

## Rubber Dam: Is it a Popular Method of Field Isolation among Dentists in Karachi?

Asaad Javaid Mirza<sup>1</sup>, Maaz Asad Javaid<sup>2</sup>, Shama Asghar<sup>3</sup>,  
Ammar Ahmed Siddiqui<sup>4</sup>, Marwah Berkathullah<sup>5</sup>

### Abstract

**Objective:** To find out the frequency of rubber dam usage among clinical students, interns and dental practitioners and the barriers they come across to place it routinely in their practices.

**Methods:** An observational cross-sectional study was performed from October 2016 to January 2017 using non-probability convenience sampling. A questionnaire was meticulously designed based on questionnaires used in similar studies in the past. The target population in this study was clinical dental students, interns and the faculty members working in various teaching institutions in Karachi and involved in general dental practice. Data from completed questionnaire was analysed using SPSS version 20.

**Results:** With the healthy response rate of 81%, this study shows that the majority (76%) of clinical students, interns and practicing dentists in Karachi, Pakistan continue to ignore the rubber dam placement in their routine practices. Total 89% of non-users did not use it as they find it time consuming and 66% of them mentioned that it is difficult to place. Couple of other reasons for which more than 50% of respondents avoid using rubber dam are frequent tearing of the sheet and patient's fear or abhorring attitude towards placement of rubber dam.

**Conclusion:** This study suggests that use of rubber dam is an unpopular method for isolation of operative site among clinical students, interns and clinicians working in Karachi.

**Keywords:** Rubber dam, dentists, foreign bodies.

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### Introduction

Operative dentistry procedures consume a huge proportion of general dentists' treatment time and the necessity to carry out such dental proce-

<sup>1,5</sup> Department of Operative Dentistry, Baqai Medical University, Karachi

<sup>2</sup> Department of Periodontology, Baqai Medical University, Karachi

<sup>3</sup> Department of Operative Dentistry, Bahria University, Karachi

<sup>4</sup> Department of Preventive Dentistry, Ha'il University, KSA

**Correspondence:** Dr. Maaz Asad Javaid  
Department of Periodontology,  
Baqai Medical University, Karachi  
Email: [maazasad@live.com](mailto:maazasad@live.com)  
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dures under dry conditions has been recognised and is well-documented. Various methods of operating field isolation are used to avoid contamination from saliva and other oral fluids. The options available to the dentists include absorption using cotton rolls, gauze, retraction cord or evacuation through saliva ejectors and high power suction. The rubber dam, developed in 1864 by Dr. Sanford Christie Barnum, is considered to be the best isolation technique. It is a piece of stretchable latex or nitrile that becomes a barrier when applied to designated teeth and is available as sheet of 6x6 inches for posterior teeth and 5x5 inches for anterior teeth available in various contrasting colours and thicknesses.

Rubber dam isolation is considered mandatory in contemporary dental practices as the patient under treatment, during most of the restorative or endodontic procedures, is in the supine position. In that position, a patient is most likely to ingest any small instrument, for instance a burr or an endodontic file inadvertently slipped from a dentist's fingers<sup>1-3</sup>. Failure to use rubber dam has been shown to influence the choice of root canal irrigating solution which may have an adverse effect on treatment outcome, as use of sodium hypochlorite due to its bad taste is not possible without rubber dam. Moreover, swallowing of foreign bodies, such as removal of a failed amalgam, chipped porcelain and broken denture pieces, has also been reported in the instances where rubber dam isolation was not implemented<sup>4</sup>. Though most of the foreign bodies pass through the alimentary canal uneventfully, but some become wedged, often in the throat and may have the potential to cause serious complications<sup>5</sup>.

During accomplishment of an operative dentistry procedure, an attending dentist is most vulnerable to contract cross infection through the patient's oral fluids like saliva, blood or inflammatory exudate. These possible fears of cross infection between dental practitioner and the patients can be at least minimised if not completely eliminated by applying rubber dam isolation instead of using other available means for field isolation.

Despite all its potential known benefits and availability for use since almost 150 years, the use of rubber dam could not gain universal popularity to be used as an effective isolation technique<sup>6-8</sup>. Like many other countries, use of rubber dam is scarcely prevalent among dentists and dental students in Pakistan<sup>9</sup>. To the best of our knowledge, a couple of studies are available which give some data about the dentists attitude towards rubber dam placement; that too involve only dentists working in the northern part of the country.

Karachi is the biggest metropolitan city of Pakistan where more than 12 dental colleges function to cater thousands of dental students, interns, post-graduate students and faculty members. Data to re-

veal the practices and attitudes of dental clinicians working or studying in the city is scarcely available. One such study reports about the knowledge and attitudes of dentist towards use of rubber dam, but reasons for not using are not reported<sup>10</sup>. Findings of this study will disclose the causes of ignoring this essential isolation step. The objectives of this study were to determine the frequency of rubber dam usage among clinical students, interns and dental practitioners and the barriers they come across to place it routinely in their practices.

### Subjects and Methods

This questionnaire-based survey was carried out among clinical students, interns and faculty members of multiple dental colleges situated in the city of Karachi. A self-administered, face and content validated questionnaire was developed by the research team for this observational study having cross-sectional design. It was pre-piloted to test its internal consistency using Cronbach's alpha test with value of 0.8 to be used as the survey tool for the study. The 2-point Likert's scale survey form with close-ended queries having respondents' preferences of "Yes" and "No" was physically distributed among clinical students, registered interns and faculty members involved in general dental practice through a nominated focal person in each dental college. The focal person was also responsible for briefing the participants about the purpose of the study, to address any felt ambiguity in the questionnaire and to collect the filled out survey forms as per participants' convenience within a week after distribution. For the sake of secrecy and anonymity of respondents, their name, institution or any personal identifying information was not obtained from them. The study was performed during October 2016 to January 2017 using non-probability convenience sampling technique. The questionnaire comprised of two portions, the first for demographic and the second portion confined to simple interrogations about the use or non-use of rubber dam as a routine clinical practice during operative and/or endodontic procedures. The non-users of rubber dam isolation were enquired about the hurdles they face to use it.

Data from the completed questionnaires were analysed using SPSS for Windows version 20, and was displayed as numbers and percentages. Pearson Chi square test was applied to check the association of rubber dam use among the groups.

### Results

The participants of the study responded at healthy rate of nearly 81% as out of 250 survey forms distributed, 202 filled out forms were received. As the queries were simple, all of them were completely filled and hence there was no rejection. The respondents of the study included 80 final year students, 73 house officers and 49 general dental practitioners (Table 1). It was observed from the responses received that merely 23.8% of the respondents used rubber dam in their clinical practices (Table 2).

The remaining 76% respondents did not apply rubber dam for various reasons despite the fact that a majority of them felt that it is an effective method for isolation of operating field and gives enhanced oral secretions control in comparison to cotton rolls or gauze. A total of 89% of non-users did not use it as they find it time consuming and 66% of them thought that it is difficult to place. A couple of other reasons for which more than 50% of respondents avoid using rubber dam are frequent tearing of the sheet and patient's fear or abhorring attitude towards placement of rubber dam (Table 3).

### Discussion

Rubber dam is considered as the ultimate method for isolation of operative field in dentistry. Despite its known benefits, use of rubber dam to carry out operative dentistry procedures is not a popular method of field isolation among dental practitioners worldwide. The idea of using a rubber sheet to isolate an operating dental site dates back to 18th century but it appears implausible that two centuries later, majority of general dentists are not convinced about the effectiveness of this self-effacing isolation method<sup>11-13</sup>. Findings of our study show that merely 23% of the respondents including final

**Table 1.** Characteristic of participants from dental colleges in Karachi

Variables	Frequency (%)
Final year students	80 (40)
House officers	73 (36)
Dental Practitioner	49 (24)
Total	202 (100)

**Table 2.** Prevalence of rubber dam use by dental clinical students, house officers and dental practitioners from Karachi

Use of rubber dam	RD users N (%)	RD non-users N (%)	Totals N (%)	p-Value
Final year	11 (5.5)	69 (34.5)	80 (40)	0.02*
House officers	23 (11.4)	50 (24.6)	73 (36)	
Dental Practitioner	14 (6.9)	35 (17.1)	49 (24)	
Totals	48 (23.8)	154 (76.2)	202 (100)	

\*Significant at 95%

**Table 3.** Reasons for not using rubber dam by dental clinical students, house officers and dental practitioners from Karachi.

Variables	Yes N (%)	No N (%)	Total N (%)
I donot use RD because of the following reasons:			
a. It is difficult to place	102 (66.2)	52 (33.8)	154(100)
b. It is time consuming	137 (89)	17 (11)	
c. It is ineffective	18 (12)	136 (88)	
d. Cotton rolls and gauze perform isolation as good as RD	51 (33)	103 (67)	
e. It frequently tears	77 (50)	77 (50)	
f. It leaks very often which causes failure of isolation	37 (24)	117 (76)	
g. Patients feel fear or don't like it	89 (58)	65 (42)	
h. I fear, patient may ingest the slipped RD clamp	49 (32)	105 (68)	
i. I have insufficient training for its placement	67 (43.5)	87 (56.5)	
j. It increases the treatment cost	53 (34.4)	101 (65.6)	

year students, interns and general dentists apply rubber dam. It determines that our findings do not differ from the universally prevailing situation regarding non-use of rubber dam. Our findings also match with a Pakistani study done in Rawalpindi and Islamabad which concludes that 28% dentists use rubber dam<sup>10</sup>.

The undergraduate students in their dental schools globally learn and are emphasised up on to routinely apply rubber dam before attempting any restorative procedure<sup>14-16</sup>. It is incredible to note that out of 80 clinical students who took part in the study, only 11 routinely applied rubber dam and the rest (n= 69) did not feel convinced to apply it. In this respect, results of this study match the results of an Irish study<sup>17</sup> and a Turkish study<sup>18</sup>. An understandable reason for persistently avoiding this important step by clinical dental students in Pakistan may be to save time to accomplish their mandatory clinical quota to make them eligible to sit in final examination. Faculty members involved in undergraduate dental teaching should ponder up on to reviewing the imposed clinical quota to reduce discrepancy between what is taught and its clinical implementation.

The prevalence of rubber dam used by general practicing dentists in different countries tends to decrease intensely after qualifying from a dental school. The same scenario regarding non-use of rubber dam exists among Pakistani dentists<sup>19,20</sup>. The figures in Table 2 show that hardly 7% of responding general dental practitioners believes in the efficacy of rubber dam isolation and therefore most of them did not use it routinely. These results are in accordance with many other studies done worldwide<sup>21-24</sup>.

Among various reasons not to use rubber dam, one repeatedly responded reason was the insufficiency of training as 43% of respondents feel that they did not receive sufficient training for rubber dam application during undergraduate clinical sessions (Table 3). This deficiency is further exposed by 66% of respondents who thought rubber dam is difficult to place or 89% who believed that it is time

consuming (Table 3). If the students during undergraduate training repetitively practice applying rubber dam in preclinical and clinical sessions, the difficulty will be reduced and consequently time of application decreases. It is obvious, if the students are well acquainted with application technique, rubber dam can be applied within five minutes<sup>17,25</sup>. It is actually the operator's lack of proficiency due to which he avoids rubber dam than lack of training<sup>26</sup>.

Regarding patients' preference to allow an operating dentist to work under rubber dam isolation, 58% dentists did not place rubber dams because of patients' fear or disagreement. There are reported studies which contradict these findings and reveal patients' preference to undergo dental treatment under rubber dam isolation<sup>27</sup>. A study done in the province of Khyber Pakhtunkhwa on this issue shows that if benefits of rubber dam are explained to the patients, their fear for its placement reduces<sup>20</sup>. Most of the time, patients' approval can be obtained if the dentist is convinced with efficacy and value of rubber dam. It is reported that a skilful dentist causes less stress in placement of rubber dam<sup>28</sup>. The dentists should spend needed time to explain the significance, safety and effectiveness of rubber dam in carrying out restorative procedures.

Majority (40%) of the respondents to this survey questionnaire were final year dental students. These students just after getting through their final professional examination are issued provisional licence from Pakistan Medical and Dental Council to practice general dentistry and, hence, they have been included in the study. It is a general observation that they in their clinical practices do whatever they have learnt during undergraduate clinical training and evidence suggests that isolation of operative field using rubber dam is not a very popular method employed.

Survey based studies have some inbuilt deficiencies. For instance, respondents may not like to provide accurate, honest answers or may feel stressed providing answers that present them in an unfavourable manner. The present study also suffers from this weakness as it cannot be identified with

certainly how accurate self-reports of rubber dam usage are.

It is therefore recommended that for clinical students and interns, it should be made compulsory to place rubber dam before starting any restorative or endodontic procedure.

For practicing dentists, under continuing dental education (CDE) programs, seminars and hands-on workshops should be conducted to re-emphasise the benefits of rubber dam and to improve their manual dexterity to place it quicker. It obviously, will ensure delivery of quality dental treatment to the patients.

Limitations of the study include that institutions were not selected and any final year student, intern or faculty involved in general dental practice who willingly filled out the form was included in the study.

## Conclusion

This study indicates that dental clinicians, may they be students, interns or graduate dentists working in Karachi, do not utilise rubber dam for various reasons. Insufficiency in training results in a time consuming and difficult procedure.

## Conflict of Interest

Authors have no conflict of interests and no grant/ funding from any organization for this study

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