

Assessment of Clinical Competency of Dental Students in Recognizing Landmarks and Radiological Lesions of Jaw and Face

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Abstract

Background: The ability to detect and recognize abnormal patterns in diagnostic images requires sufficient knowledge in studying radiographic images. By teaching oral radiology, dentists must know basic skills for interpreting images inside or outside the mouth. Therefore, this study aimed to assess the clinical competence of dental students in recognizing landmarks and radiological lesions of the jaw and face.

Methods: In this cross-sectional study conducted during the academic year 2021, the authors included general dentistry students in their 5th and 6th years of study at Yasuj University of Medical Sciences dental school. Initially, an objective structured clinical exam with 18 stations was designed to assess six different radiology students' competencies with the help of the radiology department's faculty members. Due to Covid-19 disease, 19 tests were held in absentia through the university's *Faradid* system. After this test, the results were analyzed using SPSS software version 26.

Results: The mean skill levels of dental students at Yasouj University of Medical Sciences in the diagnosis of different categories were as follows: Diagnosis of Dental Anomalies: 0.19 ± 0.70 , Diagnosis of Bone Anomalies: 0.34 ± 0.44 , Diagnosis of Anatomical Landmarks: 0.29 ± 0.75 , Diagnosis of Radiographic Techniques: 0.13 ± 0.92 , Diagnosis of Radiopaque Lesions: 0.5 ± 0.31 , Diagnosis of Radiolucent Lesions: 0.26 ± 0.45 .

Conclusion: The lowest level of students' skills belonged to the diagnosis of bone anomalies and radiolucent diagnosis. It is suggested that radiology professors take some effective measures to improve education regarding bone anomalies and radiolucent diagnosis.

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Introduction

One of the great tasks of universities and higher education institutions is to nurture a skilled, committed, and experienced workforce to meet the related needs of society. Students play an important role in achieving the university's goals, so they must receive the necessary

training using new and standard methods based on scientific principles.¹ As one of the most important fields in medical sciences, dentistry requires lots of theoretical and practical competencies. Moreover, improving the state of education in this field will improve individuals' oral health and ultimately directly affect society.²

The competency and eligibility of a dentist in

clinical measurements are very important to select the correct and proper treatment. Dental students get one of the highest scores in the university entrance exam, and previous studies have shown that these students are interested in their field and mostly have a good attitude towards it.^{3,4} However, it has been observed that the competence of graduates in this field is not as much as expected,⁵ or it is required to use further knowledge to improve the quality of education.⁶

Assessment helps identify students' strengths and weaknesses and then suggests a plan for their promotion.⁷ Up to now, numerous studies have been conducted on the evaluation of dental students in various topics in the curriculum of this field worldwide. For example, a study conducted by *Boynes et al.* in the United States found that general education on the anesthesia technique was inadequate.⁸ In Iran, many studies have also been conducted on the evaluation of dental students. For example, *Malekzadeh et al.* examined the evaluation of dental students regarding communication skills, and *Ramol et al.* evaluated dental students regarding all expected competencies from a general dentist.^{9,10}

In dentistry, the basic element of treatment is the correct diagnosis, and clinical examinations alone cannot be helpful in diagnosis, so other methods should be used to achieve the correct diagnosis. In this regard, one of the methods of diagnosing lesions and oral diseases is using maxillofacial radiography. Dental students should be familiar with radiology techniques and how they are performed and be able to interpret maxillofacial radiography and diagnose lesions.¹¹

Given the importance of assessing students' acquired skills and the absence of previous studies on the competency of students in recognizing landmarks and radiological lesions of the jaw and face at Yasouj,

this study was conducted in 2021 to evaluate the dental students' ability to recognize these landmarks and lesions at Yasuj University of Medical Sciences.

Methods

In this cross-sectional study, the population was the Department of Radiology faculty members and the General Dentistry students in the 5th and 6th years of the School of Dentistry of Yasuj University of Medical Sciences in 2021. The faculty members of the radiology department were used in full (in large numbers) to design a structured, objective clinical trial. The general dentistry students in the 5th and 6th years of the Dental School of Yasuj University of Medical Sciences in 2021 also entered the study fully and then participated in the designed exam.

To design an objective structured clinical exam, three concentrated group sessions, each lasting for three hours, were held with the faculty members of the radiology group. In these sessions, six different competencies required for dental students in radiology were determined, including the ability to diagnose dental anomalies, the ability to diagnose bone anomalies, the ability to detect anatomical landmarks, the ability to recognize different types of graphs, the ability to recognize radiopaque lesions of jaw and face, and the ability to recognize radiolucent lesions of jaw and face. After that, an objective structured clinical exam with 18 stations was designed, and three questions were proposed to assess each one of the competencies. The response checklist and graphs required for each station were identified as well. The students were told to answer these questions using the radiology questions and available images. Due to the COVID-19 pandemic, it was decided that the exam should be held in absentia (virtual) through the university's Faradid system, which is dedicated

Table 1: The clinical competency of the dental students in recognizing landmarks and radiological lesions of the jaw and face

Scope of competency assessment	Type of landmarks or radiological lesions	Mean	Standard deviation	Mean and standard deviation as a whole
Diagnose dental anomalies	Dentin dysplasia	0.29	0.46	0.70±0.19
	Fusion	0.87	0.33	
	Mesiodens	0.95	0.21	
Diagnose bone anomalies	Treacher Collins	0.41	0.49	0.44±0.34
	Cherubism	0.39	0.49	
	Paget disease	0.53	0.50	
Ability to detect anatomical landmarks	Nasopalatine Canal	0.77	0.42	0.75±0.29
	Intermaxillary suture	0.82	0.38	
	The floor of the nasal cavity	0.63	0.48	
Ability to recognize different types of graphs	Extraoral - Waters	0.90	0/3	0.92±0.13
	occlusal	0.87	0.33	
	Sialography	1	0	
Ability to recognize radiopaque lesions of the jaw and face	Torus mandibular	0.73	0.44	0.5±0.31
	Osteosclerosis	0.35	0.48	
	Fibrous Dysplasia	0.39	0.49	
Ability to recognize radiolucent lesions of jaw and face	Dentigerous cysts	0.72	0.45	0.45±0.26
	Simple bone cyst	0.46	0.50	
	Nasolabial cyst	0.19	0.40	

to virtual exams. In coordination with the education department and their representative, one day was determined to perform the exam, and the students were invited to participate. After the test, the results were analyzed using SPSS software version 26.

Results

Forty-one students participated in this test (response rate 0.89). Of them, 23 cases (56.1%) were male and 18 (43.9%) were female. Table 1 presents the dental students' level of clinical competence in recognizing landmarks and radiological lesions of the jaw and face.

Table 1 demonstrates that dental students exhibit the lowest level of competence in diagnosing bone anomalies (0.0 ± 44.34), while their highest level of competence is recognizing different graphs (0.13 ± 0.92). In addition, the lowest level of competence to diagnose nasolabial cyst is 0.4 ± 0.19 , and the highest level of competence to diagnose sialo graphic radiographic technique is 0 ± 1 .

Discussion

This study evaluated the dental students' ability at Yasouj University of Medical Sciences to recognize landmarks and radiological lesions of the jaw and face in 2021. The dental students displayed the lowest level of ability in diagnosing bone anomalies, while their highest level of ability was in recognizing different types of graphs. The bone anomalies investigated in this study were the diagnosis of *Treacher Collins*, the diagnosis of *Cherubism* anomaly, and the diagnosis of *Paget disease* anomaly. It's worth noting that no prior study is available on dentists' awareness of these anomalies. Because *Treacher Collins* and *Cherubism* syndromes are rare diseases,^{12,13} students' lack of awareness may be due to the low number of observations in the radiology ward. One possible reason for students' ability to recognize different types of graphs may be attributed to the fact that, in addition to completing radiology courses 1, 2, 3, and 4 across all departments and wards, students are also required to conduct radiography themselves. This result is consistent with that of *Mirshafiei Langari et al.*¹⁴ Correspondingly, in their study, students' awareness level of using CBCT in dentistry was relatively acceptable, but it was not reported as desired.¹⁴ However, these results are inconsistent with the studies by *luKamburog, Al Noaman, and Balabaskaran*.¹⁵ *LuKamburog et al.* reported that Turkish dental students' awareness of CBCT symptoms was poor.¹⁵ A study conducted by *Al Noaman* in Saudi Arabia also concluded that it is necessary to include appropriate practical training on CBCT in the dental curriculum and integrate it with other clinical courses to improve students' scientific based on this new technology.¹⁶ In a previous study conducted in India, *Balabaskaran & Srinivasan* claimed that 18% of dentists were unaware of the symptoms of CBCT

applications in dentomaxillofacial.¹⁷

Notably, the absence of CBCT-related questions in the present study could account for the variance in results compared to earlier studies. However, to improve dental students' awareness, attitude, and practice, the principles and points related to the use of computed tomography of conical beams should be presented as theoretical and practical courses in universities worldwide. Moreover, in Iran, some related seminars and conferences should be included in the retraining programs of the Ministry of Health.

The present study did not investigate the effects of age, gender, entrance exam rank, educational average, and scores obtained in radiology courses on the scores in each station. Therefore, in future studies, the effects of these variables on students' ability to recognize landmarks and radiological lesions of the jaw and face should be investigated.

Reduced face-to-face activities during COVID-19, along with the administration of academic achievement tests at home,¹⁸ led to the virtual participation of students in the current study. This allowed individuals to answer questions from their homes, potentially accessing external resources for assistance. It is suggested that the exam be held in person at the university exam center in future studies to eliminate the error caused by this issue.

This study investigated students' ability to recognize landmarks and radiological lesions of the jaw and face. It is suggested that dental students' abilities be assessed in other areas of ability required by dentists in future research.

Before assessing students' competency in recognizing landmarks and radiological lesions of the jaw and face, radiology courses 1, 2, 3, and 4 were delivered through lectures. It is recommended that these courses adopt more suitable teaching methods, aligning with practical course formats. Also, the student's ability to recognize landmarks and radiological lesions of the jaw and face should be re-examined, and the effects of this teaching method on students' ability should be compared with other methods.

Conclusion

The highest level of competence of dental students belongs to the ability to recognize different types of graphs, and the lowest level of students' skill belongs to the diagnosis of bone anomalies and radiolucent diagnosis. It is suggested that radiology professors take some effective measures to improve education regarding bone anomalies and radiolucent diagnosis.

Ethics Statement

The research plan was approved by the Yasuj University

of Medical Sciences research ethics committee and the ethics code of IR.YUMS.REC.1400.039. Participation in this study was voluntary and with personal consent. The names and grades of the participants were confidential.

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