

An Assessment of the Shade Differences in the Anterior Teeth According to the Age and Gender, Using Commercially Available Shade Guide

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ABSTRACT:

Objective: To assess the shade differences in the anterior teeth according to the age and gender using commercially available shade guide in the local populations of Hyderabad.

Methodology: This cross sectional study comprised of 200 patients belonging to both genders ranging in age from 15 to 75 years, divided into four groups on the basis of chronological age: Group I: 15 to 30, group II: 31 to 45, group III: 46 to 60 and group IV: 61 and onwards. Shade of the middle third of the labial surface of the anterior teeth was recorded visually using Vitapan[®] classical shade guide.

Data was analyzed via SPSS version 21. Descriptive statistics such as percentage, frequency distribution, cross tabulation and descriptive were included in Data analysis. The level of significance was set at <0.05.

Results: This study revealed that the most common shade recorded was A2 (45%), followed by B2 (20%) and A3 (10%). Younger patients had lighter tooth shades. Shades were darker with increasing age. The most common shade selected in age group I and group II was A2 which were represented as 52.8% and 52.9% respectively. Among males, the most common shade was A2 (47.6%), followed by B2 (19.5%) and A3 (15.9%) whereas in females most common shade was A2 (43.2%), followed by B2 (20.3%) and A1 (10.2%).

Conclusion: This study concluded that the tooth shade selection was strongly associated with both age and gender. Most common classical shade selected was A2. Shades were darker with the advancing age. Women's teeth were lighter than the men's. This information can be effective for fabrication of more life-like prosthesis.

Keywords: Aesthetics, Tooth shade, Shade guide, Prosthesis

INTRODUCTION:

In dentistry, patients are concerned not only with function but also aesthetics¹. The word aesthetics is concerned with beauty and in dentistry aesthetics means to create a beautiful smile.^{2,3} Most of the patients now demand restorations with increased aesthetics because of increasing dental awareness.² Aesthetics of any restoration basically needs to be considered with the parameters of surface form, translucency and shade.^{3,4} Natural teeth have different shades on their surfaces.^{5,6} Natural teeth shades depend on many factors, like age, gender, skin complexion and hair and eyes colour.⁷ Age is the common factor. Shade selected under the type of light is also a major factor.^{8,9,10} There are three main illuminates within any dental clinic: incandescent

light, fluorescent light and day light.^{11,12} Day light has been suggested to be the most appropriate type of light for teeth shade matching.¹³ Extrinsic and intrinsic staining, smoking, betel nut chewing etc, have also an effect on the teeth shade selection.^{14,15,16}

Age of the patient has been found to have a profound effect on the teeth shade. Many studies have shown that teeth shades are darker with advancing age and vice versa.^{17,18} Darker shade means less translucent, increase in yellowness and decreased lightness with an increase in age.¹⁹ That is the reason, during fabrication of complete denture, commonly lighter teeth shades are selected for younger people and darker for older people.²⁰ Another common factor is gender of the patient related with teeth shade selection. Males mostly present with darker teeth shades whereas females show lighter teeth shades.¹⁷

The aim of this study was to collect the demographic data regarding common teeth shades in our local population according to the age and gender. This information will be useful in fabrication of complete denture prosthesis in different age group persons as the selection of artificial teeth colour can be one of the most challenging procedures.

METHODOLOGY:

This was a cross sectional study, conducted in the Department of Prosthodontics at Isra Dental College, Hyderabad, over the period of eight months, from Jan, 2016 to Aug, 2016.

The study consisted of a sample size of 200 patients. Written consent was taken from the patients before shade evaluation. Patients of both genders were included with completely erupted permanent anterior teeth and within the age range starting from 15 years to 75 years.

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They were divided into 4 groups on the basis of the chronological age: Group I: 15 to 30, Group II, 31 to 45, Group III, 46 to 60 and Group IV belonged to 61 and above.

Patients which presented with caries, any type of restoration, endodontic treatment, intrinsic or extrinsic staining, dental erosion, attrition or abrasion, fracture lines, developmental anomalies including fluorosis and orthodontic brackets or bands on the anterior teeth were excluded from study. Those female patients were also excluded who were not willing to remove lipstick and facial makeup before shade evaluation. Those patients were also excluded who had xerostomia, a history of radiation or tooth bleaching.

The shade of the middle third of the labial surface of the permanent anterior teeth was taken by using the Vitapan classical shade guide (manufactured by VITA Zahnfabrik, Bad Sackingen, Germany). Shades were taken in natural daylight preferably between 10:00 am and 12:00 noon on days with clear skies. Patients were seated on an upright sitting chair. Teeth shade readings were made at the start of an appointment to avoid the errors in shade recording due to dehydration. Shades were taken within 1 to 2 minutes and not more than 3 to 4 patients were seen by an observer in a day to overcome the effects of fatigue and tiring of the observer. Patients were draped with a grey-blue napkin and patients were asked to rinse the mouth with normal tap water before shade selection. Patients were viewed at eye-level so that the most colour sensitive part of the retina was used. Eyes were rested immediately after shade selection by focusing on the grey-blue drape for 5 seconds at a time. Teeth shades recording were made very swiftly, from an arm's length distance. Shade tabs were moistened before shade recording. Data was collected & analyzed by SPSS version 21. Descriptive statistics such as percentage, frequency distribution, cross tabulation and descriptive were included in Data analysis. The level of significance was set at <0.05%.

RESULTS:

This study comprised of 200 patients. Out of which 118 (59%) were female and 82 (41%) were male patients. They were divided into four age groups on the basis of chronology. Most of the patients fell in group I (15-30 years), which represented 44.5%, followed by group II (31-45years)35.0%, group III (46-60years) 15.5% and group IV (60+ years) 5.0% respectively. The distribution of patients according to age group and gender is shown in Table-1.

Total 16 different shades were represented in our shade guide. Out of 16, only 12 shades were recorded in this study. When considering the distribution of shade selected according to the gender, it was found that 10 shades were present in females and 10 were present in the male patients. Among males, the most common shade was A2 (47.6%), followed by B2 (19.5%) and A3 (15.9%) whereas in females most common shade was A2 (43.2%), followed by B2 (20.3%) and A1 (10.2%), as shown in Table-2.

Out of 200 patients, the most common shade recorded was A2 (45%), followed by B2 (20%) and A3 (10%) among all patients, shown in Fig-1.

While considering the distribution of shade selected according to the age groups, the results found that, the most common shade selected in group I and group II was A2, which comprised 52.8% and 52.9% respectively, whereas in group III- common shade selected was B2-35.5% and in group IV, A3-70.0% was recorded (Table-3).

DISCUSSION:

This study was undertaken to assess a relationship between the different tooth shades of the individuals according to the age and gender. Tooth shade matching can also be done using one of the two methods: one is instrumental (spectrometers, photoelectric colorimeters and colour scanners) and other is visual shade guide²¹. Both techniques have inherent inaccuracies.¹⁵ In spite of being unreliable,²² visual shade analysis remains the most commonly used method because it is more cost effective and quick as well.¹⁶

For tooth shade determination, the middle third of the tooth surface was used. The middle site of the tooth is said to be the best representative of its colour because the incisal site is most often translucent and is affected by its background while the cervical colour is modified by light scattered from the gingiva.^{3, 23}

The results of this study showed that there was a significant relationship between the teeth shades and the age-groups selected. It was noted that the shades of the teeth to be darker with increasing age, which was in accordance with other studies on the subjects.^{6, 15, 17, 24}

Hasegwa et al¹⁸ conducted study in Japanese population, they observed decrease in lightness of the natural tooth colour at the center to the cervical site and increased yellowness with increasing age. Similar correlation was reported by Jahangir¹⁵ where a significant association was found between tooth colour and age of the patients, tooth tended to become darker in colour with advancing age. Esan¹⁷ found in his study that the percentage of lighter tooth shades decreased with age and that of darker ones increased with age within an age group. Hassan⁶ found that the number of patients exhibiting colours of grey and red-grey increased with advancing age. It was seen in an earlier findings by Goodkind²⁵ that after the age of approximately 35 years, tooth tended to become darker and more saturated in colour at center site whereas colour at cervical site remained unchanged, which may have been due to already thin enamel layer at the cervical portion of the tooth.

When considering the tooth shades in relation to the gender, our study showed that males exhibited darker shades than females of the same age group. This finding was supported by studies conducted by Esan¹⁷ and Guo²⁶. Their studies showed that gender is significantly associated with tooth shades. They found that the men were more likely to exhibit darker shades whereas females of the same age group exhibited lighter tooth shades.

A more lifelike prosthesis could be provided to the patients when certain factors like age, gender, and skin complexion, are kept in mind while selecting suitable teeth shades for the prosthesis.

CONCLUSION:

With the limitations of the current study, it can be concluded that the selection of the tooth shades is significantly influenced by age and gender. Selection of the shade is significantly related to the age of the

patients, in that teeth tend to be darker in colour with increasing age. It is also significantly related to the gender, in that the males exhibit darker teeth shades than females.

Furthermore, there is a lack of published literature and limited scientific information regarding the teeth shades selection. It is suggested that further research should be carried out with different shade guides available in the market to identify any other more accurate shade guide than the one used in our study.

Figure: 1
Classical tooth shade frequency

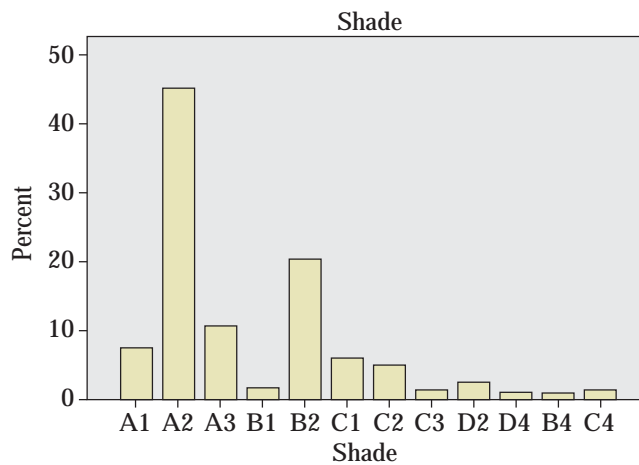


Table-1
Distribution of patients according to age group and gender

Age Group	Gender (%)				Total (%)
	Male		Female		
Group I	39	(47.6%)	50	(42.4%)	89 (44.5%)
Group II	25	(30.5%)	45	(38.1%)	70 (35.0%)
Group III	11	(13.4%)	20	(16.9%)	31 (15.5%)
Group IV	7	(8.5%)	3	(2.5%)	10 (5.0%)
Total	82	(100.0%)	118	(100.0%)	200 (100.0%)

Table: 2
Distribution of patients according to shade selected and gender

Shade Selected	Gender(%)		Total(%)
	Male	Female	
A1	3(3.7%)	12(10.2%)	15(7.5%)
A2	39(47.6%)	51(43.2%)	90(45.0%)
A3	13(15.9%)	8(6.8%)	21(10.5%)
B1	1(1.2%)	1(0.8%)	2(1.0%)
B2	16(19.5%)	24(20.3%)	40(20.0%)
C1	1(1.2%)	11(9.3%)	12(6.0%)
C2	3(3.7%)	7(5.9%)	10(5.0%)
C3	2(2.4%)	0(0.0%)	2(1.0%)
D2	3(3.7%)	1(0.8%)	4(2.0%)
D4	0(0.0%)	1(0.8%)	1(0.5%)
B4	1(1.2%)	0(0.0%)	1(0.5%)
C4	0(0.0%)	2(1.7%)	2(1.0%)
Total	82 (100.0%)	118(100.0%)	200(100.0%)

Table-3
Distribution of patients according to shade selected and age group

Shade Selected	Age Group(%)				Total(%)
	Group I (15-30 years)	Group II (31-45 years)	Group III (46-60 years)	Group IV (60+ years)	
A1	5 (5.6%)	6 (8.6%)	4 (12.9%)	0 (0.0%)	15 (7.5%)
A2	47 (52.8%)	37 (52.9%)	6 (19.4%)	0 (0.0%)	90 (45.0%)
A3	5 (5.6%)	9 (12.9%)	0 (0.0%)	7 (7.0%)	21 (10.5%)
B1	1 (1.1%)	1 (1.4%)	0 (0.0%)	0 (0.0%)	2 (1.0%)
B2	17 (19.1%)	12 (17.1%)	11 (35.5%)	0 (0.0%)	40 (20.0%)
C1	9 (10.1%)	0 (0.0%)	1 (3.2%)	2 (20.0%)	12 (6.0%)
C2	2 (2.2%)	3 (4.3%)	5 (16.1%)	0 (0.0%)	10 (5.0%)
C3	1 (1.1%)	0 (0.0%)	1 (3.2%)	0 (0.0%)	2 (1.0%)
D2	1 (1.1%)	0 (0.0%)	2 (6.5%)	1 (10.0%)	4 (2.0%)
D4	1 (1.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.5%)
B4	0 (0.0%)	0 (0.0%)	1 (3.2%)	0 (0.0%)	1 (0.5%)
C4	0 (0.0%)	2 (2.9%)	0 (0.0%)	0 (0.0%)	2 (1.0%)
Total	89 (100.0%)	70 (100.0%)	31 (100.0%)	10 (100.0%)	200 (100.0%)

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