

Rubber dam: Attitudes and practices of senior dental students in Saudi Arabia

Saleem Abdulrab¹, Sadeq Ali Al-Maweri², Mazen Doumani³, Bilal Mourshed⁴,
Nader Alaizari⁵

¹ (Department of restorative dental sciences, AL-Farabi colleges, Riyadh, Saudi)

² (Department of oral Medicine and Diagnostic Sciences, AL-Farabi colleges, Riyadh, Saudi; Department of Oral Medicine, Sanaa University, Yemen)

³ (Department of restorative dental sciences, AL-Farabi colleges, Riyadh, Saudi)

⁴ (Department of prosthodontic, AL-Farabi colleges, Riyadh, Saudi)

⁵ (Department of oral Medicine and Diagnostic Sciences, AL-Farabi colleges, Riyadh, Saudi)

Abstract:

Objective: This survey aimed to investigate the attitude of senior dental students towards rubber dam use, especially in endodontic practice.

Methods: A questionnaire-based survey was conducted on the final year dental students. A self-administered questionnaire was designed and consisted of relevant questions to ascertain attitudes, opinions and practices concerning rubber dam use.

Results: The vast majority reported using rubber dam for pedodontics (95%) and composite restoration (89.1%), whereas only 62% reported using it for amalgam restoration. The most reported benefit of rubber dam usage was provision of isolation (84.5%). The vast majority (93.3%) knew that rubber dam is more necessary to be used while working in the mandible, and almost 80% felt that most of patients dislike rubber dam usage. Whereas 74.5% of students indicated that they would use rubber dam with all procedures in the future, 17.2% declared they would use it only during root canal treatment.

Conclusions: our students have showed positive attitude towards the use of rubber dam. However, there is some reluctance about future integration of this tool in routine practice. Greater emphasis should be placed on the advantages of using rubber dam in clinical dentistry at dental schools and through continuing dental education.

Keywords: Rubber dam, attitudes, practices, dental students

I. Introduction

First introduced to the dental profession by Barnum in 1864 [1], rubber dam is a universally acknowledged as a useful adjunct during operative and endodontic treatments. Many authorities advocate its usage and encourage practitioners to adopt it in routine practice, stressing that it is an indispensable element of contemporary health service [2]. It offers several benefits during dental treatment such as: a drier field, better visibility and access, protects any inhalation or swallowing of dental fine instruments and irrigants, and infection control. Retraction of lip, cheeks and tongue are also facilitated by the use of rubber dam [3,4].

Given the numerous advantages of rubber dam, it has been recommended to be used as a standard of care by professional organizations [2, 5, 6]. Worldwide, most of dental colleges teach the use of the rubber dam as an important adjunct to restorative dentistry in both adult and child patients [7]. In spite of all its known advantages, application of the rubber dam is believed to be difficult and time consuming and patients are usually not compliant with its use [8].

The aim of contemporary dental education is to produce competent dental graduates who are eligible to practice modern dentistry and provide quality treatment where patient's safety is assured. The aim of this study was to assess the use, attitudes to, and intended uses of rubber dam by final year dental students in AL-Farabi colleges, Riyadh, Saudi Arabia.

II. Materials and methods

This was a questionnaire based cross-sectional study on the senior undergraduate dental students at AL-Farabi Colleges, Riyadh Saudi Arabia. All final year dental students enrolled during the 2014–2015 academic year were eligible to participate. The study was approved by the AL-Farabi College Institutional Ethical Review Board, and consent forms were obtained from all the participants.

We used a self-administered questionnaire, adapted from a pretested questionnaire that has been applied in a similar study by Tanalp et al. [9]. A pilot study was conducted on a random sample of students

(n=20) to ensure that the questions were understandable, with no changes were required. The questionnaire consisted of 22 close-ended questions divided into 5 sections. In the first part of the questionnaire, students were asked about areas of dental practice other than endodontic treatment where they used rubber dam. The second part comprised questions related to students' opinions about rubber dam's advantages, as well as difficulties. They were asked whether they agreed or disagreed with certain aspects of rubber dam and whether they use it because they believe in its positive influence or because they are obliged to during education. They were also inquired whether they intend to integrate rubber dam as a mandatory tool in the future and during which procedures they plan to use it. On distribution of the questionnaires all students were given the opportunity to decline participating in the survey, and all completed questionnaires were returned anonymously.

Data analysis was carried out using SPSS version 20.0, and the chi-squared test was employed to compare groups. P value <0.05 was considered statistically significant.

III. Results

The response rate was 77% (193 out of 240), of whom 71% were males and 29% were females. Table 1 shows responses of the students regarding rubber dam utilization. The majority (79.1%) always asked their patients about latex allergy, with no significant difference according to gender ($P > 0.05$). The vast majority reported using rubber dam for pedodontics (95%) and composite restoration (89.1%), whereas only 62% reported using it in case of amalgam restoration, with significant differences according to gender ($P < 0.01$). Majority of male students (84.7%) applied rubber dam directly following anesthesia while most of females (52%) applied it after determining the orifices of root canals accesses during endodontic treatment. The vast majority (94%) believed that they received enough education about rubber dam usage.

Regarding the most important advantage of rubber dam, the most reported benefit was provision of isolation (84.5%), followed by prevention of swallowing or aspiration of instruments (21%) and prevention of irrigants ingestion (13%). Majority of students (84.4%) reported that selection of the clamp and its adaptation was the most difficult stage of rubber dam usage, with significant difference between males and females. Table 3

Respondents were given a series of statements in regards to rubber dam, to which they were asked if they agreed or disagreed. The statements and their responses are reported in Table 4. Whilst an overwhelming 90% agreed that rubber dam would ease the restoration procedure and improve treatment success rate, only 69.7% agreed that the isolation cannot be achieved without rubber dam usage. Further, slightly more than half of the students (61.3% of males and 33.9% of females; $P < 0.05$) disagreed with the opinion that the access of root canals could be improved by using rubber dam. Some 84.9% were of the opinion that rubber dam usage pose difficulty in taking radiograph, and 48.7% thought that rubber dam is difficult to apply. The vast majority (93.3%) knew that rubber dam is more necessary to be used while working in the mandible, and almost 80% felt that most of patients dislike rubber dam usage. Around 90% of students indicated that they use rubber dam in the college clinics because they strongly believed in its usefulness in contrast to 9.8% who would use it only because they were obliged to do so. Whereas 74.5% of students (81.4% of males and 74.5% of females) indicated that they would use rubber dam with all procedures, 17.2% (32.7% of females and 10.9% of males) declared they would use it only during root canal treatment. There were significant differences between gender intended use of rubber dam ($P < 0.01$). The most mentioned reasons for not planning to use rubber dam in the future were: spending time for its placement; patients' discomfort; and difficulty of its application.

IV. Discussion

The challenge for contemporary dental educators is to produce competent dentists on graduation who are 'fit for purpose'. This is becoming all the more challenging when considered in light of increasing student numbers, decreased numbers of suitably qualified dental educators, limited educational budgets, and increased time pressures on the curriculum [10, 11]. Despite this, however, there should not be a reduction in the teaching of aspects of clinical dentistry that have treatment quality or patient safety implications.

To our knowledge, this is the first study conducted in Saudi Arabia assessing dental students' attitudes toward the use of rubber dam. In the present survey, students were not asked whether they use rubber dam during endodontic treatment, as it is already known that rubber dam use for endodontic is mandatory in our dental colleges. The majority of dental schools educate their students that the use of rubber dam is obligatory for procedures such as endodontic and operative procedures [12].

The basic focus of the present survey was on the endodontic relevance of the rubber dam. Overall 79% of students in the present study asked their patient about latex allergy, a finding higher than that reported by Tanalp et al.[9] and Mala et al. [13]. This result underscores the fact that more attention must be given towards the possibility of latex allergy prior to application of the rubber dam since some cases have been reported in the literature [14, 15]. Most of students reported that selection of the clamp and its adaptation were the most difficult steps of rubber dam application. This finding is in line with previous reports [9], which could be

attributed to the fact that students may not have supplied their armamentarium with adequate numbers and types of clamps, suitable for each specific case.

In the current survey the greatest advantage of rubber dam, as reported by students, was provision of isolation and an aseptic field. This finding is also similar to that reported by Tanalp et al.[9]. The majority of respondents reported that patients dislike rubber dam. This result is contradictory to what has been reported in the literature, in which many patients prefer to have rubber dam [16, 17]. It has been reported that dentists may rationalize their failure to use rubber dam by claiming patient resistance [18]. Moreover, It is worth mentioning here that dental practitioners' motivation and positive attitude towards rubber dam is one factor, which has a significant influence on patient's attitude toward rubber dam [16]. Whitworth et al. [19] suggested that the negative perception regarding patients' dislike towards rubber dam may be related more strongly to practitioner's attitude. It was heartening to note that majority of our students agreed that rubber dam allows a more successful treatment, a result which is consistent with the literature. Root canals that become contaminated with bacteria and oral fluids are associated with a higher likelihood of post -treatment infections than the ones that contain no bacteria [20], which makes rubber dam use during root canal treatment seem logical.

Studies from the international literature indicate that the use of rubber dam in general practice is limited [19, 21-24]. Lack or insufficient of rubber dam use in practice has been attributed to many factors that include: patient discomfort, insufficient time, difficulty in use, insufficient training, and cost and low fees for treatment [24]. Moreover, Whitworth and colleagues [19] observed that rubber dam use was practiced more frequently by newly graduates in comparison with older practitioners. The authors suggested that modern approaches in teaching and training had a positive impact on the recent graduates. In the present study around 49% of the respondents reported that rubber dam is difficult to apply, a similar finding has been reported by Mala et al. [13]. The ability to successfully and efficiently place a rubber dam in a variety of clinical situations comes with clinical experience and can be taught [12]. Another disadvantage of rubber dam that has been reported was the difficulty of taking radiographs in the correct site with the dam in place (85%) which is in agreement with previous reports [9]. On the other hand, removal of the dam during radiography is practically impossible as this step is particularly performed with an instrument within the root canal to determine the working length. During this step, the patient is generally left alone at the radiography site and there is no possibility of intervention in case hazards occur. Therefore, radiographs should absolutely be taken with the rubber dam placed in position.

The findings of this study indicate that contemporary dental students are trained to use rubber dam, and demonstrate enthusiasm and commitment to its use. This is in contrast to subsequent trends in general practice [9, 19]. This underlies the need to maintain the awareness of dental students and dental practitioners to the need to use rubber dam for improving the quality of treatment, delivering improved infection control, during procedures such as root canal treatment and addressing medico-legal concerns and patient safety. It was rather frustrating to know that a considerable proportion of students were not planning to use rubber dam in their future dental practices. Mala et al. [13]. and Tanalp et al. [9] also reported similar findings.

V. Tables

Table 1: Responses to questions regarding utilization of rubber dam

Questions	Male		Female		Total %	P-Value
	n	%	n	%		
Do you ask patients whether they have latex allergy prior to rubber dam use?						0.164
Yes	112	81.8	40	72.7	79.2	
No	25	18.2	15	27.3	20.8	
Do you use rubber dam in pediatric patients?						0.003
Yes	134	98.5	49	89.1	95.8	
No	2	1.5	6	10.9	4.2	
Do you use rubber dam during amalgam restoration?						0.000
Never	5	3.6	3	5.4	4.1	
Rarely	8	5.8	5	8.9	6.7	
Sometimes	26	19.0	26	46.4	26.9	
Always	98	71.5	22	39.3	62.2	
Do you use rubber dam during composite restoration?						0.006
Never	3	2.2	0	0.0	1.6	
Rarely	0	0.0	2	3.6	1.0	
Sometimes	7	5.1	9	16.1	8.3	
Always	127	92.7	45	80.4	89.1	
In which stage of endodontic treatment you use rubber dam?						0.000
Following anesthesia	116	84.7	9	16.1	64.8	
During access cavity preparation	9	6.6	4	7.1	6.7	
Following identification of root canal orifices	9	6.6	29	51.8	19.7	

During root canal shaping	3	2.2	12	21.4	7.8	
During root canal filling	0	0.0	2	3.6	1.0	
Do you think you have been given adequate and satisfactory education regarding rubber dam?						0.056
Yes	128	94.1	48	85.7	91.7	
No	8	5.9	8	14.3	8.3	
During endodontic treatment of teeth with extensive tissue loss						0.000
I don't use rubber dam	16	11.7	32	58.2	25.0	
I perform a restoration so that I can place the rubber dam	121	88.3	23	41.8	75.0	

Table 2: Opinions of students about the usage of rubber dam

What in your opinion is the greatest advantage offered by the rubber dam?	Male N (%)	Female N (%)	Total %	P-Value
A-Provision of isolation and an aseptic working area	120 87.6	43 76.8	84.5	0.060
B-Prevention of swallowing or aspirating instruments	23 16.8	19 33.9	21.8	0.009
C- Prevention of ingestion of irrigants	18 13.1	7 12.5	13.0	0.905

Table 3: Opinions of students about the most difficult aspect regarding rubber dam usage

What is the major factor that makes rubber dam application a difficult procedure?	Male N (%)	Female N (%)	Total %	P-Value
Selection of the clamp and its adaptation	126 92.6	36 64.3	84.4	0.000
Placement of the rubber dam	7 5.1	20 35.7	14.1	
Placement of the frame	3 2.2	0 0.0	1.6	

Table 4: Agreement or disagreement of students regarding various aspects of rubber dam

	Male N (%)	Female N (%)	Total %	P-Value
Rubber dam eases the restoration stage				0.437
I agree	129 94.2	51 91.1	93.3	
I disagree	8 5.8	5 8.9	6.7	
Treatment performed using the rubber dam are more successful than those performed without using it				0.901
I agree	130 94.9	51 94.4	94.8	
I disagree	7 5.1	3 5.6	5.2	
An adequate isolation cannot be achieved in case rubber dam is not used				0.260
I agree	106 77.4	39 69.6	75.1	
I disagree	31 22.6	17 30.4	24.9	
Rubber dam eases access to root canals				0.001
I agree	53 38.7	37 66.1	46.6	
I disagree	84 61.3	19 33.9	53.4	
Rubber dam makes radiograph taking procedure difficult				0.276
I agree	113 83.1	50 89.3	84.9	
I disagree	23 16.9	6 1.7	15.1	
Rubber dam is difficult to apply				0.014
I agree	59 43.1	35 62.5	48.7	
I disagree	78 56.9	21 37.5	51.3	
Rubber dam consists of too many components				0.107
I agree	103 75.7	36 64.3	72.4	
I disagree	33 24.3	20 35.7	27.6	
Rubber dam shortens/extends treatment period				0.571
Extended	112 81.8	43 78.2	80.7	
Shortens	25 18.2	12 21.8	19.3	
Rubber dam is more necessary while working in the				0.625
Mandible	127 92.7	53 94.6	93.3	
Maxilla	10 7.3	3 5.4	6.7	
Assistance is necessary during rubber dam application				0.513
I agree	114 83.2	47 87.0	84.3	
I disagree	23 16.8	7 13.0	15.7	
Patients do not like the rubber dam				0.010
I agree	102 74.5	51 91.1	79.3	
I disagree	35 25.5	5 8.9	20.7	

Table 5: Opinions about the present and future usage of rubber dam

	Male	Female	Total	P-Value
I use the rubber dam in the clinic, because:				
I strongly believe that it is a helpful tool	127 92.7	47 83.9	90.2	0.063
I only use it because I am obliged to following graduation	10 7.3	9 16.1	9.8	
Following graduation:				

I intend to use the rubber dam during all procedures indicated	112	81.8	31	56.4	74.5	0.002
I intend to use it only during restorative procedures	7	5.1	4	7.3	5.7	
I intend to use it only during root canal treatment	15	10.9	18	32.7	17.2	
I will never use it	3	2.2	2	3.6	2.6	

Table 6: Major reasons for not planning to use the rubber dam in future

	Male		Female		Total	P-Value
I do not believe that it is a helpful adjunct	29	21.2	1	1.8	15.6	0.000
I experience difficulty during application	24	17.5	6	10.9	15.6	
I believe that it consumes time	47	34.3	18	32.7	33.9	
I believe that patients do not like it	37	27.0	30	54.5	34.9	

VI. Conclusions

Within the limitations of this study, in general, our students showed positive attitude towards the use of rubber dam. Whilst dental students receive clinical and didactic teaching in the use of rubber dam when at dental school, there is scope to enhance this teaching to promote increased use of rubber dam whilst in general practice. This result is in line with other studies which indicate a general reluctance of using rubber dam amongst dental practitioners and can be regarded as a universal issue that requires further attention.

References

- [1]. Elderton RJ. A modern approach to use of rubber dam. *Dental Practitioner and Dental Record*. 1971; 21: 187–193, 226–232, 267–273.
- [2]. European Society of Endodontology, “Quality guidelines for endodontic treatment: consensus report of the European society of endodontology,” *International Endodontic Journal*. 2006; vol. 39, no. 12, pp. 921–930.
- [3]. Karauzas L, Kim YE, Boynton JR, Jr. Rubber dam isolation in pediatric patients: a review. *J Mich Dent Assoc* 2012; 94(1): 34-7.
- [4]. Bruce WS, Sharon C. Practical tips for the dental assistant to simplify the process for dry field isolation. *AEGIS Communications* 2011; 7(3): 22-6.
- [5]. American Academy of Pediatric Dentistry. Guidelines on pulp therapy for primary and young permanent teeth. *Pediatric Dentistry* 2009; 30, 170–174.
- [6]. American Association of Endodontists Guide to Clinical Endodontics, 2004, 4th edn. Chicago, IL: American Association of Endodontists.
- [7]. Koshy S, Chandler NP. Use of rubber dam and its association with other endodontic procedures in New Zealand. *New Zealand Dental Journal*. 2002; 98, 12–16.
- [8]. Jinks GM. Rubber dam technique in pedodontics. *Dent Clin North Am* 1966;4:327-40.
- [9]. Tanalp J, Kayataş M, Can ED, Kayahan MB, Timur T. Evaluation of senior dental students' general attitude towards the use of rubber dam: a survey among two dental schools. *ScientificWorldJournal*. 2014 Mar;290101.7 pages.
- [10]. Wilson NHF .Curricular issues changing from amalgam to tooth-coloured materials. *Journal of Dentistry*.2004;32, 367–9.
- [11]. Lynch CD, McConnell RJ . Attitudes and use of rubber dam by Irish general dental practitioners. *International Endodontic Journal*. 2007;40, 427–32.
- [12]. W. Ryan and A. O’Connell, “The attitudes of undergraduate dental students to the use of the rubber dam,” *Journal of the Irish Dental Association*. 2007;vol. 53, no. 2, pp. 87–91.
- [13]. S. Mala, C. D. Lynch, F. M. Burke, and P. M. H. Dummer, “Attitudes of final year dental students to the use of rubber dam,” *International Endodontic Journal*. 2009; vol. 42, no. 7, pp. 632–638.
- [14]. D. J.Kleier andK. Shibilski, “Management of the latex hypersensitive patient in the endodontic office,” *Journal of Endodontics*. 1999; vol. 25, no. 12, pp. 825–828.
- [15]. E. Kostı and T. Lambrianidis, “Endodontic treatment in cases of allergic reaction to rubber dam,” *Journal of Endodontics*.2002 ; vol. 28, no. 11, pp. 787–789.
- [16]. Feierabend SA, Matt J, Klaiber B.A. Comparison of conventional and new rubber dam systems in dental practice. *Operative Dentistry*. 2011; 36 (3):243-50.
- [17]. Stewardson DA, McHugh ES. Patient’s attitudes to rubber dam. *International Endodontic Journal*. 2002; 35, 812–819.
- [18]. Redwood C, Winning T, Lekkas D, Townsend G Improving clinical assessment: evaluating students' ability to identify and apply clinical criteria. *European Journal of Dental Education*. 2010; 14(3):136-44.
- [19]. J. M. Whitworth, G. V. Seccombe, K. Shoker, and J. G. Steele, “Use of rubber dam and irrigant selection in UK general dental practice,” *International Endodontic Journal*.2000 ; vol. 33, no. 5, pp. 436–441.
- [20]. Ireland L. The rubber dam – its advantages and application. *Texas Dental Journal* 1962; 80, 6–15.
- [21]. Going RE, Sawinski VJ . Parameters related to the use of the rubber dam. *Journal of the American Dental Association*. 1968;77, 598–601.
- [22]. Joynt RB, Davis EL, Schreier PJ . Rubber dam usage among practicing dentists. *Operative Dentistry*.1989 ; 14, 176–81.
- [23]. Marshall K, Page J . The use of rubber dam in the UK. *British Dental Journal*.1990 ; 169, 286–91.
- [24]. McColl E, Smith M, Whitworth J, Seccombe G, Steele J . Barriers to improving endodontic care: the views of NHS practitioners. *British Dental Journal*. 1999;186, 564–8.
- [25]. Jenkins SM, Hayes SJ, Dummer PMH . A study of endodontic treatment carried out in dental practice within the UK. *International Endodontic Journal*.2001 ; 34, 16–22.