CAHIERS MAGELLANES-NS
Volume 06 Issue 2
2024

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
http://magellanes.com/

PERCEIVED CONFIDENCE LEVELS IN ENDODONTIC TREATMENT OF MOLAR TEETH AMONG DENTAL INTERNS – A COMPARATIVE CROSS-SECTIONAL STUDY

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Abstract

Introduction

Endodontics is crucial in dental healthcare as it helps manage diseases and damaged tissues. The demand for endodontic treatments has grown, highlighting the challenges in performing intricate procedures, especially on molars. Dental undergraduates often find endodontics daunting due to the precision and skill required, impacting their confidence levels. This study investigates recent graduates' confidence in molar endodontics and how undergraduate experience affects their competence during their internship year .The study aims to evaluate and compare dental interns' confidence at KAUFD over two years, identify confidence gaps, and assess areas for enhancement within undergraduate training.

Methods:

This study targeted 212 dental interns using convenience sampling from KAUFD for two academic years. Data collection using surveys was done in three sections: demographic data, past endodontic experience, and confidence levels measured through Likert scales for different phases of the treatment. Further questions related to the confidence level examined the rationale behind low levels, the sufficiency of undergraduate preparations, and other facets that need improvement.

Results:

Dental interns from KAUFD's 2022-23 and 2023-24 were differently confident on the endodontic tasks. In total, the 2023-24 cohort appeared less confident in cavity preparation and canal identification, particularly concerning working length and obturation, with a significant difference in confidence levels between the two groups ($p<0$. Thus, the following research questions can be formulated: Thus, regarding the use of rubber dams and post-operative care, there was no statistically significant difference between the study groups ($p> 0. 7$). The main cause for the observed variation is lack of practice in clinical settings. However, the reasons for interns' low confidence in performing endodontic procedures were deemed worthy of further inquiry. The primary factor that directly or indirectly impacted confidence was the general notion of limited clinical experience. The following were identified as the factors of concern: the identification of anatomic landmarks, extensive and complicated molar

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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treatments, and the general notion of limited clinical experience.

Conclusion:
Therefore, the study concludes that practical molar endodontic training enhances interns' confidence in their clinical practice at KAUFD based on the findings highlighting a strong correlation between increased clinical practice and improved endodontic skills and patient care outcomes by future dental professionals. However, it retains some precluded issues, such as self-reporting bias or questioning the generalization of the findings.

Introduction
Endodontics is a specialized area of dentistry that is primarily responsible for monitoring the tissues at the apex of the teeth or their healing if there is pathology present in the area. A substantive part of routine daily dental practice implies addressing growing endodontic problems that need immediate treatment. Over the past few decades, the consciousness about the conservation of natural teeth has improved significantly, prompting a high demand for endodontic treatment [1]. However, endodontic treatment may often be demanding mainly due to anatomical factors such as the presence of various root canals, curvatures, limited working space in the molar teeth, and the high risk during the procedure. Endodontics is usually presented among the most challenging disciplines in studying dentistry at the undergraduate level. For many students, it is a delicate subject due to the high level of skill and precision expected during the procedures, especially regarding root canal treatments in the broader category of molar teeth. This perception immensely affects students' confidence, prompting the need for endodontic molar training in their undergraduate years. With the continued need for this skill and precision, Universities, through their dental schools, must formulate ways to encourage more dental students to sharpen their endodontics skills and precision, consequently boosting their confidence level when performing various endodontic procedures [3].
The degree of dentist competence should be measured by their skill and precision while conducting different endodontic procedures, as most new dentist interns are ill-prepared to handle endodontic procedures independently due to their low self-esteem and the intricate nature of the procedures [4]. Consequently, colleges of dentistry in KSA are expected to organize their programs according to the SCFHS guidelines, which include education and clinical training of students on endodontic procedures. Additionally, the courses should prepare and allow students to exhibit the skills required to perform the endodontic procedures independently upon graduation [5].
At King Abdulaziz University, the current dental education in Endodontics starts in the fourth year for the student with theoretical and simulated education. After successfully passing a practical and theoretical test, those students move on to the fifth year. In the fifth year, students treat patients through different endodontics clinical procedures. The clinical need for root fillings is seven root canals, including two double-canal teeth and four single-canal teeth. However, the students must self-assess all the clinical cases in addition to the regular clinical practice training. In the final and sixth year of dental school, students are permitted to perform a minimum of six additional root canals, either single or double, and to perform endodontic molar emergency management on at least two molars. Upon

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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completion of these requirements, students are permitted to perform additional endodontic treatments on molar teeth under the supervision of specialists.
Some alterations have been made concerning the new curriculum whereby in the past, dental students were doing root canal treatment on molar teeth from the 5th and 6th year of training, but due to the high rates of endodontic treatment failures on molars completed by undergraduates, SCFHS guidelines have set these changes. It was in this vein, therefore, that this study set out to assess interns' perceptions of preparedness when it comes to performing endodontic treatments or procedures on molars, describe the potential sources of their self-doubts, and lastly, determine whether undergraduate exposure to molar treatments affects their levels of self-confidence during their internship years.

Research Question

What factors influence interns' confidence levels in performing endodontic treatments on molar teeth, and does hands-on experience during the undergraduate years play a role?

Research Objectives

1. Compare the perceived confidence levels among dental interns at King Abdulaziz University Faculty of Dentistry (KAUFD) between the 2022-2023 and 2023-2024 internship years.

2. Identify factors affecting the confidence levels among dental interns at KAUFD.

3. Highlight specific areas within the undergraduate education years that require further attention and focus to enhance intern confidence in performing molar endodontic treatment.

Research Hypothesis

Null Hypothesis (HO): Hands-on experience with molar endodontic procedures during undergraduate years of study does not significantly influence the confidence levels of dental interns during their internship year in performing endodontic molar treatments.

Alternative Hypothesis (HA): Hands-on experience with molar endodontic procedures during undergraduate years of study significantly influences the confidence levels of dental interns during their internship year in performing endodontic molar treatments.

Significance of the Study

This study holds significant academic value as it contributes to dental education by examining the variations in perceived confidence levels among dental interns at King Abdulaziz University Faculty of Dentistry (KAUFD) from two different academic years. By identifying the areas where confidence gaps

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
http://magellanes.com/

exist, this research can shed light on the impact of educational interventions and clinical experience on the performance of all future KAUFD graduates in endodontic procedures.

Literature Review

Dentistry is a hands-on profession demanding extensive knowledge, training, and confidence to execute dental treatments effectively [13]. Endodontics stands out as a particularly challenging subject in the dental undergraduate program [2] due to its intricate anatomy, confined workspaces, the challenge of ensuring a clean field before completing restorations, responsibility toward patients, and low self-confidence [9]. The intricate nature of endodontics poses the risk of procedural errors and treatment failures due to the low confidence and poor skill of dental students and interns. Consequently, it is imperative that these issues be addressed and prevented, and all dental professionals, interns, and students who perform endodontic treatments should possess clinical competence, skill, and confidence [1].

In Saudi Arabia, dentist implements their programs to meet the qualification standards issued by the Saudi Commission for Health Specialties (SCFHS). In the set qualification standards, dentists are required to include part of the theoretical education and the clinical practice of endodontics. The competencies must be met so that the students can attain the basic skills for independent performance of endodontic procedures after graduation [4]. Ideally, after the completion of the undergraduate dental program, the new dentists should be fully capable of diagnosing the endodontic cases well and coming up with the right treatment plan to allow efficient treatment procedures relating to root canals [13]. Despite some achieving the SCFHS qualifications, low self-esteem in newly qualified dentists can be dangerous to patients' treatment outcomes [12]. This present research aims to evaluate the perception intern dentists at King Abdulaziz University of Dentistry have when performing endodontic therapy on molar teeth. For instance, it should be noted that most of these interns underwent undergraduate dental training without adequate exposure to molar endodontic procedures. This research also aims to compare their self-efficiency with that of interns who underwent more comprehensive orientations during their undergraduate studies. In this line of understanding, this research aims to reinforce the spirit of newly trained dental interns while equally firming up their skills to competently confront the executory challenges posed by endodontic treatment and transit vivacious dental careers.
When considering the confidence of dental students and interns, endodontics is given precedence due to its intricate work and complex methodologies. Studies carried out in various parts of the globe aimed to determine this confidence and its possible effects on treatment outcomes. A relatively recent paper from the University of Bristol described undergraduate dental students' attitudes and beliefs about the quality of their endodontic training and their self-efficacy when performing root canal treatments. The outcomes revealed significant variations in the students' confidence level based on the root canal therapy stage, thus supporting the observed relationships between clinical practice and students' confidence in these procedures [14].

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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Similarly, a study regarding the confidence levels of undergraduate dental students during different stages of endodontic treatments was conducted at Qassim University. The present comprehensive questionnaire, which has been developed in three parts, encompassed all aspects, including the student's academic background and profile and their potential attitudes toward referring future endodontic treatments to other individuals. Notably, a comparison of the achievements in endodontics as a discipline showed that the years of study had their pitfalls, with the outcomes showing a steep rise in the confidence level of the students during the fifth year of study, particularly as it concerned the management of molar teeth treatments. J. David's research at Cardiff University highlighted undergraduate dental students' perspectives on the caliber of endodontic education. The survey results underscored the need for more structured practical sessions, diverse lecturers, enhanced training equipment, and better supervision to boost confidence [15].

In another study from Taibah University in Saudi Arabia, the focal point was students' assurance in performing nonsurgical root canal therapies. Though the maxillary incisor was identified as a frequently treated tooth, confidence dwindled when it came to intricate procedures involving molar teeth. Broadening the scope, a Jordanian study explored students' confidence levels across various restorative dentistry aspects. This comprehensive study underscored that complex procedures, notably root canal treatments for posterior teeth, often posed challenges for students. Nevertheless, the emphasis was on the positive impact of repetitive task training and the gradual confidence boost witnessed between the fourth and fifth academic years [6]. Supporting this, another investigation on undergraduates' self-efficacy in endodontic education deduced that practical experience in root canal therapy was pivotal in enhancing confidence. Practical exposure, particularly with an increasing number of treated root canals, directly impacted students' self-efficacy [10]. Futhermore, a Malaysian survey involving 184 final-year dental students from varied universities probed into students' self-perceived competencies in endodontics. While a majority felt adept at handling single-rooted teeth, multi-rooted teeth treatments emerged as a challenge for many [2]. The overarching theme across these studies is the need for a more comprehensive and practical approach to endodontic education.

Endodontic procedures are particularly demanding for undergraduates, and skill gaps in this area have been broadly highlighted. However, the study suggests that if students can show aptitude in basic endodontics on single-rooted teeth, they might be poised to enhance their multi-rooted endodontic skills with more exposure. Enhancing the educational experience, perhaps by extending clinical hours for supervised practice, could potentially bolster students' clinical competencies during their undergraduate years [11]. At Alfarabi Dental College, a study evaluated the self-confidence of 150 intern dentists using a predetermined survey form. The findings revealed that 44.6% were comfortable taking radiographs during root canal therapy. In contrast, only 59.2% felt confident in irrigation. Interestingly, 25.2% reported never needing to remove broken instruments from patients. This research underscored a connection between the levels of self-confidence and the practical experience with certain endodontic procedures, prompting further research into potential gaps in their undergraduate training [13].

ISSN:1624-1940
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In Saudi Arabia, a study conducted by King Khalid University, emphasized on the intricacies of endodontics. An analysis from thirteen dental schools showed that despite most intern dentists feeling confident about many endodontic operations, a significant number lacked practical experience in several key procedures, such as using rotary instruments, retreatment of unsuccessful RCTs, and obturation of multi-rooted teeth. These findings emphasized the need for more hands-on training, especially for the more challenging treatments [12]. Moreover, a cross-sectional survey from Nepal evaluated dental interns' self-confidence regarding various endodontic tasks. While the first part of the survey was socio-demographic in nature, the second delved deep into the specifics of endodontic procedures. Results highlighted specific areas of low confidence, notably placing a rubber dam, managing inter-appointment flare-ups, and handling maxillary and mandibular molars. The anatomical complexities of molars were reiterated as a major challenge, reinforcing the sentiment of the other studies that more targeted practical training is crucial [1].

These studies concur on the necessity of enhancing confidence in dental interns, particularly in reference to the challenging field of endodontics. It appears that there is a focus on experience, where training seems to play a central role in guaranteeing that these future dentists are sufficiently prepared to handle the field's challenges. In such a detailed field as endodontics, the quality of the treatments the undergraduate students provides becomes one of the criteria. Perhaps it is essential to comprehend and reason for any failure or problem happening throughout these procedures because they offer feedback. This way, you will be trying to ascertain not only how effective their training is but also where their attention needs to be shifted or where they need more training. Together with the overall assessment of the treatment outcomes, these incidents reported provide a realistic picture of contemporary undergraduate endodontic proficiency. More specifically, the endodontic competence of undergraduate dental students has attracted researchers' attention with studies addressing quality aspects and incident occurrence in the last few years. There are two types of studies of this type hailing from Khartoum and Abha, which provide distinct yet overlapping perspectives on the topic.

The research at the University of Khartoum aimed to assess the extent of the quality of root canal treatment done by undergraduate students utilizing periapical radiographs of 265 roots. Surprisingly, statistics showed that less than half of the students, 34 percent, had bought something online. It was observed that only 7% of maxillary posterior teeth had adequate root filling length. The financial decision-making prerequisites at the quality parameter level were root density and taper at 10. 9% and 40%, respectively. Only 24.2% presented root fillings of the desired quality. Perhaps it may point towards possible deficiencies in the timing of exposing the students to clinical endodontics or in all aspects of preclinical preparation. One of the major findings derived from the current study can be summarized in the hypothesis that the quality of the root canal procedures executed by a dental student appears inherent in his or her practical practice in the domain.

Conversely, the study in Abha primarily aimed to discern the commonality and types of endodontic mishaps that occur during treatments by undergraduate students. Surveying 404 endodontically treated

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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teeth over six months, this study placed a spotlight on the factors leading to these errors, such as the type and position of the tooth. Their findings were quite revealing, while 86% of the teeth showed no errors related to access opening, issues like gouging and missed canals were reported in 11.1% and 2% of cases, respectively. Instrumentation mishaps were rare, but when it came to obturation, under-obturation errors were predominant, affecting 68.1% of the sample. Further analysis showed that anterior and single-rooted teeth generally had better outcomes compared to posterior and multi-rooted ones. Notably, the upper left second molar teeth exhibited a higher frequency of mishaps related to access opening. 4 In synthesizing the findings from these studies, it becomes evident that while students exhibit certain competencies in endodontic treatments, there remain areas that need addressing in their training curriculum. Both studies emphasize the necessity for enhanced practical training, with a specific focus on handling complex cases like multi-rooted teeth, to ensure the efficacy and safety of treatments provided to patients.

Evidently, there has been an increasing awareness of the need to strengthen dental education, especially in the domain of endodontics. A large number of investigations have initiated the process to assess and define the modern paradigms of undergraduate endodontic training programs, defining the possibilities for improvement. Such measures are premised on the objective of improving the standards of learning and training so that upcoming dentists are well-equipped to handle their cases. As supplements to the current programs for endodontic training, these works identified the lectures' intention to close the theory-practice gap to equip the students with professional superior endodontic skills. As such, the focus is also not only on the provision of knowledge but the solidification of confidence, and thus, the next generation of dentists are equipped to handle the challenges associated with endodontic treatments most effectively.

Several international studies have been conducted concerning the endodontic training in the undergraduate dental programs, all of which have provided comprehensive information regarding various training approaches and their effects on the student's level of competency and confidence. In Princess Nourah University, the study aimed at determining the impact of implementing the five-week preclinical elective course on preclinical endodontic training.

The study hypothesized that students with extended preclinical exposure, specifically focusing on molar teeth, would demonstrate elevated confidence and improved technical skills in clinical settings. Upon completion of their mandatory preclinical training, students commenced patient treatments under rigorous supervision. While the data suggested that students from the elective course felt slightly more equipped to treat complex multi-rooted teeth, the difference in confidence between the two groups was not statistically significant [3].

On the other hand, research from Charles University in the Czech Republic endeavored to understand the perspective of undergraduate students concerning the Endodontology Curriculum introduced by the European Society of Endodontology (ESE) in 2013. The findings highlighted that 75.9% of students felt sufficiently knowledgeable in several key endodontic skills. Interestingly, while a significant proportion felt competent in performing root canal treatments on anterior teeth and premolars,

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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confidence dropped notably when it came to molars7. The study also brought to light the overwhelming demand from students for more practical opportunities, echoing the sentiments of students at Princess Nourah University. Similarly, a study from Norway sought feedback from newly graduated dentists concerning their feelings of security and self-confidence in performing root canal treatments post-graduation. The data illuminated that while a respectable percentage felt secure and confident, a considerable fraction perceived their undergraduate endodontics training as inadequate, with a predominant emphasis on the need for increased clinical exposure [8]. In conclusion, the complex realm of endodontics and the caliber of treatments delivered by undergraduate students serve as a vital benchmark. Recognizing and dissecting any difficulties or setbacks faced during these processes offers insights. It goes beyond merely assessing the effectiveness of their education to pinpointing sectors that necessitate increased attention or further guidance.

Ultimately, as observed in the scheme of the following studies, they all align to form a similar pattern. Evidently, the increase of awareness and importance of dental education, especially in the field of endodontics, shows that dental students and interns struggle with complex endodontic cases such as multirooted teeth. Therefore, it is necessary to prepare them and fulfill the core competencies to allow them to transition into their independent dental paths smoothly.
The findings shed light on the relationship between hands-on clinical practice and the self-assurance gained [14]. The predominant message from these studies emphasizes the demand for a broader and hands-on method in endodontic training. Therefore, a rise in the number of treated root canals directly boosted the students' self-confidence. 10 When consolidating the insights from these studies, it becomes clear that although students demonstrate proficiency in certain endodontic treatments, there are still aspects of their training that require attention. Both investigations underscore the importance of augmented hands-on experience, particularly in managing intricate cases like multi-rooted teeth, to guarantee patient treatments' effectiveness and safety.

By reinforcing the core principles of endodontic education, these studies strive to narrow the divide between academic understanding and real-world execution, guiding students toward a trajectory of professional mastery. The focus extends beyond mere knowledge transfer; it's about instilling confidence and ensuring that upcoming dental professionals can tackle endodontic complexities with skill and self-assurance. The aim of this study is to measure the confidence level and the quality of work of dental interns in performing endodontic molar treatments. The study emphasizes the importance of increasing the number of prerequisites and requirements during preclinical training in the phantom lab and clinically. It is our aim to find out how the enhancements proposed herein can help increase their confidence and competency. Our thought process is that during the training, the professional should be more involved, which will ensure that they gain more confidence when handling the patients and also help increase the quality of the care given to the patients. This study aspires to fill the existing gap and create a new generation of competent dental instructors armed with the necessary expertise and self-assurance.

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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Materials and Methods

This research work employed the comparative cross-sectional research method to determine the perceived confidence levels of dental interns in KAUFD for the academic years 2022/2023 and 2023/2024. The study design aims to compare the confidence of the two cohorts of dental interns.

Sample and Sampling Methods

The targeted subjects of this study are 349 dental interns from the Academic year 2022-2023 and Academic year 2023-2024 at KAUFD. Currently, a non-probability, convenience sampling method which involves the selection of participants based on how easily they are available and willing to be included in the study. The sample involves two sets: the 2022-2023 student interns and 2023-2024 student interns. Having two groups helps to ensure that one can compare the perceived confidence level of the two groups.

Data Collection Methods

Data for this study is collected through a questionnaire survey administered electronically. The survey questionnaire consisted of three distinct sections. In the first section, participants were queried about their gender, academic year, and grade point average (GPA), aiming to gather demographic information to establish the profile of the respondents. The second section of the questionnaire encompassed 14 items. The initial item inquired about any previous endodontic treatment performed by the participants during their undergraduate training. The subsequent item investigated whether the participants had engaged in endodontic treatment during their internship year, utilizing a binary response format of "yes" or "no." If the subject responded affirmatively, 11 additional questions were presented, specifically focusing on the participants' perceptions of their self-confidence levels while undertaking different stages of endodontic treatment. These 11 items employed a 4-point Likert scale, wherein "Extremely confident" was assigned a score of 4, "Confident" received a score of 3, "Slightly confident" was scored as 2, and "Not confident at all" was scored as 1. In instances where the subject selected a score of 2 or 1, follow-up questions were triggered, allowing the subject to choose multiple answers regarding the reasons and justifications for their lack of confidence in that particular aspect. Alternatively, if the subject responded negatively to the question concerning endodontic treatment during their internship year, a single item was presented to explore the reasons behind their non-performance of endodontic treatment during that period.

The third and final section of the questionnaire entailed a closed-ended question, offering the participants the opportunity to select multiple answers. This question aimed to investigate the appropriateness of the current undergraduate training and elicit suggestions regarding areas and topics that require further emphasis in future training programs.

Data Analysis

Descriptive statistics were used to elaborate the dataset. Chi-square tests were employed to assess the differences in confidence levels between the 2022-23 and 2023-24 batches for various aspects of

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
http://magellanes.com/

endodontic treatment of molar teeth, such as endodontic diagnosis, anesthesia administration, access cavity preparation, and others. Additionally, Spearman's rank correlation coefficients were calculated to evaluate the strength of association between the number of endodontic molar treatments performed during undergraduate training and the reported confidence levels in various endodontic procedures. The statistical analysis was conducted by a qualified independent statistician. The analysis was performed using IBM SPSS Statistical Software, version 29.

Ethical Considerations

This study obtained ethical approval from the Research Ethics Committee, Faculty of Dentistry, King Abdulaziz University proposal no. 164-11-23. The participants' confidentiality and anonymity were ensured throughout the study. The data collected will be securely stored and used solely for this research study.

Results

The study involved a total of 212 respondents considered for analysis out of 349 dental interns who were provided with the online questionnaire. The confidence level of dental interns regarding various steps of endodontic treatment was assessed. Gender-wise distribution was also calculated, with a slight majority being female. Participants were evenly split between two consecutive batches. The 2022-23 cohort comprised 101 interns (47.6%), while Batch 2023-24 had 111 interns (52.4%). Their academic performance varied, with a distribution across several GPA ranges. In terms of clinical experience, a notable portion had not performed any endodontic molar treatments during their undergraduate training, while others had varying degrees of hands-on experience, ranging from just a few to more than six procedures. These findings are detailed in Table 1.

Table 1. Demographic characteristics of dental interns and their undergraduate training experience

		N	**N%**
Gender	Female	122	57.5%
	Male	90	42.5%
Batch	2022-23	101	47.6%
	2023-24	111	52.4%
GPA	3.9	29	13.7%
	3.9-4.4	87	41.2%
	4.5-4.74	87	41.2%
	4.75-5	8	3.8%
During your undergraduate training, how many endodontic molar treatments did you personally perform in the clinic?	None	92	43.4%
	1-2	46	21.7%
	3-4	50	23.6%

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
http://magellanes.com/

	5-6	14	6.6%
	>6	10	4.7%
During your training in your internship year did you preform endodontic treatment on molar teeth?	No	17	8.0%
	Yes	195	92.0%

Dental students from both the 2022-23 and 2023-24 batches generally reported high levels of confidence in various endodontic procedures. However, there were some notable differences. A greater percentage of students from the 2023-24 batch reported less confidence in access cavity preparation and identifying molar canals.

Although both groups were largely confident in obtaining working length and cleaning and shaping molar teeth, the 2023-24 batch had more students who felt slightly confident in this procedure step. This pattern extended to their confidence in obturating molar canals and interpreting radiographs, where the 2022-23 batch reported higher confidence levels. The differences in confidence levels between the batches were statistically significant in these areas.

Conversely, when it came to applying rubber dams for molar isolation, providing post-operative care instructions, and assessing the quality of root canal filling post-operatively, both batches felt similarly confident, with no significant difference in their self-assessment. In comparing the self-reported confidence levels of dental interns across different endodontic procedures, the study found significant differences between the two academic batches. For access cavity preparation, identifying molar canals, obtaining working length, cleaning and shaping of molar teeth, obturation of molar canals, and interpreting radiographs, the variations in confidence were statistically significant, with p-values all below 0.001 ($p<0.001$), indicating that these differences were not due to chance. In contrast, the interns' confidence in diagnosing molar teeth ($p=0.014$), Anaesthesia administration for molars ($p=0.21$), applying rubber dams for molar isolation ($p=0.763$), providing post-operative care instructions ($p=0.803$), and assessing the quality of root canal fillings post-operatively ($p=0.738$) showed no significant difference between the two batches, demonstrating consistent confidence levels in these procedural areas across the different groups of students (Table 2).

Table 2. Comparison of Confidence Levels in Endodontic Treatment of Molar Teeth between Batch 2022-23 and Batch 2023-24

Level of confidence	Batch 2022-23	Batch 2023-24	p-Value
1. Endodontic diagnosis for molars N(N%)			
Not confident at all	0 (0.0%)	0 (0.0%)	.014
Slightly confident	3 (3.2%)	15 (15.2%)	
Confident	54 (56.8%)	52 (52.5%)	
Extremely confident	38 (40.0%)	32 (32.3%)	
2. Anesthesia Administration for Molar Treatment N(N%)			
Not confident at all	0 (0.0%)	0 (0.0%)	.021

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
http://magellanes.com/

Slightly confident	2 (2.1%)	12 (12.0%)	
Confident	58 (61.1%)	50 (50.0%)	
Extremely confident	35 (36.8%)	38 (38.0%)	
3. Application of Rubber Dam for Molar Isolation N(N%)			
Not confident at all	1 (1.1%)	1 (1.0%)	.763
Slightly confident	9 (9.5%)	9 (9.0%)	
Confident	44 (46.3%)	54 (54.0%)	
Extremely confident	41 (43.2%)	36 (36.0%)	
4. Access Cavity Preparation for Molar teeth N(N%)			
Not confident at all	2 (2.1%)	10 (10.0%)	<.001
Slightly confident	17 (17.9%)	46 (46.0%)	
Confident	51 (53.7%)	37 (37.0%)	
Extremely confident	25 (26.3%)	7 (7.0%)	
5. Identification of Molar Canals N(N%)			
Not confident at all	2 (2.1%)	4 (4.0%)	<.001
Slightly confident	18 (18.9%)	48 (48.0%)	
Confident	53 (55.8%)	43 (43.0%)	
Extremely confident	22 (23.2%)	5 (5.0%)	
6. Obtaining working length N(N%)			
Not confident at all	1 (1.1%)	2 (2.0%)	<.001
Slightly confident	14 (14.7%)	32 (32.0%)	
Confident	57 (60.0%)	59 (59.0%)	
Extremely confident	23 (24.2%)	7 (7.0%)	
7. Cleaning and shaping of molar tooth N(N%)			
Not confident at all	1 (1.1%)	6 (6.1%)	<.001
Slightly confident	24 (25.3%)	49 (50.0%)	
Confident	44 (46.3%)	35 (35.7%)	
Extremely confident	26 (27.4%)	8 (8.2%)	
8. Obturation of Molar Canals N(N%)			
Not confident at all	1 (1.1%)	3 (3.0%)	<.001
Slightly confident	17 (17.9%)	35 (35.0%)	
Confident	54 (56.8%)	55 (55.0%)	
Extremely confident	23 (24.2%)	7 (7.0%)	
9. Interpreting radiographs N(N%)			
Not confident at all	1 (1.1%)	0 (0.0%)	<.001
Slightly confident	3 (3.2%)	13 (13.1%)	
Confident	53 (55.8%)	67 (67.7%)	
Extremely confident	38 (40.0%)	19 (19.2%)	

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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10. Post-operative Care Instructions for Molar Treatments N(N%)			
Not confident at all	0 (0.0%)	0 (0.0%)	.803
Slightly confident	5 (5.3%)	4 (4.0%)	
Confident	49 (51.6%)	56 (56.0%)	
Extremely confident	41 (43.2%)	40 (40.0%)	
11. Assessing quality of root canal filling post operatively N(N%)			
Not confident at all	0 (0.0%)	0 (0.0%)	.738
Slightly confident	8 (8.4%)	8 (8.0%)	
Confident	48 (50.5%)	56 (56.0%)	
Extremely confident	39 (41.1%)	36 (36.0%)	

To gain deeper insight into the concerns of the participants, those who reported being only slightly confident or not confident in specific procedural steps were asked follow-up questions. This approach was intended to better understand the underlying reasons for their lack of confidence in performing various endodontic procedures.

The primary factor affecting confidence across several endodontic procedures for dental interns was limited clinical experience during undergraduate years. For anaesthesia administration, the main concern was uncertainty in identifying anatomic landmarks. Access cavity preparation anxieties stemmed from fear of gouging or perforating the tooth, as well as unfamiliarity about molars anatomy access points. When it came to cleaning and shaping molar teeth, worries included creating ledges or perforations and managing complex canal paths. For endodontic diagnosis, complexity and unfamiliarity with diagnostic tools were cited, while identifying molar canals was challenged by visualizing and locating canals. Difficulty with applying rubber dams related to isolation of damaged molars and selecting appropriate clamps. Finally, in obtaining working length, the challenges were curved canals, interpreting apex locator readings, and managing multiple reference points for molars.

Table 3. Reasons reported by interns who felt slightly confident or not confident at all.

		N	N%
Anaesthesia administration for molar treatment	Limited experience of clinically preforming endodontic molar during your undergraduate years	7	33.3%
	Uncertainty of identifying the correct anatomic landmarks for molar anaesthesia	12	57.1%
	Due to presence of swelling or infection in area of administration of LA	2	9.5%
Access cavity preparation for molar teeth	Limited experience of clinically preforming endodontic molar during your undergraduate years	49	24.4%
	Uncertainty about the correct anatomical landmarks	39	19.4%

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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	for starting an access cavity on molars		
	Anxious about the possibility of gouging in the tooth during access preparation	47	23.4%
	Anxious about the possibility of creating perforation in the tooth during access preparation	44	21.9%
	Apprehensive about encountering calcified canals or pulp stones during access cavity preparation	22	10.9%
Cleaning and shaping of molar tooth	Limited experience of clinically preforming endodontic molar during your undergraduate years	48	21.9%
	Have you previously created a ledge or perforation while cleaning and shaping a molar tooth	25	11.4%
	Anxious about the possibility of creating ledges or perforations during the procedure	39	17.8%
	Have you ever experienced instrument breakage during cleaning and shaping that has affected your confidence	25	11.4%
	Have you ever experienced a sodium hypochlorite extrusion beyond the apex while cleaning and shaping a molar	7	3.2%
	A challenge in maintaining the original canal path while shaping curved or narrow molar canals	35	16.0%
	Apprehensiveness while using manual files for complex molar anatomy	19	8.7%
	Apprehensiveness while using rotary files for complex molar anatomy	21	9.6%
Endodontic diagnosis for molars	Lack of clinical exposure to preforming endodontic molar during the undergraduate course	12	33.3%
	Because it is time consuming in diagnosis of endodontic treatments particularly on molars.		
	Thus, due to unfamiliarity of the historian or the historical account with some of the diagnostic tools		
	The confidence level while diagnosing tends to rise as one moves through the non-molar teeth, whereby these teeth are relatively easier to diagnose.		
	Due to complexity of endodontic diagnosis for molars	11	30.6%
	Due to lack of familiarity with certain diagnostic tools	9	25.0%
	Confidence in diagnosing increases with the simpler anatomy of non-molar teeth.	4	11.1%
Identification of	Limited experience of clinically preforming	52	39.7%

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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molar canals	endodontic molar during your undergraduate years		
	Due to difficulty in interpreting radiographs for the identification of molar canals	30	22.9%
	Due difficulty in visualizing or locating the canals during access preparation	49	37.4%
Obturation of molar canal	Limited experience of clinically preforming endodontic molar during your undergraduate years	33	30.3%
	Have you had an experience with voids or gaps in the obturation of molar canals that has affected your confidence	26	23.9%
	Have you ever underfilled or overfilled a molar canal during obturation	30	27.5%
	Do you find it challenging to ensure proper sealer placement in molar canals with multiple curvatures	20	18.3%
Application of rubber dam for molar isolation	Limited experience of clinically preforming endodontic molar during your undergraduate years	8	29.6%
	Due to difficulty in isolating badly destructed molar	10	37.0%
	Due to difficulty in select the appropriate size and type of clamp for rubber dam	7	25.9%
	Do you feel confident about rubber dam application on anterior teeth but not on molars due to its less complex anatomy and size	2	7.4%
Obtaining working length	Limited experience of clinically preforming endodontic molar during your undergraduate years	26	27.7%
	Uncertainty about interpreting the readings from an apex locator when determining the working length	22	23.4%
	Presence of curved canals with complex anatomy	28	29.8%
	Due to a challenge in determining the working length for molars due to their multiple reference points	18	19.1%

Among the interns who asserted they did not treat endodontic molar during their internship year, the survey revealed the following as the causes. The most preferred reason was the self-perceived inadequate preparation due to limited and unrealistic practice with endodontic molar cases in dental school. A notable point that many interns raised was the dilemma of lack of opportunity to handle molar cases while offering internships.

Many interns said it was necessary to observe more or receive help, which points to the need to guide them before they can manage molar endodontics alone. They also highlighted issues on how they would be able to handle possible complications regarding molar endodontics. In previous situations, such as

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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when performing undergraduate procedures, they made a perforation or a ledge in the canal or gouged the canal walls, which affected their confidence. Also, some of the interns reported that cases of instruments separated within a molar canal have impacted their confidence level.

Finally, a few interns mentioned that they deliberately developed skills in other areas of dentistry during the internship, which shows conscious choices related to other aspects of dental education rather than molar endodontics. Spearman's rank correlation coefficients for the overall findings show a positive relationship between the amount of endodontic molar treatment done by dental interns during their undergraduate studies and their self-perceived competency in practising several forms of endodontic procedures. It was especially weak in endodontic diagnosis, administration of anesthesia, rubber dam application, and interpretation of radiographs. Contrary to this, moderate positive correlations were recorded in access cavity preparation, identification of the number of canals in a molar, determination of the working length, cleaning and shaping of molar teeth, and obturation of molar canal. This means that handling actual cases is likely to deepen one's understanding of these more complex aspects of endodontic treatment hence, thus resulting in more confidence.

Discussion

The purpose of this study was to determine the self-perceived confidence of dental interns from KAUFD in performing endodontic treatments on molar teeth. Two cohorts were assessed 2022-2023 and 2023-2024 undergraduate interns. The study offers essential insights into the effects of hands-on learning on molar endodontics on the level of confidence on recent graduates. One of the significant findings of this study was the high variation in the degree of confidence among the dental interns in various facets of molar endodontics. Despite the fact that a greater number of volunteers demonstrated a sufficient level of confidence in the diagnostic aspect of endodontics, anesthetic administration for root canal treatment, and preparing an access cavity, a substantial number of them reported lower confidence levels in the instrumentation, cleaning, and shaping of canals, as well as during obturation. This is in accordance with literature review findings, where previous authors have reported the difficulties that students experience with regards to the techniques concerning molar endodontics.

When comparing the confidence levels of the interns in this study, we looked at two groups of interns, and the following differences were observed. The learners from the 2022-2023 batch who had undergone more broad practice sessions on molar endodontics during their bachelors' course were significantly more self-confident when it came to anesthesia, access cavity, and instrumentation. This suggests that the improved clinical experiences and guidance in molar endodontics boosted the self-assurance of these interns, aligning with other studies that emphasized practical experience as a crucial method for increasing student confidence.

In contrast, the 2023-2024 group, who generally recorded less molar endodontic experience during their course, had lower confidence in several indices of the treatment procedure. This was especially true in regard to their confidence in handling procedural emergent events like ledge formation, transport and

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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instrument separation. Such a lack of confidence might be due to the interphalangeal nature and the relative absence of experience and rehearsal that these interns got through the structural and geometric complexities of molar teeth.

The positive relationship that was recorded between the level of endodontic molar treatments offered during the training and the interns' self-perceived competence yet again underlines the importance of hands-on exposure. Therefore, the documentation of the outcomes of numerous molar endodontic procedures resulted in interns exhibiting elevated levels of self-assurance throughout the various stages of treatment, thereby demonstrating a direct correlation between experience and confidence.

The findings from this study also helped establish the areas of the suggested tutorial content in which dental interns lack confidence specifically. Consequently, interns, no matter the academic year, showed a decreased ability to handle procedural challenges like curved root canals, calcified canals, and broken instrument removal. These technical difficulties of molar endodontics appear to persist and be problematic for new graduates, and this appears to call for additional attention to training and skill enhancement in these areas.

Furthermore, the interns' self-reported perceptions about the limitations of their undergraduate endodontic training contents are informative as well. A large number of participants claimed the importance of boosting the practical content of the course, especially with reference to molar teeth regulation, as well as the addition of more elaborate case-study content. They sum up with the results obtained in other similar research works that have recommended that dental curricula should be revised to meet the changing demands of clinical practice.

Therefore, the findings of this study go beyond the dental education literature as they offer insights for stakeholders and scholars in various fields. Self-confidence and skills in endodontic procedures are not only valuable for the personal growth of dental practitioners but are also closely related to the patient's needs and treatment outcomes. The lack of confidence and skills in molar endodontics may lead the interns to prefer other forms of treatment, such as tooth extraction, which may significantly dent the chances of preserving natural dentition. On the other hand, dental interns and graduates who adopt the correct conditions, which give them the confidence and expertise to treat complex molar endodontic cases, will offer more encompassing and excellent treatment standards, thus improving patients' satisfaction and improving their oral health status.

The results of the present study are rather important for further development of the issue related to dental education and for the assessment of endodontic specialization. Hence, the findings of this research are valuable in pointing out which exact areas have been found to lack confidence among dental interns, should this serve as a basis for formulating specific educational discrepancies and curriculum changes. Addressing the difficulty found in the confidence–competence aspect, one can improve the simulation training activities, especially when performing molar endodontic procedures, to improve the

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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preparedness of the dental graduates regarding what they are likely to encounter in the clinical practice arenas.

The literature review conducted in the present research has confirmed numerous revelations of prior academic research, pinpointing the effectiveness of hands-on training with regard to plastic molar teeth during the course of undergraduate studies. Such practical experience entails an orientation to different segments of the endodontic treatment process, such as diagnosis, treatment planning, preparation of the access cavity, shaping of the canal space, and the final filling of the space. With realistic plastic models, one is able to perfect the movements and get a feel of the molar teeth anatomy, besides easing on the ability to maneuver through narrow canals and tackle the usual endodontic hurdles. For example, observed that dental students who benefited from protracted training in handling plastic molar teeth during the preclinical endodontic training experience demonstrated higher self-efficacy and achievement in the clinical procedures than the students who had less exposure to such training. As highlighted in the research, it is therefore pivotal for hands-on practice on plastic teeth to be included in the undergraduate dental program with the aim of improving the confidence level of the dental interns [20].

gave an understanding of the correlation between hands-on practice and augmentation of confidence levels when carrying out root canal procedures. The researchers also concluded that students with more clinical practice during their undergraduate years showed higher confidence levels, more so with molar endodontics, further highlighting the value of clinical practice in hands-on training. Based on the findings of this study, the following broad conclusions are drawn and applied mainly to dental education. To conclude, it is possible to state that the given study contributes to the identification of the areas of endodontic training where confidence is less than ideal and, therefore, it provides the possibility for dental educators to design the specific interventions as a way to address the identified failures and end up preparing the future dentists and dental specialists for the tasks of the endodontic treatments, particularly, in terms of working on the molar teeth. Such strategies as the use of plastic molar teeth in extensive hand training and the inclusion of clinical training as part of the undergraduate curriculum can help a student acquire the right skills, dexterity, and confidence to perform endodontic procedures [19].

A Study done by Javed et al. (2021) compared achievements in endodontics showing that the years of study had their pitfalls, with the outcomes showing an increase in the confidence level of the students during the fifth year of study [10]. Underscored the difficulties students faced with intricate procedures such as root canal treatments for posterior teeth. However, the key point emphasized the beneficial effects of consistent practice and the increasing confidence observed from the fourth to fifth academic years [11].

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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The improvement of dental education can be largely enhanced by the introduction of Virtual Reality (VR) simulation into the fundamental study of molar endodontics. The utilization of VR technology is a potentiality that holds affordability as a key advantage, which is to provide the students with a highly interactive learning simulation through which they will be enabled to effectively master endodontic procedures in a controlled environment that is free of risk. Thus, the use of this combined educational method that connects virtual reality simulations with practical actions with the help of teeth plastic models will allow comprehensive training. It is a strategy that is intended to capture the learners' styles, hence enhancing the self-esteem and skills of dental students.

Future studies should build on the findings of the present study by including usable measurements of clinical proficiency. Immediate techniques like direct observation, direct check, or peer assessments may prove beneficial in extending the comprehension of the relationship measuring intervals of confidence and clinical competence. Similarly, there could be opportune gains from prospective studies aimed at charting the trends of confidence and ability in Clarke's preclinical, clinics, internship, and initial professional years. The inclusion of the educational program for a number of years suggests that the present paper aimed to shed light on the long-term influence of endodontic educational programs on the professional practice of dental practitioners and give a rich account of the educational wound since it appeared.

The study's limitations include the potential issue of self-reporting, as well as the inevitability of generalizing the results. This study has pointed out the accented impact of molar endodontic practical experience on the intern's perceived confidence levels at KAUFD. The study emphasizes that it is necessary to ensure all-encompassing clinical training focusing on molar endodontic procedures because the lack of such training influences the level of self-confidence among newly graduated dentists. It is thus possible for dental educators to intervene within these areas of shortfall and facilitate the enhancement of their students' endodontic competencies with the aim of producing a generation of dentists who are equipped and capable of handling the technicalities attached to molar endodontic procedures. Thus, awareness of the critical role that certificate courses play in enhancing patient outcomes, advancing dental treatments, and improving the standards of dentistry will increase.

Impact of the Study

The contribution of this study resides in its ability to shed light on some aspects related to the perceived confidence of dental interns when carrying out endodontic procedures. The findings yield important insights regarding the factors that influence interns' confidence and the areas where changes could be introduced to enhance interns' training in the framework of Dental education and training programs. The findings of this research can be beneficial in developing stronger methods in the field of endodontic treatment and in increasing the general performance of the professionals, which is so beneficial to patient care. Additionally, the findings suggest that the curriculum, personal guidance, and assistance policies are essential for promoting the professional development and competence of dental interns,

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
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which in turn will determine the future of the dental practice.

Acknowledgement:

We thank the participants who all contributed samples to the study.

Ethical approval

Institutional research ethics board approval was acquired before conducting any study-related procedures. Ethical approval was obtained from Research Ethics Committee of King Abdulaziz University with the IRB approval number (164-11-23).

Funding

The study did not receive any external funding.

Conflict of interests

The authors declare that there are no conflicts of interest.

Informed consent:

Written informed consent was obtained from all individual participants included in the study.

Data and materials availability

All data associated with this study are present in the paper.

References:

1. Lanning SK, Wetzel AP, Baines MB, Ellen Byrne B. Evaluation of a revised curriculum: a four-year qualitative study of student perceptions. J Dent Educ. 2012;76:1323-1333.

2. M. O. S. Seijo, E. F. Ferreira, A. P. Ribeiro Sobrinho, S. M. Paiva, and R. C. Martins, "Learning experience in endodontics: Brazilian students' perceptions," *Journal of Dental Education*, vol. 77, pp. 648–655, 2013.

3. K. Barrieshi-Nusair, M. Al-Omari, and A. Al-Hiyasat, "Radiographic technical quality of root canal treatment per- formed by dental students at the dental teaching center in Jordan," *Journal of Dentistry*, vol. 32, pp. 301–307, 2004.

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
http://magellanes.com/

4. J. E. Qualtrough, J. M. Whitworth, and P. M. H. Dummer, "Preclinical endodontology: an international comparison," *International Endodontic Journal England*, vol. 32, pp. 406– 414, 1999.

5. Saudi Commission for Health Specialties (SCHS). Saudi Dental Licensure Examination (SDLE); 2019. p. 17. Available from: https://www. scfhs.org.sa/examinations/TrainingExams/OverallEntranceExam/ Documents/SDLE%20Applicant%20Guide.pdf. [Last Accessed on 15 June 2020].

6. Tripathi, R., Acharya, N., Dahal, S., Khadka, J., Kayastha, P. K., & Nepal, M. (2023). CONFIDENCE LEVEL OF INTERNS FOR PERFORMING ROOT CANAL TREATMENT: A DESCRIPTIVE CROSS-SECTIONAL STUDY. Journal of Universal College of Medical Sciences, 11(1).

7. Al-Kadhim, A. H. A., Azan, A. N., Salim, M. M., Al-Ani, S. T. Y., & Jaafar, A. (2022). Evaluation on the perception of final year dental students on their confidence level regarding endodontic treatments a cross sectional analysis. IIUM Journal of Orofacial and Health Sciences.

8. Barakat, R. M., Matoug-Elwerfelli, M., Almohareb, R. A., & Balto, H. A. (2021). Influence of preclinical training on root canal treatment technical quality and confidence level of undergraduate dental students. International Journal of Dentistry, 2021, 1-8.

9. Alghamdi, N. S., Algarni, Y. A., Ain, T. S., Alfaifi, H. M., AlQarni, A. A., Mashyakhi, J. Q., ... & Alshahrani, M. M. (2021). Endodontic mishaps during root canal treatment performed by undergraduate dental students: An observational study. Medicine, 100(47).

10. Javed, M. Q., Khan, A. M., & Bhatti, U. A. (2021). Evaluation of undergraduate dental students self-perceived confidence level regarding endodontic procedures: A questionnaire survey. Saudi Endodontic Journal, 11(2), 228-234.

11. Hattar, S., AlHadidi, A., Altarawneh, S., Hamdan, A. A., Shaini, F. J., & Wahab, F. K. (2021). Dental students' experience and perceived confidence level in different restorative procedures. European Journal of Dental Education, 25(1), 207-214.

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
http://magellanes.com/

12. Kapitán, M., Vavřičková, L., & Suchánek, J. (2020). Perception of Undergraduate Students at the Faculty of Medicine in Hradec Králové Regarding the Endodontic Education and Suggested Improvements. ACTA MEDICA, 63(2), 67-72.

13. Haug, S. R., Linde, B. R., Christensen, H. Q., Vilhjalmsson, V. H., & Bårdsen, A. (2021). An investigation into security, self-confidence and gender differences related to undergraduate education in Endodontics. International Endodontic Journal, 54(5), 802-811.

14. Alrahabi, M. (2017). The confidence of undergraduate dental students in Saudi Arabia in performing endodontic treatment. European journal of dentistry, 11(01), 017-021.

15. Baaij, A., Özok, A. R., Væth, M., Musaeus, P., & Kirkevang, L. L. (2020). Self-efficacy of undergraduate dental students in Endodontics within Aarhus and Amsterdam. International endodontic journal, 53(2), 276-284.

16. Mat Yudin, Z., Ali, K., Wan Ahmad, W. M. A., Ahmad, A., Khamis, M. F., Brian Graville Monteiro, N. A., ... & Harun, N. A. (2020). Self-perceived preparedness of undergraduate dental students in dental public universities in Malaysia: A national study. European Journal of Dental Education, 24(1), 163-168.

17. Alshahrani, E. A., AlQisi, A. Y., Alsalhi, I. Y. A., Alwadei, W. H. A., & Alsafi, Z. A. (2018). Confidence levels of intern doctors during root canal treatment procedures in Saudi Arabia. The Egyptian Journal of Hospital Medicine, 71(5), 3148-3152.

18. Doumani, M., Habib, A., Alhababi, A., Bashnakli, A., Shamsy, E., & Nassani, M. Z. (2017). The internship dentists self confidence levels during root canal treatment procedures. Intl J Dent Res, 5(2), 121-4.

19. Davey, J., Bryant, S. T., & Dummer, P. M. H. (2015). The confidence of undergraduate dental students when performing root canal treatment and their perception of the quality of endodontic education. European Journal of Dental Education, 19(4), 229-234.

20. Puryer, J., Amin, S., & Turner, M. (2016). Undergraduate confidence when undertaking root canal treatment and their perception of the quality of their endodontic education. Dentistry journal, 5(1), 1.

21. Elsayed, R. O., Abu-bakr, N. H., & Ibrahim, Y. E. (2011). Quality of root canal treatment performed by undergraduate dental students at the University of Khartoum, Sudan. Australian Endodontic Journal, 37(2), 56-60.

ISSN:1624-1940
DOI 10.6084/m9.figshare.2632599
http://magellanes.com/

22. Murray, C. M., & Chandler, N. P. (2014). Undergraduate endodontic teaching in N ew Z ealand: Students' experience, perceptions and self-confidence levels. Australian Endodontic Journal, 40(3), 116-122.