

Prevalence of Rubber Dam usage among Indian Dentists & Dental Students in Everyday Practice: A Cross Sectional Questionnaire-based study

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Abstract

Background: Following the discovery of the Dental Rubber Dam by Dr. Barnum in the 1860s, this method of isolation has gradually and steadily gained importance as an essential technique in isolation during dental procedures. The aim of the present Questionnaire-based study is to discern the Prevalence of Rubber Dam usage among Indian Dentists & Dental Students in the city of Mumbai, India in everyday dental practice as despite various literature proven benefits of rubber dam, dentists refrain from its usage.

Materials and Methods: A 10-point cross-sectional questionnaire was distributed among final year students and dentists working in Dental colleges and Private practices in Mumbai from October, 2020 to February, 2021. The subjects participating in our survey were divided into 5 groups which were further divided into two subgroups.

Results: Around 64.58% of participants aged 25 years and older used the rubber dam while around 47.9% of the participants aged below 25 years of age made use of the rubber dam. Statistically significant difference ($p < 0.05$) was observed between males and females. The male participants around 69% used it more than the females. 94.4% of dental specialists used the rubber dam, especially Endodontists; followed by 54.5% of private practitioners. While only 48% of interns and 16.6% of the undergraduates made use of it.

Conclusions: The present demographic survey stipulated that the prevalence of rubber dam usage in Mumbai city is still average. Practice of the usage of the dental rubber dam should be put to effect in dental schools across the country so as to increase the efficiency and willingness to use in private and government practices.

Keywords: Endodontics, isolation, Rubber dam, Mumbai.

Introduction

Barnum pioneered the usage of the dental rubber dam in 1964. Since then, this isolation methodology has constantly and gradually gained acknowledgement as an indispensable technique used during dental procedures [1]. According to the European Society of Endodontology, 2006 this method is the most ideal till today [2]. The dental rubber dam effectively enables cross- infection and contamination thus improving treatment productivity. Additionally, it's usage is indispensable in providing a professional, cautious, and pleasant dental experience. [3] In endodontic treatment, isolation of the operating field is essential or even demanded as it protects the patient by preventing inhalation or aspiration of instruments , dental materials used during dental procedures thereby protecting the operator from legal responsibilities and improving treatment efficiency [4] Rubber dam considered gold standard in isolation is still not preferred by many dentists which was brought to light by a study conducted by Anabtawi MF et al who concluded that only 44% of general dentists made use of the rubber dam during routine endodontic procedures.[5]

Rubber dam a cost-effective appliance manifold increases treatment success by providing an aseptic operating field, isolating the tooth from salivary contamination, retracting soft tissues, reducing fogging of mouth mirror enabling superior visual contrast, minimizes patient conversations, and in turn encourages them to keep their mouth open during treatment.[6]

The principle of the present Questionnaire-based study is to discern the Prevalence of Rubber Dam usage among Indian Dentists & Dental Students in everyday dental practice as despite various literature proven benefits of rubber dam, dentists refrain from its usage. This present study aims to investigate (1) the frequency of usage of the rubber dam among Indian dentists and students in Mumbai

(2) investigate supplementary controlling factors such as practitioner's gender, general or specialized field and years of experience, and the type of dental settings they practice in (3) evaluate dental procedures most likely to have the rubber dam used (4) reasons why the rubber dam is preferred/ not preferred.

Materials And Methods

A 10-point cross-sectional questionnaire was distributed among final year students and dentists working in the dental college and in private practices in Mumbai from October,2020 to February,2021. The subjects participating in our survey were divided into 5 groups: Group 1 - Final year dental students

Group 2 - Interns

Group 3 - Specialised Practitioners (Post-Graduate Students / Masters of Dental Surgery -MDS)

Group 4 - Private Dental Practitioners

In each group the completed questionnaires were divided into 2 other groups:

1. Doctors/students who use the rubber dam.
2. Doctors/students who do not use the rubber dam.

A total of 350 questionnaires were distributed, out of which 315 were returned. Information included age, gender, educational qualification and the use of rubber-dam. Distribution and collection of the questionnaire was done by the same investigator. Data from the completed questionnaires were entered into an electronic database (Microsoft Excel 2007). Data was analysed by using SPSS version 17 (SPSS Inc., Chicago, IL, USA). Frequencies were calculated and cross tabulations were performed. The chi square test was used for the analysis and p value of < 0.05 was considered statistically significant.

Results

A total of 350 questionnaires were distributed, out of which 315 were returned. Overall response rate was 90%. Out of 315 questionnaires that were returned the

distribution was as follows: 120 were final year students, 50 were interns, 90 were specialised practitioners, 55 were private practitioners.

The results showed that

Fig. 1 shows the distribution of Rubber Dam Usage according to age. Around 64.58% of participants who were more than 25 years old used the rubber dam and only 47.9% who were less than 25 used.

Fig. 2 shows the distribution of Rubber Dam Usage according to gender. Statistically significant Difference ($p < 0.05$) was observed between males and females. The male participants around 69% used it more than the females.

Fig. 3,4 shows statistical difference in distribution of Rubber Dam Usage among the 4 groups. 94.4 % of dental specialists used the rubber dam, especially Endodontists; followed by 54.5% of private practitioners. While only 48% of interns and 16.6% of the undergraduates used it. Distribution of the rubber dam usage among different groups - Chi Square Test (p -value is < 0.00001)

Fig. 5 Distribution about Rubber Dam Usage among the 4 groups though the questionnaire survey. 44.45% used them for Endodontic procedures, 59.31% feel that there is inadequate knowledge of rubber dam usage among undergraduates specially. The greatest advantage of Rubber dam is dry field, around 44.44% responded in favour of that. There is not much of a significant difference whether treatments with rubber dams were successful. 33.96% of participants responded that time is a major factor to not use a rubber dam. Also, 66.22% reported that cotton rolls as an alternative method to Rubber dam.

Age	Yes	No
Less than 25 years	128 (47.9%)	139 (52.05%)

More than 25 years	31 (64.58%)	17 (35.41%)
Total	159	156

Table 1: Frequency of Rubber Dam usage according to age. The chi-square statistic is 4.5084. The p -value is .03373. The result is significant at $p < .05$

Gender	Yes	No
Male	95 (66.90%)	47 (33.09%)
Female	52 (30.05%)	121 (69.94%)
Total	147	168

Table 2: Frequency of Rubber Dam usage according to gender. The chi-square statistic is 42.5346. The p -value is $< .00001$. The result is significant at $p < .05$.

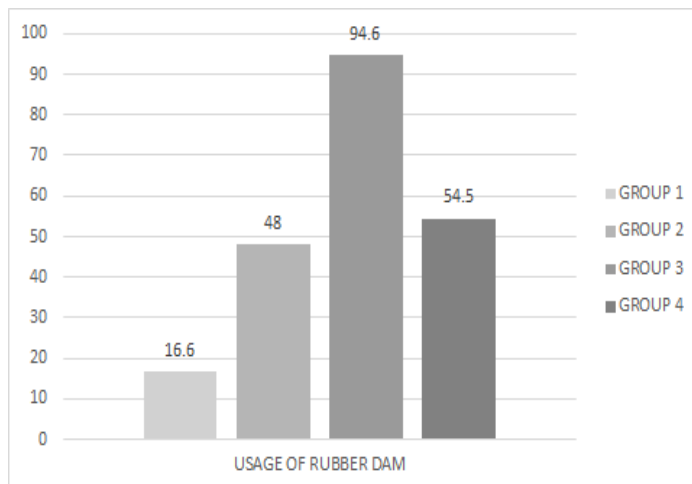


Fig 1: Distribution and percentage of the rubber dam usage among different groups (Groups 1-4 in order)

	Results			
	Group 1	Group 2	Group 3	Group 4
YES	20 (60.57) [27.18]	24 (25.24) [0.06]	85 (45.43) [34.47]	30 (27.76) [0.18]
NO	100 (59.43) [27.70]	26 (24.76) [0.06]	5 (44.57) [35.13]	25 (27.24) [0.18]

Fig 2: Distribution of the rubber dam usage among different groups - Chi Square Test (p -value is < 0.00001)

(<i>p</i> -value is < 0.00001)	Group 1	Group 2	Group 3	Group 4	Total
Ask about Latex Allergy prior to rubber dam?					
Yes	20 (16.66%)	30 (60.26%)	45 (50%)	32 (58.18%)	127(40.31%)
No	100 (83.33%)	20 (40.00%)	45 (50%)	23 (41.82%)	188 (59.34%)
Is it technically easy and time efficient in placing the rubber dam on a tooth/teeth?					
Yes	65(54.16%)	32(64.0%)	59(65.55%)	19(34.54%)	175(55.55%)
No	52(43.3%)	18(36.2%)	31(34.44%)	18(32.72%)	119(40.31%)
Maybe	3 (2.5%)	0	0	18 (32.72%)	21(40.31%)
Which cases would you prefer to use a dental rubber dam?					
Endodontic Procedures	40(33.33%)	27(54.0%)	32(35.55%)	45(81.81%)	144(44.41%)
Prosthetic Procedures	20(16.66%)	15(30.0%)	20(22.22%)	4(7.272%)	59(18.31%)
Caries/ Fillings - Operative Procedures	35(29.76%)	3(6%)	25(27.77%)	3(5.45%)	66(20.95%)
Pedodontic Procedures	25(20.83%)	5(1%)	10(11.11%)	2(3.636%)	42(13.33%)
Veneers/ Cosmetics	0	0	3(3.33%)	1(1.81%)	4(1.269%)
Have adequate and satisfactory education regarding rubber dam usage?					
Yes	32(26.66%)	23(46.0%)	45(50%)	29(52.7%)	129(40.95%)

No	98(81.66%)	27(54.0%)	45(50%)	26(47.27%)	186(59.31%)
Greatest advantage offered by					
Increases visibility & accessibility	23(19.16%)	10(20%)	23(25.55%)	13(23.63%)	69(21.90%)
Provides dry field	45(37.5%)	25(50%)	45(50%)	25(45.45%)	140(44.44%)
retracts tongue, cheeks away from the field of operation	32(26.5%)	5(10%)	2(2.22%)	10(18.18%)	49(15.55%)
Prevents any aspiration or ingestion	12(10%)	3(6%)	13(14.44%)	6(10.9%)	34(10.79%)
Preventing aerosol production	8(6.66%)	7(14%)	7(7.77%)	1(1.81%)	24(7.619%)
Assistance is necessary during the rubber dam application?					
Yes	78(65.0%)	21(42.0%)	54(60%)	25(45.45%)	178(56.31%)
No	42(35.0%)	29(58.0%)	36(40%)	30(54.45%)	137(43.49%)
Treatments performed using the rubber dam are more successful					
Yes	52(43.33%)	11(22.0%)	52(57.77%)	30(54.54%)	145(46.03%)
No	68(56.66%)	39(78.0%)	38(42.22%)	25(45.45%)	170(53.96%)
Major factor in not using the Rubber dam?					
Time	55(45.83%)	15(30%)	20(22.22%)	17(30.90%)	107(33.96%)
Cost	20(16.66%)	18(36%)	26(28.88%)	13(23.63%)	77(24.44%)
Inconvenience	13(10.83%)	8(16.00%)	4(4.44%)	12(21.81%)	37(11.74%)

Patient Refusal	32(26.66%)	9(18%)	40(44.44%)	13(23.63%)	94(29.84%)
Alternative methods for					
Cotton rolls	96(80%)	25(50%)	45(50%)	30(54.54%)	196(62.22%)
Suction	12(10%)	14(28%)	31(34.44%)	20(36.36%)	77(24.44%)
Tongue retractors	12(10%)	11(22%)	14(15.55%)	5(9.09%)	42(13.33%)

Table 3: Distribution about Rubber Dam Usage among the 4 groups through the questionnaire survey.

Discussion

Rubber dam has been known as an ideal method for tooth isolation. The use of rubber dam has proved to create increased success rates in most of the endodontic and operative procedures. Following this, many dentists are becoming aware of its advantages and educating themselves to use it for every case. However, the principle of the present Questionnaire-based study is to discern the Prevalence of Rubber Dam usage among Indian Dentists and Dental Students in everyday dental practice as despite the various literature proven benefits of rubber dam, dentists still refrain from its use.

This type of cross-sectional study is viewed as a typical instrument to gather information in the health-care services field as an enormous measure of information can be gathered in a generally brief timeframe.

A total of 350 questionnaires were distributed, out of which 315 were returned. Overall response rate was 90%. Although the response rate was high, only 159 (50.4%) participants used rubber dams during their clinic procedures.

In this present study, most of the participants were of the younger age group (less than 25). This was in accordance with study done by Lynch and McConnel [7] and Udoye[8], whereas the study done by Soldani and Foley[9] was in contrast stating that 50% of participants

were >25years of age. The differences are mostly pertaining to the study design. There should be emphasis in teaching rubber dams in curriculums and continuing education programs for young budding dentists.

Even though the 173(54%) female respondents participated in this study, the male population (66%) used rubber dams quite frequently. The predominance of females among the respondents in the present study is constant with the finding of Abdulwahab[10]. Also, the female population among the dental workforce is increasing as we can see the trends in the dental school applications, as seen in correlation with Tandon et al [11]

The study population in the present study consists of undergraduates, interns, postgraduates, and private practitioners. The rubber dam usage was highest among the postgraduates (94.6%), suggesting that some level of advanced studies help in attaining better clinical training [12]. Also, during their postgraduate course they tend to complex procedures which require a more sensitive and qualitative work [13]. Furthermore, the usage of rubber dams by private practitioners is 54.5%. There is an increasing trend to develop a better skill set and patient compliance by adapting to procedures that require a minimal amount of time.

Additionally, the relevance of using rubber dams was only related to endodontics procedures that were shown in

several studies. In this study, 44.41% of respondents used it specially for endodontic procedures. This creates a belief among future dentists that rubber dams are basically derived for root canal procedures. Although rubber dam is generally preferred during endodontics, its usefulness during restorative or prosthetic treatment cannot be overlooked.

Despite having numerous advantages of using rubber dams, especially improved visibility, dry field, and greater barrier control, the majority of dental practitioners do not use it on a wide basis. In this study, 33.96% of patients felt it was time consuming during their procedures, 29.84% mentioned refusal from the patients due to inconvenience or inadequate awareness. Though the cost of the rubber dam should not be overlooked, 24.44% reported that cost was also a supplementary factor in addition to the expenses that patients need to incur from the procedure itself [14]. In a study it was stated that the negative perception regarding patients' dislike towards rubber dam may be related more strongly to practitioner attitude [15]

There are many alternative methods that are used for isolation. Around 62.22% used cotton rolls, as it is easily accessible and convenient, 24.44% used suction devices to maintain a dry operating field, and 13.33% used retractors. These can be used as supplementary aids for isolation.

Although most dental practitioners agree that rubber dam is the standard of care in treatments, discrepancies still exist between principles and practice. Emphasis on education and increased awareness of the importance of rubber dam usage are needed. Dentists should update their knowledge and practices with current techniques and materials through a continuous dental education program (CDE).

Limitations of the study

Usage of only rubber dams for isolation was mentioned in this study. There are several aids used for isolation. The sample size mainly concentrated on young dentists. A large sample size might produce more accurate results.

Conclusion

The present demographic survey stipulated that the prevalence of rubber dam usage in Mumbai city is still average. Supplementary factors that include number of years of working experience, field of specialization and the institutional environment all play a pivotal role in the standard of care offered. Practice of the usage of the dental rubber dam should be put to effect in dental schools across the country to increase the efficiency and willingness to use in private and government practices.

Reference

1. M. F. Anabtawi, G. H. Gilbert, M. R. Bauer et al., "Rubber dam use during root canal treatment: findings from The Dental Practice-Based Research Network," *Journal of the American Dental Association*, vol. 144, no. 2, pp. 179–186, 2013.
2. European Society of Endodontology, 2006. Quality guidelines for endodontic treatment: Consensus report of the European Society of Endodontology. *Int Endod J.*, 39 (12): 921-30.
3. G. Shashirekha, A. Jena, A. B. Maity, and P. K. Panda, "Prevalence of rubber dam usage during endodontic procedure: a questionnaire survey," *Journal of Clinical and Diagnostic Research*, vol. 8, no. 6, pp. ZC01–ZC03, 2014.
4. Harrel, SK. and Molinari, J. 2004. Aerosols and splatter in dentistry: A brief review of the literature and infection control implications. *J Am Dent Assoc.*, 135:429-37.
5. Anabtawi MF, Gilbert GH, Bauer MR, Reams G, Makhija SK, Benjamin PL, et al. Rubber dam use

- during root canal treatment: Findings from The Dental Practice-Based Research Network. *J Am Dent Assoc* 2013; 144:179-86.
6. Ahmad IA. Rubber dam usage for endodontic treatment: A review. *Int Endod J* 2009; 42:963-72.
 7. Lynch CD, McConnell RJ. Attitudes and use of rubber dam by Irish general dental practitioners. *Int Endod J*. 2007; 40:427-32.
 8. Udoye CI, Jafarzadeh H. Rubber dam use among a subpopulation of Nigerian dentists. *J Oral Sci*. 2010;52(2):245-9.
 9. Soldani F, Foley J. An assessment of rubber dam usage amongst specialists in paediatric dentistry practicing with in the UK. *Int J Paediatric Dent*. 2007; 17:50-6
 10. Al-Fouzan KS. A survey of root canal treatment of molar teeth by general dental practitioners in private practice in Saudi Arabia. *SDJ*. 2010; 22:113-7.
 11. Tandon S. Challenges to the Oral Health Workforce in India. *J Dent Edu*. 2004;68(7):28-33
 12. Forrest W, Perez RS. The rubber dam as a surgical drape: protection against AIDS and hepatitis. *Journal of the Academy General Dentistry*. 1989; 37:236-7.
 13. Brunthaler A, Konig F, Lucas T, Sperr W, Schedle A. Longevity of direct resin composite restorations in posterior teeth. *Clin Oral Investig*. 2003; 7:63-70.
 14. Hill EE, Rubel BS. Do Dental educators Need to Improve Their Approach to Teaching Rubber Dam Use? *J Dent Edu*. 2008; 72:1177- 81.
 15. 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*, vol. 33, no. 5, pp. 436–441, 2000.