ORIGINAL ARTICLE

ASSESSMENT OF CONCEPT OF SHADE SELECTION OF DENTISTS PRACTICING ESTHETIC DENTISTRY

[1]ABBAS MEHDI, [2]JIAND MALIK BALOCH,[3]WAQAS YOUSUF

ABSTRACT

The aim of this cross sectional study was to determine the knowledge and concept of shade selection amongst dentists practicing esthetic dentistry in Karachi. A total of 283 participants were recruited in this study, out of which 183 were females and 100 were males. Each participant was asked to fill a questionnaire comprising of questions regarding shade selection.

Out of the total number of subjects, 47.8% of the dentists believed that the dentist should give only their advice to the patients on final shade selection. 34.2% preferred to rest their eyes on a blue or grey object prior to shade selection.71.6% thought it was best if the tooth remains moist at the time of shade selection. 83.5% preferred to perform shade selection prior to dental procedure.

The questionnaire revealed some startling deficiencies in the practice of shade selection amongst dentist in Pakistan. Significant effort needs to be made in educating dentists about the proper guidelines regarding shade selection.

Keywords: *Concept, shade, selection, esthetic dentistry*

This article may be cited as: Mehdi A, Baloch JM, Yousuf W. Assessment of Concept of Shade Selection of dentists practicing esthetic Dentistry. Pak Oral Dent J 2020; 40(3):182-85.

INTRODUCTION

One of the keys to success in esthetic dentistry is the ability to produce restorations with appropriate shades matching the natural teeth. Artificial restorations should match the individual shade characteristics and variability present in the natural dentition. However, color perception may differ from individual to individual[1] which may impact the esthetic quality of the final restorations.

Shade selection is an art which can be acquired by understanding both the basic concept and principles of color and color science.[2,3] The three dimensions of color are Hue (tone of color), Chroma (intensity and saturation of the color tone) and Value (relative lightness and darkness of the color tone). These dimensions of color are significantly influenced by numerous factors such as type and the quality of illumination[4], environment, background color[5], receiver's eye, hereditary deficiencies in color perceptions, experience[6] etc.

Patient's dissatisfaction in terms of shade of restorations has been of prime concern for dentists[7]. The determination of proper color and shade for a restoration is a subjective assessment requiring comprehensive understanding of the science and numerous factors in order to achieve a satisfactory result suitable for both the dentist and the patient.

Inappropriate shade selection often requires restorations to be repeated by the laboratory putting an extra burden on the technicians both in terms of time and cost. One study suggested that approximately 50% of the remakes for an esthetic restoration are due to faulty shade selection.[8]Advancing the field of esthetic dentistry and overcoming the miscommunication between the dentist and the technician[9] may help minimize this error.

Ideally the process of shade selection should be a collaborative effort between the patient and practitioner. However, ultimately it is up to the dentist to use his experience to properly guide the patient in proper shade selection for the restoration to ensure a satisfactory final outcome.

Aim of this study was to determine the knowledge and concept of shade selection amongst the practitioners

[1] **Corresponding Author:** Abbas Mehdi, BDS, Registrar, Prosthodontics, Fatima Jinnah Dental College and Hospital, Karachi, Res: Building 1, Street 1, Azam Town, Karachi, Contact #: +92-336-380-9324, E-mail: abbasmehdi711@Yahoo.com

[2] Jiand Malik Baloch, BDS, FCPS, Demonstrator Operative Dentistry, Bolan university of medical and health sciences, Quetta.

[3] Waqas Yousuf, BDSc, FCPS Resident, Department of Prosthodontics, Hamdard University Dental Hospital, Karachi.

Received for Publication: Aug 8, 2019
First Revision: Oct 5, 2019
Second Revision: Nov 20, 2019
Approved: Dec 15, 2019

of esthetic dentistry in Karachi.

MATERIALS AND METHODS

It was a cross sectional study done at a private dental hospital in Karachi. Sample size was 282. All dentists who practice esthetic dentistry i.e. work for beautification of patient's smile using restorative material in the teaching institutes as well as private clinics were included in this study.

Inclusion Criteria

Both male and female dentists, aged between 22 to 40 years. General dentists and Specialists. Dentists with a minimum of 1 year of clinical experience.

Exclusion Criteria

Dentists working only on a particular specialization and not any in other field;orthodontists color blind and practitioners who were not from Pakistani.

All the dentists who fulfilled the inclusion criteria, after the approval by the Institutional Ethical Review Committee were included in the study. All the participants were asked to fill a questionnaire. The questionnaire comprised of two parts; first part consisted of bio- data, the second part consisted of questions associated with shade selection.

Data were entered and analyzed using Statistical Package for Social Sciences (SPSS) Version 21. Frequency and percentages were calculated for qualitative variables. Effect modifiers were controlled by stratification.

RESULTS

A total of 283 dentists took part in this study, out of which 183 were females and 100 were males with an age range of 22 to 40 years. The participants were asked to fill a questionnaire comprising of six relevant questions regarding shade selection with their practices. The questionnaire revealed the following results (shown in tables 1-6).

DISCUSSION

The vast majority of the dentists tested in this study utilized daylight as their primary light source during shade selection (table 1). Interestingly, more experienced dentists utilized either the dental unit light or a white LED light during shade selection than their less experienced counterparts. Numerous studies have shown the use of light correcting devices to be more accurate than daylight during shade selection.[11,12] However, these devices are not widely available in Pakistan therefore, daylight being the next best option. Dental unit light and white LED light is too bright[13] and therefore should not be used as a primary light source during shade selection as it can alter the perception of

TABLE 1: LIGHT SOURCE PREFERRED WHEN PERFORMING SHADE SELECTION

Light Source Used For Shade Selection	Total (%)	Gender		Clinical Experience	
		Male(%)	Female (%)	>2 years (%)	<2 years (%)
Daylight	95.3	92.7	96.7	90.4	97.8
Dental unit light	2.5	4.2	1.6	5.3	1.1
White LED	1.1	2.1	0.5	3.2	0.0
Any	1.1	1.0	1.1	1.1	1.1

TABLE 2: INVOLVEMENT OF THE PATIENT IN SHADE SELECTION

Patient nvolvement In shade selection	Total (%)	Gender		Clinical Experience	
		Male (%)	Female (%)	>2 years (%)	<2 years (%)
Yes, but the dentist should make the final decision	47.8	54.2	44.5	48.9	47.3
Yes, but the dentist should only give his/her advice to the patient	47.8	42.7	50.5	47.9	47.8
No, it should be entirely dentist's decision	1.1	1.0	1.1	1.1	1.1
The choice of shade is entirely up to the patient	3.2	2.1	3.8	2.1	3.8

TABLE 3: IMPROVEMENT OF SHADE SELECTION ABILITY WITH EXPERIENCE

Improvement of shade selection ability with Experirnce	Total (%)	Gender		Clinical Experience	
		Male (%)	Female (%)	>2 years (%)	<2 years (%)
Yes	89.2	86.5	90.7	88.3	89.7
No	2.9	4.2	2.2	4.3	2.2
Has remained same	7.9	9.4	7.1	7.4	8.2

TABLE 4: SHADE SELECTION AFTER PERFORMING A LONG PROCEDURE

	Total (%)	Gender		Clinical Experience	
		Male (%)	Female (%)	>2 years (%)	<2 years (%)
Immediately following a procedure	24.1	25.0	23.6	18.1	27.2
You take 10 minutes rest and then perform shade selection	36.3	30.2	39.6	34.0	37.5
You rest your eyes on blue or grey object for a few minutes	34.2	40.6	30.8	42.6	29.9
Don't do shade selection on the same day	5.4	4.2	6.0	5.3	5.4

TABLE 5: USUAL METHOD OF PERFORMING SHADE SELECTION

	Total (%)	Gender		Clinical Experience	
		Male (%)	Female (%)	>2 years (%)	<2 years (%)
Completely dry the tooth prior to shade selection	25.5	34.4	20.9	20.2	28.3
Ensure the tooth is slightly moist during shade selection	71.6	62.5	76.4	77.7	68.5
With the rubber dam in place	2.9	3.1	2.7	2.1	3.3

TABLE 6: MOST APPROPRIATE TIME TO PERFORM SHADE SELECTION

Best time for Shade Selection	Total (%)	Gender		Clinical Experience	
		Male (%)	Female (%)	>2 years (%)	<2 years (%)
Before the dental procedure	83.5	74.0	88.5	81.9	84.2
After the dental procedure	16.5	26.0	11.5	18.1	15.8

shade and can result in eye fatigue regardless of the type of LED used in the dental unit light type.[14]

Almost all the dentists were in favor of involving patients in the shade matching process but a great controversy arose over who should be responsible for the final decision as to which shade to use (table 2). Almost half of the participants were in favor of the dentist having the final say. The other half were of the opinion that the dentist should only give the advice and patient should make the final shade selection.[15] Females had a slightly greater tendency to consider their role as primarily advisory, whereas male dentists were somewhat more in favor of making the final decision themselves.

There was no consensus amongst the participating dentists as to their preferred time of shade selection (table 4). The participants were almost evenly divided into three groups: those favoring immediately after the procedure, other preferring 10 minutes after the procedure while others believed they should rest their eyes on grey or blue object for few minutes prior to shade selection. These results were of some concern as majority of the dentists were unaware of the best time for shade selection. Resting your eyes on grey or blue object for few minutes allows to refresh your eyes and thus gives the best matched shade[16]. Performing shade selection immediately after the procedure can be counter-productive as staring at an object for a prolonged period can result in hue accommodation[17] and saturation of color receptors may occur. This may not be the appropriate time for shade selection. More experienced dentists tended to have better concepts in this area, preferring to either rest 10 minutes or gaze at a grey or blue color for a few minutes before performing shade selection. This is in contrast to their more inexperienced counterparts, more of whom preferred to do shade selection immediately following a procedure.

Although majority of dentists preferred shade selection when the tooth was moist but a large minority preferred to perform shade selection on a dry tooth (table 5). Less experienced dentists and males in particular were more likely to favor completely drying the tooth prior to shade selection. This finding is unfortunate as clearly a moist tooth is the best condition to perform shade selection because when a tooth is dry, Chroma and translucency decrease and value increases.[18] Thus can result in poor shade match as the natural oral environment is moist. Although the present study shows an improvement in understanding of this point with experience, it is still unfortunate to note that about one fifth of experienced practitioners still prefer to completely dry the tooth.

The vast majority of dentists chose to perform shade selection before the start of the dental procedure whereas a minority chose to perform it after the dental procedure (table 6). Males in particular were comparatively more prone to perform shade selection after the procedure.

CONCLUSION

Deficiencies in the practice of shade selection by dentists was noticed. Significant efforts need to be made in educating dentists about the proper guidelines regarding shade selection.

REFERENCES

1 Buyukkaplan, Özarslan MM, Barutcigil, Arslan, Barutcigil K, Yoldan E. Effects of staining liquids and finishing methods on translucency of a hybrid ceramic material having two different translucency levels. J Adv Prosthodont. 2017; 9(5):387-93.

2 Nakhaei M, Ghanbarzadeh J, Amirinejad S, Alavi S, Rajatihaghi H. The Influence of Dental Shade Guides and Experience on the Accuracy of Shade Matching. J Contemp Dent Pract. 2016; 17(1):22-26.

3 Haralur SB, Al-Shehri KS, Assiri HM, Al-Qahtani MA. Influence of personality on tooth shade selection. Int J Esthet Dent. 2016; 11(1):126-37.

4 A comparison of conventional visual and spectrophotometric shade taking by trained and untrained dental students. Aust Dent J. 2015;60(2):176-81.

5 N Kalantari MH, Ghoraishian SA, Mohaghegh M. Evaluation of accuracy of shade selection using two spectrophotometer systems: Vita Easy shade and Degu dent Shade pilot. Eur J Dent. 2017; 11(2): 196–200.

6 Yılmaz B, Irmak O, Batu Can Yaman . Outcomes of Visual Tooth Shade Selection Performed by Operators With Different Experience. J Esthet Restor Dent. 2019; 31(5): 500-507

7 Elamin HO, Abubakr NH, Ibrahim YE. Identifying the tooth shade in group of patients using Vita Easyshade. Eur J Dent. 2015; 9(2): 213-217.

8 Sîmpălean D, D Petrişor M, Măruşteri Mş, Ghiga D, Bacârea V, Calinici T, BĂŢAGĂ S. A software application to detect dental color. Applied Medical Informatics. 2015; 37(3):31-39.

9 Aslam A, Ahmed B, Azad AA, Kaleem M, Rehman B. Bridging the gap: quality of communication between prosthodontists and lab technicians. Pak. oral dent. j. 2015; 35(2): 152-155.

10 Imre M M, Preoteasa E, Tancu AMC, Preoteasa CT, Pantea M, Perlea P. Ethical limits between aesthetic and cosmetic dentistry. Rom. J. Mil. Med. 2018; 121(2):16-20

11 Aswini KK, Ramanarayanan V, Rejithan A, Sajeev R, Suresh R. The effect of gender and clinical experience on shade perception. J Esthet Restor Dent. 2019; 31(4): 1-5

12 Hussain S, Yazdanie N. Teeth Shade Selection: Minimize the Factors Effecting It. Biomedica. 2019;35(1):1.

13 Wee AG, Meyer A, Wu W, Wichman CS. Lighting conditions used during visual shade matching in private dental offices. J Prosthet Dent. 2016;115(4):469-74

14 Afrashtehfar KI. Increased predictability in tooth shade-matching in practice. Oral Health. 2013;15(25): 44-50.

15 ADA Principles of Ethics and Code of Professional Conduct [Internet]. Ada.org. 2019 [cited 11 December 2019]. Available from: https://www.ada.org/en/about-the- ada/principles-of-ethics-code-of-professional-conduct

16 Albert CJ, da Silva EN, Penteado MM, de Lima DR, Kimpara ET, Uemura ES. Color assessment in dental prostheses: the use of smartphones as process tools. Braz. Dent. Sci. 2019;22(4):573-77.

17 Turgut S, Bagis B, Turkaslan SS, Bagis YH. Effect of ultraviolet aging on translucency of resin-cemented ceramic veneers: an in vitro study. J Prosthodont. 2014;23(1):39-44.

18 Lee YK. Fluorescence properties of human teeth and dental calculus for clinical applications. J Biomed Opt. 2015;20(4):40-90.

CONTRIBUTIONS BY AUTHORS

All authors contributed substantially