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Research Paper

Different shades of composite used for anterior restoration in different age groups and gender - A retrospective study

Alagu Rathi Bharathi[1], Sowmya.K[2]

Alagu Rathi Bharathi
Undergraduate student Saveetha Dental college and Hospital
Saveetha Institute of Medical and Technical Sciences
Saveetha university Chennai - 600077.

Dr Sowmya K
Senior Lecturer Department of Conservative dentistry and Endodontics
Saveetha Dental college and Hospital Saveetha Institute of Medical and Technical Sciences
Saveetha university Chennai - 600077.

Corresponding author: Dr Sowmya K
Senior Lecturer Department of Conservative dentistry and Endodontics
Saveetha Dental college and Hospital
Saveetha Institute of Medical and Technical Sciences
Saveetha university
Chennai - 600077.

ABSTRACT:
Introduction: The demand for aesthetics is increasing among the patients. Patients request for high esthetic quality anterior restorations. Clinicians have become responsible to satisfy patient's esthetic demands. A natural tooth is polychromatic in nature. A wide variety of colors are available in composite resins to support aesthetic dentistry. The composite resins also display wide combinations of translucency and opacity. The composite resins are much easier to sculpt the dental anatomy of a tooth than any other dental material for restoration.
Aim: The aim of this study was to assess the different shades of composite used for anterior restorations in different age groups and gender.
Materials and Methods: The study was done in a hospital setting, the data was collected from the patient software system of Saveetha dental College and the samples included patients who needed anterior restorations. The data was analysed using the chi Square test.
Results: The most common group undergoing the anterior restorations are the females (68.4%). The most common group of people anterior restorations are from 31 to 40 years of age (34.4%). The most common composite resin shade used in our study population is the A2 shade. (57%). Tooth shade is significantly associated with age and gender of the individuals ($p<0.05$).
Conclusion: Tooth shade is significantly associated with age of the individuals, in that teeth tend to darken in color with advancing age. Tooth shade is also significantly associated with gender, in that males have relatively darker shade than females of the same age group.
KEY WORDS: *anterior restoration; shades of composite; innovative technology; innovative technique; age; gender.*

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I. INTRODUCTION:

The demand for aesthetics is increasing among the patients. Patients request for high esthetic quality anterior restorations. Clinicians have become responsible to satisfy patient's esthetic demands. A natural tooth is polychromatic in nature. Polychromatic characters display a wide variety of colors and nuances that are perceived and interpreted by the human brain. (1,2)

To artificially reproduce the polychromatic characteristics of the tooth is a challenging task. The artistic sense of the clinician is highly required in order to identify details and define the different nuances of different shades of each tooth. Colour is the result of the interaction between the three dimensions, the hue, chroma and value.(2,3). The term "hue" is synonymous with the term "color," and is used to describe the color of a tooth or dental restoration. Chroma is the intensity or saturation of the color tone (hue), light blue or dark blue. For instance, chroma is used to describe the orange or yellow hue of a tooth or a restoration

The use of composite resins for restorations have been clearly increasing. A wide variety of colors are available in composite resins to support aesthetic dentistry. The composite resins also display wide combinations of translucency and opacity. The composite resins are much easier to sculpt the dental anatomy of a tooth than any other dental material for restoration. These improvements and interventions in composite resins have made it possible to restore the minute details of the existing natural tooth, in a much more aesthetic manner and satisfying the human vision.(3-7)

Function, form and esthetic are adequately restored in direct procedures with composite resins, with the restorative conception in close relation to conservative operative interventions. A clinician should be able to carefully analyse the operative techniques and have a detailed knowledge of color characteristics of natural teeth and restorative materials to attain high functional and aesthetic results that satisfy the patients.(8)

In dentistry, hue, value and chroma of the composite resin to be used for the tooth should be identified. Alphabetic letters on the resin tubes represent the hues (A, B, C and D). (9) The saturation degree or the intensity of the hue, such as light blue, dark blue, royal blue, known as chroma is represented by numbers, whose order is crescent in saturation. Value represents the dynamic dimension of the bodies and corresponds to the luminosity of the color, and is related to the amount of the existing white or black pigments (10,11)

Natural dentin and enamel have a rich composition and details. The dentin offers the basic color to the dental element, or the hue. The value of the hue is modulated by the enamel thickness, thus the observer cannot entirely perceive the hue of the dentin.(12) The regions of the tooth where the enamel is thicker appears to be dark in colour when compared to the regions where enamel is thinner. Therefore the cervical third if the tooth tends to appear darker than the middle and the incisal thirds. The areas where the color conferred by the dentin is less subject to enamel modulation, should be the area that is chosen for the hue selection. (10)

With the increase in enamel thickness towards the middle third, there is a progressive decrease of the intensity or the color chrome. The hue remains the same, although the greater thickness of the enamel interferes in its perception, giving it a less saturated aspect. Therefore, the hue of the tooth is given by the dentin and influenced by the enamel. The enamel does not change the hue, but only confers a greater or lesser saturation or chroma according to its thickness (13) Our team has extensive knowledge and research experience that has translate into high quality publications (14–23),(24–27),(28–32) (33)

The aim of this study is to assess the different shades of composite used for anterior restorations in different age groups and gender.

II. MATERIALS AND METHODS:

The retrospective cross sectional study was done in a private dental institution, in Chennai. This study was approved by the institutional ethical board. Two reviewers were involved in the study. Patient records were reviewed from the digital archives of our university. The data was collected from the patients visiting saveetha dental college who underwent anterior restorations. Only patients with anterior restorations with composite resins were included in the study.

The independent variables are the patient's PID, name, age and gender. Dependent variables are the anterior restorations and the shades of composite resins. The data collected were reviewed and cross verified. The data was tabulated and imported to SPSS software and the variables were defined. The data was statistically analysed. Chi square tests were performed. The level of significance of each variable was set at p less than or equal to 0.05.

III. RESULTS:

The data collected from the patients management software were tabulated in SPSS and the descriptive method statistics were obtained. Patients of various age groups and both genders undergo anterior restorations. The most common group undergoing the anterior restorations are the females (68.4%) **(Figure 1)** . The most common group of people anterior restorations are from 31 to 40 years of age (34.4%) **(Figure 2)**. The most common composite resin shade used in our study population is the A2 shade. (57%) **(Figure3)**.

The correlation between the gender and the shade of composite resin used for anterior restorations shows that the common shade of composite resin used for anterior restorations is the A2 shade and is used among the females **(Figure 4)**. The correlation between the age group and the shade of composite resin used for anterior restorations shows that the common shade of composite resin used for anterior restorations is the A2 shade and is commonly used among 31 to 40 years of age **(Figure5)**.

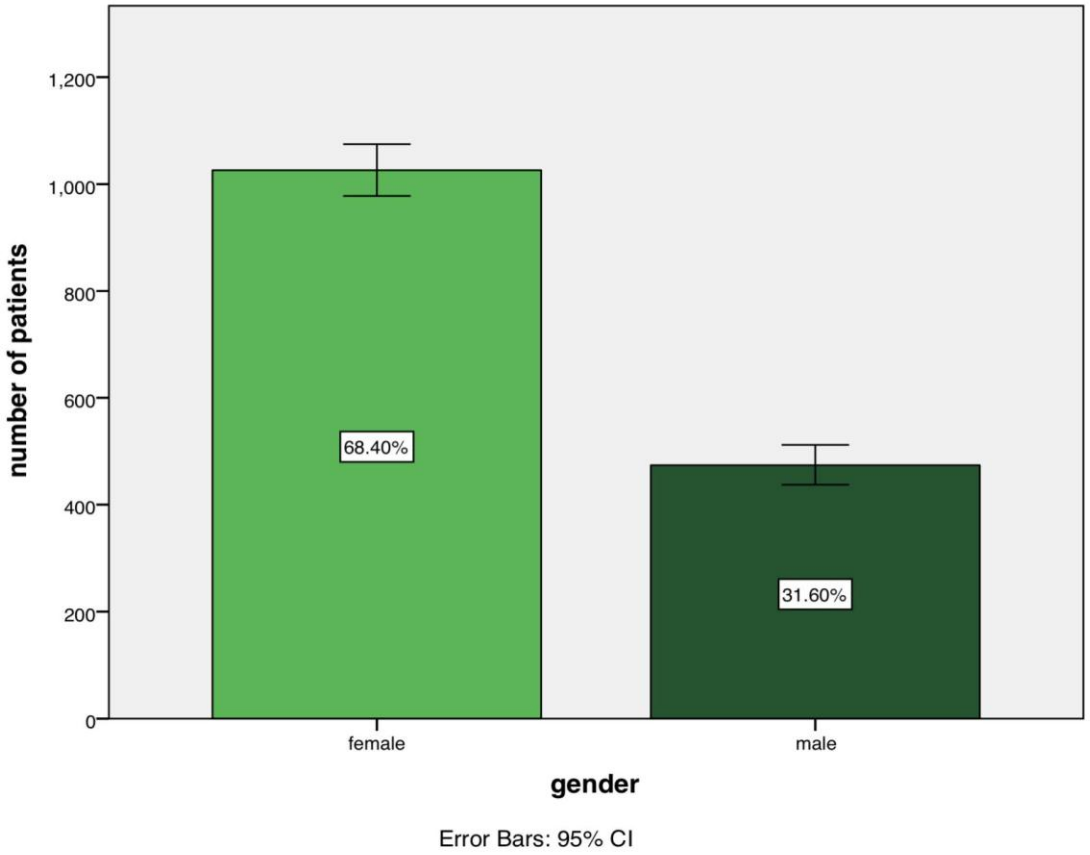

Figure 1: Bar chart representing the gender prevalence of patients who underwent anterior restorations. Y- axis represents the number of patients and X- axis represents the gender of the patients who underwent anterior restorations. 68.4% were females and 31.6% were males.

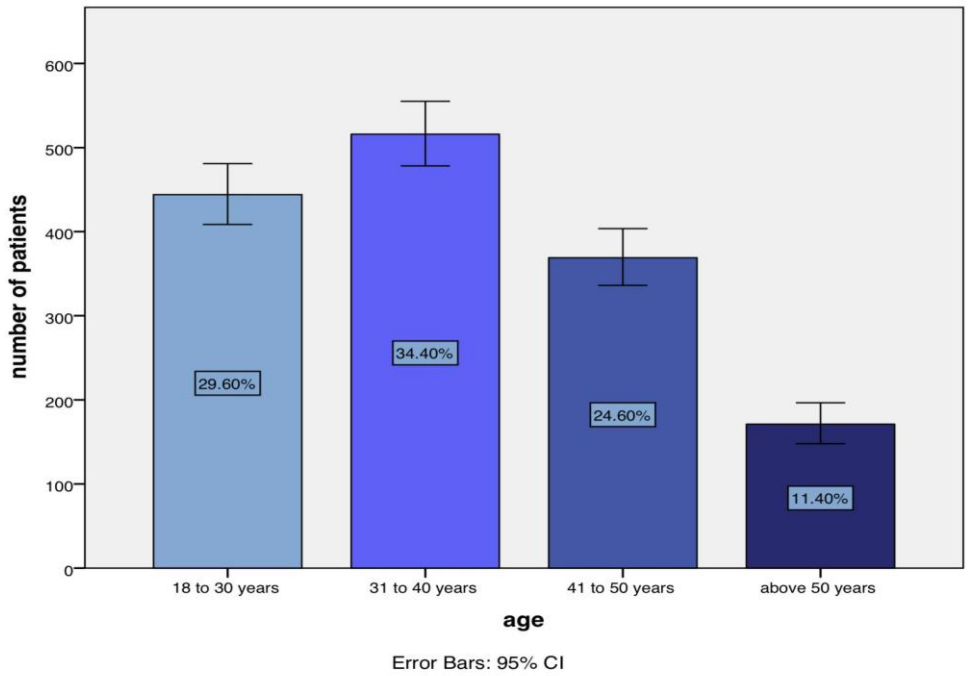

Figure 2: Bar chart representing the age prevalence of patients who underwent anterior restorations.
Y- axis represents the number of patients and X- axis represents the age of the patients who underwent anterior restorations. 29.6% were of 18 to 30 years of age group, 34.4% were of 31 to 40 years of age group, 24.6% were of 41 to 50 years of age group and 11.54% were above 50 years of age.

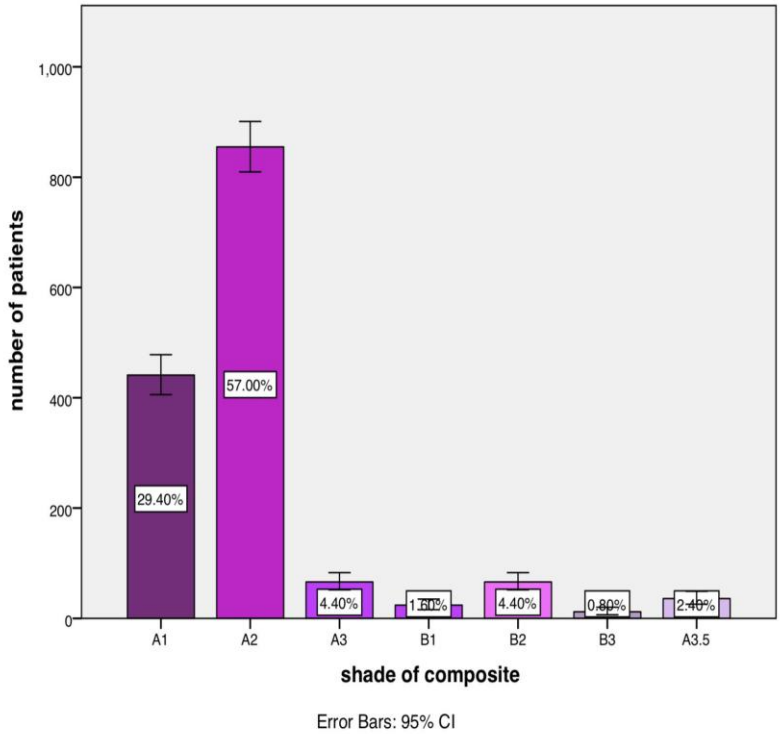

Figure 3: Bar chart representing the prevalence of shades of composite resins used for anterior restorations.
Y- axis represents the number of patients and X- axis represents the shades of composite resins used for anterior restorations 29.4% were A1 shade of composite, 57% were A2 shade of composite, 4.4% were A3 shade of composite, 1.6% were B1 shade of composite, 4.4% were B2 shade of composite, 0.8% were B3 shade of composite and 2.4 % were A3.5 shade of composite.

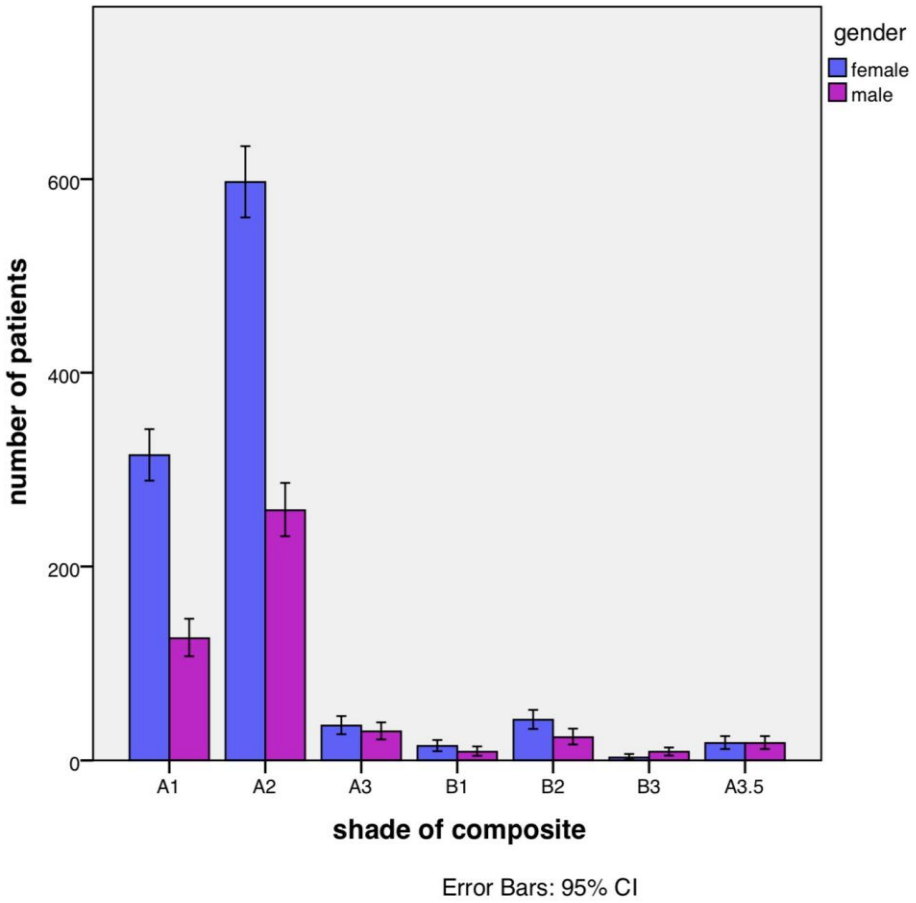

Figure 4: Bar chart depicting the association between the frequency of gender and the different shades of composite resin used for anterior restorations.
X axis denotes the shade of composite used and Y axis denotes the number of patients who underwent anterior restorations. Colour blue represents the females and colour pink represents the males. In terms of the composite shade used for anterior restorations, the majority of females have had restoration with A2 shade (39.8%). Chi square test was done, p value found to be statistically significant (p value = 0.000, <0.05).

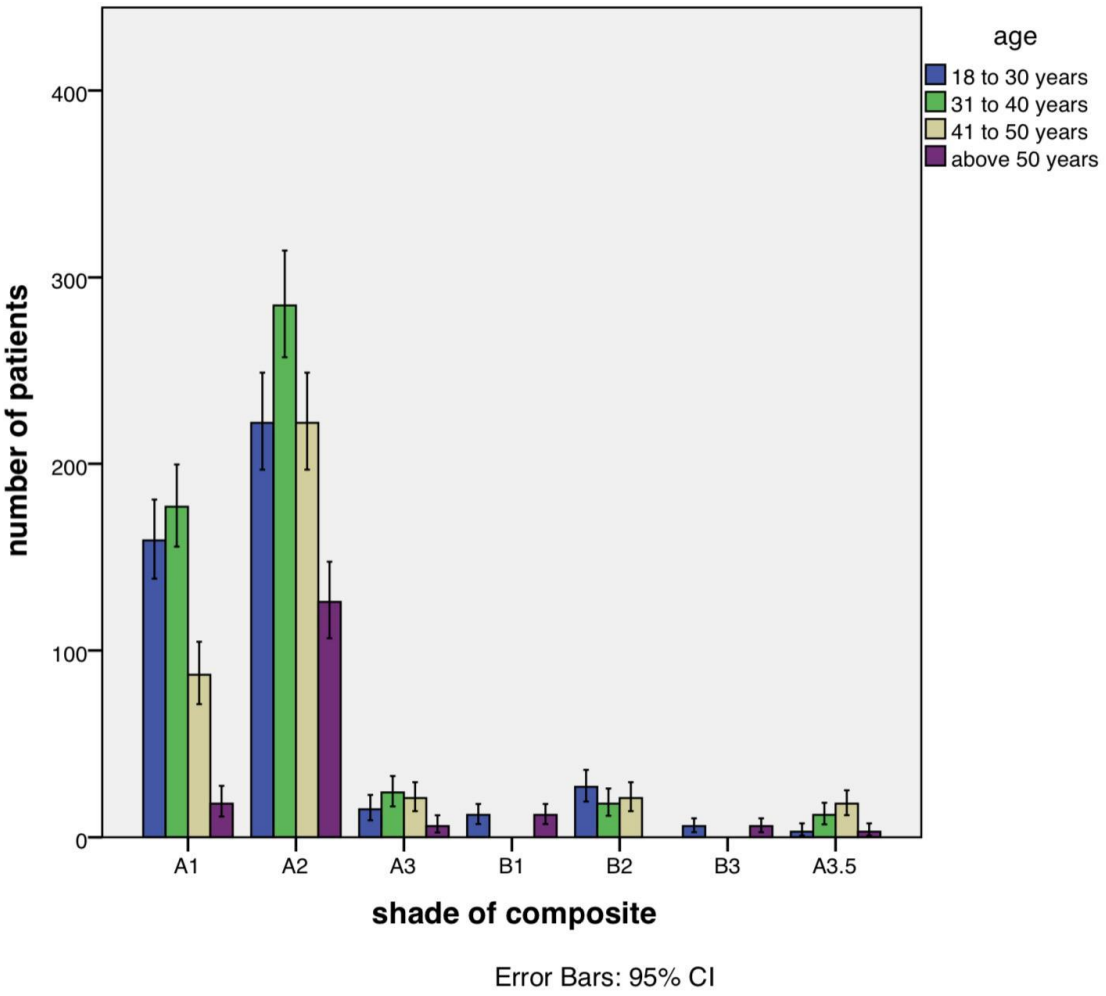

Figure 5: Bar chart depicting the association between the frequency of age and the different shades of composite resin used for anterior restorations.
X axis denotes the shade of composite used and Y axis denotes the number of patients who underwent anterior restorations. Colour blue represents 18 to 30 years of age, colour green represents 31 to 40 years of age, yellow represents 41 to 50 years of age and purple represents patients who are above 50 years of age. In terms of the composite shade used for anterior restorations, the majority of patients who are between 31 to 40 years of age have had restoration with A2 shade(19%). Chi square test was done, p value found to be statistically significant (p value=0.000, <0.05).

IV. DISCUSSION:

Thus from our study we can evidently witness that A2 is the most common shade used for the anterior restorations. These findings are also similar to the findings carried out in a study by Smith and Wilson. (34)

Our results show evidence that there is a significant relationship between shades of teeth and the age-groups. It was noted that with increasing age, there was a tendency for the teeth to be of darker shades. Similar results were also given in other studies which support the results of our study.(35-40)

Vichi et al (41) reported in his study that layer thickness and the proportion of dentinal thicknesses and translucent shade greatly influence the final aspect of a multi-layer composite restoration. Russell et al (42) revealed in his studies that the teeth become brighter after drying; thus, the clinicians should do the shade matching procedures before drying the tooth.

Veeraganta et al (43) in his study showed that there is a significant relationship between shade values of teeth and the age-groups of the patients. He observes that with the increasing age, the teeth tended to be of darker shades. This can be attributed to the fact that there is secondary dentin formation after the age of approximately 35 years, (39) coupled with thinning of enamel due to tooth wear. Hasegawa et al (38) observed that the natural tooth color showed a significant decrease in lightness at the center of the cervical site and an increase in yellowness with advancing age. Similar correlation was reported by Jahangiri et al., (35) where a

significant association was found between tooth color and age of the patients, in that with advancing age, teeth tended to become darker in color. In a similar study conducted by Esan et al., (36) it was found that the percentage of lighter tooth shades decreased with age, and that of darker ones increased with age within an age group. The findings of this study are in coherence with the results of the above-mentioned studies.

Veeraganta et al (43) in his study showed that the shade values of teeth in relation to gender, it was found that there was no statistically significant association between tooth shade and gender in the study sample. However, Esan et al., (36) indicated that gender is significantly associated with tooth shades, in that men are more likely to present with darker tooth shades whereas women of the same age group were more likely to show lighter tooth shades.

Limitations of the present study include short sample size, single centered study and it doesn't represent ethnic groups or population. However the follow up of the cases in a wide ethnic group will allow us to understand the clinical success of treatment done and attain the patient's satisfaction in a much easier way.

V. CONCLUSION:

Within the limitations of this study, the following conclusions can be drawn. Tooth shade is significantly associated with age of the individuals, in that teeth tend to darken in color with advancing age. Tooth shade is also significantly associated with gender, in that males have relatively darker shade than females of the same age group.

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CONFLICT OF INTEREST:

The authors declare that there were no conflicts of interest in the present study.

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