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A survey on Rubber Dam Usage among Students during Dental Treatment

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Abstract

Introduction: The use of rubber dam is an excellent means of providing infection control during dental treatment by reducing bacterial contamination of prepared cavities, root canal system and reducing the transmission of infections between dentist and patient. Rubber dam is recommended for various restorative and endodontic procedures. This study was conducted to evaluate the attitude toward the use of rubber dam in clinical practice by students of a private dental school. The rubber dam is considered to be the greatest benefit to patients' safety. **Materials and Methods:** A prepiloted questionnaire was prepared and distributed to 120 junior students in private dental college. The questionnaire included various aspects on rubber dam use in dental procedures such as indications, advantages difficulty in application. Statistical analysis done by using Chi-square test and used for comparison of qualitative data ($P < 0.05$) was estimated. **Results:** 79.3% males accepted that rubber dam is adequate usage in dental school training and 20.7% opinionated that training is inadequate. 81.7% females accepted that it is adequate and 18.3% accepted that it is not. **Conclusion:** The response to the questionnaire was mixed among the participants which was statistically significant. It is very much necessary to increase the awareness among practitioners to the benefits of a rubber dam usage by means of continuing education. Rubber dam will make dentistry much faster, easier, and safer for both practitioners and patients.

Keywords: Clamp, clinical standard, dental school, restoration, rubber dam

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INTRODUCTION

Rubber dam has been considered as an ideal method to control infection in the oral environment. It was introduced in dentistry in 1864 by S. C. Barnum, a New York City dentist. To provide isolation, to create an aseptic area, and to prevent the ingestion of irrigants, rubber dam application has been in practice for more than 150 years.[1]

It offers various advantages such as dry, clear operative field, improved access and visibility, soft tissue protection and retraction during operative procedures, prevention of infection transfer and aspiration of instrument and materials and also for the patients who are sensitive to gag reflex.[2,3]

Although universally accepted, dentists fail to use it in their daily practice.[4] It has been widely recommended in developed countries.[5,6] It is consider to be an essential component in modern restorative dentistry.[7,8] Many dental schools emphasize all students to use to the rubber dam during all operative procedures, the matter of concern is whether they strongly adopt using rubber dam throughout their dental practice.[9]

In spite of all recommendations, its wide range of functions is often overlooked by dental practitioners.[10-12] Literature shows rubber dam in pediatric dentistry has been on use for more than 100 years.[13] The present questionnaire-based survey aimed to assess students' perspective on the use of rubber dam in routine dental practice.

MATERIALS AND METHODS

A pre piloted questionnaire was prepared and distributed to 120 interns and postgraduate students of private dental collage, Chennai. The questionnaire included various aspects on rubber dam use in dental procedures such as indications, advantages difficulty in application. Statistical analysis was done by using Chi-square test and significance ($P < 0.05$) was estimated.

Table 1: Questionnaire

1. Gender
   a) Male
   b) Female
2. Training in dental school on the use of rubber dam
   a) Adequate
   b) Inadequate
3. Greatest advantage offered by the rubber dam
   a) Provision of isolation and an aseptic working area
   b) Preventive of swallowing or aspirating materials
   c) Preventing the ingestion of irrigants
4. What is the major factor that makes rubber dam application difficult?
   a) Selection of clamp and its adaptation
   b) Placement of rubber dam
   c) Placement of the frame
5. Rubber dam is not a helpful adjunct because
   a) I experience difficulty during application
   b) I believe that it consumes time
   c) I believe patients do not like it.
6. Is patient explained about need to use rubber dam?
   a) Yes
   b) No
7. Patient opinion on rubber dam application
   a) Doctors benefit
   b) Their benefit
   c) Both
8. Patient experience with rubber dam
   a) Pleasant
   b) Uncomfortable
   c) Painful
9. Do you ask your patient whether they have latex allergy before rubber dam usage
   a) Yes
   b) No
10. Patient preference on rubber dam to be during next dental treatment
   a) Yes
   b) No
11. Which procedure you feel it is mandatory to use rubber dam
   a) Amalgam filling
   b) Composite resin filling
   c) Root canal treatment
   d) All the above
12. Your most common reason not to use rubber dam for restorative procedure is
   a) Time and cost
   b) Inconvenience
   c) Patients refusal
13. Do you feel that the rubber dam has any effect on your restorative procedures
   a) Yes
   b) No
14. A higher clinical standard is possible when restorations are placed under a rubber dam
   a) Yes
   b) No
15. Restorations placed under the rubber dam have greater longevity than those placed without
   a) Yes
   b) No
16. You believe rubber dam prevents contamination
   b) No
17. Do you use rubber dam in pediatric patients
   a) Yes
   b) No
18. Time taken to apply rubber dam
   a) Seconds
   b) Minutes
19. Do you use of rubber dam in private practice following graduation
   a) I strongly believe that it is helpful tool
   b) I only use it because I am obliged to
20. Following graduation
   a) I intend to use the rubber dam during all the procedures required
   b) I intend to use only during restorative procedures
   c) I intend to use it only during root canal treatment
   d) I will never use it.

RESULTS

Total respondents were 120 students. Among 120 students, there were 29 males and 91 females refer Table 2. Among them, 79.3% males accepted that rubber dam is adequate usage in dental school training and 20.7% opinionated that training is inadequate. Among females, 81.7% accepted that it is adequate and 18.3% accepted that it is not.

In terms of advantage offered by rubber dam, about 63.3% with statistical significance ($P = 0.037$) mentioned that provision of isolation and an aseptic working area as a top-ranked benefit and 29.2% of students mentioned that prevention of swallowing or aspirating materials as another advantage. 88.3% students agreed that rubber dam prevents contamination but 11.7% said that it is not helpful in preventing contamination refer Table 3.

Refer Table 4 regarding difficulties faced during rubber dam usage, 44.2% students reported that selection of

clamp and its adaptation as their difficulty and 41.7% students felt difficulty in placement of rubber dam. Only 14.2% had difficulty in placement of the frame. 40% students had an opinion that rubber dam is not a helpful adjunct because patients do not like it. 38.3% felt that it consumes time ($P = 0.009$). 45.8% students did not use the rubber dam due to patients' refusal.

Refer Table 5 73.3% students ($P = 0.022$) felt that patients should be explained about rubber dam usage. 42.5% of respondents felt that patients feel rubber dam is used for both doctors and patients benefit; 35% opinioned that it is only for dentists benefit. 62.5% students were of opinion that patients find wearing rubber dam to be uncomfortable. 73.3% of students questioned the patients regarding latex allergy before rubber dam usage. 70.8% ($P = 0.002$) students reported that patients will never prefer wearing the rubber dam next time.

Refer Table 6 majority of the students told that they do not use rubber dam on pediatric patients (78.3%). 50% of students reported that they use rubber dam because it is a helpful tool remaining do it as an obligation. Following graduation, 44.2% students preferred rubber dam only for restorative procedures and 22.5% for all the dental procedures refer Table 8. 15% students said that they will use it only during root canal treatment. 18.3% said that they will never use rubber dam following their graduation.

Refer Table 7 according to 84.2% students, higher clinical standard is possible when restorations are placed under rubber dam while 15.8% did not agree for the same. 47.5% students shared their opinion that rubber dam application is mandatory for all the procedures while 29.2% students reported that it is mandatory only for amalgam restorations refer Table 8 and Graph 1 and Graph 2 for answers given by male and female dentists.

The mean time taken for rubber dam application was 7.72 min for males and 10.55 min for females with a statistical significance ($P = 0.021$) refer Table 9.

Table 2: Answers given by the students regarding the adequacy of rubber dam

Training in dental school on the use of rubber dam	Gender			*P*
	Male, *n* (%)	Female, *n* (%)	Total, *n* (%)	
Adequate	23 (79.3)	75 (82.4)	98 (81.7)	0.706
Inadequate	6 (20.7)	16 (17.6)	22 (18.3)	
Total	29 (100.0)	91 (100.0)	120 (100.0)	

Table 3: Answers given to the questions based on utilization of rubber dam usage

Questions	Options	Total, *n* (%)	*P*
Greatest advantage offered by the rubber dam	Provision of isolation and an aseptic working area	76 (63.3)	0.037
	Prevention of swallowing or aspirating materials	35 (29.2)	
	Preventing the ingestion of irrigants	9 (7.5)	
	Total	120 (100.0)	0.995
Believe rubber dam prevents contamination	Yes	106 (88.3)	
	No	14 (11.7)	
	Total	120 (100.0)	

Table 4: Opinion of students based on the difficulties faced during rubber dam usage

Questions	Options	Total, *n* (%)	*P*
Major factor that makes rubber dam application difficult	Selection of clamp and its adaptation	53 (44.2)	0.771
	Placement of rubber dam	50 (41.7)	
	Placement of the frame	17 (14.2)	
	Total	120 (100.0)	
Rubber dam is not a helpful adjunct because	Difficulty during application	26 (21.7)	0.009
	It consumes time	46 (38.3)	
	Patients do not like it	48 (40.0)	
	Total	120 (100.0)	
Most common reason not to use rubber dam for restorative procedure is	Time and cost	26 (21.7)	0.304
	Inconvenience	39 (32.5)	
	Patients refusal	55 (45.8)	
	Total	120 (100.0)	

Table 5: Answers given by the students regarding rubber dam usage on patients

Questions	Options	Total, *n* (%)	*P*
Patient explained about need to use rubber dam	Yes	88 (73.3)	0.022
	No	32 (26.7)	
	Total	120 (100.0)	
Patient opinion on rubber dam application	Doctors benefit	42 (35.0)	
	Their benefit	27 (22.5)	
	Both	51 (42.5)	0.730
	Total	120 (100.0)	
Patient experience with rubber dam	Pleasant	10 (8.3)	0.451
	Uncomfortable	75 (62.5)	
	Painful	35 (29.2)	
	Total	120 (100.0)	
Do you ask patients whether they have latex allergy prior rubber dam usage	Yes	88 (73.3)	0.187
	No	32 (26.7)	
	Total	120 (100.0)	
Patient preference on rubber dam to be used during next dental treatment	Yes	35 (29.2)	0.002
	No	85 (70.8)	
	Total	120 (100.0)	

Table 6: Student's opinion about rubber dam usage

Questions	Options	Total, *n* (%)	*P*
Use of rubber dam in pediatric patients	Yes	26 (21.7)	0.883
	No	94 (78.3)	
	Total	120 (100.0)	
Use the rubber dam in the clinic because	It is helpful tool	60 (50.0)	0.831
	Obliged to	60 (50.0)	
	Total	120 (100.0)	
Use of rubber dam in private practice following graduation	Intend to use the rubber dam during all the procedures required	27 (22.5)	0.217
	Intend to use only during restorative procedures	53 (44.2)	
	Intend to use it only during root canal treatment	18 (15.0)	
	Will never use it	22 (18.3)	
	Total	120 (100.0)	

Table 7: Students opinion on effect of rubber dam usage on restorations

Questions	Options	Total, *n* (%)	*P*
Feel that the rubber dam has any effect on your restorative procedures	Yes	93 (77.5)	0.451
	No	27 (22.5)	
	Total	120 (100.0)	
A higher clinical standard is possible when restorations are placed under a rubber dam	Yes	101 (84.2)	0.777
	No	19 (15.8)	
	Total	120 (100.0)	
Restorations placed under the rubber dam have greater longevity than those placed without	Yes	95 (79.2)	0.615
	No	25 (20.8)	
	Total	120 (100.0)	

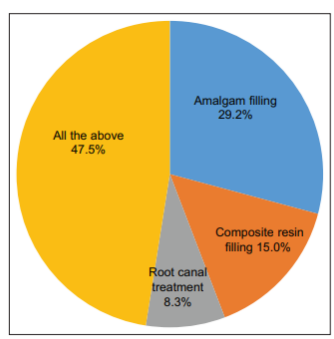
Table 8: Answers given by students on procedure that require rubber dam

Procedure which is mandatory to use rubber dam	Total, *n* (%)	*P*
Amalgam filling	35 (29.2)	0.279
Composite resin filling	18 (15.0)	
Root canal treatment	10 (8.3)	
All the above	57 (47.5)	
Total	120 (100.0)	

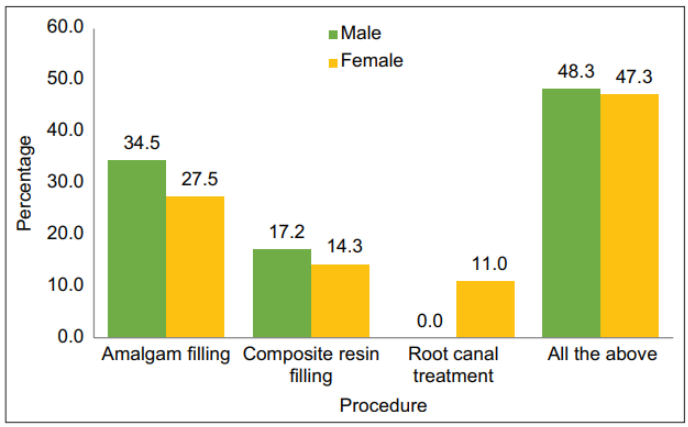
Table 9: Time taken by students for the application of rubber dam

	Gender	*n*	Mean time	SD	*t*	*P*
Time taken to apply rubber dam (min)	Male	29	7.72	4.300	2.331	0.021
	Female	91	10.55	6.050		
	Total	120	9.87	5.789		

SD: Standard deviation



Graph 1: Shows procedure which is mandatory to use rubber dam



Graph 2: Indicates the answers given by students on procedure that require rubber dam

DISCUSSION

Conducting a survey on a topic without external influence is quite difficult as stated by Hill and Rubel.[9] As students are in their learning phase, they may be tempted to give what is perceived as correct answer instead of an honest answer.

Majority of the participants thought that the rubber dam usage training in dental school is adequate. It is surprising to know that even though rubber dam has a lot of advantages, it remains as a topic of controversy. It was disappointing to note that few students reported that rubber dam is not a useful adjunct in preventing contamination. As rubber dam is an excellent tool for isolation, the reason for such response may be due to incorrect rubber dam application. The majority of students find the selection of clamp and its adaptation difficult. The reason behind that it may be the presence of inadequate tooth structure posing difficulty in placement of regular clamp or they were not having clamps for different teeth. Adequate knowledge about availability of various clamps in the market and selection of clamp according to the available tooth structure may help to resolve this problem. Pertaining to difficulty in placement and selection of clamp, repeated application may help to resolve this problem. Other problems noticed in rubber dam acceptance were patient refusal. Adequate patient education and motivation could help in overcoming this problem. Many students were not using rubber dam in pediatric patients, the reason being patients are uncooperative to this device. As rubber dam improves the quality of dental materials, proper education should be given to the parents for its acceptance. It is rather highly disappointing to know that half of the student population think that they are obliged to use it and few opinionated that they will not be using this device further in their practice.[13] It is accepted that there is a strong learning curve in rubber dam application and its usage, the advantage of using should be overweighed in comparison to difficulties encountered in its usage.

In a study from Belgium, about 64.5% of practitioners do not use rubber dam in their daily practice, while only a very few that is 3.4% believed that rubber dam to be a standard procedure.[14] Whitworth *et al*. stated that the patients dislike toward rubber dam can be strongly determined by the clinicians attitude. Stewardson and McHugh *et al*. also stated that the experience of the dentist and the efficiency and technique regarding the usage of rubber dam in the patients' oral cavity should be achieved by frequent practice. In most of the studies, practitioners are not been asked of latex allergy to the patient prior the application of rubber dam which suggests that more attention should

to be directed toward the possibility of latex allergy prior to application of the rubber dam as it causes intra oral complications.

Mala *et al*. stated that the increased percentage of students who did not use rubber dam for child patients (89.1%) [15]. This difficulty, however, needs to be considered from a pedodontic point of view, probably in a future study focusing on this group of patients. Percentages of students with this difficult facing the rubber dam were increased than that of those who reported by Mala *et al*. Marshall and Page (1990) in their study used patient discomfort as main reason for not using rubber dam.[16] However, the limitation of spending extra time in placing the dam is compensated with better working conditions offered by the dam including controlling the saliva contamination and eliminating the need to frequently change cotton rolls as well as limiting the movements of the patient's tongue and lips.[17] Packiri. reported that 37.4% believe that it is a useful tool and 45.8% students felt that patient's do not like it, thereby implying in its disincentive use in future dental practice (26.2%).[18] In other study on noncaries cervical lesions, Haripriya *et al*. stated that it is evident that majority of the practitioners are not aware of isolation methods for restoring noncarious cervical lesions (NCCLs) and those who are aware also do not imply them in their clinical practice. Therefore, knowledge about conventional methods of isolation and newer methods of gingival retraction should be imparted.[19]

CONCLUSION

As rubber dam is considered as a standard tool in terms of proper oral health delivery care, it judicious use cannot be neglected by the students. By increasing the awareness among the patients and by heightening educational awareness among students, the ultimate goal of standard method of isolation can be achieved and practiced widely.

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Conflicts of interest
There are no conflicts of interest.

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