



Review Article

A literature review on selection of dental cement in dentistry

Lalita Sheoran^{1,*}, Monika Sehrawat², Dania Fatima², Neha Nandal³,
Dimple Budhiraja²

¹Dept. of Orthodontics, Kalka Dental College and Hospital, Meerut, Uttar Pradesh, India

²Dept. of Prosthodontics Crown Bridge and Implantology, Kalka Dental College and Hospital, Meerut, Uttar Pradesh, India

³Super Whiye Dental Clinic, Sonipat, Haryana, India



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ABSTRACT

In today's time, the key to achieve the successful restoration is the selection of the proper dental cement. The proper selection of the dental cement ultimately increases the survival rate of the prosthesis or the restoration. From the past few years many new dental cements recently developed and claims better properties as compared to the traditional cements.

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1. Introduction

The prime most function of the dental cement is to fill the space between the restoration or the prosthesis which is either permanent or fixed and between the prepared tooth along with it provide resistance to dislodgement of the prosthesis during in function.^{1,2} The agent which is used as a luting cement is to hold the prosthesis or the restoration in their place for long term period of time and lastly to maintain the seal between the prosthesis and the prepared tooth.¹ Now a days most of the dental cements present with adequate and good adhesive properties with it. Most of the dental cements are acid base solutions or along with them some are resin based cements. A reaction between acid base occurs that results in the formulation of metal salt that results in the formation of cementing matrix.

Dental cements most commonly used in cementation of dental prosthesis like metal ceramics crowns, all metal crowns, metal ceramics bridges, all ceramic crowns or bridges, luting cements are also used in cementation of

orthodontic bands for patients undergoing orthodontic treatment. Dental cements are also used as pulp protecting agents as well as liners and bases in some of the endodontic procedures.

Luting refers to as a mechanical micro mechanism of locking that occurs between the two subjects that are supposed to be joined. Cement is a medium that provides locking along with mechanical micro inter locking between the two different surfaces which are supposed to be joined.³ According to the use of the prosthesis, the dental cements can be broadly classified as temporary cements which are used for cementation of the provisional prosthesis like temporary crowns and temporary bridges after vital tooth preparation to avoid the sensitivity issue, and the second type of cements are permanent cements that are used for the cementation of final restoration or prosthesis. These final or definitive dental cements are further been classified into two sub groups i.e. luting cements and bonding cements. Various types of luting cements used in dentistry are, zinc phosphate cement, zinc poly carboxylate, glass ionomer cement, and resin modified glass ionomer cement. The resin cement is the only type of dental cement which is used as bonding

* Corresponding author.

E-mail address: lalitasheoran2010@gmail.com (L. Sheoran).

cement.

The basic criteria the cement should meet are as follows:

1. It should be biocompatible material, should not harmed the adjacent tooth as well as the surrounding tissue.

The most commonly used cements for the luting the provisional restorations are zinc oxide eugenol. This cement was invented in early 1850s for many years this cement i.e. zinc oxide eugenol is been used for the cementation of provisional restorations.⁴ Zinc oxide eugenol cement provide obtunding effect on the dental pulp, is the prime most advantageous point of the cement some researchers revealed that there was a reduced bonding strength of the resin cement when earlier the provisional restoration is cemented with zinc oxide eugenol cement.^{5,6}

There fore it is advised to use zinc free cement underneath temporary prosthesis if the permanent restoration is supposed to be cemented with resin based cement.

2. Zinc Phosphate Cement

Zinc phosphate cement was introduced in the early 1880's and shows a successful record from more than a century.⁷ Due to its high clinical success, zinc phosphate cement is still using in many countries.⁸ Zinc phosphate cement does not provide adequate chemical bonding with the tooth structure that's why present show moderate value of compressive strength and low tensile strength with high solubility. Zinc phosphate cement shows low values of ph 2 when freshly mixed and after 24 hours It shows the ph value of 5.5. a study revealed that zinc phosphate cement has no irritating effect on the pulp and if there is irritating after cementation done with the zinc phosphate cement is might be due to residual amount of bacterial exudates left over the prepared tooth⁹ in only specific cases when there is less amount of residual dentine left over the prepared tooth, there could be chances of sensitivity during and after cementation of the prosthesis. Literature revealed that zinc phosphate cement is still considered as gold standard cement among all the dental cements.¹⁰

3. Zinc Polycarboxylate Cement

Zinc polycarboxylate cement is also an acid base reaction cement, similar to zinc phosphate cement. Zinc polycarboxylate cement was the first cement which shows good and adequate chemical bonding to the tooth structure. Zinc polycarboxylate cement was introduced in the year 1968. Due to the interaction of free carboxylic group with calcium from the tooth structure, zinc polycarboxylate cement made low grading with the enamel and with the dentine also (1 – 2 mpa)¹¹ zinc polycarboxylate cement present with low compressive and tensile strength.

Literature revealed hat zinc polycarboxylate cement can undergo plastic deformation once set under dynamic load.¹² Zinc polycarboxylate shows good biocompatibility with the dental pulpal tissue.

4. Glass Ionomer Cement

Glass ionomer cements shows classical properties of fluoride release and shows good adherence to the enamel as well as to some extent of the dentine. Its fluoride release properties are from silicate cements and adherence to enamel and to dentine is from polycarboxylate cement, as glass ionomer cement introduced as hybrid cement from silicate and polycarboxylate cement¹³ its high fluoride content is from aluminosilicate which is present in the powder particles of glass ionomer cement when glass ionomer cement mixed with powder and liquid, polyacrylic acid which is present in the liquid reacts with particles outer layer which results in the release of calcium ions, aluminium ions, and fluoride ions. Conventional glass ionomer cement reveals low bonding strength to the tooth structure and moderate amount of compressive strength, along with low tensile strength. The most advantageous point of the glass ionomer cement is its constant release of fluoride ions that act as anti cariogenic property towards the tooth structure. The main dis advantage of the cement is its susceptibility to moisture contamination during the initial setting period of the cement.¹⁴ When the prosthesis is been cemented with glass ionomer cement, its margins should be protected with application of Vaseline, or petroleum jelly.¹⁵

5. Resin Modified Glass Ionomer Cement

Glass ionomer cements are the hybrid or mixture of both conventional glass ionomer cement and the resin cements. This glass ionomer cemen was invented primarily to over come the dis advantage of conventional glass ionomer cement i.e. low solubility and sensitivity to early moisture contamination. This cement were manufactured by replacing poly acrylic acid with methacrylate monomer. When compared to earlier or conventional glass ionomer cement, these resin modified cements shows high compressive as well as high tensile strength and low solubility along with improved adhesion to the tooth structure. A study revealed that, patient shows least sensitivity issue when the prosthesis is cemented with resin modified cements as compared to conventional glass ionomer cements and zinc phosphate cement.¹⁶

6. Resin Cement

Resin cements was introduced in to the dentistry in 1970. Resin cements are based on BisGMA i.e. bisphenol-a-glycidyl methacrylate resin along with others methacrylate from the composite resins. Resin cements shows high compressive strength along with high tensile strength with

low solubility and great adhesion with the tooth structure with good esthetics results. Some of the resin cements are present with ytterbium trifluoride or barium aluminium fluorosilicate filler, which provide the property of anti cariogenic with the resin cements also. Resin cements are present with different curing mechanism like self cured, dual cured and light cured resin material. Self cure resin material and dual cure resin material can be used in type of cementation of prosthesis but light cured resin material restricted to veneers of porcelain and glass ceramic restorations, that allows passage of light while curing.

7. Conclusion

One should have an adequate knowledge of the cements along with the prosthesis to be cemented. And which cement to be used with which restoration is of prime concern for long successful rate of the prosthesis.

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None.

9. Conflict of Interest

The authors declare that there is no conflict of interest.

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Author biography

Lalita Sheoran, PG Student

Monika Sehrawat, 2nd Year Student

Dania Fatima, 3rd Yr Student

Neha Nandal, Private Practitioner

Dimple Budhiraja, 2nd Yr Student

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