the use of CBCT?	91.7%	8.3%

Table 4: Answers to different below mentioned questions.

Q. To what extent do you think CBCT will be used in routine orthodontic practice in near future?			
Morphometric analysis in health and disease 6.7%	Incidental findings, missed findings and medico-legal implications 13.4%	assessing treatment outcomes 8.1%	orthodontic diagnosis and treatment planning 71.8%
Q. Which year of dental education should include lectures on CBCT?			
Preclinical phase 18.8%	Clinical phase 66.2%	Doctoral phase 14.9%	There is no need 0%
Q. Are you planning to include CBCT in your practice/research in near future?			
Within 6 months 17.9%	Within 12 months 4.6%	Within 24 months 11.9%	Not Sure about it 65.6%

Table 5: Answers to different below mentioned questions.

Q. For what cases would you choose to use CBCT?						
Orthodontic diagnosis 12.4%	Impacted/supernumerary teeth 56.9%	TMJ Assessment 5.2%	Upper airway analysis 5.2%	Maxillofacial development 2%	Bone quality and assessments 9.8%	Dental and root spatial relationships & dento-alveolar morphometrics 8.5%

that CBCT offers enhanced diagnosis at lower dose than CT. 79.3 % participants agreed on the need of CBCT unit to be available at their workplace (fig 1). (table 2). 76.7% orthodontists have referred their patients for CBCT whereas only 50% have attended

workshops on CBCT use. (fig.2) (table 3) 71.7 % participants agreed on using CBCT for routine orthodontic diagnosis in future.66% of the participants were of the opinion that lectures on CBCT should be included in the clinical phase of

dental education. . Only 18.1 % of the participants were sure of using CBCT in their practice or research within 6 months and 12.2% were sure of using CBCT with 24 months (table 4). 56.9% orthodontists used CBCT for Diagnosing Impacted or supernumerary teeth whereas only 12.1 % used it for orthodontic diagnosis (table 5) (fig.3)

DISCUSSION

The literature includes one study that evaluates the effectiveness of web-based instruction in the interpretation of anatomy using CBCT images. Little information appears in the literature regarding dental practitioner's knowledge and attitudes about CBCT.⁹ The present study used a questionnaire to gauge the level of knowledge regarding CBCT among dental practitioners. Several studies have evaluated the popularity of digital imaging since the adoption of digital radiology in dental offices. One study reported that 14% of dental practitioners chose using digital radiography, but subsequent studies reported a higher percentage. The results of the survey indicated that though majority of participants had access to and were using CBCT images on a regular basis, around 30 % of participants had no access to the CBCT centers. While CBCT scans were generally not being used in place of conventional 2D radiography for daily diagnostic purposes, they were being implemented for specific diagnoses.¹ The reasons of not using CBCT for routine purposes were CBCT being expensive which was similar to the study done by Yalcinkaya SE et al.¹⁰ as majority of the participants were satisfied with the use of CBCT and have been using it for diagnosing impacted and supernumerary teeth (56.9%), only 50% of participants have attended CBCT lectures or workshops.¹¹

About 76% felt that lower radiation is the most advantage of CBCT over CT. About 89.5% answered that CBCT offers enhanced diagnosis at lower dose than CT and 2.6% contradicted this and 7.8% have no idea.¹²

CONCLUSION

This survey shows that CBCT imaging definitely has its place in orthodontics. Postgraduate training programs are incorporating its use to offer better diagnostic and treatment planning tools. Post

graduates are getting both didactic and practical (hands-on) training. Just as with any radiograph, CBCT use needs to be prescribed following ALARA protocols. The information obtained from the study highlighted the need for adapting to new technologies like CBCT and regular continuing education programs, post graduate education courses, meetings and seminars are required to update dentists' knowledge. The study also highlighted that adequate teaching is not imparted regarding CBCT in educational institutions but were willing to attend courses and update knowledge on CBCT if provided. Dental practitioners should prescribe CBCT imaging only when they expect that diagnostic yield will benefit patient care, enhance patient safety or improve clinical outcomes significantly.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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