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Huda Kh. Abdulkader
Ministry of health & Environment, Nineveh Health Directorate, Diagnosis department, Al-Ayman Specialized Center, Mosul, Iraq, hudakhh78@gmail.com

Dina waadAllah Azeez
Ministry of health & Environment, Nineveh Health Directorate, conservative dentistry department, Al-Noor Specialized Center, Mosul, Iraq, dinawaad2021@gmail.om

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ORIGINAL STUDY

Knowledge and Diagnostic Skills of Dental Residents Towards Endodontically Involved Teeth in Specialized Dental Center in Mosul city / Iraq

Huda Kh. Abdulkader [a,*], **Dina waadAllah Azeez** [b]

[a] Ministry of health & Environment, Nineveh Health Directorate, Diagnosis department, Al-Ayman Specialized Center, Mosul, Iraq
[b] Ministry of health & Environment, Nineveh Health Directorate, conservative dentistry department, Al-Noor Specialized Center, Mosul, Iraq

ABSTRACT

Objectives: to assess the knowledge regarding the diagnosis of endodontically affected teeth and the decision-making abilities regarding specific clinical situations among the dental residents in dental specialist center/ left bank/ Mosul / Iraq.

Materials & method: A self–administered questionnaire consisting of 20–questions was distributed to the dental residents at the Dental Specialist Center on the Left Bank in Mosul city, Iraq, in order to assess their diagnostic skills and decision-making abilities in relation to endodontically involved teeth. Additionally, the impacts of taking an endodontic course were investigated. SPSS version 21 was used for data analysis.

Results: Forty-one dental residents participated in the survey. The results indicated that there is no statically significant effect of endodontic course on response ($P > 0.05$). Our research found that the respondents do necessary steps in the diagnosis of endodontically involved teeth, however 29.3% managed emergency acute pain by non-steroidal anti-inflammatory (NSAIDs). According to this study, most of the participants had a good knowledge about sensibility test principle, however, 34% used it to distinguish between periapical and periodontal abscess. Furthermore, there was a significant variation among the participants' answers regarding how to manage the most common clinical scenarios.

Conclusion: This study showed that dental residents have a good knowledge regarding the endodontically involved teeth diagnosis; however, additional training interventions are required to promote the availability of advanced diagnostic technique and enhance treatment outcomes. In addition, there is a need to establish clear guidelines to improve the diagnostic principles among the dental residents.

Keywords: Diagnosis, Endodontics, Dental education, Knowledge, Pulpitis

1. Introduction

Accurate endodontic diagnosis is the basis of successful dental treatment, directly influencing treatment planning and long-term prognosis. Although dental residents get extensive training in essential skills including obtaining precise medical and dental histories, there is a notable deficiency in their formal knowledge concerning the evaluation of pulp vitality (Glickman and Schweitzer, 2013 Fall).

The determination of whether the pulp is reversible or irreversible particularly in the case of carious or traumatic exposure of the tissue is critical since it affects the prognosis of the treated tooth (Bogari et al., 2019; Mejare et al., 2012).

A number of procedures and tests are involved in endodontic diagnosis, such as reviewing the patient's dental history, determining the chief complaint and performing pulp tests that are required for the diagnosis (Garala, 2010 Aug; Dorn and Gartner, C1994).

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* Corresponding author.
E-mail addresses: hudakhh78@gmail.com (H. K. Abdulkader), dinawaad2021@gmail.om (D. W. Azeez).

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In other words, all clinical and radiographic investigations are performed concurrently with periodontal assessment and clinical testing to ensure an accurate diagnosis (Al-madi et al., 2020).

Accordingly, in order to optimize treatment plan and prognosis, each dentist should thoroughly assess all diagnostic data and anticipate the treatment challenges.

Several studies have shown that general dental practitioners do not follow the recommended protocols for root canal therapy (Bogari et al., 2019). and a notable study gap in identifying the precise attitudes, knowledge and decision –making skills that influence dental residents' diagnostic accuracy during their formative training period.

The aim of this study is to evaluate the dental residents' attitudes, knowledge, and decision-making skills regarding the diagnosis of teeth with endodontic involvement at dental specialist center / left bank in Ninawa / Iraq. This research will address the following questions:

1. What is the current level of knowledge among dental residents regarding the diagnostic tests and procedures for endodontic involvement?
2. What factors influence residents' decision-making for diagnosing teeth with pulp pathology?

2. Materials and methods

The research committee of the Training and Human Development Center of the Nineveh Health Directorate granted ethical permission (letter no. 219, dated 25/7/2021).

This study was conducted in August 2021 by self-administered questionnaire to 41 dental residents who trained in the specialized dental center / left bank in Mosul city, Iraq, as the total number of dental residents enrolled at the Dental Specialist Center / Left Bank in Mosul during the study period (August 2021) was 41. Therefore, all residents were included in the study to ensure the findings represent the entire population (total population sampling (census)).

A list of 20 multiple-choice questions was chosen from MCQ Review for Saudi Licensing Exam (SLE) (MCQs Review for Saudi licensing Exam (SLE)), to determine the dental residents' knowledge in diagnosing endodontically affected teeth as well as their ability to make decision regards specific clinical situations.

Each participant was asked to select only one answer for each question, then the data was collected and analyzed using IBM SPSS statistics version 21. Frequency and distributions were computed for each question and t-test (p-value < 0.05) was employed to determine the effect of attending any course regarding the management of endodontically involved teeth.

Table 1. Gender.

Gender	n	%
Male	21	51.2
Female	20	48.8
Total	41	100.0

Table 2. Course attendance.

	n	%
No	29	70.7
Yes	12	29.3
Total	41	100.0

3. Results & discussion

41 dental residents participated in this study, achieving a 100%. response rate. Among the total responses, 51.2% male and 48.8 % was female. Table 1 & Table 2 shows that only 29.3% of respondents had previously attended a course on the management of endodontically involved teeth prior to their participation in this study.

There was no statistically significant difference ($P > 0.05$) between the responses of the participants who attended endodontic course and those who did not for all questions, as the effects of the continuing education take time to become apparent so this study could not assess the long-term changes, future longitudinal studies are needed to explore the effects over time (Chapko et al., 1984 Dec). The results may suggest that a single course might not provide a sufficient knowledge boost to differentiate it from other forms of learning. Also there were no significant differences between the responses of male and female,as the gender does not appear to be a confounding variable in the acquisition of endodontic knowledge in this population.

The affected tooth or teeth must be correctly diagnosed to ensure successful endodontic treatment. This diagnosis can often be simple when there is a large carious cavity and there are healthy, restoration-free adjacent teeth. Otherwise, it becomes extremely challenging when the symptoms are less defined and there have been multiple endodontic procedures on other teeth.

To get an accurate diagnosis, specific testing and examination procedures should be used (Carrotte, 2004 Sept). All the relevant information must be collected. This include case history, medical history, clinical examination and diagnostic test (Carrotte, 2004 Sept).

Table 3. Distribution of the participants' responses (Q1-Q6).

	n.	%
Q1:Diagnosis to RCT should always be based on		
Good medical and dental history	0	0
Proper clinical examination	0	0
A periapical radiograph	0	0
All of the above	*41*	*100.0*
Q2: The fundamental rule in the endodontic emergencies is		
Control pain by NSAI	12	29.3
Proper diagnosis	*16*	*39.0*
All of the above	13	31.7
Q3: The normal response of a vital pulp to the electric pulp testing is		
No response	2	4.9
Higher than that of the control teeth	8	19.5
Lower than that of the control teeth	4	9.8
In a rang similar to that of control teeth	*27*	*65.9*
Q4:The normal response of a vital pulp to the thermal testing is		
Lingering painful response	4	9.8
Hypersensitivity painful response	3	7.3
Painful response that disappear soon after stimulus is removed	*34*	*82.9*
Q5:Thermal pulp test principle of		
Blood supply of the pulp	13	31.7
Nerve supply of pulp	*13*	*31.7*
All of the above	14	34.1
None of the above	1	2.4
Q6:The contraindication/s for RCT except		
Non restorable tooth	2	4.9
Vertical root fracture	4	9.8
Tooth with insufficient tooth support	8	19.5
Tooth with large preapical lesion	*27*	*65.9*

This information are important to make a proper diagnosis for patient (Glickman and Schweitzer, 2013 Fall; Cohen, C1994), and allow the dentists to categorize any affected tooth into one of four groups:

1) Teeth that are asymptomatic and do not have a lesion of endodontic origin.
2) Teeth are asymptomatic and have lesion of endodontic origin.
3) Teeth are symptomatic and do not have lesion of endodontic origin.
4) Teeth are symptomatic and have lesion of endodontic origin (MCQs Review for Saudi licensing Exam (SLE)).

Accordingly, This study showed that 100% of the respondents applied the principle stages of endodontic examination (Q1; Table 3).

The first step in endodontic treatment is to assess the pulp's vitality. There is still a significant knowledge gap regarding the impact of diagnostic tests commonly used to assess the pulp condition. It is not easy to distinguish between treatable and untreatable pulpal inflammation in teeth suffering from deep caries, trauma or other injuries. The determination of the pulp's health status remains a significant challenge for clinicians (Mejare et al., 2012).

Thus, the accuracy of participants' use of pulp testers (both electric and thermal) is assessed in this study.

Accordingly, This study showed that 65.9% believe that the normal response of a vital pulp to the electric pulp testing is in a rang similar to that of control teeth and 82.9% consider that the normal response of a vital pulp to the thermal testing is painful response that disappear soon after stimulus is removed(Q3 & Q4; Table 3).Although the pulp testing does not provide any information regarding the status of the vascular supply which indicate the pulp vitality level (Naseri et al., 2017; Patro et al., 2022 Aug 4), further scientific research is required to assess the accuracy of a test used to determine the pulp condition and determine whether the pulp is vital or not (Bogari et al., 2019).

A bacterial infection is the primary cause of pulpitis, which is generally defined as inflammation of the dental pulp tissue. The signs and symptoms associated with progressive pulpal and periapical illness determine whether or not the pulpal inflammation is reversible.

The pulp's inflammation causes varying degrees of reaction, reversible pulpitis is characterized by pain that subsides as soon as the stimulus is removed. If the symptoms persist and the pain level increases in

Table 4. Distribution of the participants' responses (Q7-Q16).

	n.	%
Q7:Hyperemia of the pulp result in		
Trauma of occlusion	8	19.5
Pain of short duration	*21*	*51.2*
Radiographic changes	2	4.9
All of above	10	24.4
Q8:Spontaneous pulpal pain is indicative of		
Reversible pulpitis	4	9.8
Irreversible pulpitis	*37*	*90.2*
Q9:Sensitivity to palpation and percussion indicates		
Irreversible pulpitis	6	14.6
Hyperplastic pulpitis	2	4.9
Inflammation of the periradicular tissues	*33*	*80.5*
Q10:The distinguish between periapical and periodontal abscess		
X-ray examination	21	51.2
Clinical examination	6	14.6
Vitality of the pulp	*14*	*34.1*
Q11:The radiographic criteria to evaluate the success of endodontic therapy with PAL		
Reduction of the size of the periapical lesion	*35*	*85.4*
No response to percussion and palpation test	2	4.9
Extension of the sealer cement through lateral canals	3	7.3
None of the above	1	2.4
Q12:Pulp stone can be the following except		
Present freely in the pulp	7	17.1
Cause discomfort and pain to the patient	*23*	*56.1*
In radiographs small spheroidal radiopaque	2	4.9
False stone occurs due to dystrophic dentin	9	22.0
Q13: The color of tooth with internal resorption		
Yellow	4	9.8
Dark brown	10	24.4
Pink	*27*	*65.9*
Q14: With aging, the pulp will be		
Reduce collagen fiber	2	4.9
Increase cellular in pulp	1	2.4
Decrease pulp chamber size	*36*	*87.8*
None of the above	2	4.9
Q15: Endodontic treatment for molar teeth is difficult because		
Molar have more complex canal configuration	1	2.4
Molar tend to have greater canal curvature	2	4.9
A & b	*38*	*92.7*
Q16: Perio - endo lesion the primary treatment		
Endo treatment	*5*	*12.2*
Deep scaling and root planning	13	31.7
A & B	23	56.1

duration and intensity, the pulpitis is probably irreversible and the tooth may exhibit a prolong reaction to both hot and cold but it is not necessary tender to percussion.

The tooth may extrude and become painful to percussion once the pulpal inflammation has moved via the different foramina to the periradicular tissues (Hennessy, 2021 Mar).

The knowledge of dentists whether the pulp is vital or necrotic is equally important to be able to recognize whether the pulp is reversibly or irreversibly inflamed especially in connection with a carious or traumatic exposure of the tissue (Mejare et al., 2012). According to this research, most participants are able to identify the type of pain associated with each stage of pulp inflammation (Q7 & Q8; Table 4).

However, Participants' responses differ regards the diagnosis of the tooth, which is sensitive to palpation or percussion (Q9; Table 4).

As the periodontal abscess is the third most frequent dental emergency making up 7–14% of all dental emergencies, and they may be the cause of tooth extraction (Patel, Kumar and Patel, 2011 Apr), furthermore, the distinguishing the periodontal abscess from periapical abscess might be difficult (Glickman and Schweitzer, 2013 Fall).

This research focused primarily on identifying the differences between these two types. Over 50% of

Table 5. Distribution of the accuracy of participants' decision making.

	n.	%
Q17: A tooth very painful to percussion does not respond to heat, cold or the electric pulp tester. The most probable diagnosis is		
Acute apical periodontitis	*33*	*80.5*
Pulp necrosis	8	19.5
Q18:21 years old patient with pathological exposure in lower first premolar management		
Direct pulp capping	5	12.2
Indirect pulp capping	2	4.9
Root canal treatment	*33*	*80.5*
Pulpotomy	1	2.4
Q19:Patient presented with trauma to the central incisor with open apex tooth clinical examination revealed cut of blood supply to the tooth what is the next step		
Endo	1	2.4
Observe over time	*7*	*17.1*
Apexification	33	80.5
Q20: Child 10 years came with trauma on the central incisor from year ago		
Apexification	*26*	*63.4*
RCT with gutta percha	11	26.8
Extraction	4	9.8

the participants are dependent on X- ray (Q10; Table 4)., however the pulp vitality is very important step in distinguishing between two abscesses (Carrotte, 2004 Sept), because the periodontal abscess is caused by the impaction of a foreign body in the gum, which result in an abscess, In contrast, the necrotic pulp, which leads to bacterial invasion of the periapical tissue, is linked to the periapical abscess (MCQs Review for Saudi licensing Exam (SLE)). There are many studies differentiate between the periodontal and periapical abscess as the treatment of two abscess is different (Glickman and Schweitzer, 2013 Fall; Shende et al., 2018).

It is essential to take a postoperative radiograph from a medico-legal standpoint since it gives baseline data for follow-up and treatment outcome evaluation (Jenkins, Hayes, and Dummer, 2001). The results of this study are the same as those of a study conducted among UK dentists (Singh, 2011)., which found that 85.4% of participants took oral radiographs to assess the effectiveness of endodontic therapy with periapical lesions (Q11; Table 4).

The interaction between the periodontium and the tooth has long been of interest, and dentists frequently see "perio-endo lesions," which are lesions with both periodontal and endodontic etiological components.

Due to the interface between the periodontium and the tooth has long been an area of interest and the dentists are likely to encounter lesions that have both periodontal and endodontic etiological components; which is called 'perio-endo lesions'. This study therefore attempted to determine how the participants treat such situations.

In this study, only 12.2% of participants initiated with root canal therapy (Q16; Table 4). Despite the fact that periodontal intervention should come after endodontic treatment, multidisciplinary cooperation is necessary to achieve good clinical results for the patient because the effectiveness of periodontal therapy, which involves scaling and root planning or flap debridement to reduce the microbiologic burden in the periodontal tissue, depends on controlling the pulpal infection (Singh, 2011; Wu et al., 2016 Apr).

In the regular dental practice, dentists occasionally struggle to choose the best treatment option for certain cases. This study aimed to evaluate the participants' ability to make decisions in specific circumstances.

This study showed that there is no consistent agreement among the participants' choices of treatments and there is no statistically significant difference between those who attended an endodontic course or not. (Q17, 18, 19 & 20; Table 5) More educational intervention could be necessary to help them make better decisions and deliver high-quality dental treatment (Dechouniotis, Petridis, and Georgopoulou, 2010 July; Maupomé et al., 2010).

However this study only included a small number of participants; a larger sample could yield more reliable findings, and doing a pre-test/post-test study to assess the effects of the course would yield data on the efficacy of learning.

In addition this study provides a snapshot in time. It doesn't allow for an analysis of the long-term effects of continuing education on clinical practice, a longitudinal study would be necessary to determine if a course leads to gradual changes in practice.

Based on these limitations, we propose several future research for potential confounding variables like prior clinical experience and self-directed learning habits to assess the direct impact of a continuing education course.

4. Conclusion

Although there are some knowledge gaps in the treatment plan for some cases, it can be said that the participants have a reasonable understanding of how to manage certain dental diseases.

In general, the standard guidelines are required to aid in understanding and evaluation of the pulp diseases.

In addition, more educational programs regarding the endodontic diagnosis are also required such as endodontic workshop and case based learning sessions to enhance diagnostic accuracy and promote the most appropriate treatment planning.

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Conflict of interest

No conflict of interest.

References

MCQs Review for Saudi licensing Exam (SLE).

Al-madi, E. M., Al-bahrani, L., Al-sherani, R., Al-saleh, S. A., and Al-obaida, M. I. (2020) Creation and evaluation of an endodontic diagnosis training software. *Int J of Dent*, 1–5.

Bogari, Df, Alzebian, N. A., Mansouri, R. M., Aljiaid, F. G., Al-ghamdi, M., and Almalki, M., *et al.* (2019) The knowledge and attitude of general dental practitioners toward the proper standards of care while managing endodontic patients in Saudi Arabia. *Saudi Endod J,* 9, 40–50.

Carrotte, P. (2004 Sept) Endodontic: part 2 diagnosis and treatment planning. *BDJ*, 197(5), 231–38.

Carrotte, P. (2004 Sept) Endodontic:part 3 treatment of endodontic emergencies. *BDJ*, 197(6), 299–305.

Chapko, M. K., Milgrom, P., Bergner, M., Conrad, D., and Skalabrin, N. (1984 Dec) the effect of continuing education in dental practice management. *J Dent Educ*, 48(12), 659–64.

Cohen, S. (C1994) diagnostic procedures. In: Cohen S, Burns RS, editors. Pathways of the pulp. 6th ed. St.louis: mosby, 2-24.

Dechouniotis, G., Petridis, X. M., and Georgopoulou, M. K. (2010 July) Influence of Specialty Training and Experience on Endodontic Decision Making. *JOE*, 36(7), 1130-34.

Dorn, S. O. and Gartner, A. H. (C1994) Case selection and treatment planning. In: Cohen S, Burns RC, editors. Pathways of the pulp. 6th ed. St. Louis: Mosby, 60–76.

Garala, M. (2010 Aug) Cntemporary endodontic evaluation and diagnosis: implication for evidence-based endodontic care. Available at.

Glickman, G. N. and Schweitzer, J. L. (2013 Fall) Endodontic Diagnosis [newsletter]. Chicago: American Association of Endodontists.

Hennessy, B. J. (2021 Mar) Pulpitis. MSD manual professional version. [internet]. available fromhttps://www.msdmanuals.com/professional/dental-disorders/common-dental-disorders/pulpitis.

Jenkins, S. M., Hayes, S. J., and Dummer, P. M. (2001) A study of endodontic treatment carried out in dental practice within the UK. *Int Endod J*, 34, 16–22.

Maupomé, G., Schrader, S., Mannan, S., Garetto, L., and Eggertsson, H. (2010) Research article Diagnostic thinking and information used in clinical decision-making: A qualitative study of expert and student dental clinicians. *BMC Oral Health*, 10(11), 1–15.

Mejare, I. A., Axelsson, S., Davidson, T., Frisk, F., Hakeberg, M., and Kvist, T., *et al.* (2012) Diagnosis of the condition of the dental pulp: A systemic review. *Int Endod J*, 45, 597–613.

Naseri, M., Khayat, A., and Zamaheni, S., *et al.* (2017) Correlation between Histological Status of the Pulp and Its Response to Sensibility Tests. *Iran Endod J*, 12(1), 20–24.

Patel, P. V., Kumar, S., Patel, A. (2011 Apr) Periodontal abscess: A review. *JCDR*, 5(2), 404–09.

Patro, S., Meto, A., Mohanty, A., Chopra, V., Miglani, S., Das, A., Luke, A. M., Hadi, D. A., Meto, A., Fiorillo, L., Karobari, M. I., Wahjuningrum, D. A., and Pawar, A. M. (2022 Aug 4) Diagnostic Accuracy of Pulp Vitality Tests and Pulp Sensibility Tests for Assessing Pulpal Health in Permanent Teeth: A Systematic Review and Meta-Analysis. *Int J Environ Res Public Health*, 19(15), 9599.

Shende, S., Ansari, S., and Gattani, D., *et al.* (2018) Periodontal abcess. *IJCR*, 10(2), 65097–65102.

Singh, P. (2011) Endo-perio dilemma: A brief review. *Dent Res J*, 8(1), 39–47.

Wu, Y., Blicher, B., Pryles, R. L., and Lin, J. (2016 Apr) Understanding periodontal-endodontic infections. *Inside dentistry*, 14(4).