Knowledge and Attitude of Dental Practitioners Towards Composite Restorations - A Questionnaire based Survey

Mohd Sajad[1], Shafia[2], Neerja Sharma[3]

ABSTRACT

Introduction: Aesthetically pleasing restorations are much desirable in current day dentistry and efforts have been made to develop a restorative material to suit the patients desires and needs. Composite resins are currently the most popular of all tooth coloured restorative materials, which completely replaced silicate cement and acrylic resin as esthetic restoarive material. The aim of our study was to know the various clinical practices and techniques related to composite resins amongst dentists in two different population groups to get a wide range of opinion.

Material and Methods: The multiple-choice questionnaire regarding the use of composites and technique associated with its placement were distributed among 200 dentists. Out of 200 dentists only 176 responded. The analysis of data was performed using methods of descriptive statistics.

Results: The response rate in this survey was 88% (176/200). Losses in response rate were due to lack of return of questionnaire form**.** In this survey we found that only 5% of the dentists used rubber dam, more than 80% of the dentists used cotton rolls and suction tips as a method of isolation, 34% dentists used Mylar strips as matrix band in composite restorations instead of a proper matrix system.

Conclusion: Composites are popular among dentists practicing in Srinagar and Delhi. There is a need of continued professional education and clinical training of the dentists in order to achieve desired results and esthetics within a stipulated time.

Keywords: Acid etching, Bonding Agent, Composites, Dentists, Finishing, Isolation.

INTRODUCTION

With the growing sense and awareness of beauty and fashion, aesthetic restorations are an inseparable part of modern day conservative dentistry and ever since efforts have been made to develop a restorative material to suit the patients desires and needs. Composite resins are currently the most popular of all tooth coloured restorative materials, which completely replaced silicate cement and acrylic resin as esthetic restoarive material.

Composite restorative materials consist of a continuous polymeric or resin matrix in which a filler is dispersed.[1] With the development of acid etch technique (Bunocore-1955) and dentin bonding agents, the marginal seal and bonding of composite to tooth structure has drastically improved, hence adding to the longevity of the restoration. Also the move towards minimal intervention has been made possible by great improvements in restorative materials, which make it possible for a motivated practitioner to achieve a good result in a realistic amount of clinical time.

Based upon the filler particle size composites are classified as megafill, macrofill (10-100µ), midifill (1-10µ), minifill (0.1-1µ), microfill (0.01-0.1µ) and nanofill (0.001- 0.1µ). Composites with mixed ranges of particle sizes are called hybrids.[1] The newly introduced composite materials in the market are used for posterior restoration and have promising results. Despite excellent aesthetic results and good strength values, composites like any other restorative material have their demerits. Due to polymerization shrinkage they are prone to marginal leakage, post-operative sensitivity and secondary caries. The aim of our study was to know the various clinical practices and techniques related to composite resins amongst dentists in two different population groups to get a wide range of opinion.

MATERIAL AND METHODS

This study was a cross sectional, questionnaire based survey approved by institutional ethical committee. A written consent was taken from the participants before the questionnaire, those unwilling to participate in the study were excluded from the study.

The survey focuses on the various clinical aspects related to composite resins followed by dentists of two different cities in india namely Delhi and Srinagar. Forms were distributed amongst dentists in Delhi and Srinagar in the year 2017. All the filled questionare forms were filed and sealed by the dentists themselves in a blank envelope. The questionare forms were collected by us from their clinics on the same day. The name and address of dentist was not mentioned in the forms to eliminate bias and confideniality. Out of 200 dentists only 176 responded to the questionare.

[1]Senior resident, Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital, Shireen Bagh, Srinagar, [2]Lecturer, Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital, Srinagar, [3]Private Practioner, Chandigarh, India.

Corresponding author: Dr. Mohd Sajad, Senior resident, Room No 600, Department of Conservative Dentistry and Endodontics, Goverment Dental College and Hospital, Shireenbagh, Srinagar, India.

How to cite this article: Mohd Sajad, Shafia, Neerja Sharma. Knowledge and attitude of dental practitioners towards composite restorations - a questionnaire based survey. International Journal of Contemporary Medical Research 2018;5(8):H9-H12.

DOI: http://dx.doi.org/10.21276/ijcmr.2018.5.8.12

S. No	Questions	Options	Results	
			Srinagar	Delhi
1	Brands of composites most commonly used	3M	54	27
		Dentsply	21	56
		Ivoclar	24	15
		Others	4	2
2	Number of shades used for anterior composites	1shade	28	26
		2shades	46	48
		3shades	24	23
		More than 3 shades	2	3
3	Method of isolation most commonly used	Cotton rolls	16	9
		Suction tip and Cotton rolls	82	84
		Suction tip, cotton rolls and rubber dam	2	7
4	Most preferred generation of bonding system	5th generation bonding system	49	41
		7th generation bonding system	51	59
5	Most preferred brand of bonding system	Prime and Bond NT	26	34
		Adper single bond 2	13	4
		XenoV	29	32
		Adper easy	11	8
		G bond	6	9
		Tetric N Bond	5	4
		Others	10	9
6	Time for etching enamel for 5th generation bonding system	10 sec	48	49
		15sec	27	28
		20 sec	19	14
		30 sec	6	9
		40 sec	0	0
7	Most commonly used technique for placement of composite	layering technique	95	85
		Bulk technique	5	15
8	Type of curing light used	LED	85	90
		Halogen	15	10
9	Time for curing the composite	20 sec	41	45
		30 sec	34	31
		40 sec	25	24
10	Checking curing light intensity	Never	28	20
		Once a year	47	55
		Twice a year	25	25
11	Cleaning of fibre optic tip	After every use	19	35
		once a week	65	60
		once a month	15	5
		not sure	1	0
12	Finishing and polishing of anterior composites	Immediately post op	56	60
		3-7 days post operatively	27	28
		Both	17	12
13	Systems most commonly used to finish and polish composite resins	Soflex	20	24
		Shofu polishing kit	57	10
		Shofu supersnap	18	62
		Others	5	4
14	Matrix band used for posterior composite restorations	Mylar strip	23	22
		Tofflemire	46	39
		Ivory 1	9	13
		Palodent	10	21
		Others	12	5
15	Post-operative instructions	Avoid consumption of beverages like Tea, Coffee for 24 hours	87	83
		Not to bite on anterior teeth Avoid sticky food	100	100
		Avoid biting on hard food (break food into small pieces) Secondary caries	25	37
		may develop around restoration in future so check for marginal darkening	67	60
		Discontinue habits like tobacco chewing and cigarette smoking Rinse after	7	5
		consuming colored beverages	44	37
		Regular brushing and flossing Check for tooth sensitivity. If present, report	39	34
		to the dentist Regular check up every 6 months	88	91
			26	31
			73	62

Table-1: Responses of the questions.

STATISTICAL ANALYSIS

Descriptive statistics like mean and percentages were used to interpret the data with the help of Miscrosoft office 2007.

RESULTS

The response rate in our survey based study was 88% (176/200). Losses in response rate were due to lack of return of questionnaire form. In this survey we found that only 5% of the dentists used rubber dam, more than 80% of the dentists use cotton rolls and suction tips as a method of isolation, 34% dentists use Mylar strips as matrix band in composite restorations instead of a proper matrix system. More than 38% never checked curing light intensity and 19% of respondents in Srinagar and 35% in Delhi cleaned the tip of curing unit after every use. 7th generation bonding system is most popular (used by 41% respondents) and Xeno V is the most preferred brand of 7th generation bonding system. 48% dentists etched for 10 seconds,27% etched for 15 seconds and about 6% etched for more than 30 seconds in Srinagar. In Delhi 49% dentists etched for 10 seconds, 28% etched for 15 seconds and 10% etched for greater than 30 seconds.

In our study, there was no significant difference seen in the practices and tecchniques related to composite resins amongst dentists between the two different cities in india.

DISCUSSION

The success of a composite restoration depends on various clinical conditions like condition of operating field, type of composite and bonding system, different design of tooth preparation, method of filling the cavity (incremental/ bulk), time and type of finishing and polishing of composite restoration.

According to Parpaiola AR et al. the main cause of restoration replacement was composite shade discoloration (63.8%) followed by marginal staining (50%), unsatisfactory restoration anatomy (50%), marginal fracture (14.9%), painful symptoms (8.5%), fractured restoration body (4.3%), dental fracture (1.1%) and total displacement of the restoration (1.1%).[2] Marginal staining and composite shade discoloration contrasting with dental structure were related to the presence of caries.

According to a survey, the major reason for the first time placement of restorations was primary caries while that for replacement of restoration was secondary caries (36.2%), followed by endodontic root canal therapy (22.2%), discoloration of the restoration (14.4%), restoration failures (13.4%), composite restoration fracture (11.3%), pain or sensitivity (2.4%).[3]

The composite resin contracts by about 1.5% to 5% and the mode of polymerization of composite resin is free radical polymerization.[4] Significant polymerization shrinkage results in gap formation, secondary caries, marginal leakage and post-operative sensitivity. The incremental layering technique of composites for restoration have been recognized as the technique of choice to minimize polymerization shrinkage stresses.[5] The incremental filling technique yielded significantly lower cuspal deflection than the bulk filling technique in a previous study.[6] Results of the survey showed that 95% dentists in Srinagar and 85% dentists in Delhi used incremental layering technique.

Traditionally Mylar strips, Tofflemire band and retainer, Ivory 1 and 8 band and retainer have been used for developing contact and contour in lesions involving proximal walls. But now we have better matrix systems like Palodent plus (Dentsply), Sectional matrix plus retainer system (3M), V 3 rings (Triodent), Optra matrix (Ivoclar) specially designed to assist clinicians in creating precise automatically shaped contact points in cavities involving proximal walls. In our survey we found mylar strip and Tofflemire band and retainer are the most popular and Palodent is used only by 10% dentists in Srinagar and 21% in Delhi.

According to a survey done in 2010, 63% did not use a rubber dam for any restorative procedures.[7] In our survey, we found that only 5% of the dentists uses rubber dam as a method of isolation. Greater than 62% of the dentists uses cotton rolls and suction tips as a method of isolation.

The 42% of respondents uses Prime and Bond (DENTSPLY DeTrey, Konstanz, Germany) and the reasons cited for its popularity were its availability, ease of use and reliability.[8] The previous study compared microleakage of fifth, sixth, and seventh generation dentin bonding agents and found the preparations treated with Clearfil S3 (7th generation DBA) showed significantly less leakage than the other groups.[9] In our survey we found that 7th generation bonding system is most popular and Xeno V is the most preferred brand of 7th generation bonding system followed by 5th generation bonding system. Prime and Bond NT is the most preferred brand of 5th generation bonding system.

Strength of tooth-restoration interface is also a function of etching time when using 5th generation bonding system. Gilpatrick RO studied Resin-to-enamel bond strengths with various etching times and concluded that 5- second etch was sufficient to allow adequate bond strength.[10] Other previous study also found that the phosphoric acid gels (35% and 10%) and the 10% maleic acid gel applied for 15 and 60 seconds removed the smear layer and opened the dentinal tubule orifices.[11] Thus it may be postulated that over etching is not required. Light output needs to be checked routinely in order to obtain durable results. Hegde V conducted a clinical survey of the output intensity of 200 light curing units in dental offices across Maharashtra and found only 10% LED units and 2% QTH curing units had good intensities (>400 mW/cm 2).[12] Miyazaki M et al in a similar study found that the light intensities of the curing units used in private practice were lower than expected.[13] Martin FE (Australia) in a survey reported that nearly 50% of dentists had never checked the light output of their units and over one half of the light curing units were not functioning satisfactorily.[14]

Baek CJ studied the effects of light intensity and light-curing time on the degree of polymerization of dental composite resins and found that light-curing composite resins with higher energy density was beneficial to acquiring higher micro-hardness values and lower coefficients of thermal

expansion.[15]

Coelho Santos MJ studied effect of light curing method on volumetric polymerization shrinkage of resin composites and found that in hybrid composite (Z-100), continuous output with higher intensity light resulted in significantly higher shrinkage than continuous output with conventional intensity light method and pulse-delay output.[16] Jose R David studied effect of curing time on curing efficiency and found significant increase in micro-hardness values for all light curing composite when exposure time was increased from 20 to 40 seconds.[17] In our survey we found that 41% of respondents in Srinagar and 45% in Delhi cured for 20 seconds, 34% of respondents in Srinagar and 31% in Delhi cured for 30 seconds, 25% of respondents in Srinagar and 24% in Delhi cured for 40 seconds.

Finishing and polishing of composite resins enhances the esthetics as well as increases the longevity of the restoration. The survival rate of composite resin was found to be 91.7% at 5 years and 82.2% at 10 years. For amalgam the survival was 89.6% at 5 years and 79.2% at 10 years.[18] Lopes GC et al studied effect of finishing time and techniques on marginal sealing ability of two composite restorative materials and found that for microfilled composite restorations on dentin margins, delayed wet finishing with diamond burs resulted in significantly lower microleakage scores and Hybrid composite restorations had equivalent levels of microleakage regardless of the finishing method.[19]

In our study,we found that about 60% respondents finished and polished composite resins post operatively immediately after the restoration and about 40% did it 3-7 days post operatively. The most popular systems used to finish and polish composite resins is Shofu supersnap (greater than 60%).

CONCLUSION

Composites are popular among dentists practicing in Srinagar and Delhi but lesser percentage of dentists follow the recommended protocol. There is a need of continued professional education and clinical training of the dentists for composite restorations in order to achieve desired results and esthetics within a stipulated time. Further studies are therefore required to add information to the pool of data available.

REFERENCES

1. Sturdevant, CM, Barton, RE, Brauer, JC. The Art and Science of Operative Dentistry. 5th edition: McGraw-Hill Book Co, New York: 2012.
2. Parpaiola AR. Guimaraes PS, França FM, Basting RT. Small cross-sectional survey of composite restoration attributes associated with choices for replacement. Braz Oral Res 2009;23:346-51.
3. Al-Negrish. Composite resin restorations: a cross-sectional survey of placement and replacement in Jordan. Int Dent J 2002;52:461-8.
4. Deniz Cakir, Robert Sergent and John O. Burgess Polymerization Shrinkage. A Clinical Review. Inside Dentistry 2007;3:88-92.
5. Yamazaki PC, Bedran-Russo AK, Pereira PN, Wsift EJ Jr. Microleakage evaluation of a new low-shrinkage composite restorative material. Oper Dent 2006;31:670-6.
6. Kwon Y, Ferracane J, Lee IB. Effect of layering methods, composite type, and flowable liner on the polymerization shrinkage stress of light cured composites. Dent Mater 2012;28:801-9.
7. Gilbert GH. Litaker MS, Pihlstrom DJ, Amundson CW et al. Rubber dam use during routine operative dentistry procedures: findings from The Dental PBRN. Oper Dent 2010;35:491-9.
8. McFadzean RW. Gibson E, Newcombe RF, Nataraja R, Santini A. Resin-based composites and dentine-bonding agents. Which, who and why? A study in the East of Scotland. Prim Dent Care 2009;16:59-6.
9. Vinay S,Shivanna V. Comparative evaluation of microleakage of fifth, sixth, and seventh generation dentin bonding agents: An in vitro study. J Conserv Dent 2010;13:136–40.
10. Gilpatrick RO. Resin-to-enamel bond strengths with various etching times. Quintessence Int 1991;22:47-9.
11. Mario Fernando de Goes, Sinhoreti MA, Consani S, Silva MA. Morphological Effect of the Type, Concentration and Etching Time of Acid Solutions on Enamel and Dentin Surfaces. Braz Dent J 1998;9:3-10.
12. Hegde V, Jadhav S, Aher GB. A clinical survey of the output intensity of 200 light curing units in dental offices across Maharashtra. J Conserv Dent 2009;12: 105–08.
13. Miyazaki M, Hattori T, Ichiishi Y, Kondo M, Onose H, Moore BK. Evaluation of curing units used in private dental offices. Oper Dent 1998;23:50-4.
14. Martin FE. A survey of the efficiency of visible light curing units. Journal of Dentistry 1998;239–3.
15. Baek CJ. Hyun SH, Lee SK, Seol HJ, Kim HI, Kwon YH. The effects of light intensity and light-curing time on the degree of polymerization of dental composite resins. Dent Mater J 2008;27:523-33.
16. Coelho Santos MJ, Santos GC Jr, Nagem Filho H, Minnelli RF, El-Mowafy O. Effect of light curing method on volumetric polymerization shrinkage of resin composites. Oper Dent 2004;29:157-61.
17. David JR. Gomes OM, Gomes JC, Loguercio AD, Reis A. Effect of exposure time on curing efficiency of polymerizing units equipped with light emitting diodes. Journal of oral science 2007;49:19-24.
18. Opdam NJ, Bronkhorst EM, Roeters JM, Loomans BA. A retrospective clinical study on longevity of posterior composite and amalgam restorations. Dent Mater 2007;23:2-8.
19. Lopes GC. Franke M, Maia HP. Effect of finishing time and techniques on marginal sealing ability of two composite restorative materials. J Prosthet Dent 2002;88:32-6.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 06-07-2018; **Accepted:** 08-08-2018; **Published:** 19-08-2018