

# **RESEARCH ARTICLE**

## "A COMPARATIVE CLINICAL EVALUATION FOR PRECISE ISOLATION USING ADDITION SILICONE DAM COVERAGE WITH CONVENTIONAL ISOLATION TECHNIQUES- AN IN-VIVO STUDY."

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# Abstract

**Context:** A proper isolation technique plays a key role in the success of restoration of carious tooth.

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Aim Of The Study: The aim of this in-vivo study was to evaluate efficacy of addition silicone dam coverage technique with conventional isolation methods in restorative procedures and endodontic treatment.

**Settings And Design**: Forty-Five patients who fulfill the inclusion criteria were selected for the study.

**Materials And Methods:** All the participants underwent clinical procedures using 3 different isolation techniques.

Group-1: Clinical procedures were carried out using traditional cotton roll isolation.

Group-2: Clinical procedures were carried out using conventional rubber dam isolation procedure.

Group-3: Clinical procedures were carried out using addition silicone dam coverage technique.

The efficacy of isolation in terms of clinician usage and patient comfort is evaluated by a single evaluator.

The results were tabulated and statistically analyzed.

**Statistical Analysis:** IBM SPSS (version 21.0) software was used. Chisquare test was performed, considering P < 0.05 for statistical significance.

**Results:** All the groups demonstrated satisfactory clinical performance. Upon inter and intra-group comparison of the isolation methods, there was statistically significant difference (P > 0.05).

**Conclusion:** It is important to achieve an aseptic environment in clinical restorative and endodontic procedures. Addition silicone dam coverage technique is a chair side modified design which is user

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friendly with improved treatment efficacy. However, long-term clinical studies must be needed for further evaluation.

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### **Introduction:-**

Operative dental procedures require the dentist to contend with soft tissues like mucosa, gingiva and tongue. The leakage of oral fluids like saliva, gingival fluid, blood, and water spray into the operatory field affects the properties of restorative material and hampers clinician's treatment efficacy. Adhesive techniques are more sensitive than conventional techniques. Also, during root canal treatment this leakage can cause primary or repeated bacterial contamination of root canals.<sup>[1]</sup>

Hence, it is important to isolate the operatory field to achieve a moisture-free environment along with adequate retraction. To accomplish this goal, rubber dam isolation is the gold standard procedure. But because of complexity in application procedure, rubber dam usage among clinicians is uncommon.<sup>[2]</sup>

In order to find an alternative isolation technique to substitute the conventional isolation methods, addition silicone dam coverage method has emerged as an effective and promising procedure.

Dam coverage method is a technique in which addition silicone based impression material is placed on the tooth prior to universal clamp application. This will reduce the time of clamp selection and placement, provide adequate retraction and control moisture in the operatory field.<sup>[2]</sup>

Hence, the aim of the present study was to compare Dam coverage technique with conventional isolation systems with regards to time consumption and isolation quality.

# **Materials And Methods:-**

Forty-five patients with a mean age of 20–50 years presenting with chief complaint of carious tooth in maxillary or mandibular arch reported to the Department of Conservative Dentistry and Endodontics were selected for the study. Patients having grossly carious tooth with less than 2mm crown structure remaining, rotated teeth and tooth placed out of arch were included in the study. Grossly carious tooth with poor prognosis, medically compromised and uncooperative patients were excluded from the study.

Approval was taken from the institutional ethical committee to conduct the study, and the procedures followed were in accordance with the institutional ethical standards. After confirming eligibility, the clinical procedure and the associated risks were explained to the patients. Informed consent was obtained from the patient after their approval.

Patients who fulfill the inclusion criteria underwent clinical procedures using different isolation methods (n = 45).

#### **Treatment Modalities:**

**Group I (n=45): Participants underwent clinical procedures using Cotton roll isolation.** 2 rolls of cotton were placed in the muco-buccal folds in the operated tooth. (Fig-1)



Fig 1:- Cotton roll isolation.

# Group II (n=45): Participants underwent clinical procedures using Conventional Rubber dam isolation.

Clamp was selected and placed on the operated tooth following which rubber dam sheet and frame was applied. (Fig-2)



Fig 2:- Rubber dam isolation.

# Group III (n=45): Participants underwent clinical procedures using Dam coverage method of isolation.

Addition silicone impression material was placed on the cervical area of the operated tooth following which Universal clamp(14-A) was placed. After clamp placement Rubber dam sheet and frame was applied. (Fig-3)



Fig 3:- Dam coverage method.

#### **Clinical Evaluation:**

All the isolated tooth were evaluated for the efficacy of isolation achieved by a single evaluator who was blinded to the study on a score of Five (5) based on goals of isolation achieved that includes-

- 1- Adequate moisture control in operatory field.
- 2- Maximal access and visibility to operatory site.
- 3- Protection of adjacent hard and soft tissue.
- 4- To harm prevention
- 5- To improve treatment outcome.

The cases fulfilling 4-5 goals of isolation were given Grade-A (Alpha).

The cases fulfilling 3-4 goals of isolation were given Grade-B (Beta).

The cases fulfilling 2-3 goals of isolation were given Grade-C (Charlie).

The results were analyzed using this modified USPHS criteria, which was based on the Alpha (A), Bravo (B), and Charlie (C) ranking.

# Statistical Analysis:

SPSS version 21.0 (IBM Corp) software was used to carry out the statistical analysis of the data. In all the isolation groups, the performance of the isolation system for each category of USPHS criteria was evaluated.

Chi-square test (P < 0.05) was used to compare all the criteria between the three groups.  $P \le 0.05$  was considered to be statistically significant.

# **Results:-**

Results were analyzed based on the A (Alpha - excellent), B (Bravo - acceptable), and C (Charlie - unsatisfactory) ranking given in modified USPHS criteria.

Inter-group comparison among the variables was based on Chi-square test (Table-1) and it shows that there was statistically significant difference in efficacy of isolation achieved between three groups.

Score between different isolation groups showed statistically significant difference (p<0.05) [fig.4]

Table 1:- Intergroup comparison of the results obtained by Chi-square test.

	SCORE-1	SCORE-2	SCORE-3	SCORE-4	SCORE5	p-value
ISOLATION						
GROUPS						
GROUP-1	0	18	27	1	0	< 0.05
(COTTON						
ROLL						
ISOLATION)						
% WITHIN	0	39.1%	58.7%	2.2%	0	
GROUP						
GROUP-2	0	0	11	30	3	< 0.05
(RUBBER DAM						
ISOLATION)						
% WITHIN	0	0	25%	68.2%	6.3%	
GROUP						
GROUP-3	0	0	0	13	32	< 0.05
(DAM						
COVERAGE						
METHOD)						
% WITHIN	0	0	0	28.9%	71.1%	
GROUP						





Fig 4:- Score between different isolation groups.

# **Discussion:-**

Statistically significant differences were found when the Dam coverage method was compared with conventional isolation methods. The Conventional isolation methods were chosen as a control for comparing the newly developed Dam coverage method. Cotton roll isolation provides satisfactory dryness while performing operatory dental procedures, however, fails to provide a complete moisture-free environment.

The conventional rubber dam method is considered as gold standard in isolation fulfilling all goals. This method undoubtedly has additional steps in application and hence its usage among clinicians is uncommon. The presence of surrounding structures also makes it more difficult for rubber dam application. This rubber dam application process is complicated in various clinical considerations like grossly carious teeth, irregular morphology or position of teeth. [4]

These complexities in isolation are reduced in Dam coverage method. Addition silicone application in cervical area stabilizes the clamp in position and also reduces additional clamp selection time by the clinician. <sup>[2]</sup> This isolation system also prevents gingival trauma and seepage of oral fluid into operatory area that forms an added advantage to other advanced isolation systems.

According to Feierabend et al, who compared the conventional rubber dam and recent rubber dam modification systems in patients, concluded that the modern rubber dam systems are expensive and do not reduce clinical application time thereby not providing a complete dry-environment for restorative procedures.<sup>[5]</sup>

Conventional rubber dam application takes 3-5mins for placement by a clinician.<sup>[6]</sup>

In the present study, the application time of Dam coverage method is 1-1.5min which is the standard time for application of Isolation System. The chair-side design of our study was in accordance with the studies done previously, so it was possible to determine the efficacy of Dam coverage method.

# **Conclusion:-**

In order to achieve an aseptic environment isolation plays an important role in restorative dentistry. Conventional isolation method still has flaws which can be overcome by this Addition Silicone Dam coverage technique. However, the limitations was that Dam coverage method's efficacy on partially edentulous patients was not evaluated in the current study, therefore, further clinical trials in all anatomic considerations is to be conducted.

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