ISSN: 0975-3583,0976-2833 VOL12, ISSUE 06, 2021

ORIGINAL RESEARCH

Preference of restorative material for class V restoration among BDS students, interns, practising dentists and post graduate students: A cross sectional survey

[1]Dr. Ravi Ranjan Sinha, [2]Dr. Mariyam Fidha, [3]Dr. Sabin Siddique, [4]Dr. Pavankumar Chiluvuri, [5]Dr.Pritee Rajkumar Pandey, [6]Dr. AkritiMahajan, [7]Dr. Afroz Kalmee Syed

[1]Reader, Dept of Prosthodontics, The Oxford Dental College, Bangalore, Karnataka, (RGUHS), India
[2]Senior Lecturer, Dept of Oral Pathology and Microbiology, MES Dental College, Perinthalmanna, Kerala, India
[3]Professor and Head, Dept of Public Health Dentistry, MES Dental College and Hospital, Perinthalmana, Kerala, India
[4]MDS, Senior lecturer, Department of Orthodontics, Konaseema Institute of Dental Sciences, Amalapuram, Andhra Pradesh, India
[5]Consultant Maxillofacial Surgeon, New Delhi, India
[6]MDS, Oral Medicine and Radiology, Private Consultant, Jammu and Kashmir, India
[7]MDS, Oral and Maxillofacial Pathology, Incharge Medical Officer, Covid Care Centers, Tenali, AP, India

Correspondence:
Dr PriteeRajkumarPandey
Consultant Maxillofacial Surgeon, New Delhi, India
Email: Priteepandey1990@gmail.com

Abstract

Aim: To compare and evaluate the preferences of restorative material in class V lesions restored with composite resin, Glass ionomer cement amongst BDS students, Interns, practising dentists and post graduate students.

Materials and methodology: 100 class V cavities were prepared in Maxillary central incisors in selected patients amongst general population. After proper selection and identification, four groups of patient were formed and each group involved 25 patients each. Restorative material was randomly selected and each group was involving composite and GIC. In this study these cavities were divided into four groups: Group A (= 25)—restored by Bds students, Group B (= 25)—restored by Interns, Group C (= 25)—restored by practising dentists and Group D (n= 25) restored by Post graduate students in the department. After proper restoration of the cavity the preferences of restoring groups were asked and evaluated by the questionnaires.

Conclusion: Within the limitations of this study, none of these materials were free from microleakage. Both materials showed microleakage at gingival margins compared to occlusal margins. Among all the groups GIC showed the least microleakage at the gingival wall. Since Isolation is difficult in GIC therefore Composite was preferred by practising dentists and Post graduate students.

Key words:microleakage, composite resin, Glass ionomer cement.

ISSN: 0975-3583,0976-2833 VOL12, ISSUE 06, 2021

Introduction

Dentistry had always thrived to achieve biocompatible restorations that do not compromise the pulp and also maintain the dental seal. One of the significant contributions has been the development of resin-based composite technology. With the constant increase in aesthetic demands composites are the widely used restorative material.[1-4] Developments in filler technology and initiator systems have considerably improved composite physical properties and expanded their clinical applications. Cervical lesions are very often caused by incorrect tooth brushing and dental caries and usually have little or no enamel at the cervical margin. Flowable composite resins are widely used in clinical practice by many practising dentist and are the most common resin materials that are recommended for restoring these lesions instead of conventional resin composites because of low viscosity and good aesthetic properties. The major disadvantage of visible light-cured composites is polymerization shrinkage and higher cost.[5]This shrinkage can result in gap formation between the composite material and tooth structure, particularly if the restoration margin is placed in dentin or cementum. Bacteria, fluids, molecules, or ions can pass through this gap between the resin composite and the cavity wall, a process called microleakage.[6]Microleakage is thought to be responsible for hypersensitivity, secondary caries, pulpal pathosis, and failure of restorations. Besides pulpal irritation and secondary caries, microleakage also results in marginal discoloration. Also the use of GIC has good result in Class V restoration. GICs are especially effective for the treatment of non-carious cervical lesions, bonding chemically to the calcium of the tooth structure, and avoiding unnecessary removal of enamel for cavity margin beveling.[7] The use of a liner to act as a flexible intermediate layer between restoration and substrate has been suggested as a method of relieving the stress associated with polymerization shrinkage.[8]Flowable composites have been recommended as liners due to their low viscosity, increased elasticity, and wettability. But due to its higher cost compare to glass ionomer cement (GIC), it is less preferred by the students.[9,10]

Methods and methodology

100 class V cavities were prepared in Maxillary central incisors in selected patients amongst general population. After proper selection and identification, four groups of patient were formed and each group involved 25 patients each. In this study these cavities were divided into four groups: Group A (= 25)—restored by Bds students, Group B (= 25)—restored by Interns, Group C (= 25)—restored by practising dentists and Group D (n= 25) restored by Post graduate students in the department. After proper restoration of the cavity the preferences of restoring groups were asked and evaluated by the questionnaires. Wilcoxon test was used to compare occlusal and gingival scores of each material. Kruskal Wallis one-way analysis of variance (ANOVA) was used to compare the occlusal and gingival scores for each group of restoration. Significance was considered at the ≤ 0.05 level.

Table 1: Preference of restorative material in Four Groups

	Composite	GIC	P value
Group A	-	Preferred	≤0.05
Group B	Preferred	Preferred	
Group C	Preferred	-	
Group D	Preferred	-	

ISSN: 0975-3583,0976-2833 VOL12, ISSUE 06, 2021

Results

Significance was considered when □ value was ≤0.05.

(i) The statistical analysis showed that there was no significant difference between the Preference groups (□ = 0.573). But there was a very significant difference at the gingival margins (□ = 0.004).

(ii) Group A showed significantly less Preference for Composite than other Groups at gingival margins (□ = 0.001 and □ = 0.024). Between Groups A and B there was no significant difference (0.334).

Discussion

Because of constant increase in aesthetic demands bonded composites have been the common choice for the aesthetic restorations of class V lesions.[11]One of the main reasons for failure of composites is interfacial defects which develop as a result of long time thermal and mechanical stresses, stresses developed due to polymerisation shrinkage, and physical and chemical properties of the material. These interfacial defects can lead to microleakage which is a matter of concern because it can lead to staining at the margins of restorations, recurrent caries, hypersensitivity, and pulp pathology.[12-13]Microleakage is an important property that has been used in assessing the success of any restorative material used in restoring tooth. Improvements in resin composites have increased their usefulness as restorative materials; however, polymerization shrinkage continues to remain one of the primary deficiencies of composite restorations.[14] Polymerization shrinkage causes contraction stress within the restoration that leads to microleakage, as well as stress within the surrounding tooth structure. Possible reasons for microleakage at the dentin restoration margin are cavity configuration (C-factor), dentinal tubule orientation to the cervical wall (CEJ), organic content of dentine substrate and movement of dentinal tubular fluids, incomplete alteration or removal of smear layer by acidic primers (self-etch system) for adequate demineralization and hybrid layer formation, inefficient infiltration/ penetration of primer components into the demineralized collagen fibrils, dentin substrates hydration level, incomplete evaporation of the solvent from the dentin surface prior to attachment of the adhesive monomers, incompatibility of the bonding agent with the respective resin composite, acid component composition (pH, osmolarity, and thickening agent), polymerization contraction, physical characteristics of the restorative material, (filler loading, volumetric expansion, and modulus of elasticity), inadequate margin adaptation of restorative material, polymerization source-photo initiator incompatibilities and instrumentation, and finishing and polishing effects. Hence the current study evaluated the preference of these four groups either for composite or GIC in class V cavities in Maxillary central incisors.[15] In the present study class V cavities are selected because cervical lesions have been a restorative challenge for any kind of restorative material due to their Complex morphology where the margins are partly in enamel and partly in dentin/cementum. The primary problem associated with the restoration of class V cavities is microleakage at gingival margins located in dentin. The cyclic loading was done in this study because occlusal stress generated in the cervical region during normal function and parafunction may increase microleakage and deteriorate the margins of class V restorations. To reduce the stress magnitude in composite restoration a low stiffness material is applied between the restoration and cavity walls to increase the compliance of bonding substrate.[16]Another benefit from this procedure is that stress distribution is more uniform along the low elastic modulus layer. This technique is called elastic cavity wall and is accomplished by the use of intermediate layer of low viscosity flowable composite which causes reduction in microleakage. Simi and Suprabha showed that the marginal adaptation of a composite improved when used in conjunction with a flowable composite. A Study

ISSN: 0975-3583,0976-2833 VOL12, ISSUE 06, 2021

concluded that a 0.5–1.0 mm layer of flowable composite liner used under packable composite restorations resulted in a significant reduction in microleakage. The results obtained in this study showed that two restorative material composite resins that were investigated exhibited more microleakage on the gingival margins than on the occlusal margins because the flexural stresses at cervical margins are much more higher than that at the occlusal margins which is in accordance with previous studies by Nayak et al. and Kumar Gupta et al. whereas GIC has less microleakage compared to composite. Therefore preference for Group A and B was mainly for GIC due to cost effective.[17-20]

Conclusion

Within the limitations of this study, none of the Materials were free from microleakage. Both the materials showed more microleakage at gingival margins compared to occlusal margins. Among all the Group B,C and D showed more preference for Composite compare to GIC. Therefore even though composite has good results and more efficient compared to GIC, but GIC was more preferred by the bds students and Interns compare to practising dentists and Post graduate students

References

1. S. B. Mitra, D.Wu, and B. N. Holmes, “An application of nanotechnology in advanced dental materials,” Journal of the American Dental Association, vol. 134, no. 10, pp. 1382–1390, 2003.
2. L. A. Litonjua, S. Andreana, P. J. Bush, T. S. Tobias, and R. E. Cohen, “Noncarious cervical lesions and abfractions: a reevaluation,” Journal of the AmericanDental Association, vol. 134, no. 7, pp. 845–850, 2003.
3. T. Miyasaka and H. Okamura, “Dimensional change measurements of conventional and flowable composite resins using a laser displacement sensor,” DentalMaterials Journal, vol. 28, no. 5, pp. 544–551, 2009.
4. N. Attar, L. E. Tam, and D.McComb, “Flow, strength, stiffness and radiopacity of flowable resin composites,” Journal of the Canadian Dental Association, vol. 69, no. 8, pp. 516–521, 2003.
5. A. R. Yazici, C¸ .C¸elik, and G. Ozg¨unaltay, “Microleakage of different resin composite types,” Quintessence International, vol. 35, no. 10, pp. 790–794, 2004.
6. T. J. Hilton, R. S. Schwartz, and J. L. Ferracane, “Microleakage of four Class II resin composite insertion techniques at intraoral temperature,” Quintessence International, vol. 28, no. 2, pp. 135–145, 1997.
7. E. B. Franco, L. G. Lopes, R. F. LiaMondelli,M. H. Da Silva E Souza Jr., and J. R. P. Lauris, “Effect of the cavity configuration factor on the marginal microleakage of esthetic restorative materials,”American Journal of Dentistry, vol. 16, no. 3, pp. 211– 214, 2003.
8. M. Radhika, G. S. Sajjan, B. N. Kumaraswamy, and N. Mittal, “Effect of different placement techniques on marginal microleakage of deep class-II cavities restored with two composite resin formulations,” Journal of Conservative Dentistry, vol. 13, pp. 9–15, 2010.
9. R. C. Alonso,M. A. Sinhoreti, L. CorrerSobrinho, S. Consani, and M. F. Goes, “Effect of resin liners on the microleakage of class V dental composite restorations,” Journal of Applied Oral Science, vol. 12, pp. 56–61, 2004.
10. C. S. Silveira de Ara´ujo, T. I. Incerti da Silva, F. A. Ogliari, S. S. Meireles, E. Piva, and F. F. Demarco, “Microleakage of seven adhesive systems in enamel and dentin,” Journal of Contemporary Dental Practice, vol. 7, no. 5, pp. 26–33, 2006.

ISSN: 0975-3583,0976-2833 VOL12, ISSUE 06, 2021

11. I.Kaplan,H.H.Mincer, E. F.Harris, and J. S.Cloyd, “Microleakage of composite resin and glass ionomer cement restorations in retentive and nonretentive cervical cavity preparations,” The Journal of Prosthetic Dentistry, vol. 68, no. 4, pp. 616–623, 1992.
12. B. Simi and B. S. Suprabha, “Evaluation of microleakage in posterior nanocomposite restorations with adhesive liners,” Journal of ConservativeDentistry, vol. 14, no. 2, pp. 178–181, 2011.
13. E. A. Kidd, “Microleakage: a review,” Journal of Dentistry, vol. 4, pp. 199–206, 1976.
14. A. H. Alani and C. G. Toh, “Detection of microleakage around dental restorations: a review,” Operative Dentistry, vol. 22, no. 4, pp. 173–185, 1997.
15. F. K. Wahab, F. J. Shaini, and S. M. Morgano, “The effect of thermocycling on microleakage of several commercially available composite Class V restorations in vitro,” The Journal of Prosthetic Dentistry, vol. 90, no. 2, pp. 168–174, 2003.
16. H. D. Arisu, M. B. Uc¸tasli, E. Elig¨uzeloglu, S. Ozcan, and H. Om¨url¨u, “The effect of occlusal loading on the microleakage of class V restorations,” Operative Dentistry, vol. 33, no. 2, pp. 135– 141, 2008.
17. A. R. Yazici, M. Baseren, and B. Dayangac¸, “The effect of flowable resin composite on microleakage in class V cavities,” Operative Dentistry, vol. 28, no. 1, pp. 42–46, 2003.
18. R. R. Braga, R. Y. Ballester, and J. L. Ferracane, “Factors involved in the development of polymerization shrinkage stress in resincomposites: a systematic review,” Dental Materials, vol. 21, no. 10, pp. 962–970, 2005.
19. U. A.Nayak, P. Sudha, andM. Vidya, “A comparative evaluation of four adhesive tooth coloured restorativematerials.Anin vitro study,” IndianJournalofDental Research, vol. 13,no. 1, pp.49–53,2002.
20. S.KumarGupta, J. Gupta, V. Saraswathi,V.Ballal, andS.RashmiAcharya, “Comparative evaluation of microleakage in Class V cavities using various glass ionomer cements: an in vitro study,” Journal of Interdisciplinary Dentistry, vol. 2, no. 3, pp. 164–169, 2012.