Asian J. Exp. Sci., Vol. 20, No. 2, 2006, 405-408

Importance of Shade Characteristics of Anterior Teeth for Artificial Replacement Introduction

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Abstract : An investigation was undertaken on 1020 subjects comprising of both the sexes between 18-57 years of age group to find out the shade characteristic in relation to location of the teeth. Various shade difference in relation to incisors and canines and on maxillary and mandibular teeth were indentified for anterior teeth. The results of the study showed several variables like canines were darker than the incisors, mandibular teeth were slightly lighter than the maxillary anterior teeth. Since the anterior teeth show one or many of these shades difference, a consideration must be given to incorporate some of these shade variation on anterior restoration. The result on the study provided guidelines for incorporation of these shade variation during the fabrication of anterior restoration.

Key words : Shade Characteristics, Anterior Teeth, Artificial Replacement.

Introduction :

Patients generally emphasize on the esthetic excellence in anterior restoration and to satisfy their esthetic needs. Selection of appropriate shade and colour matching to the natural dentition is critical. The term esthetics denotes beauty. Esthetic beauty is not absolute but is extremely subjective as is often dictated by individual preference of appreciable in dentistry, creating a restoration that simulates natural tooth beauty to improve patients. Appearance is of great concern to both, the dentist as well as the patient.

Matching the colour of a restoration with that of the natural teeth is considered more an art than a science. Colour is a phenomenon of light (Red, Green, Brown and Yellow) or visual perception that permits the differentiation of otherwise identical objects one must understand the scientific basis of colour as well as the artistic aspect of shade selection.

Tooth whitening is one of the most widely accepted esthetic procedures today, with treatment options that include in-office procedures, dentist prescribed home-applied systems, over-the-counter (OTC) bleaching kits, and a host of whitening dentifrices. Peroxides have been used for tooth bleaching for more than 100 years, and at-home nightguard vital bleaching, which involves use of a 10% carbamide peroxide gel in a custom-fitted tray, has met with much success since its introduction in 1989 (Haywood and Heymann, 1989). The safety and efficacy of carbamide peroxide bleaching agents is well documented, and currently six products have been approved by the American Dental Association for home whitening (Haywood, 1999). Tooth discoloration in vital teeth can result from chromogenic foods, tobacco products, medications such as tetracyclines and fluoride, pulp pathology, and aging (Haywood, 1999). Concentrations of up to 35% peroxide have been used to resolve discoloration. The most research has been conducted on 10% carbamide peroxide, which produces substantial lightening of treated teeth after 2 to 6 weeks of treatment (Haywood *et al.*, 1994) (Matis *et al.*, 1998). Although a period as long as 6 months may

be required for stubborn stains, such as those caused by tetracycline or nicotine (Haywood *et al.,* 1997), after treatment, the whitening effect may persist for 3 or more years.

Colour is dependent on three factors, namely, the observer, the object and the light source. Each one of these is a variable and when any one is altered, the perception of colour changes. Understanding these three dimensions can affect shade or colour characteristic of a restoration. Gratifying results are achieved when a careful attention is given to each of these factors.

It becomes apparent that comparing colour samples from a shade guide with the natural teeth and arriving at the proper selection is a blending of artistic experience and science. This process requires a knowledge of the dimensions of colour as well as clinical judgment.

Material and Methods :

A study was conducted to evaluate the shade characteristics of anterior teeth. To find out the commonest shades in different age groups and to relate the shade differences between incisors and canines and also the shade variations between maxillary and mandibular anterior teeth for this study, 1020 subjects comprising of both sexes were selected. The subjects were divided into 18-27, 28-37, 38-47, 48-57 years for convenience.

Demographic and personal characteristics such as occupation, smoking habits, betelnuts tobacco chewing and alcohol consumption were recorded on an examination form.

Criteria for Selection of the Subject :

1. The subject included in the investigation had a full complement of upper and lower anterior teeth.
2. The anterior teeth were free from extensive restoration which are likely to change the colour of the teeth crown replacement development anamolies, fluorosis and similar conditions.
3. Any non-vital teeth or teeth with gross tetracycline stains were not included in the study.
4. Teeth with heavy extrinsic stain due to smoking or tobacco chewing or other similar habits were not included.
5. Shade was recorded in natural day light in the noon forenoon.
6. The female sex were specially asked not to wear any lipsticks or lip paints or bright makeup.
7. Rapid shade comparison was done to avoid fatigue of cones in the retina of the investigator.

Tooth colour was obtained on examination of maxillary and mandibular anterior teeth using vital lumin shade guide. This was preferred because this shade guide which is grouped into reddish brown, reddish yellow, grey and reddish grey shades is the most commonly used shade guide at the present time.

The subject was made to sit comfortable on the dental chair near the window for adequate natural day light and the patients mouth is kept at the dentist's eye level; the teeth were divided into two compartments along the horizontal axis into incisor third and canine portion. The shade selection procedure is preceded with thorough prophylaxis of teeth. The subject was asked to open his/her mouth. Lips were gently retracted till the third incisor of the teeth were exposed. The observer matches the shade and select the shade of incisal third of the shade guide. Similarly, the remaining part of the teeth is exposed by retracting the lips and the colour for body

part of the tooth was matched with body portion of the Shade table of vital lumin shade guide. The shade were matched for each tooth included in this study with vital lumin shade guide; the shade thus obtained for the maxillary and mandibular anterior teeth were recorded in a proforma.

Result and Descussion :

The results of this study highlight the shade variation seen in different location in the maxillary and Mandibuiar teeth. Anterior teeth must be considered during the fabrication of anterior restoration so that the restoration appears life-like.

For the study 1020 subjects comprising of both the sexes were selected ranging from 18-57 years of age. In this study it was observed that the commonest shade for the incisal ⅓" of Maxillary incisor was B-2 in 27.1% subjects which was followed by A-2 and A-1 shades whereas the commonest shade for the body portion of the maxillary incisors was found to be B-3 in 27.4% and 26.8% in central incisors and lateral incisors, respectively. This shows that the incisal ⅓" is lighter than the body portion, but belongs to the same reddish yellow shade.

Most frequently observed shade for the incisal portion of the maxillary canines was A-2 on 23.1% and A-3 for 19.1% subjects, whereas the body portion of the canine shows A-3.5 as the most common shade in 23.1% followed by A-4 on 18.6% and C-3 in 11.2% of the subjects. These observation indicates that the incisal ⅓" of antrier teeth have a lighter shades than the body portion of the same canines. However, canine shade, when compared to incisors and do not have the same shade as that of the incisors.

According to the study, the most common shade observed for the incisal ⅓" madibular incisors were found to be B-l in 18.0% of the subjects which was followed by A-1 and B-2 shades, whereasthe most common shade for the body portion of the mandibular incisors was B-2 on 16.4% followed by A-2 and A-3. This shows that the mandibular incisors are slightly lighter than the maxillary incisors. It was observed that the commonest shade for the mandibular canine was A-3.5 and A-4. The findings of the study also suggests that the rural procedure of matching uniform shade in a complete denture anterior setup is not desirable as shown in the study. There is a shade variation between the upper and the lower teeth, likewise the canines are darker than the rest of the anterior teeth. This information should be incorporated in the complete denture. The procedure of selecting one uniform shade should be avoided but rather select different shades for the incisors and canines. Again some shade difference should be incorporated between upper and lower counterpart. Therefore, this observation would particularly useful on the shade selection for the young edentulous patients. This would also break the monotony of having a monochromatic shade distribution in complete denture.

As part of the development of a guide to aid the undergraduate in the selection of artificial teeth, the aim of one of the studies was to investigate the variability in choice of dental staff to select teeth appropriate to the age and sex of the individual with the aid of a series of three-dimensional guides. Four three-dimensional guides were produced for use in the study. Fifty dentists were asked to complete a questionnaire designed to assess the variability in selection of anterior teeth appropriate for

the age and sex of an individual. It was concluded that there was little consistency in the selection of the shade, mould and arrangement of anterior teeth appropriate for the age and sex of the individual by qualified dental staff. The development and implementation of an aesthetic proforma to guide dental staff, dental undergraduates and patients through the process of choosing tooth mould, shade and arrangement based on age and sex may be helpful (Sellen *et al.,* 2002).

Women have traditionally been believed to be more capable of matching colors than men. Because of this factor women should tend to agree with one another more often than men regarding tooth shade selection. Another study tested differences in dental color perception between men and women. Generally, there were no statistically significant findings with the use of three light sources and two shade guides for men at the p less than 0.05 level. For women, the light source made a difference. The men, as a group, showed border-line more (63% to 58%) uniform shade selection than the women (Donahue *et al.,* 1991).

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