Original Article

Correlation of Tooth Shade with Skin Colour and Gender- A Comparative Study

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ABSTRACT:
Aim; Aim of the present study was to correlate tooth shade with skin colour and gender. **Materials and Method;** The study comprised of 250 subjects. The sample selection was done through non-probability sampling technique. The study included both the genders with age group ranging from 18 years to 35years old. The shade guide used in this study was Vitapan Classical (Vident) shade guide. The tabs in this shade guide were divided in to four groups (A, B, C, D), with A group shade contains 5 tabs (A1, A2, A3, A3.5, A4); B group shade contains 4 tabs (B1, B2, B3, B4); C group shade contains 4 tabs (C1, C2, C3, C4); D group shade contains 3 tabs (D2, D3, D4). Based on the shade guide of Revlon makeup foundation, colour of the skin is categorized as fair, medium and the dark. The spearman's correlation and chi-square test was used for statistical analysis with a P-value of 0.05 is considered to be statistically significant. **Results;** Among 250 subjects, shade A group had 96 (38.4%) subjects, shade B group had 81 (32.4%) subjects, shade C group had 56 (22.4%) subjects and shade D group had 17 (6.8%) subjects. A2 (n=59) shade from A group, B1 (n=51) shade from B group, C1 (n=56) shade from C group, D2 (n=10) shade from D group had highest number of subjects as per Chi-Square analysis. The association of gender to the different shades of the tooth was proved to be significant. The correlation of skin colour with different shade of tooth showed that; medium coloured skin of A2 shade (n=32) from A shade, medium coloured skin of B1 shade (n=28) from B shade, medium coloured skin of C1 shade (n=32) from C shade, medium coloured skin of D2 shade (n=5) from D shade had highest number of subjects and therefore correlation was proved to be statistically significant. **Conclusion;** There was a significant positive correlation between skin colour and different shades of tooth, which proved that the people with skin colour of fair to medium will have teeth with lighter shade.
Keywords; gender, shade guide, skin colour, tooth colour

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INTRODUCTION:
The visual record a dentist care for is a smile. In this present society, people are more esthetically conscious. Importance for beauty in turn increased the requirement for esthetic dentistry. The factor which is considered to be esthetically significant is tooth shade. Therefore shade of a tooth cannot be underestimated as it signifies the attractiveness of smile.[1]

The surface of the natural teeth acquires different shades, which is influenced by various factors. The most common factor is age and light. Light factor is ignored most of the times. Contrast is one more factor which imparts different complexion of the skin.[2] Visual defects including colour blindness further worsens the case. Other factors which affect natural teeth shade in vivo are smoking, extrinsic/intrinsic stains, and chewing betel quid.[3]

Shade, translucency and surface form are the parameters to be considered for any esthetic restoration. The most significant factor which patients' assess the restoration is by shade.[4] The shade guides which are commercially available are compared with the tooth of interest during selection of shade visually.

Artificial tooth selection is done by many factors such as skin colour, age and sex. Various methods are devised for evaluating the esthetic factors which are reliable for tooth selection.[5]

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Skin tone of the face is most commonly recommended by the authors as a guide for selection of tooth. Some authors have mentioned that fair complexioned people will have less colour saturation and colour range of teeth in turn makes the colour of teeth light in harmony with the face colour. Likewise with the dark complexioned people teeth colour will be darker in harmony with face colour.[6]

There has been a controversy regarding the influence of gender on shade of the tooth. Few authors suggested that the relation between tooth shade and gender is of no significance. Where in others insisted of linking tooth shade with gender.[6,2] Hence the present study was conducted to assess the relationship between tooth shade with skin colour and gender.

MATERIALS AND METHODS:

The study comprised of 250 subjects. The selection was done through non-probability sampling technique. The study included both the genders with age group ranging from 18 years to 35years old and who has permanent maxillary central incisors which were completely erupted. The study excluded the subjects whose permanent maxillary left or right central incisors exhibited any deviations such as; caries, restoration (of any type), Endodontically treated, stained tooth (intrinsic or extrinsic) caused by smoking, betel quid chewing, tetracycline etc…, developmental defects including fluorosis, dental attrition, abrasion or erosion, any form of fracture line, and which was orthodontically treated.

The subjects participated voluntarily and their decision to participate in the study or not, did not have any influence on the status (present/future) of individuals' as a patient. After detailed explanation of the study procedure, the subjects signed the consigned consent form.

Data collection:

A standardized questionnaire was used to collect the data from the subjects. The demographic data was recorded during the process which included age, sex, colour of the skin and tooth number.

The study was conducted by a principal examiner, who recorded the shade of the tooth. The principal examiner was tested for any visual disabilities such as colour blindness and colour vision deficiency. The subject was examined positioning upright with an arm length away from the examiner's position. The subject's mouth positioned at the examiner's eye level for selection of shade. The calibration was made on daily basis as manufacturers' outline using shade guide.

Shade selection:

The shade guide used in this study is Vitapan Classical (Vident) shade guide, which is a gold standard. The tabs in this shade guide are divided in to four groups (A, B, C, D) based on the hue and is called as primary group. Within the group, the tabs are arranged based on the in the chroma. The chromatic tabs are numbered higher with increase in the chroma. A group shade contains 5 tabs (A1, A2, A3, A3.5, A4); B group shade contains 4 tabs (B1, B2, B3, B4); C group shade contains 4 tabs (C1, C2, C3, C4); D group shade contains 3 tabs (D2, D3, D4).[7] As per manufacturer's instruction, a principal examiner will evaluated the shade of the tooth with skin colour.

Skin colour:

The shade of skin is categorized as three groups as fair, medium & dark using the makeup shade guides of Revlon foundation as a reference. The fair category corresponds to nude, vanilla and shell shades of Revlon compacts. The medium category corresponds to the cool beige, medium beige, and natural shades of compact. The dark category corresponds to the rich ginger shades and golden beige of compact. The compacts' deeper shades beyond this were considered as dark skin.

Statistical analysis:

The analysis of data was done by using the Statistical Package for Social Sciences (SPSS), Version 20.0. Descriptive statistics were calculated. Chi square test and spearman's correlation is used for data analysis. A P-value of <0.05 was taken as statistically significant.

RESULTS:

The study subjects distribution was done as showed in table 1 by gender and tooth shade wise. Among 250 subjects, shade A had 96 (38.4%) subjects, shade B had 81 (32.4%) subjects, shade C had 56 (22.4%) subjects, and shade D had 17 (6.8%) subjects. All the groups had more female subjects than male.

The subjects were categorized as fair, medium and the dark according to the colour of the skin,. There were 38% of fair, 41.2% of medium and 20.8% of dark complexioned subjects in the study. The female subjects were more under fair group and male subjects were more under medium and dark coloured group as per table 2.

To check the gender and different shade of tooth correlation, Chi-Square test for done as in table 3. A2 (n=59) shade from A group, B1 (n=51) shade from B group, C1 (n=56) shade from C group, D2 (n=10) shade from D group had highest number of subjects. This proved that the different shade of the tooth was associated with gender significantly.

The association of different shade of tooth and skin colour is showed in table 4. Medium coloured skin of A2 shade (n=32) from A shade, medium coloured skin of B1 shade (n=28) from B shade, medium coloured skin of C1 shade (n=32) from C shade, medium coloured skin of D2 shade (n=5) from D shade had highest number of subjects and therefore correlation was proved to be statistically significant.

Table 1: Tooth shades and gender wise distribution of study subjects

Shades	Gender		Total
	Male (%)	Female (%)	
Shade A	44 (45.8%)	52 (54.2%)	96 (38.4%)
Shade B	38 (46.9%)	43 (53.1%)	81 (32.4%)
Shade C	26 (46.5%)	30 (53.5%)	56 (22.4%)
Shade D	10 (58.9%)	7 (41.1%)	17 (6.8%)
Total	118 (47.2%)	132 (52.8%)	250 (100%)

Table 2: Skin colour and gender wise distribution of study subjects

Skin colour	Gender		Total
	Male	Female	
Fair	35 (36.8%)	60 (63.2%)	95 (38%)
Medium	56 (54.4%)	47 (45.6%)	103 (41.2%)
Dark	27 (51.9%)	25 (48.1%)	52 (20.8%)
Total	118 (47.2%)	132 (52.8%)	250 (100%)

Table 3- Association between different tooth shades and Gender

Shades		Gender		Chi-Square value	P value
		Male (n)	Female (n)		
Shade A	A1	10	13	18.042	0.001*
	A2	28	31		
	A3.5	06	08		
Shade B	B1	26	25		
Shade B	B2	12	18		
Shade C	C1	26	30		
	D2	6	4		
Shade D	D3	4	3		

Table 4- Correlation between different tooth shade and skin colour

Shades		Skin colour			r value	P value
		Fair (n)	Medium (n)	Dark (n)		
Shade A	A1	8	12	3	0.624	0.001*
	A2	16	32	11		
	A3.5	5	8	1		
Shade B	B1	14	28	9		
Shade B	B2	10	15	5		
Shade C	C1	18	32	6		
	D2	2	5	3		
Shade D	D3	2	3	2		

DISCUSSION:

The individuals' psychophysical response towards the interaction of light with other objects is a colour. The hard tissues and light's physical property will influence the colour. The individuals' psychological precondition also affects perceived colour. For a facial restoration to be esthetically successful, colour of the tooth should complement the skin. The selection of tooth shade for a complete denture without any remaining teeth and pre-extraction record, will be entirely subjective.[8]

The tooth middle third site is used for the determination of the shade, as there will be gradation of colour from incisal to cervical area. The incisal area is often affected with its background due to its translucency and cervical area is affected by the light reflected from gingival.

Therefore middle area is generally preferred. The facial skin colour is taken as the basic shade guide during tooth shade selection. Particularly, the value of the teeth colour must match with the lightness or darkness of individuals' skin tone of the face.[9]

This study had more dark skin coloured males compared to that of females. The results from this study showed association of gender with their tooth shade which is comparable to studies conducted by Azad AA et al[10], Esan et al[11] and Guo et al[12]. Their studies proved that, the darker shaded tooth were present more likely in men compared to that of same aged women who have lighter shade of tooth. The study by Zhu et al[13] in China, showed that there was no change in the anterior teeth colour in between men and women.

The Vitapan Classical is the widely used shade guide by dentists was used in this study. The shades of the teeth were determined under uniform and standardized conditions. Facial skin colour was taken as basic guide to select the tooth shade. The teeth colour value was kept matching with the lightness and darkness of skin tone of the face.[1]

When relation between tooth shade and gender was considered, it showed its association to be statistically significant from present study. The present study results were similar to that of the Esan et al[11] study, which showed that darker shade of the tooth is most likely to be seen in men compared to women of same age have lighter shade. These results from Veeraganta SK et al[14] states that, the ratio of imbalance in the sample size between men and women in the study may have affected the study results.

The complexion of the face should be taken as basic guide for tooth colour selection as suggested and also the teeth value should match with the lightness or darkness of facial skin tone. The present study showed that, the association of skin colour to the value of tooth shade to be statistically significant. The similar results from Jahangiri et al[2] study showed inverse relation between skin colour and value of tooth shade. There was a disagreement with the results by Esan et al[11] by the fact that; there was a variation in the sampling method and lack of sharp contrasts within different skin coloured people in a population were considered in this study. There were various studies conducted in the past to know the relationship between tooth shade and skin colour.[7,15,16] The study conducted by Herekar M et al[16] in Belgaum showed that the most common shade within the population was under A2 and A3. From present study, we have the most common tooth shade to be A2 and B1 which follows. There are many factors such as age, gender, ethnicity or race, skin colour, eye colour which acts as a influencing factor during selection of teeth as suggested by many authors. To understand these factors in edentulous patients who do not have any preexisting extraction records will be a challenge for all the dentists in the world. For which a longitudinal study is required to assess the change in the skin colour of the face by age and also to know the changes in the tooth shade as age progress from young to old.

CONCLUSION:

The study showed a positive correlation between skin colour and different shades of tooth. The study also proved that fair/medium skin coloured people will have lighter teeth shade. This result will serve as a potential guide in obtaining natural appearance during tooth shade selection for partial or full mouth rehabilitation.

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