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Original Article

Spectrophotometric analysis of shade duplication of various recent ceramic system used for porcelain fused to a metal crown: An invitro study

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Abstract

Objective: To evaluate and compare the colour difference of the total colour replication process and the direction of the individual color parameters for dental porcelain of three brands.

Materials and methods: The fabricated shades (A2) of 3 different porcelain companies were determined visually and instrumentally using Vita Lumin Shade Tab (A2) and Spectrophotometer. Corresponding porcelain disks were made of approximately 0.8 mm metal, 0.2mm opaque, 0.8 mm dentin, 0.5mm enamel and glaze were fabricated with each of the three porcelain brands (Vita VMK 95, Ceramco 3, Ceramax). The colour of the fabricated disks and master disks were measured with a spectroradiometer with a $45^0/0^0$ using {C.I.E 1931(xyz)} parameter. Analysis of variance (ANOVA) was applied to evaluate within group differences among the porcelain groups for total colour difference (D.E) and direction of colour parameters (D.L, D.RG, D.YB).

Result: The largest mean (D.E) was recorded for Ceramax and least for Vita VMK 95.A significant difference (P= 0.015) was found in yellow and blue axis (D.YB). Data collected further showed no significant difference between shade selection methods and the evaluated clinical criteria. The amount of change within each colour parameters was dependent on the porcelain system, as well as the amount of change among colour parameters.

Conclusion: Samples made with different brands of porcelains have noticeably different shade despite having the same Vita Lumin Shade Guide. Different brands of porcelain differ from each other more in redness and yellowness. Different brands of porcelain differ from each other more in lighter than darker shades.

Key words: Spectrophotometer, Vita shade guide, Porcelain systems

Introduction

Colour matching between natural teeth, shade guides and metal ceramic restorations is a common clinical problem[1].Use of shade guides is highly subjective[2], most existing commercial shade guides do no represent the entire spectrum of tooth colour[3].Due to inter human difference in the perception of colour, visual shade assessment of human teeth is lacking standardization that may be improved by use of spectrophotometer[4].General variable such as external light conditions, experience, age, fatigue of human eye and physiological variables such as colour blindness lead to inconsistencies[4]. Computerized shade matching system offers better accuracy, improved efficiency and esthetic benefits to the patient, dentist and technician. It analyzes the color of natural tooth and calculate the exact rates of hue, chroma and value for multitude of points on the tooth surface and display this information on the computer screen[2].

Materials and methods

The materials used in this study were - **Porcelain systems:** 1: Ceramco 3 (Dentsply International**,** USA, code C) 2: Ceramax (Alphadent Co. Ltd, Korea, code CM) 3: Vita VMK 95 (Vita Zahnfabrik H. Rauter GmbH & Co.KG. Germany, code V) **-Base Metal Alloy**: Ni**-**Cr alloy: (Brand-Ugirex, France, code N)

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