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Original Article

Dentistry Section

Knowledge and Attitudes of General Dental Practitioners Towards Posterior Composite Restorations in Northern Saudi Arabia

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ABSTRACT

Introduction: The restoration of posterior teeth with composite restoration is a common clinical practice nowadays. Opinions regarding posterior composite restorations vary among dentists. The aim of the present study was to determine the knowledge and opinions of general dental practitioners towards composite resins for posterior teeth restorations.

Materials and Methods: A questionnaire was devised to elicit information regarding placement of composite restoration in posterior teeth in northern Saudi Arabia. It was distributed to 230 dentists by hand and e-mail. A response rate 136 (59%) was obtained. The questionnaire sought details about case selection criteria for composite restoration, problems associated with composites and reasons for selecting composite restoration in posterior teeth. The data was processed and analysed by SPSS statistical software 19. Frequencies and percentages were calculated for various responses of the participants.

Results: Regarding the selection of composite restoration in posterior teeth, 97% of the dentists did not prefer composite placement for class I restoration with heavy occlusal contacts. 83% of the participants did not select composite for class II restoration. 78% of the respondents opted for restoring composites in small defects. Patients' aesthetic demands (90%), amalgam replacement (22%) and restoration of endodontically treated teeth (42%) were the contributing factors.

Regarding the problems associated with posterior composite restorations. Recurrent caries (87%), post-operative sensitivity (84%), restoration fracture (83%) and polymerization shrinkage (73%) were the major problems reported by respondents associated with composite restorations. The other minor concerns were wear (60%), contact build up in case of class II cavity restorations (51%) and isolation for composite restorations (36%).

Conservative cavity preparation (78%), aesthetics (73%) and patient preference (65%) were the main reasons for choosing composite restoration for the posterior teeth.

Conclusion: Posterior composites are not popular among dentists practicing in northern Saudi Arabia and there is a need of continued professional education and clinical training for the dentists for posterior composite restorations.

Keywords: Attitudes, Dentists, Posterior restorations, Resin composites

INTRODUCTION

The modern world we live in puts so much importance on appearances. Appearance is believed to contribute to professional success. A pleasant face and pearly white smile breed confidence, and are often considered as parameters for youth and vitality. Dentists have been entrusted with the job of restoring smile from time immemorial [1]. Introduction of polymerizing resins in the 1950s opened up new avenues for the dentists and ever since remain one of the most popular treatments in dentistry [2].

Composite resins have several advantages. They are restorative materials that can bond well to the conditioned tooth surface. Being tooth colored, they are used to give natural life like appearance to the restored teeth. Tooth preparation is very minimal when compared to amalgam preparations and due to the adhesion; it reinforces the tooth improving its resistance form [3,4]. Composite resins became the unanimous choice for anterior restorations but failed miserably for posteriors. Marginal leakage, secondary caries, poor load bearing ability, high wear rate and inability to restore the contact were considered limitations of composite resins as posterior restorative material [5]. Resins and adhesive technology have made rapid strides from those initial days and now offer numerous alternatives [6].

A modern dental practitioner is spoilt for choices when it comes to selecting the treatments and materials. But this selection, if anything, has become even more challenging. This is because a practitioner often finds it difficult to balance his past (his training), his present (demands of his patients according to the prevalent trends) and his future (compulsion to keep pace with the advances). Good training advises a clinician to be discrete as heeding to all the patient's demands or endorsing all the advances wouldn't be in the best interest of the patient [7]. Past surveys have revealed that the choice of material and treatment also depend on certain general perception of the society and fraternity [8].

Surveys based on pre-piloted questionnaires are very useful in gauging these perceptions. Surveys are simple and cost effective for cohort studies and designed to cover large regions in a short period of time. Perceptions of restorations have changed a lot over the years. Amalgam was promoted for a while till there were apprehensions on its toxicity and its ill effect on human body [9]. Several studies hence, toxicity of amalgam still continues to be debated in the academic circles. There have been studies vouching for and against amalgam. International opinion still remains very much divided on this issue. Composite resins were overwhelmingly welcomed in this backdrop. After the initial euphoria it was realized that this new material demanded a different of kind of protocol

So, specific methods of tooth preparation and conditioning was proposed [10].

Dentists found out that the new material was much more technique sensitive than amalgam. Questions raised on the suitability of resins to restore deep carious lesions on account of the effect of residual monomers on underlying pulp. Similar concerns were also raised on the appropriateness of composite resins to restore class II restorations due to their poor load bearing ability and high wear rate [11]. Despite several studies in favor of composite our general practitioners and clinicians still have several apprehensions and misconceptions about using composite resins for posterior restorations [12]. Furthermore, no research has been done on the opinions and knowledge of dentists practicing in northern Saudi Arabia regarding posterior composite restorations.

This questionnaire based survey aims at studying the awareness of posterior composite restoration and the attitude to it among the northern Saudi Arabian dentist population.

MATERIALS AND METHODS

A questionnaire was developed from a similar study [13] and was further modified for use in the present survey. The questionnaire used close ended questions. The questionnaire was piloted among small group of clinical dentists and then after minor modification distributed by hand and through email to 230 clinical dentists in northern Saudi Arabia. The study was approved by the ethics committee of the college of dentistry, Aljouf University, Sakaka, Saudi Arabia.

The questionnaire included demographic information and inquiry into adequacy of teaching received during dental school training regarding posterior composite restoration. Preference of location for composite placement, reason/ reasons for choosing composite restoration for posterior teeth and the most common problems associated with posterior composites were the three main group of questions asked. The respondents were allowed to choose one option of their choice. The participants had to respond by selecting the yes or no option.

STATISTICAL ANALYSIS

The data was analysed using the SPSS computer software (Statistical Package for the Social Sciences, version 19.0, SPSS Inc., Chicago, IL, USA). Descriptive statistics that is frequency and percentage tables were created for responses of the respondents.

RESULTS

Of 230 dentists, 136 returned the completed questionnaire representing a response rate of 59%. The participants included 116 (85%) males and 20 (15%) females. 61% of the respondents reported that their dental school training before graduation regarding posterior composite restorations was adequate.

[Table/Fig-1] summarizes the preferred locations for placement of composite restorations in posterior teeth. Majority of the dentists seemed to be reluctant to the placement of composites where direct occlusal contacts were involved. Likewise most of the respondents were comfortable with placing composites in smaller cavities in posterior teeth.

[Table/Fig-2] demonstrates data regarding problems encountered by dentists after placement of posterior composites. Polymerization shrinkage, post-operative sensitivity, recurrent caries and restoration fracture were amongst the most common problems faced by the respondents.

[Table/Fig-3] presents reasons for placement of posterior composites. Conservative cavity preparation was the most common choice followed by esthetics.

[Table/Fig-4] reveals comparison of the present study results with the previous studies.

Location	Yes	No
Class I with Occlusal Contact (Functional inclines)	4 (2.9%)	132 (97.1%)
Class I Without Occlusal Contact (Non Functional Inclines)	49 (36%)	87 (64%)
Class II	23 (16.9%)	113 (83.1%)
Proximal surface without Marginal Ridge involvement	72 (52.9%)	64 (47.1%)
Small Defects (Class V)	106 (77.9%)	30 (22.1%)
All Cavities	19 (13.9%)	117 (86.1%)
Patient's Aesthetic Demands	122(89.7%)	14 (10.3%)
Amalgam Replacement	30 (22.1%)	106 (77.9%)
Restoration of Endodontically treated teeth	57 (41.9%)	79 (58.1%)

[Table/Fig-1]: Responses of the surveyed clinical dentists practicing in northern Saudi Arabia on questions regarding location preference for posterior composite restorations use (total n = 136). Data shown are n (%)

Problem	Yes	No
Polymerization Shrinkage	100 (73.5%)	36 (26.5%)
Wear	82 (60.2%)	54 (39.8%)
Post-operative Sensitivity	114 (84.5%)	22 (15.5%)
Isolation	49 (36%)	87 (64%)
Contact Build up	69 (50.7%)	67 (49.3%)
Recurrent Caries	119 (87.5%)	17 (12.5%)
Restoration Fracture	114 (83.8%)	22 (16.2%)
All of the Above	15 (11%)	121 (89%)

[Table/Fig- 2]: Responses of the surveyed clinical dentists practicing in northern Saudi Arabia on questions regarding problems associated with posterior composite restorations (total n = 136). Data shown are n (%)

Reason	Yes	No
Aesthetics	100 (73.5%)	36 (26.5%)
Patient Preference	89 (65.4%)	47 (34.6%)
Conservative Procedure	106 (77.9%)	30 (22.1%)
All	14 (10.2%)	122 (89.8%)

[Table/Fig- 3]: Responses of the surveyed clinical dentists practicing in northern Saudi Arabia on questions regarding their reasons for choosing posterior composite restorations (total n = 136). Data shown are n (%)

	Gilmour A S et al., [12]		Gilmour A S et al., [13]		Burke F J et al., [5]		Present study 2014	
Factors	Yes	No	Yes	No	Yes	No	Yes	No
Clinical situation	249 (98%)	5 (2%)	257(97%)	6 (3%)	631 (99%)	6 (1%)	___	____
Patient's Aesthetic demands	243 (96%)	11(4%)	233 (89%)	30 (11%)	683 (99%)	4 (1%)	122 (90%)	14 (10%)
Conservative procedure	201 (79%)	53 (21%)	___	___	___	___	106 (78%)	30 (22%)
Patient preference	231 (91%)	23 (9%)	___	___	___	___	89 (65%)	47 (35%)
Isolation	201 (79%)	53 (21%)	___	___	___	___	49 (36%)	87 (64%)
Contact build up	94 (37%)	160(63%)	___	___	___	___	69 (51%)	67 (49%)
Post Operative sensitivity	218 (86%)	36 (14%)	___	___	___	___	114 (85%)	22 (15%)

[Table/Fig-4]: Comparison of the responses of the present study dentists to the previous studies

DISCUSSION

Direct restorations are used for posterior teeth not only because of their conservative nature but also because of cost effectiveness as compared to indirect restorations. Amalgam and composites are the most commonly used materials for restoration of posterior teeth [14,15]. At one time, amalgam was the material of a choice for restoring posterior teeth but now it is gradually being replaced by composite resins [16]. This change is due to the dentist and patient related factors [17].

Many countries like Sweden. Norway and Finland are virtually becoming amalgam free nations [18]. There is an increasing trend in the use of composite resins in Saudi Arabia but amalgam is still used in posterior teeth restorations.

Clinical situation was the most important factor in selecting composites for posterior teeth. The results were similar to the previous studies where 99%, 98% and 97% of the participants respectively reported clinical situation, the most influencing factor in selecting posterior composites [5,12,13]. Various clinical situations were provided to the respondents in the present study. Almost all dentists were against the placement of composite resins in areas of heavy occlusal contact Class I restorations. This is in agreement with the previous studies that do not promote the use of composites in these situations [19,20]. Similarly, the use of composite restoration in class II cavity with heavy contacts and in all cavities regardless of the size was not preferred by dentists in the present study. This is in accord with the previous published information in which low success rate of composites in proximal restorations was reported. Class II restorations, especially large ones require more effort to control moisture and to build up contact point [21]. One study reported preference for composites in 59% of occlusal restorations and 22% proximal restorations while the other study showed that 66% of the dentists performed proximal composite restorations. However, composites are used for restoring endodontically treated teeth and in small or moderate cavities [10,22].

Another study revealed an interesting pattern in relation to placement of composite in posterior teeth in the United Kingdom. Majority of general dental practitioners placed a composite restoration in premolar or molar tooth (> 95% of respondents). Only one half considered placing composites in premolar teeth in more than 50% of cases and fewer than one in three general practitioners considered placing a composite in a molar tooth. This clearly indicated reluctance of dental practitioners to provide composite restorations in molar teeth and probably due to the outdated advice issued before 10 years ago [12].

Aesthetics is the main concern of the patients who demand for composite restorations in posterior teeth. They may choose composites because of apprehension of mercury toxicity from amalgam advertised on internet or published sources [23]. Although studies have shown no adverse effects of the use of amalgam restorations on health [9]. In the present study patients' aesthetic demands were one of the main factors of selecting posterior composites by our respected colleagues. This is in keeping with previous published information and opinion where patients' aesthetic demands for posterior composite restorations reported by participants were 99%, 96% and 89% [5,12,13]. Dentists' educational background and work experience also influence the clinical practice. The patients should be informed of the pros and cons of different treatment options available prior to the execution of treatment plan [24].

The most common problems associated with composite restorations were recurrent caries (87%), restoration fracture (84%) and post-operative sensitivity (84%) which were reported by dentists in the present study. The above mentioned statistics are in agreement with the published literature available, where recurrent caries and restoration fracture were the main causes of failures. Short term studies show that early composite failure was associated with restoration fracture while long term studies reveal failure due to recurrent caries [25]. Similarly, postoperative sensitivity is one of the major issues related to direct posterior composites. Zero to fifty percent prevalence of post operative sensitivity was cited in literature. Mainly class II restorations in posterior teeth were associated with the above mentioned problem. The postoperative sensitivity can be reduced, if proper guidelines and techniques are followed for composite restorations [26]. The results (85%) of the present study were in accordance with the previous study (86%) regarding post operative sensitivity after composites placement [12].

Polymerization shrinkage is also an inherent problem with composites. In the present study, 73% of this problem was reported. Inadequate polymerization is responsible for reducing retention, post-operative sensitivity and adverse pulp reaction. Various clinical methods have been recommended to reduce the effect of polymerization shrinkage including small incremental placement into cavities, control of curing light radiance and flowable resin liner application is recommended to avoid such a problem [27].

Other concerns associated with posterior composite restorations were wear, isolation and build up of contact point in case of class II restoration. Composite restorations placed in high stress area are more prone to wear despite advances in the materials composition. The longevity of restoration may be reduced in patients having history of bruxism [28]. Proper isolation with rubber dam is pre requisite for composite restoration. According to American Dental Association, composites should not be placed in sites where isolation cannot be maintained. Establishment of proper contact with composites in class II restoration is also a great problem. Different techniques of restoration and matrix systems have been introduced to overcome this problem [29]. In the present study 36% and 51% reported moisture control and creating adequate proximal contact point respectively, the problems associated with posterior composites. This was against to the findings of a previous study that found 79% and 37% the above mentioned problems respectively [12].

The most common reason for choosing posterior composite restoration by the participants was conservative cavity preparation followed by aesthetics and patient's preference. The results were opposite to the findings of Glimmer AS et al., who found patient preference followed by conservative procedure for choosing posterior composites among the participants [12]. A study conducted on the undergraduate European dental students in England reported that the most common factors influencing the choice of posterior restorations were esthetics and conservation of tooth structure [30]. The response rate of the present study was 59%. This survey had several limitations. The dentists covered in the survey were general dental practitioners due to scarce availability of specialists in the region. Also we could not compare any information regarding dental practitioners in private and government setups. Patients' socio-economic status could not be targeted.

CONCLUSION

The use of composites in posterior teeth is still not popular in the northern Saudi Arabia as per the responses obtained. There is a need of improved under graduate training in colleges and clinical training for general dental practioners to improve their clinical skills. Further studies are therefore required to add information to the pool of data available.

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REFERENCES

[1] Roeters JJ, shortall AC. Opdam NJ. Can a single composite resin serve all purposes? *Br Dent J.* 2005;199(2):73-79.

[2] 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.

[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. Amalgum 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] 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.
[8] Deligeorgi V, Mjor IA, Wilson NH. An overview of reasons for the placement and replacement of restorations. *Prim Dent Care*. 2008;8(1):5-11.
[9] Shenoy A. Is it the end of the road for dental amalgam? A critical review. *J Conserv Dent*. 2008;11(3):99-107.
[10] Makhija SK, Gordan VV, Gilbert GH, Litaker MS, Rindal DB, Pihlstrom DJ, et al. Practitioner, patient, and caries lesion characteristics associated with type of material: findings from The Dental Based-Research Network. *J Am Dent Assoc*. 2011;142(6):622–32.
[11] Forss H, Widström E From amalgam to composite: selection of restorative materials and restoration longevity in Finland. *Acta Odontol Scand*. 2001;59(2): 57–62.
[12] 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.
[13] Gilmour AS, Evans P, Addy LD. Attitudes of general practitioners in the UK to the use of composite materials in posterior teeth. *Br Dent J.* 2007;202(12): E32.
[14] 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.
[15] 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.
[16] 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.
[17] 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.
[18] Opdam NJ, Bronkhorst EM, Roeters JM, Loomans BA. A retrospective clinical study on longevity of posterior composite and amalgam restorations. *Dent Mater.* 2007;23(1):2–8.
[19] Opdam NJ, Bronkhorst EM, Roeters JM, Loomans BA. Longevit and reasons for failure of sandwich and total-etch posterior composite resin restorations. *J Adhes Dent*. 2007;9(5):469-75.
[20] Lucarotti PS, Holder RL, Burke FJ. Outcome of direct restorations placed within the general dental services in England and Wales (Part 1): variation by type of restoration and re-intervention. *J Dent*. 2005;33(10):805–15.
[21] Stockton LW, Tsang ST. Microleakage of class II posterior composite restorations with gingival margins placed entirely within dentine. *J Can Dent Assoc*. 2007;73(3):255.
[22] Baraba A, Domejean-Orliaguet S, Espelid I, Tveit AB, Miletic I. Survey of Croatian dentists' restorative treatment decisions on approximal caries lesions. *Croat Med J*. 2010; 51(6):509-14.
[23] Christensen GJ, Child PL Jr. Has resin-based composite replaced amalgam? *Dent Today*. 2010:29(2):108-10.
[24] Omar R, Al-Kokani M, Abu Nassif L, Khan NB. Influence of dentist-related factors on the time spent on providing prosthodontic services among general dentists. *Saudi Dent J*. 2003;15:2-10.
[25] Brunthaler A, Konig F, Lucas T, Sperr W, Schedle A. Longevity of direct resin composite restorations in posterior teeth. *Clin Oral Investig*. 2003;7(2):63–70.
[26] Lynch CD, McConnel RJ, Wilson NH. Challenges to teaching of posterior composites in the United Kingdom and Ireland. *Br Dent J.* 2006;201(12): 747-50.
[27] Agbaje LO, Shaba OP, Adegbulugbe IC. Evaluation of post-operative sensitivity and secondary caries in posterior composite restorations: a 12 month study. *Niger J Clin Pract.* 2010;13(4):441-44.
[28] Kampouropoulos D, Paximada C, Loukidis M, Kakaboura A. The influence of matrix type on the proximal contact in Class II resin composite restorations. *Oper Dent J*. 2010;35(4):454–62.
[29] Ritter AV. Posterior composites revisited. *J Esthet Restor Dent.*2008;20(1): 57-67.
[30] Lynch CD, Guillem SE, Nagrani B, Gilmour AS, Ericson D. Attitudes of some European dental undergraduate students to the placement of direct restorative materials in posterior teeth. *J Oral Rehabil*. 2010;37(12):916–26.

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