Use of absolute isolation in Endodontics: an analysis of the perception of the patient and the dentist of northwestern Paraná/Brazil

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ABSTRACT

Introduction: Rubber dam isolation is a mandatory procedure in dental treatment, especially in Endodontics. However, some professionals still refuse to employ it. **Aim:** This study interviewed dental professionals, dental students and patients, evaluating the perception of each group concerning the efficacy and safety of rubber dam by the percentage of responses to the questions. **Methods:** The questionnaires were responded by 50 students of the last year of Dentistry course at Unipar, 50 dental professionals and 100 patients from private clinics and the dental clinic of Unipar, at the city of Umuarama in Paraná. After collection of all submitted questionnaires, the responses were tabulated and analyzed. **Results:** 66% of dental professionals and 74% of dental students interviewed reported that they always use rubber dam isolation, mentioning as negative aspects for not using it the time required for placement, patient refusal and lack of training. Among the patients, 52% from private clinics and 54% from the dental clinic of Unipar considered the rubber dam uncomfortable, yet only 6% and 10%, respectively, indicated they would not like to use the rubber dam on the following session. **Conclusions:** Rubber dam isolation has great acceptance by professionals, students and patients. A significant part of dental professionals and students have been using the rubber dam routinely in the endodontic practice. The patients consider the rubber dam uncomfortable, notwithstanding they prefer to use it during dental treatment.

Keywords: Rubber dam, Endodontics. Patients. Dental professional. Dental students.

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Introduction

Modern Endodontics is characterized by the inclusion of scientific advances provided by high-tech equipment, such as microscope and tomograph, which enabled the accomplishment of treatments with better domain of anatomical anomalies and greater accuracy of biomechanical preparation and root canal filling[1]. However, some resources persist throughout the history of Endodontics due to their proven efficiency, becoming a standard in the evaluation of quality of endodontic treatment, such as rubber dam isolation.[2]

The rubber dam was introduced in Dentistry by Sanford C. Barnum in 1864, in an attempt to isolate the treatment area from the saliva[2,3]. Over the years, the advantages of rubber dam isolation have expanded[4] and currently include the following: significant reduction in atmospheric bacterial contamination[2], prevention of inhalation and ingestion of instruments, prevention of irrigation solutions from flowing into the oral cavity[5,6,7] and soft tissue retraction.[5,7]

Despite the benefits for both patients and dentists, the rubber dam has been scarcely used in routine endodontic treatment, as often demonstrated in the literature. Slaus and Bottenberg[8] reported that, among dentists from the Flanders region, the rubber dam is not used in 77.3% of cases. Peciuliene et al.[9] report that, among American general practitioners, 41% never use rubber dam. According to Saunders et al.[10] in the United Kingdom, 60% to 70% reported not using it for any procedure. Kaboré et al.[5] found that 91.9% of dentists in Burkina Faso do not use the rubber dam for endodontic treatment. In Saudi Arabia, Madarati[6] surveyed general practitioners and Endodontics specialists and 62.7% did not use rubber dam for root canal treatment.

The reasons presented for this by dental professionals are diverse, ranging from difficult placement, unavailability in their workplace, time spent for utilization, patient rejection, lack or insufficient professional training and even high cost.[6,7,11]

The present study aimed to interview dental professionals and students, as well as their patients, at the Northwestern region of the state of Paraná, aiming to collect answers regarding rubber dam isolation, assessing the percentage of responses to each question, the perception of interviewed groups on the effectiveness and safety regarding the use of the rubber dam. It is also expected that the results of this study may positively impact the entire dental community, interfering with the behavior of professionals and students in relation to the advantages and importance of using the rubber dam.

Material and method

This study was approved by the Institutional Review Board under n. 51303515.6.0000.0109. Questionnaires were developed and delivered to dental students, dental professionals and patients from the Northwestern region of Paraná, in the period between May and September 2017.

The patients were randomly selected among people assisted at private clinics and at Unipar dental clinic, adding up to 50 patients from each setting. After treatment completion, in the waiting room, the form containing questions related to the use of rubber dam in endodontic treatment (Fig 1) and the informed consent form (ICF) were given to patients for filling. They were advised to insert only the sheet containing the questionnaire in the envelope provided, to ensure that the answers would remain anonymous and confidential. Once sealed, the envelope and the ICF were delivered to the clinic assistant, for patients attended at Unipar dental clinic, or to the dental nurse for patients assisted in private clinics. Each patient filled only one form, regardless of the number of treatment sessions.

Concerning the students, 50 randomly selected individuals enrolled in the last term of the Dentistry Course at Universidade Paranaense, Umuarama campus, participated in the study. The form (Fig 2) was delivered to the students, who filled it and returned in a sealed envelope apart from the ICF. Two boxes were kept at the reception of the dental clinic throughout the study period, being one for the envelope with the questionnaire and the other for the ICF, to preserve the identity of the participants. Each student filled only one questionnaire.

AGE:_____ GENDER:_____

HOW OFTEN DO YOU DO TO THE DENTIST?
( )REGULARLY ( ) SOMETIMES ( ) NEVER

HAVE YOU PREVIOUSLY EXPERIENCED THE USE OF RUBBER DAM IN DENTAL TREATMENT?
( ) NO ( ) YES

DID THE DENTIST EXPLAIN WHY THE RUBBER DAM WAS USED?
( ) YES ( ) NO

DID YOU UNDERSTAND THE REASONS FOR USING THE RUBBER DAM?
( ) YES ( )NO

YOU THINK THE RUBBER DAM WAS USED TO BENEFIT:
( ) YOU ( ) THE DENTIST ( ) BOTH

YOU THINK THE RUBBER DAM WAS:
( ) COMFORTABLE ( ) UNCOMFORTABLE

WOULD YOU LIKE TO USE THE RUBBER DAM ON YOUR NEXT SESSION?
( ) YES ( ) NO ( ) ANY

COMPARING YOUR SESSIONS OF DENTAL TREATMENT WITH AND WITHOUT THE RUBBER DAM, WHAT IS YOUR OPINION ABOUT THE TWO TREATMENTS?
( ) BETTER ( ) WORSE

Figure 1. Form containing the questions responded by patients assisted in private clinics and the dental clinic of UNIPAR.

Regarding the professionals, questionnaires were delivered to 50 dentists working in private clinics in the city of Umuarama, who perform endodontic procedures. The completed forms were stored in envelopes, sealed separately from the ICF and collected later (Fig 3). The selected professionals completed a single questionnaire and did not necessarily have to be the same professionals responsible for assisting the patients who participated in the project.

		Always	Nearly always	Sometimes	Never
After graduation, do you intend to routinely use the rubber dam for endodontic treatment?		☐	☐	☐	☐
Which of these items do you consider a negative aspect of the rubber dam?	Lack of confidence on the rubber dam				☐
	Too long time				☐
	Extra cost				☐
	Lack of patient acceptance				☐
	Technical difficulty				☐
	Lack of habit				☐
	Possibility of dental fracture				☐
	Allergic reaction				☐
Indicate, in decreasing order (from the most to the least important) the items which, in your opinion, represent **ADVANTAGES** to use the rubber dam	Soft tissue retraction				☐
	Absence of saliva on the operating field				☐
	Better illumination				☐
	Possibility of field disinfection				☐
	Protection against aspiration and swallowing				☐
				Yes	No
Do you consider the rubber dam fundamental in Endodontics?				☐	☐

Figure 2. Form containing the questions to be answered by the dental students from UNIPAR.

		Always	Nearly always	Sometimes	Never
Do you use the rubber dam for endodontic treatment?		☐	☐	☐	☐
If not, why?	Too long time				☐
	Lack of confidence on the rubber dam				☐
	Extra cost				☐
	Lack of patient acceptance				☐
	Technical difficulty				☐
	Lack of habit				☐
	Possibility of dental fracture				☐
	Allergic reaction				☐
Indicate, in decreasing order (from the most to the least important) the items which, in your opinion, represent **ADVANTAGES** to use the rubber dam	Soft tissue retraction				☐
	Absence of saliva on the operating field				☐
	Better illumination				☐
	Possibility of field disinfection				☐
	Protection against aspiration and swallowing				☐
				Yes	No
Do you consider the rubber dam fundamental in Endodontics?				☐	☐

Figure 3. Form containing the questions to be answered by the dental professionals.

Results

After collection of all questionnaires, the responses were tabulated and organized in the following tables and graphs.

Data obtained from the questionnaire of students are presented in Table 1 and Figures 4 and 5.

Table 1. Percentage achieved as responses to the form delivered to students.

After graduation, do you intend to routinely use the rubber dam for endodontic treatment?	Almost	74%
	Almost always	16%
	Sometimes	10%
	Never	0%
Do you consider the rubber dam fundamental in Endodontics?	Yes	100%
	No	0%

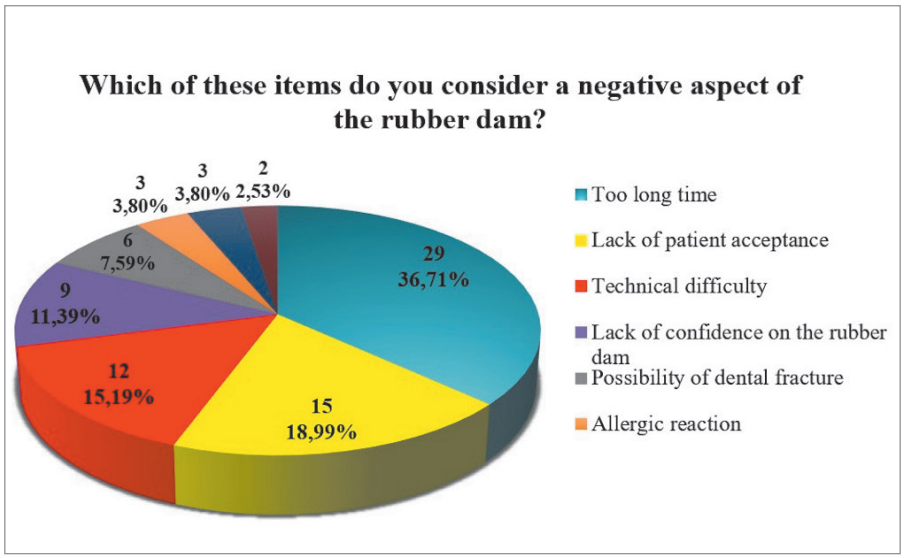

Figure 4. Percentage achieved from students about the negative aspects of rubber dam.

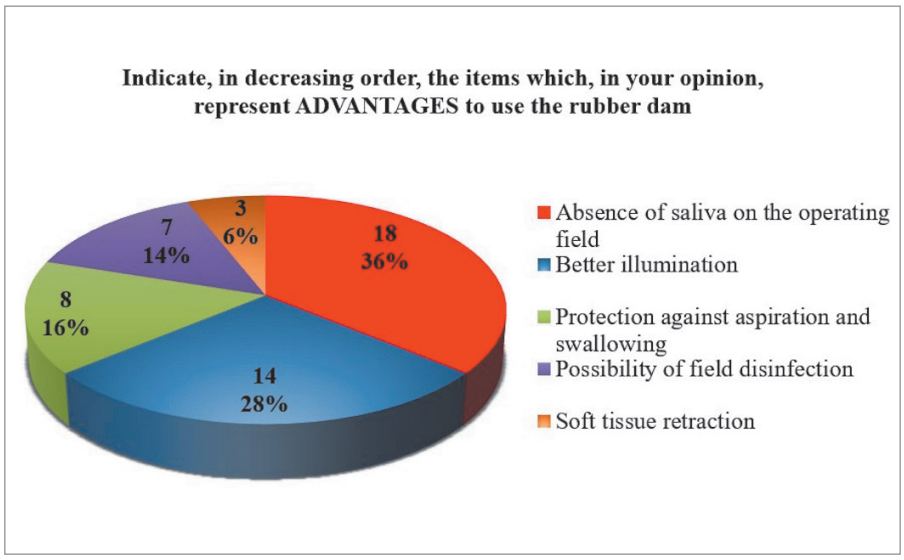

Figure 5. Percentage achieved in the study conducted on students about the advantages of rubber dam.

Data collected from the professionals are presented on Table 2 and Figures 6 and 7.

Data obtained from patients assisted at the university clinic and a private clinic are shown on Tables 3 and 4, respectively.

Table 2. Percentage of responses achieved from the professionals.

Do you use the rubber dam for endodontic treatment?	Always	66%
	Nearly always	18%
	Sometimes	10%
	Never	6%
Do you consider the rubber dam fundamental in Endodontics?	Yes	86%
	No	14%

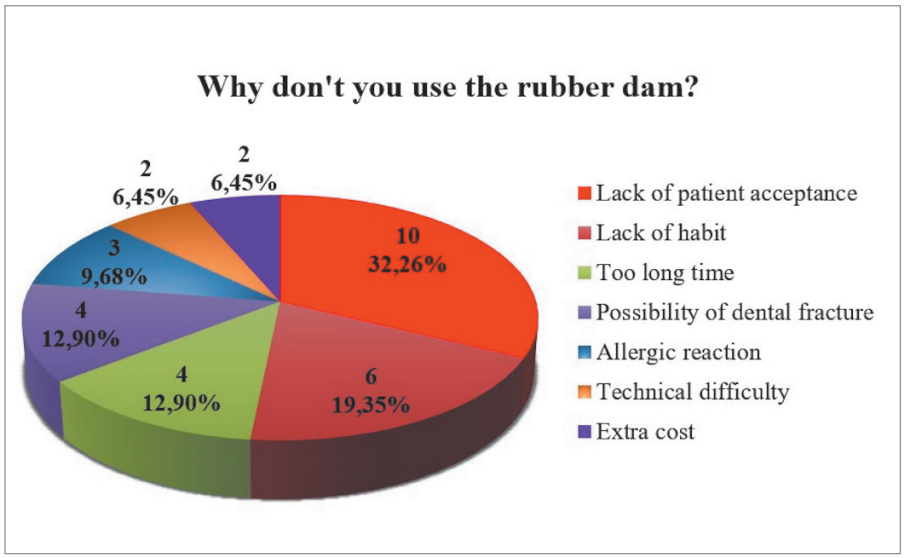

Figure 6. Percentage obtained from professionals concerning the reasons for not using the rubber dam.

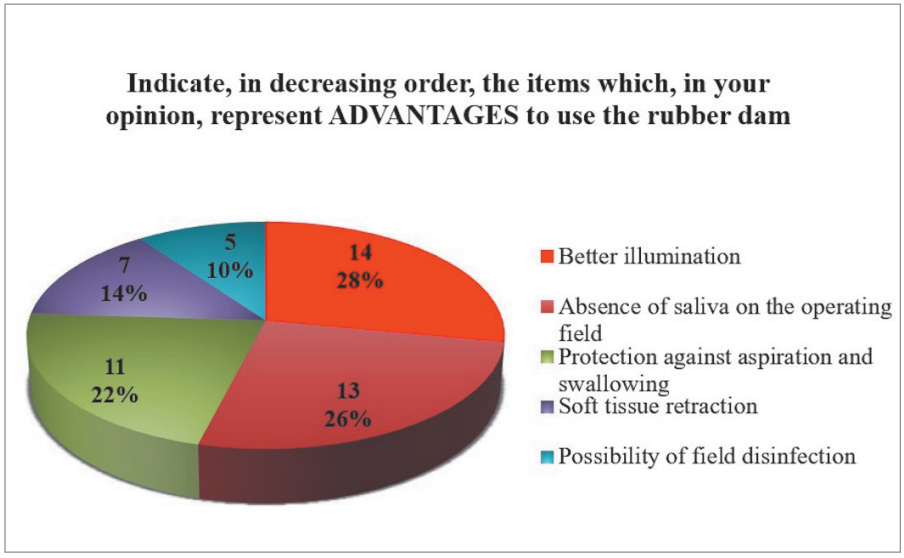

Figure 7. Percentage obtained from professionals about the advantage to use the rubber dam.

Table 3. Percentage of responses from patients assisted at the dental clinic of Unipar.

How often do you go to the dentist?	Regularly	Sometimes	Never
	40%	58%	2%
Have you previously experienced the use of rubber dam in dental treatment?	Sim	Não	
	54%	46%	
Did the dentist explain why the rubber dam was used?	Sim	Não	
	60%	40%	
Did you understand the reasons for using the rubber dam?	Yes	No	
	90%	10%	
You think the rubber dam was used to benefit:	You	Dentist	Both
	16%	1%	82%
You think the rubber dam was:	Comfortable	Uncomfortable	
	46%	54%	
Would you like to use the rubber dam on your next session?	Yes	No	Any
	70%	10%	20%
Comparing your sessions of dental treatment with and without the rubber dam, what is your opinion about the two treatments?	Better	Worse	
	72%	28%	

Table 4. Percentage of responses from patients assisted at private clinics.

How often do you go to the dentist?	Regularly	Sometimes	Never
	32%	66%	2%
Have you previously experienced the use of rubber dam in dental treatment?	Yes	No	
	36%	64%	
Did the dentist explain why the rubber dam was used?	Yes	No	
	70%	30%	
Did you understand the reasons for using the rubber dam?	Yes	No	
	68%	32%	
You think the rubber dam was used to benefit:	You	Dentist	Both
	8%	8%	84%
You think the rubber dam was:	Comfortable	Uncomfortable	
	48%	52%	
Would you like to use the rubber dam on your next session?	Yes	No	Any
	52%	6%	42%
Comparing your sessions of dental treatment with and without the rubber dam, what is your opinion about the two treatments?	Better	Worse	
	74%	26%	

Discussion

Rubber dam isolation is a procedure that aims to isolate one or more teeth in the dental arch during the dental procedure, providing the advantage of a clean operative field, with no moisture, in addition to better visibility of the operative field.[12]

According to Feierabend et al.[13], only three years after Dr. Sanford Christie Barnum used a thin piece of rubber for dental isolation in 1864, the prevalence of use of rubber dams was already widespread. Currently, due to its efficiency, it is considered a "gold standard" procedure especially in the academic en-

vironment, where the relevance of using the rubber dam is emphasized during training in Endodontics, Restorative Dentistry and many specialized practices.[14] This importance is recognized and could be detected in this study, especially among dental students, in which 100% answered to consider the rubber dam fundamental in Endodontics. This rate reduced to 86% when this question was directed at professionals, although it can still be considered a high rate. According to the interviewees, both students and professionals, the three main advantages of the rubber dam are: better illumination, absence of saliva in the operative field and protection against aspiration and swallowing.

However, the enthusiasm about the rubber dam use after graduation is reduced, since it is rarely used by general practitioners, as demonstrated by Tanalp et al.[15], who obtained a response from last-term students that only 49% would make routine use of rubber dam in cases of endodontic treatment, as opposed to the present findings, in which 74% of students intended to use the rubber dam whenever endodontic treatment is necessary. The expectation that this rate can effectively become a real percentage is revealed in the analysis of the questionnaire distributed to professionals, in which 66% reported that they always use the rubber dam in endodontic treatments. This rate is different from several studies in the literature, such as Pedrosa et al.[16], in which only 38% of respondents in the city of Belo Horizonte reported using rubber dam in Endodontics. Gilbert et al.[17] interviewed 1490 dentists over the internet and only 47% reported always using the rubber dam during root canal treatment.

The reasons for dentists to reject the rubber sheet dam are their belief that it takes too long and that patients do not accept it. These arguments against the rubber dam use do not change significantly across studies.[13,14,17,18,19] In this study, these two items appeared among the main, with reports of lack of patient acceptance by 32.26%, and the concern about time was reported by 12.90%. It is interesting to note that this opinion seems to be rooted as a preconception about the rubber dam use, since both appear as the two main negative items listed in the questionnaire applied to academics, only with inverted importance, in which the time was reported by 36.71% and lack of patient acceptance by 18.99%. However, these assumptions are easily questioned, as demonstrated by Kapitán et al.[18] who obtained an average time for rubber dam application of 53 seconds. The report of this item by dental students is justified, in general, by their short training time, reported in this study as technical difficulty by 15.19%.

Regarding the patients' dissatisfaction in relation to the rubber dam use, it was decided to apply a questionnaire to patients assisted both in private clinics and in the university clinic, to obtain data that could effectively determine their perception about the rubber dam use.

From the answers, it was possible to verify that a small number of people were experiencing dental care for the first time, since only 2% of them, in both settings, reported never having undergone dental treatment. Analysis of the remaining public shows a contradictory aspect in comparison to the information collected from questionnaires addressed to dental professionals and students, since 64% of patients assisted in dental clinics and 46% of patients from the university reported not having previously used the rubber dam. These values are close to other reports in the literature, such as Anabtawi et al.[20], in which only 44% of interviewees used the rubber dam for all cases of endodontic treatment, or Shashirekha et al.[21] who obtained only 23% of positive responses to the use of rubber dam in all cases of endodontic treatment when interviewing dental students, general practitioners and endodontic specialists from India. This can be interpreted as a masking of the real approach of professionals and students when signaling the answer, in an attempt to protect themselves from failure in the clinical sequence considered as standard. This ethical dilemma was not among the study objectives, thus we prefer to believe that this discrepancy indicates a transformation in the behavior of those in charge of dental care, for recognizing the importance of this procedure, and that the present results may represent a permanent change in the commitment to offer excellent endodontic treatment. However, further studies are necessary to corroborate this expectation.

It was observed that the patient is able to understand the advantages and reasons for using the rubber dam, since 84% of people assisted in a private

clinic and 82% of those assisted at the university understood that the rubber dam represents a benefit for both patient and professional. To increase this percentage, Ahmed et al.[14] recommend that the dental professional, among other things, should provide concise and convincing explanations to patients about the rubber dam before onset of root canal therapy, which was observed in this study for 70% of patients from private clinic and 90% of from the university.

This study can confirm that a large number of patients consider the rubber dam uncomfortable, regardless of the group surveyed, either from the private (52%) or academic clinic (54%), different from the report of Kapitan et al.[22], in which 77% of patients reported a high level of comfort during endodontic treatment with the rubber dam. Although a feeling of discomfort was obtained as a response, when asking patients to compare with consultations in which the rubber dam was not used, they evaluated that treatments with the rubber dam were better, with very close values for both groups (74% for private clinics and 72% for universities). This could be explained by the work of Ammann et al.[23], who concluded that the rubber dam causes less stress in young patients when compared to cotton rolls.

Finally, when asking the patient about the preference in relation to this procedure, only 6% of those assisted in private clinics and 10% of patients from universities indicated that they would not like to use the rubber dam in the following session, which was also observed by Kapitan et al.[22], who reported a rate of 14% of patients who reported they preferred not to use the rubber dam.

Conclusion

With the present data, we concluded that rubber dam isolation has great approval by professionals and mainly by students, who reported that they will continue to use the rubber dam routinely for endodontic treatment, confirming that university education has been effective in raising awareness about the relevance of this procedure, with the expectation that the percentage of rubber dam utilization may increase over time. Patients from both private clinics and from the dental clinic of Unipar consider the rubber dam uncomfortable, although they prefer to use it during dental treatment.

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