

## KNOWLEDGE AND PRACTICE OF VARIOUS DENTAL CEMENTS AMONG THE DENTAL PRACTITIONERS IN RIYADH CITY: A SURVEY BASED STUDY

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### ABSTRACT:

**Aims:** To assess the knowledge and practice of dental practitioners' use of dental cements.

**Materials & Methods:** A questionnaire was constructed using Google forms and sent to dental practitioners using social media and emails. The target sample size was 400.

**Results:** There was a statistically significant difference between male female, work experience and patient exposure.

**Conclusion:** The level of knowledge of dental practitioners was found to be satisfactory regarding dental cements.

**Clinical Significance:** Results of this study may be helpful for some newly graduated dentists in order to choose the best cements for dental restorations.

**Keywords:** Cross-sectional study, dental cements, knowledge.



### INTRODUCTION:

In earlier times, about fifty years ago, dentists usually did not have to undergo so much of difficulties in choosing the cement since they only had to deal to zinc phosphate cement and gold crowns as the indirect material for restoration and luting cements. But over the intervening period things have become more and more complicated. Over the period of time the manufacturers have started to provide with such materials which are more metal free, restorative, natural looking and esthetic in looks (Zandparsa, 2014). Zinc phosphate has been long used in the field of dentistry but subsequently it has served as being a difficult protocol for mixing, low strength, it has metal based restoration, has quite high solubility and this why it has now become a very poor choice for the dentists all over the world. To satisfy

the growing needs in the dentistry, with the help of modern technology the higher demands of restoration have been developed. This is exactly why today dentists have such myriad of cements which are discordant with each other. The article here examines how the dentists use the right kind of cement is the procedures (Anna, 2015).

Although each kind of cement has its own advantages in the procedures being carried out but it is essential to understand that which cement will work best in which condition. It is necessary to understand that which substrate will bond with which material in the right manner. The cements which turn out the best should be able to excel superlatively in adhesion, should be long term and should have the right mechanical

properties. The cement should have biocompatibility and have good esthetic (Morita, 2016).

There are basically two factors which greatly affect the restoration and the long term success of the dental procedures; choosing the right kind of dental cement and then using it in the right manner. If a trouble free procedure is required then it is essential that the cement which is being used must observe the basic mechanism, handling and the biological requirements of the cement. The innovations which have taken place over the period of time include the self-adhesive resin cement; this provides an ease when dealing with the glass ionomer and glass which is modified. They provide dual curing and esthetic which are improved (Adar, 2017).

The cements which are used can have certain components which can affect the performance of the procedure. There are usually three kinds of components which are used in cements in dentistry. First is the resin based components for example the Temrex, second is the zinc oxide for example the Temp-Bond and last is the zinc oxide non-eugenol for example the Zone. All the components which are present in the cement have different properties and they react differently with the other chemicals therefore it is essential for the dentists to understand which cement they desire to use. There have been several studies which show that eugenol do not harshly affect the

properties of the permanent cement (Yucel, 2015).

2. Aims of the study:

- To assess how well the dentists understand which cement is supposed to be used.
- Which cement is supposed to be used where?
- To understand the demand from dentists in order to achieve esthetics and how advances have taken place restoration and fabrication.

### **MATERIALS AND METHODS:**

The survey which is being used in the study here consists of a questionnaire which is close ended in nature. The questionnaire contains several kinds of questions which are related to the topic. The questions are associated with how the dentists analyze that what kind of cement is supposed to be used in which case. The study also inquires that which cement works best under different circumstances for longevity. The sample size which will be used in the survey will be numbered to 400 and will be distributed among different dentists around the city to achieve a diversified approach. The data which will be gathered will be analyzed with the assistance of SPSS version 21.

Measuring Instrument:

The survey used in this study consisted of questions such as gender, work experience, daily patient exposure; with these 3 being our variables that we used

to compare each other. Rest of the survey included the preference of cement to be used, cement having greater strength, oldest cement, multi-dimensional cements (based on their usage), most cost effective cement, cements with highest bonding strength with tooth and finally the ones causing post operative tooth sensitivity.

For all the above mentioned questions, we used zinc phosphate, polycarboxylate, glass ionomers and resins as options, where as a fifth option of 'others' was also added. The data that we expected to achieve was categorical and we aimed to compare among the tree groups, therefore we chose chi-square test to get the value of significance, which was kept under 0.05. Survey was constructed using Google forms and was sent to the potential participants via email and social media.

4. Time line & schedule:

Preparation time: 1 month

Data collection: 3 months

Write up: 1 month

Research budget: Private.

**RESULTS:**

We sent the survey to over 400 dentists in Riyadh city. However, the response rate was around 81% as 323 participants agreed to take part in this study and sent us the completed questionnaire.

The results which were gathered with the assistance of the questionnaire ensued questions where it was accounted that according to a major number of dentists 66.9% of the times the cement used is that of Resin. On the other hand the oldest cement which has been used is that of Zinc Phosphate with a percentage of 50.2%. Also, 50.2% resulted in answering Resin cement as the cement which is used more often in all kinds of restorations. 10.8% of the dentists agreed that Glass Ionomer is more cost effective than any other cement used. According to 27.9% of the candidates Zinc Phosphate does not bond well with the teeth which are worked upon. 55.7% of the result analyzed that Zinc Phosphate causes more sensitivity compared to other cements used.

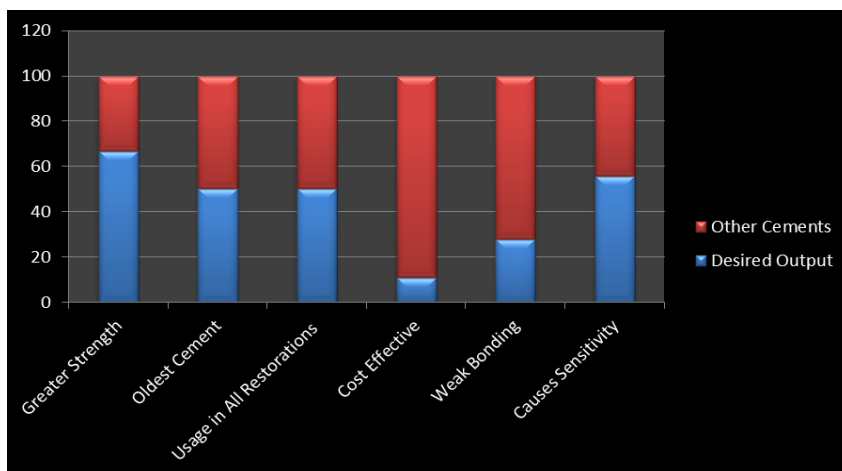


Figure 1: Correct responses (desired output) vs. the incorrect (other cements) recorded from the participants.

**5.1. Gender Comparison**

In accordance to the gender comparisons made, 44.6% of the females answered the questions related to the survey and the rest of the 55.4% of the questions were answered by male candidates. When questioned about the best kind of cement which is used in the field of dentistry, about 35% of the women and 34% of the men stated that Resin is more often used. More over 63% of the women and 55% of the men answered that Resin tends to be more strengthening when compared to all the other cements used. When questioned about the oldest cement being used in this field, about 33% of women and 55% of the men answered Zinc Phosphate being the oldest cement. Whereas 37%

of the women and 52% of the men answered Resin as being one of those cement which can nearly be used in all kinds of restorations. Next, 9% of the women and about 20% of the men answered that they believed that Glass Ionomer was one of the most cost effective cement which can be used. When questioned about which cement does not bond well during the restoration, about 42% of the women and 9% of the men answered that Zinc Phosphate does not gel in well as compared to the other cements which are used. More over Zinc Phosphate causes more sensitivity according to the 62.5% of the women and 50% of men thought the same thing (Table 1).

Variables	Percentage				P- Value
	Zinc Phosphate	Poly Carboxylate	Glass Ionomer	Resin	
Which Cement do you Use More often	Male 34% Female 66%	Male 57% Female 43%	Male 64% Female 36%	Male 45% Female 55%	0.000
Which cement has Greater Strength	Male 52% Female 48%	Male 59% Female 41%	Male 70% Female 30%	Male 52% Female 48%	0.002
Which is the Oldest Cement	Male 67% Female 33%	Male 23% Female 78%	Male 73% Female 27%	Male 69% Female 31%	0.001
Which cement can be used in Used All Restorations(fillings)	Male 47% Female 53%	Male 80% Female 20%	Male 41% Female 59%	Male 64% Female 36%	0.000
Which cement is Cost Effective	Male 52% Female 48%	Male 36% Female 64%	Male 73% Female 27%	Male 65% Female 35%	0.000
Which cement Does Not Bond with the tooth	Male 21% Female 79%	Male 70% Female 30%	Male 46% Female 54%	Male 52% Female 48%	0.000
Which cement Causes Sensitivity	Male 50% Female 50%	Male 75% Female 25%	Male 49% Female 51%	Male 50% Female 50%	0.001
Do you think you Require More Knowledge on dental cements?	YES Male 11% Female 55%	MAY BE Male 76% Female 38%	NO Male 13% Female 7%		0.000

Table 1: Gender comparison of the questions included in survey

**5.2. Work Experience Comparison**

Another comparison was carried out on the basis of the work experience of the people who were involved in the survey that was carried out. When questioned about the best kind of cement which is used in the field of dentistry, about 40% of the under five years' experience, 32% of five to ten years' experience and 27% of more than ten years' experience stated that Resin is more often used. More over 71% of the under five years' experience, 57% of five to ten years' experience and 41% of more than ten years' experience answered that Resin tends to be more strengthening when compared to all the other cements used. When questioned about the oldest cement being used in this field, about 50% of the under five years' experience, 34% of five to ten years' experience and 44% of more than ten years' experience answered Zinc Phosphate being the oldest cement. Whereas 58% of the under five years' experience, 34% of five to ten years' experience and 31% of

more than ten years' experience answered Resin as being one of those cement which can nearly be used in all kinds of restorations. Next, 15% of the under five years' experience, 36% of five to ten years' experience and 4% of more than ten years' experience answered that they believed that Glass Ionomer was one of the most cost effective cement which can be used. When questioned about which cement does not bond well during the restoration, about 2% of the under five years' experience, 9% of five to ten years' experience and 23% of more than ten years' experience answered that Zinc Phosphate does not gel in well as compared to the other cements which are used. More over Zinc Phosphate causes more sensitivity according to the 0% of the under five years' experience, 0% of five to ten years' experience and 33% of more than ten years' experience thought the same thing (Table 2).

Variables	Percentage					P- Value
	Zinc Phosphate	Poly Carboxyle	Glass Ionomer	Resin	Others	
Which Cement do you Use More often	Under 5 years 25% 5 to 10 years 6% More than 10 years 6%	Under 5 years 6% 5 to 10 years 6% More than 10 years 9%	Under 5 years 30% 5 to 10 years 57% More than 10 years 57%	Under 5 years 40% 5 to 10 years 32% More than 10 years 27%		0.000
Which cement has Greater Strength	Under 5 years 17% 5 to 10 years 32% More than 10 years 31%	Under 5 years 2% 5 to 10 years 9% More than 10 years 9%	Under 5 years 10% 5 to 10 years 2% More than 10 years 2%	Under 5 years 71% 5 to 10 years 57% More than 10 years 57%		0.000

	years 15%	10 years 19%	10 years 25%	10 years 41%		
Which is the Oldest Cement	Under 5 years 50% 5 to 10 years 34% More than 10 years 44%	Under 5 years 19% 5 to 10 years 30% More than 10 years 31%	Under 5 years 14% 5 to 10 years 34% More than 10 years 5%	Under 5 years 7% 5 to 10 years 2% More than 10 years 4%	Under 5 years 10% 5 to 10 years 0% More than 10 years 17%	0.000
Which cement can be used in All Restorations(fillings)	Under 5 years 17% 5 to 10 years 0% More than 10 years 4%	Under 5 years 5% 5 to 10 years 34% More than 10 years 4%	Under 5 years 20% 5 to 10 years 32% More than 10 years 61%	Under 5 years 58% 5 to 10 years 34% More than 10 years 31%		0.000
Which cement is Cost Effective	Under 5 years 22% 5 to 10 years 32% More than 10 years 47%	Under 5 years 10% 5 to 10 years 32% More than 10 years 0%	Under 5 years 15% 5 to 10 years 36% More than 10 years 4%	Under 5 years 52% 5 to 10 years 0% More than 10 years 49%		0.000
Which cement Does Not Bond with the tooth	Under 5 years 0% 5 to 10 years 57% More than 10 years 43%	Under 5 years 93% 5 to 10 years 32% More than 10 years 31%	Under 5 years 5% 5 to 10 years 2% More than 10 years 4%	Under 5 years 2% 5 to 10 years 9% More than 10 years 23%		0.000
Which cement Causes Sensitivity	Under 5 years 78% 5 to 10 years 68% More than 10 years 17%	Under 5 years 11% 5 to 10 years 0% More than 10 years 50%	Under 5 years 11% 5 to 10 years 32% More than 10 years 0%	Under 5 years 0% 5 to 10 years 0% More than 10 years 33%		0.000
Do you think you Require More Knowledge on dental cements?	Yes 41% Maybe 4% No 43%	Yes 43% Maybe 94% No 55%	Yes 17% Maybe 2% No 3%			0.000

**Table 2: Work experience comparison among the participants on the basis of questions asked in the survey**

**5.3. Patients Exposure Comparison**

Lastly, the comparison was carried out on the basis of how many patients were treated by the doctors per day. The categories were made in regard to the group of one to five patients, six to ten patients and lastly more than ten patients. When questioned about the best kind of cement which is used in the field of dentistry, about 54% who deal with one to five patients, 28% who deal with six to ten patients and 0% who deal with more than ten patients stated that Resin is more often used. More over 73% who deal with one to five patients, 57% who deal with six to ten patients and 0% who deal with more than ten patients answered that Resin tends to be more strengthening when compared to all the other cements used. When questioned about the oldest cement being used in this field, about 92% who deal with one to five patients, 30% who deal with six to ten patients and 0% who deal with more than ten patients answered Zinc Phosphate being the oldest cement.

Whereas 77% who deal with one to five patients, 36% who deal with six to ten patients and 0% who deal with more than ten patients of the men answered Resin as being one of those cement which can nearly be used in all kinds of restorations. Next, 4% who deal with one to five patients, 22% who deal with six to ten patients and 0% who deal with more than ten patients answered that they believed that Glass Ionomer was one of the most cost effective cement which can be used. When questioned about which cement does not bond well during the restoration, about 33% who deal with one to five patients, 21% who deal with six to ten patients and 0% who deal with more than ten patients answered that Zinc Phosphate does not gel in well as compared to the other cements which are used. More over Zinc Phosphate causes more sensitivity according to the 80% who deal with one to five patients, 50% who deal with six to ten patients and 0% who deal with more than ten patients thought the same thing (Table 3).

Variables	Percentage					P- Value
	Zinc Phosphate	Poly Carboxyle	Glass Ionomer	Resin	Others	
Which Cement do you Use More often	1 to 5 patients 4% 5 to 10 patients 20% More than 10 patients 17%	1 to 5 patients 6% 5 to 10 patients 7% More than 10 patients 17%	1 to 5 patients 36% 5 to 10 patients 45% More than 10 patients 67%	1 to 5 patients 54% 5 to 10 patients 28% More than 10 patients 0%		0.000
Which cement has Greater Strength	1 to 5 patients 0% 5 to 10 patients 0%	1 to 5 patients 22% 5 to 10 patients 0%	1 to 5 patients 4% 5 to 10 patients 0%	1 to 5 patients 73% 5 to 10 patients 0%		0.000

	patients 28% More than 10 patients 0%	patients 4% More than 10 patients 0%	5 to 10 patients 10% More than 10 patients 100%	5 to 10 patients 57% More than 10 patients 0%		
Which is the Oldest Cement	1 to 5 patients 92% 5 to 10 patients 30% More than 10 patients 0%	1 to 5 patients 0% 5 to 10 patients 37% More than 10 patients 0%	1 to 5 patients 4% 5 to 10 patients 19% More than 10 patients 0%	1 to 5 patients 3% 5 to 10 patients 6% More than 10 patients 0%	1 to 5 patients 0% 5 to 10 patients 0% More than 10 patients 100%	0.000
Which cement can be used in Used All Restorations(fillings)	1 to 5 patients 4% 5 to 10 patients 13% More than 10 patients 0%	1 to 5 patients 3% 5 to 10 patients 12% More than 10 patients 6%	1 to 5 patients 16% 5 to 10 patients 39% More than 10 patients 94%	1 to 5 patients 77% 5 to 10 patients 36% More than 10 patients 0%		0.000
Which cement is Cost Effective	1 to 5 patients 19% 5 to 10 patients 32% More than 10 patients 100%	1 to 5 patients 0% 5 to 10 patients 15% More than 10 patients 0%	1 to 5 patients 4% 5 to 10 patients 22% More than 10 patients 0%	1 to 5 patients 79% 5 to 10 patients 31% More than 10 patients 0%		0.000
Which cement Does Not Bond with the tooth	1 to 5 patients 33% 5 to 10 patients 21% More than 10 patients 0%	1 to 5 patients 38% 5 to 10 patients 69% More than 10 patients 100%	1 to 5 patients 4% 5 to 10 patients 4% More than 10 patients 0%	1 to 5 patients 24% 5 to 10 patients 5% More than 10 patients 0%		0.000
Which cement Causes Sensitivity	1 to 5 patients 80% 5 to 10 patients 0%	1 to 5 patients 0% 5 to 10 patients 0%	1 to 5 patients 0%	1 to 5 patients 20%		0.000



	patients 50% More than 10 patients 0%	patients 25% More than 10 patients 100%	5 to 10 patients 16% More than 10 patients 0%	5 to 10 patients 8% More than 10 patients 0%		
Do you think you Require More Knowledge on dental cements?	Yes 8% Maybe 41% No 100%	Yes 89% Maybe 46% No 0%	Yes 3% Maybe 13% No 0%			0.000

Table 3: Daily patient exposure comparison among the study participants

### DISCUSSION:

The results which were obtained here in the survey carried out here stated that Resin serves as the best cement that can be used by the dentists in making sure that the aesthetics are ensured well and the procedure is secured. But according to Dr. Abrams, he stated that it is essential for the doctors to understand that they should at least use a combination of two different cements in order to make sure that the prosthetic which is carried out should be anchored firmly. He specified that this could be done easily if the dentists keenly study the objective behind the prosthetic. This way the outcome will be more reliable (Abrams, 2009).

In another paper which was published by Mizrahi, he made specifications that the preparations which were carried out during the crowning of the tooth which are usually beyond the margins of CEJ the extra places should be filled with the right kind of cement. According to him the right kind of cement is the Resin. He chose this because according to him Resin shows lower strengths and they also have a higher glass base. According

to him choosing the right kind of cement cannot be compromised at all (Mizrahi, 2008). Lastly, in a research which was carried out by Jeffery, he stated in accordance with Dr. Marvin that the best kind of cement which can be used in the prosthetics was to use Resin as the right cement. He identified that there are several advantages which come along using Resin as the cement in the process. He mentioned that it has a low solubility and more over its compressive strength is quite high. The Resin used today is of high quality as the ones which were used in the earlier times since they did not have the correct amount of the filler particles. Over the period the chemists have increased the quality of the Resin cement and now they are a perfect combination in the armamentarium (Jaffery, 2017).

It can be noted from the results that all the comparisons made revealed a significant difference among all the groups.

### CONCLUSION:

Overall the knowledge of dental practitioners was satisfactory. However,

this level of knowledge was affected by patient exposure and work experience of

the participants.

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