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A study to compare post cementation hypersensitivity between glass ionomer and resin luting cement: A split mouth study

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Abstract

Aim: The aim of the present study was to clinically compare post-cementation hypersensitivity between glass ionomer luting cement and resin based luting cement in split mouth case.

Setting and Design: In vivo, a split mouth study.

Materials and Methods: A total of 15 subjects aged between 20-40 years, seeking crown or bridge were selected. The informed consent was obtained and the fixed partial dentures were fabricated under standard crown preparation protocols for the split mouth study. The fixed partial dentures were cemented using glass ionomer luting cement and self-adhesive resin luting cement. Cold sensitivity test were carried out to evaluate post cementation sensitivity. Sensitivity was assessed on visual analog scale of 0-10 scores. Sensitivity results were checked before cementation, immediately after cementation, 1week post cementation, 3 months post cementation, 6 months and 1 year post cementation.

Statistical Analysis Used: Chi-square test and Z score test

Results: The data obtained were analyzed, compared and correlated. It showed, there was no significant difference in post-cementation sensitivity between GIC and self-adhesive resin luting cement during pre-cementation (P=0.317) and immediately after post-cementation (p=0.180). Post-cementation sensitivity between GIC and self-adhesive resin luting cement differed significantly at 1-week, 3-months, 6-months & 1-year follow-up evaluations.

Conclusion: The difference in hypersensitivity with GIC and resin luting cement showed insignificant difference when tested before & immediately after cementation. However on subsequent appointments abutments with glass ionomer luting cement showed

higher response when compared with resin luting cement. According to the present study self-adhesive resin cement could be the material of choice for luting if occurrence of post cementation sensitivity is of chief concern. If GIC is being used, patient should be told about the occurrence of sensitivity for longer period of time than with self-adhesive resin cement.

Keywords: Luting cement, hypersensitivity, visual analog scale.

Introduction

Fixed partial dentures are commonly used treatment modality for replacement of missing teeth, which involves preparation of abutments to support the retainers of fixed prosthesis. For full coverage restorations abutment requires notable amount of crown preparation to be done. However, consequences of significant amount of tooth preparation and newly cementation of crown on vital abutment may lead to sensitivity of tooth to hot and cold which can be troublesome for patient as well as dentist. Hence hypersensitivity or post cementation tooth sensitivity is a common complaint seen in patients receiving fixed prosthesis on vital abutments.[1]

Post cementation hypersensitivity is a symptom which is signalized by a short, sharp pain when thermal and chemical stimuli are introduced to the vital abutment teeth after cementation of crown or fixed partial denture. Various clinical studies on post cementation sensitivity have been documented from as low as 3% to 34%. Prevalence rate of hypersensitivity is about 10% in accordance to a survey by Rosenstiel and Rashid. According Jhonson et al incidence of hypersensitivity was 25% and Bebermeyer and Berg documented 10% of prevalence rate for hypersensitivity .[2]

Hypersensitivity is affected by amount of tooth preparation, erosion of smear layer by etching with acids like phosphoric acid, failure of provisional restoration due to marginal deficiency causes microleakage which ultimately leads to hypersensitivity. However, there are different means to reduce post cementation sensitivity such as use of adequate water coolant during tooth preparation, use of appropriate temporary cement and restorations, use of desensitizer and bonding agents, and most importantly selection of appropriate definitive luting cements.[3]

Fixed prosthesis are delivered using luting cements, there are various definitive luting cements available for cementation of restorations such as zinc phosphate, polycarboxylate, glass ionomer, resin modified glass ionomer, and resin luting cements.

Zinc phosphate has been considered historically popular luting agent for cementation of fixed restorations, whereas predominantly used permanent luting cement for fixed partial denture is glass ionomer luting cement, which has several advantages over other luting agents such as cariostatic action due to its sustained release of fluoride, chemical adhesion to tooth and low disintegration after cementation. But it also has disadvantages like initial setting pH is low during cementation and this is associated as a cause for post cementation sensitivity .[4]

Resin based luting cements, which also has several advantages such as lower solubility, higher pH, high compressive and tensile strength, and good esthetic properties, also have many shortcomings.[3] There are various subgroup of resin cements available, whereas self-adhesive cement (for example RelyXTM U200) is a recent introduction in the market. They have favorable characteristics such as ease of handling because of elimination of etching procedure, less technique sensitive and good adhesive property. They exclude the negative aspects of conventional zinc phosphate, glass

ionomer, and other resin cements. With the use of self-adhesive cements tooth sensitivity appear to be eliminated because the smear layer is not removed. However, post cementation hypersensitivity is still described in reports because of marginal discrepancy caused by polymerization shrinkage.[5]

Long term studies concerning the further investigation of post cementation hypersensitivity of self-adhesive and glass ionomer luting agents are lacking. Therefore, the purpose of the study was to investigate whether a difference can be found in the post cementation hypersensitivity of abutment teeth luted with complete coverage crowns between self-adhesive resin cements and glass ionomer luting cements after a follow up of 1 year in split mouth case.

Methodology

In this in-vivo study an experimental split mouth design was conducted on patients seeking oral rehabilitation in Department of Prosthodontics. The methodology adopted was granted with the ethical clearance by the ethical committee of the institution prior to the commencement of this study.

- Consent was obtained from every subject for the photography and documenting for purposes of Advancing Dental/ Medical Education.
- In the present study, a total of 15 patients seeking oral rehabilitation were selected from the department of Prosthodontics including Crown and Bridge,
- All the study subjects were informed and explained in detail about the nature of the research procedure in understandable terms and a written consent was obtained from every subject for the photography and documenting for purposes of Advancing Dental/ Medical Education.
- To standardize the selection of study subjects and to avoid bias in the study owing to any anatomical aberrations well-defined inclusion and exclusion criteria were set.

(A) Inclusion criteria[6]

1 Patients aged between 20-40 years.

2 Patients requiring posterior full coverage crown or bridge having vital abutments in non-antagonistic contralateral quadrants

(B) Exclusion criteria[1]

1. Rampant uncontrolled caries or advanced untreated periodontal disease.
2. Tooth with symptoms of pulpal or periapical pathology.
3. Tooth that is non-vital or had root canal therapy.
4. Tooth that has been pulp capped; or with near or actual exposure.
5. Tooth that has little remaining tooth structure and requires extensive core build-up.
6. Tooth with history of attrition, abrasion, erosion.
7. Tooth with history of desensitizing agent treatment
8. Pregnant and lactating women
9. Psychiatric patients
10. Patients on analgesic medication.

Clinical steps involved

Preparation of work field: An appropriate medical and dental history of each patient was recorded, after which clinical examination was conducted. Signed informed consent of patients was obtained.

Fabrication of diagnostic casts: The subjects were seated comfortably in an upright position on the dental chair. Diagnostic/Preliminary alginate impressions of the both maxillary and mandibular partial Dentate arch were made using dentulous perforated metal stock tray and were immediately poured with type III (A.D.A. specification no. 25) gypsum and once stone was set, the casts were retrieved and occlusal analysis was performed over them.

Fabrication of acrylic resin custom trays: The fabrication of a custom impression tray specifically tailored to the contours of the patient‘s teeth or arch offers a distinct advantage in limiting and equalizing the amount of impression material necessary for the body of the final impression. A spacer of two sheets of modelling wax (1.2 mm each) was first adapted to the cast to provide space for polyvinylsiloxane (PVS) impression material (2-4mm). The wax spacer provides the necessary space within the tray to allow the optimum thickness of impression material during the subsequent final impression procedure.[7]

Tooth preparation: (figure 3)

The subjects involved for the study were seated comfortably in an operator position on the dental chair. Under standard crown preparation protocol abutment teeth were prepared contra laterally on both sides of arch for full coverage restoration. Tooth preparation guidelines for the metal ceramic full coverage crown of an occlusal reduction of 1.5 to 2mm, axial reduction of 1.2mm and a shoulder margin at buccal side and a chamfer finish line on lingual side was followed. For full metal crown, occlusal reduction of 1.5mm, axial reduction of 1.2mm and a chamfer finish line on both buccal and lingual side was followed.[8]

Retraction of gingival tissue (figure 4)

Exposure of finish line was done by chemicomechanical gingival retraction method. Cord was twisted to make it tight and small and dipped in 25% AlCl3 solution in a dappen dish. After which retraction cord is looped around the tooth and held tightly with the thumb and forefinger. The cord is packed into the gingival sulcus starting from the mesial surface of the tooth and stabilized near the distal end of the tooth. At least 2-3 mm of cord was left protruding outside the sulcus so that it can be grasped for easy removal. After 10 minutes, the cord was removed slowly in order to avoid bleeding and impression was made only after cessation of bleeding.[7]

Impression: (figure 5)

Before making impression, tray adhesive was applied inside the tray and allowed to dry for 15 minutes. After removal of the retraction cord, final impression was made from custom fabricated acrylic tray using multiple mix technique, in which first heavy body elastomers was loaded on to the tray and light body elastomer was syringed over the tooth preparation after which tray was seated over the tooth surface, material was allowed to set. After setting, impression was removed, inspected, and disinfected before pouring, after that impression was poured using type IV dental stone.[7]

Temporization: (figure 6)

Provisional restoration was fabricated using direct technique, in which over impression was made using putty elastomeric material before tooth preparation. After tooth preparation petrolatum coated over the prepared tooth surface, base and catalyst of bis acrylic was mixed, loaded onto the over impression and seated into the patient mouth, material was allowed to polymerize. After which over impression was removed from mouth and restoration was removed out, finished, polished and cemented using zinc oxide non eugenol luting cement (Relyx Tempbond).[7]

Laboratory steps: involves obtaining working cast and dies, fabrication of wax pattern, investing, and casting, finishing and polishing of restorations.[8]

Cementation: (figure 7)

Temporary restoration was removed abutment teeth were cleaned with rubber cup and prophylactic paste. After that metal try in (for metal restorations) and bisque try in (for metal ceramic restorations) was done. Restorations were cemented using GIC on one side of the arch and self-adhesive resin on another side of the arch after

referring proper protocol recommended by manufacturer.[7]

Hypersensitivity evaluation: (figure 9 & 10)

Hypersensitivity of abutment teeth were evaluated by means of modified visual analog scale of 0-10; Scores of 1-4 signify mild sensitivity, 5-7 moderate sensitivity, 8-10 severe sensitivity and scores of 0 signify no response.[3] Before testing for sensitivity patients were explained about sensitivity scores and how to rate their sensitivity on application of endofrost.

The clinical testing for sensitivity was done using endofrost, to elicit the response, on cotton pellet endofrost was applied using a nozzle and cotton pellet was placed on the tooth surface on lingual metal collar before cementation and after cementation. Then patients were asked, how sensitively the abutment teeth reacted by this cold temperature, and patients were told to rate each parameter by marking the perceived sensitivity on a line ranging from 0 (not sensitive) to 10 (extremely sensitive).[1]

The sensitivity was checked before cementation, immediately after cementation, 1 week post cementation, 3 months post cementation, 6 months post cementation and 1 year post cementation.

Results

The present study was conducted to compare post cementation hypersensitivity between glass ionomer luting cement and self-adhesive resin luting cement using visual analog scale on various time periods of pre cementation, immediately after cementation, 1 week, 3months, 6 months, and 1 year after cementation in split mouth case.

A total of 15 subjects who were undergoing treatment for full coverage restoration for crown and bridge formed the sample for the study.

All of them were given either full coverage metal crown/bridge or porcelain fused to metal crown/bridge, which is cemented using glass ionomer luting cement on one side and self-adhesive resin luting cement on other side.

Through the course of the study there were two patients who failed to report back for the follow up, however we had already considered such possibility during sample size calculation.

Table 1

Represents the master chart showing hypersensitivity values obtained with VAS using GIC luting cement at different time point such as pre cementation immediately after cementation, 1 week, 3months, 6 months, and 1 year after cementation. On comparison of VAS average score with different time period, VAS average scores at precementation stage was highest whereas at different time period it went on decreased.

Table 2

Represents the master chart showing hypersensitivity values obtained with VAS using self-adhesive resin luting cement at different time point such as pre cementation, immediately after cementation, 1 week, 3months, 6 months, and 1 year after cementation. On comparison of VAS average score with different time period, VAS average scores at precementation stage was highest whereas at different time period it went on decreasing.

After an assessment of the normality using the Shapiro-wilk test showed that the data is not normally distributed ($p<0.001$). Hence non-parametric tests were applied for statistical analysis between the two cements- Chi-square test and Z score test (was used for standard error calculation.).

Table 3

Represents difference between the subjective hypersensitivity within GIC and self-adhesive adhesive resin cement from pre-cementation to 1-year follow-up. (N=15) which shows mean ranks for GIC at pre cementation (5.90), immediately after cementation (4.93), 1 week (3.93), 3months (3.03), 6 months (1.83), 1 year after cementation (1.37). There was significant difference in hypersensitivity within GIC when compared with precementation values, with immediately after cementation (P=0.001), 1 week (P=0.002), 3months(P=0.002), 6 months(P=0.001), and 1 year (P=0.0025), And mean ranks for Resin adhesive at pre cementation (5.90), immediately after cementation (4.97), 1 week (3.80), 3months (3.20), 6 months (1.90), 1 year after cementation(1.23), There was significant difference in hypersensitivity within self-adhesive resin luting cement when compared with precementation values, with immediately after cementation (P=0.002), 1 week (P=0.001), 3months(P=0.007), 6 months(P=0.001), and 1 year (P=0.005), which showed a highly significant difference within both cements with respect to the hypersensitivity experienced at various follow-up periods ($p<0.001$). Post-hoc analysis showed significant differences between all the follow-up periods among both.

Table 4

Represents comparison of hypersensitivity between GIC and self-adhesive resin from 1week to 1-year post-cementation. (N=15) Which showed mean ± SD obtained for GIC at pre cementation (4.60), immediately after cementation (3.60 ± 0.50), 1 week (2.73 ± 0.59), 3months (2.07 ± 0.45), 6 months (1.20 ± 0.56) and 1 year after cementation (0.87 ± 0.64). The mean ± SD obtained for self-adhesive resin at pre cementation (4.80), immediately after cementation (3.40 ± 0.73), 1 week (2.27. ± 0.59), 3months (1.67 ± 0.61), 6 months (0.80 ± 0.56) and 1 year after cementation (0.27 ±0.45). Which concluded that, there was no significant difference between GIC and self-adhesive resin luting cement during pre-cementation (P=0.317) and immediately after post-cementation (p=0.180). GIC and Resin adhesive differed significantly at 1-week (p= 0.020), 3-months (p=0.034), 6-months (p=0.034) and 1-year (p=0.003) follow-up evaluations. (Significant at the level of $p<0.05$)

Graph 1

Represents hypersensitivity experienced with both materials (GIC and Resin adhesive) used.

The results were also expressed as Pareto diagram/ graph which use medians of two different cement to plot. Where X axis has different time intervals of GIC and self-adhesive resin luting cement and Y axis has diagnodent scores of hypersensitivity. And line represents improvement in hypersensitivity along with the percentage on right side.

According to this graph at pre-cementation stage median of hypersensitivity value of GIC and resin adhesive is 5 and hypersensitivity is 10 %.

At post cementation stage median of hypersensitivity value of GIC and resin adhesive is 4 and improvement in hypersensitivity is 40 % for GIC and 50% for resin adhesive cement.

At 1 week after post cementation stage median of hypersensitivity value of GIC and resin adhesive is 3 and improvement in hypersensitivity is 50% for GIC and 60% for resin adhesive cement.

At 3 months after post cementation stage median of hypersensitivity value of GIC and resin adhesive is 2 and improvement in hypersensitivity is 75 % for GIC and 80% for resin adhesive cement.

At 6 months after post cementation stage median of hypersensitivity value of GIC and resin adhesive is 1 and improvement in hypersensitivity is 85 % for GIC and 90% for resin adhesive cement.

At 1 year after post cementation stage median of hypersensitivity value of GIC and resin adhesive is 1 and improvement in hypersensitivity is almost 100 % both for GIC and resin adhesive luting cement.

Table 1: Hypersensitivity values obtained with VAS at different time point using GIC luting cement

Patient	Pre-cementation	immediately after cementation	1 week after cementation	3 months after cementation	6 months after cementation	1 year after cementation
1	5	4	3	2	1	1
2	5	4	3	2	1	1
3	5	4	3	2	1	0
4	4	3	2	2	2	1
5	4	4	3	2	1	0
6	4	3	3	2	1	1
7	4	3	2	2	1	1
8	5	4	3	2	1	0
9	4	3	3	2	1	1
10	5	4	2	2	1	1
11	4	3	3	2	2	2
12	5	3	2	2	2	1
13	6	4	3	3	2	2
14	5	4	2	1	0	0
15	4	4	4	3	1	1

Table 2: Hypersensitivity values obtained with VAS at different time point using self-adhesive resin luting cement

Patient	Pre-cementation	immediately after cementation	1 week after cementation	3 months after cementation	6 months after cementation	1 year after cementation
1	5	3	2	1	1	0
2	5	4	3	1	0	0
3	5	4	2	1	0	0
4	4	3	2	1	1	0
5	4	4	2	2	1	0
6	6	4	3	2	1	1

7	4	2	2	2	1	1
8	6	4	2	2	1	0
9	5	3	2	1	0	0
10	6	3	2	2	1	0
11	4	2	2	2	1	1
12	5	3	1	1	1	0
13	5	4	3	3	2	1
14	4	4	3	2	1	0
15	4	4	3	2	0	0

Table 3: Difference between the subjective hypersensitivity GIC and Resin Adhesive from pre-cementation to 1-year follow-up. (N=15)

Variable	Mean Rank	Chi-square (p-value)	Post-hoc tests (p-value)
GIC pre-cementation	5.90	70.963 (<0.001**)	--
GIC post-cementation	4.93		0.001*
GIC 1-week follow-up	3.93		0.002*
GIC 3-month follow-up	3.03		0.002*
GIC 6-month follow-up	1.83		0.001*
GIC 1-year follow-up	1.37		0.025*
self-adhesive pre-cementation	5.90	71.479 (<0.001**)	--
Resin adhesive post-cementation	4.97		0.002*
Resin adhesive 1-week follow-up	3.80		0.001*
Resin adhesive 3-month follow-up	3.20		0.007*
Resin adhesive 6-month follow-up	1.90		0.001*
Resin adhesive 1-year follow-up	1.23		0.005*

Significant at $p<0.05$

Significant at $p<0.001$

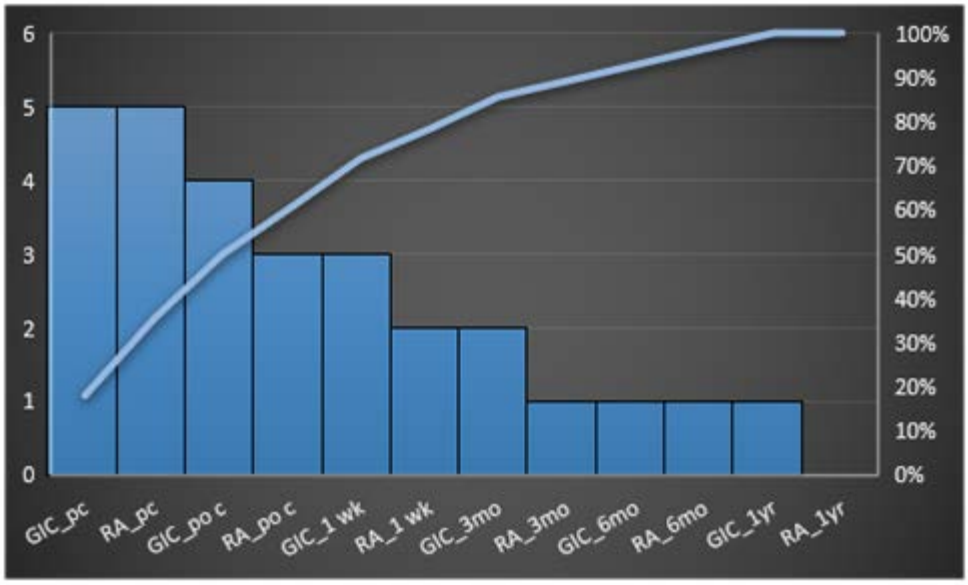
Table 4: Comparison of hypersensitivity between GIC and Resin adhesive from 1week to 1-year post-cementation. (N=15)

Variable	Mean (SD)	Median	Z-score (p-value)
GIC post-cementation	3.60 (0.507)	4	-1.342 (0.180)
Resin adhesive post-cementation	3.40 (0.737)	4	
GIC 1-week follow-up	2.73 (0.594)	3	-2.333 (0.020*)
Resin adhesive 1-week follow-up	2.27(0.594)	2	
GIC 3-month follow-up	2.07 (0.458)	2	-2.121 (0.034*)
Resin adhesive 3-month follow-up	1.67(0.617)	2	

GIC 6-month follow-up	1.20 (0.561)	1	-2.121(0.034*)
Resin adhesive 6-month follow-up	0.80(0.561)	1	
GIC 1-year follow-up	0.87(0.640)	1	-3.000(0.003*)
Resin adhesive 1-year follow-up	0.27(0.458)	0	

Significant at the level of $p<0.05$

Graph 1: Hypersensitivity experienced with both materials (GIC and Resin adhesive) used



Discussion

At International work shop of dentine hypersensitivity in 1983 defined the term dentine hypersensitivity (DHS) is frequently experienced dental complication. When dentin is exposed to stimulus like thermal, evaporative, tactile, chemical or osmotic it causes short, sharp pain in exposed dentine, which cannot be attributed to any other dental faults or pathology. Different authors have given different name for DHS by substituting the word dentine or adding site descriptors, like cervical or root, and assembling this with either hypersensitivity or sensitivity (Such as cervical dentine sensitivity (CDS), cervical dentine hypersensitivity (CDH), dentine sensitivity (DS) and root dentine sensitivity (RDS)/root dentine hypersensitivity [RDH])[9]

Hypersensitivity at Precemetation Stage

In the present study mean obtained for GIC at pre cementation (4.60- mild sensitivity), patient experience mild sensitivity at the time of precementation stage which was similar to the study by Bebermeyer et al.[10] stated that level of patient perceived sensitivity was 1 (which is mild sensitivity) at the time of precementation. Reason for mild sensitivity on cold provocation could be exposure of dentino enamel junction during tooth preparation

In the present study mean obtained for self-adhesive cement (4.80) which was similar to a study by Shanker et al.[4] stated that the mean VAS score for self-adhesive resin cement was 4 at the time of precementation, where by Piwowarczyk et al.[11] (1.2 ±2.1) and by Blatz et al.[12] (3.9) mean scores were closer to the mean scores of present study.

In the present study, there was no significant difference between GIC and self-adhesive resin luting cement during pre-cementation (P=0.317) which was similar to the study by Shetty et al.[1] and by Hammad et al.[3] Where they stated there was insignificant difference (P>0.05) between GIC

and self-adhesive resin luting cement during pre-cementation. Reason for insignificance at this stage was, since abutments in both the groups were uncovered after removal of temporary prosthesis for sensitivity evaluation.

Hypersensitivity At Immediately After Cementation Stage

In present study the hypersensitivity score obtained immediately after cementation with resin cement was 3.40 ± 0.73 which was similar to the results obtained in a study by Saad et al.[13] (3.70 ± 1.8).

In present study the hypersensitivity score obtained for GIC immediately after cementation (3.60 ± 0.50).

The results obtained in the present study immediately after cementation showed no significant difference (p >0.05) between GIC and self-adhesive resin which was similar to the results obtained in a study by Shetty et al.[1] and Hammad et al.[3](p>0.05)

Hypersensitivity At 1 Week After Cementation Stage

In present study the hypersensitivity score obtained 1 week after cementation with self-adhesive resin cement was 2.27 ± 0.59 which was similar to the results obtained in a study by saad et al.[13](2.3 ± 1.4) and Hammad et al.[3] (2.24 ±0.48).

In present study the hypersensitivity score obtained for GIC1 week after cementation (2.73 ± 0.59).

The results obtained in the present study 1 week after cementation showed a significant difference (p<0.05) between GIC and self-adhesive resin which was similar to the results obtained in a study by Shetty et al.[1] (p<0.05)

In another study by bebermayer et al.[10] stated there was no significant difference in hypersensitivity between glass ionomer and zinc phosphate after 1 week of postcementation which was contradictory to the results obtained in present study, when GIC was compared to self-adhesive resin cement, where there was statically significant difference after 1 week of cementation. This could be attributed to the advanced properties (chemical & biological) in resin cement.

Hypersensitivity At 3 Months After Cementation Stage

The mean value obtained in present study at 3 months for GIC was 2.07 ± 0.45 which was similar to the results obtained by a study conducted by Kern et al.[14](2.00).

In present study the mea hypersensitivity score obtained 3 months after cementation with self-adhesive resin cement was (1.67 ± 0.61), which is closer to a study y Prasad et al.[15]where mean hypersensitivity score obtained 3 months after cementation with self-adhesive resin cement was(0.20±0.41)

The p value (p>0.930)obtained in a study conducted by Hammad et al.[3] at 3 months showed a insignificant difference which was contradictory to the results obtained in present study where the p value (p<0.034) showed a significant difference. This could be due to difference in sample size, amount of tooth reduction to receive final restoration, or cement handling.

Hypersensitivity At 6 Months After Cementation Stage

The mean value obtained in present study at 6 months for self-adhesive resin cement was (0.80 ± 0.56).Piwowarczyk et al.[11] In their study stated that postcementation hypersensitivity of self-adhesive resin cement at 6 months was 0.1 ± 0.4. Which was close to the results in present study (0.80 ± 0.56).

In present study the mean hypersensitivity score obtained 6 months after cementation with GIC was (1.20 ± 0.56), which is closer to a study y Prasad et al.[15]where mean hypersensitivity score obtained 6 months after cementation with GIC was (0.6±0.5)

Prasad et al.[15] stated that there is significant difference (P < 0.05) at different intervals of time (immediate, 1 week, 1 month, & 6 months).) Between GIC and self-adhesive resin cement after 6 months which was similar to present study where the (p <0.0034).

Hypersensitivity At 1 Year After Cementation Stage

The results obtained in the present study 1 year after cementation showed a significant difference ($p < 0.05$) between GIC and self-adhesive resin. In a study conducted by Denner et al.[16] stated there was no significant difference in hypersensitivity between self-adhesive resin cement and GIC 1 year after cementation which was contradictory to the results obtained in present study. Could be due to different in sample size, difference in patient perception, or amount of tooth reduction.

kozmacs et al.[5] In their study stated that in most of the vital teeth luted with full coverage restorations minimal number of patients experienced severe sensitivity which was similar to the present study where level of hypersensitivity experienced was mild on cold provocation test, which could be due to advance properties (chemical & biological) of self-adhesive resin cement where it excludes etching and rinsing and opening of the dentinal tubules.

Resin cement used in our study had better performance in contrast with studies by Denner N et al.[16] in their study, 13.3% of sensitivity was found in subjects with resin cement and only 5.9% of sensitivity was found in subjects with GIC. It was thought to be due to the etching with green activator which contain 10% of citric acid followed by resin cement, which removes the smear layer and opens dentinal tubules. However, in their study, the resin cement used was a total etch cement as compared to the self-adhesive cement used in present study, where self-adhesive cement doesn't open the dentinal tubules when compared to a total etch cement and may also cause better occlusion of tubules.

The reason attributed to the entire performance in reducing hypersensitivity of resin cement when compared to GIC could be due to the following reasons:

a) Resin based luting cements exhibit lower solubility in comparison to conventional Glass Ionomer cements

b) Their pH at placement is also higher (towards neutral) as compared to Glass Ionomer cements.

c) Self-adhesive resin cements found at the dental market have a promising new approach in cementation of crowns and fixed partial dentures by eliminating etching, priming, and bonding to dentin without separate bonding agents when compared to total etch resin cements.

The results of this present study support the claim that the selection of an appropriate luting material for the cementation of fixed partial dentures is critical for the success of the final restoration and limits postoperative sensitivity.

Brannstrom.[17] suggested certain precautions for precementation procedures to reduce the risk of an inflammatory response in the pulp: (1) the provisional crown should be well fitting, covering cervical dentin but not impinging on the periodontal tissues. The definitive crown should be cemented as soon as possible. (2) The superficial smear layer should be removed and the dentinal surface should be treated with an antibacterial solution before the provisional crown is placed. (3) To decrease dentinal permeability under the provisional crown, the dentinal surface should be covered with a liner that can be easily removed before final cementation. (4) To ensure optimal micro-mechanical bonding, the dentinal surface should be thoroughly cleaned, and the dentin should be kept moist until cementation. (5) The occlusion should be carefully checked before cementation of the crown.

Rosenstiel et al.[18] in his study, showed that the incidence of postoperative complication is usually underestimated by most dentists. The factors considered very important' in reducing sensitivity by more than 50% were

desiccation, luting agent, occlusion, provisional and water spray.

This present study also has certain limitations, apart from selection of luting cements other factors which affects the hypersensitivity should be considered such as amount of tooth reduction, marginal seal & fitting of restoration, desiccation of tooth before cementation, and occlusion, also there are many other properties of cement which needs to be considered before selecting a luting agent for successful treatment outcome.

In this clinical study the difference in hypersensitivity with GIC and resin luting cement showed insignificant difference when tested before and immediately after cementation. However on subsequent appointments (such as 1 week, 3 months, 6 months and 1 year after cementation) with glass ionomer luting cement showed higher response when compared with self-adhesive resin luting cement.

Conclusion

Within the limitations of this study and from the results obtained following conclusion can be drawn.

- Majority of the patients exhibited either mild or moderate sensitivity on cold sensitivity tests, with a very small percentage experiencing severe sensitivity
- The sensitivity responses mellowed down with time with both the luting cements.
- Based on the results obtained study concluded that self-adhesive resin luting cement showed lower hypersensitivity response when compared with Glass ionomer luting cement

Clinical Implication

- According to the present study self-adhesive resin cement could be the material of choice for luting if occurrence of postoperative sensitivity is of chief concern. If GIC is being used, patient should be told about the occurrence of sensitivity for longer period of time than with self-adhesive resin cement.

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