

Knowledge and Practices of Dentists, Oral and Maxillofacial Surgeons of Cone Beam Computed Tomography (CBCT) and the Dentascanner in a Low Income Country: Case of Togo

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Abstract

Background: In dental-maxillofacial imaging, 3D sectional imaging progressively replaces conventional 2D imaging in developed countries. They are based specially on Computed tomography (CT-Scan), with the Dentascanner application and cone beam computed tomography (CBCT). In developing countries those techniques are newly introduced. **Aim:** This study aimed at studying the knowledge and practices of dentist and oral and maxillofacial surgeons on sectional imaging such as Dentascanner and Cone Beam Computed Tomography (CBCT). **Materials and Methods:** We conducted an anonymous survey among dentists and oral maxillofacial surgeons in Togo over one month. **Results:** The response rate was 78.79% (27/33). They were mainly male sex (sex ratio of 2.25 men for one woman). They were aged between 27 and 71 years old with an average of 49.69 years old. The majority (61.54%) had a professional experience over 20 years. The majority of respondents (65.38%) believed their level of knowledge about dental x-Ray was poor. Half of them (50%) confirmed that they had never asked for a Dentascanner, and 15.38% asked from time to time for it and only two (7.69%) asked often for this test. 96.15% confirm they have no knowledge of the Dentascanner. Regarding the CBCT, 84.62% didn't ask for it because this technique did not exist in Togo before. 69.20% of respondents confessed to be interested in continuing training on sectional imaging. **Conclusion:** This study shows that sectional imaging is very little used by oral and dental practitioners in Togo because of the ignorance of the new techniques

and the absence of the CBCT. It is therefore necessary to promote the teaching of the new technique of sectional imaging in the training syllabus of oral and dental specialists and to initiate continuing medical training.

Keywords

Knowledge, Practice, Dentascan, Cone Beam Computed Tomography (CBCT), Dentist, Oral and Maxillofacial Surgeon, Togo

1. Introduction

In dental-maxillofacial imaging, 3D sectional imaging progressively replaces conventional 2D imaging in developed countries with the recommendations of professionals after consensus conferences [1]. It is more often used for diagnosis in dental care, reconstructive dentistry, and pediatric dentistry [1] [2]. This preference is due to the solution of shot confusing problem awkward situation in 2D imaging. There are various techniques to generate three-dimensional images in dentistry. Conventional tomography depicts a defined layer of the body; structures outside of this layer appear out of focus [3]. Computed tomography (CT-Scan) represents layers in the axial, coronal or sagittal plane and can provide information about the topographical location of various structures to one another. The CT scanner works using a rotating radiation source and high tube voltages. X-rays are emitted in a fan-shaped beam to stationary detectors placed 360° around the patient. Each rotation of the tube records an axial slice of the volume being examined. The 3-D domain is axially moved and each new section is recorded. The coronal and sagittal slices are computed from the axial data [4].

Arai Y. *et al.* 1999 [5] first described the application of cone beam computed tomography (CBCT). In contrast to computer tomography the Arai group introduced an Ortho-CT using a conical beam of radiation. The radiation source and the detector rotate around the patient. From a single 360° rotation, the complete volume under investigation is recorded. The cone beam computed tomography can capture a cylindrical volume of variable size.

In Togo, the CT-Scan was introduced in 2000 with a sequential cutting device which lacked of dental imaging software. Since then, new faster devices, including helical scanners, multi cuts (4 to 16 cuts) equipped with Dentascan software were installed. This study comes as a result of the scarcity of the use of the Dentascan by dental surgeons in Togo. The objective of this study was to review the knowledge and practices of dentists, maxillofacial surgeons and stomatologists in Togo on sectional imaging namely the Dentascan and the CBCT.

2. Materials and Methods

It is an anonymous cross-sectional study conducted with dentists, and oral and maxillofacial surgeons, of Togo over a period of a month from August 31st, 2015 to September 30th, 2015, during a meeting organized by the Dentists, Oral and

Maxillofacial Surgeons Association. The survey was conducted on the basis of anonymous survey form, previously established and tested and distributed to practitioners. All the dentists, oral and maxillofacial Surgeons who agreed to respond to the survey had been included in the study. Only the correctly completed survey forms had been retained.

The collected information dealt with the following items: 1) the participant (age, sex, place of basic training or specialization, number of years of practice, mode of practice); 2) the practice of medical imaging (knowledge, use of x-ray device at the dental surgery, frequency of using Dentascan and CBCT, the indications of the Dentascan and the CBCT); and 3) the need for continuing training in 3D Imaging.

3. Results

Out of 33 practitioners in Togo according to the Dentist, Oral and Maxillofacial Surgeons Association, 27 forms had been returned to us and one had been rejected for incomplete information accounting for 26 forms selected. The response rate was 78.79%. Oral and maxillofacial surgeons were 02 (7.69%) while dentists were 24 (92.31%). There were 18 men (69.23%) and 8 women (30.77%) accounting for a sex ratio of 2.25 and aged between 27 and 71 years old with an average of 49.69 ± 9.93 years old. 23 practitioners were over 38 years old (88.46%). They were trained in Senegal (69.23%), Côte d'Ivoire (3.85%) and France (7.69%). Among them, five (19.23%) were trained outside of Africa and France, (Ukraine, Yugoslavia, Russia, Cuba).

61.54% of dentists and oral surgeons had more than 20 years of professional experience (**Figure 1**). 42.31% of the respondents practiced their profession only in private health center against 38.46% who practiced only in public. Those who practiced both in public and private presented 19.23%. 25 out of 26 practitioners accounting for 96.30% had admitted that they had at least one x-ray device in their office. **Table 1** displays the x-ray devices practitioners have at their disposal. No Dental clinic had CT-Scan or the CBCT in Togo.

The Assessment by themselves of their own level of knowledge about dental radiology had enabled to notice that 18 practitioners (65.38%) had poor knowledge, 3 (11.54%) had good knowledge and 04 (15.38%) had average knowledge. Only one (3.85%) had a very good knowledge.

Table 1. X-ray devices practitioners have at their disposal in their dental clinics.

	Number	Percentage (%)
Retro-alveolar X ray Machine	23	88.46
Orthopantomogram	09	34.62
Retro-alveolar X ray machine + Orthopantomogram	07	26.92
Teleradiography	02	07.69
CT-Scan	00	00
CBCT	00	00

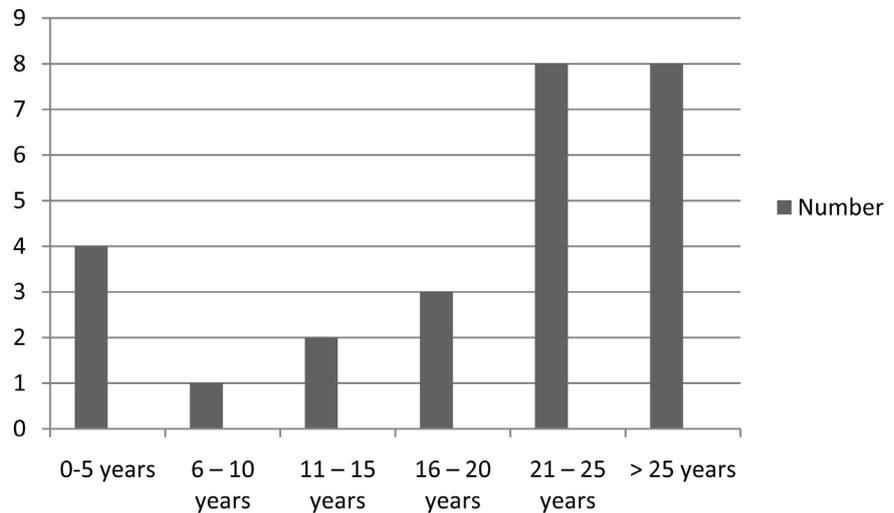


Figure 1. Number of years of professional experience of dentists, maxillofacial surgeon and stomatologists.

About the quality of radiologic images they have been receiving from various imaging centers in Togo, 7.69% said they were very satisfied; 38.50% were satisfied; 23.10% were fairly satisfied; 7.69% were not satisfied and 23.10% were neutral.

As far as the quality of radiological reports received from imaging departments are concerned, 3.85% said to be very satisfied; 38.50% were satisfied; 23.10% were fairly satisfied; 7.69% were not satisfied and 23.10% were neutral.

Half of the respondents (50%) confirm they had never asked for Dentascan; 15.38% asked from time to time for it and only two (7.69%) asked often for it (**Table 2**). This is also noticeable in the assessment of their knowledge about Dentascan; a practitioner (3.85%) considered he had a good/sufficient knowledge, against 25 (96.15%) who considered their knowledge poor.

Regarding the CBCT, only 4 (15.38%) had exceptionally asked for it; the rest had (84.62%) never. None of the participants had good knowledge about the CBCT during our study, 38.50% had insufficient/poor knowledge of this technique while 42.30% had poor knowledge, and 15.38% did not know about it. According to practitioners, the indications of the Dentascan were maxillofacial traumas (34.62%), followed by the exploration of the temporomandibular joint (15.38%), dental trauma (15.38%), orthodontic assessment (15.38%) and pre-implantation assessment (7.69%). 69.20% of the respondents said to be very interested in continuing training on sectional imaging (Dentascan and CBCT); 26.90% were fairly interested and 3.85% were not interested at all.

4. Discussion

The response rates in our study was 78.79%, close to that usually obtained in similar surveys especially 72.73% in Iran in 2015 by Mehdizadeh M. *et al.* [6] and 74% in Norway in 2014 by Hol C. *et al.* [7]. Our sample is small, 26 participants in all. This could be explained by a very low number of practitioners of oral and

Table 2. Frequency of Dentascan demand made by dentists, maxillofacial surgeon and stomatologists.

	Number	Percentage (%)
Never	13	50.00
Exceptionally	3	11.54
Very rarely	2	7.69
Rarely	2	7.69
From time to time	4	15.38
Often	2	7.69
Total	26	100.00

dental survey in Togo. As a matter of fact, only 33 people practice this profession in Togo for a population estimated at 7.5 million [8] accounting for an average density of 1 dentist for more than 227,000 people, whereas in France, the average density was 63.1 dentists for 100,000 inhabitants in metropolitan France in 2013 [9].

The practitioners' population of oral and dental surgery in Togo is older than that of Switzerland, Turkey, despite the fact that life expectancy is shorter in Togo: 64.5 years old in Togo in 2015 against 83.13 years old in Switzerland. Actually, the average age was 49.69 years old, with extremes of 27 and 71 years old against an average of 45.3 years old and extremes of 25 and 75 years old in Switzerland [10] and 37.14 years old, with extremes of 20 and 63 in Turkey [11]. The main reason for this difference is to be searched in the non-renewal of the specialists. For lack of training in Togo, and the scarcity of scholarships few people are interested in that field which cost a lot abroad. This is also noticeable through the analysis of the years of professional experience. In fact, more than half of dental surgeons (61.54%) had more than 20 years of professional experience. The predominance of male recorded in our study is also found in almost all of the studies [2] [10] [12].

Practitioners in Togo use very few cut imaging in their daily practice compared to those of European countries. This can be explained on the one hand by the absence or low availability of these imaging techniques in Togo; In fact the CBCT does not exist in Togo yet, however the Dentascan is available but it is only 5 CT-Scan devices across all the country and on the other hand by the ignorance of the Dentascan existence, the lack of information and sensitization on the part of dentists whose practice is much more private. They did not even talk to patients about CBCT because this technique did not exist yet. However in Switzerland, 19.2% of dentists were able to use CBCT on the spot, 40.8% of respondents asked for CBCT examination in second position, 4.9% asked for the conventional scanner, 34.2% would ask for a CBCT or a scanner depending on the situation, 11.1% said that they did not resort to any of the two options [10]. In Iran, 33.7% of practitioners suggest scanner to their patients, 18.8% suggest CBCT, and 46.3% had never suggested CBCT [6].

The Dentascan was the only technique in 3D cut imaging in oral and dental surgery available in Togo, and yet, its use is rare. Indeed, it was asked only twice in trimester by 15.38% of practitioners while two respondents (7.69%) said having asked for it more than once a month. Half of practitioners never used this technique in Togo whereas in Turkey, only 33.7% of them never used it [11]. The CBCT which is a rare technique in Togo is the most preferred one in other countries. It is the case in India where 72.7% of dentists preferred CBCT to scanner according to Sudhakara [13]. The fact that cut imaging is less used could be explained by the lack of sensitization and the poor knowledge in dental radiology in general, with those 65.38% who considered their knowledge poor. As for the CBCT, none of them did not assert having knowledge in that domain. As to the Dentascan, only one (3.85%) said to have good knowledge of this technique. This poor knowledge of cut imaging can be explained not only by the advanced age of practitioners who during their period of studies did not have access to these techniques because they are not developed yet, but also by the lack of continuing training. These two channels are the appropriate ways to acquire basic know-how and to update one's skills. For instance the observations made in Turkey show that 55.9% of dentists had knowledge about CBCT [11]; that knowledge was acquired by 59.9% of respondents during basic training at the faculty, 31% in seminars and 20.9% on the internet [14]. It is the same in Switzerland where half of dentists who took part in the study had confessed having received a good training in the field of medical imaging and 44.2% have acquired their knowledge during their basic training [10].

According to practitioners in Togo, trauma represents 34.62% of indications for 3D sectional imaging, 7.79% for implantology, whereas implantology alone accounted for 63.40% in Switzerland [10] and 62.5% in Iran [6]. According to directives in Switzerland in 2015, the CBCT is mainly used for implant treatment [2]. This evidence still confirms the ignorance of indications of the different techniques of sectional imaging of practitioners in Togo.

In view of knowledge deficiency recorded, 69.20% of practitioners expressed their interest in receiving a continuing training on the Dentascan/CBCT. This rate is higher than that of Switzerland (42%) [10]. One of the solutions would be to introduce in the teaching curriculum of the basic training, the new imaging techniques and to update those lecturers knowledge in accordance with the new techniques evolution. That is the wish of dentistry's students (91%) in Turkey who wanted that learning unit of the CBCT to be accessible at the dentistry Faculty [14] and in India where 49.1% of students wanted that training on the CBCT should be incorporated in the basic clinical training in dentistry [13].

5. Conclusion

Dental imaging is an essential tool for diagnostic and therapeutic orientation in the oral and dental surgery field. In Togo, sectional imaging is less used by practitioners of oral and dental medicine because of the ignorance of the new techniques existence and the absence of the CBCT. This ignorance stems from the

lack of sectional imaging course in the training syllabus at the time when most of those practitioners whose experience is more than 20 years were being trained and the lack of continuing medical education that would allow them to update their knowledge and to learn about the interests of new techniques. Therefore, it is necessary to promote the teaching of the new cut imaging technique in the training syllabus of oral and dental diseases specialists, and to initiate continuing medical training on that subject.

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