



Posterior composite restorations: attitudes and knowledge of techniques and problems by dentists in government and private dental practices in Edo state

*Harrison A Omokhua, **Louis O Ibhawoh

**Department of Restorative Dentistry, University of Benin, Benin City, Nigeria*

***Department of Restorative Dentistry, University of Benin, Benin City, Nigeria*

Abstract

Context: Aesthetic considerations form a major aspect of dental material selection for tooth restorations. Anterior restorative materials exclusively used in anterior teeth. With the advances made, tooth-colored restorative materials are now used in posterior teeth restorations.

Objective: The aim of this study was to evaluate the techniques employed, associated problems and the attitudes of dental practitioners to the placement of posterior composites

Method: This was a questionnaire-based study conducted among sixty-eight (68) dentists practicing in public/government-owned and private hospitals.

Results: The results show that 86.8% of the respondents considered the conservation of tooth substance as the most common factor influencing their choice of composite materials for posterior teeth. On their perceptions of posterior composites generally, 77.9% of the respondents agreed that posterior composites needed less destruction of sound tooth substance while 35.0% considered moisture control as the most difficult problem faced during placement of the restoration. Wooden wedges were the most popular wedges while ultraviolet curing light were the most commonly used by the respondents. Majority (82.4%) agreed that calcium hydroxide and glass ionomer cement should only be used in cases of operatively exposed dentine in deep cavities. The percentage that never used rubber dam was 47.1 while incremental curing was the most commonly used method. Sectional matrices were more commonly used by respondents while the most commonly encountered post-treatment problem was the fracture of restorations

Conclusion: While more dental practitioners are embracing the use of composites for posterior restorations, there remains the need to get them to embrace the techniques of placement to ensure more satisfactory and predictable outcomes.

Keywords: Composite, posterior composites, aesthetics.

Introduction

Aesthetic considerations form a major aspect of dental material selection during tooth restorations. In time past, anterior restorative materials referred to as aesthetic restorative materials were used exclusively in the restoration of anterior teeth because they were tooth-colored and lacked

mechanical properties required by materials to be used in the posterior teeth.

However, with the advances made in tooth-colored restorative materials, a variety of these materials apart from the aesthetic properties, also possess the required mechanical properties that qualify them as materials of choice for posterior teeth restorations.

With the introduction of polymerizing resins in the 1950's, dentists were presented with new choices and these have remained popular treatments in dentistry.¹ Composite resins possess several advantages.² They can bond well to the conditioned tooth surface using a bonding agent and because

Corresponding Author: Dr. Harrison A. Omokhua

*Department of Restorative Dentistry,
University of Benin, Benin City, Nigeria.
E-mail: harri4u2002@yahoo.com*

they are tooth colored, they give natural looks to restored teeth. Less tooth preparation is required compared to tooth preparations for amalgam restorations and due to its adhesive bonding, it can reinforce the tooth, thus increasing the tooth's resistance form.^{3,4} The choice of composite resins as the main tooth-colored material for anterior restorations suffered some setbacks when used for posteriors teeth restorations. Problems like marginal leakage, secondary caries, poor load-bearing ability, high wear rate and inability to restore the contacts were considered as the draw backs of composite resins when used as a posterior restorative material.⁵ Improvements in resins and adhesive technology have made giant and rapid strides from those early days and now provides a myriad of alternatives.⁶ There is no doubt that, resin composite has provided a ready alternative to amalgam in the restoration of posterior teeth.⁷ Concerns regarding mercury pollution of the environment are among the reasons for the discontinuation of dental amalgam use in some countries.⁸

The reports of several studies which have been carried out either support the use of pre-encapsulated amalgam when clinically indicated or discourage the continued use of amalgam. There are still diverse opinions globally on this issue. Against this backdrop, composite resins became very popular and more acceptable. After the initial excitement, it was discovered that this new material needed a different kind of protocol, so specific methods of tooth preparation and conditioning were proposed.⁹

Therefore, this study was aimed at assessing the knowledge of dentists in the placement of posterior composite and the challenges associated with the process.

Methodology

After securing an approval from the Research and Ethics committee of the University of Benin Teaching Hospital, a structured questionnaire regarding the use of composites in posterior teeth was distributed among 96 dental practitioners in both private and government hospitals in Edo state. The participants were selected at random from tertiary health facilities and private hospitals. The questionnaires included questions on socio-

demographics, factors influencing the choice of composite in posterior teeth, perceptions about composite, factors causing problems during placement, choice of materials in shallow, moderate and deep cavities, use of rubber dam and incremental curing, the type of matrix used, the wedge, light curing unit, bonding agent used and commonly encountered post treatment problems.

Results

A total of 96 questionnaires were administered while 68 of them were filled and returned giving a response rate of 70.8%. The respondents' ages ranged between 27 and 55 years with a mean age of 35.88 ± 5.95 years. Table 1 show that more than half of the respondents were within the 31-40 years age group. There was a male preponderance with a male to female ratio of 1.7:1. Majority of the respondents (95.6%) claimed they practiced in the government hospital while general dental practice accounted for 33.8% of area of specialty by the respondents (Figure 1). Less than 1/3 of respondents (27.9%) were of the junior resident cadre. The results also show that 42.6% of respondents had been practicing for between zero and five years.

On the factors affecting the choice of direct restorative materials for posterior teeth, 86.8% of respondents claimed that the conservation of the remaining tooth substance influenced their choice, while 39.75 of respondents reported patients concern regarding amalgam as influencing their choice of posterior composite.

Confidence with using restorative material accounted for 44.1% of respondents who gave this as a factor influencing choice of restorative material and a very few 14.7% respondents reported journal articles on review on placement of material and more than half (58.8%) of the respondents claimed availability of material influence their choice. About 61.8% of respondents reported aesthetics as the major influence in their choice of posterior composition. Meanwhile 67.6% said they would not use posterior composite due to the cost.

On their perceptions of posterior composite, less than half of the respondents (35.3%) perceived of posterior composites placement to be more technically demanding than amalgam placement while 77.8% claimed posterior composite placement was less destructive of tooth substance.

Table 1: Socio-demographic data of respondents

CHARACTERISTICS	FREQUENCY	PERCENTAGE
Age group		
21-30	11	16.2
31-40	44	64.7
41-50	12	17.6
>50	1	1.5
Gender		
Male	43	63.2
Female	25	36.8
Type of practice		
Public	65	95.6
Private	3	4.4
Specialty		
Restorative dentistry	11	16.2
Oral surgery	18	26.5
Periodontics	4	5.9
Oral pathology	4	5.9
Orthodontics	5	7.4
Paedodontics	2	2.9
Community dentistry	1	1.5
General dental practice	23	33.8
Cadre		
Consultant	8	11.8
Senior registrar	16	23.5
Registrar	19	27.9
Dental officers	13	19.1
House officers	12	17.6
Years of practice		
0-5	29	42.6
6-10	22	32.4
11-15	7	10.3
>15	10	14.7
Total	68	100.0

Table 2: Managing operatively exposed dentine

METHODS USED	FREQUENCY	PERCENTAGE
SHALLOW CAVITY		
Calcium hydroxide sublinig&GIC	25	36.8
GIC	27	39.7
Cavity Varnish	12	17.6
No liner used	4	5.9
MODERATE CAVITY		
Calcium hydroxide sublinig&GIC	39	57.4
GIC	26	38.2
Cavity Varnish	2	2.9
No liner used	1	1.5
DEEP CAVITY		
Calcium hydroxide sublinig&GIC	57	83.8
GIC	5	7.4
Cavity Varnish	3	4.4
No liner used	3	4.4
TOTAL	68	100.0

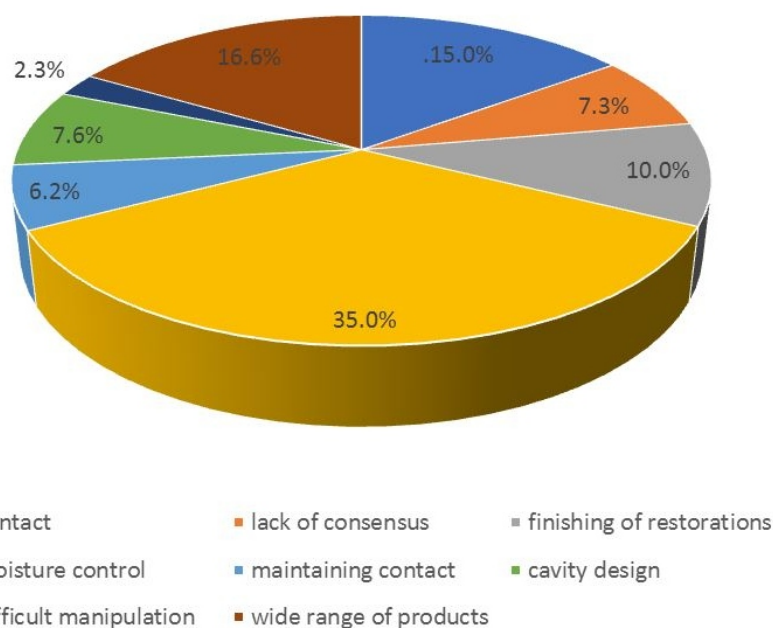


Figure 1: Difficulty faced during posterior composite placement

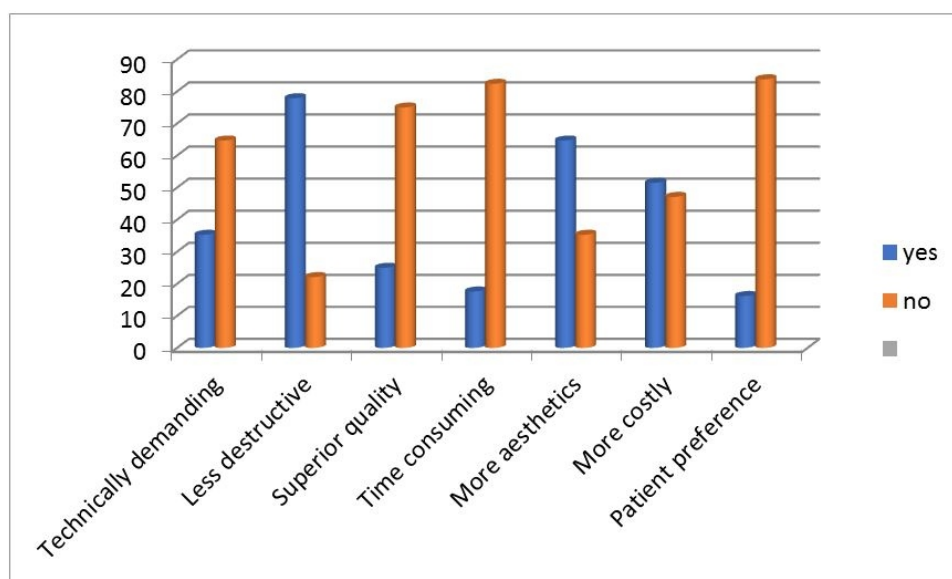


Figure 2: Level of agreement on various perceptions about Posterior composite

Majority of respondents (75%) did not think posterior composite was of superior quality to amalgam. Less than one-third (17.6%) of respondents reported that posterior composite placement was time consuming. However, a majority of respondents (64.7%) agreed that posterior composite was more aesthetically pleasing while 51.5% of respondents thought that posterior composites than amalgams was more costly while 16.2% of the respondents thought that it was preferred by patients. On difficulty faced during placement of posterior composite Contact point contour (15.0%), lack of consensus (7.3), finishing of restoration (10.0%), moisture control (35.0%) maintaining contact (6.2%), cavity design (7.6%), difficulty in manipulation (2.3%) and a wide of range of products (16.6%) were reported by the various respondents about the difficulty faced by clinicians during the placement of posterior composites.

When asked about how they manage dentine exposure in shallow cavities, the majority of the respondents (39.7%) claimed they use glass ionomer cement (GIC) for managing dentine exposure while 36.8% reported using calcium hydroxide sub-liner and GIC only a very few, 5.9% used neither sub-liner nor base in dentine exposure before composite placement in a shallow cavity.

In managing dentine exposure in moderate and deep cavities, majority of the respondents (82.4%) agreed

they use calcium hydroxide and GIC in deep cavity before posterior composite placement.

Forty-seven percent of participants have never used rubber dam during posterior composite placement as against 13.2% who claimed they always use rubber dam.

More than half of the respondents, (52.9%) reported placing posterior composite in an incremental manner while 4.4% rarely complied with incremental placement of matrices used during composite placement. Sectional matrix was the most popularity used by majority of the respondents (52.9) while about one third (25%) used circumferential matrix.

Many of the participants 33.8% did not use wedges during placement of posterior composite in Class II cavities while 32% said they used wooden wedge.

Ultraviolet light unit was the most commonly used light curing unit (55.9%) as reported by the respondents. This was followed by LED units (36.8%) and halogen units (2.9%) respectively.

On the post-treatment problems rarely encountered, 61.8% of the respondents claimed they rarely encountered food packing, 54.4% reported staining, 61.8% loss of retention, 5% sensitivity, 35.9% secondary caries, and 48.5% fracture of restoration as problems they rarely encountered after treatment. However, 22.1% said they encountered food packing, 35.5% staining, 30.9% loss of retention, 25.0% sensitivity, 25.0% secondary caries, and

45.6% fracture of restoration which is the most commonly encountered post treatment problem.

Discussion

The use of direct restorations such as dental amalgam and resin composite for filling posterior teeth is not only due to the more conservative preparations associated with them but also because of their cost effectiveness when compared to indirect restorations. Amalgam and more recently, resin composite are the most commonly used materials for direct restoration of posterior teeth.^{10,11}

In the past, amalgam was the material of choice for restoring posterior teeth, especially because of its high compressive strength and relatively low cost but now it is gradually being replaced by composite resins which possess better aesthetics.¹² This trend is due to dentist-related and patient-related factors.¹³

The response rate for this study was reasonably high at 70.8%. The result reflects the varying opinions of dentists on the placement of composite restorations in posterior teeth.

On the factors influencing the choice of composite resins for posterior teeth restorations, the study showed that the conservation of tooth substance (86.8%) followed by financial status of the patient (67%) and aesthetics (61.8%) were the most common factors influencing choice of posterior composite. This is similar to the study done in northern Saudi Arabia,² which reported that the conservation of cavity preparation followed by aesthetic demands as the major factors influencing choice of posterior composite. However, Glimmer et al¹⁴ and a study in Palestine¹⁵ reported aesthetic demands as the main reason participants used posterior composite.

Regarding the perception of posterior composite placement, majority (64.7%) did not think posterior composite placement was more technically demanding while 17.6% perceived posterior composite placement to be time consuming. This is similar to a study¹⁵ which also reported that majority of dentists did not think posterior composite was more technically demanding. However, this other study reported a higher value (63.4%) as those who perceived posterior composite placement to be time consuming.

In the present study, moisture control was the most difficult problem encountered during placement of

posterior composite. In a similar study by Glimmer et al¹⁴ they reported moisture control as the most difficult problem faced during placement. This is also in agreement with the study done in Palestine.¹⁵

Regarding the management of operatively exposed dentine in shallow, moderate and deep cavities, the current study, reported that majority of participants (82.4%) used calcium hydroxide and Glass ionomer cement in moderate and deep cavities. In the study by Gilmour et al, 63% of participants preferred calcium hydroxide in moderate and deep cavities. This is lower than the observed statistics in this study.

On the use of rubber dam, 47.1% said they never used rubber dam. This is slightly lower than the statistics (53.7%) reported in a study done in Palestine.¹⁵

In the present study, majority of participants (52.9%) placed composite incrementally and regarding the type of curing light used, Ultraviolet light was the most common light (52.9%) this is followed by LED (36.8%). This is in disagreement with a study¹⁵ where 79.7% used LED.

The most commonly encountered post treatment problem reported in this study was fracture of restoration (45.6%). This is consistent with Iftikhar's study², in which majority of participants reported fracture of the restoration as the most common post-treatment problem observed. On the contrary, in studies done in the United Kingdom⁵ and Palestine¹⁵, the participants claimed they never or rarely encountered such problems as fracture of restoration. However, these studies^{2,15}, including the present study reported that majority never or rarely encountered food packing, staining and loss of retention of the restorations.

The present study, reported a statistically significant association between the years of practice and moisture control (p-0.034) with majority of those who had practiced for 6-10 years reporting moisture control as the major difficulty they faced during posterior composite placement. This is probably due to the fact that majority of the respondents in this study did not use rubber dam as moisture control methods.

Conclusion

This study showed clearly a lot of varying opinions in the use of composites in the posterior teeth

restoration. For example, when managing operatively exposed dentin at different cavity depth. The study also revealed that moisture control and rubber dam placement are very vital in posterior composite restoration. More dental practitioners in Edo state appeared to be embracing posterior composite placement from the study. However, more still needs to be done in getting them to learn the right techniques of placement to ensure more satisfactory and predictable outcomes.

References:

1. Bohaty BS, Ye Q, Misra A, Sene F, Spencer P. Posterior composite restoration update: focus on factors influencing form and function. *Clin Cosmet Investig Dent*. 2013;5:33–42.
2. Iftikhar A. Knowledge and Attitudes of General Dental Practitioners Towards Posterior Composite Restorations in Northern Saudi Arabia, *J Clin Diagn Res*. 2015 Feb; 9(2)
3. Cenci M, Demarco F, de Carvalho R. Class II composite resin restorations with two polymerization techniques: relationship between microtensile bond strength and marginal leakage. *J Dent*. 2005;33(7):603–10.
4. Coelho-De-Souza FH, Camacho GB, Demarco FF, Powers JM. Fracture resistance and gap formation of MOD restorations: influence of restorative technique, bevel preparation and water storage. *Oper Dent*. 2008;33(1):37–43.
5. Burke FJ, McHugh S, Hall AC, Randall RC, Widstrom E, Forss H. Amalgam and composite use in UK general dental practice in 2001. *Br Dent J*. 2003;194(11):613–18.
6. Minguez N, Ellacuria J, Soler J I, Triana R, Ibaseta G. Advances in the history of composite resins. *J Hist Dent*. 2003;51(3):103–05.
7. Palmer C. “Good progress reported in mercury treaty talks”. *ADA News*. 42(21). 1-2. 2011
8. Correa MB, Peres MA, Peres KG, Horta BL, Barros AD, Demarco FF. Amalgam or composite resin? Factors influencing the choice of restorative material. *J Dent*. 2012;40(9):703–10.
9. Da Rosa Rodolpho PA, Donassollo TA, Cenci MS, Loguercio AD, Moraes RR, Bronkhorst EM, et al. 22-Year clinical evaluation of the performance of two posterior composites with different filler characteristics. *Dent Mater*. 2011;27(10):955–63.
10. Da Rosa Rodolpho PA, Cenci MS, Donassollo TA, Loguercio AD, Demarco FF. A clinical evaluation of posterior composite restorations: 17-year findings. *J Dent*. 2006;34(7):427–35.
11. Vidnes-Kopperud S, Tveit AB, Gaarden T, Sandvik L, Espelid I. Factors Influencing dentists’ choice of amalgam and tooth-colored restorative materials for Class II preparations in younger patients. *Acta Odontol Scand*. 2009; 67(2):74–79.
12. Sunnegardh-Gronberg K, van Dijken JW, Funegard U, Lindberg A, Nilsson M. Selection of dental materials and longevity of replaced restorations in Public Dental Health clinics in northern Sweden. *J Dent*. 2009;37(9):673–78.
13. Gilmour AS, Latif M, Addy LD, Lynch CD. Placement of posterior composite restorations in United Kingdom dental practices: techniques, problems, and attitudes. *Int Dent J*. 2009;59(3):148–54.
14. Tarek H. Rabi. Placement of Posterior Composite Restorations in Palestine Dental Practices: Techniques, Problems, and Attitudes. *Int J Dent Sci and Research Vol. 3, No. 3, 2015*, pp 72-78.