

## Prevalence of Tooth Shade and its Correlation with Skin Colour - A cross-sectional study

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### ABSTRACT

**Background:** The significance of aesthetics has become a significant concern in recent years. One of the elements that determine one's beauty is the colour of one's teeth. Gender, age, eyes and skin colour as well as other variables have all been found to impact tooth shade in studies.

**Aim:** To find out that how tooth shade relates to the skin colour.

**Methods:** This cross-sectional, analytical research was performed in the Operative Dentistry Department. Over a year, 250 patients between the ages of 18 and 68, of either gender, participated. The complexion of the skin on the face was assessed and split into three skin tone categories (Fair, Medium, and Dark).

**Results:** SPSS version 20.0 was used to analyse the data. There were 162 males and 88 females among the 250 participants. 45.2% of patients was Value 2, which was followed by Value 3 (31.2%), Value 1 (13.2%), and Value 4. (10%). Value 5 had no shadows recorded. The skin tone of the male participants was medium, whereas the skin tone of the female participants was fair.

**Conclusion:** A lower tooth shade value was found in people with fair skin, resulting in teeth that looked darker in colour. A greater tooth shade value was found in those with a darker skin complexion, leading in teeth that seemed lighter in colour. When comparing the tooth colours of men and women, men had a lower shade value while women had a greater shade value. The teeth of the older people were darker in colour because of a significant decrease in lower tooth shade value.

**Keywords:** Skin tone, Shade guide, Tooth colour, gender

### INTRODUCTION

Because it seems to define one's uniqueness, aesthetics has grown to become a major subject of debate in contemporary culture. The primary goal of dental therapy was to ensure that patients could live their everyday lives with little discomfort. After decades of declining dental caries, the focus has shifted to the improvement of dental aesthetics<sup>1</sup>.

The selection of the appropriate shade is critical in patients with an aesthetically pleasing restoration that blends in smoothly with their existing teeth. Naturally occurring teeth are said to exhibit a range of colours on their surfaces<sup>2</sup>. Furthermore, numerous variables have been shown to affect the colour of natural teeth. The most frequent of these been age. One of the most essential elements<sup>3</sup> is light, which is also one of the most frequently neglected. Another element that may affect the colours of natural teeth is the colour given by various skin complexions<sup>4,5</sup>.

It has been shown in a study that usage of teeth with appropriate shade improves the patient's impression of their appearance and their acceptance of prosthesis<sup>6</sup>. If sufficient natural anterior teeth are still present, the procedure of choosing prosthetic tooth to replace the missing natural teeth is fairly straightforward. There have been several different tooth shade standards developed during the last hundred years<sup>7</sup>.

Patients with natural teeth have shown to be very helpful. Choosing a tooth shade for an edentulous individual, on the other hand, is problematic since there is no pre-extraction information available. It has been recommended that factors like age, gender, and skin tone should be taken into consideration while selecting an artificial tooth hue. Some dentists suggest to use hair and eye colour as a reference when selecting a tooth shade, whereas the majority of others propose to use your face skin tone as a reference<sup>8</sup>. Denture aesthetics is described as "the cosmetic impact generated by a dental prosthesis that influences the desired beauty, attractiveness, character, and dignity of the person"<sup>9</sup>. There is minimal empirical evidence to support the relationship

between skin tone on the face and tooth colour. This lack of knowledge may impair a prosthodontist's ability to provide patients with excellent aesthetics.

The goal of this research was to establish the prevalence of tooth shade & facial skin colour in the general population, as well as the relationship between tooth shade & facial skin colour.

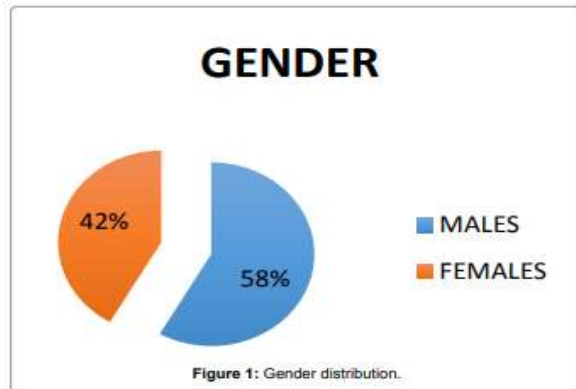
### METHOD AND MATERIALS

An analytical cross-sectional investigation using a non-probability convenient sampling method was carried out for one year in this research. A total of 250 individuals who came to the Dental Opd for regular dental treatment were included in our study. Before patients were enrolled in the research, a formal permission procedure was obtained from the relevant institute's Ethical Review Committee. The nature and aim of the research were explained to the participants, and they signed a written informed mutual consent form. After a comprehensive history gathering process and a thorough clinical extraoral and intraoral examination, the participants were selected based on the inclusion and exclusion criteria. Exclusion criteria were carefully followed to eliminate confounding factors and bias. Patients of both genders were chosen for inclusion criteria, and with age range from 18 to 68 years. Patients having any systemic diseases, like Albright syndrome, high blood sugar level, Addison's diseases, melanoma or any gingival pathology that causes colour changes, were excluded. Patients with dental abrasion, erosion, attrition, developmental anomalies or fluorosis were also excluded. Also the individuals with xerostomia who had radiation therapy or tooth whitening procedures were excluded. Female patients who declined to remove their lipstick, lip-gloss, or cosmetics before the shade evaluation were excluded from the study.

**The procedure of data collection:** This research comprised 250 patients who visited the Department of Operative Dentistry for regular dental treatment and fulfilled the above-mentioned selection criteria. Males were 58% of the participants in this study, while females were 42% of the total participants (Figure 1)

Received on 07-04-2022

Accepted on 16-08-2022



Depending on their chronological age, they were split into five groups of 50 people each. Group I was 18-27 years old, Group II was 29-38 years old, Group III was 39-48 years old, Group IV was 49-58 years old, and Group V was 59-68 years old. The fair, medium, and dark skin complexions on the face were classified into three groups<sup>10</sup>. A single inspector who assessed the skin colour followed the manufacturer's instructions and matched the colours of the teeth in strong natural light, according to the manufacturer's requirements. A single inspector assessed the people in broad daylight for their skin tone and tooth colour on the face and teeth.

**Statistical analysis:** The data were analyzed using the SPSS, and descriptive statistics were used to examine baseline demographic data. Both for qualitative and quantitative variables, descriptive statistics were computed. Men and women were compared on the mean of each variable by utilising an independent sample T-test with a 95% confidence level, which was performed on the data. The Pearson's Chi-square test was performed to determine the relationship between tooth colours and age, gender, and skin tone on the face for men, women, and children in the younger and older age groups. It was decided to use a  $p$ -value of  $< 0.05$  to indicate statistical significance.

## RESULTS

Table 1. Patient's distribution according to age group and gender

Age group	Male	Female	Total
Group I	38	14	50
Group II	32	20	50
Group III	38	18	50
Group IV	32	16	50
Group V	22	20	50
Total	162	88	250

A total of 250 patients took part in our investigation. Participants were divided into two groups: 162 men and 88 girls (Table 1).

Table 2. Patient's distribution according to gender and tooth shade value

Tooth Shade	Male	Female	Total	Percentage %
1	28 (11.2%)	5 (2%)	33	13.20%
2	62 (31%)	51 (20.4%)	113	45.20%
3	50 (25%)	28 (11.2%)	78	31.20%
4	22 (8.8)	4 (1.6%)	26	10.40%
Total	162	88	250	100%

The shade guide's "Value 2" shade group was seen by 113 patients (45.25), followed by "Value 3" (31.2%), "Value 1" (13.2%) and "Value 4" (10.1%) (Table 2)

Table 3. Patient's distribution according to age group and tooth shade value.

Tooth shade value	Group I (18-28 years)	Group II (29-38 years)	Group III (39-48 years)	Group IV (49-58 years)	Group V (59-68 years)	Total	%
1	11	13	5	4	2	35	14
2	33	25	18	10	15	101	40.40
3	3	10	25	20	17	75	30
4	3	2	2	16	16	39	15.60
Total	50	50	50	50	50	250	100

However, for the Value 5 shade category, no shade was observed. The Value 2 shade group was significantly more frequent, with 62(31%) men and 51(20.4%) females out of 250 participants, respectively. Tooth Shade Value 2 was more frequent in Groups I and II (66% and 50%, respectively), whereas Tooth Shade Value 3 was more common in Groups III (50%), IV (40%), and V (34%) (Table 3).

Table 4. Patient's distribution according to facial skin complexion and gender

Facial skin complexion	Male	%	Female	%	Total	%
Fair (lighter)	49	30.2	53	60.2	102	40.8
Medium	98	60.4	25	28.4	123	49.2
Dark	15	9.2	10	11.3	25	10
Total	162	100	88	100	250	100

Medium Facial Skin tone was observed in 123 instances, regardless of gender (49.2%). Medium skin complexions were more frequent in men (60.4%), whereas lighter or fair skin complexions were more common in females (60.2%). (Table 4).

Table 5. Patient's distribution according to facial skin complexion and tooth shade value.

Tooth shade value	Fair	Medium	Dark	Total
1	10(9.8%)	14(11.3%)	5(20%)	29(11.6%)
2	46(45.0%)	58(47.1%)	15(60%)	119(47.6%)
3	38(37.2%)	36(29.2%)	3(12%)	77(30.8%)
4	8(7.8%)	15(12.1%)	2(8%)	25(20%)
Total	102	123	25	250

Value 2 was more frequently observed in light skin complexions (45%) and medium skin complexions (47.1%) when it came to Value (Brightness) (Table 5).

An independent sample T-test with a 95% confidence level was utilised to enhance the study's goal to achieve it. According to the findings of this specific research, there was a significant relationship between the skin tone of the face and the colour of the teeth, regardless of age or gender. When the skin tone of the patient's face was related to the participant's gender, tooth colour, or age, the findings were very significant ( $P$ -value 0.001).

## DISCUSSION

This research also highlights the fact that gender may have an impact on tooth colour<sup>11,12</sup>. A strong relationship was discovered between gender and tooth shade, with males having a lower tooth shade value and a darker colour of teeth of the same age group,

and females having a higher tooth shade value and a lighter colour of teeth of the same age group.

Tooth colour is affected by variables such as light absorption and dispersion in the tooth structure, the contour & hardness of the tooth's hard tissues, the kind of tooth or its location in the dental arch, the form of the tooth surface, and the reflectance of the tooth surface<sup>13,14,15</sup>.

One of the most significant elements influencing attractiveness is tooth colour. Colour is a multifaceted concept that includes both subjective and objective phenomena<sup>16</sup>. Due to lack of scientific evidence on link between tooth shade and skin colour, the present research was conducted to establish the prevalence of tooth shade and its relationship with skin colour. Because of this lack of expertise, the prosthodontist may be unable to choose prosthetic teeth that are complementary to the patient's face tone and appearance.

Because it is often used by dental professionals, the Vitapan Classical shade guide was chosen for this study. The tooth colours were matched in a uniform and controlled way throughout the whole process. To determine the colour of the teeth, it is helpful to look at the skin colour on the face first. It is believed that the value of the teeth must correspond to the darkness or lightness of the skin tone of the face.

Various studies on the connection between shade and skin colour have been performed in the past<sup>12,17-19</sup> but there is little scientific evidence on the connection between tooth shade and skin colour. Herekar M et al. conducted a study to determine the prevalence of tooth shade in Indians, which is the first of its kind. According to Herekar M et al., the most common shade among the population in Belgium was between A2 and A3<sup>20</sup>. A2 (38.00) was the most frequent tooth colour in our study, and it was followed by A1 (38.00). (38.00). (25.3). According to few studies, there is a difference between men and women in terms of tooth colour, with females getting lighter teeth than men<sup>12,21</sup>. In contrast to our results, both genders exhibited an almost equal prevalence of colours in our study, which was conducted on a random sample of participants.

We discovered a correlation between skin colour & tooth shade, according to our findings. The presence of high-value teeth (dark teeth) was more common in people with medium and dark skin tones than in those with light skin tones, whereas those with light skin tones were less likely to have such teeth (low value). Jahangiri et al. discovered an inverse connection between tooth shade and skin colour in a multiracial population study conducted in the 1990s, which is in direct contrast to the findings of this study, which are presented here. A benefit is that the results of this research differ from those of Temitope et al., who found no relationship between a tooth and skin colour in their study<sup>12</sup>.

## CONCLUSION

The following findings were drawn from the current inquiry, taking into account the limits of our research study. The teeth of people with fair or light skin are darker, and their tooth shade value is lower; on the other hand, the teeth of people with a medium or deeper skin tone are lighter, and their tooth shade value is higher. According to one hypothesis, as people get older, their teeth become deeper in colour as the shade value of their teeth diminishes, resulting in a darker smile. In comparison to females of the same age group, men have darker teeth and a lower tooth shade value, while females of the same age group have lighter

teeth and a higher shade value. The participant's gender, age, and facial complexion, on the other hand, have a strong correlation with tooth colour.

**Limitations:** According to several writers, the selection of dental materials is influenced by a variety of variables including the patient's age, gender, ethnicity or race, eye and skin colour. Dentists all around the globe are faced with a unique problem when assessing the impact of variables like age, gender, and skin colour on the choice of prosthetic teeth in totally edentulous patients who do not have any pre-extraction data.

**Conflict of interest:** Nil

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