

The relationship of tooth color to eye color, facial skin complexion and gingival pigmentation

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ABSTRACT

Background: The selection of a color for the edentulous patient is difficult because the natural teeth are no longer present to act as a guide. The aim of the present study is to evaluate the relationship of tooth color to eye color, facial skin complexion, and gingival pigmentation.

Materials and Methods: A total of 140 subjects (80 females and 60 males) from Al-Taji village were examined in this study. The participants ranged in age from (18 – 35 years). Each subject was seated on a chair in an upright position under day light between (10 a.m. and 1 p.m.). Direct visual examination was used to evaluate eye color and face complexion. The Dummett oral pigmentation index (DOPI), was used to estimate gingival pigmentation of the maxillary arch. The shades of the maxillary central and lateral incisors were obtained by using (Vivadent), basic colors selector

Results: The statistical analysis of the data revealed a non significant relation between tooth color and other parameters (eye color, facial skin complexion and gingival pigmentation). In addition, the light yellow teeth were most commonly seen (61.42%), while brown teeth were the least (0.71%).

Conclusions: The results of this study indicate that depending on eye color, facial skin complexion and gingival pigmentation in order to match tooth color is not appropriate.

Key words: Tooth color, tooth selection. (J Bagh Coll Dentistry 2006; 18(1) 20-24)

INTRODUCTION

Complete denture service presents a color problem in selection of teeth that is different from the color problem in other fields of restorative dentistry. Complete denture service demands color selection, while partial dentures, crown and bridges require only color matching. Matching color is comparatively simple because the color requirement is known. The selection of a color for the edentulous patient is more difficult because the natural teeth are no longer present to act as a guide⁽¹⁾. Therefore, the colors of the face, eye, and hair have been used by some prosthodontists as guides for selection of tooth color⁽²⁻⁴⁾. Patients with blue, green eye and fair skin usually have light teeth, while patients with dark hair, black or dark brown eyes, with dark complexion usually have gray or brown teeth. Early examination of skin color involved visual comparison with comprehensive color charts and a selection of the nearest match. Color tops or wheels with different colors on their surface have been used⁽⁵⁾. Skin color has been also studied by using spectrometry⁽⁵⁾, the measurement of spectral reflectance. White light is separated into a spectrum and the amount of light reflected for each wavelength recorded. Sproull^(6,7) examined the potential of using the Munsell color system in dentistry.

Ibusuki⁽⁸⁾ used the Munsell system to study the color of gingivae in 60 subject in 18 locations around the anterior teeth. He reported that gingival color varied with the position of papillary, marginal, and attached gingivae. Powers and associates⁽⁹⁾ used Munsell color tabs under both fluorescent light and simulated day light for clinical measurements of value, chroma, and hue of attached gingivae in 100 black and 100 white subjects. They reported that the color of non pigmented gingivae of blacks and whites was similar. The color of gingiva pigmented by melanin in blacks was similar in hue, but lower in value and chroma than non pigmented gingiva. Dummett et al⁽¹⁰⁾ made a study on 115 Afro-American patients; they used the Dummett oral pigmentation index (DOPI) to estimate the gingival pigmentation. They reported that the (DOPI) estimates were not consistently significantly correlated with tooth color. Also facial skin complexion was not significantly correlated with tooth color. The purpose of this study was to evaluate the relationships of tooth color to eye color, facial skin complexion, and gingival pigmentation.

MATERIALS AND METHODS

The sample consisted of 140 subjects (80 females, and 60 males), with age group of 18-35 years old. They were randomly selected from Al-Taji village. All the subjects had

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maxillary anterior teeth, with good gingival condition. Those who had major restorations, and marked gingivitis were rejected. Each subject was seated on a chair in an upright position, under day light between 10 a.m. and 1 p.m, and the following examination were done:-

1. The eyes colors were examined by direct visual examination and were classified into five categories: Blue, brown, gray, green, and black.
2. The face complexions were classified into four categories: Light, light brown, dark brown, and black.
3. Gingival pigmentation: The Dummett oral pigmentation index (DOPI),^(10,11) was used to estimate the gingival pigmentation of the maxillary arch. The maxillary arch is divided into 32 unit spaces, buccally and palataly. Each unit space approximated the region of the marginal gingivae and extended apically about 4-5 mm, to the level of the attached gingivae. The division into 32 unit spaces was maintained among partially edentulous subjects, since oral pigmentation of gingivae is independent of the presence or absence of teeth⁽¹⁰⁾. A numerical oral pigmentation estimate was assigned to each of these 32 unit spaces. The estimate was based on the following scale:
 - 0 = pink tissue (no clinical pigmentation).
 - 1 = Mild light brown tissue (mild clinical pigmentation).
 - 2 = Medium brown (moderate clinical pigmentation).
 - 3 = Deep brown or blue/black tissue (heavy clinical pigmentation).

After the numerical estimates were assigned to each of 32 maxillary arch units, they were added and a mean was computed. The resulting number represents the (DOPI) assessment for that subject. Each subject was examined with mouth mirror, and a special

case sheet form was used to record the (DOPI) index.

4. Tooth color: The shades of the maxillary central and lateral incisors were obtained by using (Vivadent) basic colors selector, and were classified into six categories: White, light yellow, gray, yellow gray, brown, yellow brown.

RESULTS AND DISCUSSION

The data collected were analyzed by computer for computing (Chi-squares). A significance level of 0.05 was chosen because it is the level most often used in evaluating biological data. Tables 1-3 show that the relationship between tooth color and eye color were not significant, in neither females nor males, or the total sample. This result disagree with Heartwell and Rahn⁽³⁾, they mention that the color of the eye could be used as an aid in selecting tooth color for edentulous patients, while in this study no relationships were found between tooth color, and eye color. Possibly because the size of the iris of the eye is so small in comparison with the area of total face, and the eyes are not close to the teeth⁽¹³⁾. Tables 4-6 show that the relationship between tooth color, and face complexion were not significant, neither in females nor males or the total sample.

This was in disagreement with Wehner et al⁽¹²⁾, Heartwell and Rahn⁽³⁾, but it agree with the result of Dummett et al⁽¹⁰⁾, who concluded that facial skin complexion was not significantly correlated with tooth color.

Table 1: The relationship between tooth color and eye color in females

Tooth color	Eye color					Total
	Blue	Brown	Gray	Green	Black	
White	1	6	0	2	5	14
Light Yellow	0	28	3	2	13	46
Gray	0	6	1	0	5	12
Yellow Gray	0	1	0	0	3	4
Brown	0	1	0	0	0	1
Yellow Brown	0	2	0	0	1	3
Total	1	44	4	4	27	80

Chi-square = 14.56 Non significant

In addition, non significant correlation were found between tooth color, and gingival pigmentation, neither in females, nor males, or the total sample (Tables 7-9). This was in agreement with Dummett et al ⁽¹⁰⁾, who concluded that (DOPI) estimates were not consistently significantly correlated with tooth color. No relationships discussed in this study

showed significant correlations. Possibly, because of biological variation seen among the subjects. Table 10 show that light yellow teeth were most commonly seen in males, and females. The percentages were 66.66% and 57.5% respectively, while brown teeth were the least in males, and females. The percentages were 0%, and 1.25% respectively.

Table 2: The relationship between tooth color and eye color in males.

Tooth color	Eye color					Total
	Blue	Brown	Gray	Green	Black	
White	0	3	1	0	1	5
Light Yellow	1	29	3	1	6	40
Gray	0	7	0	0	3	10
Yellow Gray	0	1	0	0	2	3
Brown	0	0	0	0	0	0
Yellow Brown	0	0	0	0	2	2
Total	1	40	4	1	14	60

Chi-square = 12.82 Non significant

Table 3: The relationship between tooth color and eye color in (males and females)

Tooth color	Eye color					Total
	Blue	Brown	Gray	Green	Black	
White	1	9	1	2	6	19
Light Yellow	1	57	6	3	19	86
Gray	0	13	1	0	8	22
Yellow Gray	0	2	0	0	5	7
Brown	0	1	0	0	0	1
Yellow Brown	0	2	0	0	3	5
Total	2	84	8	5	41	140

Chi-square = 18.75 Non significant

Table 4: The relationship between tooth color and face complexion in females

Tooth color	face complexion				Total
	light	Light Brown	Dark Brown	Black	
White	4	9	1	0	14
Light Yellow	10	30	6	0	46
Gray	0	7	4	1	12
Yellow Gray	0	2	2	0	4
Brown	0	0	1	0	1
Yellow Brown	0	2	1	0	3
Total	14	50	15	1	80

Chi-square = 17.12 Non significant

Table 5: The relationship between tooth color and face complexion in males

Tooth color	Face complexion				Total
	light	Light Brown	Dark Brown	Black	
White	0	2	3	0	5
Light Yellow	5	26	8	1	40
Gray	2	6	2	0	10
Yellow Gray	0	2	1	0	3
Brown	0	0	0	0	0
Yellow Brown	0	1	1	0	2
Total	7	37	15	1	60

Chi-square = 6.31 Non significant

Table 6: The relationship between tooth color and face complexion in (males and females)

Tooth color	Face complexion				Total
	light	Light Brown	Dark Brown	Black	
White	4	11	4	0	19
Light Yellow	15	56	14	1	86
Gray	2	13	6	1	22
Yellow Gray	0	4	3	0	7
Brown	0	0	1	0	1
Yellow Brown	0	3	2	0	5
Total	21	87	30	2	140

Chi-square = 12.72 Non significant

Table 7: The relationship between tooth color and gingival pigmentation in females.

Tooth color	Gingival Pigmentation				Total
	Pale Pink	Light Brown	Medium Brown	Black Blue/Black	
White	12	2	0	0	14
Light Yellow	40	4	2	0	46
Gray	10	1	0	1	12
Yellow Gray	1	2	1	0	4
Brown	1	0	0	0	1
Yellow Brown	3	0	0	0	3
Total	67	9	3	1	80

Chi-square = 19.74 Non significant

Table 8: The relationship between tooth color and gingival pigmentation in males.

Tooth color	Gingival Pigmentation				Total
	Pale Pink	Light Brown	Medium Brown	Black Blue/Black	
White	3	1	1	0	5
Light Yellow	36	3	1	0	40
Gray	8	2	0	0	10
Yellow Gray	2	1	0	0	3
Brown	0	0	0	0	0
Yellow Brown	1	0	1	0	2
Total	50	7	3	0	60

Chi-square = 15.35 Non significant

Table 9: The relationship between tooth color and gingival pigmentation in (males and females).

Tooth color	Gingival Pigmentation				Total
	Pale Pink	Light Brown	Medium Brown	Black Blue/Black	
White	15	3	1	0	19
Light Yellow	76	7	3	0	86
Gray	18	3	0	1	22
Yellow Gray	3	3	1	0	7
Brown	1	0	0	0	1
Yellow Brown	4	0	1	0	5
Total	117	16	6	1	140

Chi-square = 20.71 Non significant

Table 10: Percentages of teeth colors in males, females and in (males and females).

Tooth color	Males	Females	(Males+Females)
White	8.33%	17.5%	13.57%
Light Yellow	66.66%	57.5%	61.42%
Gray	16.66%	15%	15.71%
Yellow Gray	5.00%	5.00%	5.00%
Brown	0%	1.25%	0.71%
Yellow Brown	3.33%	3.75%	3.57%

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