Harsukh Educational Charitable Society
International Journal of Community Health and Medical Research
Journal home page:www.ijchmr.com doi: 10.21276/ijchmr

ISSN E: 2457-0117 **ISSN P:** 2581-5040 **Index Copernicus** ICV=62.61

Original ARTICLE

A comparative study of two luting cements for implant restoration- An in-vitro study

Suyashvi Gupta[1], Aman Sharma[1], Priyal Jain[2], Priyanka Sain[2], Sakshi Tikkiwal[2], Rashi Bansal[2]

[1]Senior lecturer, [2]UG students, Department of Prosthodontics, Pacific Dental College and Research Center, Rajasthan

***ABSTRACT*:**
Background: One of the most argued topic in the field of fixed prosthodontics regarding support of fixed partial (FPDs) is the connection between implant and natural tooth. The present study was conducted to compare two luting cements for implant restoration. **Materials & Methods:** The present in vitro study was conducted in the department of Prosthodontics. Two different implant cements such as Implant Cement (ILC) (a methacrylic-based urethane resin cement and Premier® Implant Cement TM (PIC) with Temp-Bond™ NE a temporary luting cement (TB) was selected. **Results:** In group I, mean tensile bond strength with ILC cement was 0.231 MPa, for PIC was 0.735 MPa and for TB was 0.682 MPa. The difference was significant (P< 0.05). In group II, mean tensile bond strength with ILC cement was 0.341 MPa, for PIC was 0.726 MPa and for TB was 0.690 MPa. The difference was significant (P< 0.05). **Conclusion:** Authors found that non-eugenol temporary resin cement may be considered as a better choice for cementation of implant prosthesis.
Key words: Luting, Non-eugenol temporary resin, Tensile bond strength

Corresponding author: Dr. Aman Sharma, Senior lecturer, Department of Prosthodontics, Pacific Dental College and Research Center, Rajasthan

This article may be cited as: Gupta S, Sharma A, Jain P, Sain P, Tikiwal S, Bansal R. A comparative study of two luting cements for implant restoration- An in-vitro study. HECS Int J Comm Health Med Res 2020; 6(1):27- 29.

INTRODUCTION

One of the most argued topic in the field of fixed prosthodontics regarding support of fixed partial (FPDs) is the connection between implant and natural tooth. Splinting the implant to the natural tooth or another implant was an obligation to prevent rotation of the restoration and its associated complications.[1]

Implant supported prosthesis may range from a single tooth replacement to multiple replacements and they are predominantly fixed restorations. The two modes of retention of the suprastructure to the implant abutment component are by means of a prosthetic screw or cement retention. The preferred mode of retention is usually an informed choice made by the clinician based on the need of the clinical situation or the desired outcome.[2]

In recent years, a number of dental cements have been developed, claiming superiority over the traditional materials. The primary function of dental cement is to fill the space between the restoration and the implant abutment and at the same time resisting the dislodgement of the restoration. Selection of suitable dental cement exclusively for the cementation of implant supported prosthesis has become increasingly complicated because of the abundance of availability in the market.[3]

Various authors have shown that the choice of cement material, amount of cement space or internal relief, occlusal forces, and type of luting agent can also affect the retentiveness of final restorations. The ideal cement should be strong enough to retain the crown indefinitely, yet weak enough to allow the clinician to retrieve it if necessary.[4] The present study was conducted to compare two luting cements for implant restoration.

MATERIALS & METHODS

The present in vitro study was conducted in the department of Prosthodontics. Ethical approval from institutional ethical committee was obtained. Two different implant cements such as Implant Cement (ILC) (a methacrylic-based urethane resin cement and Premier® Implant Cement TM (PIC) with Temp-

Bond™ NE a temporary luting cement (TB) was selected. A total of six implant abutment complex were made. Impressions of the implant abutment complex were made using elastomeric impression material and polyvinyl siloxane impression material. Onto to this, the abutment replicas were inserted and type IV die stone was poured. A total of 60 metal copings were designed and fabricated (30 for 4 mm and 30 for 5.5 mm abutment height) using CADCAM. The copings were divided into two control groups and two test groups. Each group had 15 copings and were assigned to two different abutment heights of 4 mm and 5.5 mm for two different luting cements. Group I was for Temp Bond 4 mm and group II was for 5.5 mm. Test Group PIC for Premier®. Implant Cement™ and test Group ILC for (Implalute ® Implant Cement). Both the test groups were subdivided as A and B for two different abutment height. The copings were cemented to the abutment at room temperature using the respective cements assigned to each group as per the manufacturer's recommendations. After the aging process, the dislodging forces of the copings were measured using a universal testing machine. Results were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I shows that in group I, mean tensile bond strength with ILC cement was 0.231 MPa, for PIC was 0.735 MPa and for TB was 0.682 MPa. The difference was significant (P< 0.05). Table II shows that in group II, mean tensile bond strength with ILC cement was 0.341 MPa, for PIC was 0.726 MPa and for TB was 0.690 MPa. The difference was significant (P< 0.05). Table III shows inter- group comparison of tensile mean strength which was significant (P< 0.05).

Table I Mean tensile strength of cement in group I

Cement	Mean (MPa)	P value
ILC	0.231	0.021
PIC	0.735	
TB	0.682	

DISCUSSION

Due to inherent differences between tooth and implant, particularly in their biomechanics, supporting mechanism, survival rate as well as a higher risk of technical complications in tooth implant supported fixed prosthesis, this procedure has been a topic of argument and controversies. Over the last few decades, implant supported prosthesis have become the most sought-after treatment option for replacement of missing teeth.[5] A survival rate of 91.5% has been reported for dental implants if placed under favourable conditions in a healthy patient.

Implant prosthesis can be either screw retained or cement retained with the latter being more popular. Though screw retained restorations demonstrate easy retrievability and better fit at the abutment margin, screw loosening has been observed in 50% of the restorations during the first year of function.[6] They are also more expensive to fabricate due to the additional components and laboratory costs. Cement retained prosthesis remains a popular alternative as it is easy to use, provides better aesthetics, control of occlusion and a passive fit of the prosthesis. However, a major drawback of cement retained prosthesis is the extrusion of excess cement into the peri implant sulcus.[7] The present study was conducted to compare two luting cements for implant restoration.

Graph I Mean tensile strength of cement in group I

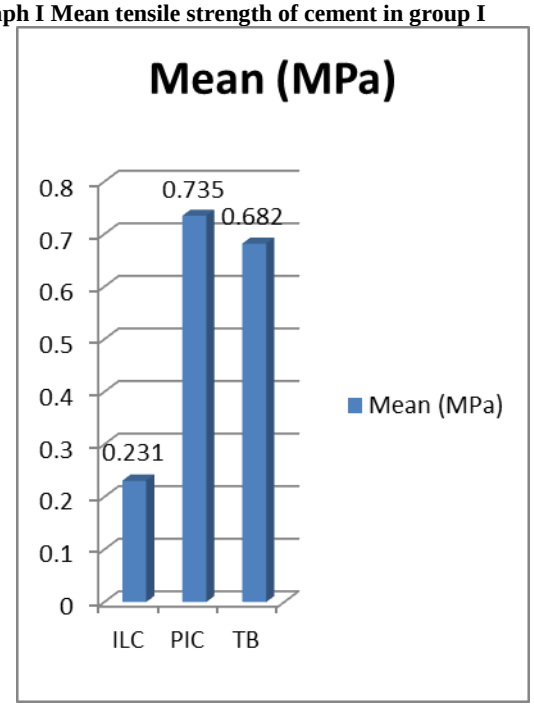


Table II Mean tensile strength of cement in group II

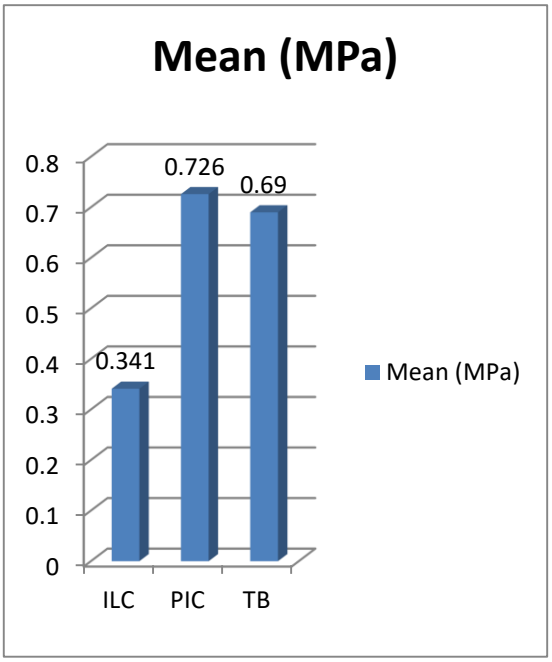
Cement	Mean (MPa)	P value
ILC	0.341	0.051
PIC	0.726	
TB	0.690	

Table III Comparison between both groups

Cement	Group I (MPa)	Group II (MPa)	P value
ILC	0.231	0.341	0.05
PIC	0.735	0.726	
TB	0.682	0.690	

In present study, mean tensile bond strength with ILC cement was 0.231 MPa, for PIC was 0.735 MPa and for TB was 0.682 MPa. Sarfaraz et al[8] conducted a study in which a master stainless steel mold was used to mount snappy abutment-implant analog complex in acrylic resin. A total of six snappy abutments (Nobel Biocare®) of 4 mm and 5.5 mm height with their analogs were used. A total of 66 ceramill® Sintron metal copings fabricated using computer-aided design/computer-aided manufacturing system and divided into six groups according to the height (three 4 mm abutment and three 5.5 mm abutment). Non-eugenol temporary resin cement had the highest tensile strength followed by non-eugenol zinc oxide cement and the least retentive strength was observed in resin-based acrylic urethane cement.

Graph II Mean tensile strength of cement in group II



The mean tensile bond strength with ILC cement was 0.341 MPa, for PIC was 0.726 MPa and for TB was 0.690 MPa. Gultekin et al[9] compared seven provisional cements and found that there was a significant difference in retention between Premier® and Temp-Bond™ NE cements. It has been established that zinc oxide eugenol (ZOE) cement (Temp-Bond™) has high solubility in direct contact with water and also requires sufficient time for a complete setting reaction to maximize its retention. However, the same has not been reported for non-eugenol zinc oxide resin cement and has been used when longer cementation periods were required. Further research regarding the precise mechanism responsible for this observation with non-eugenol zinc oxide resin cement is required. Resin-based acrylic urethane cement (ILC) had the lowest retentive strength compared to other cements used in the study. There was significant difference between resin-based acrylic urethane cement (ILC) and the other two cements used in this study. Manufacturer claims that it has got significantly lower displacement resistance than conventional cements, and it can be used as semi-permanent cement for customized abutment or abutment with reduced adhesion surface; particularly small abutments.[10]

CONCLUSION

Authors found that non-eugenol temporary resin cement may be considered as a better choice for cementation of implant prosthesis.

REFERENCES

1. Hill EE. Dental cements for definitive luting: A review and practical clinical considerations. Dental Clinics of North America. 2007; 51: 643-658.
2. Hao Yu et al. Proper Selection of Contemporary Dental Cements .OHDM 2014; 13 17.
3. Manawar A, Dhanasekar B, Aparna IN, Naim H. Factors influencing success of cement versus screw-retained implant restorations: A clinical review. J Osseointegration 2012;4:43-7.
4. Chee W, Jivraj S. Screw versus cemented implant supported restorations. Br Dent J 2006;201:501-7.
5. Michalakis KX, Hirayama H, Garefis PD. Cement-retained versus screw-retained implant restorations: A critical review. Int J Oral Maxillofac Implants 2003;18:719-28.
6. Hebel KS, Gajjar RC. Cement-retained versus screw-retained implant restorations: Achieving optimal occlusion and esthetics in implant dentistry. J Prosthet Dent 1997;77:28-35.
7. Tarica DY, Alvarado VM, Truong ST. Survey of United States dental schools on cementation protocols for implant crown restorations. J Prosthet Dent 2010;103:68-79.
8. Gultekin P, Gultekin BA, Aydin M, Yalcin S. Cement selection for implant-supported crowns fabricated with different luting space settings. J Prosthodont 2013;22:112-9.
9. Sarfaraz H, Hassan A, Shenoy KK, Shetty M. An in vitro study to compare the influence of newer luting cements on retention of cement-retained implant-supported prosthesis. J Indian Prosthodont Soc 2019;19:166-72.
10. Covey DA, Kent DK, St Germain HA Jr., Koka S. Effects of abutment size and luting cement type on the uniaxial retention force of implant-supported crowns. J Prosthet Dent 2000;83:344-8.