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Attitude Of Yemeni Dental Practitioners Toward Some Technical Aspects Of Endodontic Treatment Procedures

Ahmed A. Madfa[1], Fadhel A. Al‑Sanabani[1], Hamzah A. Al-washali[2]
[1](Department of Conservative Dentistry, Faculty of Dentistry, Thamar University, Dhamar, Yemen)
[2](Department of Statistical Analysis, Faculty of Administrative Sciences, Thamar University, Dhamar, Yemen)

Abstract: *This study was conducted on the Yemeni dental practitioners to gather data on the current opinions of the dental practitioners regarding some technical aspects of routine endodontic practice. Dental practitioners were asked to choose only answer that best fitted their clinical performance. The Chi-square test was used to compare proportions among groups and the significance threshold was set at $p < 0.05$. Of the respondents, only 7.1% used rubber dam isolations during endodontic treatments compared to other isolation method. A majority of respondents (37.1%) used radiographic method while whose used both electronic and radiographic method were 21.4%. Sodium hypochlorite was the most popular choice as a root canal irrigant (60.9%), while 12.9% used chlorhexidine. The cold lateral compaction of gutta-percha in conjunction with a root canal sealer was used by 85.7% of the respondents, while 12.9% used a single cone technique. Zinc-oxide eugenol root canal sealer (68.6%) was most frequently chosen, followed by N2 (31.4%). A majority of the respondents agreed that want to improve their clinical practice (92.9%) and agreed to carry out continues education programmes in endodontics (95.7%).This study shows that majority of respondents still used conventional materials and techniques for filling root canal system.*

Keywords : *Dental practitioner, Questionnaire survey, Root canal treatment, Yemen.*

I. Introduction

Endodontic therapy is considered as an essential element in the dental services provided to the population around the ward. Indeed, most endodontic treatment is performed by general dental practice where it's the quality has been questioned due to endodontic treatment is technically demanding and it fails when treatment does not meet the acceptable standards [1-3]. Although, the viewpoint of academic teaching and endodontic societies is evident; however, little information is existing about the approach of general practitioners towards these standards. Additionally, many innovative concepts, techniques and instruments have been incorporated into endodontics but most general dental practitioners do not know how deal with these modern endodontic technology in their clinical practice.

Various epidemiological studies found that the failure rate is significantly higher for teeth treated by general dental practitioners [4, 5]. Numerous studies stated that the most general practitioners do not follow the formulated guidelines on the quality of endodontic treatment [4-9]. These studies investigated the attitude of general practitioners in developed countries such as Germany [4], Belgium [6], the USA [7], and UK [9]. However in developing countries, few studies have assessed the approach of general practitioners toward various aspects of endodontic treatment [10-12.]

General practitioners must be well known about the result of endodontic treatment in order to provide modern therapy for patients. The outcome of endodontic treatment is not only be influenced by root canal infection and complexity of root canal morphology, but it is also very much effected by dentist's skills and attitudes. What is more, the failure of endodontic treatment may be more occurred due to the skills and attitudes of dentists than endodontic pathogens [13-15].

Yemen is a poor developing country located South-West of Arabian Peninsula to Kingdom of Saudi Arabia. For most people in Yemen, dental care does not have the same intuitive quality of life dimension as health care in general. Additionally, Yemen governorate has been grappling with major health problems such as tuberculosis and malnutrition, and has high mortality rates; as a result, oral health is not yet regarded as a high priority by Yemen governorate [16]. Therefore, Yemeni population does not have access to primary dental healthcare and are not being targeted by any dental educational/preventive programs. Baseline data on oral health status in Yemen itself are sparse.

Dental caries is still the main reason for endodontic treatment [17, 18]. Although the nationwide database on the prevalence of dental caries in Yemen is not available, some studies reported that the prevalence of dental caries among Yemeni population is high compared to other countries [19-21]. Accordingly, there are higher need and demand for endodontic therapy. Furthermore, the number of endodontists is too few in Yemen, where huge numbers of general practitioners take responsibility for endodontic treatment which might influence on quality of the treatment.

No published data are available on the current status of some technical aspects of endodontic practice in Yemen. Consequently, this study was conducted to gather data on the current opinions of the dental practitioners regarding some technical aspects of routine endodontic treatment.

II. Materials And Methods

This cross-sectional study was conducted on the Yemeni dental practitioners. About 91 dental practitioners agreed to participate in this study but analysis was carried out on 70 practitioners who provided complete data on the variables of interest to this study.

In August 2014, the questionnaire was sent to all members of the Yemeni Dental Association. In addition, an announcement was attached to the website of the Yemeni Dental Association. The questionnaire was sent with an explanatory cover letter explained the aim of the study and specified that all information obtained would be kept confidential. They were asked to fill the copy of the questionnaire from August 2014 till January 2015. After each 4 weeks, all members of Yemeni Dental Association received a reminder.

The first part of the questionnaire asked for information regarding gender, dental practice period and type of work place. The second part of the questionnaire concerned with the frequency of which various endodontic materials and procedures were used. Inquiries about how endodontic treatment procedures were accomplished, including the choice of isolation method, root canal irrigants, working length determination methods, obturation materials and techniques. The questionnaire also concerned about the need for improving their endodontic practice, and the demand for continuation education programmes in endodontics. At the present time, in Yemen, there is no postgraduate program for endodontic specialty; therefore the information from the questionnaire did not contain information from trained endodontic specialists.

Dental practitioners were asked to choose only one answer that best fitted their clinical performance. Respondents were instructed to complete the questionnaire and return them through email. All returned forms were coded by a single operator and the data were checked and entered twice into a personal computer. Data has been collected and entered to the computer were analyzed using SPSS (Statistical Package for Social Science) program (version 21; Inc., Chicago. IL). Cross-tabulations were used to determine of percentages of tested groups. The Chi-square test was used to compare proportions among variables. The significance threshold for all tests was set at $p < 0.05$.

III. Results

Characteristics Of The Sample

Of the respondents, 65.7% were male, while 34.3% were female. Amongst them, 57.1% of respondents had worked more than 10 years while 42.9% were worked less than 5 years. In the same way, the majority of the respondents (57.1%) were worked full time compared to whose worked as part time (42.9%).

Isolation Method

Only 7.1% of respondents used rubber dam during endodontic treatments. A majority (67.1%) utilized cotton roll for isolation while 20% used suction. 5.7% have not used anything during endodontic procedures. A significantly higher proportion of respondents who used cotton roll during endodontic treatment compared to other methods ($p < 0.01$) as shown in Table 1. There were significant differences in response rate between males and females for selection isolation method ($p < 0.01$). However, dental practice period and type of working type didn't show any significant among participants for selection Isolation method ($p > 0.05$) as shown in Tables 2-4.

Working Length Determination

Only 4.3% used electronic apex locator during endodontic treatments. A majority of respondents (37.1%) used radiographic method only, whereas whose used both electronic and radiographic methods were 21.4%. Some respondents still used tactile sense only (28.6%) and patient response only 8.6% during endodontic treatments. The utilizing the radiographic method only during root canal treatment showed significantly higher ($p < 0.01$) amongst respondents compared to other methods (Table 1). Gender, dental practice period and type of working place did not show any significant differences ($p > 0.05$) for working length determination (Tables 2-4).

Root Canal Irrigant

Of the respondents, sodium hypochlorite was the most popular choice as a root canal irrigant (60.9%), whereas 12.9% of respondents were used chlorhexidine. Some respondents (18.6%) used only saline as a root canal irrigant while hydrogen peroxide used only by 8.6% of respondents. Not any respondent used ETDA during root canal treatment (Table 1). A significantly higher proportion of respondents who used sodium hypochlorite during root canal treatment compared to other methods ($p < 0.01$). Gender, dental practice period and type of working place didn't effect on dentists response ($p > 0.05$) as shown in Tables 2-4.

Obturation Techniques and Materials

The cold lateral compaction of gutta-percha in conjunction with sealer was used by the majority of the respondents (85.7%) while 12.9% used a single cone technique. Only 1.4% used a paste for the root filling (Table 1). Cold lateral compaction of gutta-percha showed significantly higher compared to other methods among the respondents ($p < 0.01$). Zinc-oxide eugenol root canal sealer was most frequently chosen (68.6%) by respondents ($p < 0.01$) compared to N2 (31.4%) as seen in Table 1. Once more, gender, dental practice period and type of working place didn't effect on selection the obturation techniques and materials ($p > 0.05$) among tested groups (Tables 2-4).

A majority of the respondents agreed that are important to improve their clinical practice (92.9%, $p < 0.01$) and needs for continues education programmers in endodontics to improve their endodontic practices (95.7, $p < 0.05$) amongst respondents regardless of their gender, dental practice period and type of working place (Table 5).

IV. Discussion

This first study provides published information on some technical aspects of endodontic practice in Yemen. The study found that the majority of Yemeni dental practitioners were not following the standards during endodontic practice.

The use of a rubber dam during dental practice is necessary for infection control during endodontics as recommended by undergraduate programs of dental schools around the ward [22, 23]. However, several study reported that the use of a rubber dam in daily dental practice was varies [7, 8, 24]. The use of a rubber dam was 59% among American general practitioners, while 30-40% used rubber dam during routine endodontic treatment among UK practitioners [7, 8]. However, the use rubber dam during endodontic treatment among general practitioners in Belgium was only 7.2% [24]. This concurred with the present study that found 7.1% of respondents that used the rubber dam during endodontic treatment.

Working length determination is one of the endodontic treatment procedures. The both radiographs and electronic apex locators for determination the working length were recommended in order to minimize the displacement of infected dentine and/or debris into the periradicular tissues and can impair healing [25, 26]. The present study found that 21.4% of respondents used both radiographs and electronic apex locators for determination the working length.

The cleaning of the root canal system cannot be achieved by only mechanical means due to the complexity of the root canal morphology [27]. Therefore, the use of an antimicrobial irrigant solution is strongly recommended. Sodium hypochlorite solution has antimicrobial action and a capacity to dissolve organic matter, thus it is desired for cleaning the root canal during endodontic procedures [28]. Sodium hypochlorite was used by 62.6% of the respondents in the current study. In this study, the most respondents were not used rubber dams and they used sodium hypochlorite. The use of either sodium hypochlorite and/or hydrogen peroxide, without utilizing the rubber dam, can present hazardous for patients during daily dental practice.

Over the years, several materials and techniques have been advocated to fill the prepared root canal system, each with its own argues of simplicity, efficiency or superiority. However, the cold lateral compaction of gutta-percha with sealer is still the most widely accepted technique to fill root canals, and is taught at many dental institutes as part of the undergraduate program [6, 29]. Therefore, it is not surprising in this study that cold lateral compaction is the most popular used by the majority of the respondents (85.7%).

The single-cone gutta-percha technique is not effective for three-dimensions filling the root canal space [11]. Nevertheless, 12.9% of the respondents in the present study are still being used this technique. For paste-type root filling method, only1.4% of the respondents used this method. This is perhaps due to that this method associated with risk of underfilling or overfilling of the root canal system [25, 26].

Although many types and brands of sealers are available; however, the zinc oxide-eugenol sealer is still the "gold" standard [25, 26]. The results of the present study showed that 68.1% of the respondents used zinc oxide-eugenol sealer, followed by paraformaldehyde containing sealer such as N2 (31.9%). The sealer used during the root canal filling should be biocompatible [22]; however, high percentage of the respondents is still being used N2 (31.9%).

Apparently, the general dental practitioners in Yemen were not utilized the most recently introduced obturation techniques and armamentarium. This might be attributed to additional costs involved and/or the lack of skill and training. Therefore, it is not surprising that most the respondents in this study agreed that are necessaries to improve their dental practice (92.9%) and needs for continues education programmes in endodontics (95.7).

V. Conclusion

During past decade, many innovative materials and techniques have been introduced in dental practice.

Despite a variety of new technology, majority of respondents in this study used conventional materials and techniques for filling root canal system. Based on the reported data in this study, it is recommended to carry out continuing dental education programmes for general dental practitioners to update their knowledge about endodontic training.

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Table 1: Preference of some technical aspects of endodontic treatment procedures by the respondents

Variables	Distribution	Marginal percentage	*p-value*

Isolation method	Rubber dam (n=5)	7.1%	.000
	Suction (n=14)	20.0%	
	Cotton roll (n=47)	67.1%	
	None (n=4)	5.7%	
Working length determination	Electronic apex locator only (n=3)	4.3%	.000
	Radiographic technique only (n=26)	37.1%	
	Electronic and radiograph (n=15)	21.4%	
	Tactile sense only (n=20)	28.6%	
	Patient response only (n=6)	8.6%	
Root canal irrigant	Sodium hypochlorite (n=42)	60.9%	.000
	Saline (n=13)	18.6%	
	Hydrogen peroxide (n=6)	8.6%	
	Chlorhexidine (n=9)	12.9%	
	EDTA (n=0)	0.0%	
Oburation technique	Cold lateral compaction (n=60)	85.7%	.000
	Single-cone technique (n=9)	12.9%	
	Paste-type root filling (n=1)	1.4%	
Oburation materials	Gutta-percha and sealer (n=69)	98.6%	.000
	Paste-type root filling (n=1)	1.4%	
Root canal sealer	Zinc oxide-eugenol (n= 48)	68.6%	.002
	N2 (n=22)	31.4%	

Table 2: Influence of gender on some technical aspects of endodontic treatment procedures amongst respondents

Variables		**Participates response**		***p-value***
		Male	**Female**	
Working length determination	Tactile sense only	21.4%	7.1%	.285
	Electronic apex locator only	4.3%	0.0%	
	Radiographic technique only	18.6%	18.6%	
	Electronic and radiograph	15.7%	5.7%	
	Patient response only	5.7%	2.9%	
Isolation method	Cotton roll	52.9%	14.3%	.001
	Rubber dam	4.3%	2.9%	
	Suction	5.7%	14.3%	
	None	2.9%	2.9%	
Root canal irrigant	Sodium Hypochlorite	37.1%	22.9%	.168
	Saline	11.4%	7.1%	
	Hydrogen Peroxide	7.1%	1.4%	
	Chlorhexidine	10.0%	2.9%	
	EDTA	0.0%	0.0%	
Oburation materials	Gutta-percha and sealer	64.3%	34.3%	.470
	Paste-type root filling	1.4%	0.0%	
Oburation technique	Cold lateral compaction	58.6%	27.1%	.165
	Single-cone technique	7.1%	5.7%	
	Paste-type root filling	0.0%	1.4%	
Root canal sealer	Zinc oxide-eugenol	40.0%	28.6%	.056
	N2	25.7%	5.7%	
Improving their endodontic practice	Yes	58.6%	34.3%	.096
	No	7.1%	0.0%	
Demand for continuation education programmes	Yes	64.3%	31.4%	.230
	No	1.4%	2.9%	

Table 3: Influence of dental practice period on some technical aspects of endodontic treatment procedures amongst respondents

Variables	**Dental practice period**	***p-value***

		Less than 5 years	More than 5 years	
Working length determination	Tactile sense only	11.4%	17.1%	.460
	Electronic apex locator only	1.4%	2.9%	
	Radiographic technique only	21.4%	15.7%	
	Electronic and radiograph	4.3%	17.1%	
	Patient response	4.3%	4.3%	
Isolation method	Cotton roll	30.0%	37.1%	.427
	Rubber dam	2.9%	4.3%	
	Suction	7.1%	12.9%	
	None	2.9%	2.9%	
Root canal irrigant	Sodium Hypochlorite	27.1%	32.9%	.333
	Saline	8.6%	10.0%	
	Hydrogen Peroxide	1.4%	7.1%	
	Chlorhexidine	5.7%	7.1%	
	EDTA	0.0%	0.0%	
Oburation materials	Gutta-percha and sealer	42.9%	55.7%	.571
	Cement only	0.0%	1.4%	
Oburation technique	Cold lateral compaction	40.0%	45.7%	.089
	Single-cone technique	2.9%	10.0%	
	Paste-type root filling	0.0%	1.4%	
Root canal sealer	Zinc oxide-eugenol	31.4%	37.1%	.316
	N2	11.4%	20.0%	
Improving their endodontic practice	Yes	38.6%	54.3%	.364
	No	4.3%	2.9%	
Demand for continuation education programmes	Yes	38.6%	57.1%	.074
	No	4.3%	0.0%	

Table 4: Influence of work type on some technical aspects of endodontic treatment procedures amongst respondents

Variables		**Working type**		***p-value***
		Part time	**Full time**	
Working length determination	Tactile sense only	11.4%	17.1%	.477
	Electronic apex locator only	2.9%	1.4%	
	Radiographic technique only	12.9%	24.3%	
	Electronic and radiograph	14.3%	7.1%	
	Patient response only	1.4%	7.1%	
Isolation method	Cotton roll	28.6%	38.6%	.345
	Rubber dam	4.3%	2.9%	
	Suction	10.0%	10.0%	
	None	0.0%	5.7%	
Root canal irrigant	Sodium Hypochlorite	24.3%	35.7%	.518
	Saline	11.4%	7.1%	
	Hydrogen Peroxide	2.9%	5.7%	
	Chlorhexidine	4.3%	8.6%	
	EDTA	0.0%	0.0%	
Oburation materials	Gutta-percha and sealer	41.4%	57.1%	.429
	Paste-type root filling	1.4%	0.0%	
Oburation technique	Cold lateral compaction	38.6%	47.1%	.250
	Single-cone technique	4.3%	8.6%	
	Paste-type root filling	0.0%	1.4%	
Root canal sealer	Zinc oxide-eugenol	32.9%	35.7%	.158
	N2	10.0%	21.4%	
Improving their endodontic practice	Yes	41.4%	51.4%	.281
	No	1.4%	5.7%	
Demand for continuation education programmes	Yes	41.4%	54.3%	.608
	No	1.4%	2.9%	

Table 5: Response of dental practitioners toward needs the continuation education programmes

Variables	**Distribution**	**Percentage**	***p-value***
Improving their endodontic practice	Yes (n=65)	92.9%	.000

	No (n=5)	7.1%	
Demand for continuation education programmes	Yes (n=67)	95.7%	.000
	No (n=3)	4.3%	