

EVALUATING SHADE MATCHING ABILITY OF DENTAL PROFESSIONALS

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ABSTRACT

This study was carried out to evaluate the shade matching ability of dental professionals by testing of color blindness assessment using Ishihara color Blindness 14- plate test by using vita pan shade guide under two light sources. Five groups (20 each) of dental students, dental practitioners, dental interns, prosthodontists, and dental technicians participated. All of them were analyzed by Ishihara color blindness test comprising of 24 plates. The groups were asked to match shade of three artificial maxillary right central incisors by Visual method, using Vita pan shade guide and Vita tooth Guide 3D – Master (Vita Zan Fabrik). The prosthodontists and dental students showed the highest correct shade matching under yellow light, while dental interns showed the highest correct shade matching under day light. It was concluded that visual method shade matching is preferable under yellow light by relying on prosthodontists and dental students.

Key Words: Shade selection, color matching ability, color blindness test.

INTRODUCTION

The three components of color are: light source (illuminates the object), object (reflects, absorbs or transmits the incident light to the observer) and the observer (perceives the reflected light. Selecting¹ the appropriate shade-matching color has many clinical applications: porcelain and composite restorations, removable prosthetic teeth and gingival components. Determining a precise shade is dependent on clinical skill, shade guide system and lighting conditions. Color and shade matching is very challenging in the field of dentistry.² Computerized spectrophotometer and colorimeter devices use color quantification that generally provides a more accurate color-matching outcome.³ While color matching instruments such as colorimeters and spectrophotometers are objective, they are not widely used in dental practice yet.⁴ Visual color selection in dentistry is dependent on many factors, and variation in any of them can lead to a change in color perception.⁵ Also, individuals have been found to be not staying the same throughout in their shade matches. Color perception depends upon source of light, the object and the person who note the proceedings without participating in them.⁶ Tooth color consists of layers of enamel and dentin that, reflect, transmit, incident light, by giving the good quality of color.⁷ The clinician should bring the primary tooth shade characteristics of hue, chroma and value to the technician who, in turn,

produces the restorations that match to the remaining tooth structure.⁸ Lightness or brightness, distinguishes a color's relative darkness,¹⁰ Value is often the most important dimension of shade.⁹

This study evaluated the quality of being sensitive and precise, clear in making statements of the 24 plates of Ishihara's tests for color blindness. Many individuals also have some form of color vision deficiency or color vision confusion. Individuals with a red-green deficiency showed lower color vision scores in the yellow regions of visible light spectrum, which is most relevant to dentistry.¹⁰ 8 to 14% of dental professionals seen to be color deficient.¹¹

Color perception varies from person to person; in addition the human eye is unable to perceive color in a clear, unchanging manner is very important.¹² Incorrect responses used to remain same in the value, hue and chroma.¹³ The ability of proper shade selection by different people without having the training classes in the shade matching to be analyzed.

METHODOLOGY

One hundred participants formed in the study for visual shade marching under day light and yellow light and they were divided into five groups of 20 each, were randomly selected included male and female participants. In group one was prosthodontist. Age varied from 20 to 50 years, group two consisted of dental practitioner. In group three were dental interns. group four consisted of dental technicians, while dental students formed group five. 50 subjects were observed twice by each group. The shade of the maxillary central incisors was analyzed visually by 2 observers. A questionnaire was provided to all groups to fill out their name, age,

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gender and years of experience. As the color vision deficiency can adversely affect the correct shade matching, so participants were tested for color deficiency using the 14-Plate Ishihara's Tests for Color- Blindness. Vita pan classical shade guide was used for teeth shade selection in different groups. In spite of the fact that the Classical Vita pan shade guide was chosen as it is most commonly used in all dental clinics.

The respondent group was supposed to match the shade of central incisor by matching with vita shade tabs twice, under day light, and dental unit's yellow light, and the scores were calculated by frequency using statistical analysis SPSS 16.

RESULTS

There was hundred participants participated and equally divide in five groups, each group contained 20 respondents and their age ranges between 18 -50 years. Color deficient was excluded. On comparing the different groups of respondents the dental interns showed the highest score in correct shade matching. Under yellow light 90% of the respondents from prosthodontist, 65% of the respondents from dental practitioner, 65% of the respondents from the dental interns did the correct shade matching. The group of dental technicians shade and dental students group did the correct shade matching.

DISCUSSIONS

This study was conducted to evaluate the shade matching ability in different dental clinicians worked in clinics labs, dental students by using visual method of shade selection under day light and yellow light. Shade selection of dental restorations is usually done visually by matching a shade guide. Different persons will make different interpretations of the same stimulus, and thus shade selection depends on subjective assessment. Moreover, an artificial light is preferred over the natural light due to the constant intensity. It is obvious from the results of the conducted study that shade matching under yellow light available is more reliable method for shade selection.

The current Glasgow Dental Hospital clinical procedures teaching policy stated that shades should

TABLE 1: DEMOGRAPHICS OF THE RESPONDENTS

Respondents	Age (years)	Experience (years)
Prosthodontist	28–50	10–15
Dental Practitioner	23–40	5–10
Dental Interns	23–30	2–4
Dental Technicians	24–50	10–15
Dental Students	20–22	0

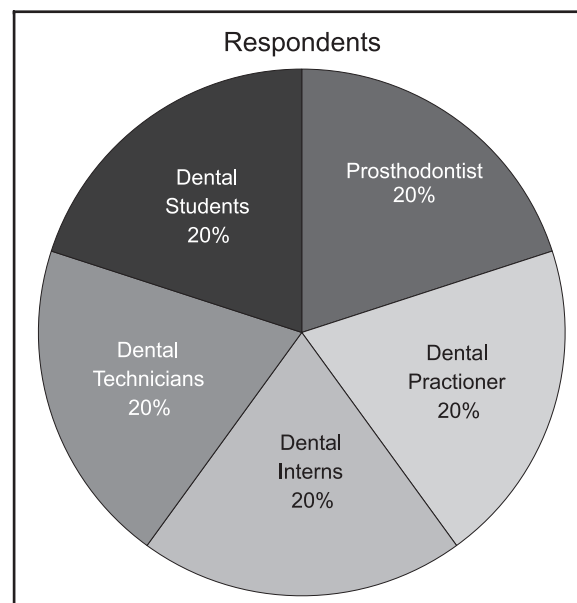


Fig 1:

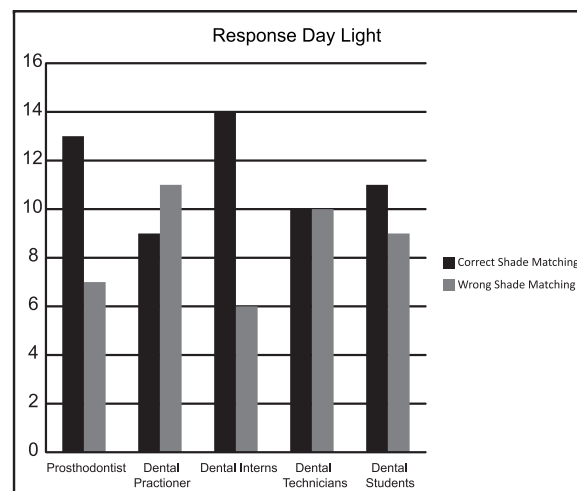


Fig 2:

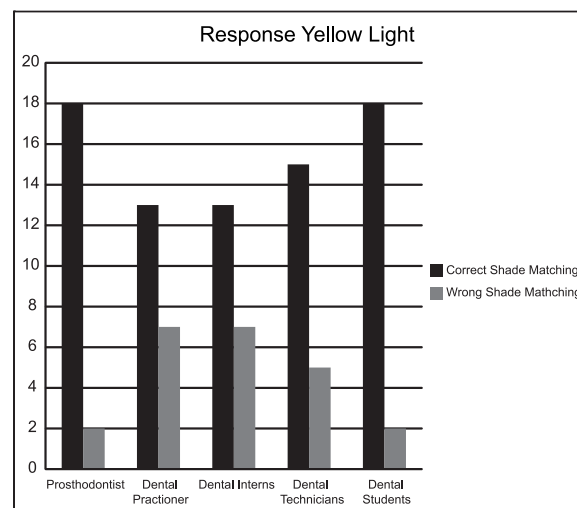


Fig 3:

be selected in a variety of light conditions including natural, fluorescent and incandescent light.

In this research each respondent was given just 1 minute for particular tooth or tab which might have affected the results. Within the limitations of this study standard light source, and appropriate conditions in the clinics required. The respondents from prosthodontist group and dental students did correct shade matching under yellow light, and dental interns did the correct shade matching under day light. It could be concluded that shade matching is preferable under yellow light by relying on prosthodontists, dental students and dental interns. A limitation of this study was the shade matching of individual tooth has been investigated, more studies are required on shade matching with natural teeth and need to evaluate by a measurement device. Within the limitations of this study a standard light source and appropriate conditions in the clinics needed.

CONCLUSION

There are some limitations in this study significant differences seen in color shade matches of different groups because of lack of digital commercial source available (spectrophotometer) could give more accurate results comparative to visual method using daylight and yellow light. It is concluded that for correct shade matching light source is an important factor to be considered under dental unit's light source. The participants matched the shades under two light sources, those matched in day light was not correctly matched so the shade to be taken under yellow light is more correctly matched.

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