

Rubber dam use among a subpopulation of Nigerian dentists

Christopher I. Udoeye¹⁾ and Hamid Jafarzadeh²⁾

¹⁾Faculty of Dentistry, College of Medicine, University of Nigeria, Enugu Campus, Enugu State, Nigeria

²⁾Department of Endodontics, Faculty of Dentistry and Dental Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

(Received 14 September 2009 and accepted 19 February 2010)

Abstract: In this cross-sectional questionnaire-based study, we surveyed the attitudes toward, knowledge of, and use of rubber dams (RDs) among dentists in southern Nigeria. The questionnaire, which was distributed and collected by one of the authors, requested information on the dentists' background characteristics, attitudes, and knowledge. Data were analyzed with SPSS, and the chi-square was used to assess differences in categorical variables. A total of 100 out of 108 dentists responded (92.6% response rate). The prevalence of RD use was 18%. Dentists in the government sector used RDs more often than did dentists in the private sector. About 77% of dentists had not used RDs or were unaware of how to use them. All specialists had seen RDs, but only 56% had used one in their practice. All dentists believed in the effectiveness of RDs. We conclude that rubber dams are underutilized in this population, and that dentists need to be made aware of the possibility of rubber dam use through an awareness campaign. (*J Oral Sci* 52, 245-249, 2010)

Keywords: rubber dam; Nigerian dentists; prevalence; attitude and knowledge.

Introduction

The use of a rubber dam (RD) is an established technique that has been used for over 100 years in controlling the

oral environment (1). Although they are universally accepted and advocated by recognized authorities, many practicing dentists fail to use RDs in their practice (2).

RDs are useful in endodontology, operative dentistry, and periodontology, and they are widely recommended for use in developed countries (3,4). They are excellent for infection control and a great aid in soft tissue retraction. In addition, RDs prevent aspiration of fine instruments, provide a dry operating field, and allow treatment of patients with sensitive gag reflexes (5,6). However, RDs are believed to generate more controversy than any other dental device or technique (7). It is widely believed that the application of RDs is difficult and time-consuming (8), and that patient noncompliance is a problem. Patient discomfort, insufficient time and training, and cost are frequently cited reasons for the limited use of RDs (9,10).

Going and Sawinski (7) reported RD use was low in the United Kingdom and North America, while Jenkins et al. (11) observed that RDs were not routinely used, even for root canal treatment. In Great Britain, about 5% of dentists in the National Health Service were reported to use RDs more than their colleagues in private practice (12). Marshall and Page (9) reported that RDs were used in 1.4% of operative procedures in the United Kingdom, as compared with 10.9% of endodontic procedures.

Despite the increasing awareness of the need for effective and evidence-based practice, clinical techniques such as RD use have not been assessed in Nigeria. The purpose of this study was to investigate attitudes toward, knowledge of, and use of RDs among a subpopulation of Nigerian dentists.

Participants and Methods

This cross-sectional questionnaire-based study of dentists in southern Nigeria was conducted from January through March 2007. Earlier, a pilot study of all dentists at the

Correspondence to Dr. Hamid Jafarzadeh, Department of Endodontics, Faculty of Dentistry and Dental Research Center, Mashhad University of Medical Sciences, Vakilabad Blvd, Mashhad, P. O. Box: 91735-984, Iran

Tel: +98-511-8829501

Fax: +98-511-7626058

E-mail: hamid_j365@yahoo.com & JafarzadehBH@mums.ac.ir

Table 1 Questionnaire (A: background information, B: respondents' attitudes)

A	
1. Age:	
2. Gender:	<input type="checkbox"/> Male <input type="checkbox"/> Female
3. Experience since graduation (years):	
4. Type of practice:	<input type="checkbox"/> GDP <input type="checkbox"/> Specialist
5. Service sector:	<input type="checkbox"/> Private <input type="checkbox"/> Government
6. During the course of your professional training did you receive any form of foreign training?	<input type="checkbox"/> Yes <input type="checkbox"/> No
7. I have heard of RDs:	<input type="checkbox"/> No <input type="checkbox"/> As undergraduate <input type="checkbox"/> As specialist <input type="checkbox"/> In practice
8. I have seen one:	<input type="checkbox"/> Yes <input type="checkbox"/> No
9. RDs are available where I practice:	<input type="checkbox"/> Yes <input type="checkbox"/> No
10. I have used an RD:	<input type="checkbox"/> Yes <input type="checkbox"/> No
B	
11. I have forgotten how to use an RD:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Other
12. RDs are cumbersome and difficult to apply:	<input type="checkbox"/> Yes <input type="checkbox"/> No
13. Intracoronal restorations can be placed more quickly when an RD is used:	<input type="checkbox"/> Yes <input type="checkbox"/> No
14. RD use may influence the success rate of amalgam restoration:	<input type="checkbox"/> Yes <input type="checkbox"/> No
15. RDs offer give access to the operating site when restoring teeth:	<input type="checkbox"/> Yes <input type="checkbox"/> No
16. A higher clinical standard is possible when restorations are placed under an RD:	<input type="checkbox"/> Yes <input type="checkbox"/> No
17. Restorations placed under an RD have greater longevity than those placed without one:	<input type="checkbox"/> Yes <input type="checkbox"/> No
18. My patients don't like RDs:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Other

GDP: General dental practitioner
RD: Rubber dam

Table 2 Age and sex distribution of respondents

Age (Yrs)	n (%)	Men (%)	Women (%)
<30	1 (1.0)	0 (0.0)	1 (100.0)
30-39	71 (71.0)	43 (60.6)	28 (39.4)
40-49	24 (24.0)	18 (75.0)	6 (25.0)
50-59	4 (4.0)	3 (75.0)	1 (25.0)

$\chi^2 = 3.61; P = 0.306$

University of Nigeria Teaching Hospital (UNTH), Enugu was conducted to test the adequacy of the questionnaire as a measuring instrument. After this pilot study, minor modifications to the questionnaire were made. The modified questionnaire was then distributed to the dentists in this study. Both distribution and collection were done by the same person. Unfortunately, there is no reliable register of dentists in southern Nigeria. Informed consent was obtained from all respondents. The respondents' background data and other information were recorded on the questionnaire (Table 1). The data were then analyzed with SPSS, version 6 after simple frequencies were

calculated and cross-tabulation was performed. The chi-square test was used for the analysis, and a *P* value of <0.05 was considered statistically significant.

Results

Of the 108 dentists recruited for the study, 100 submitted useable questionnaires (response rate 92.6%). The age range was 29-51 years, and the mean ages were as follows: population (36.58 ± 5.31 years), men (37.03 ± 5.59 years), and women (35.78 ± 4.75 years). The mean numbers of years in practice were as follows: population (8.45 ± 5.23), general dental practitioners (GDPs; 8.4 ± 5.28), specialists (8.01 ± 4.58), men (9.16 ± 5.89), and women (7.19 ± 3.63).

Sixty-five (65%) respondents were men and 35 (35%) were women. A total of 71 (71%) respondents were aged 30-39 years: 43 men and 28 women. Twenty-four were aged 40-49 years, 4 were aged 50-59 years, and 1 was younger than 30 years (*P* = 0.003; Table 2).

Eighteen (18%) dentists had used an RD. Of the 9 (9%) dentists that had received training in a country other than Nigeria, 6 (66.7%) had used an RD and 3 (33.3%) had not (*P* < 0.0001). Fourteen (77.8%) dentists in the government

Table 3 Characteristics of rubber dam (RD) users and nonusers

Used RD	Foreign training		Service sector		Type of practice		Years in practice			
	Yes	No	Private	Government	GDP	Specialist	≤ 5	6-10	11-15	>15
Yes	6	12	4	14	11	16	6	8	3	2
No	3	78	12	69	64	17	25	38	8	10
	$\chi^2 = 15.64$ $P < 0.0001$		$\chi^2 = 0.60$ $P = 0.44$		$\chi^2 = 1.60$ $P = 0.21$		$\chi^2 = 0.87$ $P = 0.83$			

GDP: General dental practitioner

Table 4 Respondents' attitudes to RDs

No.	Item	Response (%)		
		Yes	No	Other
1	I have forgotten how to use an RD.	13 (13.0)	10 (10.0)	77 (77.0)
2	RDs are cumbersome and difficult to apply.	51 (51.0)	49 (49.0)	-
3	Intracoronar restorations can be placed more quickly when an RD is used.	92 (92.0)	8 (8.0)	-
4	RD use may influence the success rate of amalgam restoration.	93 (93.0)	7 (7.0)	-
5	RDs give better access to the operating site when restoring teeth.	93 (93.0)	7 (7.0)	-
6	A higher clinical standard is possible when restorations are placed under an RD.	99 (99.0)	1 (1.0)	-
7	Restorations placed under an RD have greater longevity than those placed without one.	100 (100.0)	0 (0.0)	-
8	My patients don't like RDs.	4 (4.0)	17 (17.0)	79 (79.0)

Table 5 Knowledge of rubber dams (RDs) among respondents, by type of practice

Item	Type of practice				Chi-square test
	GDP		Specialist		
	No	Yes	No	Yes	
I have heard of RDs.	1.3	74 (98.7)	0 (0.0)	25 (100)	$\chi^2 = 3.4$; $p = 0.562$
I have seen RDs.	24 (32.0)	51 (68.0)	0 (0.0)	25 (100)	$\chi^2 = 10.53$; $P = 0.001^*$
RDs are available where I practice.	55 (73.3)	20 (26.7)	11 (44.0)	14 (56.06)	$\chi^2 = 7.19$; $P < 0.0001^*$
I have used RDs.	64 (85.3)	11 (14.7)	7 (46.7)	8 (53.3)	$\chi^2 = 3.66$; $P = 0.06$

* Statistically significant, GDP: General dental practitioner

sector had used an RD, as compared with 4 (22.2%) in the private sector; the difference was not significant ($P > 0.05$). Eleven GDPs had used RDs, as compared with 6 specialists ($P > 0.05$). Eight (42.1%) dentists with 6-10 years' experience in practice had used an RD, as had 6 (31.6%) with <5 years practice experience and 3 (15.8%) with 11-15 years' experience. Among dentists with the longest experience in practice (>15 years), 2 (10.5%) had used RDs; the proportion of RD users was lowest among dentists with the longest experience in practice (Table 3).

Respondents' attitudes to RD are shown in Table 4, and

their knowledge of RD and type of dental practice are shown in Table 5.

Discussion

The predominance of men among the respondents in the present study is consonant with the findings of Lynch and McConnell (6) in their study of Irish general dentists, but not with those of Soldani and Foley (13), who studied pediatric specialists in the United Kingdom. The reason for the high proportion of men in the current study is that, in Nigeria, men are more likely to study dentistry than are

women. In general, a dental license requires 6 years of education, and specialization requires another 6 years. Most Nigerian women prefer professions with shorter periods of qualification, as they desire to start a family soon after completing their university education.

In both the current study and that of Lynch and McConnell (6), more respondents were aged 30-39 years than in the study of Soldani and Foley (13), in which more than 50% of respondents were aged 40-50 years. This difference may be due to differences in the design of the studies.

The limited use of RDs noted in the current report agrees with the findings of most previous studies. This widespread disregard for RDs, despite their acknowledged advantages, was recognized by Silversin et al. (12) when he observed that probably no other technique, treatment, or instrument used in dentistry is so universally accepted and advocated by the recognized authorities and so universally ignored by practicing dentists. Joynt et al. (14) reported that an RD was used in 62% of endodontic procedures, but in only 17% to 19% of restorative procedures.

The factors responsible for underutilization of RDs in this population include cost, and lack of training, availability, and acceptance. In Nigeria, patients living in cities are more likely to accept RDs than are those living in rural areas. Similarly, educated Nigerians are more likely to accept RDs than those who are less educated. The way forward lies with both professional bodies and the federal government. Both should mount enlightenment campaigns, in print and electronic media, while the government addresses the cost of RDs. Furthermore, the Nigerian National Health Insurance Scheme should be broadened to cover techniques such as RD use.

In the present report, dentists in the government sector used RDs more often than dentists in the private sector did; however, in England it has been reported (15) that RD use was greater among dentists in the private sector than among those in the National Health Service. It may be that, in Nigeria, dentists in the private sector are under greater time and financial constraints than their counterparts in the government sector.

In the present study, most of the respondents believed that intracoronal restorations can be placed more quickly when an RD is used. Also, most stated that the use of an RD influences the success rate for amalgam restoration. In addition, 93% of respondents stated that an RD gives better access to the operating site when restoring teeth, and 99% of respondents believed that a higher clinical standard is possible when restorations are placed using an RD. It is interesting to note that all respondents stated that

restorations placed using an RD have greater longevity than those placed without an RD.

A striking aspect of the present study is the positive attitude toward RDs in the majority of respondents, among whom RD use was associated with high-quality dentistry. However, it should be noted that some studies have reported that RDs resulted in no clinical difference in treatment outcomes. Soldani and Foley (13) maintain that until randomized controlled trials with long-term follow up are conducted, the issue of whether RDs improve the quality of dentistry is unresolved. One wonders why RD use was limited among participants in the current study, given the beliefs in RD effectiveness expressed by the majority. The reason may be that 77% had not used an RD or were unaware of how to use one. This suggests that RDs are not available in practice, that they are perceived as cumbersome, that they result in patient noncompliance, and/or that dentists lack the competence to use them. It is not surprising that all specialists have seen an RD, as compared with only 67% of GDPs. Specialists are more likely to be exposed to RD technique during the course of their specialization. In Nigeria, specialization is rigorous and one takes postings in related fields to qualify as a specialist. All specialists have seen an RD, while only 56% use them in their practice. All dentists, however, believe in the effectiveness of RDs. Because RDs are underused in this study population, it seems that dentists need to be sensitized to RD use through an awareness campaign. We recommend that such an awareness campaign be mounted both in print and electronic media by relevant professional bodies and the Nigerian federal government.

References

1. Rule RW (1931) Rubber dam: its use and adjustment. *Pac Dent Gas* 39, 541-556.
2. Ireland L (1962) The rubber dam. Its advantages and application. *Tex Dent J* 80, 6-15.
3. Rugg-Gunn AJ, Welbury RR, Toumba J (2001) British Society of Paediatric Dentistry: a policy document on the use of amalgam in paediatric dentistry. *Int J Paediatr Dent* 11, 233-238.
4. Fayle SA, Welbury RR, Roberts JF (2001) British Society of Paediatric Dentistry: a policy document on management of caries in the primary dentition. *Int J Paediatr Dent* 11, 153-157.
5. Cochran MA, Miller CH, Sheldrake MA (1989) The efficacy of the rubber dam as a barrier to the spread of microorganisms during dental treatment. *J Am Dent Assoc* 119, 141-144.
6. Lynch CD, McConnell RJ (2003) The use of microabrasion to remove discolored enamel: a

- clinical report. *J Prosthet Dent* 90, 417-419.
7. Going RE, Sawinski VJ (1968) Parameters related to the use of the rubber dam. *J Am Dent Assoc* 77, 598-601.
 8. Jinks GM (1966) Rubber dam technique in pedodontics. *Dent Clin North Am*, 327-340.
 9. Marshall K, Page J (1990) The use of rubber dam in the UK. A survey. *Br Dent J* 169, 286-291.
 10. Gergely EJ (1989) Desmond Greer Walker Award. Rubber dam acceptance. *Br Dent J* 167, 249-252.
 11. Jenkins SM, Hayes SJ, Dummer PM (2001) A study of endodontic treatment carried out in dental practice within the UK. *Int Endod J* 34, 16-22.
 12. Silversin B, Shafer M, Sheiham A, Smales FC (1975) The teaching and practice of some clinical aspects of endodontics in Great Britain. *J Dent* 3, 77-80.
 13. Soldani F, Foley J (2007) An assessment of rubber dam usage amongst specialists in paediatric dentistry practising within the UK. *Int J Paediatr Dent* 17, 50-56.
 14. Joynt RB, Davis EL, Schreier PH (1989) Rubber dam usage among practicing dentists. *Oper Dent* 14, 176-181.
 15. No author (1983) A survey of endodontics in general practice in England. *Br Dent J* 154, 222-224.