

An assessment of Rubber Dam use by Paediatric Dental Professionals and Post Graduate Trainee in India: Questionnaire based Survey

¹Dr. Shrutika Udayrao Mankar , MDS III yr , department of pediatric and preventive dentistry , VSPM dental college Nagpur

²Dr. Devendra Nagpal, HOD, department of pediatric and preventive dentistry , VSPM dental college Nagpur

³Dr.Gagandeep Lamba, Reader, department of pediatric and preventive dentistry , VSPM dental college Nagpur

⁴Dr. Purva Chaudhary, Reader, department of pediatric and preventive dentistry , VSPM dental college Nagpur

⁵Dr. kavita hotwani, Senior lecturer, department of pediatric and preventive dentistry , VSPM dental college Nagpur

⁶Dr. Prabhat singh Yadav, Senior lecturer, department of pediatric and preventive dentistry , VSPM dental college Nagpur

Correspondence Author: Dr. Shrutika Udayrao Mankar, MDS III yr , department of pediatric and preventive dentistry , VSPM dental college Nagpur

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Abstract

Objective: Rubber dam is recommended by the British Society of Paediatric Dentistry (BSPD) & American Academy of Paediatric Dentistry (AAPD) for various restorative and endodontic procedures in children. To date, in India there has been no report of actual usage of rubber dam within the specialty of pediatric dentistry. Therefore, the aim of the study was to assess the use of Rubber Dam by Pediatric dental professionals and post graduate trainee in India.

Methods: A cross-sectional questionnaire based study was conducted September 2018 to December 2018. The

web-based questionnaire comprising 39 close ended questions was electronically sent to the pediatric dental professionals and pediatric dental trainees registered ISPPD (Indian society of pediatric and preventive dentistry)

Results: Data were available for 236 questionnaires. Majority of respondents were aged between 25 to 35 years (n= 168 i.e. 71.19%). Majority of respondents stated that they use rubber dam ‘Sometimes’ (n=135 i.e 57.20%). Among the all respondents there were majority post graduate trainee using rubber dam in their clinical use. Perceived difficulties of dam usage the most common

reasons were lack of patient cooperation and the time constraint. Preferred procedure done under rubber dam it was found that, composite was the most commonly reported restoration to be placed under Rubber dam.

Conclusion: Current BSPD and AAPD guidelines recommend rubber dam usage for restorative and endodontic procedures; however, it would appear that there is wide variability in the application, as well as under-use, of rubber dam in India.

Keyword: Rubber Dam, Children, Pediatric Dentist

Introduction

Rubber dam was introduced in the United States in 1864 by Dr. Sanford Christie Barnum. Rubber dam which is a well-established and gold standard technique for tooth isolation for various procedures in dentistry, has been utilized for over 150 years¹⁻³. Isolation of the operating field is a fundamental aspect in pediatric dentistry. Rubber dam, cotton roll, and saliva ejectors are commonly employed for this purpose. Inhalation or ingestion of endodontic instruments can be avoided by rubber dam as well as it helps retracting soft tissues, and contributing to efficient treatment.⁴

The use of the air turbine results in the formation of aerosols and droplets that are usually contaminated with bacteria and blood.⁵⁻⁷ These aerosols and droplets represent a potential route for transmission of infectious diseases such as measles, tuberculosis, SARS, hepatitis and AIDS (Wong 1988, Forrest & Perez 1989, Harrel & Molinari 2004).³⁻⁸ The use of rubber dam results in a significant reduction in the microbial content of air turbine aerosols produced during operative procedures, thereby reducing the risk of cross-infection in the dental practice (Wong 1988, Cochran et al. 1989, Forrest & Perez 1989, Samaranyake et al. 1989, Harrel & Molinari 2004).^{3,7-10}

The complexity of oral environment presents many obstacles in performing dental treatment procedures.

European society of endodontology recommends that rubber dam should always be used to isolate the tooth undergoing root canal treatment. From medico-legal stand-point.⁹ dental defense agencies recommended. The use of rubber dam while performing root canal treatment or treatments involving the use of potentially harmful agent such as phosphoric acid¹¹⁻¹². A questionnaire study done by G, Shashirekha et al. showed that 75 % of respondents felt that RD should be used compulsory during RCTs⁴. Many reasons were reported such as: placement difficulty, time consumption, patients' rejection, lack or insufficient training, and high cost¹³⁻¹⁷. In addition, gender, undergraduate and postgraduate training, tooth to be treated and, practice location and type are possible influencing factors for frequency of rubber dam use¹⁰⁻¹⁵

Rubber dam is recommended by the British Society of Paediatric Dentistry (BSPD) & American Academy of Paediatric Dentistry (AAPD) for various restorative and endodontic procedures in children.¹⁸ Although there have been a number of previously published survey & literature regarding Rubber dam use in general dentistry but the data regarding the actual usage of the technique within the specialty of paediatric dentistry is sparse to date. Therefore, the aim of the planned study was to assess the use of Rubber Dam by Pediatric dental professionals and post graduate trainee in India.

Methodology

A cross-sectional questionnaire based study was conducted September 2018 to December 2018 among pediatric dental professional and post graduate trainee in India. After getting the approval from institutional ethical committee and department of pediatric dentistry. Validation of questionnaire by subject expert was done. A pilot study was completed with subsequent minor

modifications in the questions. A final questionnaire was constructed using the Google Drive tool.(google forms) The web-based questionnaire comprised 39 close ended questions in five categories; demographics, general practice, usage of Rubber Dam, reasons for no use, alternative methods for tooth isolation. The questionnaire was electronically (e-mail) sent to the pediatric dental professionals and pediatric dental trainees registered in ISPPD (Indian society of pediatric and preventive dentistry). The email sent to participants explained aim of the study and answered that participants identity would remain anonymous. Three reminder emails were sent to all selected pediatric dentists at 1 month, in case they did not respond to first e-mail.

Responses were generalized and data was entered into SPSS 22 Windows software (SPSS Inc., Chicago, IL, USA). Data was analyzed using the Chi-square and Linear-by-Linear association tests at the 0.05 level of significance

Results

A total 236 pediatric dentists responded to the present survey. The greatest advantage offered by Rubber dam, provision of isolation and an aseptic field was the top ranked benefit. Demographic data showed that 164 (69.49%) females and 72(30.51%) males responded to the present survey. Majority of respondents were aged between 25 to 35 years (n= 168,71.19%). Majority of respondents stated that they use rubber dam 'sometimes' (n=135, 57.20%) Table 1 Showed that Majority of post graduate trainee were using rubber dam in their clinical use. Among the respondents the most common reason for not using rubber dam was 'time constraints and patients co-operation' followed by only 'patient co-operation & not needed' in all cases (table 2). **Table 3** showed that respondents having clinical experience of 5-10 years required less time to apply rubber dam than others. While

evaluating preferred procedure done under rubber dam it was found that, composite was the most commonly reported restoration to be placed under RD, while amalgam restoration was the least likely (**graph 1**). While evaluating preferred technique of isolation it was found that, majority respondents preferred saliva ejector 177 (75%) followed by cotton rolls 159(67.4%) and rubber dam 145 (61.4%) (graph 2)

Discussion

The questionnaire survey is regarded as common instrument to collect data in the healthcare field as large amount of data can be collected in a relatively short period of time²⁰⁻²². Questionnaires reporting attributes, preferences, practices and demographics of participants are an important research tool²³. However, they should be well conducted to enable high response rates, so that the results can be generalized previous studies have reported various rates of RD usage, but it should be considered that there may be a type of selection bias: those practitioners who are keen in the use of rubber dam may have been more likely to respond than those who are not. In general, these studies have demonstrated that there is under-usage compared to current recommendations, a finding similar to present study^{15,24-26}

In present study majority of respondents were females. The increase in the number of women in dentistry has been one of the major dental professional trends during the last quarter of the past century and may well continue during the initial decades of this century.²⁷

Majority of respondents in present study were aged between 25-35 year. This was similar to study done by Singh et al and Lynch et al³⁰⁻³², whereas Sodlani et al¹ majority respondents were 41 – 50 years. This variation is due to difference in study design as majority of post graduate students falls in this group⁵

Usage of rubber dam is more by post graduate trainee This was similar to studies done by lynch⁹ and myccanol et al⁹ suggested that specialist are more likely to practice the rubber dam placement during their course of specialization. More over specialist tend to do more complex procedure which require more qualified and sensitive technique²⁹. This explains the higher usage of rubber dam among post graduate students. Stewardson and McHugh also indicated that the experience of the dentist and their level of skill influence the patient's opinion and suggested that proficiency regarding the utilization of rubber dam must be gained through frequent usage.³⁰⁻³⁵ The British Society of Pediatric dentist (BSPD) guidelines recommend rubber dam isolation 'wherever possible' for many procedures. But In present study only 17(7.20%) used rubber dam 'always', 135(57.20%) responded that they use rubber dam 'sometimes', 63(26.69%) 'occasionally' followed by the limited use of RD noted in the current report is in agreement with the findings of most previous studies³⁰.

This widespread disregard for rubber dam , despite their recognized advantages, was conceded by Silversin et al.³⁵ 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. Present study revealed that, in relation to the barriers of RD use, lack of 'patient cooperation' was cited as the main factor preventing RD use, which concurs with previous results studies done by sodlani et al.¹

Majority patients in the above study accepted RD, with 79% having good acceptance of RD and 30% stating that they preferred treatment with RD. In the present study 'saliva ejector' followed by 'cotton rolls' was commonly preferred isolation technique in pediatric patients. 'The use of rubber dam is obviously the safest way of securing

optimal moisture control, but in young and newly erupted teeth this is usually not practical since it demands the use of local analgesia for placement of the clamp.³⁶

Limitation of this study was that due to an extensive questionnaire comprising of 39 questions the number of responses might have reduced. A face to face survey could have led to much more responses. Also, conducting such surveys at specialty conferences could yield into more responses to procure authenticity of the results.²⁸⁻³⁰

In view of this and the inconclusive evidence for rubber dam use, as above, European Academy of Pediatric Dentistry: EAPD guidelines state that 'the keeping of a dry field must therefore usually be achieved by the use of cotton rolls and isolation shields, in combination with a thoughtful use of the water spray and evacuation tip'.³⁷

Qualification	Never	Always	Occasionally	Sometimes	Total	χ ² -value 3.26 p=0.35,NS
Dental Professionals	7(2.97%)	8(3.39%)	27(11.44%)	70(29.66%)	112(47.46%)	
Postgraduate Trainee	14(5.93%)	9(3.81%)	36(15.25%)	65(27.54%)	124(52.54%)	
Total	21(8.90%)	17(7.20%)	63(26.69%)	135(57.20%)	236(100%)	

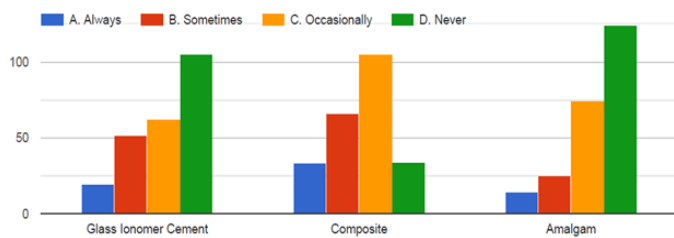
Table1: frequency of rubber dam use among professionals & Postgraduate Trainee

Reasons for not using rubber dam	Frequency of using rubber dam				χ ² -value 75.24 p=0.001,S
	Sometimes	Occasionally	Never	Total	
Does not offer any significant advantage	0(0%)	0(0%)	3(1.27%)	4(1.69%)	
Lack of knowledge and skill	3(1.27%)	5(2.12%)	4(1.69%)	15(6.36%)	
Lack of trained assistant	2(0.85%)	0(0%)	2(0.85%)	4(1.69%)	
Not cost efficient	1(0.42%)	3(1.27%)	0(0%)	4(1.69%)	
Not needed in all cases	6(2.54%)	9(3.81%)	9(3.81%)	29(12.29%)	
Patient Co-operation	20(8.47%)	13(5.51%)	19(8.05%)	53(22.46%)	
Patient co-operation, lack of knowledge and skill	4(1.69%)	0(0%)	0(0%)	4(1.69%)	
Patient co-operation, lack of trained assistant	1(0.42%)	0(0%)	3(1.27%)	4(1.69%)	
Patient co-operation, not cost efficient	0(0%)	0(0%)	2(0.85%)	2(0.85%)	
Time Constraints	3(1.27%)	8(3.39%)	5(2.12%)	16(6.78%)	
Time constraints, does not offer any significant advantage, lack of knowledge and skill, lack of trained assistant	0(0%)	2(0.85%)	6(2.54%)	8(3.39%)	
Time constraints, lack of knowledge and skill	1(0.42%)	0(0%)	2(0.85%)	3(1.27%)	
Time constraints, lack of trained assistant	0(0%)	1(0.42%)	2(0.85%)	4(1.69%)	
Time constraints, not needed in all cases	5(2.12%)	12(5.08%)	14(14.41%)	28(24.58%)	
Time constraints, patients co-operation	4(1.69%)	9(3.81%)	34(5.93%)	58(11.86%)	
Total	50(21.19%)	62(26.27%)	105(44.49%)	236(100%)	

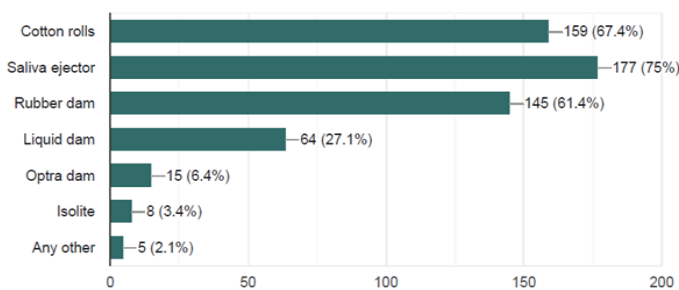
Table 2: Reasons of Not Using Rubber Dam

Years of clinical practice	Average time taken for application of rubber dam					K2-value
	<5min	5-10 min	11-15 min	>15 min	Total	
<5 yrs	15(6.36%)	28(11.86%)	12(5.08%)	1(0.42%)	56(23.73%)	27.30 p=0.007,S
5-10 yrs	39(16.53%)	67(28.39%)	19(8.05%)	17(7.20%)	142(60.17%)	
11-15 yrs	14(5.93%)	10(4.24%)	4(1.69%)	0(0%)	28(11.86%)	
16-20 yrs	6(2.54%)	1(0.42%)	1(0.42%)	0(0%)	8(3.39%)	
21-25 yrs	0(0%)	1(0.42%)	0(0%)	1(0.42%)	2(0.85%)	
Total	74(31.36%)	107(45.34%)	36(15.25%)	19(8.05%)	236(100%)	

Table 3: Average time taken for application of rubber dam



Graph 1: Preferred procedure to perform under rubber dam



Graph 2: Preferred technique of isolation in children

Conclusion

Though current BSPD and AAPD guidelines recommend rubber dam usage for many restorative procedures, appears that there is wide variability in dam usage amongst specialists in pediatric dentistry working in INDIA

Respondents cited a lack of patient cooperation as the most common factor preventing them from using rubber dam, while patient safety rated as the greatest benefit of rubber dam.

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