

IN CLASS-1 AMALGAM RESTORATIONS POSTOPERATIVE SENSITIVITY ADMINISTRATION ASSESSING EFFECTIVENESS AMONG BONDED AMALGAM - THE USE OF CONVENTIONAL AMALGAM RESTORATION AND CAVITY VARNISH: A CLINICAL STUDY

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ABSTRACT

Objective: To evaluate the lining material which responsible for reduced post-operative sensitivity between cavity varnish, conventional silver amalgam and bonded amalgam filling class-1 amalgam restoration.

Materials and Methods: Present study was conducted at University of Lahore during the period from February, 2016 to December, 2016. After oral examination, 51 patients were included who have cavity (black class-1) in mandibular molars divided the selected patients into three groups. Amalgam filling got by group-1 with zinc phosphate and amalgam restoration got by group-2 with coating of cavity varnish. Bonded amalgam restoration was given to group-3.

Results: The outcomes dismissed the invalid hypothesis (Ho) which means that similar findings presented by all restorations to reduce the post-operative sensitivity. There is distinction between these restoration methods which was also confirmed by Tukey HSD Test.

Conclusion: In class-1 cavity, the post-operative sensitivity can be reduced by bonded amalgam restoration. The post-operative sensitivity also positively reduced through cavity varnish use.

Key words: Dentine Bonding Agent, Postoperative Sensitivity, Hybrid Layer, Cavity Varnish, Restorations, Amalgam Filling.

INTRODUCTION

In dentistry, now-a-days, many restorative materials have been developed which make old materials out of running. According to the structure and cavity type, these materials are used. It is considered that amalgam is one of old restoration material. In spite of the fact that it has some debate with respect to mercury toxicity yet-to-date there has been little concurrence on that and can most likely fill the bill. It accommodate approximately 75% of all helpful materials utilized by the dentists¹. It has high destructive properties and compressive quality. With the passage of time, tooth and cavity gaps sealed by this corrosion of products. Tooth does not formed by the chemical bond and the maintenance is only gotten by the cavity design and large scale mechanical maintenance. To defeat this inadequacy of bond with teeth, bonded amalgam technique developed by some researchers in which applying an unfilled resin in the cavity walls surrounding enamel and dentine after

inscription the tooth. The method of reasoning is the fixing gaps till the erosion is started. Improve marginal integrity is the key aspect of bonded amalgam. Sealed amalgam executed unrivaled longevity than that unbounded amalgam as concluded by the Chadwick RG in his study.² Before placement of material, a legitimate protection of the dentine is fundamental as the amalgam is metallic material. Under amalgam restorations, zinc phosphate used as base considering as better insulating material. Glass ionomer cement, zinc oxide eugenol cement and calcium hydroxide cement concrete strengthened type are the other materials. While zinc oxide eugenol cement has low compressive quality, glass ionomer is radiolucent and difficult to control. Zinc phosphate is good alternate apply in thick consistency in which there are less acidic liquid substance to go about as aggravation to pulp.³

It was observed that sometimes postoperative sensitivity causes by restoration a tooth with amalgam. There is an inexorably imperative are in the reclamations

that need to get on the ball. In bio-material fields, current developments have sharp/elevate the need for more appropriate materials. Whereas, in amalgam restoration cavity floor is kept just beneath dentine enamel junction except if the lingering caries are available. The dentine has responsible for sensation nerve endings.³ Many researchers advocated this post-operative sensitivity indicated as a general situation grumbled by patients.⁴

MATERIALS AND METHODS

The study was carried out at University of Lahore during the period from February, 2016 to December, 2016. In the present study, restoration protocols of three types were executed while considering center of attention is post-operative sensitivity in amalgam restoration. Total 51 patients were selected who have cavity (black class-1) in mandibular molars. The ages of the selected patients were between 20-years to 40-years. There were 20 patients were females and male patients were 31. There was no any other sensitivity issue in the selected patients. All patients were in well periodontal health and also have good oral hygiene. All patients were randomly divided into 3-groups. There were seventeen patients in each group. Zinc phosphate was given to the one group under amalgam

restoration while silver amalgam restoration was given to the second group along application of cavity varnish and bonded silver amalgam was received by the third group. Prepared the cavity with air-turbine having water irrigation plenty.

In accordance with the instructions of manufacturers, application of all materials was done keeping isolation to preparation. Visual analogue scale was used to check the post-operative sensitivity with cold water and air jet by use of triple syringe. By the interval of one month observed the each case thrice to give a correct scale and take the mean. All treatments are same as shown by the null hypothesis (Ho) but alternate hypothesis (Ha) shows difference among sets of treatment.

RESULTS

Tukey chart use to determine the value of q. Within group, 48 is Df with three groups of treatment. In chart, it observed to be 3.42 with alpha-0.05. We got 0.97 value from Tukey HSD equation. It implies that more than 0.97 any two means are different significantly. Obtained F-statistic is more than 3.42. Therefore, the null hypothesis is decline suggested that one or more treatments are different significantly. Moreover, there is difference among 3 sets of regimes (Table I).

Table 1: Analysis of Tukey's HSD test

Treatment	Ag Amalgam with zinc Phosphate Base (A)	Ag Amalgam with cavity varnish (B)	Bonded Ag Amalgam	Total
N	17	17	17	51
Sum $\sum x_i/x$	119	10	58	277
Mean	7	5.882	3.4118	5.4314
Squares Sum	.857	.606	.222	.1685
Sample Variance S ²	1.5	1.1103	1.5074	3.6102
S.D Sample S	1.224	1.0537	1.2277	1.9001
Mean S.D	0.2970	0.2556	0.2978	0.2661

Variance Analysis ANOVA

Group	Squares SS Sum	Freedom V Degree	Mean Square	F Statistic	p
Within	65.882	48	1.372	41.757	<0.001
Between	114.627	2	57.313		
Total	180.509	50			

$$\text{HSD} = q \text{ MS}_{\text{within}} / n = 3.42 \quad 1.3725 / 17 = \mathbf{0.97} \quad X_a - X_b = 7.0 - 5.882 = \mathbf{1.1176}$$

$$X_a - X_c = 7.0 - 3.4118 = \mathbf{3.5882} \quad X_b - X_c = 5.8824 - 3.4118 = \mathbf{2.4706}$$

DISCUSSION

Lining is the material layer which applies in thin sections underneath restorative material. Liner may also be known as a cement thin layer which is used for dental pulp protection. Another term utilized is

base having a motivation behind dental mash insurance however, connected in more thickness.⁵ There are lot of materials developed for coating and base. Thinking about the amalgam restorative material, the most normally given coating is that of zinc phosphate bond. In any case, a

typical exhibiting protest by the patient is that of affectability after the rebuilding has been put. The sensitivity which is watched soon after the position of amalgam is for the most part because of small scale spillage at tooth restoration interface. There are a great deal of conventions that are utilized to decrease the post-operative sensitivity for the use of the liners and base materials. Distinctive materials have diverse properties. At whatever point a cavity is setup for restoration reason, there still a hole might be available at the tooth rebuilding interface. Through this hold the smaller scale organisms can enter into the depression by capillary activity of oral fluids^[6]. This is called smaller scale spillage. Different hypotheses additionally recommend that the post-operative sensitivity is because of the smooth motion between the holes of tooth and restoration.⁷

Bacteria and their side-effects may also cause pain. Our oral cavity sanctuary a considerable measures of bacteria. So there are likewise odds of making contamination mash by ingress of microscopic organisms into reestablished cavity through these smaller scale holes. To overcome this problem, applied technique of bonded amalgam. It has an edge over the regular amalgam rebuilding in part of decreased sensitivity and smaller scale spillage. Bonded amalgam has more prominent life span when contrasted with non reinforced amalgam rebuilding efforts with no significant decision about postoperative sensitivity.⁸ What we think about bonded amalgam is generally in light of experimental examinations that research the underlying driver of instrument. In dentine there is formation of hybrid layer when dentine bonding agent applied after etching. Permeability decreased by this hybrid layer and along these lines sensitivity.⁹ There is fixing of the tubules that decreases the sensitivity.¹⁰ There is no confirmation that the dentine bonding agent is unsafe to the pulpal tissue. No pulpal fiery reaction was watched histologically after the use of the dentine bonding agent as theorized by Subay et al.¹¹

However, the application of dentine bonding agent in case of pulpal exposure on pulpal tissue may reason pulpal inflammation.¹² In a study conducted by Aljazairy assessed the bonded amalgam effects and inferred that bonded amalgam demonstrated decreased affectability and micro-leakage when contrasted with copalite varnish or no coating. Another gathering of researchers revealed that amalgam restoration is a prescient factor of post agent affectability notwithstanding female and more youthful patients.⁴ Inquires about likewise feature that restoration accepting liners demonstrated less post-

operative sensitivity in class-1 amalgam reclamation when contrasted with unlined restoration efforts. The liners were incorporated dentine bonding agents and cavity varnish.¹⁴ Micro-leakage complications incorporated recurrent caries, pulpal inflammation, marginal discoloration and pulpal necrosis.^{15,16} The bonded amalgam to have more prominent adequacy in diminishing the post-operative sensitivity took after by cavity varnish and traditional amalgam restoration efforts with zinc phosphate lining as signify by Tukey HSD. This is in accordance with Ghavamnasiri recent study and different examiners have likewise be demonstrated it to diminish the decrease micro-leakage and post-operative sensitivity.¹⁷

Since cavity varnish is utilized as a part of very thin film, therefore, they are not utilized as coating material. Zinc phosphate can reasoning postoperative sensitivity due to having low pH. But this can be limited by setting the cavity varnish blocking the dentinal tubules and keeping the corrosive entrance. A little scale think about by a few researchers call attention to that no amalgam bonding is obligatory in feeling of restoration survival rate contrasted with non-bonded amalgam and postoperative sensitivity was not a significant factor.^{18,19}

CONCLUSION

By a wide margin the bonded amalgam builds the amalgam maintenance as well as seals the dentinal tubules. This fixing impact is of positive esteem with respect to the decline in postoperative sensitivity caused in amalgam restoration efforts. In addition the arrangement of erosion results in later stages superimposes the fixing of tooth reclamation interface. However, much vulnerability still exists about the connection of bonded amalgam to the tooth in regards to diminish in postoperative sensitivity.

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