

## Awareness On White Metal Ceramic Crowns - A Survey

Research Article

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## Abstract

The metal ceramic crown was the most preferred form of tooth replacement. Hence they were at peak of their usage even if there are many disadvantages. After the introduction of zirconia crowns, the popularity of the metal ceramic crowns were lost. Hence this research is to study about the tooth coloured metal ceramic crown. This has reduced disadvantages. In order to regain its popularity, this research is to show that metal ceramic crowns are better than any other form of crowns after the modifications. A questionnaire of 15 questions were taken and they are circulated among the dental students and dental practitioners of good standardisation. They are requested to answer, data was collected and analysed by SPSS software. The graphs are also drawn using SPSS software. The obtained results were like 37% of the people prefer all ceramic crowns for the tooth replacement. 89% of the people are aware of metal ceramic crowns. 53% of the people are aware of metal used for coping. We can conclude from the survey that people are aware of metal ceramic crowns. They know the advantages and disadvantages of metal ceramic crowns.

**Keywords:** White Metal; Metal Ceramic Crowns; Silicon Paste And Survey.

## Introduction

Crown or dental cap is the type of dental restorations that encircle a tooth or dental implant. They may be needed in the situation of large cavity threats, recommended for the health of the tooth [27]. Another example for this can be given as 'porcelain fused to metal crowns'. They are metal infused porcelain crowns. The metal used for the coping has a widespread range depending on the patient [17, 3]. The metal alloy which can withstand high temperature [2]. The metal should have a high melting point preventing the surface of the crown from melting.

The metal ceramic crown has the advantage like they are strong and durable [3]. The underlying metal makes the crown stronger and more stable. The metal helps in bonding to the tooth. They

are aesthetics by having a little dark shade. There are a variety of shades available for the selection [14]. The metal ceramic crown can be placed to make a tooth [16]. Highly strong on the tilting and tipping forces [10]. They are placed by removal of the tooth structure and placing the crown above it. This is used to place the tooth implant too. They can be placed for cosmetic modification [14]. Placing these crowns protects the tooth from tooth decay.

Even if there are many advantages, on the contrary there are many disadvantages too. The disadvantages include the structural weakening in the ceramic crown, prone to chipping of the ceramic or may cause fracture of the tooth [14, 15]. The chipping of the ceramic is the most form of disadvantage faced by the patients. They give a dull appearance too [25]. This is due to the presence of dark metal. After a short term usage, some tooth can have a

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dark line [24]. This is due to metal reaction on the fusion with the ceramic. Hence in some cases, they are non-aesthetic after a few days of tooth replacement [29]. Hence they are not recommended for the anterior tooth replacement. They also needed a monthly varnish to retain its colour. And those varnishes are not effective, after the application also there is dullness [26]. The aim of this study is to create awareness on the metal ceramic and to find a new form of metal ceramic crown with reduced disadvantages.

### Materials And Methods

**Research Approach and Design:** Cross section study taken using social media. A questionnaire of 15 questions were added in google forms and they were circulated among the people. They are requested to answer all the questions.

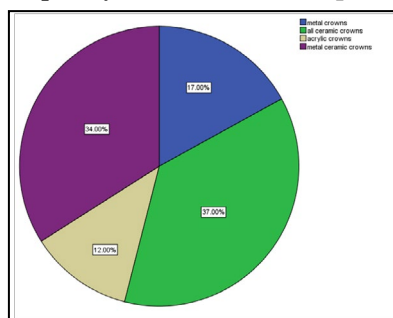
**Population, sample, sampling:** The sample size of 100 members, that too students of reputed colleges and dental practitioners of high standard were asked to answer. The data was transferred to SPSS. The data was then analysed by SPSS, statistics were made. The graphs were also drawn using SPSS. The graphs

were later analysed.

### Results and Discussion

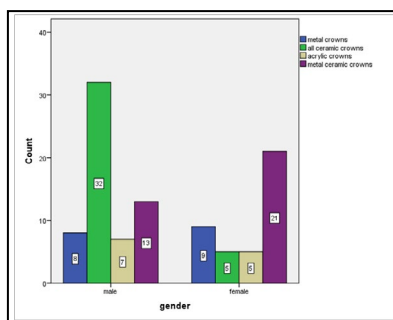
The results show that the majority of the people who attended the survey are aware of metal ceramic crowns. 37% of the people prefer all ceramic crowns for the tooth replacement [29]. The only disadvantage in all ceramic crowns is removal of tooth structure which is about 2mm (fig1,2) [24, 7]. 34% of the people prefer metal ceramic crowns for tooth replacement. 17% of the people prefer metal ceramic for the tooth replacement and the remaining 12% of the people prefer acrylic crowns which don't have a long period usage. 89% of the people are aware of metal ceramic crowns [16]. 11% of the people are unaware of the metal ceramic crowns (fig 3). 53% of the people are aware that the metal used for coping is stainless steel [19]. 47% of the people are unaware of the metal used for coping (fig 4,5). 57% of the people are aware that the metal coping is attached to the ceramic by a silicon paste [5]. 43% of the people are unaware of the fixative used for the attachment of metal coping to ceramic (fig 6).

Figure 1. Pie chart depicting the frequency distribution of the preferred crown for tooth replacement.



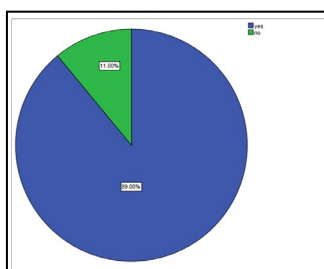
37% of the study population responded all ceramic crowns, 34% has responded metal ceramic crowns, 12% responded acrylic crowns and 17% responded metal crowns.

Figure 2. Bar graph depicting the association of gender and awareness on preference of crown selection for tooth replacement.



X axis represents the gender and Y axis represents the awareness on selection of crown for tooth replacement. Association between gender and awareness on selection of crown for tooth replacement was done using Chi square test (P value = 0.02, which is statistically significant). The most preferable crown form is all ceramic of which 32% were males and 5% were females. Hence men are more aware of selection of crowns for tooth replacement than women.

Figure 3. Pie chart depicting the frequency distribution of the people who are aware of metal ceramic crowns.



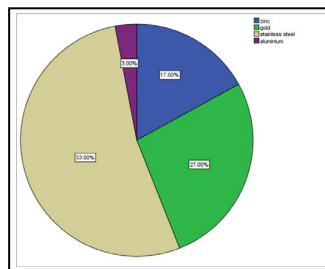
89% of the study population responded for yes and 11 % responded for no.

51% of the people opted that the removal of the tooth structure has a greater impact on the disadvantages, where as other disadvantages like separation of ceramic, non aestheticity and monthly varnishes are likely to be okay (fig 7) [18, 30]. 51% of the people consider that the metal ceramic crowns are better than porcelain crowns (fig 8,9). 76% of the people are aware of white metal. Whereas 24% of the people are unaware of the white metal (fig 10) [4]. 47% of the people are okay with the disadvantage of removal of tooth structure (fig 11) [13]. They consider that the chipping of tooth structure has the greatest impact on disadvantages [9, 13]. The main disadvantage of this is removal of the ceramic, this leads to failure of the tooth. Theories are non aesthetic

because of the dullness [4, 28]. This can be more intense when the replaced tooth lasts more than a year. The varnishes fail to retain the colour of the tooth [23]. After a long duration of placing the tooth 7% of the people are aware that the metal can change its colour. 29% of the people are unaware of it (fig 12). The metal can change its colour by chemical reaction, this can be accessed by sunlight too [6]. But an intense colour change can be brought by the electroplating method. Electroplating is the transfer of ions which gives the colour of the absorbed ions [8, 22]. This should be done under a vacuum condition.

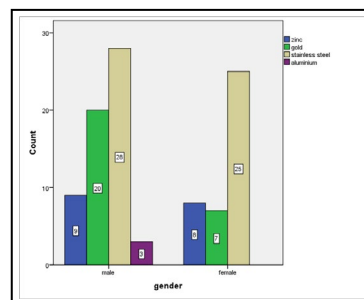
The listed disadvantages have their own impact on the tooth. But

**Figure 4. Pie chart depicting the frequency distribution of the metal used for coping.**



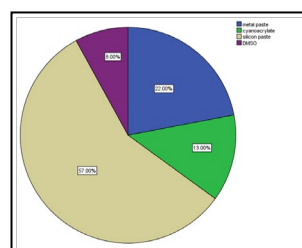
53% of the study population responded for stainless steel, 27% responded for gold, 17% responded for zinc and 3% responded for aluminium.

**Figure 5. Bar graph depicting the association between gender and awareness on the metal used for coping.**



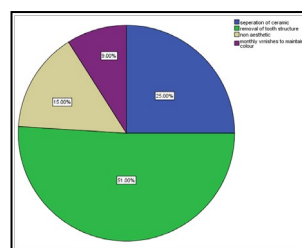
X axis represents the gender and the Y axis represents the awareness on the metal used for coping. Association between awareness on the metal used for coping and gender was done using Chi square test (P value = 0.04, which is statistically significant). Stainless steel is the metal used for coping of which 28% were males and 25% were females. Hence men are more aware of metal used for coping than women.

**Figure 6. Pie chart depicting the frequency distribution of the people who are aware of the substance used for fixation of coping metal to the ceramic crowns.**



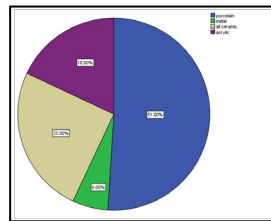
57% of the study population responded for silicon paste, 22% responded for metal paste, 13% responded for cyanoacrylate and 9% responded for DMSO.

**Figure 7. Pie chart depicting the frequency distribution of the greatest disadvantage in metal ceramic crowns.**



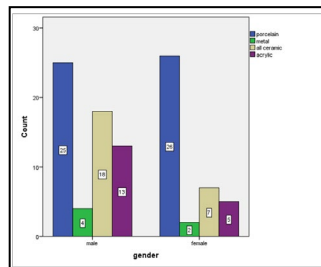
51% of the study population responded for removal of tooth structure, 25% responded for separation of the ceramic, 15% responded for non aesthetic and 9% responded for monthly varnishes.

**Figure 8. Pie chart depicting the frequency distribution of the crowns which are alternatives to metal ceramic crowns.**



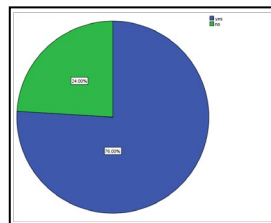
51% of the study population responded for porcelain, 18% responded for acrylic, 25% responded for all ceramic and 6% responded for metal.

**Figure 9. Bar graph depicting the association between gender and awareness on metal ceramic crown.**



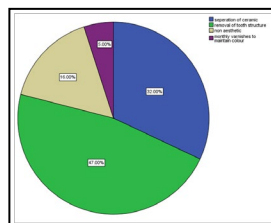
X axis represents the gender and the Y axis represents the awareness on the metal ceramic crown. Association between awareness on metal ceramic crown and gender was done using Chi square test ( P value = 0.960, which is statistically insignificant).

**Figure 10. Pie chart depicting the frequency distribution of the people who have seen white coloured metal.**



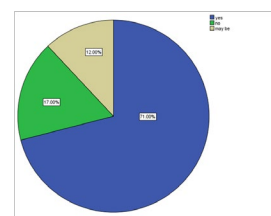
76% of the study population responded for yes and 24% responded for no.

**Figure 11. Pie chart depicting the frequency distribution on awareness of disadvantage of metal ceramic crowns.**



47% of the study population responded for removal of tooth structure, 32% responded for separation of the ceramic, 16% responded for non aesthetic and 5% responded for monthly varnishes.

**Figure 12. Pie chart depicting the frequency distribution of the people who are aware of metal colour changing process.**

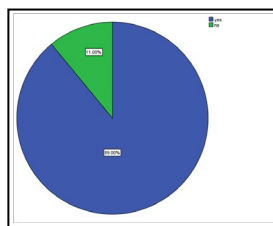


71% of the study population responded for yes, 17% responded for no and 12% responded for may be.

the replacement of these disadvantages can be using white or tooth coloured metal usage in a metal ceramic and provision of boxes and groves for the metal coping, can prevent them from chipping [8, 22]. They ll withstand high stress and shearing. The tooth coloured metal gives them aesticity and provides them resistance to dullness after a long usage [1]. The monthly varnishes are not required often because the metal ceramic with tooth coloured metal is highly aesthetic and sometimes they never require

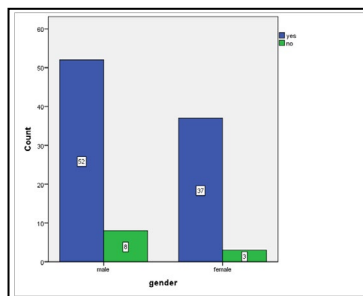
them (Narayanan, Narayanan and Devanarayanan, 2020). 89% of the people opted that white metal ceramic crowns are preferable for tooth replacement option, hence this shows that people have an idea of the alternative to be used for tooth replacement (fig 13,14). The only disadvantage of the tooth coloured metal ceramic crown is the removal of the tooth structure up to 1,5mm. This leads to weakening of the tooth [20]. Or they can be used for all types of tooth replacement programmes. In future there ll be

Figure 13. Pie chart depicting the frequency distribution of the people who prefer white metal ceramic crowns.



89% of the study population responded for yes, 11% responded for no.

Figure 14. Bar graph depicting the association between gender and awareness on preference to white metal ceramic crown.



X axis represents the gender and the Y axis represents the awareness on white metal ceramic crown. Association between awareness on white metal ceramic crown and gender was done using Chi square test (P value = 0.363, which is statistically insignificant).

introduction of tooth coloured metal ceramic crown which is the strongest and aesthetic too.

## Conclusion

By this survey, we can say that people are aware of metal ceramic crowns. Metal ceramic crowns were leastly used crown choice for the replacement of the tooth. Sincere metal can change its colour. There is a new option of coloured metal ceramic crowns. Hence this can take away all the disadvantages present in the old form. This is a preferable option.

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