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Original Article

The confidence of undergraduate dental students in Saudi Arabia in performing endodontic treatment

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ABSTRACT

Objective: This study examined the endodontic experience, perceptions of endodontic practice, and self-rated confidence of dental students enrolled in Taibah University, Saudi Arabia. **Materials and Methods:** A questionnaire was distributed to 41 undergraduate dental students registered in endodontic courses in the 2015 academic year. The questionnaire evaluated their confidence performing nonsurgical root canal treatment. The level of confidence was classified using a 5-point scale as "very confident," "confident," "neutral," "not very confident," or "not at all confident." The data were analyzed using SPSS version 20.0 (SPSS, Chicago, IL, USA). **Results:** The participation rate was 93%. The maxillary incisor was the most common first tooth treated. The students were relatively confident, but their confidence levels were lower regarding endodontic radiology, evaluation of root canal obturation, and determining the correct recall period for the patient. **Conclusion:** The confidence of undergraduates in endodontics must be enhanced to increase their clinical competence when performing root canal treatment.

Key words: Dental students, education, endodontics, Saudi Arabia, self-confidence

INTRODUCTION

Student perception of their dental school experience is an essential measure of the success of dental education.[1] Undergraduates' feedback and suggestions are very important for improving the curriculum and learning process.[2] This information also helps determine the students' preferences regarding different elements of their educational experience.[3] Low self-confidence affects the daily practice of health professionals.[4-8] Endodontics teaching can be considered complex, difficult, and stressful because of the complex anatomy of the root canal system, responsibility toward patients, and low self-confidence. Many students feel inadequate in terms of endodontic molar treatments.[1] However, teaching endodontics in recent years has improved as a result of the development of knowledge, techniques, and materials.[9] Dental students at Taibah University, Saudi Arabia, take a preclinical full-year endodontic course in the 3rd year of their 6-year Bachelor of Dental Surgery degree. The course consists of 28 h of theoretical lectures and 28 3-h laboratory sessions, during which they perform technical aspects of root canal treatment on extracted single- and multi-rooted teeth. There is a one-semester clinical endodontic course in the 4th year that consists of 14 theoretical lectures and fourteen 3-h clinical sessions during which students treat single- and multi-rooted teeth. In the 5th year, endodontic treatments are performed as part of a comprehensive dentistry care course under the supervision of specialists. This curriculum

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is consistent with the recommendations of the European Society of Endodontology.[10]

This study examined the endodontic experiences, perceptions of endodontic practice, and self-rated confidence of dental students enrolled in Taibah University, Saudi Arabia.

MATERIALS AND METHODS

Study approval was obtained from the Research Ethics Committee of the College of Dentistry, Taibah University (reference number: TUCDREC/20160107/ALRAHABI). This study enrolled 41 undergraduate dental students registered in endodontic courses in the 2015 academic year at the College of Dentistry, Taibah University, Saudi Arabia. Participation was voluntary, and students were informed that they could refuse participation.

A questionnaire was distributed to 19 4th-year and 25 5th-year students in the final month of the academic year after they had had the maximum amount of training. The study was briefly described to the participants. The questionnaire consisted of 18 multiple-choice and open-ended questions. The questions evaluated self-confidence at performing nonsurgical root canal treatment and experiences in this discipline. The level of confidence was classified using a 5-point scale as "very confident," "confident," "neutral," "not very confident," or "not at all confident."

To compare results, the Chi-square test and Mann–Whitney U-test were used. Statistical analyses were carried out using SPSS version 20.0 (SPSS, Chicago, IL, USA). Statistical significance was set at $P < 0.05$.

RESULTS

The overall response rate was 93%, with 18 of the 19 4th-year students and 23 of the 25 final-year students returning questionnaires. Table 1 shows the results for the first three questions (first endodontic case treated, level of case difficulty, and number of endodontic treatments performed by the student). The results of the remaining questions are summarized in Table 2. Figure 1 shows levels of confidence in the practical steps of root canal treatment.

Confidence levels differed significantly between 4th- and 5th-year students in the following steps of root canal treatment: determining the working length, taking and interpreting radiographs during root canal treatment, evaluating the quality of root canal obturation, and recalling the patients periodically in the correct manner. Fourth-year students were more confident regarding these practical steps than 4th-year students.

Table 3 summarizes the results of the last question regarding suggestions to improve the teaching of endodontic courses.

DISCUSSION

In dentistry, evaluating competence is an important step toward validating the quality of graduating dentists, although the relationship between the self-confidence and clinical competence of medical students is not fully understood.[11] Increasing the confidence of medical students should increase their competence in clinical practice.[12]

One way to standardize education is to poll students using questionnaires to help in the assessment, evaluation, and improvement of education.[13] This study obtained information about the confidence of undergraduate dental students at Taibah University, Saudi Arabia regarding endodontics. It revealed that an upper incisor 78% was the most common tooth first treated by students. Upper incisor root canal treatment is relatively easy, and this should encourage students. In another study, the first teeth treated by students were the first and second maxillary premolars.[14] Most of our students described the experience with the first case as okay 78%, while 7.4% described it as easy and 14.6% described the first case as difficult, possibly because the first case for those students involved a molar or premolar. In other studies, students considered molars to be the most difficult tooth to treat.[14-16]

In our study, the maximum number of teeth treated in the 4th year was four cases, by 66.7% of the students, while the maximum number of teeth treated in 5th year was 11 cases, by 8.8% of the students. The number of teeth treated by students in the 4th and 5th year did not meet the recommendations of the European Society of Endodontology 2001 guidelines, which advised that for adequate competency a student should complete root canal treatments in 20 teeth.[17] Although the European Society of Endodontology published new undergraduate curriculum guidelines for Endodontology in 2013, these focused on the quality

Table 1: First endodontic case treated, level of case difficulty, and number of endodontic treatments performed

First endodontic case treated		Level of first case difficulty			Number of endodontic treatments performed by the student		
Tooth type	Percentage	Easy (%)	Okay (%)	Difficult (%)	Number of treated teeth	Fourth academic year (%)	Fifth academic year (%)
Upper incisor	78.0	7.4	78.0	14.6	2	5.6	0
Lower incisor	7.4				3	22.2	4.3
Upper premolar	2.4				4	66.7	17.4
Lower premolar	9.8				5	5.5	17.4
Upper molar	2.4				6	0	17.4
					7	0	13.0
					8	0	21.7
					11	0	8.8

Table 2: Self-confidence of 4th- and 5th-year dental students regarding the steps of nonsurgical root canal treatment

Practical step in nonsurgical root canal treatment	Not at all confident		Not very confident		Neutral		Confident		Very confident	
	4th year	5th year	4th year	5th year	4th year	5th year	4th year	5th year	4th year	5th year
Diagnosis of cases needing endodontic treatment	0	0	5.6	13.0	50.0	30.4	16.7	43.5	27.8	13.0
Knowing when to refer patients for more complicated endodontic treatment	0	0	11.1	13.0	33.3	47.8	44.4	34.8	11.1	4.3
Achieving anesthesia for endodontic treatment	0	0	5.6	8.7	5.6	30.4	55.6	39.1	33.3	21.7
Placement of the rubber dam	0	0	5.6	13.0	11.1	17.4	50.0	47.8	33.3	21.7
Determining the working length of each canal using an electronic apex	0	4.3	27.8	17.4	22.2	34.8	27.8	30.4	22.2	13.0
Cleaning and shaping the root canal system	0	0	0	8.7	27.8	26.1	50.0	60.9	22.2	4.3
Placing an inter-appointment dressing	0	0	5.6	13.0	11.1	39.1	44.4	47.8	38.9	0
Root canal obturation	0	0	5.6	17.4	22.2	34.8	50.0	39.1	22.2	8.7
Understanding and appropriately managing the treatment risks (such as flare-ups)	0	13.0	33.3	26.1	38.9	43.5	22.2	17.4	5.6	0
Taking and interpreting pre-, intra-, and post-operative radiographs	0	4.3	16.7	13.0	16.7	26.1	33.3	39.1	33.3	17.4
Assessing the quality of a root filling postoperatively and determining the correct recall period for the patient	0	0	11.1	13.0	16.7	47.8	44.4	34.8	27.8	4.3
Establishing successful communication with the patient during the endodontic treatment	0	0	0	8.7	11.1	17.4	44.4	60.9	44.4	13.0
Restoration of endodontically treated teeth	0	4.3	16.7	0	27.8	21.7	33.3	60.9	22.2	13.0

and consistency of student performance more than simply the quantity of clinical exposure.[17] However, one study reported that 81% of the students in 48 dental schools in the European Union achieved the minimum number of root canal treatments required for their graduation: the number of treated cases ranged between 3 and 80 canals, and the average was 17 canals.[18]

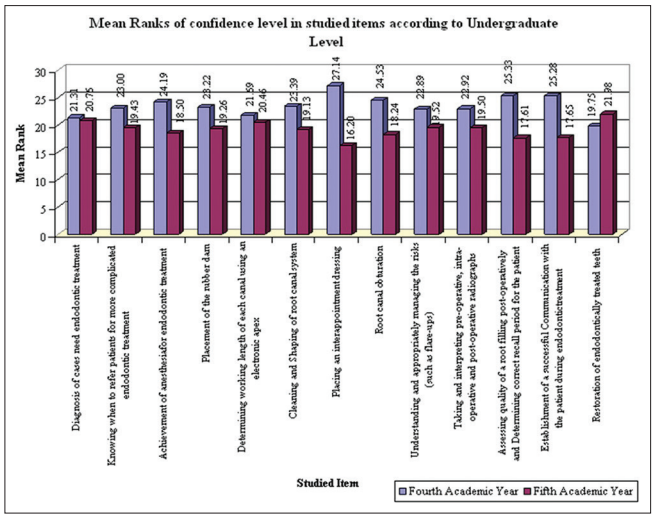

Figure 1: Levels of confidence in the different steps of root canal treatment

Table 3: Students' suggestions for improving the teaching of endodontic courses

Suggestions to improve endodontics teaching	Fourth academic year (%)	Fifth academic year (%)
Use rotary nickel-titanium files during treatment	44.4	18.2
Increase the number of requirements	5.6	9.1
Extended credit hours for endodontic courses	50.0	63.6
Teach a new obturation technique	0	9.1

In our study, we observed that confidence varied according to both the year the student was in and the practical steps of nonsurgical root canal treatment. Both groups reported relatively good confidence, although there were significant differences between 4th and 5th year students regarding some steps. Fourth-year students were more confident than 5th-year students in the following: determining the working length, dealing with X-rays during root canal treatment, evaluating root canal obturation, and recalling patient at the correct time. This might be because there were fewer 4th-year students in the sample, there are fewer requirements in 4th year, and strict supervision by supervisors helped 4th-year students more than 5th-year students.

Confidence regarding working length determination was low in both 4th- and 5th-year students. This might be the result of the root canal anatomy, which many dental students find difficult to learn because of its variation among individuals.[1]

The reduction in confidence regarding endodontic radiology, the evaluation of root canal obturation, and determining the correct recall period probably results from insufficient clinical exposure. Murray *et al*. wrote that a lack of clinical exposure in the undergraduate curriculum reduces the confidence that develops with clinical practice.[19] In addition, an overly busy curriculum will compromise self-confidence.[20]

Students' suggestions for improving the teaching of endodontics focused on two major issues: using rotary nickel-titanium (NiTi) files during treatment and increasing credit hours for the endodontic course. Introducing advances in endodontics into undergraduate training, such as NiTi rotary instruments, may improve the clinical experience of students and their self-confidence because it will help increase the numbers of cases treated.[1] Peru *et al*. believe that introducing NiTi rotary instruments into the undergraduate dental curriculum would be safe and improve endodontics teaching[21] because inexperienced operators can learn to use rotary instruments adequately with brief training.[22] Nevertheless, another study found that intensive preclinical training is a prerequisite for using NiTi rotary instruments. These results prompted us to reconsider the theoretical and practical coursework when teaching endodontics.[23]

Changing the methods of teaching endodontics so that students can complete root canal treatment more easily and quickly, with minimal procedural accidents, will improve clinical outcomes.[21,24,25] Low self-confidence can be ameliorated by increasing clinical exposure, which will help students to obtain the necessary skills through experience.[6,26]

CONCLUSION

Fourth- and fifth-year dental students at Taibah University, Saudi Arabia, are confident regarding root canal treatment, although they report lower confidence in some steps of the root canal treatment process. Endodontics education should be improved by increasing preclinical and clinical sessions and using new teaching methods that introduce recent advances in endodontics in the undergraduate curriculum.

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Conflicts of interest
There are no conflicts of interest.

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