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ORIGINAL RESEARCH

Evaluation of Relationship of tooth color, eye color and skin color and its relation with gender

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ABSTRACT:

Background: The color of teeth is strongly determined by dentin with more translucent enamel playing a lesser role through scattering at wavelengths in the blue range. The present study was conducted to assess tooth color, eye color and skin color and its relation with gender. **Materials & Methods:** The present study was conducted on 120 subjects of age ranged 20-40 years of both genders. Eye color or iris color was visually inspected and was assessed as: score 1 was for Blue, blue/green light, score 2 was for brown/ gray, score 3 was for dark brown and score 4 was for black. Skin color was determined on the forehead at 3 cm above the nasal bridge and then it was categorized as: score 1 for very light, 2 for light, 3 for middle and 4 for dark. Tooth color was measured using Vita Easy Shade Advance and expressed as L, C and H. **Results:** Age group 20-30 years had 35 males and 32 females and 30-40 years had 25 males and 28 females. A negative and significant correlation between skin color and L* in males and females was found. A negative and significant correlation was seen between eye color and chroma of tooth (P< 0.05). A negative but significant correlation between age and L* in males and females (P< 0.05) was observed. **Conclusion:** Authors found that hue, value and chroma of tooth are partially dependent on skin color, eye color, age, and gender.

Key words: Chroma, hue, value.

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INTRODUCTION

The color of teeth is strongly determined by dentin with more translucent enamel playing a lesser role through scattering at wavelengths in the blue range. The tubules are the predominant cause of light scattering in dentin and in enamel the hydroxyapatite crystals contribute significantly to scattering.¹ At the outermost incisal and

proximal edges of teeth, the layer of enamel is backed only by its own curved surface; because of the interfacial reflection caused by the change in index of refraction, this surface acts as a condensing mirror focused on the dentin.²

The word "Esthetic" meaning "concerned with beauty or the appreciation of beauty" is regularly used in

dentistry to describe restorations and artificial teeth replacements. Increasing dental awareness among the general population in developing countries has led to increased demand for esthetic restorations. Selection of tooth shades based on natural anterior teeth is influenced by many factors.³ Light under which the shade is viewed is a major factor. Clinical skill of the operator and shade guide system used, play an important role in the shade selection process. Staining due to various factors, both extrinsic and intrinsic, have a direct impact on altering tooth shades. Some of the extrinsic factors are diet, smoking, xerostomia, and restorations. Intrinsic factors include congenital defects of enamel or dentin such as amelogenesis and dentinogenesis imperfecta, environmental factors such as tetracycline staining, traumatic injury, dental caries, and aging.⁴ Special devices such as spectrophotometer give result in a more objective measurement of color and have shown good repeatability of natural teeth color. Spectrophotometers measure one wavelength at a time from the reflectance or transmittance of an object and have been used to measure the visible spectra of teeth.⁵ The present study was conducted to assess tooth color, eye color and skin color and its relation with gender.

MATERIALS & METHODS

The present study comprised of 120 subjects of age ranged 20-40 years of both genders. All patients were informed regarding the study and written consent was obtained.

Data such as name, age etc. was recorded. Each subject was made to sit upright on a dental chair, facing the natural daylight and viewed at eye level. Eye color or iris color was visually inspected and was assessed as: score 1 was for Blue, blue/green light, score 2 was for brown/ gray, score 3 was for dark brown and score 4 was for black. Skin color was determined on the forehead at 3 cm above the nasal bridge and then it was categorized as: score 1 for very light, 2 for light, 3 for middle and 4 for dark. Tooth color was measured using VitaEasy Shade Advance and expressed as L* (value; lightness of color, values from 0 = black to 100 = perfect white) C* (chroma; saturation of color, 0 = 0% saturation to 100 = 100% saturation) h* (hue; corresponding to wavelength, commonly called color). Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Age group (Years)	Male	Female
20-30	35	32
30-40	25	28

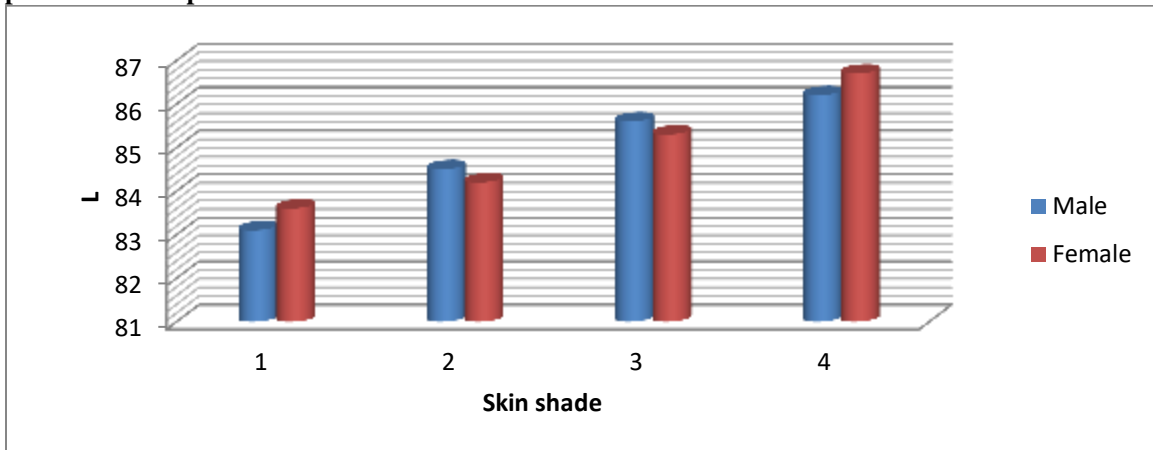
Table I shows that age group 20-30 years had 35 males and 32 females and 30-40 years had 25 males and 28 females.

Table II Skin color, eye color, age, and gender with mean L*, C*, and h* values

Parameters	L	C	H
Skin color score	Mean	Mean	Mean
1 (10)	83.1	17.2	94.5
2 (30)	84.5	19.5	93.2
3 (65)	85.6	16.7	94.1
4 (15)	86.2	15.1	96.4
Eye color score			
1 (0)			
2 (35)	83.5	19.3	94.5
3 (70)	84.2	17.5	93.9
4 (15)	84.9	16.4	94.1
Gender			
Male	82.5	19.2	93.4
Female	84.2	16.8	94.5
Age group (Years)			
20-30	82.1	19.4	93.2
30-40	84.5	16.7	94.8

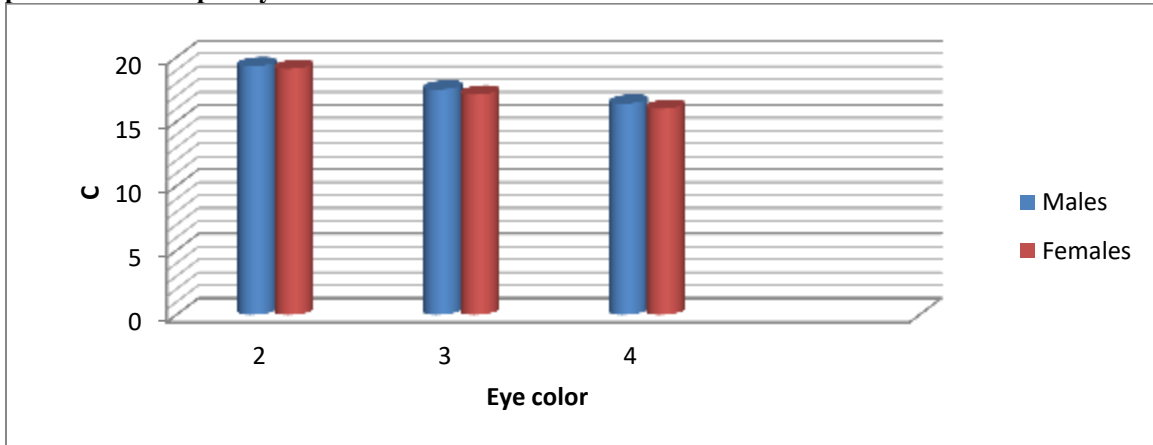
Table II shows that skin color, eye color and L, C and H value based on gender and age groups which revealed significant difference in values.

Graph I Relationship of skin color and L



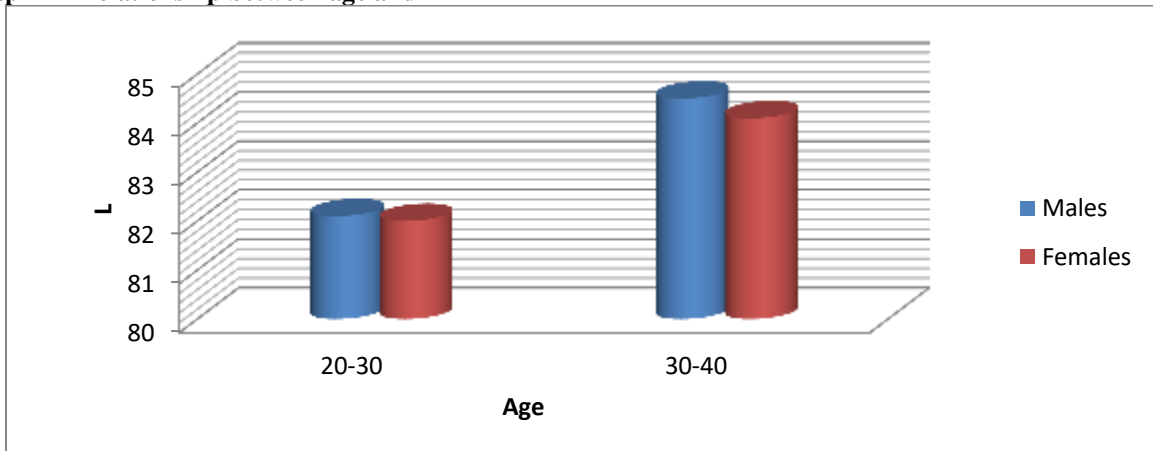
Graph I shows negative and significant correlation between skin color and L* in males and females.

Graph II Relationship of eye color and chroma of tooth



Graph II shows negative and significant correlation was seen between eye color and chroma of tooth ($P < 0.05$).

Graph III Relationship between age and L



Graph III shows negative but significant correlation between age and L* in males and females ($P < 0.05$).

DISCUSSION

Prosthodontists in their daily routine have to harmonize tooth shade with facial appearance in fully edentulous patients or complete fixed appliances. The color of the teeth must harmonize with the surrounding environment such as skin, hair, eye color and age all with the aim of enhancing facial appearance.⁶ The color of the restorations is a significant factor affecting dental appearance of maxillary anterior teeth in patients and, therefore, the clinician has to be very careful in choosing the right one using reliable tools. The knowledge of human tooth color and its distribution are very important in aesthetic dentistry. Tooth color has an influence on aesthetics and it is important for social rehabilitation of denture wearers.⁷

The selection of artificial tooth shade to replace missing natural teeth is a relatively simple procedure when few natural anterior teeth remain. However, for the edentulous individual when no preextraction records are available, the choice of tooth shade is a subjective process.⁸ A perception among dentists has been that individuals with darker skin colors have lighter shades of teeth. This perception is commonly explained by the illusion of greater contrast between skin color and tooth shade. Age of the patient was found to have a definite relation with tooth shade value. This relation has been collaborated by many studies which have shown darker tooth shade values with an increase in age and vice versa.⁹ The present study was conducted to assess tooth color, eye color and skin color and its relation with gender.

In our study, age group 20-30 years had 35 males and 32 females and 30-40 years had 25 males and 28 females. We found that skin color, eye color and L, C and H value based on gender and age groups which revealed significant difference in values. There was negative and significant correlation between skin color and L* in males and females. Veeraganta et al¹⁰ comprised 100 subjects belonging to both gender between the age groups of 16 years to 55 years. Tooth shade values of permanent maxillary left or right central incisors were recorded. Chi-square statistical test demonstrated that younger subjects have lighter tooth shade values. No statistically significant differences were recorded in tooth shade value according to gender or skin color.

We found that negative and significant correlation was seen between eye color and chroma of tooth ($P < 0.05$). A negative but significant correlation between age and L* in males and females was seen. Seth et al¹¹ included 200 subjects (100 males and 100 females) in the age range of 20–35 years. Skin color was categorized using skin shade tab (aviance beauty palette); eye color was visually assessed; and L*, C* and h* values of tooth were measured. Significant correlation was observed

between skin color and value, eye color and chroma, age, and value in males and females ($p < 0.05$).

Pustina et al¹² determined tooth color in 255 patients in the inter-canine sector of the maxilla using an intraoral spectrophotometer Vita Easy shade. Skin and eye color was determined by visual perception. The shades of the Vita Tooth Guide 3D Master were registered by the spectrophotometer. Pearson's chi-squared test was used to examine the differences between tooth color and skin and eye color. The most frequent shade registered in the central incisors was 2M1 (62 subjects, 8.10%); in the lateral incisors, 1.5M1.5 (65 subjects, 8.50%); and in the canines, 2M3 (142 subjects, 18.56%). Pearson's chi-squared test results showed a statistically significant difference in the relations between skin and eye color and central incisor color, lateral incisor color and canine color. On the other hand, no significant difference was observed in the relation of the lateral incisors and canines with eye color.

CONCLUSION

Authors found that hue, value and chroma of tooth are partially dependent on skin color, eye color, age, and gender.

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