

A Comparison of Conventional And New Rubber Dam Systems in Dental Practice

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ABSTRACT

With today's heightened awareness of infection control, patient safety, and technique sensitive dental materials; meticulous operative field isolation is mandatory. To overcome these problems a new system was developed

(OptraDam, IvoclarVivadent AG, Schaan, Liechtenstein). The aim of this study was to investigate if a new rubber dam system would be better accepted by patients and dentists than the conventional one.

Key Words : Conventional Rubber Dam, Optra Dam, Isolation.

INTRODUCTION:

The American Association of Endodontists, which is dedicated to excellence in the art & science of Endodontics, states that tooth isolation using the dental dam is the standard of care; it is integral and essential for any nonsurgical endodontic treatment^[1]

The use of the rubber dam confers the following advantages:

The patient is protected from ingestion, aspiration of small instruments, dental fragments, irrigating solutions or irritant substance.^[2,3,4]

The opportunity to operate in a clean, surgical field, to prevent salivary contamination of the root canal space during treatment. This reduces the risk of microbial contamination of root canal systems.^[2,3,4]

Retraction and protection of soft tissues.^[2,4]

To reduce potential aerosol contamination.

Better visibility in the working area.

To facilitate the use of materials which may have deleterious effects if inadvertently placed in contact with the gingival or oral tissues. e.g. sodium hypochlorite.^[4]

Reduction of delays as the patient will not have to rinse their mouth every five minutes.^[2]

The dentist and the dental assistants are protected against infections which can be transmitted by the patient's saliva.

The dentists are more comfortable, as they may work at a more leisurely pace and may be permitted to answer an important telephone call, leaving the patient well protected with the rubber dam and the dental assistant close to them.^[2]

To facilitate treatment of patients with a pronounced gag reflex.^[4]

Better tactile sensitivity during the cleaning and shaping procedure.^[2]

The patients are more comfortable, as they do not feel hands, instruments and liquids invade their mouth.^[2]

The main priority of rubber dam isolation was endodontic isolation against fluids and microorganisms in the oral cavity. Added to this,

is the need to protect the patient against accidental aspiration or ingestion of small endodontic instruments. According to court ruling in many countries, such occurrences are considered avoidable, and can be attributed to negligence on the part of the dentist. An additional restorative application field requiring absolute dryness has come to be with the increased use of the acid etching technique. In view of the new diseases with potential for infection during dental treatment, the rubber dam gains added significance as a simple & clear-cut prophylactic measure against infection.^[5] As long ago as 1962, Ireland stated that no other technique, treatment or instrument used in dentistry is so universally advocated by the recognized authorities & so universally ignored by the practicing dentist. Lack of personal experience was one of the factors preventing the use of rubber dam. Wolcott and Goodman found that dentists who used rubber dam more frequently encountered fewer patient objection and came to the conclusion that either the dentist's motivation to use rubber dam may be reflected by the presentation of rubber dam to patients / dentists may rationalize their failure to use rubber dam by claiming patient resistance.^[6] This said, it seems incredible that even today, in the 3rd millennium, there are still dentists who are not convinced of the usefulness of this very simple rubber sheet. The Quality Assurance Guidelines of the American Associations of Endodontics says that, "Cleaning, shaping, disinfection and obturation of all canals are accomplished using an aseptic technique with rubber dam isolation whenever possible." According to Arnaldo Castellucci, when it is not possible there are two options : one is to make it possible and the other is to extract the tooth. There is no other option. Even more so than in the restorative dentistry, the rubber dam is obligatory in Endodontics, so much so that endodontics should not be performed without a rubber dam. Furthermore, an endodontic treatment should not be undertaken unless the tooth has been reconstructed to allow easy positioning of the rubber dam. There should be no excuse for not using the rubber dam in endodontics, the law should severely punish the dentist who causes serious injury, including death, to a patient because he did not use one. In the U.S. any law suit is lost if the rubber dam is not used.^[2]

Despite these factors, the use of the rubber dam has not established itself in many countries. The common considered

reason for this aversion to the rubber dam is inadequate training and the resultant great amount of time needed for its use, though even inexperienced students have been shown to need only around 5 minutes for it. A typical problem, with which regular users of the rubber dam technique are familiar, is the frequently inadequate retention of the rubber dam on molars. This arises because of the great amount of tension created when the rubber sheet is stretched onto the frame. This tension can exert such a tug on the rubber dam clamps that under adverse conditions the whole rubber dam can spring loose.^[5]

Therefore, several development of the rubber dam frame design have been published since the account of the metal attributed to Young. The development of metal folding frame by Kahn was a significant innovation, which was later followed by a plastic folding frame with two hinges developed by Sauveur.^[6] The objective of the folding mechanism was to enable easier access to the oral cavity under the rubber dam for taking periapical radiographs. Another field of further development is related to the material used in manufacturing the rubber dam frame. Whereas the traditional metal frame developed by Young was made of radioopaque steel, various frames made of plastic have been introduced in the recent past. These first resembled in their shape the traditional U-formed metal frame (Starlite Visiframe); Hygienic Master 6 (Coltene/ Whaledent). In addition there was the polygonal Nylon frame by Nygaard – Ostby Known as the “shark mouth” (Svenska Dental Instruments). Other frames based on Sauveur folding frame designs mentioned above were using various types of plastic depending on the manufacturer (Cadre de Digue, Roeko). Further development replaced the conventional one-piece frame with a two-piece frame design. The Safe-T-Frame (Sigma Dental Systems) is composed of two hinged frame members whose snap-shut locking mechanism securely clamps the rubber dam sheet in place. This concept also makes it possible to retain the traditional U-formed frame geometry and dimensions.^[5]

The most recent advancement in rubber dam is the OptraDam (Ivoclar – Vivadent USA). Features of OptraDam include a metal – free design, patented anatomical shape, integrated frame and high flexibility. It is a double ring framed dental dam that does not generally require conventional & rubber dam clamps. The metal-free, dual ring frame design allows the dam to be placed intraorally. The inner ring is placed in the vestibule area, while the outer fits extraorally against the patient's face. This design allows OptraDam to be placed by one person, provides sufficient tension to negate the need for conventional rubber dam clamps, while allowing flexibility that provides patient comfort during long procedures. This ocean blue dam includes a mapping of both arches with printed dots, representing where to punch holes for the teeth, in addition to a cross design to represent quadrants of the mouth. Due to its anatomical shape and flexible 3-dimensional design, OptraDam is completely different from conventional rubber dam. As the dam is automatically stretched in an oral direction, an automatic hold of the device in the oral cavity is ensured. OptraDam can be used for single, multiple or dual arch tooth isolation. Ivoclar – Vivadent maintains that OptraDam designs allows it to match the shape of the patient's oral cavity, therefore providing a larger working area and increased access and visibility compared to conventional rubber dam isolation methods. OptraDam is individually packaged

for optimal hygiene and is available in two adult sizes : regular and small.^[7]

The contemporary products solutions (CPS) review team said the new revised OptraDam plus was a true improvement. The dam material was thick enough and presented good tear strength to withstand stretching and pulling. The team was pleasantly surprised that the patients were comfortable without anesthetic while placement occurred. The OptraDam Plus was used for several procedures such as bonding and bleaching. Some felt this was the dam of choice when using a split dam technique for placement of restorations. Clamps were needed in the posterior area, but again clamps are needed for other conventional dam placement. CPS team gives OptraDam plus a 4 diamond rating.⁸

The aim of this study was to investigate if patients and dentists would better accept a new rubber dam system than the conventional rubber dam.

MATERIALS & METHOD :-

For this study, two simple questionnaires were prepared. The first questionnaire consisted of 5 questions. This questionnaire was filled by 60 patients. It enquired into the personal details of the patient, which included the name, age & gender ,the patient's previous experience of rubber dam use.

The teeth to be isolated.

The type of procedure being carried out.

The patient's comfort regarding the conventional rubber dam & the OptraDam.

The patient's protection regarding the conventional rubber dam & the OptraDam. The patient's preference regarding the conventional rubber dam & the OptraDam.

The second questionnaire consisted of 7 questions. This was to be filled by the dentist operating on the respective patient. This questionnaire enquired into

The time taken to apply the conventional rubber dam & the OptraDam.

The ease with which rubber dam could be applied.

The amount of retraction & access achieved during the use of each rubber dam.

The amount of moisture control achieved during the use of each rubber dam.

The ease with which radiograph could be taken.

Any additional means for the support of a conventional rubber dam or the OptraDam were also recorded.

The dentist's preference regarding the conventional rubber dam & OptraDam.

At the beginning of each procedure, the patient was informed about the treatment & awareness on latex allergy.

In the first 30 patients, the conventional rubber dam was used prior to the OptraDam. In the next 30 patients, the OptraDam was used before the conventional rubber dam. This was done to prevent bias. For the first 30 patients, on the day of the first appointment, the stopwatch was set for recording the time taken for the application of

the conventional rubber dam . Following this, the required dental treatment was carried out. Radiographs were taken as & when necessary. At the end of the appointment, the questionnaires were filled by the patient as well as the operator regarding their experience of the conventional rubber dam.

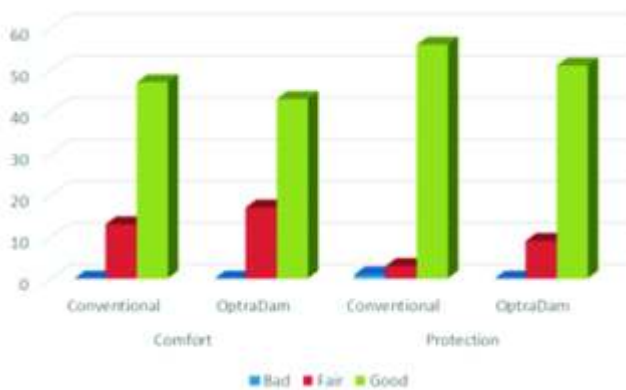
On the next consecutive appointment, the stopwatch was set for the recording the time of application of the OptraDam. The required dental treatment was carried out. Radiographs were taken. At the end of the appointment, the questionnaires were again filled by the patient as well as the operator regarding their experience of the OptraDam. [For the next set of 30 patients, the above procedure was repeated, except that, for them the OptraDam was used prior to conventional rubber dam].

The questionnaires were then sent for statistical analysis. All statistical analyses are performed with SPSS 13.0 (Statistical package for the Social Sciences, Chicago, Ill ,USA) Analyses were confined to simple cross tabulations of the patients & operator. P-value was calculated using(Chi-square test & Wilcoxon test whenever required to get appropriate results).

RESULT

	Patient			
	Comfort		Protection	
	Conventional	OptraDam	Conventional	OptraDam
Bad	0	0	1	0
Fair	13	17	3	9
Good	47	43	56	51

Graph 1: Patients' response analysis (Comfort and Protection)



Interpretation

From the data collected and by observing the graph it can be concluded that more number of patients find the conventional rubber dam to be better in comfort as well as protection (Table 1, Graph 1).

Table 2: Patients' Response Analysis (Preference)

	Preference	
	Conventional	OptraDam
Yes	40	20
No	20	40

Interpretation

Since p-value for both Chi-Square Tests are greater than that 0.05, we concluded that the patient feels that both the method are equal in comfort. (Table 2).

	Value	df	p-value
Pearson Chi-Square	4.234 ^a	2	.120
Likelihood ratio	4.760	2	.093
Linear-by-linear association	1.104	1	.293
N of valid cases	120		

Table 4 Wilcoxon test for patients' comfort and protection

	Comfort	protection
Z	.784-	-1.069
p-value	.433	.285

Interpretation

Since p-value for both Comfort as well as Protection is greater than 0.05, we concluded that patient feel that both the methods are equal. (Table 4).

Table 5: Patients' response analysis (preference)

	Preference	
	Conventional	OptraDam
YES	40	20
NO	20	40

Graph 2: Patients' response analysis (Preference)

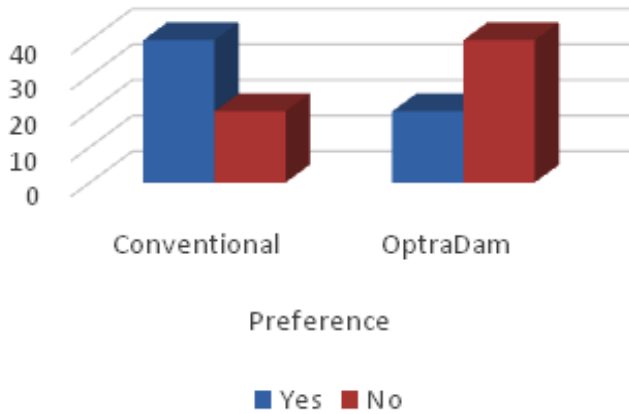


Table 6: Chi-Square test for Patients' Preference

	Value	df	p-value
Pearson Chi-Square	13.333 ^a	1	.000
Continuity Correction ^b	12.033	1	.001
Fisher's Exact Test			.000
N of Valid Cases ^b	120		

Interpretation

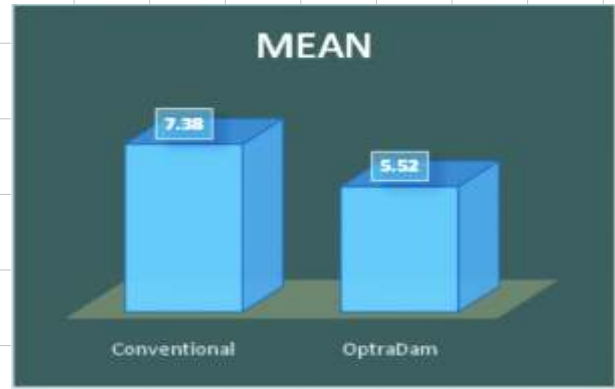
Since p-value for the Chi-Square test and Fisher's Exact Test is less than that of 0.05, it indicates that response that response is not independent of method used.

Hence on observing the graph it can be concluded that patients prefer the conventional rubber dam system more than the use of the OptraDam (Table 5, Table 6, Graph 2).

Table 7: Operators' response analysis (Time parameter)

	Conventional	OptraDam
Mean	7.38	5.52
Standard Deviation	7.214	4.959
Observations	60	60
Degree of freedom (df)	58	
t-Stat	1.65	
P(<=t) two-tail	0.1012	

Graph 3: Operators' Response Analysis (Time Parameter)



Interpretation

Since the p-value for independent t-test is greater than that of 0.05, it indicates that there is no significant difference between average time required for conventional rubber dam method and OptraDam method

On observing the time values it can be inferred that the average time required for conventional rubber dam method is more than that of OptraDam but this difference is not statistically significant (Table 7, Graph 3).

Table 8: Operators' response analysis

(Ease of application, retraction, moisture control, ease of radiograph)

	Operator							
	Ease of application		Retraction		Moisture Control		Ease of Radiograph	
	Con.	Optra	Con.	Optra	Con.	Optra	Con.	Optra
Bad	0	0	1	1	1	1	1	0
Fair	12	13	11	22	6	19	18	11
Good	48	47	48	37	53	40	36	46

Con. – conventional rubber dam

Optra – OptraDam.

Graph 4: Operator's Response Analysis

(Ease of application, retraction, moisture control, ease of radiograph)

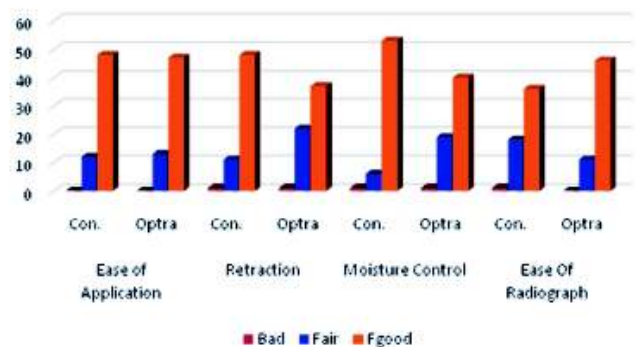


Table 9: Wilcoxon Test for Operators' Ease of Application, Retraction, Moisture Control, Ease For Radiograph

		Operator			
		Ease of Application	Retraction	Moisture Control	Ease For Radiograph
Wilcoxon Test	Z	-.243	-1.915	-2.600	-.754
	p-value	.808	.056	.009	.451

Interpretation

1. Since p-value for test for parameter moisture control is less than that of 0.05. it indicates that there is significant differences in the rating for conventional rubber dam and OptraDam method. The conventional is rated highly than that of OptraDam method.
2. However, since p-value for all other parameter is greater than 0.05, we concluded that operator finds no significant difference while working with conventional rubber dam method and the OptraDam method (Table 8, Table 9, Graph 4).

Table 10: Operators' Preferences

	Preference	
	Conventional	Optra
Yes	42	18
No	18	42

Graph 5: Operators' Preference

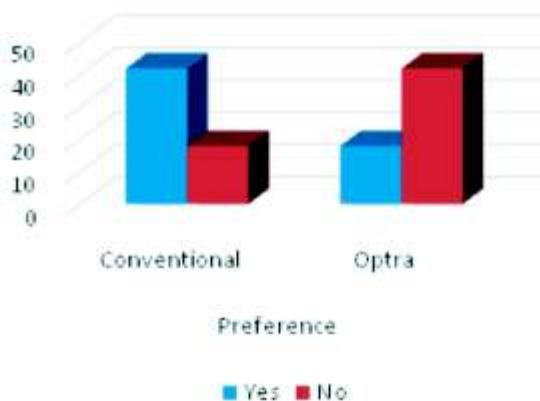


Table 11: Chi-Square test for operators' preferences

	Value	df	p-value
Pearson Chi-Square	19.200 ^a	1	.000
Continuity correction ^b	17.633	1	.000
Fisher's Exact Test			.000
N Of Valid Cases ^b	120		

Interpretation

Since the p-value for the Chi-Square test and Fisher's Exact Test is less than that of 0.05, it indicates that the response is not independent of method used.

Hence on observing graph it can be concluded that the operator prefers conventional rubber dam method than that of OptraDam method (Table 10, Table 11, Graph 5).

Discussion

Rubber dam has been a controversial issue. Its necessity in (endodontics & Restorative dentistry is all but beyond controversy at dental schools & in many specialist practices, but general practitioners seldom use it. This well-known deficit has led to further development of the conventional system. Recent studies have addressed the issue of patient comfort in the treatment with & without using a rubber dam. Interestingly, the authors demonstrated that from the patient's point of view, the use of the rubber dam significantly increases comfort during treatment. In addition, using a rubber dam can actually save time. For these reasons, it is desirable to overcome the various barriers against the use of the rubber dam for the corresponding indication areas. Where technical obstacles are concerned, technical solutions must be found.⁵

On the basis of this study, it was found that the conventional rubber dam was easier to apply on the posterior tooth; it had better moisture control & retraction properties. However, the necessity to use a clamp & difficulty in shooting radiographs are the disadvantages of a conventional rubber dam.

On comparing the OptraDam to conventional rubber dam, the OptraDam was easier to apply & shoot radiographs in the anterior region. Clamps were seldom used for retention. However OptraDam had displeasing compression due to the inner arch. On the posterior tooth, inferior isolation & difficulty to shoot radiographs was observed.

Thus investigations have been made to determine whether these enhancements have made the rubber dam easier to use for dentists & whether the patients are more comfortable.

To carry out this investigation, two questionnaires were made. These questionnaires were regarding the experience of the conventional rubber dam & the OptraDam, one of which had to be filled by the patient while the other was to be filled by the operator.

The questionnaires helped in the assessment of the opinions of the patients as well as the operator. It further helped to compare the two different rubber dam systems from the patient's as well as operator's point of view on the basis of various factors.

Men & women ranging in age from 14 to 69 years participated in this study. Each patient had undergone treatment under both the conventional rubber dam as well as OptraDam in consequent appointments by the same operator. For all 60 patients, alternate first use of both the rubber dam system was done i.e. the conventional rubber dam was used in the first appointment for the next 30 patients, while the OptraDam was used in the first appointment for the next 30 patients & vice versa. The operator was not accustomed to any rubber dam system, & he was introduced to both at the same time. Therefore it should not be reasoned that a certain "habitualiaon" effect, with regard to the conventional system, played an important role during the study.

Patient protection has been found to be an important advantage of rubber dam use. Although rare, ingestion/inhalation of endodontic instruments during treatment without rubber dam can result in clinical complication & subsequent legal proceedings.

Tiwana has reported 36 cases of complications, of which 25 cases were of ingestion, while 1 was on aspiration.¹⁰

Patricia Ammann et al have reported that isolation with rubber dam caused less stress in children & adolescents compared to relative isolation with cotton rolls, if applied by an experienced dentist.¹¹ Thus it can be said that the use of rubber dam not only takes care of patient protection, but also helps the patients to be stress free & comfortable.

However Kazuhino Iwatani et al has stated that the breathing pattern may become deteriorated by airway obstruction during dental treatments requiring a rubber dam.

In this study, 47 patients found the conventional rubber dam system to provide good comfort and 56 patients found it to provide good protection. On the use of OptraDam, 43 patients found it comfortable and 51 found it to be protective.

In the study performed by SA Feierabend, J malt and B. klaiber, it was observed that, 183 patients out of 246, found the conventional rubber dam system to be more comfortable, while 53 patients found the conventional rubber dam to be uncomfortable. However in the case of OptraDam, 155 patients found the system to be comfortable, while 90 patients found the OptraDam to be uncomfortable. Hence the result for the newer system was nearly the same. Their study also shows that very few patients felt uncomfortable when rubber dam was used (regardless of the system. This study also confirms the same)¹²

In the present study, on the basis of their complete experience, 40 patients preferred the conventional rubber dam system as opposed to a much lesser 20 patients who preferred the OptraDam. This result was statistically significant. SA Feierabend, J Malt and B Klaiber in their study found that 51.99% of the patients preferred the conventional rubber dam while only 38.77% patients found the OptraDam to be better.

In this study, the mean time taken by the operator for the application of the conventional rubber dam was 7.38 minutes with a S.D. of 7.214. The mean time for the OptraDam application was 5.5 minutes with a S.D. of 4.959. The average time required for conventional method is more than that of OptraDam, but this difference is not statistically significant. The argument of insufficient time being a consideration is not entirely valid, as studies have demonstrated that when proficient in its use, rubber dam application can be performed in approximately two minutes (Ireland 1962, Reid et al 1991, Stewardson and MC Hugh 2002.)^{12,9}

Furthermore, there is evidence that treatment can be performed more quickly once the rubber dam has been applied (Ireland 1962.)

William Ryan, Anne O'Connell found the average time spent placing the rubber dam was 8 minutes for children & 5 minutes for adults.¹³

In this study, on the parameter of ease of application, the operator found the conventional rubber dam to be good for 48 patients, while fair for 12 patients. He found the Optra dam to be good for 47 patients as opposed to fair for 13 patients. This is not statistically significant. This shows that the insertion and fixation of both systems were easy for most of the patients. It was found that the

conventional rubber dam is easier to apply in the posterior region, whereas the OptraDam is better for application in the anterior region. SA Feierabend, J malt & B Klaiber got statistically significant results for ease of application ($p < 0.01$) stating that the OptraDam is easier to apply as compared to the conventional dam.⁹ They also mentioned that the insertion & fixation of both systems were assessed as easy ($p < 0.0001$) for both conventional and new dams. According to their study, they mentioned that the conventional rubber dam is easier to apply in the posterior region, whereas the Optra dam is better for application in the anterior region. Also, the conventional rubber dam was never used without a clamp, whereas the OptraDam needed a clamp only 48.1% of the time. The most common patient characteristics that impeded application for both systems were very tight contacts and short anatomical crowns and no, or only slight, anatomical undercut. In the present study, the operator found the conventional rubber dam to be good for retraction in 48 patients, fair in 11 and bad for 1 patient. The OptraDam retraction was good for 37 patients, fair for 22 and bad for 1 patient, according to the operator to solve the difficulty of inadequate retention for posterior teeth, a number of ideas have been proposed these solutions were focused on increasing the dam's retention at the sheet's tension point. Efforts in this regard have resulted in the development of countless number of variously shaped rubber dam clamps. From the dentist's point of view, this has been problematic for a number of reasons.

It is difficult to obtain a clear overview among the variety of clamps, a situation fostered by the unsystematic numbering systems development over time by the difficult manufacturers, particularly since several clamp makes (Ivony / Sigma Dental Systems – Emasoli, Hygienic / Coltene / Whaledent, Hufriedy, Ash, Roeko) use different designations for essentially the same clamps.⁵

In addition to this, the concept itself is an issue because it involving a system of clamps of increasing tension. Because it has been shown that damage to the dental hard tissue by rubber dam clamps is possible due to suboptimal positioning, especially in the root area; such increases in the clamp's tension force or the increase in the number or size of the clamps beaks, must be regularly with caution.⁵

Other alternatives, of the replacement of spring – tension clamps by tensionless resin – bonded rings attached to the tooth to be isolated through the acid-etch technique are at least temporarily invasive.⁵

OptraDam may require a clamp in most of the posterior tooth isolation. Hence accessibility is more related to correct clamp selection, position of the tooth and height of contour of the tooth on which clamp is placed. In high frenum cases, it would be difficult to place OptraDam since the inner ring of the OptraDam lies in the vestibular area and outer ring along the lips of the patient for retention. Hence OptraDam does not require clamps. A rubber dam, with special gingival retraction clamp, 212 or 9 ivory clamps is ideal for retraction of class V cavity.^{14,15}

Radiographs are an integral part of operative dentistry and Endodontics. Hence the ease of shooting a radiograph is of immense importance. According to the Operator, the experience of shooting a radiograph was good in 36 patients when the conventional rubber dam was used, as opposed to 46 patients while using an OptraDam. While using a conventional rubber dam system, the experience of shooting a radiograph was fair in case of 18 patients, but bad in case of 1 patient. The operator found the OptraDam to be fair in 11 cases. Statistically, there was no

significant difference between the two systems.

S.A. Feierabend, J malt and B Klaiber showed the preference of the conventional rubber dam and their result was statistically significant.⁹

Moisture control was found to be good in 53 patients, fair in 6 patients and bad in 1 patient during the use of conventional rubber dam system in the present study. In OptraDam cases, it was good in 40 patients, fair in 19 patients and bad in 11 patient. Statistically there is significant difference. The conventional was rated highly than that of OptraDam method.

S.A. Feierabend, J malt and B. Klaiber found the ease of suctioning for moisture control to be better with the conventional rubber dam system which was confirmed by the P value being < 0.05 , making this result statistically significant.⁹

Utilization of the rubber dam resulted in significantly higher shear bond strength of composite resin to enamel.¹⁶

Francesca Soldani, Jennifer Foley found in their study that 65% and 52% of the respondents quoted.⁶

Rubber dam plays an important role in protecting the dental team age the ever growing number of carriers of Hepatitis and HIV Virus. It has also been stated that the operator was more protected when the rubber dam was used with an antiseptic mouth rinse, as there was a 98.8% bacterial reduction.¹⁷

For this study, the operator preferred using the conventional rubber dam system in a much higher 42 patients as compared to a lesser 18 patients for the use of OptraDam. Since p- value for the chi-square and Fisher's test is less than that of 0.05, it can be concluded that the operator preferred conventional method to the OptraDam.

In their study, SA Feierabend, J Malt and B Klaiber found that 88.16% of the operators preferred the conventional rubber dam while only 9.21% preferred the OptraDam. Thus the p value was found to be < 0.001 . The operators found the insertion and fixation of both the systems to be easy ($p < 0.001$).⁹

So even though the use of rubber dam is found to be very advantageous at many levels, their relative use by various dentists is very average.

A total of 229 dentist practitioners participated in "The Dental Practice-Based Research Network (DPBRN)." A rubber dam was used for only 12% of restorations.¹⁸

In 2007, a study was conducted for US general dentists, of which 53% reported never using a rubber dam for amalgam restorations, 45% never used one for anterior direct resin composites and 39% never used a rubber dam for posterior direct resin composites.

An earlier British Survey found that 93% of dentists in the BD association never or seldom used a rubber dam for operative dental procedures, compared to 82% who never or seldom used a rubber dam for endodontic procedures.

Mark et al also carried out a survey to determine the use of rubber dam for various dental procedures. The sample for this survey was 276 US Air Force general dentists. From the sample, 233 dentists i.e. 84% replied. It was reported that 52.4% of these respondents were using the rubber dam 81-100% of the time for operative procedures, and an average of 97.7% reported using the rubber dam at the same level for endodontic procedures.

In a 2001 survey of British general dentists, 53% reported that they never used a rubber dam when placing posterior composite

restorations.

The overall prevalence of rubber dam usage for RCT by dentists under the NH1 system in Taiwan was 16.5%. But one thing should be understood, that, whether RCT or operative treatment, rubber dam use should be mandatory irrespective of the treatment procedure unless there is some contraindication.

Thus further studies should be carried out to understand the reason for less use of rubber dam in various procedures.

SA Feierabend, J malt and B Klaiber found simple insertion and lack of difficulty while taking radiographs to be the major advantage of the conventional dam, while the need for the use of clamps was found to be its major disadvantage.

They also found that the OptraDam outperformed the conventional system with regard to the use in the anterior region, where as it was considered difficult to apply on posterior teeth or when taking radiographs. The cause to use rubber dam in general could be patient acceptance, breathing difficulty and asthmatic / allergic patients. Research has also shown that patients do not dislike the use of rubber dam, and P. Carrolte had never a single patient request its removal once the reasons for its use have been explained. It may be particularly helpful to explain to the patient that the rubber dam is necessary to isolate the operating area in exactly the same way as a surgical drape is essential for similar invasive medical procedures, where bacterial contamination may have a profound effect on the outcome. Indeed, refusal to accept a rubber dam may preclude the prescription of endodontic therapy.

Perhaps the answer for the relative lack of use of rubber dam can be associated with another factor that of altitude.

Porcelain veneers and laminates also require isolation. For this, William H. Liebenberg introduced rubber dam retaining (RDR) appliances, a practical adjunct involving fabrication of a circumferential flange and a posterior occlusal bite, which gave an advantage of better moisture control.

Secondary retention usually employed anteriorly & include floss ligatures, strip of latex, wedges stabilizing cord, toggle retainers, bear floss retainers, compound material, interdental wedges.

Allergy to latex in rubber dam appears to be an increasing problem in dentistry. The prevalence of latex allergy in the general population maybe as low as 1% studies have suggested that the prevalence of latex allergy may be as high as 6% in dental staff and 9.7% in dental patients. Therefore the possibility of allergic or delayed type sensitivity reactions to latex rubber dam must not be underestimated. Careful identification of patients who are known or suspected to be allergic to latex or natural rubber is imperative. The patient's medical history should be checked to avoid the use of latex rubber dam. Non-latex rubber dam, for e.g. Flexi Dam (Roeko, Coltene, Whaledent), may be of use for allergic or high risk patients such as atopic individuals.

Flexi Dam, non-latex is an exceptionally elastic dental dam. It is made from an elastic plastomer and can be elongated more than 100% before tearing. It contracts extremely well around the cervix of tooth for effective isolation and an absolutely dry working area. Also, Hygienic Framed Non-Latex Flexi Dam with an ultra convenient, flexible built in frame can be used.

Only for OptraDam there is no provision for latex free dam material still.

Therefore most of the cases are indicated and must be acceptable

for using rubber dam. However, the few shortcomings of the rubber dam should be improved and taken care of. It is found in this study that the OptraDam has not been very useful, as we still require clamps for its placement especially in the posterior teeth. We could not prove the hypothesis that the newer rubber dam system is superior to the conventional one. The decision to work with an isolated field seems to be independent of traditional or newer aids, but rather reflects a matter of attitude. It may be doubted whether the true reasons for rubber dam rejection are really based on design and handling.

So, the dentists need to show more responsibility towards the patients as well as themselves by using the rubber dam in every possible case. Hence more training, research and development are required in the field of rubber dam to provide best treatment modalities and optimum protection to the patients.

Conclusion:

It has been reported repeatedly that among patients there is a high acceptance of rubber dam use. Also, the use of rubber dam allows the clinician to perform procedural excellence while keeping the patient protected.

The prevalence of rubber dam use by dentists is very low. As rubber dam isolation provides better infection control, increased patient protection, and improves treatment efficiency, there is an urgent need to advise dentists to use rubber dam with a positive approach for every possible case and get the necessary training for the same. A change in the attitude of the dentists will not only make the patient more accepting to the rubber dam use but further development would be made for the betterment of dentistry.

On the basis of our study, it has been observed that more number of patients preferred the conventional rubber dam as opposed to the OptraDam. The operator also prefers the conventional rubber dam system in most of the patients.

Hence our study confirms that the conventional rubber dam is preferred by both the patients as well as the operator. However, change is the only constant entity, so with further productive development in the rubber dam systems, studies can be performed to compare the newer rubber dam systems to the conventional one to evaluate their preference for the betterment of the patients and the convenience of the operator.

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RUBBER DAM SURVEY FORM NO:

PATIENT'S NAME:

AGE:

SEX:

REG NO:

EARLIER EXPERIENCE WITH RUBBER DAM: Yes No

I HEREBY DECLARE THAT I HAVE BEEN EXPLAINED ABOUT THE TREATMENT, WHICH IS TO BE DONE IN PRESENCE OF THE TWO DIFFERENT RUBBER DAM SYSTEM AND AWARENESS ON LATEX ALLERGY.

PATIENTS SIGN

1. TEETH TO BE ISOLATED: ANTERIOR POSTERIOR

2. PURPOSE OF APPLICATIONS: ENDODONTICS

ADHESIVE DENTISTRY

OTHERS

3. PATIENTS COMFORT: (PUT A TICK IN THE BOX)

CONVENTIONAL		
GOOD	FAIR	BAD

OPTRA DAM		
GOOD	FAIR	BAD

4. PATIENTS PROTECTION: (PUT A TICK IN THE BOX)

CONVENTIONAL		
GOOD	FAIR	BAD

OPTRA DAM		
GOOD	FAIR	BAD

5. PATIENTS PREFERENCES : (PUT A TICK IN THE BOX WITH PREFERENCE)

CONVENTIONAL	OPTRA DAM

Any Other Comments

QUESTIONNAIRE FOR PATIENT

OPERATORS FORM

1. TIMING OF APPLICATION:

CONVENTIONAL	OPTRA DAM
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2. EASE OF APPLICATION:

CONVENTIONAL		
GOOD	FAIR	BAD

OPTRA DAM		
GOOD	FAIR	BAD

3. RETRACTION AND ACCESS (HINDRANCE WITH CLASP):

CONVENTIONAL		
GOOD	FAIR	BAD

OPTRA DAM		
GOOD	FAIR	BAD

4. MOSTURE CONTROL:

CONVENTIONAL		
GOOD	FAIR	BAD

OPTRA DAM		
GOOD	FAIR	BAD

5. EASE OF TAKING RADIOGRAPH:

CONVENTIONAL		
GOOD	FAIR	BAD

OPTRA DAM		
GOOD	FAIR	BAD

6. ANY ADDITIONAL MEANS FOR SUPPORT:

CONVENTIONAL	OPTRA DAM
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7. OPERATOR'S PREFERENCE:

CONVENTIONAL	OPTRA DAM
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Any Other Comments
QUESTIONNAIRE FOR OPERATOR



Fig 1: Application of
Conventional Rubber Dam



Fig 2: Application of
OptraDam



Fig 3: Conventional Rubber
Dam



Fig 4: OptraDam

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