ABILITY OF DENTAL OPERATORS TO IDENTIFY THE SHADE OF ELECTRONIC SHADE TAB – A CROSS SECTIONAL   SURVEY

Dr. Sudhindra Mahoorkar*, MDS; Dr Ajay Singh**

*Professor

**PG Student

HKES S Nijalingappa institute of dental science and research, Gulbarga, Karnataka

ABSTRACT-

Introduction-The challenge of achieving accurate colour matching in restorative dentistry is central to success in aesthetics. For many years selection of tooth colour in restorative dentistry has relied on shade guides which present a number of tabs of differing hue. Signal difficulties do arise with their use, notably in terms of accuracy and variability under differing circumstances. The use of a digital device to evaluate, record and communicate tooth colour offers an advanced option as these are digitally accurate images.

Aim and Objective-The objective the of the study was to determine the ability of dental professionals inidentifying accurately the shade of electronic shade tab using Vita Classic shade guide.

Materials and Methods- The cross-sectional survey was conducted which involved total of 70 participants which included post graduate students and teaching faculty whose experience ranged from 0-20 yrs (0-5yrs, 5-10yrs, 10-15yrs and 15-20yrs).Each were shown eight electronic images of shade tab in which at least one shade of each groupi.e from group A, B, C and D. Options were also given for them to give inputs regarding the quality of image, and results were obtained and descriptive analysis was carried out.

Result –Out of the various shades B1 and A1 were selected accurately by 47% of the observers, least being the A4 shade which was 0%.

Key words – electronic shade tab, shade guide.

Introduction

In today's world of dentistry the fabrication of restoration has been switching from manual to digital, eliminating the operators fault and achieving the maximum precision, but this is not the exact situation when it comes to selection of shade in which the most common modality is still matching the shade manually.

Shade matching manually has many drawbacks one being wrong selection of desired shade which will lead to refabricate the restoration ,increase labor, increase material cost, increase patients appointment ,all these leading to overall increase in the cost of treatment.

Determination and precise communication of color is a requirement for a successful restoration and for obtaining an aesthetic restoration. Tooth shade matching in prosthetic dentistry involves five steps.

   • Analysis of color; (shade selection)
   • Color communication to the dental technician;
   • Interpretation of the color information in the ceramic part selection;
   • Making the restoration;
   • Color verification before the final cementation in the mouth[3].

Traditionally, shade matching of teeth in dentistry is done by visually comparing the colour of tooth/teeth with standard shade guide tabs, the operator choosing that which he/ she deems to be the best or closest match.

These shade guides offer relatively quick and cost effective methods of shade matching, offset by the major problems of the subjective variability of shade matching, the polychromatic nature of teeth, and the limitations of dental shade guides that incompletely represent the colour range of natural teeth.

Differences in perception of colour (operator subjectivity), operator experience,fatigue and colour blindness are human physiological factors affecting visual tooth matching.

Colours appear different when viewed under varying light sources, which may have different colour distribution. This phenomenon is known as metamerism and may result in perceptible and unacceptable colour differences in changing settings.

Thus, ambient light has to be standardised before tooth colour is assessed, to minimise the influence of variables such as the light source, time of day, the surrounding background colour of the walls and the angle and distance at which the tooth is viewed by the operator[4].

Determination of the color changes in aesthetic dentistry, and providing a more practical and consistent method to determine the color in dental clinics and to transmit this information to dental laboratories should be obtained.
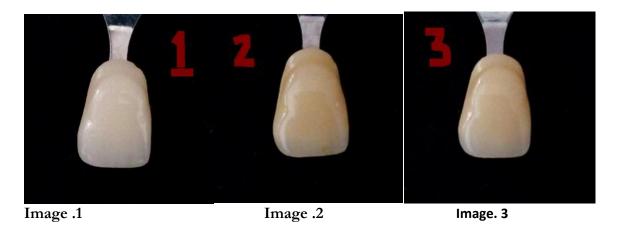
Materials and methods

Our study included total of 70 participants ,consisting of post graduate students and teaching faculty of different experience level and were as follows,
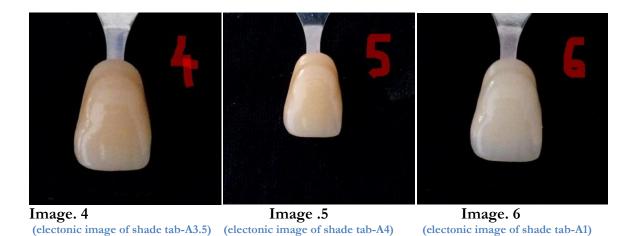
SR NO	SUBJECTS	TOTAL NUMBER
1	Participants having experience between 0-5yrs	31
2	Participants having experience between 5-10yrs	23
3	Participants having experience between 10-15yrs	2
4	Participants having experience between 15-20yrs	14

Total number – 70

Each participant was shown 8 electronic images of shade tabs and was asked to match the shade with physical Vita Classical Shade Guide.

Image .1

(electonic image of shade tab-B1)|

Image .2

(electonic image of shade tab-B4)

Image. 3

(electonic image of shade tab-B3)

Image. 4
(electonic image of shade tab-A3.5)

Image .5
(electonic image of shade tab-A4)

Image. 6
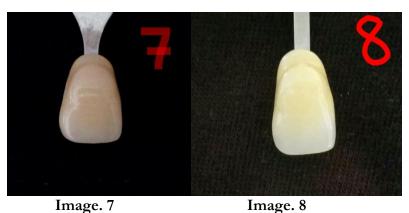(electonic image of shade tab-A1)

Image. 7
(electonic image of shade tab-C3)

Image. 8
(electonic image of shade tab-D4)

They were also provided with Vita Classical Shade guide compromising of all shades.

Image.9 (VITA CLASSICAL SHADE GUIDE)

The questioner provided to them consisted of following questions.

Sr no
Name-
Designation-
Method used for shade selection in practice-
Years of experience-
Outcome of shade selection: Excellent
     (Please tick one)   Good
                                Fair

Image	Shade selected
1	
2	
3	
4	
5	
6	
7	
8	

Please rate the image quality shown: Excellent
(Please tick one)

Good

Fair

Poor

RESULT

This Cross Sectionalsurvey had been conducted on 70 participants (dental faculty and post graduate students) with the help of electronic shade tab and vita classical shade guide.
The perception of the participants was compared and shade was obtained which was as follows and the analysis used was descriptive analysis.
Participants ranging from 0-5yrs of experience - 31 in number (table no .1)

Sr no	Shade shown	No of participants accurately matching the shade	Percentage
1	Image 1 –B1	22	71%
2	Image 2- B4	7	22.5%
3	Image 3-B3	4	12%
4	Image 4- A3.5	2	6%
5	Image 5- A4	0	0%
6	Image 6- A1	14	45%
7	Image 7- C3	3	9.6%
8	Image 8- D4	6	19%

Participants ranging from 5-10yrs of experience- 23 in number (table no. 2)

Sr no	Shade shown	No of participants accurately matching the shade	Percentage
1	Image 1 –B1	9	39%
2	Image 2- B4	2	8.6%
3	Image 3-B3	7	30%
4	Image 4- A3.5	6	26%
5	Image 5- A4	0	0%
6	Image 6- A1	15	65%
7	Image 7- C3	6	26%
8	Image 8- D4	2	8.6%

Participants ranging from 10-15yrs of experience- 2 in number (table no.3)

Sr no	Shade shown	No of participants accurately matching the shade	Percentage
1	Image 1 –B1	0	0%
2	Image 2- B4	0	0%
3	Image 3-B3	1	50%
4	Image 4- A3.5	1	50%
5	Image 5- A4	0	0%
6	Image 6- A1	1	50%
7	Image 7- C3	1	50%
8	Image 8- D4	0	0%

Participants ranging from 15-20yrs of experience- 14 in number (table no.4)

Sr no	Shade shown	No of participants accurately matching the shade	Percentage
1	Image 1 –B1	2	14%
2	Image 2- B4	2	14%
3	Image 3-B3	4	28%
4	Image 4- A3.5	4	28%
5	Image 5- A4	0	0%
6	Image 6- A1	3	21%
7	Image 7- C3	8	57%
8	Image 8- D4	0	0%

Individual shade matching accuracy (table no.5)

Sr no	Shade shown	No of participants accurately matching the shade	Percentage
1	Image 1 –B1	33	47%
2	Image 2- B4	11	15.7%
3	Image 3-B3	16	23%
4	Image 4- A3.5	13	18.5%
5	Image 5- A4	0	0%
6	Image 6- A1	33	47%
7	Image 7- C3	18	26%
8	Image 8- D4	8	11.5%

Overall accuracy

70 participants were shown 8 different electronic shade tabs i.e. 560 times the shade were matched out of which 132 got it correct ,so the overall accuracy is about **23.57%.**

Discussion

Because of the inherent property of the of the optical characteristics of natural teeth coupled with the operators variability and the visual environment in which shade selection is done it poses a challenge for accurate shade selection[15].

Communicating the shade selection done to the laboratory personel to recreate the shade interpretation as selected by the clinician is also a major hurdle.

It would be better if the technician has a reference picture of the dental structures and the surrounding pink structure while he is building up the restoration in ceramic in laboratory.

Electronic communication not only reduces the time factor involved in communication but also reduces the cost involved in doing a physical communication[16].

The use of image generated and transmitted electronically is a new development in the field of dentistry, with proliferation of electronic gadgets with image capturing capabilities and their ubiquitous prevalence of usage by everyone tempts dentist also to use this media as a tool in place of physical shade tabs and also to capture the image as a reference to the shade of the patient's natural teeth.

This survey was initiated to test the ability of the dental operators to match shades of images of shade tabs.

They were shown 8 electronic images of the different subgroups of the Vita Classical Shade Guide and were asked to identify the shade of the captured image with the help of physical shade guide.

The experience of the participants in the dental field ranged from 0-20 years with the average being about 3.5 years.

The percentage wise distribution of the shade tabs correctly matched is shown in table no.5.

The overall accuracy is 23.57%in this survey which was quite less,hence it can be stated that as the electronic gadgets increase to substitute the physical means more and more dental personel will become familiar with the digital modality ensuring a more accurate results.

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