Original Article

IDENTIFICATION OF TOOTH SHADE IN VARIOUS AGE GROUPS OF PAKISTANI POPULATION USING VITA EASYSHADE

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ABSTRACT

Objective: *The aim of the present investigation is to identify tooth shade among a group of Pakistani patients.*

Materials and Methods: *Total number of patients was 227. Participants age ranged from 16 to 65 years, which, was divided into four groups. The tooth included in the study was sound maxillary right or left central incisors. Vita Easyshade was used to select the tooth shade.*

Results: *Most common classical shade was B2 with highest incidence in between ages 26-35 years and shade A spreads widely among the groups.*

Conclusions: *B2 was the most common classical tooth shade in Pakistani population.*

Recommendations: *Health education regarding oral hygiene should be given at school level.*

Key words: *Tooth shade, Vita Easyshade, Age.*

INTRODUCTION

In contemporary dentistry, the needs of patients are considered in terms of function and dental appearance[1]. The ultimate objective of aesthetics in dentistry is to create a beautiful smile and the aesthetics of any restoration needs to consider the parameters of surface form, translucency and shade[2]. The shade of the restoration is found to be the most important factor in the patient's assessment[3], where majority of patients with an anterior metal ceramic restoration were aware of the shade mismatch relative to the adjacent natural tooth[4]. Accomplishing the shade selection is normally done by visually comparing the selected tooth to shade tabs from commercially available shade guides. There are two systems used to describe color: the descriptive Munsell color system and the more quantitative CIELAB (Commission International de l'Eclairage) system[5]. The Munsell system describes color in three attributes: hue, chroma and value. Used almost exclusively in color research, CIELab describes color as the product of blending three color coordinates; L*, a* and b*. By giving these three coordinates numerical values the CIELab system is able to locate an object in a three-dimensional color space. Tooth shade is measured by various methods including visual assessment with a shade guide or instrumental measurement[3]. Due to inter-human differences in the perception of color, visual shade assessment of teeth is lacking standardization that may be improved by the use of a spectrophotometer[6]. The shades of several tooth-colored restoratives are now keyed to the Vita Classical Shade Guide which is a very popular system in the dental industry[7]. To select a shade that will ultimately result in a restoration matching the adjacent natural dentition; it is helpful to have a background about the shade distribution within the specific group of people. More recently colorimeters, spectrophotometers, and image analysis techniques have been introduced and

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advocated to reduce the subjectivity integral in shade selection. Compared to conventional visual shade assessment, spectrophotometric analyses were determined to be more reproducible[8,9,10]. Many studies had implemented tooth color coordinates in association with age, gender and skin color[11,12,13]. Identifying tooth shade according to our population age distribution will limit the number of shade tabs that are needed for matching. A careful reduction of the number of shade tabs in the guide tested might simplify shade selection procedures and help to standardize shade-taking[14,15].

METHODS AND MATERIALS

The present study was conducted on 227 patients attending No 6 Dental Unit, PAF Hospital Islamabad. Ethical board permission was obtained. Patients were divided into four groups; Group 1 (16-25 years), group 2 (26-35 years), group 3 (36-45 years) and group 4 (46 years and above). The tooth included in the study was either right or left sound maxillary central incisor. Any tooth that was bleached or with enamel hypoplasia, fluorosis, veneered, carious or restored was excluded. Vita Easyshade was used to select the tooth shade. A portable clinical spectrophotometer (Vita Easyshade, Vident, Brea, California, USA) was used to identify the tooth shade. The contact probe tip was held at 90 degree to the surface in the middle one third of the tooth. The display presents the closest Vita shade in the classical and 3D shade guide designation. According to the manufacturer, two identical readings are required to ensure accuracy; the output reading was recorded. The data was analyzed by using the software SPSS statistical package version 11.5(SPSS Inc., Chicago, IL, USA). Tests significance level was taken at the level of P-value ≤ 0.05.

RESULTS

Out of 227 patients, 157 (69.16%) were male while 70 (30.84%) were female with a male to female ratio of 2.24:1.The age distribution of 227 patients is given in Table-1. Most of the participants fell in Group-2 accounting for 44.9% followed by Group-1 (23.3%).

Table-1: Age Distribution

Age Group	n	%
16-25	54	23.79
26-35	103	45.37
36-45	42	18.50
46 & above	28	12.34
Total	**227**	**100**

Table 2: Association between Classical tooth shade and age

Classical Tooth Shade	Age group in years								Total	
	16 - 25		26 - 35		36 - 45		46 and above		n	%
	n	%	n	%	n	%	n	%		
A1	1	0.4	5	2.2	4	1.8	4	1.8	14	6.2
A2	16	7	27	11.9	12	5.3	7	3.1	62	27.3
A3	2	0.9	12	5.3	8	3.5	4	1.8	26	11.5
A3.5	1	0.4	1	0.4	0	0	2	0.9	4	1.8
(Shade A)	**20**	**8.7**	**45**	**19.8**	**24**	**10.6**	**17**	**7.6**	**106**	**46.8**
B1	0	0	4	1.8	0	0	3	1.3	7	3.1
B2	30	13.2	37	16.3	7	3.1	8	3.5	82	36.1
B3	0	0	6	2.6	4	1.8	1	0.4	11	4.8
(Shade B)	**30**	**13.2**	**47**	**20.7**	**11**	**4.9**	**12**	**5.2**	**100**	**44**
C1	1	0.4	1	0.4	0	0	1	0.4	3	1.3
C2	1	0.4	6	2.6	3	1.3	1	0.4	11	4.8
C3	1	0.4	0	0	1	0.4	0	0	2	0.9
(Shade C)	**0**	**1.2**	**7**	**3**	**4**	**1.7**	**2**	**0.8**	**16**	**7**
D2	0	0	2	0.9	2	0.9	0	0	4	1.8
D3	0	0	1	0.4	0	0	0	0	1	0.4
(Shade D)	**0**	**0**	**3**	**1.3**	**2**	**0.9**	**0**	**0**	**5**	**2.2**
Total	**53**	**23.1**	**102**	**44.8**	**41**	**18.1**	**31**	**13.6**	**227**	**100**

(p- value = 0.026)

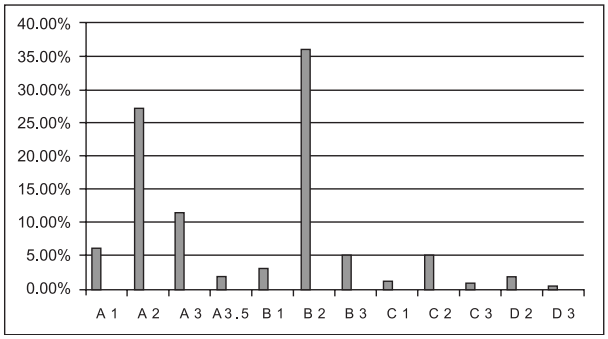

Figure-1: Tooth shade frequency in Pakistani Population

Shade A-type represented 46.8% followed by B-type (44%). Distribution of shade guide is given in Figure-1.

Results showed that there was significant association between tooth shade and age with p-value at level 0.026. Shade A spreads widely among the groups. B2, B3 and B1 are the commonest shades in Group-1 and Group-2 while Group-3 and Group-4 has a sequence of A2, A1, A3 and A 3.5. The distribution of shade in relation to age group is given in Table-2.

DISCUSSION

The suggestion that population age-specific classical tooth shade guide is attainable is supported by the results of this investigation; since there was a powerful relation between tooth shade and age of patient (p-value = 0.026). These findings give rise to proposition that compensating the differences of natural tooth color space, may likely expand the options of shade selection for all populations. The significant relation between Classical tooth shade and age (p=0.026) was supported by worldwide studies[12,14,16]. Paravina[17] et al divided tooth shades into 4 categories according to value the highest value group (shades A1, B1, A2, B2); high value group (shades C1, D2, A3, D4); medium value group (shades B3, B4, C2, D3); and low value group (shades A3.5, C3, A4, C4). In the present investigation, all examined groups ranged between the highest and high value groups which is in agreement with the findings of Jahangiri[12] et al, Cocking[16] et al and Udea[18] et al. Their results also showed medium and low values tooth shade for these age groups respectively. This analysis of tooth shade/age relation revealed that same age group might have the same tooth shade worldwide. The above results explanation could be due to the significant relation between age and CIELAB coordinates (L*, b* and a*) with increase of age teeth become darker, more yellow and more red. This finding was well documented in many studies[11,14,19]. Although Odioso and Reno[19], and Gibb[20] et al did not include a* in their studies. Xiao[13] et al and Hasegawa[11] et al found that a* values showed no significant association. Moreover Zhao and Zhu[21] did not include b* in their study.

The limitations of the present study may be derived from the sample size, selected populations as well as the measuring instrument. The sample does not represent a random sample of the Pakistani population so extrapolation of the present study results to the general population must be done with cautious. With regard to the population, 69.16% of the recruited subjects were females and most of the population were in Group-2 which represents 44.8% of the sample size. The natural tooth shade females and younger individuals tend to be less saturated compared to males and older populations. This could be responsible for the concentration of measured shades in B-type. Vita Easyshade 5-mm probe captures roughly 25% of the color reflection of the measured tooth, while the middle area captured was most representative of a tooth's color, this limited window yields incomplete data22, 23. Further research is necessary to validate the present investigation findings. The participants should be balanced for age groups, ethnic background and gender. Other contributing factors to the shade of teeth, such as genetics and influence of nutrition during the development of tooth bud, should be investigated.

CONCLUSIONS

The most common classical shade was B2 with highest incidence in between ages 26-35 years and shade A spreads widely among the population

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