

Knowledge and motivation of Nigerian dental students towards the use of rubber dam

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Abstract

Objective: To investigate the knowledge, familiarity and disposition of final year dental students in Nigeria to the use of rubber dam.

Method: A cross-sectional survey of final year dental students was undertaken in three selected dental schools within the southern part of Nigeria. The survey employed an anonymous structured questionnaire to determine the extent of familiarity, knowledge of importance, exposure to the use, and variety of operative and endodontic procedures for which the use of rubber dam was thought to be mandatory. Furthermore, the questionnaire sought to know whether the students have been able to use the instrument on their own and if they would continue to use it in their future practice.

Results: All the students (100%, n=76) agreed to the importance of rubber dam. Varying proportions of students were of the opinion that the use of rubber dam is mandatory for a variety of restorative and endodontics procedures. Only 62.3% (n=48) had seen rubber dam before, 60.5% (n=46) had been taught how to fix rubber dam. Majority of the respondents (97.3% n= 74) claimed that rubber dam was not routinely used on patients in their schools. Barely 26.3% (n=20) of the students indicated to continue the use of rubber dam in their future practice.

Conclusion: Exposure and utilization of rubber dam at the dental schools is poor. Therefore, the routine use of rubber dam by dental educators during undergraduate training is recommended to improve motivation and promote global best practices among Nigerian dentists.

Key words: Dental students, restorative dentistry, endodontics, rubber dam

Introduction

The use of Rubber dam was first introduced in dentistry by SC Barnum in 1860¹. Since then, Rubber dam has been established as an effective and reliable tool for tooth isolation in clinical dentistry⁽¹⁾. The advantages are numerous; including, but not limited to cross infection control, protection against patients' ingestion or aspiration of restorative materials and/or instruments, and protection of restorative materials from moisture contamination during restorative and endodontic procedures^(2,3). Hence, rubber dam has become an important subject in dental education with many dental schools making its use mandatory during restorative and endodontic procedures⁽⁴⁾. In fact, some regulatory dental professional organizations such as the American Academy of Pediatric Dentistry (ACPD)⁽⁵⁾ and the European Society of Endodontology (ESE)⁽⁶⁾ currently insist on the use of rubber dam during endodontic procedures as a standard of care. A study by Withworth et al⁽⁷⁾ in the year 2000 revealed that recent graduates were more likely to routinely use rubber dam than older dental practitioners. This was corroborated

by a more recent study conducted by Al-abdulwahhab et al⁽⁸⁾ which showed that recent dental interns believed in the use of rubber dam, used it frequently and were very enthusiastic about usage in the future. However, other authors^(4,9-12) have reported a decline in the use of rubber dam by dentists, years after graduation. In an opinion poll to elicit the reason for this downturn, majority of the students and dentists polled actually reported that their dental school training in the use of rubber dam was adequate. The authors therefore suggested a modification to the teaching methods on rubber dam towards greater emphasis on its relative advantages based on evidence. In Nigeria, neither is the use of rubber dam yet a common practice in clinical dental practice⁽¹³⁾ nor is there any evidence to suggest greater enthusiasm for its use among recent dental graduates. Therefore, this study was designed to investigate the knowledge, exposure and disposition of final year dental students in Nigeria regarding the use of rubber dam for now and for the future.

Materials and method

Fully accredited and qualifying dental schools in Nigeria are almost exclusively based in the Southern part of the country. Hence, a cross-sectional survey of the final year dental students in 3 selected dental schools within the South-west and South-south geopolitical zones was conducted during the academic year of 2011/2012. The selected dental schools included the Obafemi Awolowo University dental school (OAUDS) at Ile-Ife, the University of Benin dental school (UniBenDS), and the University of Port Harcourt dental school (UniPortDS). The final year undergraduate classes were targeted because of their maximum clinical exposure and level of attainment within the dental education curriculum during the year. Informed verbal consent was obtained from all participants prior. Participation was by voluntary involvement, following an explanation of the study objectives and protocol. The participants were assured of strict confidentiality on information provided.

The study employed an anonymous, self-administered, structured questionnaire. The questionnaire was developed following literature review, experts' discussion and opinion analysis. The instrument was designed to collect information on demographics, extent of familiarity, knowledge of importance, exposure to the use, and variety of operative and endodontic procedures for which the use of Rubber dam was thought to be mandatory. Furthermore, the questionnaire sought to know whether the students have been able to use the instrument on their own, how often they did and if they would continue to use it in their future practice. The survey instrument was estimated to

take no more than five minutes to complete and were distributed and collected from the participants on the same day. Information and data collected were entered into an electronic database and analysed using SPSS® for windows® V.20.0.

Result

A total of 95 questionnaires were distributed of which 76 (80% response rate,) were properly completed, returned and analyzed. The number of completed questionnaire per institution were OAUDS: 90.5%, (n = 38) UniBenDS: 65.9 % (n=29), UniportDS: 100%, (n= 9). Of the respondents, 50 (65.8%) were males while 26(34.2%) were females and all were within the age range of 20-36 years.

All the students (100%, n=76) agreed on the importance of rubber dam. Varying proportions of students were of the opinion that the use of rubber dam is mandatory for a variety of restorative and endodontics procedures including; amalgam filling (64.5%, n=49), composite restorations (59.2%, n=45), root canal therapy (85.5%, n=65) and pulp capping (61.7%, n=51) (**Table 1**). Most respondents (62.3%, n=48) had seen rubber dam before, 60.5% (n=46) had been taught how to fix rubber dam through clinical demonstrations whereas none of the respondents had ever personally used rubber dam on a patient. Majority of the respondents (97.3% n= 74) claimed that rubber dam was not routinely used on patients in their schools. Barely 26.3% (n=20) of the students indicated to continue the use of rubber dam in their future practice while 64.5% (n= 49) were undecided.

On their confidence in fixing rubber dam on patients the response is shown in (**Table 1**).

Table 1: Questions and responses of the students

Questions	Responses			
	Yes (n, %)	No (n, %)	Not sure (n, %)	
1. I have seen a rubber dam before	48(63.2)	28(36.8)		
2. I have been taught by demonstration how to fix a rubber dam	46(60.5)	30(39.5)		
3. I have fixed a rubber dam on a patient	-	76(100)		
4. Rubber dam use is important during restorative procedures	76(100)	-	-	
5. Rubber dam use is compulsory during the following procedures				
a. Amalgam filling	49(64.5)	19(25.0)	8(10.5)	
b. Composite restoration	45(59.2)	16(21.1)	15(19.7)	
c. Root canal therapy	51(67.1)	13(17.1)	12(15.8)	
d. Pulp capping procedures				
6. I can confidently fix rubber dam on patients	3(3.9)	56(73.7)	17(22.4)	
7. I feel rubber dam use is a waste of time	2(2.6)	63(82.9)	11(14.5)	
8. I will consistently use rubber dam after I graduate	21(27.6)	7(9.2)	48(63.2)	
	Always (n, %)	Sometimes (n, %)	Rarely (n, %)	Never (n, %)
9. I use rubber dam on my patients	-	1(1.3)	1(1.3)	74(97.4)
10. Rubber dam is available in our clinics for our use	-	4(5.3)	17(22.4)	55(72.4)

Discussion

The relative proportion of participants from the selected schools showed a comparatively low participation from UniportDS. This is a reflection of age and approved in-take capacity of the schools; UniportDS being a newly accredited school with the least annual in-take.

Although Ogunbodede⁽¹⁴⁾ had predicted a balancing in the female to male dentists ratio by 2015, our study population still reveals an in-balance in favour of the male population. In an earlier study of the use of rubber dam among Nigerian dentists, Udoye and Jafarzadeh⁽¹³⁾ noted a gender tilt in favour of males; a similar observation has been made in this study among the final year dental students. We tend to subscribe to these authors' opinion that the length of stay at the dental school might possibly discourage females' enrollment.

The importance of rubber dam in restorative and endodontic practice is already well documented^(2, 15). It is therefore no surprise that all the respondents in the present study agreed on this fact. This suggests that the importance of rubber dam use is being sufficiently stressed in the teachings at the dental schools. Paradoxically, this study, just like Udoye and Jafarzadeh's⁽¹³⁾ observed that the knowledge of importance exhibited by participants does not correlate to clinical utilization of the device.

Participants were further queried on the relative importance of rubber dam for various restorative and endodontic procedures. Their responses were in contrast to some other published students' studies. A higher proportion (64.5%) of our respondents believed rubber dam use should be compulsory during amalgam filling while a lower proportion (59.2%) shared the same opinion about composite restorations. This response is in contrast to published data which seems to indicate that composite restoration is more moisture sensitive than amalgam filling^(16,18) and as such rubber dam use should be compulsory. It varies from the study by Mala et al⁽¹⁹⁾ in Wales and Ireland which found that final year students never or rarely used rubber dam during amalgam filling. Other studies carried out among dentists in other countries have similarly reported low utilization of rubber dam during amalgam restorations^(20,21).

Rubber dam has been said to be an essential component of adhesive dentistry and some studies⁽¹⁶⁻¹⁸⁾ have highlighted that its use ensured better and long lasting composite restorations. Though this was not corroborated by Smales⁽²²⁾ study in 1993, which did not find significant difference in quality of direct anterior composite irrespective of whether rubber dam was used or not. However, since composite resin placement is more technique sensitive and requires absolute isolation to prevent bond failure, compulsory use of rubber dam should be advocated, at least during predoctoral training. This is due to the fact that in predoctoral clinics, students usually do not have constant assisting from dental assistants and so good moisture control with these methods may be unachievable. Thus the compulsory use of rubber dam for most adhesive restorations and endodontics is the practice in most dental schools^(4,23,24).

In endodontic therapy the use of rubber dam is regarded as a standard of care. In fact, most well established dental schools abroad mandate its use for all endodontic procedures^(4,24). This study population obviously believed in this as shown by the high percentage (85.5%) of

respondents who indicated that rubber dam should be compulsory for root canal therapy. Several studies among students have indeed shown a greater use of rubber dam during endodontic treatment compared to pure restorative treatments^(11,21,25). This implies that faculties and clinical supervisors are probably more insistent on the use of rubber dam during endodontics than other restorative procedures. However, Udoye and Jafarzadeh⁽¹³⁾ showed that the use of rubber dam for root canal therapy was still low among Nigerian dentists.

Asepsis is of critical importance to the success of pulp capping thus justifying the importance of rubber dam during the procedure. This fact was not well appreciated by our respondents as only 67.1% believe rubber dam is relevant for pulp capping. Accorinte et al⁽²⁶⁾ showed poorer prognosis in teeth that direct pulp capping was done using dentine bonding agents without rubber dam isolation compared to those for which rubber dam was used.

Unlike some foreign studies^(4,19,24) which examined students' attitude to, frequency of use and categories of patients (adults or children) on which students used rubber dam, our subjects only had lectures and clinical demonstrations, hence it was impossible for us to evaluate the adequacy of their training in rubber dam. This calls for concern and for modification of teaching methods to both stress the advantages and enhance clinical proficiency with rubber dam use during dental training in Nigeria. Whitworth et al⁽⁷⁾ had opined that the qualifying dental school has a significant impact on the use of rubber dam in future by its graduates. Not only did all the respondents in this study claim never to have fixed rubber dam on a patient; they also expressed that rubber dam was rarely used by the teachers at the clinics in their various school. So the dental schools have a huge task of ensuring that their students have the opportunity and materials to practice so they can become proficient in use of rubber dam.

While it is important to teach unto clinical proficiency, emerging evidence suggests that adequacy of training is not sufficient to motivate and entrench the use of rubber dam in a practicing dentist after graduation. Clark et al⁽²⁷⁾ after a survey, found that most dentists discarded a lot of techniques they had learnt in the dental schools after graduation. Some claimed that with longer practice experience, some of the learnt techniques were not quite essential to efficient dentistry. The same attitude was noted in several studies^(4,9-12) in respect of rubber dam use. Ironically, the reasons often given did not include inadequacy of training rather, majority of the students and dentists polled actually confirmed that their dental school training in the use of rubber dam was quite adequate. This is contrary to Murray et al's⁽²⁸⁾ opinion that insufficient exposure during undergraduate years leads to lack of confidence; therefore the reason why dentists do not perform some taught techniques in their post graduation practices. However, this opinion might apply in the case of our respondents who expressed low confidence in their ability to use rubber dam stemming from the fact that they have neither used rubber dam on their patients nor was it frequently used by their trainers. A similar observation was noted by Soldani and Foley⁽²⁹⁾ where dentists claimed that their non use of rubber dam was as a result of being taught by dentists who cannot / do not use it too. It is therefore expedient for dental educators themselves to be seen consistently using rubber dam during restorative and

endodontic procedures to encourage and motivate the trainees.

Among the reasons often given for low utilization of rubber dam by practicing dentists is that it is time consuming^(11-12,29). However, it has been shown that consistent use of rubber dam improved proficiency and decreased the time taken to fix it. In fact, the time seemingly wasted in fixing the device was regained by the efficient barrier and moisture control produced as procedures were much less frequently interrupted⁽¹²⁾. With consistent practice, most dentists and students were able to place rubber dam between 3-5 minutes^(4,12,30). This can be achieved during the waiting time for the onset of local anaesthesia. When asked about time consumption for fixing rubber dam, majority of respondents in the present study were of the opinion that rubber dam fixing is not time wasting. However, their opinion may not count since they have already expressed poor exposure and lack of personal experience in the procedure.

On a promising note, Withworth⁽⁷⁾ had shown that contemporary dental students seem to have a higher enthusiasm for the use of rubber dam than older dental graduates. This has been attributed to a paradigm shift in the teaching methods which currently emphasizes the advantages of use based on quality scientific evidence in addition to adequate hands-on practice at the dental schools^(10,11). Contrary to this observation, 63.2% of Nigerian final year dental students sampled in this study were undecided on whether they would use rubber dam or not in their future practice. This disposition is traceable to their poor exposure and low motivation as demonstrated in this survey. Udoye et al⁽³¹⁾ in their recent publication showed that cotton wool isolation was the major method of moisture control amongst their sample population. Most of the respondents were between 6 -10 years' post graduation and this might imply that training in use of rubber dam in Nigerian dental school has not improved over the years after their initial publication⁽¹³⁾ which showed lack of training as a contributor to non usage of rubber dam. With proper review of approach to teaching in line with global best practices, this attitude can be changed.

This was the response from the dental schools surveyed as at 2012, it would be interesting to reexamine these schools as well as the remaining dental schools to see if these findings are a national issue as well as note if changes in training has occurred.

Conclusion

In conclusion, this study, as well as the previous study by Udoye and Jafarzadeh⁽¹³⁾, has revealed the deficiency of training, low level of utilization and poor motivation for the use of rubber dam among dentists and dental students in Nigeria. This hopefully will ginger the consciousness of dental educators and local regulatory professional organizations such as the Nigerian Dental Association. The desired reaction is a kindling of the process of curriculum review in the dental schools to accommodate better teaching approaches in line with global best practices on the use of rubber dam. In addition, new policy statements need be pronounced on expected standard of care in restorative and endodontic practices in Nigeria.

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References

1. Winkler R. Sanford Christie Barnum- inventor of rubber dam. *Quintessenz* 1991; 42:483-486.
2. Cohen S, Schwartz SF. Endodontic complications and the law. *J Endodo* 1987; 13: 191197.
3. Forrest W, Perez RS. The rubber dam as a surgical drape: protection against AIDS and hepatitis. *J Acade Gen Dent* 1989; 37:236237.
4. Ryan W, O'Connel A. The attitudes of undergraduate dental students to the use of the rubber dam. *J Iri Dent Assoc* 2007; 53:87-91.
5. American Academy of Pediatric Dentistry. Guidelines on pulp therapy for primary and young permanent teeth. *Pediac Dent* 2009; 30: 170-174.
6. European Society of Endodontology. Consensus report of the European Society of Endodontology on quality guidelines for endodontic treatment. *Int Endod J* 2006; 39:921-930.
7. Whitworth JM, Seccombe GV, Shoker K, Steele JG. Use of rubber dam and irrigant selection in UK general dental practice. *Int Endod J* 2000; 33:435-41.
8. Al-Abdulwahhab BM, Al-Thabit H, Al-Harthi A, Shamina R, Al-Ashgai A, Al-Qabbani F, Al-Ghamdi S, Al-Taher R. The attitudes of dental interns to the use of the rubber dam at Riyadh dental colleges. *Saudi Endod J* [serial online] 2012 [cited 2014 July 20]; 2:75-9. Available from: <http://www.saudiendodj.com/text.asp?2012/2/2/75/108153>.
9. Going RE, Sawinski VJ. Frequency of use of the rubber dam: a survey. *J Am Dent Assoc* 1967; 75:158-166.
10. Joynt RB, Davis EL, Schreier PJ. Rubber dam usage among practicing dentists. *Oper Dent* 1989; 14: 176-181.
11. Hill EE, Rubel BS. Do dental educators need to improve their approach to teaching rubber dam use? *J Dent Educ* 2008; 72:1177-1181.
12. Abraham SB, Rahman B, Istarabadi A, Ali Mahmoud AH, Danielle Q. Attitudes towards use of rubber dam in private practices in the United Arab Emirates. *Saudi Endod J* 2012; 2:142-146.
13. Udoye CI, Jafarzadeh H. Rubber dam use among a subpopulation of Nigerian dentists. *J Oral Sci* 2010; 52:245-249.
14. Ogunbodede EO. Gender Distribution of Dentists in Nigeria, 1981 to 2000. *J Dent Educ* 2004; 68:115-118.
15. Cochran MA, Miller CH, Sheldrake MA. The efficacy of the rubber dam as a barrier to the spread of microorganisms during dental treatment. *J Am Dent Assoc* 1989; 119:141144.
16. Chapman TE. Why no dental dam? *J Am Dent Assoc* 1993; 124:126.
17. Barghi N, Knight GT, Berry TG. Comparing two methods of moisture control in bonding to enamel: a clinical study. *Opera Dent* 1991; 16:130-135.



18. Small BW. The rubber dam: a step toward clinical excellence. *Compendium Continuing Educ Dent* 2002; 23:276-280,282.
19. Mala S, Lynch CD, Burke FM, Dummer PM. Attitudes of final year dental students to the use of rubber dam. *Int Endod J* 2009; 42:632-638 doi: 10.1111/j.1365-2591.2009.01569.x.
20. Burke FJT, McHugh S, Hall AC, Randall RC, Widstrom E, Forss H. Amalgam and composite use in UK general dental practice in 2001. *Br Dent J* 2003; 194:613-618.
21. Lynch CD, McConnell RJ. Attitudes and use of rubber dam by Irish general dental practitioners. *Int Endod J* 2007; 40:427-432.
22. Smales RJ. Effect of rubber dam isolation on restoration deterioration. *Am J Dent* 1992; 5: 277-279.
23. Lynch CD, McConnell RJ, Wilson NHF. The teaching of posterior composite resin restorations in undergraduate dental schools in Ireland and the United Kingdom. *Eur J Dent Educ* 2006; 10:38-43.
24. Al-Hadi D, Hashim R, Al-Ali F. Dental Students' Attitudes To The Use Of Rubber Dam In United Arab Emirates | *Int Dent Med Res* 2013; 6:20-24.
25. Marshall K, Page J. The use of rubber dam in the UK. *Br Dent J* 1990; 169:286-291.
26. de Lourdes Rodrigues Accorinte M, Reis A, DouradoLoguercio A, Cavalcanti de Araujo V, Muench A. Influence of rubber dam isolation on human pulp responses after capping with calcium hydroxide and an adhesive system. *Quintessence Int* 2006; 37:205-212.
27. Clark DM, Oyen OJ, Feil P. The use of specific dental school-taught restorative techniques by practicing clinicians. *J Dent Educ* 2001; 65:760-765.
28. Murray FJ, Blinkhorn AS, Bulman J. An assessment of the views held by recent graduates on their undergraduate course *Eur J Dent Educ* 1999; 3:3-9.
29. Soldani F, Foley J. An assessment of rubber dam usage amongst specialists in paediatric dentistry practising within the UK. *Int J Paediatr Dent* 2007; 17:50-56.
30. Stewardson DA, McHugh ES. Patients attitude to rubber dam. *Int Endod J* 2002; 35: 812-819.
31. Udoye CI, Sede MA, Jafarzadeh H, Abbott PV. A Survey of Endodontic Practices amongst Dentists in Nigeria. *J Contemp Dent Pract* 2013; 14:293-298.