



The Factors Driving Moroccan Orthodontists to Adopt Cone-Beam Imaging in Clinical Practice

Lahcen Ousehal¹, Amine Majid¹, S. Elbenna²

¹Orthodontics Department, Faculty of Dentistry, University Hassan II, Casablanca, Morocco

²Orthodontics Department, Faculty of Dentistry, University Mohamed VI of Health Sciences (UM6SS), Casablanca, Morocco

Email: amine.ma.09@gmail.com

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Abstract

Nearly two decades since Cone Beam-Computed Tomography (CBCT) was introduced in dentistry, this technology has been proven to be a useful asset in modern dental practice. The information gleaned from a CBCT scan influences treatment decisions and prognostication of some orthodontics cases. **Objective:** To evaluate the reasons for the use of cone beam by Moroccan orthodontists in their clinical practice. **Materials and Methods:** We carried out a descriptive cross-sectional study to evaluate professional practices regarding CBCT as an imaging technique in orthodontics. To do this, we conducted a questionnaire that was sent via e-mail to all teachers and specialists in orthodontics in Morocco. Then, an analytical study was carried out with the help of the Microsoft Excel software in order to allow us to interpret the results obtained. **Results:** Our study achieved a response rate of 51%. The findings indicated that 100% of Moroccan orthodontists use CBCT as a secondary diagnostic tool rather than routinely. Analysis revealed a notable prevalence of CBCT prescription among Moroccan orthodontists, particularly among those with 10 to 20 years of experience, tapering off among those with over 20 years of experience. According to our survey, CBCT was primarily employed for locating impacted teeth, supernumerary teeth, and root resorption. Conversely, its use for orthognathic surgery and cleft lips was less frequent. Moroccan orthodontists demonstrated confidence in their CBCT expertise, which they attribute to widespread training in its use and interpretation. However, the acquisition of CBCT equipment remains a significant challenge for many practitioners. Most orthodontists reported refraining from using CBCT scans for children due to high costs and radiation exposure, factors that also deter patient requests for CBCT. Finally, a majority of Moroccan orthodontists anticipate that in five years, CBCT will be prescribed only when clinically necessary rather than routinely. **Conclusion:** The results of the present study showed that CBCT is finding its place more and more in

Moroccan orthodontic practice. Moroccan orthodontists are aware of the interest of this new technology in their daily practice. Efforts should be made to improve the equipment status of Moroccan orthodontists to make them more easily use it.

Subject Areas

Dentistry

Keywords

Radiography, Cone-Beam Computed Tomography, Orthodontics

1. Introduction

The use of two-dimensional imaging in dentistry has been well established for many years, but its lack of additional dimension has led to shortcomings in diagnosis and treatment planning [1]. In orthodontics, clinicians have traditionally used panoramic and profile radiographs to obtain essential information, but these images do not always provide accurate detail, especially for complex conditions such as the location of impacted teeth [2].

Cone Beam Computed Tomography (CBCT) is a major advance in dental imaging, offering three-dimensional visualization of calcified tissues such as bone and teeth [3]. Since its introduction to dentistry in 1998, CBCT has become a valuable tool for orthodontic diagnosis, treatment planning and research [4].

Unlike traditional scanners, CBCT uses a lower dose of radiation, making it safer for patients [3]. Since its introduction into dentistry in 1998, CBCT has become a valuable tool for orthodontic diagnosis, treatment planning and research [4]. Unlike traditional scanners, CBCT uses a lower dose of radiation, making it safer for patients [3]. However, despite its many potential indications, scientific evidence of its effectiveness in various clinical contexts is still being developed. In this context, it is important to evaluate how Moroccan orthodontists use CBCT in their clinical practice. To date, no studies have been published on this subject in Morocco.

This study therefore aims to evaluate the reasons why Moroccan orthodontists use CBCT in their clinical practice.

2. Material and Methods

Our study forms part of an evaluation aimed at understanding the factors influencing Moroccan orthodontists' use of cone-beam technology in their practice. To achieve this, we conducted a descriptive cross-sectional study involving Moroccan orthodontic specialists.

2.1. Sample Description

The target population for our survey consists of doctors specializing in ortho-

dontics at public institutes, as well as orthodontic specialists in private centers and practices.

2.2. Inclusion Criteria

The following were included in our sample:

All doctors specializing in orthodontics who are part of private or public dental care centers in Morocco.

2.3. Exclusion Criteria

The following were excluded:

Practitioners who refused to take part in the survey. Thus, out of 143 randomly selected from the overall list, 73 completed questionnaires were received duly completed.

2.4. Methodology

To gather the necessary information for our study, we developed a questionnaire comprising 17 questions covering:

- Epidemiological data related to the sample obtained.
- Practitioners' experience.
- Cone-beam practices.

The questionnaire was launched online on January 2, 2022, using the Google Forms platform. Here is the link to access it:

<https://docs.google.com/forms/d/15l65N3ANzzeyXarovTvURSZ4sX-WstrddZKriiArUpI/edit#responses>

2.5. The Variables Studied Are

- 1) Demographic and socio-professional variables of practitioners (age, sex, years of practice).
- 2) Variables related to the criteria for indicating cone-beam imaging in orthodontics, cone-beam imaging in orthodontics.
- 3) Variables related to knowledge of techniques and orthodontists' personal opinion of cone-beam imaging.

2.6. Analysis and Interpretation of Data

The data were processed and entered using Microsoft Excel.

Microsoft Excel software in order to classify the information in the form of in the form of tables and graphs.

Pearson's chi-squared test or Pearson's χ^2 test was used for statistical comparisons with a risk of error of 5%.

Epi-INFO version 16.0 was used for the statistical comparison.

3. Ethics

The research topic was submitted to and approved by the thesis committee,

which serves as the ethics committee at our institution. Participants were informed about the study's objectives, and they were made aware that completing the questionnaire was anonymous and voluntary. Their informed consent was obtained prior to participation.

4. Results

A total of 143 questionnaires were emailed to all orthodontic specialists in Morocco. We received 75 completed questionnaires, of which 2 were excluded due to missing data.

The age of participants in our study ranged from 25 to over 55 years, with an average age of 39 years (see **Table 1**).

Table 1. Description of the sample in terms of age, gender, professional experience, and workplace of the practitioners.

	Female		Male	
	Number	Percentage	Number	Percentage
Gender	35	47.95%	38	52.05%
Age				
[25 - 35]	15	42.86%	11	28.95%
[35 - 45]	12	34.29%	12	31.58%
[45 - 55]	8	22.86%	12	31.58%
>55	0	00%	3	7.89%
The experience				
<5 years	11	31.43%	9	23.68%
[5 - 10]	9	25.71%	5	13.16%
[10 - 20]	12	34.29%	13	34.21%
>20 years	3	8.57%	11	28.95%
Place of work				
Private	24	68.57%	30	78.95%
Public	5	14.29%	4	10.53%
Both	6	17.14%	4	10.53%

In terms of professional experience (see **Table 1**):

- Less than 5 years of experience was reported by 11 women (31.43%) and 9 men (23.68%).
- 5 to 10 years of experience was reported by 9 women (25.71%) and 5 men (13.16%).
- 10 to 20 years of experience was reported by 12 women (34.29%) and 13 men (34.21%).
- More than 20 years of experience was reported by 11 men (28.95%), with no women falling into this category.

Regarding workplace (see **Table 1**):

- Private practices/centers were the workplace for 24 women (68.57%) and 30 men (78.95%).
- Public institutions employed 5 women (14.29%) and 4 men (10.53%).
- Both public and private institutions employed 6 women (17.14%) and 4 men (10.53%).

All the orthodontists (100%) in the sample studied stated that they only used CBCT as a 2nd line treatment (**Table 2**).

Table 2. Rate of orthodontists using CBCT in 1st intention.

	Female	Male
CBCT in 1st intention:	0	0
CBCT in 2nd intention:	35	38

It was observed that among 5 women (6.85% of the female population), none had ever prescribed cone-beam imaging. Specifically, among these women, 3 had less than 5 years of experience (4.11%), one had between 5 and 10 years of experience (1.37%), and one had between 10 and 20 years of experience (1.37%). Conversely, among 9 men (constituting 23.68% of the male population) who had never prescribed cone-beam imaging, they were distributed as follows: 3 had less than 5 years of experience (4.11%), 2 had between 5 and 10 years of experience (2.74%), 1 had between 10 and 20 years of experience (1.37%), and 3 had more than 20 years of experience (4.11%) (See **Table 3**).

Among our sample, 26 women (35.62%) have occasionally prescribed cone-beam imaging in their orthodontic practices. Specifically, this breaks down as follows: 7 women have less than 5 years of experience (9.59%), 6 have between 5 and 10 years of experience (8.22%), 10 have between 10 and 20 years of experience (13.70%), and 3 women have over 20 years of experience (4.11%). On the other hand, 24 men (32.88%) have also occasionally prescribed cone-beam imaging. Their distribution is as follows: 4 men have less than 5 years of experience (5.48%), 3 have between 5 and 10 years of experience (4.11%), 9 have between 10 and 20 years of experience (12.33%), and 8 have over 20 years of experience (10.96%) (See **Table 3**).

Four women (5.48%) have often prescribed cone-beam imaging, including one with less than 5 years of experience (1.37%), 2 with between 5 and 10 years of experience (2.74%), and one with between 10 and 20 years of experience (1.37%). Furthermore, 5 men (6.85%) have also often prescribed cone-beam imaging, including 2 with less than 5 years of experience (2.74%) and the other 3 with between 10 and 20 years of experience (4.11%) (See **Table 3**).

None of the orthodontists (both men and women) with over 20 years of professional experience have often prescribed cone-beam imaging in their practice (See **Table 3**).

Statistical comparison has shown that there is no significant difference based

on gender regarding this parameter ($p > 0.05$) (See **Table 3**).

Table 3. Frequency of cone-beam prescriptions by gender and practitioner's professional experience.

	Female		Male		P
	Number	Percentage	Number	Percentage	
Never	5	6.85%	9	12.33%	0.876
Less than 5 years	3	4.11%	3	4.11%	
5 to 10 years	1	1.37%	2	2.74%	
11 to 20 years	1	1.37%	1	1.37%	
More than 20 years	0	0.00%	3	4.11%	
Sometimes	26	35.62%	24	32.88%	0.654
Less than 5 years	7	9.59%	4	5.48%	
5 to 10 years	6	8.22%	3	4.11%	
11 to 20 years	10	13.70%	9	12.33%	
More than 20 years	3	4.11%	8	10.96%	
Often	4	5.48%	5	6.85%	0.786
Less than 5 years	1	1.37%	2	2.74%	
5 to 10 years	2	2.74%	0	0.00%	
11 to 20 years	1	1.37%	3	4.11%	

Excluding all male and female orthodontists who responded “never” to the previous question (question 7)—meaning those who have never prescribed CBCT in their orthodontic practice—we focus on those who have prescribed it often or sometimes. Among these orthodontists, when they requested a CBCT for their patients, here's what we found:

- Among female orthodontists: 20 patients (66.67%) accepted after a request for justifications, and 10 patients (33.33%) accepted directly (See **Table 4**).
- Among male orthodontists: 11 patients (52.38%) accepted after a request for justifications, and 18 patients (47.62%) accepted directly (See **Table 4**).

Statistical comparison shows that there is no significant difference based on gender regarding this parameter ($p > 0.05$).

Table 4. Patient acceptance rate of CBCT.

	Female		Male	
	Number	Percentage	Number	Percentage
Accept after a request for justification	20	66.67%	11	52.54%
Accept directly	10	33.33%	18	47.46%
Total	30	100%	29	100%
				p = 0.346

Orthodontists' Training in CBCT:

- 24 women (68.57%) and 32 men (84.21%) have received training in the use and interpretation of CBCT, while 11 women (31.43%) and 6 men (15.79%) have not had the opportunity to receive training (See **Table 5**).

Equipment of Orthodontists in CBCT:

- 13 women (37.14%) and 15 men (39.47%) have a CBCT device in their workplace (See **Table 5**).
- 22 women (62.86%) and 23 men (60.53%) reported not having a CBCT device in their workplace. Statistical comparison has shown that there is no significant difference based on gender regarding this parameter ($p > 0.05$) (See **Table 5**).

Table 5. Orthodontist training and equipment in CBCT.

	Female		Male	
	Number	%	Number	%
Training				
NO	11	31.43%	6	15.79%
YES	24	68.57%	32	84.21%
				p = 0.623
Equipment				
No	22	62.86%	23	60.53%
YES	13	37.14%	15	39.47%
Total	35	100.00%	38	100.00%
				p = 0.467

Among the 73 orthodontists surveyed, various indications were identified for prescribing cone-beam scans to patients:

Table 6. Reasons why Moroccan orthodontists use the cone-beam in their practices.

	Number	Percentage
Locating impacted teeth	66	90.41%
Location of supernumerary teeth	41	56.16%
Assessment of root resorption	32	43.84%
Cleft lip and palate	20	27.40%
Orthognathic surgery	31	42.47%
Other	18	24.66%

- 66 orthodontists (90.41%) used cone-beam for locating impacted teeth.
- 41 orthodontists (56.16%) opted for CBCT to locate supernumerary teeth.
- 32 orthodontists (43.84%) found cone-beam useful in evaluating root resorption caused by impacted teeth.
- 20 orthodontists (27.40%) prescribed cone-beam for cases of cleft lip and pa-

late.

- 31 orthodontists (42.47%) requested CBCT for patients requiring orthognathic surgery.
- 18 orthodontists (24.66%) also identified other indications for CBCT in their orthodontic practice (See **Table 6**).

Among the 73 orthodontists surveyed:

For adult patients (18 years or older) (**Table 7**):

- 42 orthodontists (57.53%) estimated prescribing a CBCT to 1 to 10 adult patients per month.
- 4 orthodontists (5.48%) reported prescribing a CBCT to 11 to 20 adult patients per month.
- 3 orthodontists (4.11%) prescribed a CBCT to 21 to 30 adult patients per month.
- 24 orthodontists (32.88%) did not prescribe any CBCT to adult patients per month.

For pediatric patients (**Table 7**):

- 22 orthodontists (30.14%) estimated prescribing a CBCT to 1 to 10 pediatric patients per month.
- 1 orthodontist (1.37%) prescribed a CBCT to 11 to 20 pediatric patients per month.
- 1 orthodontist (1.37%) prescribed to 21 to 30 pediatric patients per month.
- 49 orthodontists (67.12%) did not prescribe any CBCT to any pediatric patient during a month.

Table 7. Number of adult and pediatric patients scanned by orthodontists in their practices using CBCT in one month.

	Adults		Children	
	Number	Percentage	Number	Percentage
1 - 10	42	57.53%	22	30.14%
11 - 20	4	5.48%	1	1.37%
21 - 30	3	4.11%	1	1.37%
Never	24	32.88%	49	67.12%

Among the 73 respondents:

For high spatial resolution:

- 5 orthodontists (6.85%) deemed it unimportant.
- 16 orthodontists (21.92%) considered it moderately important.
- 52 orthodontists (71.23%) affirmed that high spatial resolution is a highly important characteristic of CBCT images.

For high contrast resolution:

- 9 orthodontists (12.33%) deemed it unimportant.
- 12 orthodontists (16.44%) considered it moderately important.
- 51 orthodontists (69.86%) affirmed that high contrast resolution is very im-

portant.

- 1 orthodontist (1.37%) was unsure.

Regarding the ability to adjust the Field of View (FOV):

- 8 orthodontists (10.96%) deemed it unimportant.
- 25 orthodontists (34.25%) considered it moderately important.
- 19 orthodontists (26.03%) affirmed that the ability to adjust the FOV is very important.
- 21 orthodontists (28.77%) were unsure.

For the possibility of short analysis times:

- 8 orthodontists (10.96%) deemed it unimportant.
- 34 orthodontists (46.58%) considered it moderately important.
- 25 orthodontists (34.25%) affirmed that the possibility of short analysis times is very important.
- 6 orthodontists (8.22%) were unsure.

Regarding anatomical precision:

- 3 orthodontists (4.11%) deemed it unimportant.
- 7 orthodontists (9.59%) considered it moderately important.
- 63 orthodontists (86.30%) affirmed that anatomical precision is very important.

Finally, for image capture with a flat panel (See Table 8):

- 10 orthodontists (13.70%) deemed it unimportant.
- 30 orthodontists (41.10%) considered it moderately important.
- 18 orthodontists (24.66%) affirmed that image capture with a flat panel is very important as a CBCT image characteristic.
- 15 orthodontists (20.55%) were unsure.

Table 8. Relative importance of CBCT image characteristics according to Moroccan orthodontists.

	Number	Percentage
High spatial resolution		
Not important	5	6.85%
Moderate importance	16	21.92%
Very important	52	71.23%
Don't know	0	0.00%
High contrast resolution		
Not important	9	12.33%
Moderate importance	12	16.44%
Very important	51	69.86%
Don't know	1	1.37%
Possibility of adjusting the FOV (Field of View)		
Not important	8	10.96%
Moderate importance	25	34.25%

Continued

Very important	19	26.03%
Don't know	21	28.77%
Possibility of short analysis times		
Not important	8	10.96%
Of moderate importance	34	46.58%
Very important	25	34.25%
Don't know	6	8.22%
Anatomical accuracy		
Not important	3	4.11%
Of moderate importance	7	9.59%
Very important	63	86.30%
Don't know	0	0.00%
Image capture with flat screen		
Not important	10	13.70%
Of moderate importance	30	41.10%
Very important	18	24.66%
Don't know	15	20.55%

45 orthodontists (61.64%) stated that the high cost prevented them from requesting a cone-beam for their patients.

Subsequently, 7 orthodontists (9.59%) mentioned software difficulty and updates as hindrances to prescribing a cone-beam for their patients.

Meanwhile, 27 orthodontists (36.99%) cited radiation exposure as a limiting factor in prescribing a cone-beam for their patients.

Additionally, 10 orthodontists (13.70%) reported other reasons preventing them from requesting a cone-beam for their patients (See **Table 9**).

Table 9. Limits to prescribing the cone-beam to patients.

	Number	Percentage
High cost	45	61.64%
Software difficult to use	7	9.59%
Radiological exposure	27	36.99%
Other	10	13.70%

68.49% of survey participants (50 out of 73 respondents) believed that cone-beam imaging would become a routine part of orthodontic practice in 5 years only if there are indications.

Table 10 also shows that 15.07% of participants (11 orthodontists) believed it would still be present in daily routine.

Meanwhile, 10.96% did not think so, and 5.48% were unsure.

Table 10. Predicted use of CBCT in orthodontics.

	Number	Percentage
I do not know	4	5.48%
CBCT will not be used in routine orthodontic practice	8	10.96%
Yes, but only if there are indications	50	68.49%
Yes, always	11	15.07%

5. Discussion

Undoubtedly, cone-beam computed tomography (CBCT) represents an exceptional imaging technique that has revolutionized the diagnosis, treatment, and patient monitoring in orthodontics.

We conducted a cross-sectional study among 73 orthodontists (21% men) who have accumulated professional experience between 10 and 20 years. This provided them with a significant level of familiarity with CBCT and insights into its application in orthodontic practice.

The majority of these orthodontists are located in Casablanca, comprising 63% of our sample. Key findings revealed that when initial examinations are insufficient and additional diagnostic measures are required, 100% of Moroccan orthodontists reported using CBCT as a secondary diagnostic tool, consistent with existing literature.

As with all radiographic procedures in dentistry, the use of CBCT in orthodontics should not be routine and should only be considered following an assessment of the patient's health status, availability of previous radiographs, and a thorough clinical examination. The potential benefits of the imaging series must be carefully weighed against the known risks to justify exposure [4].

In all cases, CBCT cannot replace conventional radiographic examinations, which are generally sufficient, nor can it substitute for traditional impression taking [5].

Exposing patients to ionizing radiation should never be considered routine [6]. Some orthodontists emphasize that CBCT should only be used when necessary for diagnostic purposes [7].

Our study illuminated the varying degrees of CBCT adoption among Moroccan orthodontists. While a notable proportion occasionally requested a cone-beam scanner for their patients, a minority reported never using CBCT in their orthodontic practice. These findings underscore a progressive trend towards integrating CBCT into orthodontic treatment planning and diagnosis.

These results align with a multi-country survey where CBCT imaging is widely prescribed in orthodontics, with only 14% of respondents indicating no use of this imaging modality in clinical practice [7].

The study found that orthodontists with 11 to 20 years of experience had higher rates of CBCT prescription, whereas those with over 20 years of experience had the lowest rates.

This difference may be attributed to older orthodontists' lesser familiarity with digital imaging techniques. These findings are consistent with trends observed among orthodontists in the United States, where younger practitioners are more inclined towards using cone-beam CT and intraoral imaging, while older generations prefer traditional diagnostic tools like hand-wrist radiographs and alginate impressions [8].

The majority of patients agreed to undergo CBCT when requested by their orthodontists, but only after seeking justification. This practice aligns with the clinical recommendations of the American Academy of Oral and Maxillofacial Radiology regarding the use of cone-beam CT in orthodontics. The panel concluded that CBCT should be justified on a case-by-case basis, depending on the clinical circumstances. These guidelines cover general recommendations, criteria for selecting appropriate uses, optimization protocols, radiation dose considerations, risk assessment strategies, and outcomes [6].

As highlighted in Caido's multinational survey, orthodontists trained in CBCT imaging demonstrate a 48% higher adherence to guidelines in prescribing CBCT compared to those without such training [7]. Therefore, the significant uptake of CBCT training among Moroccan orthodontists has notably improved prescription practices. Interestingly, this trend persists despite the majority of Moroccan orthodontists not having CBCT machines in their own practices, relying instead on radiology clinics or external facilities for CBCT scans.

In contrast to American endodontists, who have better access to CBCT machines, Ziyad T Alzamzami noted that approximately 86% of endodontists had CBCT machines in their own offices, with the remaining 14% referring patients to external clinics [8].

In an ideal scenario, additional training and improved access to equipment within Moroccan orthodontic practices could enhance decision-making regarding the prescription of CBCT.

Our survey revealed that Moroccan orthodontists primarily prescribe CBCT for locating impacted teeth (90.41%), supernumerary teeth (56.16%), and assessing root resorption (43.84%). Cases involving orthognathic surgery and cleft lip and palate are less common reasons, while some orthodontists cited other indications for CBCT.

These findings are consistent with several studies. According to Caido's multinational survey, CBCT was prescribed by 84.4% of participants for specific cases (84.9%), primarily for impacted teeth (92.4%), preoperative planning (54.1%), and assessing root resorption (51.9%) [7].

In 2014, Guerrero ME *et al.* conducted a study [9] comparing cone beam computed tomography (CBCT) images and panoramic radiographs for initial orthodontic evaluation. The study involved two groups of observers: orthodontic residents and radiologists. The results indicated that panoramic radiographs are often unreliable for diagnosing various dental issues such as canine impaction, third molar impaction, mesial root angulation, root contact, root resorption, and supernumerary teeth diagnosis. Conversely, CBCT scans provided more reliable

information, leading to different diagnoses and treatment plans for these specific conditions.

The primary reasons for using CBCT included precise determination of the position of impacted teeth and identification of root resorption associated with impacted teeth [10].

Another study demonstrated a statistically significant difference between diagnoses obtained by CBCT and traditional radiography. CBCT was found to be statistically superior ($P < 0.05$) in locating pathologies, detecting root resorption, and contributing to treatment planning. CBCT also enabled more precise localization of pathologies ($P < 0.05$). However, no statistically significant difference was observed in the overall presence of pathology diagnoses [11].

However, the benefits of CBCT imaging must be weighed against the risks of radiation exposure for pediatric patients and the complexity of the pathology [12].

Regarding CBCT image characteristics, Moroccan orthodontists in our study demonstrated a comprehensive understanding of this matter. Our findings contradict a cross-sectional questionnaire study by Reddy Lavanya in 2016 on the use of CBCT among third-year dental students, which found that a majority lacked knowledge of CBCT image characteristics. This knowledge gap was often attributed to the absence of CBCT units in their workplace, lack of practical experience, and unfamiliarity with image acquisition characteristics [11].

A majority of Moroccan orthodontists stated that within five years, CBCT scans would only be prescribed when necessary and not as routine examinations. This stance was supported in 2015 by a joint position statement from the American Association of Endodontists (AAE) and the American Academy of Oral and Maxillofacial Radiology (AAOMR) regarding the use of CBCT in endodontic treatment. The statement emphasized using CBCT only when imaging needs cannot be met by low-dose two-dimensional radiography. CBCT should not be routinely used for diagnosis or screening in the absence of clinical signs and symptoms. Additionally, adequate training and experience are crucial when using CBCT, as clinicians' experience level correlates with their ability to accurately diagnose periapical disease in CBCT volumes. Consultation with an oral and maxillofacial radiologist should always be considered [13].

A study conducted among participants at the International Dental Congress in Lithuania noted that dentists in Lithuania are aware of the overuse of CBCT in routine clinical practice: the vast majority predicted that within five years, scans would only be performed when there are specific indications, rather than as routine procedures [14].

The main barriers preventing Moroccan orthodontists from requesting cone-beam imaging for their patients were primarily the high cost (61.64%) and concerns over radiation exposure (36.99%). Similarly, in Brazil, where the prevalence of CBCT imaging prescriptions was lowest, the higher cost of 3D exams was cited as a significant reason for not prescribing CBCT imaging [7].

Moreover, findings from a survey on the use of cone-beam computed tomography among endodontic practitioners in the United States conducted by Setzer *et al.* in 2017 echo our survey results. Common concerns included resolution limitations, radiation exposure, and cost to the patient [15].

Additionally, a survey conducted by Ziyad T Alzamzami in 2019 among American endodontists regarding the use of cone-beam computed tomography supports our findings. While approximately 81.1% of endodontists did not consider CBCT imaging to pose a high risk of radiation exposure, 10% of their patients declined CBCT imaging due to concerns about both cost and radiation exposure [8].

6. Conclusions

Undoubtedly, CBCT represents an exceptional imaging technique that has revolutionized diagnosis, treatment, and patient monitoring in orthodontics. Consequently, Moroccan orthodontists are aware of the utility of CBCT in orthodontics, as 80% of them utilize CBCT in their orthodontic practice. Among orthodontists, those with 10 to 20 years of experience are the most frequent prescribers of CBCT, while practitioners with over 20 years of experience rarely opt for cone-beam imaging in their practice.

The level of expertise among Moroccan orthodontists regarding CBCT is quite commendable compared to studies conducted in other countries. However, we have observed that access to equipment in their practices is mediocre. This is largely due to the exorbitant cost of CBCT machines.

Moroccan orthodontists believe that within five years, CBCT may become a routine examination in orthodontic practice, but only when there is a clear indication for its use.

Ethical Considerations

We have submitted the work to the approval of the department manager and the centre through the main supervisor. We sought and obtained the verbal informed consent of the patient's guardian for the publication of the result of our work with the scientific community.

Conflicts of Interest

There is no conflict of interest in this work.

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