

## **Dental Practitioners' Awareness, Knowledge and Attitude towards Cone Beam Computed Tomography**

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**Abstract Objective:** The Aim Of This Study Was To Evaluate Awareness, Knowledge And Attitude Regarding Cone Beam CT (CBCT) Among Dental Practitioners.

**Methods:** A Questionnaire Consisting Of 25 Questions Was Given To 150 Dentists (130 Graduates And 20 Post-Graduates At Nanded, Maharashtra, India. Their Response Based On Years Of Practice, Education Level And Sex Were Assessed.

**Results:** Results Showed That Only 49 % Had Heard Of CBCT. Of These 10, % Said They Had Learned About CBCT Through Seniors And Post Graduates, 47 % In Seminars And 20 % From The Internet; 100 % Thought q It Essential For CBCT To Be Available At Dental Institutions; 53% Said That Should Be Introduced In Final Year Curriculum, 87 % Believed That The Use Of CBCT Would Become More Widespread In The Near Future; And 100% Wished To Use CBCT Technology In Their Future Careers..

**Conclusion:** This Research Suggests That Although CBCT Is A Promising Imaging Modality For Dento-Maxillofacial Region A Gap In Knowledge And Awareness Was Found Among Dental Practitioners. So Efforts Should Be Made To Increase The Awareness And Knowledge Regarding CBCT. More Time Should Be Devoted By Dentists To Gain Proper Knowledge Of Indications And Usage Of This Technique. The Knowledge Of CBCT Should Be Imparted From Final BDS Onwards In College Curriculum.

**Keywords:** CBCT, Awareness, Dental Practitioners, Imaging, Three-Dimensional

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### **I. Introduction**

Cone Beam CT (CBCT) Is An Advanced Imaging Modality That Has Recently Become Useful For Dento Maxillofacial Imaging. CBCT Systems Operate By Focusing A Cone-Shaped X-Ray Beam On A Two-Dimensional (2D) Detector That Rotates 360° Or Less Around The Patient's Head To Produce A Series Of 2D Images. A Cone Beam Algorithm Is Then Applied To This Data Set, Allowing The Operator To Extract Planar And Curved Reconstructions Of Varying Thicknesses In Any Orientation And To Generate Accurate Three-Dimensional(3D) Images Of Bone And Soft-Tissue Surfaces.[1,2,3]

When Compared With Conventional CT Scanners, CBCT Units Cost Less And Require Less Space, Have Rapid Scan Time, Limit The Beam To The Head And Neck, Reduce Radiation Doses And Have Interactive Display Modes That Offer Maxillofacial Imaging And Multiplanar Reformation, Making Them More Suitable For Use In Dental Practices [4,5]. The Drawbacks Of CBCT Include Beam Hardening And Scatter From Dental Materials And Poor Soft-Tissue Contrast [4]. Common Indications For CBCT In Dentistry Include Assessment Of The Jaws For Placement Of Dental Implants; Examination Of Teeth And Facial Structures For Orthodontic Treatment Planning; Evaluation Of The Temporo-Mandibular Joints For Osseous Degenerative Changes; Evaluation Of The Proximity Of Mandibular Third Molar Teeth To The Mandibular Canal Prior To Extraction; And Evaluation Of Teeth And Bone For Signs Of Infection, Cysts And Tumours [6]. On The Other Hand, The Information Obtained From CBCT Imaging Also Requires A Substantial Level Of Expertise For Interpretation. This Implies That The Untrained Clinician Is Likely To Have A Substantial Error Rate In The Interpretation Of CBCT Images Resulting In A High Percentage Of Missed Or False Positive Diagnoses [7].

Literature Shows That CBCT Has A Wide Application In The Field Of Dentistry [8, 9, 10]. Though Some Workshops Are Organized Sporadically, But There Is No Standard Curriculum Or Protocol For Creating Awareness And Providing Training Regarding CBCT. Current Status Of Awareness And Knowledge Regarding CBCT Amongst The Dental Practitioners Is Not Known Precisely.

In View Of The Increasing Availability Of CBCT The Importance Of Dental Practitioners' Attitudes Towards New Technologies Is A Matter Of Concern. This Survey Assessed The Awareness, Knowledge And Attitudes Regarding CBCT Among Undergraduate And Post-Graduate Dental Practitioners At Nanded, Maharashtra, India.

## II. Materials And Method

A Self-Administered Questionnaire (Table 1) Consisting Of 25 Questions Was Designed And Administered Voluntarily To 150 (54 Female, 96 Male) Dental Practitioners At Nanded, Maharashtra, India. Of These 120 Were Graduates And 30 Were Post-Graduates. In Addition To Collecting Demographic Information, The Questionnaire Gauged The Respondents' General Awareness, Knowledge And Attitude Towards CBCT.

**Table 1: Questionnaire Used In The Survey:**

Qu No.	Questions	Respo nses
1	Age In Years	
2	Gender: A) Male B) Female	
3	Qualification: A) BDS B) MDS	
4	Type Of Practise A)General Practitioner B) Public Dentist C) Academician	
5)	Do You Use Digital Imaging Modalities To Make Radiographs? A) Yes B) No	
6)	Please Specify Your Reasons To Use Digital Imaging? A) Less Radiation Dose B) Short Time C) Easy To Store Data D) No Developing Required E) Adjustments And Measurements Can Be Made F) Any Other Specify	
7)	Are You Satisfied With The Digital Imaging Modality Available To You? A) Not At All B) A Little C) No Idea D) Satisfied	
8)	Please Check The Reasons Of Not Using Digital Imaging A) Expensive B) No Idea C) Do Not Know How To Use Computer D)Hard To Perform	
9)	Are You Aware Of CBCT In Dental Radiology? A) Yes B) No	
10)	How Did You Come Across The Term CBCT A) Seminars/Workshops/CDE B) Lessons By Faculty C) Internet D) Seniors E) Others (Specify)	
11)	Do You Feel CBCT Is A Useful Diagnostic Tool In Dentistry A) Yes B) No	
12)	Do You Feel CBCT Will Be The Ultimate Tool In Future Dentistry And Research? A) Yes B) No	
13)	To What Extent Do You Believe CBCT Will Be Used In Routine Dental Practice In The Future? A) It Will Not Be Used B) In All Specialties Of Dentistry C) Limited Use D) Selected Dental Applications Only E) No Idea	
14)	In Which Year Of Under Graduate Dental Education Should CBCT Be Included? A) III BDS B) IV BDS C) Post Graduates	
15)	Do You Feel Frequent CDE/Workshop Should Be Conducted To Acquire More Knowledge On CBCT? A) Yes B) No C) Maybe	
16)	Do You Feel The Necessity Of Having CBCT In The Dental Institution? A) Yes B) No	
17)	Would You Like To Use CBCT In Your Future Professional Career? A) Yes B) No C) Maybe	
18)	What Advantages Do You Feel Will A CBCT Offer Over Other Diagnostic Imaging Modalities? A) Lower Radiation Dose Compared To Medical CT B) Short Scanning Time C) Image Processing Easier Due To Limited Beam D) Less Expensive E) Data Reconstruction Can Be Performed On A Personal Computer F) No Idea	
19)	For What Cases Would You Like To Use CBCT In Your Future Professional Career? A) Orthodontic Assessment B) Implant Dentistry C) Evaluation Of Cysts And Tumors D) Evaluation Of Impacted Teeth E) Trauma Cases F) All Of The Above	
20)	Is Adequate Teaching Given To The Dental Under Graduate Students Regarding CBCT By The Faculty? A) Yes B) No	

21)	Have You Attended Courses Related To CBCT A) Yes B) No	
22)	Are You Willing To Attend Courses Pertaining To CBCT? A) Yes B) No C) Maybe If Within Budget	
23)	Which One Do You Prefer When You Need 3D Imaging Of Head And Neck Region? A) CT B)CBCT If Available	
24)	Have You Ever Advised CBCT For Any Diagnosis? A) Yes B) No	
25)	Are You Willing To Obtain Any Updated Information Regarding CBCT? A) Yes B) No	

**III. Results:**

Among The Total Sample Of 150 Dentists The Age Varied From 24 -65 Yr With A Mean Of 45 Years, Of Which 96 (64%) Were Males And 54(36%) Were Females. Postgraduates Were 30(20%) And Graduates Were 120(80%) , 95(63.3%) Were General Practitioners Whereas 40 (26.6%) Were Academicians Who Also Had Their Clinical Practise And 15(10%) Were Public Dentists Working At Taluka Places.

Of All Participants Only 65(43.33%) Were Already Using Digital Radiography In Their Routine Practise. Majority 93(62%) Said That The Positive Side Of Digital Imaging Was Reduced Radiation Dose While Only 7(4.66%) Said That It Was Easy To Store Data. 42(64.61 %) Were Satisfied With Their Digital Imaging Modality Whereas 23(35.38%) Were A Little Bit Satisfied Looking For Better Options. 62% Said That Digital Imaging Was Expensive And 48% Did Not Know How To Use Computer And So Were Unable To Use Digital Radiography. Of 150 Participants Only 73(48.6%) Were Aware Of CBCT, Of These 47% Had Come To Know About It From Seminars And Cdes ,20% Had Come To Know Via Internet, 10% Were Told By Their Seniors And Postgraduates And 2% Were Aware Through Lectures By Faculty. 82% Felt That CBCT Was A Useful Tool In Dentistry Whereas 18% Were Negative About It. 87% Thought CBCT Would Be An Ultimate Tool In Future Dentistry And A Great Aid In Research.

Knowledge And Attitude Of Dental Practitioners Towards CBCT Has Been Tabulated In Table 2.

**Table 2: Knowledge And Attitude Of Dental Practitioners' Towards CBCT**

S . N o	Question	No Of Res pon se	Perc entag e
14	In Which Year Of Dental Education Should CBCT Be Introduced LlI BDS Lv BDS POST GRADUATE	40 80 30	27 53 20
15	Do You Feel Frequent CDE/Workshop Should Be Conducted To Acquire More Knowledge On CBCT YES NO	150 0	100
16	Do You Feel Its Essential To Have CBCT In Dental Institutions YES NO	150 0	100
17	Would You Like To Use CBCT In Your Future Professional Career YES NO MAY BE	132 0 18	88 12
18	What Advantages Do You Feel Will A CBCT Offer Over Other Imaging Modalities? Lower Radiation Dose Compared To Medical CT Short Scanning Time Image Processing Easier Due To Limited Beam Less Expensive Data Reconstruction Can Be Performed On A Personal Computer No Idea	63 35 12 16 20 4	42 23.3 3 8 10.6 6 13.3 3 2.66
19	For What Cases Would You Like To Use CBCT In Your Future Professional Career Orthodontic Assessment Implant Dentistry Trauma Cases	14 114 7	9 76 5

	Evaluation Of Cysts And Tumors Evaluation Of Impacted Teeth Any Other Specify	14 1	9 1
20	Is Adequate Teaching Given To The Dental Undergraduates Regarding CBCT By The Faculty YES NO	21 129	14 86
21	Have You Attended Any Courses Related To CBCT YES NO	127 23	85 15
22	Are You Willing To Attend Courses Pertaining To CBCT YES NO IF WITHIN BUDGET	120 0 30	80 20
23	Which Will You Prefer For 3D Imaging Of Head And Neck Region CT CBCT ANY OTHER	14 136	10 90
24	Have You Ever Advised CBCT For Any Diagnosis YES NO	68 82	45.3 54.7
25	Are You To Receive Updated Information Regarding CBCT YES NO	150	100

Regarding Inclusion Of CBCT In Dental Education 53% (N=80) Thought It Should Be Include From Final Year BDS Where As 27% (N=40) Felt It Should Start In Third BDS And 20% (N=30) Felt It Should Be Included In Post Graduate Curriculum. Everyone 100% (N=150) Agreed That More CDE/Workshops Should Be Conducted On CBCT. 88% (N=132) Said They Would Like To Use CBCT In Future Whereas 12% (N=18) Had Still Not Made Up Their View. Majority 42 % (N=63) Answered Reduced Radiation As Advantage Of CBCT Over Other Imaging Modalities, 23.33% (N=35) Said It Was Short Scanning Time, 8 % (N=12) Thought Easier Image Processing Was An Advantage, 13.33% (N=20) Found It Advantageous As Data Reconstruction Can Be Done On Personal Computer, 10.66% (N=16) Thought It Was Advantageous As It Was Less Expensive And 2.66% (N=4) Had No Idea.

Most Of The Dentists 76% (N=114) Said They Would Like To Use CBCT For Implant Dentistry, View Regarding Use In Orthodontic Treatment And Evaluation Of Cysts And Tumors Was Equally Shared I.E. 9% (N=14). 5% (N=7) Found It To Be More Useful In Trauma Cases And Only 1% (N=1) Thought It Could Be Used For Evaluation Of Impacted Teeth. 86% (N=129) Opined That Adequate Teaching Was Not Given To Dental Students But 14% Thought Otherwise. Only 15% (N=23) Had Ever Attended Any Courses On CBCT But 80% (120) Were Willing To Attend Courses Pertaining To CBCT, Rest 20% (N=30) Aid They Would Attend If Budget Permitted. 136(91%) Preferred CBCT Over CT For 3D Imaging Of Head And Neck Region. CBCT Had Been Advised By Only 68(45.3%) Dentists For Diagnostic Purpose, But Then All 150 (100%) Were Willing To Obtain Updated Information Regarding CBCT.

#### IV. Discussion:

Very Few Studies Have Been Reported In The Literature Regarding The Knowledge And Attitude Of The Present Day Dental Fraternity Toward Advanced Dento-Maxillo-Facial Imaging [11, 12]. A Study Conducted In Turkey By Kamburoglu *Et Al* Indicated That There Was A Very Low Awareness About CBCT Amongst The Dental Students. They Suggested That Efforts Should Be Made To Improve Students' Knowledge Regarding CBCT And That The Dental School Curriculum Should Devote More Curriculum Time To This Promising New Technology [11]. Reddy *Et Al* Carried Out A Study To Evaluate Knowledge And Attitude Of Dental Fraternity Toward CBCT In South India [13] They Too Found Very Low Awareness Amongst The Dentists Regarding A Pplications Of CBCT And Pointed Out The Lack Of Availability Of CBCT Centres In Dental Institutions And Non-Inclusion Of CBCT Training During Dental Education Could Be The Possible Causes Of This Low Awareness. They Recommended That, There Is A Need For Well-Guided And Well-Planned Teaching Programs For The Present Day Dental Fraternity.

In This Study Also We Found Very Poor Awareness Of 49% Among The Dentists, And Only 45.3% Of The Dentists Had Referred Cases For CBCT. Although Maximum Suggested Use For Dental Implant They Are Not Aware Of Its Use In Other Fields Of Dentistry.

## **V. Conclusion**

Cone Beam Computed Tomography Is An Advanced Imaging Technique For Maxillofacial Imaging With A Multifaceted Uses In The Field Of Dentistry. It Is Capable Of Becoming The Ultimate Tool In Dentistry. It Is Now Gaining Popularity Among Dentists. The Study Results Point Out That There Is A Lack Of Awareness And A Definite Gap In Knowledge Of CBCT And Its Applications Amongst The Dental Professionals. The Practitioners However Strongly Felt That There Was Need For Creating Awareness And Providing Training In This Field Through Workshops, Cdes. It Was Strongly Perceived That Training In CBCT Should Begin In Final B.D.S. Level And Continued Even At Postgraduate Level. A Positive Attitude For Learning And Using New Technology Was Shown By All The Dental Practitioners. Utilising This Technique In An Efficient Way Will Improve The Accuracy And Reliability Of Oral And Maxillo-Facial Diagnosis, Treatment Planning And Outcomes And Will Soon Become A Gold Standard.

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