

# Techniques Used by Dental Specialists for Extensive Posterior Composite Restorations

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## ABSTRACT

**Objective:** To assess the techniques used by dental specialists for placement of extensive posterior composite restorations.

**Methodology:** A cross sectional descriptive was conducted in 150 dentists of College of Dentistry, SMDC, Lahore from June 2019 to July 2020 after obtaining ethical approval from Sharif Medical Research Centre (SMRC). Data was collected using a pre validated questionnaire

**Results:** A statistically non-significant association between the specialty of the dentist the technique used for placement of the composite during restoration ( $p=0.08$ ). The most commonly used techniques for the placement of posterior composite restorations by dentists of all specialties including Periodontology (88%), Prosthodontics (68.4%), Orthodontics (85.7%), Oral Surgery (91.3%), Oral Pathology (71.4%), Oral Biology (33.3%), Dental materials (75%), Community Dentistry (100%), Operative Dentistry (90.9%) and Oral Medicine (75%) is incremental curing.

**Practical implication:** This study will give an insight on the various techniques used by dentists from various specialties for the placement of composite restorations in posterior teeth. This will in turn help them adopt new and revisit old techniques used by them while placing composite restorations.

**Conclusion:** The most commonly used techniques for the placement of posterior composite restorations by dentists of all specialties is incremental curing followed by use of moisture control during the placement of composites both with and without rubber dam isolation.

**Keywords:** Dental Specialists, Composite Restorations, Posterior Dental Restorations, Incremental Curing

## INTRODUCTION

Composites are now used more frequently now as posterior restorative option as a result of rising interest for cosmetic restorations and improvements to their biomechanical qualities<sup>1,2</sup>. When employing composites in extended posterior cavities with the periodontal border completely encased in dentine in clinical settings, a significant issue is faced<sup>3</sup>. Researches reveal that in Class II fillings, the bonding on gingival borders is less efficient than that on axial as well as occlusal boundaries<sup>3</sup>. It has been connected towards the dentin's heterogeneity nature, which makes adhesion difficult<sup>4</sup>.

The adhesive systems in dentin must take into account the hydroxyapatite, collagen, smeared layer, dentinal tubules, and liquid characteristics all at once<sup>5</sup>. Furthermore, the bonding procedure is negatively impacted by the morphological placement of dentinal tubules in the apical region<sup>6</sup>. The bonding just at gingival level may well be broken by forces that really are strong enough to be produced while composite polymerization<sup>6</sup>. This causes microleakage and the creation of gaps in this region<sup>6</sup>. It has been demonstrated that the amount of microleakage increases with the gingival margin's apicality<sup>6</sup>. Several strategies had been implemented in clinical practise to counteract the impact of polymerization strains at gingival borders<sup>7</sup>.

The techniques which have been commonly employed in deeper class II composite restorative procedures involve the application of glass ionomer cement which would chemically link with dentin in sandwiched fillings or the use of a flowable composite for the initial increments<sup>7</sup>. Since its debut, resin modified glass ionomer cement had replaced other materials as the preferred option for sandwich restoration<sup>7</sup>. Due to the resin composition, it has a further benefit of bonding with composite in combination to possessing fast curing, reduced moisture susceptibility, and good strength<sup>7</sup>. This study will give an insight on the various techniques used by dentists from various specialties for the placement of composite restorations in posterior teeth. This will in turn help them adopt new and revisit old techniques used by them while placing composite restorations. The aim of this study

was to assess the techniques used by dental specialists for placement of extensive posterior composite restorations.

## METHODOLOGY

A cross sectional descriptive was conducted in 150 dentists of College of Dentistry, Sharif Medical and Dental College, Lahore from June 2019 to July 2020 after obtaining ethical approval from Sharif Medical Research Centre (SMRC). All participants irrespective of their age, gender and clinical experience were included. Practitioners who had never used composites for posterior restoration were excluded from the study. The sample size was calculated using an online sample size calculator keeping precision at 5%, 95% confidence level with prevalence of use of composites as posterior restoration. 9.8%<sup>8</sup>, the sample size was calculated to be 150. Data was collected using a pre validated questionnaire<sup>8</sup>. Informed consent was taken from the participants.

Numerical data like the age was reported as mean and standard deviation. Nominal data like gender and years of clinical experience were recorded as frequency and/or percentages. For data analysis, all recorded data was coded and entered using SPSS statistical package version 23.0. Chi square test was used to find the association between technique used for placement of composite restorations and specialty of the dentist.

## RESULTS

A cross sectional study was conducted on data collected from 150 dental practitioners in Sharif College of Dentistry, SMDC, Lahore. The mean age of the participants was 26.66 years  $\pm$ 4.514 with 39.3% males and 60.7% females. Table 1 shows that the most commonly used techniques for the placement of posterior composite restorations by dentists of all specialties is incremental curing followed by use of moisture control during the placement of composites both with and without rubber dam isolation.

Table 1: Techniques employed by various dental specialist for placement of posterior composite restorations

Dental specialty	Technique Used for Placing Composite in Extensive Posterior Restorations				
	Incremental curing	Use of moisture control method (not rubber dam)	Use of rubber dam	Total etch/dentine bonding agents	Metal matrix band
Periodontology	22 (88.0%)	1 (4%)	1 (4%)	1 (4%)	0 (0%)
Prosthodontics	13 (68.4%)	5 (26.3%)	1 (5.3%)	0 (0%)	0 (0%)
Orthodontics	12 (85.7%)	0 (0%)	1 (7.1%)	0 (0%)	1 (7.1%)
Oral surgery	21 (91.3%)	1 (4.3%)	0 (0%)	0 (0%)	1 (4.3%)
Oral pathology	5 (71.4%)	0 (0%)	1 (14.3%)	1 (14.3%)	0 (0%)
Oral biology	1 (33.3%)	1 (33.3%)	1 (33.3%)	0 (0%)	0 (0%)
Dental materials	3 (75%)	0 (0%)	1 (25%)	0 (0%)	0 (0%)
Community dentistry	2 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Operative dentistry	30 (90.9%)	1 (3%)	0 (0%)	1 (3%)	1 (3%)
Oral medicine	15 (75%)	1 (5%)	0 (0%)	2 (10%)	2 (10%)

Table 2 shows a statistically non-significant association between the specialty of the dentist the technique used for placement of the composite during restoration.

Table 2: Association of specialty of dentists with technique used for composite restorations

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	48.481 <sup>a</sup>	36	.080
Likelihood Ratio	41.378	36	.247
Linear-by-Linear Association	.845	1	.358
N of Valid Cases	150		

a. 43 cells (86.0%) have expected count less than 5. The minimum expected count is .07.

## DISCUSSION

Composite resin placement in cavity excavations has traditionally been done through incremental layers<sup>9</sup>. In order to guarantee appropriate curing, this approach typically entails applying composite resin over increments with such a maximal thickness of two millimeters<sup>9</sup>. Especially comparison to chemically cured resin composites, this technique results in a resin composites restoration significantly better physical qualities, enhanced marginal adaptability, and less cytotoxicity<sup>9</sup>. A study done by Alan SM Gilmour in United Kingdom reported that the technique of placement of composite restorations depends upon the extent of the dentine cavity how the effected dentine is managed<sup>10</sup>. For superficial cavities, 79% utilise a "dentine-bonding" method (i.e., no base/liner), whereas only 9% might accept this strategy for a deeper cavity<sup>10</sup>. Just 10% of participants utilise a sectional metal matrix systems, whereas 29% employ translucent matrix systems while 61% use a circumferential matrix alloy system to restore occlusoproximal cavities<sup>10</sup>. Another study reported that dental professionals implemented the sandwich technique utilising RMGIC in 62% of cases, GIC in 60% of cases with instant composite restoration, flowable composite in 39% of cases as a gingival level, GIC in 4.4% of cases with such a 48-hour postponement for composite filling, and restoration without the addition of a liner in 4.4% of cases<sup>8</sup>.

According to our study the most commonly used techniques for the placement of posterior composite restorations by dentists of all specialties including Periodontology (88%), Prosthodontics (68.4%), Orthodontics (85.7%), Oral Surgery (91.3%), Oral Pathology (71.4%), Oral Biology (33.3%), Dental materials (75%), Community Dentistry (100%), Operative Dentistry (90.9%) and Oral Medicine (75%) is incremental curing followed by use of moisture control during the placement of composites both with and without rubber dam isolation.

Irrespective of the extent or depth of such cavity, composites have been the material of choice among some of the study's respondents for reconstructing posterior cavities<sup>11</sup>. This complies with the recommendations for posterior resin composite from the European Department of the Academy of Operative Dentistry, which views composites as the best restorative substance for filling both minor and extensive cavities in posterior teeth<sup>11</sup>. This strategy

satisfies patients' increasing needs for aesthetics while taking use of the widely recognized benefits of composite restorations, such as conservative tooth preparation and simplicity of repairs comparing to dental amalgam<sup>11</sup>. Large - sized and tiny posterior composite fillings offer great clinical efficacy and a high chance of survival, according to clinical investigations<sup>11</sup>. Although the impact of improper tooth preparation might not be apparent right away that after restoration was inserted, it could have an impact on the efficacy of posterior resin composite<sup>12</sup>. Considering this, neither in Saudi Arabia<sup>13</sup> nor North America<sup>14</sup> is that there is general agreement on how cavities preparations for posterior resin composite should be taught. The occlusal borders should not be beveled<sup>3</sup> since this could lead to ambiguity in restorative finishing, repairs, or replacements and wasteful loss of healthy dental tissues<sup>15</sup>. It is advised to use a rubber dam to seal off the surgical area<sup>16</sup>. Yet, many dentists can view the installation of a rubber dam as a lengthy process. 39.8% of the respondents said they used a rubber dam to isolate the operating zone<sup>17</sup>. In clinical research, isolation methods using cotton rolls or suction or a rubber dam did not affect the life expectancies of posterior restorations<sup>17,18</sup>.

There are different techniques opted by various dental practitioners for placement of posterior composite restoration. The aim of this study is to compare techniques for placement of extensive composite restorations by various dental specialties.

**Limitation:** A larger sample size and multicenter study would have helped us unravel more findings.

## CONCLUSION

The most commonly used techniques for the placement of posterior composite restorations by dentists of all specialties is incremental curing followed by use of moisture control during the placement of composites both with and without rubber dam isolation.

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