

DIFFERENT TYPES OF GINGIVAL SHADES USED IN FABRICATING AN AESTHETIC FIXED PARTIAL DENTURE

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Abstract

A heavy global burden of periodontal disease can have an undeniable negative. Replacing the partially edentulous area in the anterior region can be challenging in achieving an optimal aesthetic result. In the field of dentistry, its superior basis for achieving aesthetics and to replace and replicate the appearance of teeth to mimic nature to its closest sense and form. The aim of the study is to check the frequency of gingival shades used in the fabrication of fixed partial denture. The current study is an institutional based retrospective study performed over a review of 49832 cases. The results obtained shows the frequency ranges of gingival shades used in a fixed partial denture with gingival ceramics. Within the limitations of the study, The most common type of shade used was G2 and the most common gender undergoing treatment were male subjects.

Keywords: *Celtra ceram shade guide ; Fixed partial denture ; Gingival ceramics ; Shade matching.*

Introduction

Replacing the partially edentulous area in the anterior region can be challenging in achieving an optimal aesthetic result.[1,2]. In the field of dentistry, its superior basis for achieving aesthetics and to replace and replicate the appearance of teeth to mimic nature to its closest sense and form.[3]. Periodontics has been instrumental in treating hard and soft tissue defects. Several regenerative and surgical periodontal procedures can reconstruct three-dimensional architecture of a soft and hard tissue defect.[4,5] However, these invasive surgical procedures can still be of aesthetic concern for the patients. In such situations, defects can be treated by a prosthetic approach.[6] An aesthetically pleasing and a non-invasive more of treatment would be a choice of many[7]. Replacing the incisal relationship, to restore normal teeth, gingival tissue shape, morphology and relationship by including artificial gingiva all together within a fixed partial denture can be challenging.[7-9] .

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Artificial gingival restorations can correct maxillofacial defects, compensate for inadequate maxillary-mandibular relationships and promote air seal during speech.[10,11,12] Tissue replacement procedures/prosthesis can replace lost tissue due to trauma, ridge resorption or traumatic tooth resorption. [13,11]

Dental aesthetics is based on both “ white component “ referring to the tooth and “ pink component “ referring to the gingiva.[4] Materials used in replacing the lost gingiva i.e. the pink component of the processes include auto cure, heat cure acrylics , porcelains, composite resins and thermoplastic acrylics as well as silicon-based soft materials.[14].

Selecting the appropriate shade for pink porcelain possesses a challenge, especially when the patient presents with a high smile line.[1,15,16] Visual shade matching is subjective, consistency is difficult to achieve. Photometric and colorimetric analysis techniques offer great potential For tooth colour evaluation and aiding duplication process.[17,11,12,18].There are various types of dental shade guides for both the “ white complaint” and the “pink component”.The shade guides are as follows, hyashi shade guide, clark shade guide, spectatone, vita shade guide, vitaspan 3-D master shade guide, Which uses systematic and equidistant coverage of natural tooth, Shade spectrum, dentin shade guides , custom shade guides , modified gingival shade guides.[19]

Recent advances include colorimeter, spectrophotometer, digital cameras as filter colorimeters, spectrophotometers and spectroradiometers. The primary advantage of these over visual shade guides is that it is not influenced by the surrounding environment [20].

The present study throws light on the most frequent types of shades used in matching the gingival aesthetic for a fixed partial denture in patients attending a private institution. We used the celtra ceram shade guide system by Densply sirona as the gingival colour indicator for lithium silicates and zirconia oxide.[20,21,22]. This gingival indicator system has an add-on gingival shade guides ranging from G1-G5 , lightest to darkest shades respectively. It also has an indicator for dentin gingiva ranging from DG1 - DG5 , DG1 being the lightest and DG5 being the darkest. The aim of the study is to check the frequency of gingival shades used in the fabrication of fixed partial denture.

MATERIALS AND METHOD

Study Design - Retrospective, descriptive study.

Study Setting - The study was a hospital based study conducted in Saveetha Dental College, Chennai. Data was retrieved from Dental Information Archiving Software (DIAS) and was examined by two examiners.

Ethical approval - Prior to starting study, ethical approval number (SDC/SIHEC/2020/DIASDATA/0619-0320) was obtained from Scientific Review Board, Saveetha Dental College, SIMATS University.

Study Population - The study population consists of patients reporting to the Department of Prosthodontics at Saveetha Dental College.

Study Period - The study was conducted between July 2019 - March 2020.

Inclusion Criteria - 1) Patients aged 18 years and above 2) Patients indicated for a fixed partial denture 3) Patients willing to take part in the procedure.

Exclusion Criteria - 1) Patients aged below 18 years. 2) Patients not willing to take part in the procedure.

Study Instrument - A total of 995 subjects who underwent full mouth rehabilitations were chosen from the study in a total of 49,832 subjects screened for the data.

Statistical Analysis - Data collection was done using microsoft excel and statistical tests were done using SPSS Version 23.0. Descriptive statistics were used. Treatment needs and Gender were compared using Chi Square test. Age, gender and gingival prosthesis were also compared using Chi square test. Pearson correlation was done to assess the relationship between age,gender and different types of shades used. Statistical significance was set at $p < 0.05$.

RESULTS

Figure 1 states the frequency of the age group undergoing treatment with the gingival ceramics. The age group in the current study ranges between 20 years to 73 years of age, in which the most commonly affected age group studied 45 years of age. The most common reason being trauma and treated carious tooth showing symptoms in this particular age group causing the edentulous space. Various studies also suggest that this age group is more susceptible to periodontal diseases which leads to the collapse of the gingival architecture. The y-axis denotes the frequency of age observed, while the x-axis denotes the various ranges of age. The mean age was 38.23 and the standard deviation observed was 12.629.

Figure 2 states that the most commonly affected gender group is male in the current study with 42 male subjects and 33 female subjects were selected, in which gingival shades were used. Incidence of male population is higher than female due to adverse oral habits and they are more prone to traumatic accidents. The x-axis denotes the gender types and the y-axis denotes the frequencies of gender predilection observed. 1 on the x-axis denotes male and 2 denotes female. The mean obtained was 1.44 and the standard deviation being 0.5.

Figure 3 states the frequency of gingival shades used. In the total selected subjects of 75, shades from G1 being the lightest and G5 being the darkest were evaluated. The x-axis denotes the various types of gingival shades used in fabrication of a fixed partial denture and y-axis denotes their frequencies. The values on the x-axis denote various shades namely, 1 is G1, 2 is G2, 3 is G3, 4 is G4, 5 is G5 respectively. In the above obtained results G2 (50.7%) was the most frequently used reported by 30 subjects, followed by 22.7% in G3, 10.7% in the G4, 8% in G5 and 8% in G1. The standard deviation is 1.053 and the mean obtained was 2.6.

Figure 4 represents the correlation between the shade used and the gender. Blue colour on the x-axis denotes the shade G1 used in the specific dentures, Red colour denotes G2, Green colour denotes G3, Orange colour denotes G4, Yellow colour denotes G5, and Sea green colour denotes the total of all the gingival shades used in the study. G2 was used more commonly in 56% male subjects and 44% female subjects with the total being 38. The least used shade in males was G1 and the least used shade in females was G5. This can be due to adverse oral habits. The statistical test performed was a Chi-square test between the frequency of shades used and the gender. The p value obtained was greater than 0.05 making the correlation non significant. X axis denotes the gender types and Y axis denotes the frequencies of shades used.

DISCUSSION

A person's smile clearly plays a significant role in the perception that others have of our appearance and our personality. Restoration of the defective environment inside an esthetic zone is always a challenge.[1,18,23] .Surgical or reconstructive procedures to re-establish the three-dimensional architecture of hard- or soft-tissue deformities have been developed and performed successfully throughout the past 15 years.[18]. However, the result of the surgical procedure is slow, dependent on patient's cooperation, and cannot replace class III and class IV Miller's recession defect where bone loss and gingival recession is severe. It is possible to create esthetically pleasing and anatomically correct tissue contours when small volumes of tissues are being reconstructed. [24]. However, this method is unpredictable when a large volume of tissue is missing

In such situations, a gingival-colored prosthesis can be one of the options as a treatment to recover the hard- and soft-tissue defect. This gingival-colored prosthesis can be of fixed or removable type. Various authors have described clinical situation-based and material-based gingival-colored prosthesis. This article presented two clinical reports of gingival-colored prosthesis for both tooth-supported and implant-supported fixed prosthesis.

However, the biomechanical principles associated with each approach are completely different. As a result of severe bone loss and supportive periodontal ligament, it was not possible to recreate the soft-tissue architecture in either of the cases.[25] A retrospective study in the maxillary anterior region has shown that when the distance from the contact point to the bony crest was greater than 5 mm (due to bone loss), the preservation of interproximal papilla may not be predictable. The option of fixed prosthesis was chosen for both the cases since it gives a significant comfort and self-confidence to the patient with a more natural feeling without any discomfort.[5,12,26,27].

According to the author's knowledge, there is very little or no research conducted on the frequency of the shades used in attaining gingival architecture. Gingival profiles establish natural crown-root ratios and reduce the necessities for technique sensitive surgical procedures. One can reduce the cost and the duration of treatment by using the gingival ceramics. The use of the gingival ceramics further extend down to implant prosthesis and complete dentures.

CONCLUSION

Within the limitations of the study, The most common type of shade used was G2 and males showed a higher predilection than females in requiring gingival prosthesis.

LIMITATIONS

While the sample size being relatively small of 995, single centred and longevity of the shade and complications associated with the use of gingival ceramics were not reviewed.

ACKNOWLEDGEMENT:

We would like to thank our statistician for helping in preparing various statistical parameters of this manuscript. The authors are also thankful to Saveetha Dental College for providing a platform to express our knowledge.

AUTHOR CONTRIBUTION:

Karthik EVG contributed in the concept design of the study, sequence alignment, statistical analysis and drafted the manuscript. Dr.Venkatesh Kommi participated in the design of the study, statistical framework, manuscript drafting. Dr.Uma Maheswari contributed in coordination of the study, manuscript drafting and proofreading. All authors read and approved the final manuscript.

CONFLICT OF INTEREST

The authors have declared no conflict of interest.

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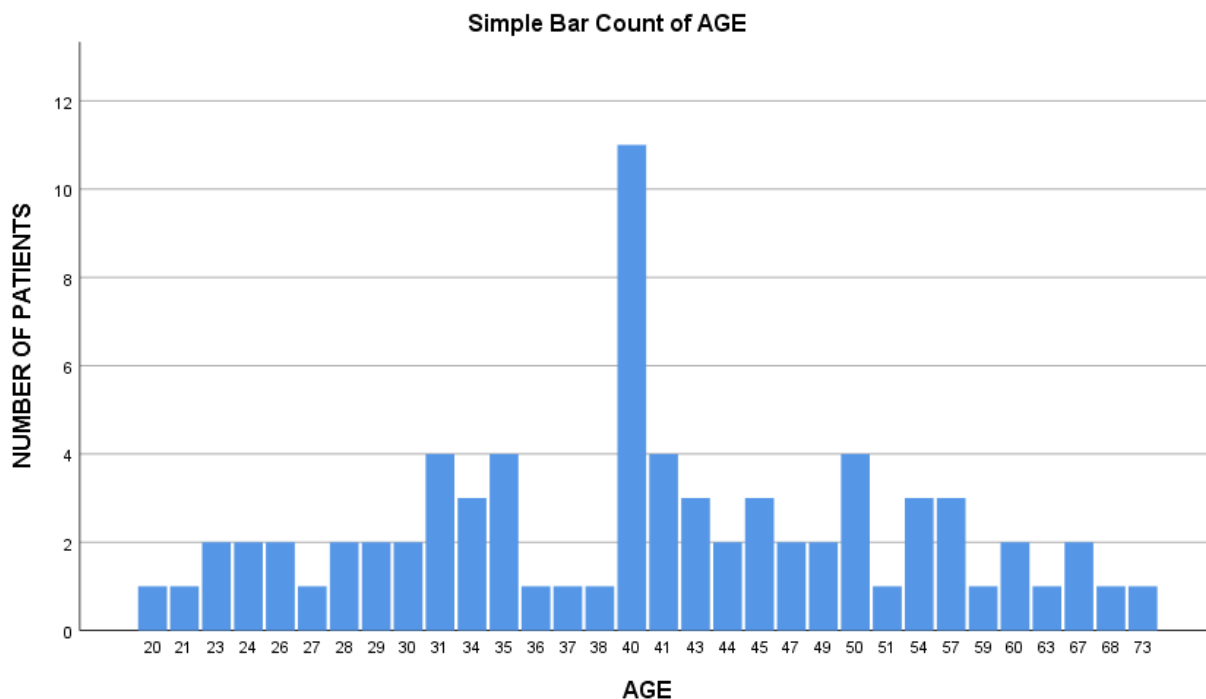


Figure 1: shows the frequency of age group undergoing treatment. X axis represents the age and Y axis represents their frequencies. The age group in the current study ranges between 20 years to 73 years of age, in which the most commonly affected age group studied 40 years of age. The mean age obtained was 43 and the standard deviation observed was 12.829.

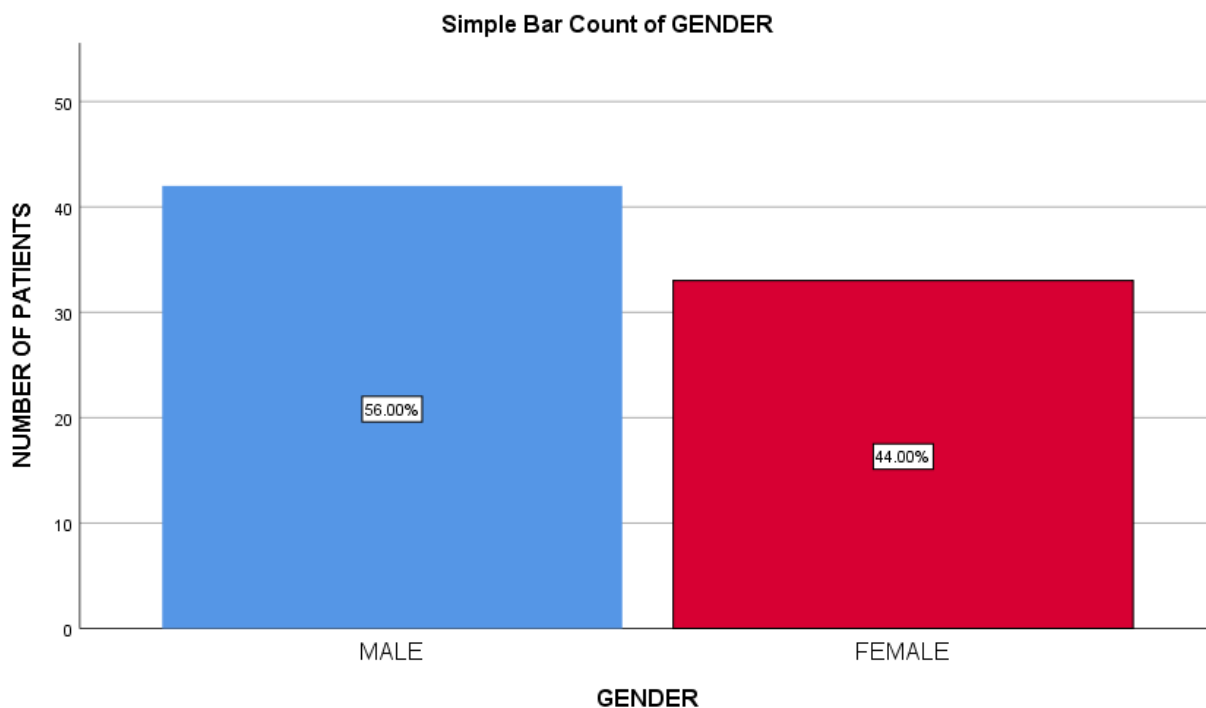


Figure 2 : shows the frequencies of gender undergoing treatment. X axis represents the gender groups and Y axis represents their frequencies.. This graph includes the complete gender group undergoing treatment for a fixed partial denture with and without gingival prosthesis. Within the subjects with gingival prosthesis, there were 42 male subjects and 33 female subjects.

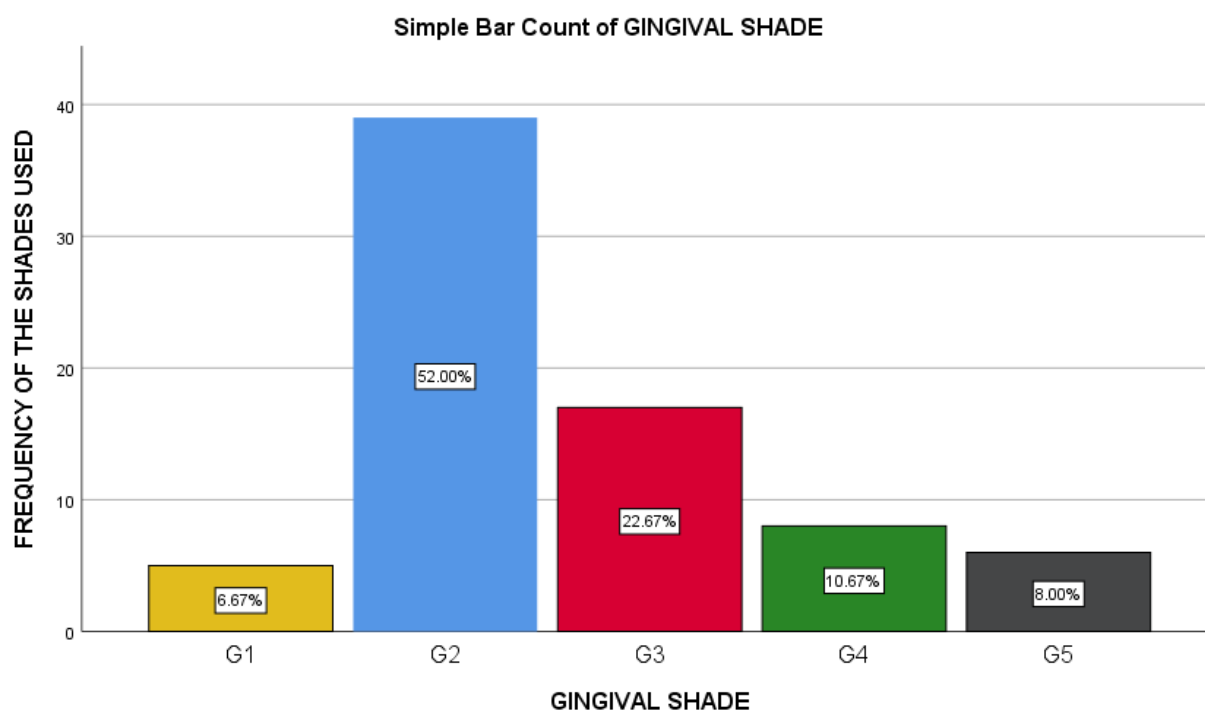


Figure 3 : states the frequency of gingival shades used. In the total subjects of 996, gingival shades were used in only 75 subjects. Shades from G1 being the lightest and G5 being the darkest were evaluated. The X-axis denotes the various types of gingival shades used in fabrication of a fixed partial denture and Y-axis denotes their frequencies. The values on the X-axis denote various shades namely, 1 is G1, 2 is G2, 3 is G3, 4 is G4, 5 is G5 respectively. In the above obtained results G2 was the most frequently used gingival shade, followed by G3, G4, G5 and G1 respectively. The standard deviation was 1.053 and the mean obtained was 2.6.

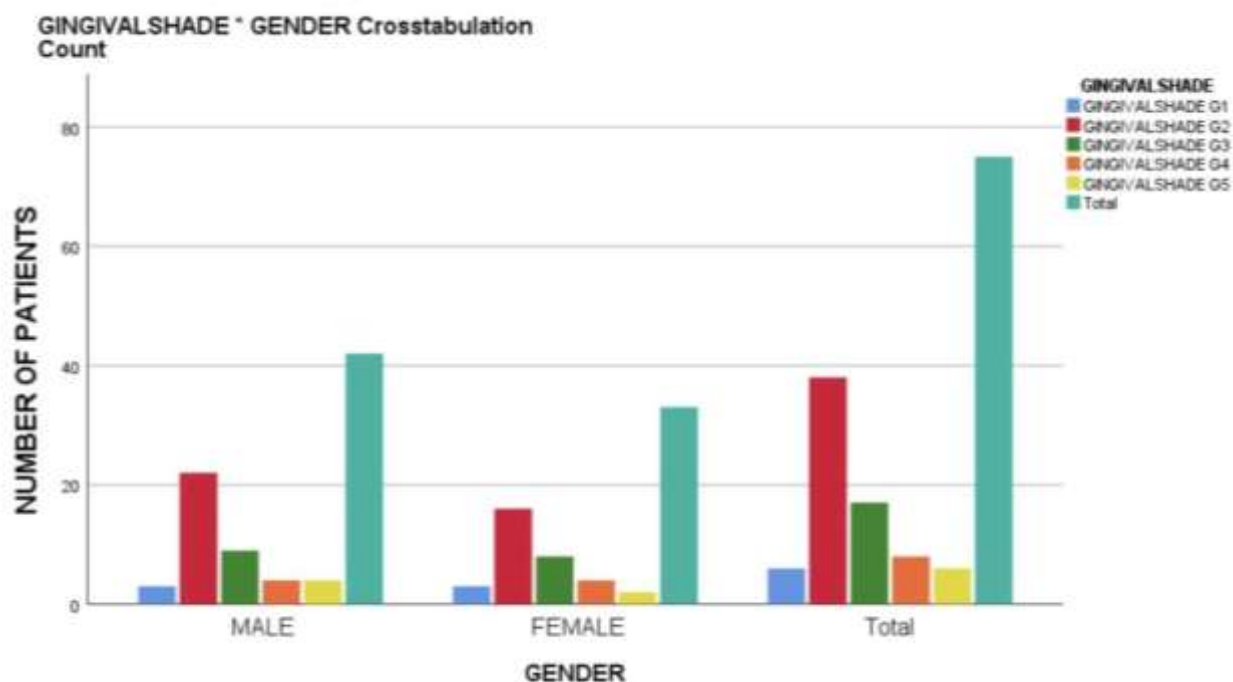


Figure 4 : represents the correlation between the shade used and the gender. X axis denotes the gender types and Y axis denotes the frequencies of shades used. Blue colour on the x-axis denotes the shade G1 used in the specific dentures, red colour denotes G2, green colour denotes G3, orange colour denotes G4, yellow colour denotes G5, and sea green colour denotes the total of all the gingival shades used in the study. The statistical test performed was a chi-square test between the frequency of shades used and the gender. The p value obtained was greater than 0.05 making the correlation non significant. G2 was used more commonly in 56% male subjects and 44% female subjects with the total being 38. The least used shade in males was G1 and the least used shade in females was G5.