AWARENESS ON CASTING DEFECTS AMONG DENTAL STUDENTS

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ABSTRACT

INTRODUCTION: The casting defects have become more common now a days.Cellular materials are recognized for their high specific mechanical properties, making them desirable in ultra-lightweight applications. Periodic lattices have tunable properties and may be manufactured by metallic additive manufacturing (AM) techniques. However, AM can lead to issues with un-melted powder, macro/micro porosity, dimensional control and heterogeneous microstructures. **MATERIALS AND METHODS**:The cross sectional survey was done among the dental students to find if they are aware of casting defects,the survey involved 15 questions which was distributed to them by a link.**RESULTS AND DISCUSSION:**73.2% were in the age group of 16-18 years. 26.7% were in the age group of 18-20. 71.23% are female, 28.7% were male.85.15% Are aware of casting defects, 14.85% are not aware of casting defects. $p = 0.58$;$p>0.05$ which is found to be statistically not significant. In both genders there is a similar level of awareness of casting defects.**CONCLUSION**: It is concluded that most of the students are aware of dental defects that may be a high consequence in the patients.

Keywords: Awareness,eco friendly,Innovative techniques,Casting, Dental students, Types.

INTRODUCTION:

In the metal casting process, a casting defect is an unwanted irregularity. Some flaws can be tolerated, while others can be repaired; however, all flaws must be removed.In castings, the words "defect" and "discontinuity" apply to two distinct objects. Conditions in a casting that must be fixed or omitted, or the casting must be refused, are referred to as defects. "Interruptions in the physical continuity of the casting," or "discontinuities," are described as "interruptions in the physical continuity of the casting."Some of these issues may be addressed by metal casting techniques, where there have been recent advances on the filling of thin-walled molds allowing good dimensional control coupled with good microstructural control. However, the main

difficulties associated with casting techniques are frequently related to mold production. To address this issue, recent research has focused on developing novel hybrid additive manufacturing assisted investment casting techniques which is the focus of the current study.

The three-dimensional (3D) design of the cardiovascular system can be reliably depicted using the vascular corrosion casting method. The origin, direction, dimension, and relative spatial location of the great vessels can be visually displayed using our updated cast models, which may be a useful complement to prenatal echocardiogram (1,2). There are many types of defects which result from many different causes. Some of the solutions to certain defects can be the cause for another type of defect are shrinkage defects,gad porosity, pouring metal defects, metallurgical defects, The process specific defects are die casting, continuous casting,sand casting (3).There are some methods for lowering the inclusion concentration. The metal may be melted with a flux, in a vacuum, or in an inert environment to limit oxide formation. Other additives should be added to the mix to make the dross float to the surface and be skimmed off until the metal is poured into the mould (4).

Since microshrinkage cavities can also contain gases, it can be difficult to discern between gas porosity and micro shrinkage. Micro Porosities can shape in general if the casting is not correctly registered or if a material with a wide solidification range is used. If none of these are true, the porosity is most likely due to gas production (5,6).Closed shrinkage defects, also known as shrinkage porosity, are defects that form within the casting. Isolated pools of liquid form inside solidified metal, which are called hot spots. The shrinkage defect usually forms at the top of the hot spots (7,8).

The fluidity of a substance can be measured in a variety of ways , but the most common method is to use a regular mould form to measure the distance the material flows.The composition of the substance,the freezing temperature or spectrum,the surface tension of oxide films,and most notably , the pouring temperature all influence fluidity (9).Since the mould fails, several defects can occur in sand casting. The mould normally fails for one of two reasons: it was made of the wrong material or it was rammed incorrectly.The first type is mould corrosion, which occurs as the liquid metal fills the mould and wears it down. Since most other casting methods have more durable moulds, this form of defect typically only happens in sand castings. Rough patches and waste content can be found in the castings (10).

The aim of this study is to create knowledge and awareness about casting defects among the dental students , the information about this casting defects was also given to the dental students.Our team has extensive knowledge and research experience that has translate into high quality publications(11–19),(20–25),(26–30) .

MATERIALS AND METHODS:

This descriptive cross sectional study was conducted among the dental students randomly. To analyse their awareness in casting defects among dental students . Approval was obtained from the Institutional review board. The survey was conducted among 100 people. Random sampling method was done. Self administered questionnaires of 15 closed ended questions were prepared

and distributed among the participants online through “Google forms”. The self administrated questionnaire was prepared and explained well and distributed.The datas were collected, compiled, arranged in a systematic manner and analysed in terms of frequencies using SPSS software and pearson chi square test which was done in association with gender and the awareness and knowledge in casting defects.The confidence interval was found to be 95% and statistically significant of $p<0.05$. The results are then represented as pie charts and bar graphs.

RESULTS AND DISCUSSION:

Responses were collected and the data was analysed. Majority of the south Indian population are aware of transmission of air borne diseases, most of them were aware of the prevention and precaution of air borne disease while some of them were not aware of the preventional strategy.

The study was conducted among 100 random people of the south Indian population. 73.2% were in the age group of 16-18 years. 26.7% were in the age group of 18-20. 71.23% are female, 28.7% were male .85.15% Are aware of casting defects, 14.85% are not aware of casting defects.(Figure 1). When they were asked about the most common casting defects, 50.50% responded as cold shots, 25.74% responded as shut off surface, 15.84% responded to us all, 7.92% responded as slag inclusion.(Figure 2) When asked about identification of cause ,70.30% responded as slag defects, 29.70% responded that it appears as blue.(Figure 3) When they were asked about the advantages of die casting, 76.24% responded as mold is a very fast loss, 20.79% a date responded that it is a very fast process, 2.97% responded that its shape and weight of the casting is limited.(Figure 4) When they were asked what is the best material to make mould, 66.34% responded to polyurethane, 32.67%responded to silly cunts, 0.99% responded as both. (Figure 5) When they were asked whether Gasparo city of course when the metal traps gas,69.31% responded yes, 30.67% responded as no.(Figure 6)When they were asked which one is more dangerous, 52.48% responded as close to shrinkage defects, 47.52% responded as open shrinkage defects.(Figure 7) When they were asked which one is more common 64.36% responded as mold materials, 34.65% responded as gas porosity,0.99% responded as pouring metal.(Figure 8) When they were asked the defects in sand casting, 81.19% responded as hot during, 18.81% responded as surface projections.(Figure 9)

Composites mostly exhibit thermal properties because they have a good thermal mechanical power including good hardness, strength, better assistance and fracture roughness to wear and corrosion. The advantages characteristics can be used to increase the composite material in industrial applications comparatively the dental defects are low (31).Advancely nowadays utility of modified vascular corrosion casting technique in the diagnosis of fetal Ductus arteriosus abnormalities are also found in advanced studies which are very useful for the dentist and the doctors in modification of casting defects in this ductus anatomy and arteriosus anatomy is known cast modelling scan which will displace than a topical characteristics scenarios which results as an abnormality in the fetus (1,4). Even studying the defects and the effects of wearing rate on the casting defect using non-destructive test techniques are also common to know the abnormalities and the defects which happen while casting. Gas defect mostly the Sultan gas buckets from gas dissolving and melt then

it again becomes solid (7,8).The study has demonstrated that variation exist in the quality of course used in crown and bridge work specially those used in the construction of indirect restoration which also includes started relation purposes and also in mini advanced usages (32), there are many issues that are found in metalcasting tactics which has three recent advances on the filling of Thin walled moulds That have a good dimensional control and also with good microstructural control, many difficulties are also being placed during casting techniques which are frequently mould production while manufacturing also that is many investment in Casting techniques which off focused by many other studies (33). Metal composite is increased in the replacement of traditional materials which are used in construction also in the construction of many missionaries and equipment which can also be responsible for casting to defects. Also many classification in case of metal composite castings should be further assessment on the distribution and reinforcing face of microscopic studies. (34)

The limitation of the study is it could have been done in a distributed population and also more dates could be included.The future scope is this study can be done in an advanced manner.

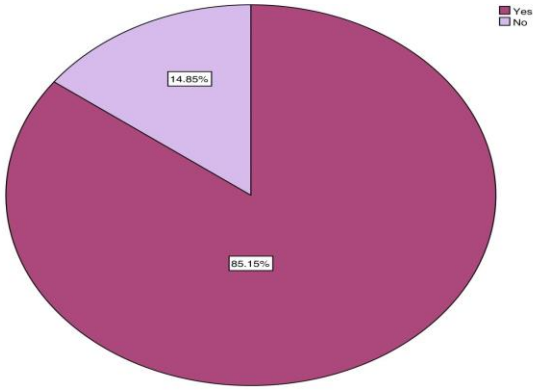

Figure 1: The pie chart represents the frequency distribution of ,85.15%(violet) Are aware of casting defects, 14.85%(purple) are not aware of casting defects.

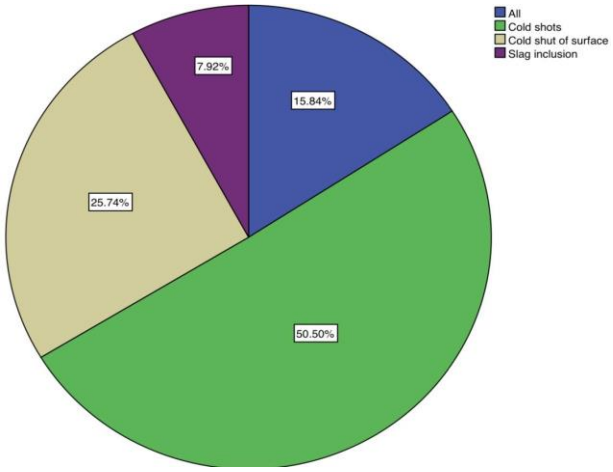

Figure 2: The piechart represents the frequency distribution of When they were asked most common casting defects, 50.50%(green) responded as cold shots, 25.74%(cream) responded is called shut of surface, 15.84% responded us all, 7.92%(violet) is responded as slag inclusion.

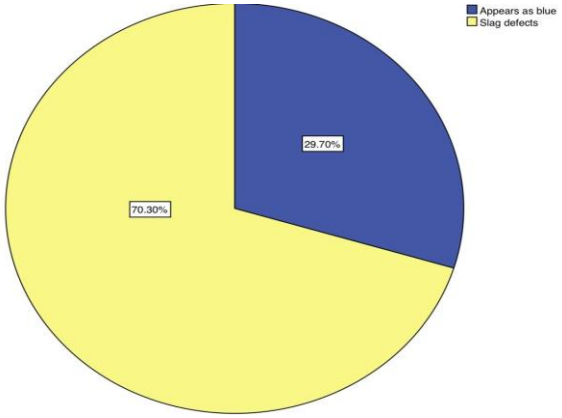

Figure 3:The piechart represents the frequency distribution of When asked about identification of cause ,70.30%(yellow) responded as slag defects, 29.70%(blue) responded that it appears as blue.

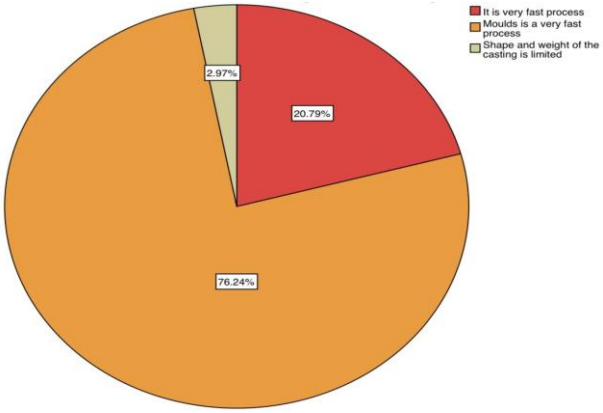

Figure 4:The piechart represents the frequency distribution of When they were asked advantages of diecasting, 76.24%(sun yellow) responded as moulds is a very fast losses, 20.79% (red)a date responded that it is a very fast process, 2.97%(cream) responded that it shape and weight of the casting is limited.

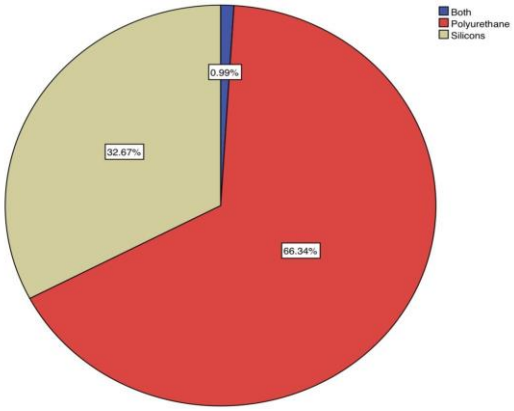

Figure 5:The piechart represents the frequency distribution of When they were asked what is best material to make mould, 66.34% (red)responded polyurethane, 32.67%(cream)responded us silly cunts, 0.99%(blue) is responded as both.

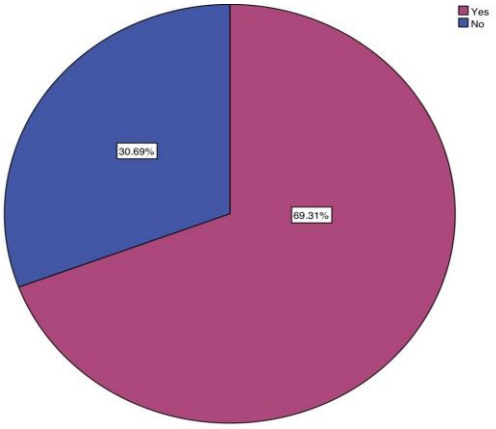

Figure 6:The piechart represents the frequency distribution of When they were asked whether Gasparo city of course when the metal traps gas,69.31%(violet) responded us yes, 30.67%(blue) it's responded as no.

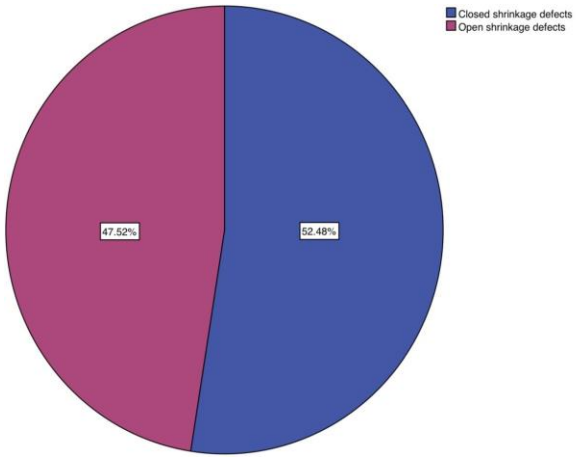

Figure 7:The piechart represents the frequency distribution of When they were asked which one is more dangerous, 52.48%(blue) responded as close to shrinkage defects, 47.52%(violet) responded as open shrinkage defects.

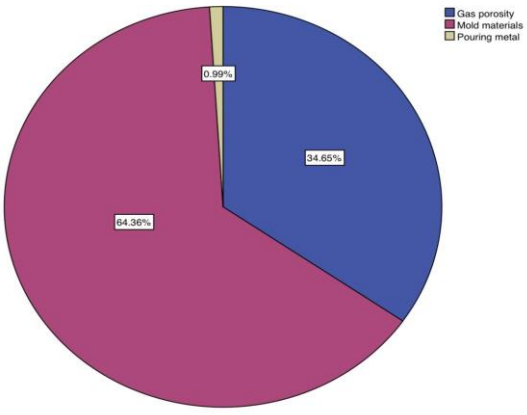

Figure 8:The piechart represents the frequency distribution of When they were asked which one is more common 64.36% (violet)responded as mold materials, 34.65% (blue) responded as gas porosity,0.99%(cream) responded as pouring metal.

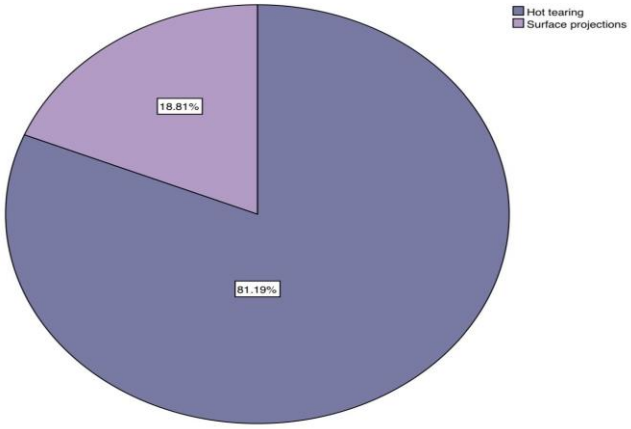

Figure 9:The piechart represents the frequency distribution of When they were asked the defects in sand casting, 81.19% dark purple)is responded as hot during, 18.81% (purple) is responded as surface projections.

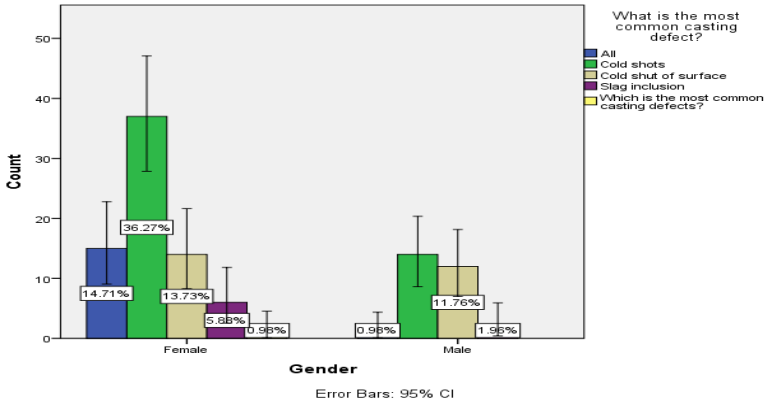

Figure 10: This graph represents the association between gender and common casting defects known among people, x axis represents gender and y axis represents number of participants, blue represents that people prefer all types, and green represents cold shots,cream colour represents cold shut off surface,violet represents slag inclusion . The association between gender and casting defects was done using chi square test (Pearson's Chi Square test value:0.307, DF value:1 and p = 0.58;p>0.05 which is found to be statistically not significant. In both genders there is a similar level of awareness of casting defects.

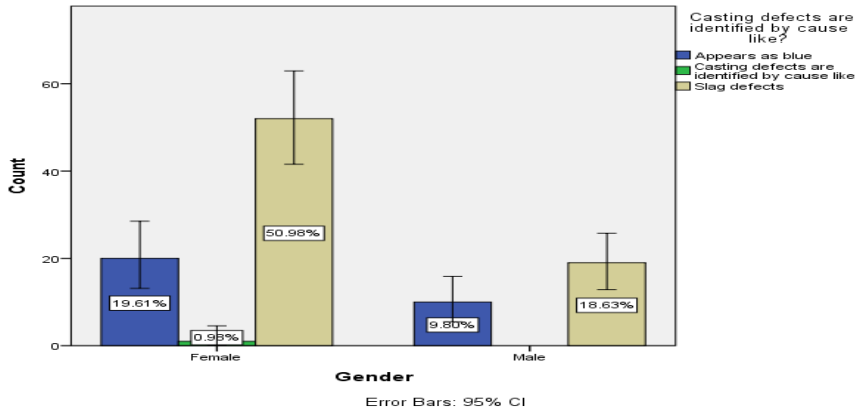

Figure 11:This graph represents the association between gender and casting defects identification among people, x axis represents gender and y axis represents number of participants, blue represents that people are aware, and red represents they are not aware. The association between gender and casting defects was done using the chi square test (Pearson's Chi Square test value:0.307, DF value:1 and p = 0.58;p>0.05) which is found to be statistically not significant. In both genders there is a similar level of awareness in casting defects.

CONCLUSION:

It is concluded that most of the dental students in Chennai population were aware of casting defects that may lead to many other dental problems and also sometimes it leads to fetal abnormality.

AUTHOR CONTRIBUTION

Author 1 (S. Amrithaashri), carried out the study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Author 2(Dr.Vinay) aided in conception of the topic , has participated in the study design, statistical analysis and has supervised in preparation of the manuscript. Author 3 (Dr.Dhanraj) has participated in the study design and has coordinated in developing the manuscript.All the authors have discussed the results among themselves and contributed to the final manuscript.Author 4 (DrKeerthi Sasanka) aided in, methodology and statistical analysis and has supervised in preparation of the manuscript

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CONFLICTS OF INTEREST:

Non declared.

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- SIMATS, saveetha university
- Cigram capitals, karur.

P-Dental students

I-Knowledge and awareness on casting defects.
C-Dental students who did not have awareness on casting defects.
O-Dental students who have awareness on casting defects.

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