

Prevalence of Rubber Dam Usage during Endodontic Procedure: A Questionnaire Survey

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ABSTRACT

Aim: To determine the prevalence and frequency of rubber dam usage for endodontic procedures among general practitioners, specialized practitioners, undergraduate final year students and Endodontists in the state of Odisha, India.

Methodology: A pre-piloted questionnaire was distributed among 737 subjects. Dentists and final year students were surveyed in relation to their prevalence of rubber dam usage.

Statistical Analysis Used: Chi-square/Fisher Exact tests have been used to find the significance of study parameters on categorical scale between two or more groups.

Results: Overall response rate was 71%. While about 94% of the subjects knew the use of rubber dam, 30% have used it for root canal cases and 23% use them for all cases of root

canal treatment. Use of rubber dam was 15.4% in paediatric patients and 34.4% in adult patients. 68% of subjects received knowledge about rubber dam usage in undergraduate school. 75% felt that rubber dam should be compulsory before endodontic treatment & 90% were willing to gain knowledge through training and continuing dental education programs.

Conclusion: Whilst rubber dam is used frequently for root canal treatment than operative treatment, in the present survey there is a low prevalence of its usage during endodontic therapy. This presents quality issues, as well as medico-legal and safety concerns for the professional and patients alike. Greater emphasis should be placed on the advantages of using rubber dam in clinical dentistry at dental school and through continuing dental education for practitioners to update their knowledge.

Keywords: Rubber dam, Survey, Root canal treatment

INTRODUCTION

Developed by Dr Sanford C Barnum on 15th March 1864 rubber dam has evolved from a system that was designed to isolate teeth for placement of gold foil to one of sophistication for the ultimate protection of both patient and clinician and is mandatory in root canal treatment [1]. The advantages [1] and absolute necessity of the rubber dam must always take precedence over convenience and expediency (a rationale often cited by clinicians who avoid its use). When properly placed, the rubber dam facilitates treatment by isolating the tooth from obstacles (saliva, tongue, lips and cheeks) that can disrupt any procedure. Salient advantages of using rubber dam in endodontics include patient protection from aspiration of endodontic instruments [2,3] tooth debris, medicaments and irrigating solutions [4]. It improves visibility and helps in soft tissue retraction and protection thereby increasing efficiency. A surgically clean operating field is isolated from saliva, hemorrhage and other tissue fluids. The dam reduces the cross contamination of the root canal system, and it provides an excellent barrier to the potential spread of infection. The rubber dam minimizes patient conversation during treatment and the need for frequent rinsing. Clinician is protected from litigation because of aspiration or swallowing of an endodontic file by the patient. Routine placement of rubber dam is considered the standard of care by professional organizations [5-10].

The Kansas Supreme Court ruled that the general dentist performing endodontic treatment on a patient must apply the same precautions during therapy as those employed by an endodontic specialist [11]. The application of rubber dam is taught in most dental colleges [12,13]. Although, it has many recommendations and advantages, the use of rubber dam is frequently ignored. In 1962 Ireland summed up this poor acceptance rate of rubber dam by saying that, "Probably no other technique, treatment or instrument used in dentistry is so universally accepted and advocated by the recognized authorities and so ignored by the practicing dentists" [14]. Unfortunately, this statement holds true even today.

The purpose of this survey was to assess the usage of rubber dam among the undergraduate dental students, general dental practitioners, endodontists and dentists belonging to other specialties and to analyse the different aspects of rubber dam usage in routine endodontic treatment.

METHODOLOGY

An 11 point questionnaire was pilot tested among dental surgeons who were working at our dental college followed by final revision for clarity and scope before the survey. The subjects participating in the survey were divided into four groups as follows:

Group I: Under graduate students (Final year B.D.S) of 3 different dental colleges in the state

Group II: General Practitioners

Group III: Endodontists

Group IV: Specialized practitioners (Other than Endodontists)

The questionnaires were distributed in lecture halls among the final year students, while the questionnaires were sent to the group II, III and IV dentists through post/e-mail. An initial approach was made to the dentists through telephone. Self addressed envelopes were sent to whom questionnaires were sent through post. Microsoft word formats (97-2003.doc) of the questionnaires were sent through e-mail and the subjects were asked to underline the options and return the e-mail with the word document as an attachment. The completed questionnaires were collected and sent for statistical analysis. Statistics were obtained by software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment ver.2.11.1 and Microsoft word and Microsoft Excel sheet have been used to generate graphs and tables. The statistics were analysed by Chi-square/ Fisher Exact test and the tests have been used to find the significance of study parameters on categorical scale between two or more groups.

RESULTS

Total subjects were 737 and overall response rate was 71 % (n=625) [Table/Fig-1]. Group I comprised of 100 undergraduate students studying in final year of three different dental colleges in the state, Group II comprised of 600 general dentists, Group III comprised of 12 endodontists, Group IV comprised of 25 specialized practitioners. Questionnaire and their results are given in [Table/Fig-2].

Overall response rate was 71%. While about 94% of the subjects knew the use of rubber dam, 30% have used it for root canal cases and 23% use them for all cases of root canal treatment. Use of rubber dam was 15.4% in paediatric patients and 34.4% in adult patients. 68% of subjects received knowledge about rubber dam usage in undergraduate school. Insufficient training (91%) followed by difficulty in using (87.5%), more time consuming (84%), costly (82.4%), patient discomfort (71.7%) and no interest (47%) were the reasons for not using rubber dam. 75% felt that rubber dam should be compulsory before endodontic treatment & 90% were willing to

	Group I	Group II	Group III	Group IV
Responded	80 (80.0%)	520 (86.7%)	10 (83.3%)	15 (60.0%)
Non-Responded	20 (20.0%)	80 (13.3%)	2 (16.7%)	10 (40.0%)
Total	100 (100.0%)	600 (100.0%)	12 (100.0%)	25 (100.0%)

[Table/Fig-1]: Percentage of responded and non-responded subjects among groups

Statements	Group I (n=80)	Group II (n=520)	Group III (n=10)	Group IV (n=15)	p-value
Do you know the use of rubber dam? YES (Y) / NO (N)	70 (87.5%) (Y)	500 (96.2%) (Y)	10 (100%) (Y)	10 (66.7%) (Y)	<0.001**
Do you use rubber dam in your practice/clinical posting? YES (Y) / NO (N)	20 (25%) (Y)	150 (28.8%) (Y)	10 (100%) (Y)	8 (53.3%) (Y)	<0.001**
Do you use rubber dam for all cases of root canal treatment? YES (Y) / NO (N)	30 (37.5%) (Y)	100 (19.2%) (Y)	7 (70%) (Y)	7 (46.7%) (Y)	<0.001**
Do you use rubber dam for paediatric patient?					
a. Occasionally	15 (18.8%)	50 (9.6%)	4 (40%)	4 (26.7%)	0.001**
b. Regularly	2 (2.5%)	5 (1%)	3 (30%)	1 (6.7%)	<0.001**
c. Never	62 (77.5%)	460 (88.5%)	3 (30%)	10 (66.7%)	<0.001**
d. Always	1 (1.3%)	5 (1%)	0 (0%)	0 (0%)	0.958
Do you use rubber dam for adult patients?					
a. Occasionally	25 (31.3%)	100 (19.2%)	2 (20%)	4 (26.7%)	0.096+
b. Regularly	10 (12.5%)	52 (10%)	4 (40%)	1 (6.7%)	0.021*
c. Never	43 (53.8%)	358 (68.8%)	1 (10%)	8 (53.3%)	<0.001**
d. Always	2 (2.5%)	10 (1.9%)	3 (30%)	2 (13.3%)	<0.001**
Knowledge gained for application of rubber dam technique from.					
a. Undergraduate dental school	80 (100%)	332 (63.8%)	4 (40%)	11 (73.3%)	<0.001**
b. Post graduation	0 (0%)	0 (0%)	6 (60%)	2 (13.3%)	<0.001**
c. from other sources (colleagues, internet, friends)	0 (0%)	168 (32.3%)	0 (0%)	3 (20%)	<0.001**
Why are you not using rubber dam?					
a. Costly	70 (87.5%)	437 (84%)	0 (0%)	8 (53.3%)	<0.001**
b. Difficulty in using	76 (95%)	462 (88.8%)	0 (0%)	9 (60%)	<0.001**
c. More time consuming	70 (87.5%)	446 (85.8%)	1 (10%)	9 (60%)	<0.001**
d. Patient discomfort	40 (50%)	398 (76.5%)	0 (0%)	10 (66.7%)	<0.001**
e. Insufficient training and knowledge	78 (97.5%)	478 (91.9%)	0 (0%)	13 (86.7%)	<0.001**
f. No interest	50 (62.5%)	232 (44.6%)	0 (0%)	12 (80%)	<0.001**
For which teeth you will prefer to use rubber dam					
a. For anterior teeth	78 (97.5%)	490 (94.2%)	10 (100%)	15 (100%)	0.402
b. For pre molar teeth	75 (93.8%)	483 (92.9%)	10 (100%)	13 (86.7%)	0.627
c. For molar teeth	78 (97.5%)	495 (95.2%)	10 (100%)	15 (100%)	0.558
d. For all the teeth	70 (87.5%)	502 (96.5%)	10 (100%)	15 (100%)	0.002**
Do you think rubber dam should be compulsory before starting endodontics treatment? YES (Y) / NO (N)	50 (62.5%) (Y)	399 (76.7%) (Y)	8 (80%) (Y)	10 (66.7%) (Y)	0.044*
Do you want to use rubber dam when you taking multiple X-rays? YES (Y) / NO (N)	60 (75%) (Y)	342 (65.8%) (Y)	8 (80%) (Y)	10 (66.7%) (Y)	0.329
Willingness to gain knowledge about rubber dam through training/ CDE programs YES (Y) / NO (N)	75 (93.8%) (Y)	470 (90.4%) (Y)	4 (40%) (Y)	14 (93.3%) (Y)	<0.001**

[Table/Fig-2]: Questionnaire about rubber dam and the corresponding data

gain knowledge through training and continuing dental education programs.

DISCUSSION

These findings demonstrate that use of a rubber dam during endodontic procedures is not common. An earlier British survey found that 93% of dentists in the British Dental Association “never or seldom” use a rubber dam for operative dental procedures, compared to 82% “never or seldom” for endodontic procedures [15]. A study of more than 1000 alumni of one U.S. dental school observed that 40%–45% of dentists never use a rubber dam for restorative procedures depending on the procedure compared to 11% who never use it for endodontic procedures [16]. Surveys of dental students suggest that while rubber dam usage for operative procedures during dental school is high, these same students do not use rubber dam commonly for the same procedures once in private practice [17,18]. A 1995 survey of alumni of a mid-western U.S. dental school observed that the most-common reason for non-use of certain techniques taught in dental school (such as use of rubber dam) was “not essential to efficient dentistry” [19]. Therefore, our findings support similar findings from questionnaire studies that have included a broad range of practitioners and dental students [18,19]. A 2007 survey of U.S. dentists observed that the most common reason for not using rubber dam was “inconvenience” and that “it was unnecessary” [17]. In this survey similar reasons

and insufficient training, time consuming and being costly were advocated by students and practitioners. Patient acceptance has been reported as the main reason for not using rubber dam in other studies, [15] although studies that actually query patients have found patient acceptance to be high [20,21]. The incidence of instrument aspiration is highest among paediatric patients and according to our survey the use of rubber dam was alarmingly low in paediatric patients among all categories of dental surgeons.

Earlier Survey findings suggest that use of rubber dam is associated with certain dentist, patient and procedure level characteristics [22]. A 1984 survey of U.S. Air Force general dentists asked respondents to report on their use of the rubber dam in percentage categories [23]. Respondents reported detailed usage, including usage by restoration material type, restoration classification, and procedure type. An overall conclusion was that rubber dam usage was very high compared to usage reported by other types of dentists. For example, for class II amalgam restorations in maxillary teeth, 87% of dentists responded that they use a rubber dam at least 21% of the time. Usage by Air Force dentists was unusually high compared to dentists at large.

The main reasons among practicing dental surgeons for the lack of use of rubber dam was the lack of sufficient knowledge and training. Time and cost received the least-important ratings. The time saved by operating in a clean field with good visibility may compensate for the time spent applying the rubber dam [24]. If practitioners realized rubber dam's advantages such as increased treatment quality, its use would be irresistible. Few other dental procedures offer both an increase in operating speed and treatment quality [25].

One limitation of this study is that other forms of isolation were not queried. We restricted the study to rubber dam isolation because this is by far the most effective and accepted method to enhance a dental procedure by allowing better access, visibility, and dry field isolation [26,27]. Additionally, the effectiveness of other types of isolation of the operating field has not been ascertained. Further studies of these factors would be warranted.

CONCLUSION

Undergraduate dental educators need to look for opportunities for improvements to reduce discrepancy between what is taught and the general practice of dentistry. Dental students should believe that rubber dam is relevant to clinical dentistry. Greater emphasis should be placed on the application of rubber dam; a) at dental school level and b) in Clinical practice through CDE programs, to provide dental treatment to patients of a recognized standard. There was a high willingness observed to gain knowledge about rubber dam through training.

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