

Difficulties Facing Dental Practitioners during Rubber Dam Application in Saudi Arabia

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Abstract

Aim: The study aims to assess the difficulties facing dental practitioners in Saudi Arabia regarding RD application.

Materials and Methods: It's a survey study using a questionnaire with 16 questions including different aspects of gender, specialty, years of experience and the area of practice. The questionnaire had distributed to dental practitioners working in private and governmental dental clinics, and also to undergraduate dental students in Saudi Arabia during the period from December to January 2018 - 2019.

Results: 600 dental practitioners were participating in this survey. The majority of them were 20 - 30 years (n = 483) (80.4%). The participants were involved within their specialty were dental students (34.7%), dental interns (16%), general practitioners (41%) and Specialists (8.3%).

Conclusion: RD used more commonly in governmental hospital than the private clinics. The female dental practitioners were more concern about using RD when treating patients than male.

Clinical Significance: Conducting more workshops and clinical training are required to improve the skills of RD application of many dental practitioners.

Keywords: Rubber Dam; Tooth Isolation; Endodontic; Restorative Treatment

Introduction

Isolation of the badly decayed teeth is the key to prevent contamination of the canal system by oral microbial flora or chemo-mechanical preparation [1,2]. Microbial infection intra-radicular and/or the peri-radicular area is the main cause of endodontic disease [3,4]. In 1989, Cochran MA, *et al.* published a result showed when using rubber dam (RD) there is a big reduction in microorganisms by 90% [5]. Infection control has to be along with all stages of root canal treatment from caries removal to final coronal restoration [6,7]. Rubber dam is the most important part of infection control and it is essential for patient's safety and cross infection prevention.

Using rubber dam for isolation considered as a standard of care by different organizations such as European society of endodontology 1992, 2006, American Association of endodontists 2004, American Academy of pediatric dentistry 2008 - 2009. In a study published in 2014, survival rate of initial root canal treatment with rubber dam after 3.43 years (the mean observed time) was 90.3%, which was significantly greater than 88.8% without the use of RD [8].

However, observations have been reported by Stewardson DA, *et al.* and Peciulienė V, *et al.* found that the majority of graduated dental practitioners have never applied RD.

Moreover, the situation in Saudi Arabia is nearly the same. According to a study published in the Saudi Dental Journal, 400 general dental practitioners working in private clinics were assessed. The percentage of those who used rubber dam was too low (3%) [9].

So, the study aims to assess the difficulties facing dental practitioners in Saudi Arabia regarding rubber dam application by answering these questions:

- What are the difficulties facing dental practitioners from using the rubber dam?
- What is the best way to improve the dental practitioner’s awareness level?

Materials and Methods

It’s a descriptive observational study, ethically approved by the Ministry of Health in Saudi Arabia, ethical number (H-02-K-076-1811-071). The questionnaire was distributed to dental practitioners working in private and governmental dental clinics and also to undergraduate dental students in Saudi Arabia during the period from December to January 2018 - 2019. It had 16 questions, some questions had a space to explain, also participants were given an option to choose more than one answer for some questions. The survey was divided into 5 sections: demographics, comparison of RD usage according to gender, years of experience, specialty, and area of practice. The total number of the participants were 600 of both gender (35% male, 65% female) with different age groups, specialties and years of experience.

The questionnaire was distributed by two methods; one was a self-administrated questionnaire distributed to the dental practitioners in private clinics and governmental dental clinics (participants were asked to answer the questionnaire on iPad using Google form), while the second one sent online through social media.

Descriptive summary statistics were done for the variables included in the study. Difference in proportion was tested using Chi-Square test and Kruskal-Wallis analysis of variance (ANOVA) followed by Man-Whitney U test for intergroup comparison. All statistical tests were two sided with significance level set at $p < 0.05$. SPSS version 17 was used for all analysis.

Results

All data were collected from the participants and analyzed into 5 sections.

Socio-demographic details of study participants

The information was collected from 600 dental practitioners. The area of practice were government clinics and private clinics. The majority of age of the participants were 20 - 30 years (n = 483) (80.4%). The participants were involved within their specialty were dental students (34.7%), dental interns (16%), general practitioners (41%) and Specialists (8.3%) (Figure 1).

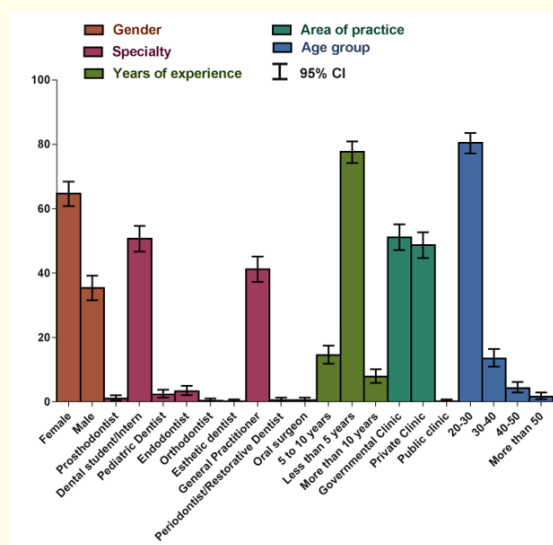


Figure 1: The socio-demographic details of the participants.

Comparison of RD usage according to gender

Regarding the frequently using of RD for daily procedures, female dental practitioners were significantly higher than male. Moreover, the female participants were significantly higher in using of RD if it was available at workplace than male. However, regarding the reason behind not using RD, both genders thought some dentists prefer not to use it due to insufficient training (Table 1).

Regarding the believe of doing RCT without rubber dam will affect the treatment outcomes, was significantly lower among male dental practitioners compared to female. Moreover, if the patient has limited mouth opening and the dental practitioners not able to use rubber dam for isolation, cotton rolls and saliva ejector were used significantly lower among male compared to female. Difficulties of RD application depending on the condition of the tooth, accessibility of the tooth and difficulty in selecting the suitable clamp were significantly lower among male compared to female participants (Table 1).

Furthermore, the dental practitioners thought the experienced dentists didn't need to apply a RD was significantly lower among male compared to female. Also, about the condition of cannot applying rubber dam, the participants would choose referring the case to a specialist was significantly lower among male compared with that of female. On the other hand, the majority of dental practitioners didn't have any knowledge about other available solutions than conventional type present in market like optidam and DMG mini dam (Table 1).

Finally, dental practitioners thought the best way to promote the usage of RD will be by conducting more workshops and clinical training for dental students and graduates about RD application techniques and by increasing patient's awareness level regarding using RD for dental treatment (Table 1).

	Gender							p-value
	Female		Male		Total			
	N	%	N	%	N	%		
6- How often do you use rubber dam?	Always	202	52.06%	70	33.02%	272	45.33%	< 0.001**
	Never	49	12.63%	42	19.81%	91	15.17%	
	Only with RCT cases	137	35.31%	100	47.17%	237	39.50%	
7- Why do you think some dentist prefer not to use rubber dam?	Insufficient training	23	5.93%	19	8.96%	42	7.00%	0.272
	It's time consuming	288	74.23%	153	72.17%	441	73.50%	
	Some patients find it uncomfortable	55	14.18%	26	12.26%	81	13.50%	
	To reduce the cost of the treatment	4	1.03%	6	2.83%	10	1.67%	
	Not available	18	4.64%	8	3.77%	26	4.33%	
8- If the rubber dam was available at your workplace will you use it?	No	8	2.06%	9	4.25%	17	2.83%	< 0.001**
	Only with RCT	93	23.97%	68	32.08%	161	26.83%	
	Sometimes	61	15.72%	49	23.11%	110	18.33%	
	Yes	226	58.25%	86	40.57%	312	52.00%	
9- According to your experience and knowledge do you believe that doing RCT without rubber dam will affect the treatment outcomes?	I don't know	15	3.87%	12	5.66%	27	4.50%	0.033*
	No	33	8.51%	31	14.62%	64	10.67%	
	Yes	340	87.63%	169	79.72%	509	84.83%	
10- If the patient has limited mouth opening what you will do instead of applying rubber dam?	Isolation with cotton rolls and saliva ejector	355	91.49%	190	89.62%	545	90.83%	0.125
	Others	9	2.32%	11	5.19%	20	3.33%	
	Drugs (antisialagogues)	13	3.35%	3	1.42%	16	2.67%	
	Local anesthesia to reduce saliva	11	2.84%	8	3.77%	19	3.17%	

11- What are the difficulties of rubber dam application that stops you from using it?	A condition of the tooth	249	64.18%	141	66.51%	390	65.00%	0.457
	Accessibility of the tooth	87	22.42%	36	16.98%	123	20.50%	
	I don't know exactly the correct way to apply it	17	4.38%	13	6.13%	30	5.00%	
	Difficulty in selecting the right clamp	19	4.90%	10	4.72%	29	4.83%	
	Others	16	4.12%	12	5.66%	28	4.67%	
12- If you're not using RD and you need to isolate the tooth what's your preferred methods?	Cotton rolls	112	28.87%	72	33.96%	184	30.67%	0.563
	High volume suction	15	3.87%	7	3.30%	22	3.67%	
	Both	254	65.46%	128	60.38%	382	63.67%	
	Others	7	1.80%	5	2.36%	12	2.00%	
13- What do you think the best way to promote the usage of rubber dam?	By conducting more workshops and clinical training for dental students and graduates about RD application techniques	32	8.25%	22	10.38%	54	9.00%	0.614
	By increasing patient awareness level regarding using RD for dental treatment	232	59.79%	120	56.60%	352	58.67%	
	By providing other easy types of rubber dam and clamps to use rather than the regular ones	124	31.96%	70	33.02%	194	32.33%	
14- Have you ever used any of these new rubber dam systems?	DMG mini-dam	8	2.06%	3	1.42%	11	1.83%	0.747
	Optidam	53	13.66%	26	12.26%	79	13.17%	
	No, I have only used the conventional type	327	84.28%	183	86.32%	510	85.00%	
15- Do you think an experienced dentists doesn't need to apply a rubber dam?	No	271	69.85%	130	61.32%	401	66.83%	0.032*
	Yes	19	4.90%	21	9.91%	40	6.67%	
	Yes, except RCT cases	87	22.42%	50	23.58%	137	22.83%	
	I don't know	11	2.84%	11	5.19%	22	3.67%	
16- If you cannot apply rubber dam for RCT because of some tooth conditions, what will you do?	Work without RD	124	31.96%	82	38.68%	206	34.33%	0.049*
	Refer the case to a specialist	0	0.00%	2	0.94%	2	0.33%	
	Try to do a gingivectomy	49	12.63%	18	8.49%	67	11.17%	
	Others	215	55.41%	110	51.89%	325	54.17%	

Table 1: Differences in the participants' responses according to their gender.

Comparison of RD usage according to years of experience

Among the years of dentist's experience, the dental practitioners who had less than 5 years of experience where the majority in using RD comparing to other groups (Figure 2).

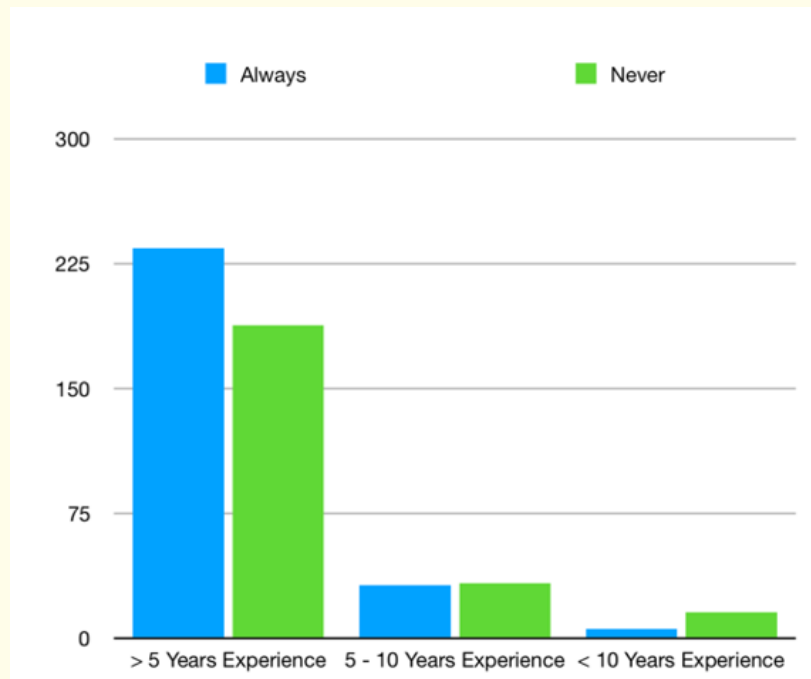


Figure 2: Comparison of RD usage according to years of experience.

The participants' response was significantly different for not using RD. Among the responses, 130 less than 5 years old of experience, 27 from 5 to 10 years of experience, 21 more than 10 years of experience due to insufficient training.

357 less than 5 years old of experience, 42 from 5 to 10 years, 17 more than 10 years due to time consuming. 260 less than 5 years, 22 from 5 to 10 years, 8 more than 10 years due to Some patient finds it uncomfortable.

202 less than 5 years, 19 from 5 to 10 years, 7 more than 10 years due to not availability.

Most of the participants who had less than 5 years of experience (n = 310) faced difficulties in RD application due to the condition of the tooth or the difficulty in selecting the right clamp. When the participants had been asked about what is your preferred way to isolate tooth if RD not an option, using both cotton rolls and high-volume suction where the most popular choice for all groups.

Additionally, when the participants had been asked about what is the best way to promote the usage of RD, according to the years of experience, 286 less than 5 years, 53 from 5 to 10 years, 13 more than 10 years answered by increasing patients' awareness level regarding using RD for dental treatment. The majority of participants didn't use any type of the new RD system. 392 less than 5 years, 82 from 5 to 10 years, 36 more than 10 years of experience they only used the conventional type. Regarding the choosing of not to use RD for RCT because of some teeth conditions, the greater part of dental practitioners who had less than 5 years of experience choose referring the patients to specialists to treat them (Figure 3).

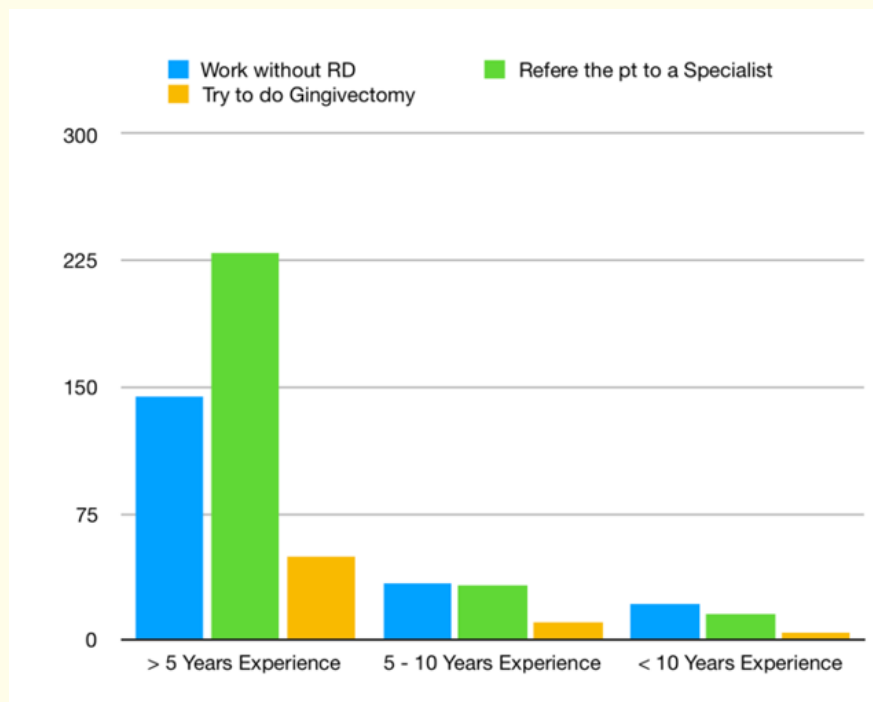


Figure 3: If dental practitioners (according to their experiences) can't use RD for RCT due to some teeth conditions.

Comparison of RD usage according to specialty

The participants had been asked in general how often do you use RD; the major part of dental students was using it always while most of the specialists and GP's were using RD only during RCT. Also, when they asked why some of dentists prefer not to use RD, the result showed 149 of dental student, 50 of dental interns, 184 of GP's and 33 of specialists were not using RD due to time consuming. 117 of dental students, 42 of dental interns, 114 of GP's and 17 of specialists due to some of patients found it uncomfortable. The participants had been asked also about what are the difficulties of RD application, it found 120 dental students, 57 dental interns, 143 GP's and 15 specialists due to accessibility of the tooth and 69 dental students, 28 dental interns, 22 GP's and 6 specialists due to difficulty of selecting the right clamp.

About what are the preferred methods to isolate the tooth if you're not using RD, most of dental students will use cotton rolls alone. Whereas the GP's where the major part of dental practitioners who used combination of cotton rolls with high volume suction. Regarding the best way to promote the usage of RD, 159 of dental student, 64 of dental intern, 147 of GP's and 31 of specialists were answered by providing the other easy types of RD & clamps to use rather than the regular ones. In case if it was impossible to apply RD for RCT because of some teeth condition, most of GP's and specialists were chose to work without RD. However, most of dental students would refer the case to specialists (Figure 4).

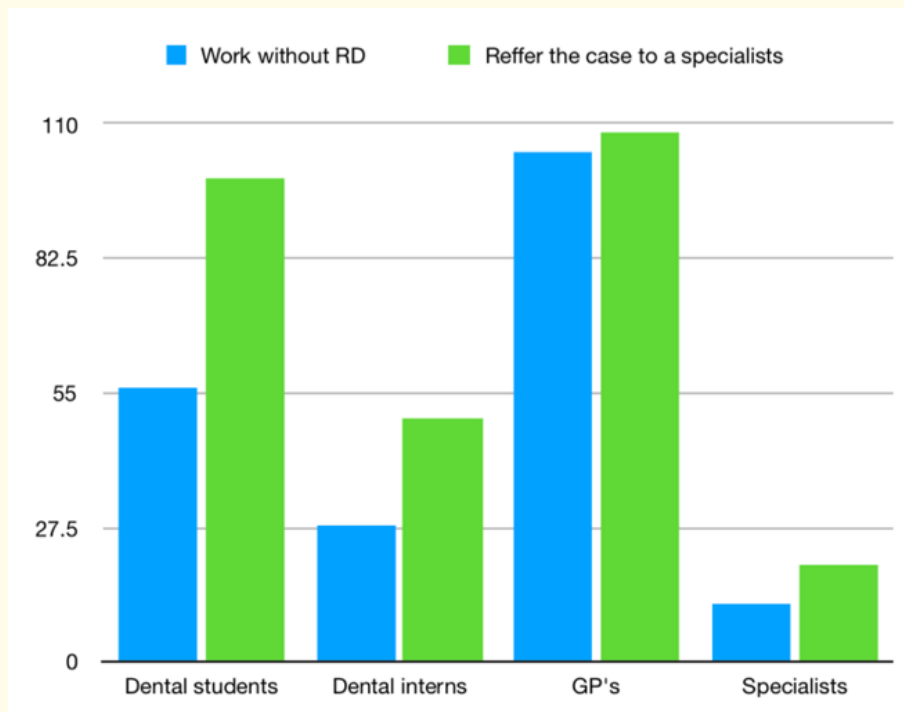


Figure 4: If dental practitioners (according to their specialty) can't use RD for RCT due to some teeth conditions.

Comparison of RD usage according to area of practice

In comparison of RD usage between governmental hospitals and private clinics, the governmental hospital's dentists had slightly higher percentage of using RD than private's dentists. RD usage according to years of experience the result showed that 220 governmental hospitals' dentists and 180 private's dentists answered it's important to use it especially in RCT cases. When the participants had been asked if the tooth's condition is one of the reasons why dentists didn't use RD, the majority of privates' dentists worked without RD in compare to governmental dentists (Figure 5).

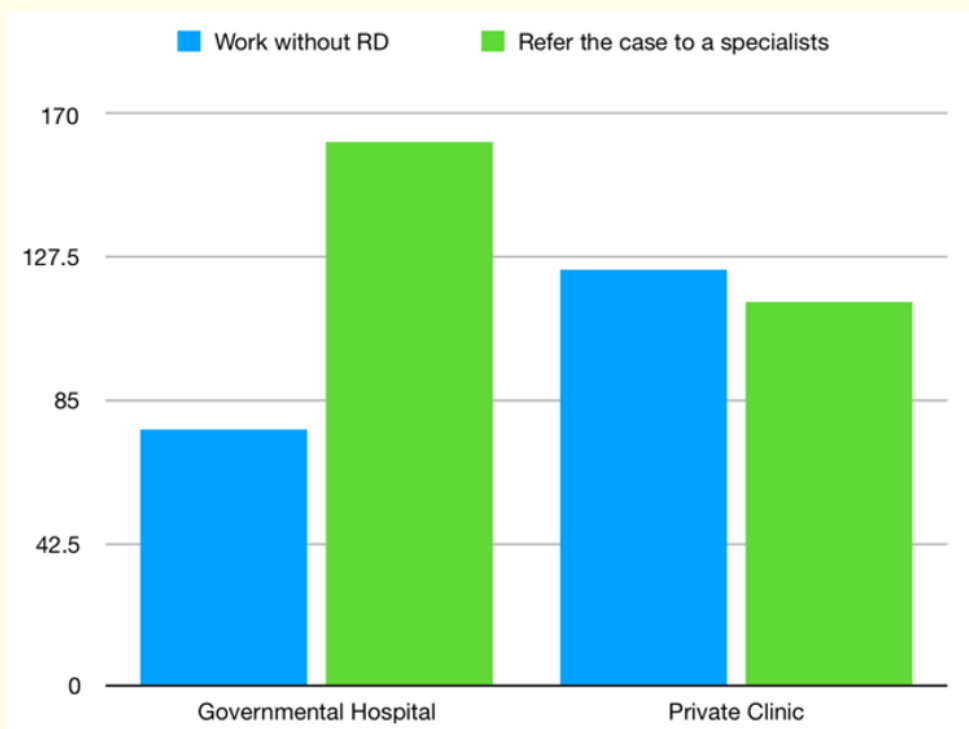


Figure 5: The response of dental practitioners when tooth's condition prevent them to use RD.

Discussion

Collecting information about individual perspectives, opinions, attitudes or experiences can be done by medical research questionnaire or survey. There are three types of survey: epidemiological surveys, surveys on attitudes to a health service or intervention and questionnaires assessing knowledge on a particular issue or topic [10]. In our survey study the participants were about 600 from different specialties and working places. It found that the main cause not using RD is time consuming similar to the results of Shashirekha, *et al.* 2014 [11]. However, this reason not acceptable because the median time to apply RD is 51 sec when apply conventional type and apply new system like OptiDam. The next main reasons were insufficient training and patient uncomfortable. Those reasons were reported depending on the experience of the participants similar to the results that reported by another Sudanese study [12]. The cause beyond that is the majority of the participants were dental practitioners who had less than 5 years of experience. On the other hand, the main cause which significantly high leading to decrease use RD depending on the gender of the participants was insufficient training. Even though female participants were more concerning about not treating patients without RD comparing to male. However, regarding the specialty of the participants the main causes for avoiding RD were the time and patient uncomfortable.

To overcome patient's uncomfortable must be increase their awareness and decrease time of application of RD as it recommended by Ahmed, *et al.* 2014. Moreover, to overcome time consuming the participants should train in multiples conditions clinically and education program.

This study revealed how availability of RD in the clinics had a massive effect on increasing the usage of RD for all group, so it's advisable that all dental centers should bring in different types of RD in the clinics [13].

Regarding teeth condition, our results showed that 99 of dental students and 108 of GP's more likely to refer the patient immediately and not doing the treatment by themselves if the tooth condition make the RD difficult to apply. On the other hand, regarding the results of using RD in restorative dentistry, Yan Wang, *et al.* had systematic review about RD isolation for restorative treatment which had a conclusion of no strong evidence to favor RD usage in improving the survival rate of restorations [14]. Although that study ended up with this conclusion, using RD could prevent the accidental swallowing of restorative material or instruments. Furthermore, it could help in protecting the soft tissue like tongue from accidental injuries. Also, RD had a major rule in controlling pediatric patient during procedures.

Conclusion

The fact that using RD considered as a corner stone in dental treatments specially in endodontic, the more experienced dentist the less RD usage. RD used more commonly in governmental hospital than the private clinics. The female dental practitioners were more concern about using RD when treating patients than male. Conducting more workshops and clinical training are required to improve the skills of RD application of many dental practitioners.

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