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AWARENESS REGARDING DIFFERENT ORTHODONTIC BRACKETS AMONG UNDERGRADUATE DENTAL STUDENTS

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ABSTRACT
Introduction: *Orthodontic brackets are small orthodontic attachments (metal or ceramic) secured to a tooth for fastening an archwire. It is bonded to the enamel surface. It helps to treat the malposition teeth in the correct position.*
AIM: The aim of the study was to assess the awareness regarding different orthodontics brackets among undergraduate students.
Materials and Methodology: *A well structured 10 questions regarding different types of orthodontic brackets were framed and administered to the participants through an online google form. Survey was conducted among 200 college students. Data was statistically analysed using SPSS and Chi square analysis was used to determine the association.*
Results: *A survey was conducted among 200 dental college students in that 66% of them were female and 34% of the male population. The association graph was assessed by Chi Square test where p< 0.05 was considered statistically significant. Our results show a p value of 0.14 which was statistically not significant.*
Conclusion: *Based on the results of the survey, we can conclude that undergraduate dental students have a better understanding of the many types of brackets and that more practice should be developed among the population of dental students.*

Keywords: *awareness ;ceramic ;plastic ; metal; orthodontic brackets;innovative survey*

INTRODUCTION
Orthodontics is a type of dentistry which deals with the diagnosis, prevention, and correction of malpositioned teeth and jaws. Abnormal alignment of the teeth and jaws are treated in this branch of dentistry.[1] . By the late 1980s, the number of practitioners using the orthodontics bracket technique had fallen, leaving only a handful who still believed in its potential. And after a few days they have originated the brackets[2]
The orthodontic brackets are components which are attached to the enamel surface and have a great impact on orthodontic treatment. Brackets are mainly used to hold the wire[3]. Self-ligating brackets help to reduce friction between the wire and the bracket, Lingual brackets are bonded to the back of the teeth, are best for patients who don't want their braces to be visible, and titanium brackets are used for patients who are allergic to nickel[4]. Ceramic braces are constructed of a ceramic material which blends into the natural color of the teeth and it is effective for the movement of teeth into desired positions, but it has less noticeable due to their color.[4,5] Lingual braces are made up of metal, they are used to attach inside of the teeth so it cannot be easily seen from the outside.they are less effective and it takes longer time to achieve desired tooth alignment. They are uncomfortable for the patient as they come in contact with the tongue[6]. Invisalign is the most distinct type and used for aesthetic purposes because it does not involve brackets and wires but it has custom-made clear plastic aligners that are worn over the teeth[7]. It is preferred by many patients because they are almost invisible and allow them to eat and drink anything. But it is used only to correct minor to moderate dental problems in teenagers and adults [8]. Self-ligating braces utilize clips rather than elastic bands to hold the wire where there is less friction on the braces and it is used to keep the braces and teeth clean[9].
Plastic brackets are used for aesthetic treatment. plastic brackets have problems with torque capacity, and excessive torsional loads generated by archwires were activated[10]. Ceramic is the third hardest material known to humans because of the presence of aluminum oxide which is stronger than stainless steel. It has significant advantages of both monocrystalline and polycrystalline ceramic brackets over stainless steel brackets, it rapidly contacts between teeth and ceramic brackets.[11]
The bond strength between mechanical and chemical bondings differs mainly in the way stress concentration is distributed over the bonding surfaces.[5,12]. Our team has extensive knowledge and research experience that has translated into high

quality publications [13,14,15,16,17,18,19,20,21,22,23,24,25–29,30,31,32,33]. The study aims to assess the awareness regarding different orthodontic brackets among undergraduate students.

MATERIALS AND METHODOLOGY:

Study Design, Area and Study Population:

An online survey was conducted among dental students regarding their awareness of different orthodontic brackets. The sample size of this survey is a total of 200 students. Participation in this study was voluntary and no incentives were provided to the participants. The survey was conducted in February 2021

Study Instruments:

A questionnaire was prepared after extensive review of the existing literature. The questionnaire was reviewed and amendments were made to improve clarity of pertinent questions and eliminate ambiguous responses. The survey instrument was a structured questionnaire with close ended questions. It consists of a brief introduction regarding the purpose of the study, questions pertaining to demographic data and questions regarding research objective 10 questions were circulated to the participants in a google form.The method of representation of the data is as a pie chart.

Data Analysis

Only completely filled online forms were included in the study.The full response was verified by two reviewers and the controlled data was entered on the same day. The entered data were analysed using SPSS. Descriptive analysis was performed to calculate frequencies of categorical variables. Chi square analysis was used to determine the association. The level of significance was set at $p<0.05$.The independent variables are age,sex.The dependent variables are knowledge and attitude.

RESULT:

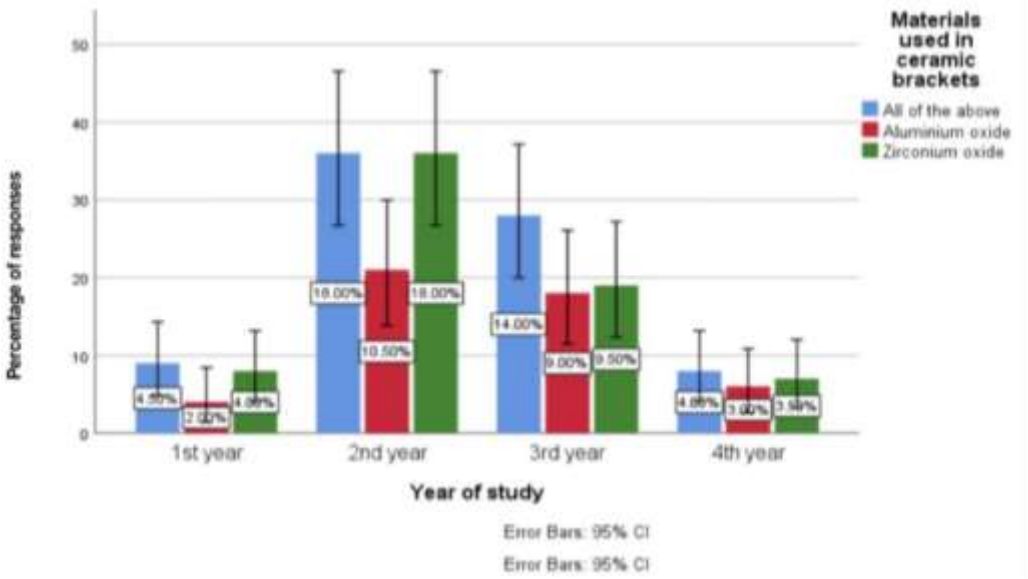

Figure 1: The bar graph represents the association between year of study and the awareness of different types of materials used in ceramic brackets. X- axis represents the year of study and the y- axis represents the percentage of responses. Majority ,18% of the second years responded that both Aluminium oxide and Zirconium oxide are used in ceramic brackets.Pearson chi-square test shows the p value is 0.14 (p value> 0.05). Hence it is statistically not significant.

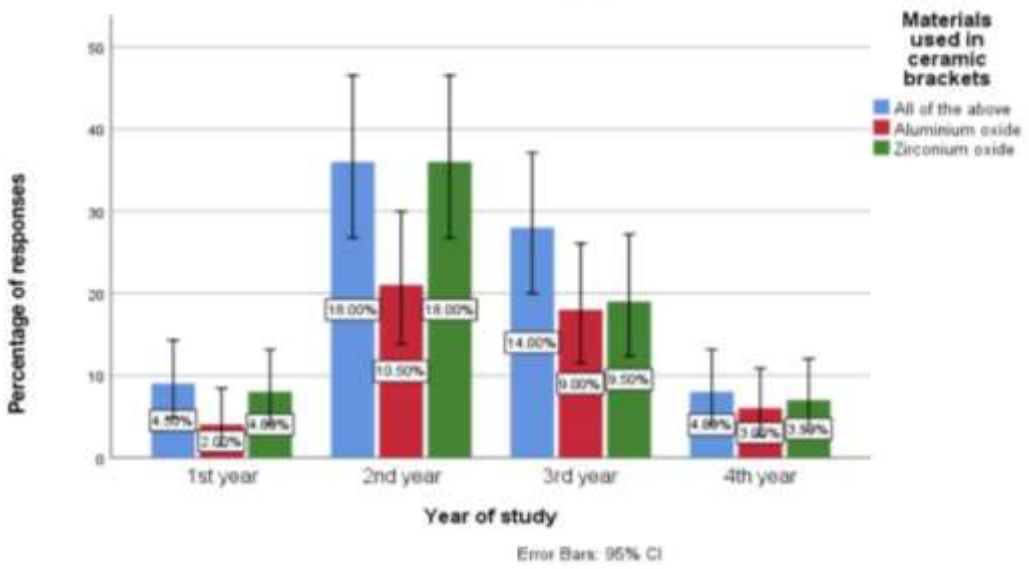

Figure 2: The bar graph represents the association between year of study and bracket which is more aesthetic. X- axis represents year of study and y- axis represents the percentage of responses. Majority, 25% of the second years responded that ceramic brackets are more aesthetic. Pearson chi-square test shows the p value is 0.00 (p value> 0.05). Hence it is statistically significant.

DISCUSSION

The survey is conducted among 200 dental students. In this survey, Majority of the participants, around 66% were females and 34% were males.Out of the total study population, 25% of the students belonged to the 1st year,25% of the students belonged to the 2nd year,25% of the students belonged to 3rd year and 25% of the students belonged to the 4th year. Responses regarding the identification of brackets were based on 9.50% of arch, 25% of quadrant, 31% on tooth type and 34.50% responded on all of the above. Responses regarding treatment duration with different brackets ,Out of the total study population , 35.50% responded metal bracket has less treatment duration, followed by 30% who responded ceramic brackets , followed by 18.5 % who responded self ligating brackets and 16% who responded as 'other' .The frequency distribution of the awareness regarding orthodontic brackets among undergraduate students,40.50 % responded that ceramic brackets contains both aluminium oxide and zirconium oxide followed by 35 % who responded that ceramic bracket contains zirconium oxide and 24.5%of the participants responded that ceramic bracket contains aluminium oxide.34% of the total participants, responded that resin remnants after removal of the brackets will result in accumulation of dental plaque 18.50% responded that it will result in enamel damage, 20% respond that it will result in discolouration and 27.50% responded as 'all the above'.

Out of the total study population, 45.50% responded that ceramic bracket are more aesthetic , followed by 29 % responded that metal brackets are aesthetic and 25.50 % responded to plastic bracket are more aesthetic. 31.50% respondedthat colour stability of the brackets depends on the composition, morphology and surface property, followed by 29 % who responded it is by the surface property, followed by 24% who responded it as morphology and 15.50% responded it as compositionOut of the total study population, 44% responded that ceramic brackets have more resistance to staining agent , followed by 30.50 % responded that plastic brackets have more resistance to staining agent and 25.50% responded that by metal brackets have more resistance to staining agent. 29 % of the participants responded that it affects the aesthetics followed by 23% who responded that it is not cost effective followed by 22 % who responded that it is corrosive and 26% responded to all of the above. The association between year of study and different types of materials used in ceramic brackets revealed.Majority,18% of the second years responded that both Aluminium oxide and Zirconium oxide are used in ceramic brackets.Pearson chi-square test shows the p value is 0.14 (p value> 0.05). Hence it is statistically not significant (Figure 1).The association between year of study and bracket which is more aesthetic revealed that the majority, around 25% of the second years, responded that ceramic brackets are more aesthetic compared to others. Pearson chi-square test shows the p value is 0.00 (p value> 0.05). Hence it is statistically significant (Figure 2).

In the previous literature author responded to that Orthodontic treatment has a fixed appliance, which is important for the brackets and tubes and it should be accurately positioned and that the bonding failure rate during treatment is

minimized.Bonding tubes on first and second molars can increase the risk of failure.[34]One of the disadvantages of this treatment is the friction at the bracket/archwire, which may reduce the amount of orthodontic movement .The technological innovations used to develop new low-friction materials such as the design alterations and the surface treatments seem to present good potential to reduce friction in specific clinical situations.[35] . The demineralization of enamel adjacent to orthodontic brackets is a main problem.The application of sodium fluoride (TM/NaF) can provide significant additional prevention of enamel demineralization when resin-modified glass ionomer cement(RMGIC) is used for bonding.[36]Stainless steel self-ligating brackets had kinetic frictional forces than conventional stainless steel and polycarbonate self-ligating brackets. All brackets showed higher static and kinetic frictional forces as the wire size increased.[37] fluoride-releasing materials showed significant differences on enamel demineralization around the brackets when compared with a conventional adhesive, and the agent with the initial higher amounts of fluoride.Scanning electron microscopy of the enamel surface revealed particle depositions of micro globular form.[38] .in the previous study the author responded to that Most metallic brackets used in orthodontic therapy are made from stainless steel (SS) with good physical properties and good corrosion resistance and the bracket has good frictional property, corrosion resistance and biocompatibility with a lower probability of allergic reaction, compared with conventionally used SS brackets.when compared this is compared with (fig - 1) shows the percentage of disadvantages of the metallic brackets, in that 22% responded to corrosive, 29% responded to it caused aesthetic, 23% responded to cost and 266% all of the above. In that blue colour belongs to all of the above, red colour belongs to corrosive, green colour belongs to aesthetic and orange colour denotes the cost[39].the hardness of wing components of conventional stainless steel brackets, introducing the problems associated with soft and compliant wing components[40]

LIMITATION

The limitations of the present study on different orthodontic brackets consider a small number of concentration and in vitro study. In the future, this study can be conducted in increased concentration, and clinical studies can be done. It can be used as an alternative bracket in the future.

FUTURE SCOPE

It can be used as a good tool in dentistry, for creating awareness and for educating the undergraduates

CONCLUSION

Based on the results of the survey, we can conclude that undergraduate dental students have a better understanding of the many types of brackets and that more practice should be developed among the population of dental students.

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CONFLICT OF INTEREST

There was no potential conflict of interest.

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