



# Rubber dam application in clinical practice: a study on patient perspective

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## ABSTRACT

**Aims:** The present study aimed to elicit the views of patients, applying to our faculty for dental treatment, on rubber dam application.

**Methods:** We recruited 250 patients, who applied to Dicle University, Faculty of Dentistry, Department of Restorative Dentistry for dental treatment, in this study upon their informed consent. Following routine clinical and radiological examinations, the patients undergoing dental procedures with rubber dams were asked to fill out a questionnaire about their views on the application. Accordingly, while the patients' characteristics and responses to the questionnaire are shown descriptively, we sought the relationships between the categorical variables using a chi-square test. All statistical analyses were performed on the IBM SPSS 25.0 program.

**Results:** The findings revealed that rubber dams were applied to 85.6% of the patients for the first time. In this sense, the majority of the patients (86.8%) found the treatment with rubber dams more comfortable than their previous treatments. It was discovered that the patients were uncomfortable the most when being unable to communicate with the physician during the treatment. About half of the patients (52.8%) found the most comforting aspect of rubber dam application to be the absence of water accumulation in the mouths. Besides, we found a significant association between gender and the most disturbing aspect of rubber dam application. Accordingly, while 42.6% of the female patients reported having difficulty swallowing or breathing, 40% of the male patients reported being uncomfortable when being unable to rinse their mouth and communicate with the physician during the treatment. Finally, almost all patients (93.2%) stated that they would prefer rubber dam application on their next visit.

**Conclusion:** Despite the advantages of rubber dam application, clinicians hold a belief that patients may be disturbed by the application for various reasons. Yet, our findings showed vice versa; most patients were not disturbed by the application, and even they would prefer it on their future visit. Thus, addressing rubber dam applications in undergraduate and postgraduate education would help improve patient comfort and the quality of dental procedures.

**Keywords:** Rubber dam, isolation, patient satisfaction

## INTRODUCTION

Thanks to the advantages it offers for infection control, patient protection, and treatment effectiveness, rubber dams are accepted as a standard in dental procedures, particularly in root canal treatment (RCT) (1-4). The most prominent advantage of using a rubber dam may be that it ensures safety during the operation by reducing the risk of transmission of infectious agents between the operator/dental assistant and the patient. Moreover, it assumes a critical role in preventing malpractice during endodontic procedures as it hinders accidental swallowing of instruments, solvents, and irrigation solutions during root canal treatment (5) and protects soft tissues, including gingiva, buccal mucosa, and tongue (9). A rubber dam provides a clean, dry operation area by excluding tissues other than the tooth focused and greater visibility to the operator during treatment (5).

Despite its advantages, rubber dam application is not a popular method for area isolation among many practitioners and specialist dentists. Difficulty in its placement, insufficient training in clinical years, and expensive equipment and materials can be counted among the reasons why rubber dams are not widely adopted. When misapplied, they may disturb the patient, which, in turn, may hinder their use among dentists (6).

Most dental schools worldwide teach rubber dam application in the preclinical years and expect student qualification till the final year. Rubber dams are now utilized more in practice by newly graduated dentists than in the past. (7) To improve the quality of dental procedures, relevant skills can be acquired or improved through continuous professional education (8). The present study aimed to reveal patients' views on their experience with rubber dam application in restorative procedures in the Faculty of Dentistry at Dicle University.





## METHODS

The study was approved by the Dicle University Faculty of Dentistry Ethics Committee (Date: 2021, Decision No: 2021/34). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Following their routine clinical and radiological examinations, we sought descriptive characteristics of and informed consent from 250 patients who applied to Dicle University, Faculty of Dentistry, Department of Restorative Dentistry for dental restoration. After their treatments with rubber dam application, they were asked to fill out a questionnaire about the quality of the rubber dam application during the procedure.

While the patients' characteristics and responses to the questionnaire are shown descriptively, we sought the relationships between the categorical variables using a chi-square test. The confidence interval was set to 95%, and a  $p$ -value  $< 0.05$  was accepted as statistically significant. All statistical analyses were performed on the IBM SPSS 25.0 program.

## RESULTS

| Table 1. Patients' demographic characteristics |     |      |
|------------------------------------------------|-----|------|
|                                                | N   | %    |
| Sex                                            |     |      |
| Female                                         | 115 | 46.0 |
| Male                                           | 135 | 54.0 |
| Age                                            |     |      |
| 18-25 years                                    | 83  | 33.2 |
| 26-30 years                                    | 56  | 22.4 |
| 31-35 years                                    | 39  | 15.6 |
| 36-40 years                                    | 38  | 15.2 |
| 41 years and older                             | 34  | 13.6 |
| Total                                          | 250 | 100  |

There were a total of 250 patients in the study, 115 (46%) females and 135 (54%) males. About one-third of them (33.2%) were aged 18-25 years, 22.4% were aged 26-30 years, 15.6% were aged 31-35 years, 15.2% were aged 36-40 years, and 13.6% were aged 41 years and older.

The majority of the patients (85.6%) were not applied a rubber dam in their previous visits for treatment. Similarly, most of the patients (86.8%) reported feeling more comfortable with the rubber dam application, while 6.4% and 6.8% experienced the same comfort and uncomfortable, respectively, compared to their previous treatments. Moreover, we found the most disturbing aspect of the application to be difficulty in swallowing or breathing (26.8%), being unable to rinse mouth during the treatment (30.4%), and being unable to communicate with the dentist during the treatment (37.6%) (Table 2). On the other hand, the aspects of the application that the patients felt the most comfortable with were as follows: no water accumulation in the mouth (52.8%), no risk of materials spilling in the mouth (26.8%), no risk of swallowing or inhalation of the materials used (16.4%), and better protection from infection (4%). In addition, almost all patients (92.3%) stated that they would prefer rubber dam application on their next visit for treatment.

When it comes to the relationship between patients' views on the rubber dam application and sex, we found a significant difference between the male and female patients only in the aspect of the application that bothered them the most ( $p < 0.05$ ). Accordingly, while 42.6% of the female patients felt uncomfortable with the application due to difficulty swallowing or breathing, 40% of the male patients complained about being unable to rinse their mouths and communicate with the dentist during the treatment (Table 3).

We also compared the patients' views on the rubber dam application by age. The findings demonstrated that the patients significantly differed in the aspect of the application with which they felt most comfortable the most by age ( $p < 0.05$ ). In this regard, 70.6% of patients aged 41 years and older reported that they were more comfortable with no water accumulation in their mouths (Table 3).

| Table 2. Patients' views on the rubber dam application                                               |                                                                   |     |       |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-----|-------|
|                                                                                                      |                                                                   | N   | %     |
| Was any rubber dam applied in your previous treatments?                                              | Yes                                                               | 36  | 14.4  |
|                                                                                                      | No                                                                | 214 | 85.6  |
| Have you been informed about why a rubber dam would be applied?                                      | Yes                                                               | 250 | 100.0 |
| To what extent has the rubber dam application been comfortable compared to your previous treatments? | More comfortable                                                  | 217 | 86.8  |
|                                                                                                      | In the same comfort                                               | 16  | 6.4   |
|                                                                                                      | More uncomfortable                                                | 17  | 6.8   |
| What has bothered you the most during the rubber dam application?                                    | Difficulty swallowing or breathing                                | 67  | 26.8  |
|                                                                                                      | Being unable to rinse the mouth during the treatment              | 76  | 30.4  |
|                                                                                                      | Being unable to communicate with the dentist during the treatment | 94  | 37.6  |
|                                                                                                      | Other                                                             | 13  | 5.2   |
| What aspect of the rubber dam application have you felt the most comfortable with?                   | No water accumulation in the mouth                                | 132 | 52.8  |
|                                                                                                      | No risk of materials spilling into the mouth                      | 67  | 26.8  |
|                                                                                                      | No risk of swallowing or inhalation of the materials used         | 41  | 16.4  |
|                                                                                                      | Better protection from infection                                  | 10  | 4.0   |
| Would you prefer rubber dam application in your following treatments?                                | Yes                                                               | 233 | 93.2  |
|                                                                                                      | Uncertain                                                         | 12  | 4.8   |
|                                                                                                      | No                                                                | 5   | 2.0   |
| Total                                                                                                |                                                                   | 250 | 100   |

**Table 3. Patients' views on the rubber dam application by sex**

|                                                                                                      | Sex          |              | $\chi^2$ | P      |
|------------------------------------------------------------------------------------------------------|--------------|--------------|----------|--------|
|                                                                                                      | Female       | Male         |          |        |
| To what extent has the rubber dam application been comfortable compared to your previous treatments? |              |              | 2.768    | 0.251  |
| More comfortable                                                                                     | 96<br>83.5%  | 121<br>89.6% |          |        |
| In the same comfort                                                                                  | 8<br>7.0%    | 8<br>5.9%    |          |        |
| More uncomfortable                                                                                   | 11<br>9.6%   | 6<br>4.4%    |          |        |
| What has bothered you the most during the rubber dam application?                                    |              |              | 30.420   | 0.000* |
| Difficulty swallowing or breathing                                                                   | 49<br>42.6%  | 18<br>13.3%  |          |        |
| Being unable to rinse the mouth during the treatment                                                 | 22<br>19.1%  | 54<br>40.0%  |          |        |
| Being unable to communicate with the dentist during the treatment                                    | 40<br>34.8%  | 54<br>40.0%  |          |        |
| Other                                                                                                | 4<br>3.5%    | 9<br>6.7%    |          |        |
| What aspect of the rubber dam application have you felt the most comfortable with?                   |              |              | 5.939    | 0.115  |
| No water accumulation in the mouth                                                                   | 55<br>47.8%  | 77<br>57.0%  |          |        |
| No risk of materials spilling into the mouth                                                         | 33<br>28.7%  | 34<br>25.2%  |          |        |
| No risk of swallowing or inhalation of the materials used                                            | 19<br>16.5%  | 22<br>16.3%  |          |        |
| Better protection from infection                                                                     | 8<br>7.0%    | 2<br>1.5%    |          |        |
| Would you prefer rubber dam application in your following treatments?                                |              |              | 0.486    | 0.784  |
| Yes                                                                                                  | 107<br>93.0% | 126<br>93.3% |          |        |
| Uncertain                                                                                            | 5<br>4.3%    | 7<br>5.2%    |          |        |
| No                                                                                                   | 3<br>2.6%    | 2<br>1.5%    |          |        |

\*p &lt; 0.05

## DISCUSSION

Anything that obscures the operating field is likely to adversely affect the efficiency and success of the operator. In this sense, the proper use of a rubber dam may help easily perform any procedure with improved quality of treatment outcome. Compared to other insulation methods, rubber dam application is considered the best moisture control method (9). Despite all its procedures and difficulties, a rubber dam should be applied for proper tooth isolation during root canal treatments, as highlighted in the quality guidelines by the European Society of Endodontics (10).

One reason why a rubber dam is not favored may probably be the time it takes to be placed in the operation area. We calculated the time of rubber dam application in the patients to be about two minutes. In their study, Orafi et al. (11) reported the average time required to place a rubber dam to be 4.28 minutes for general practitioners. It should be noted that the time may be influenced by factors such as the occupancy of the working environment (hospital, private clinic), dentists' workload, experience in manual dexterity and rubber dam application, and patient-related anxiety, panic, and excitement.

A dentist should be able to recognize when a patient is under extreme stress or anxiety. In doing so, clinicians should be able to avoid or reduce anxiety-provoking procedures and minimize their impacts on their patients (12). Sana et al. emphasized that the more experienced the operator, the less time they would spend on rubber dam application. Moreover, they also stated that the acceptance of rubber dam application would increase when the need for the application is clearly conveyed to patients (8). Therefore, it is deemed important for clinicians to demonstrate satisfying competence for correct, quick use of a rubber dam both during their undergraduate education and in clinical practice.

**Table 4. Patients' views on the rubber dam application by sex by age**

|                                                                                                      | Age         |             |             |             |                    | $\chi^2$ | P      |
|------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|-------------|--------------------|----------|--------|
|                                                                                                      | 18-25 years | 26-30 years | 31-35 years | 36-40 years | 41 years and older |          |        |
| Was any rubber dam applied in your previous treatments?                                              |             |             |             |             |                    | 3.692    | 0.449  |
| Yes                                                                                                  | 15<br>18.1% | 10<br>17.9% | 5<br>12.8%  | 3<br>7.9%   | 3<br>8.8%          |          |        |
| No                                                                                                   | 68<br>81.9% | 46<br>82.1% | 34<br>87.2% | 35<br>92.1% | 31<br>91.2%        |          |        |
| To what extent has the rubber dam application been comfortable compared to your previous treatments? |             |             |             |             |                    | 13.290   | 0.102  |
| More comfortable                                                                                     | 71<br>85.5% | 52<br>92.9% | 35<br>89.7% | 32<br>84.2% | 27<br>79.4%        |          |        |
| In the same comfort                                                                                  | 8<br>9.6%   | 3<br>5.4%   | 2<br>5.1%   | 0<br>0.0%   | 3<br>8.8%          |          |        |
| More uncomfortable                                                                                   | 4<br>4.8%   | 1<br>1.8%   | 2<br>5.1%   | 6<br>15.8%  | 4<br>11.8%         |          |        |
| What has bothered you the most during the rubber dam application?                                    |             |             |             |             |                    | 11.123   | 0.518  |
| Difficulty swallowing or breathing                                                                   | 26<br>31.3% | 18<br>32.1% | 9<br>23.1%  | 7<br>18.4%  | 7<br>20.6%         |          |        |
| Being unable to rinse the mouth during the treatment                                                 | 23<br>27.7% | 19<br>33.9% | 15<br>38.5% | 11<br>28.9% | 8<br>23.5%         |          |        |
| Being unable to communicate with the dentist during the treatment                                    | 29<br>34.9% | 15<br>26.8% | 14<br>35.9% | 18<br>47.4% | 18<br>52.9%        |          |        |
| Other                                                                                                | 5<br>6.0%   | 4<br>7.1%   | 1<br>2.6%   | 2<br>5.3%   | 1<br>2.9%          |          |        |
| What aspect of the rubber dam application have you felt the most comfortable with?                   |             |             |             |             |                    | 25.063   | 0.015* |
| No water accumulation in the mouth                                                                   | 46<br>55.4% | 25<br>44.6% | 16<br>41.0% | 21<br>55.3% | 24<br>70.6%        |          |        |
| No risk of materials spilling into the mouth                                                         | 25<br>30.1% | 17<br>30.4% | 7<br>17.9%  | 9<br>23.7%  | 9<br>26.5%         |          |        |
| No risk of swallowing or inhalation of the materials used                                            | 10<br>12.0% | 13<br>23.2% | 13<br>33.3% | 5<br>13.2%  | 0<br>0.0%          |          |        |
| Better protection from infection                                                                     | 2<br>2.4%   | 1<br>1.8%   | 3<br>7.7%   | 3<br>7.9%   | 1<br>2.9%          |          |        |

\*p &lt; 0.05



On the other hand, overlapping with our results, Kapitan et al. (13) emphasized that patients with a higher level of comfort during rubber dam application would also prefer it in their future dental treatments. In previous research in Riyadh and Croatia, 75.8% and 69.1% of the patients, respectively, stated that they would prefer a rubber cover for their future dental procedures if a more experienced operator could perform it (14, 15). Maslamani et al. also reported that 61% of their patients would prefer rubber dam applications for future dentist visits, which may be significantly related to patient acceptance and comfort during the application (16).

## CONCLUSION

Overall, besides our findings, further research is needed to understand better the psychological impacts of dental treatments on patients and the acceptability of dental treatment practices in optimizing patient comfort and treatment quality. It should be noted that despite a substantial emphasis on the importance of rubber dam application in relevant curricula and clinical studies, high costs and lack of time restricts the use of a rubber dam in dental operations.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** The study was approved by the Dicle University Faculty of Dentistry Ethics Committee (Date: 2021, Decision no: 2021/34).

**Informed Consent:** Participants were informed about the purpose of the study and their consent was obtained by paying attention to the principle of voluntariness. In addition, it was ensured that the information about the participants was kept confidential.

**Referee Evaluation Process:** Externally peer-reviewed.

**Conflict of Interest Statement:** The authors have no conflicts of interest to declare.

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**Author Contributions:** All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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