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TRABALHO FINAL DE GRADUAÇÃO

COLOR MEASUREMENT: A COMPARISON BETWEEN SPECTROPHOTOMETER

AND VISUAL METHOD

Santa Maria, RS

2020

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Trabalho final de graduação apresentado ao Curso de Oodontologia, Área de Ciências da Saúde, da Universidade Franciscana, como requisito parcial para obtenção do grau de Cirurgiã-dentista.

Orientadora: Pâmela Gutheil Diesel

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Aprovado em: ......de.............................de..............

RESUMO

O objetivo desse estudo foi comparar os métodos eletrônico e visual para escolha de cor em Odontologia. Para avaliar a técnica eletrônica, foi realizada coleta de dados de L*, a* e b* utilizando espectrofotômetro Easyshade e escala Vita classical durante 20 dias por um mesmo operador. E, para técnica visual, foi realizada coleta com 38 estudantes formandos do curso de Odontologia da Universidade Franciscana, na qual os estudantes denominaram a cor de 5 amostras em comparação com a escala Vita classical. A média obtida pelo método eletrônico foi 3,5 e a pelo método visual foi 3. Os resultados desse estudo demonstraram que os dois métodos são eficazes, por mais que não sejam sempre precisos, para escolha de cor no dia a dia clínico em Odontologia.

Palavras-chave: cor, odontologia e materiais dentários.

ABSTRACT

The objective of this study was to compare visual and electronic methods for color selection in dentistry. To evaluate electronic technique, the data of L*, a* and b* values was collected using the spectrophotometer Easyshade and the Vita classical scale during 20 days by the same researcher. And for the visual technique, it was collected by 38 students registered in the tenth semester of the dentistry course from Universidade Franciscana, in which the academics chose the color of 5 samples by comparing them to the Vita classical scale. The average obtain from the electronic method was 3,5 and from the visual technique was 3. The results found in this study show that both methods are viable, even though any of them are precise, for color selection in the clinical routine.

Key-words: Color, dentistry and dental materials.

SUMMARY

1. INTRODUCTION

Selecting color is one out of many difficulties that the dentist faces in restorative dentistry. In order to obtain satisfied patients with imperceptible changes on their smile esthetic, bleaching, resin restorations, esthetic veneers, selection of artificial teeth for prosthetics, inlays, onlays and overlays require knowledge about color, lighting and color measurement methods and evaluations. (SS MEIRELES et. al; 2008).

Color is basically light reflected from an object to our eyes and interpreted by our brain. Known by visual spectrum, with length between 380 and 760nm. According to the wave length, different colors can be interpreted by the brain: short waves (400-500nm) are seen as blue, medium waves (500-600nm) are seen as green and long waves (600-700) are seen red and the combination of these colors result in the other colors. Thereby, without light, there are no color (SIKRI, V K. 2010).

To obtain a great result in rehabilitation, tooth shade selection must be exact. Color is understood as a tridimensional nature, owning value, chroma and hue. Due to this, the traditional method used to evaluate and register color is the visual, which uses scales such as Vitapan Classical and Vita 3D-Master, that use the tridimensional nature of color as assistance for color selection. This method is taught since the beginning semesters in dental college and the students develop this technique along de years while in clinical practice. However, it does not assure that the students will have a good perception of color in their everyday practice, considering that the shade matching require an ideal environment. (JAIN, M et. al; 2019).

Apart from the visual method there are electronic methods that are used for color measurement. Wherein devices (spectrophotometers and colorimeters) emit light and analyze the spectrum reflected by the teeth aiming to indentify the colors. The results from this analysis can be as simple as corresponding to the Vita 3D-Master scale or as complex as chromatic reports of all teeth. Studies show that the visual method has a significant level of inconsistency, whereas the spectrophotometer has shown a better reliability for color selection. (IGIEL, C et. al; 2017).

1.1 PURPOSE

Visual and eletronic method are mentioned in literature as qualified for color selection. However, not many studies has compared these techniques among dentistry students.

1.2 OBJECTIVE

1.2.1 General Objective

This study has the goal/aim to compare the visual method for color selection using the Vitapan Classical scale with the electronic method for color selection using the spectrophotometer Vita Easyshade.

2. THEORETICAL REFERENCE

2.1 COLOR AND LIGHT IN DENTISTRY

Rehabilitation is considered successful when the restoration immitates natural teeth aspects, It must present an appropriate function and esthetic including form, texture and the correct color. In order to obtain a satisfactory result for patient and dentist, we must have knowledge about color, light and optical effects, in addition to, restorative techniches (SIKRI; 2010).

In 1666, Isaac Newton projected a diagram representing a wheelcolor circle, represented by figure 1, with the purpose of combining them. There have been inumerous changes of the original diagram, however this is the most common. Firstly, in the centre, there are the primary colors: red, yellow and blue. Followed by three colors resulted from their combination: the secondary colors, which are green, orange and purple. These two groups mixed originated six shades os colors (SIKRI; 2010).

Figure 1 – Wheelcolor circle

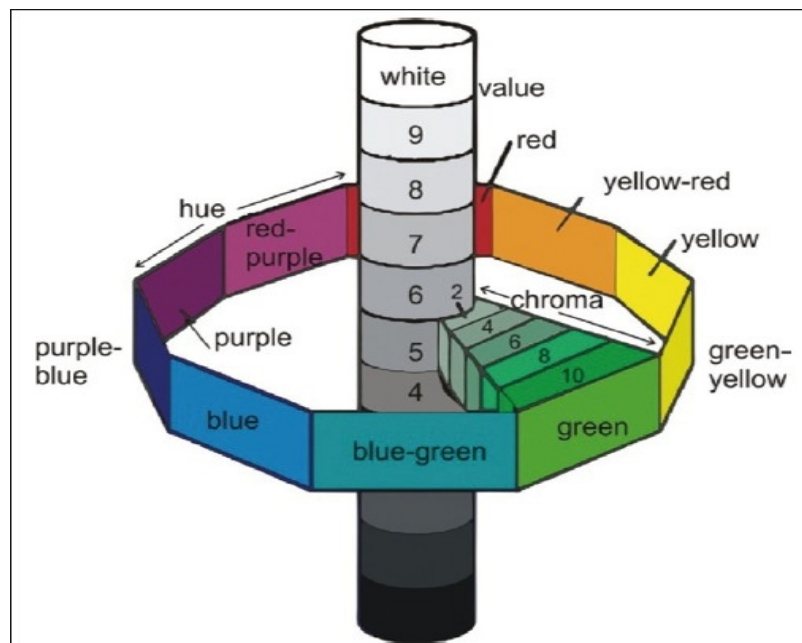Source: Color: Implications in dentistry- Vimal K Sikri

Albert Munsell, in 1955, presented color in three measurable the dimensions, as shown in figure 3. The dimensions are: hue that defines the family which determined color belongs to and chroma that describes the hue saturation and value which is the luminosity that each color represents in a grey scale. In which it is possible to differ dark color (low value) from light colors (high value), as demonstrated in figure 2. Value is considered to be the most important dimension of color because there are more eye structures capable of identifying color luminosity than structures responsible for detecting hue and chroma variations (SIKRI; 2010).

Figure 2 - Three dimensions of color a) Hue b) Value c) Chroma
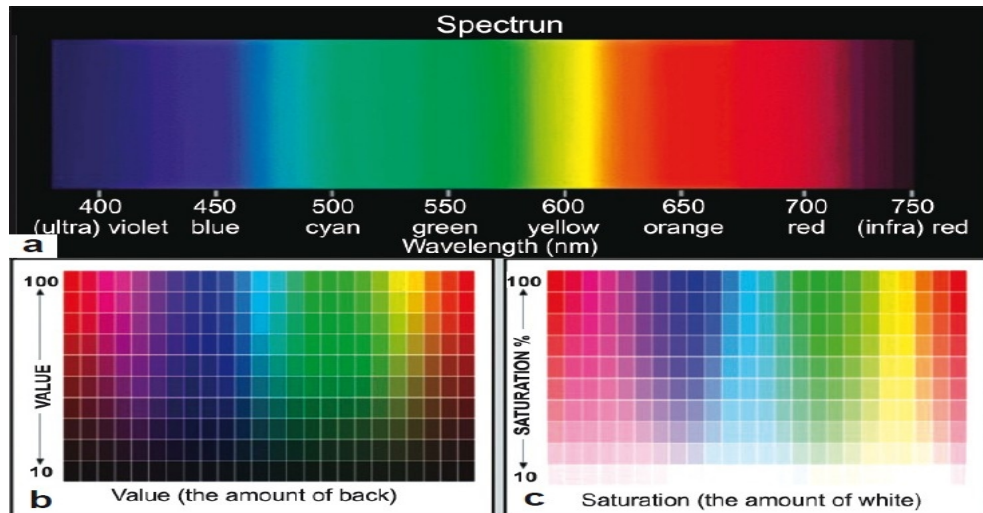
Source: Color: Implications in dentistry- Vimal K Sikri

Figure 3 - Munsell color system

Fonte: Color: Implications in dentistry- Vimal K Sikri

Studies have demonstrated that the perfect environment for color measurement is natural light at mid-day around 10 am or 2pm. It is also important to neutralize any lipstick, make-up or colorful clothes that the patient may be wearing. However, it is very difficult to depend on these factors for color selection on the everyday routine in a clinic. Dentists are dependent on artificial light, due to this it is important to choose a similar one. (SIKRI; 2010).

Incidence of color can be modified when projected through an object by three different processes: reflexion, occurs when the luminous spectrum is fully reflected by the object (high value), absorption, when all waves of any length are absorbed by the object (medium value) and transmission, which happens when the object allows light to be transmitted from one side to another (low value). Therefore, transmission is a characteristic of translucent objects and reflection and absorption of opaque objects (SIKRI; 2010).

Opalescence is an optical effect observed in natural teeth. It is related to the dental enamel, in which short waves lengths are reflected and long waves are transmitted. And it is responsible for the shades of blue that are observed on the incisal third when light is reflected or shades of orange when light is transmitted. Fluorescence is also an optical effect observed in the dental dentin. It occurs due to the capacity of absorbing ultraviolet light that is non visible for the human eye and, as a response, reflects a short wave length visible to the human eye and interpreted as blue (SIKRI; 2010).

Therefore, natural teeth presents multiple color variations and characteristics that are hard to copy, including arcades and surfaces variation. Teeth color also changes as people get old, for intrinsic and extrinsic factors, light, and due to the observer that is making color selection. Due to that, it is important to use an appropriate technique for color measurement (CHEN et. al; 2012; SS MEIRELES et. al; 2008).

2.2 MEASUREMENT METHODS

2.2.1   Visual technique

The most common method for color measurement is the visual and the commonly used shade guide is the Vitapan Classical, represented in figure 4. Hue is represented by the letters A (orange), B (yellow), C (yellow + grey) and D (orange + grey) and chroma is responsible for ordering the hue in the following order: A1, A2, A3,5, A4, B1, B2, B3, B4, C1, C2, C3, C4, D2, D3 and D4. Colors can also be presented as their value, the most important dimension of color: B1, A1, B2, D2, A2, C1, C2, D4, A3, D3, B3, A3,5, B4, C3, A4 and C4 (C. OLMS et. al 2013).

Figure 4 – VITA CLASSICAL shade guide
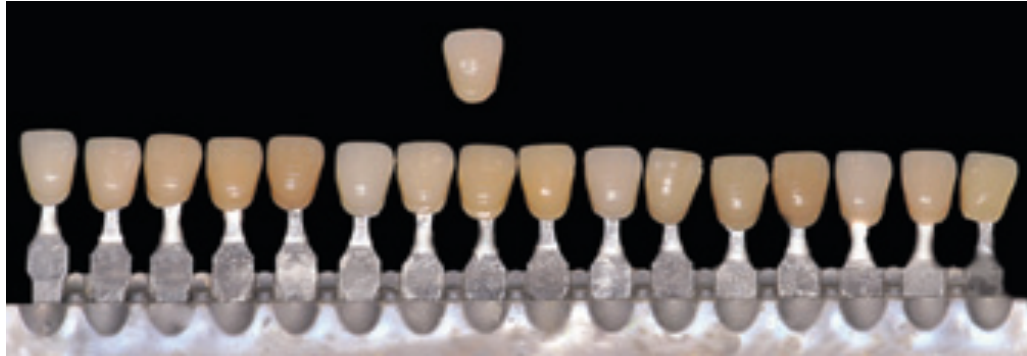
Source: A systematic review of visual and instrumental measurements for tooth shade matching – Hui Chen

Although Vitapan Classical is the most traditional there is also the Vita 3D-Master shade guide, in which colors are presented by value > chroma > hue. Differently from the Vitapan classical that presents 16 colors. It has 26 colors divided in 5 groups for a better coverage (SIKRI; 2010).

As mentioned previously, for color to exist there must be light, an object submitted by action of light and an observer capable of interpreting the waves from the luminous spectrum. Beyond these characteristics that are dependent from one another, it becomes clear why two individuals can interpret different colors from the same object in color evaluation by the visual method (CHEN et. al; 2012, SIKRI; 2010).

Furthermore, during the visual technique there are other aspects that must be considered: the professional experience, the dentists fatigue, the patients position by the light, the kind of light source as well as the metamerism phenomenon. The latter occurs when two colors with different spectral reflectance seem to be the same in front of a light source. To avoid this phenomenon it is recommended to observe both colors under distinct light sources. All these factors influence in color selection (SIKRI; 2010, SS MEIRELES et. al; 2008 e C. OLMS et. al 2013)

2.2.2   Electronic method

Nowadays the eletronic method includes spectrophotometers, colorimeters and even digital cameras, represented by figure 5, have been more common. It is defined as an accurate technique and has trustful results, on the other hand it is an expensive and complex technique. The most used instrument is the spectrophotometer which is known to be objective and capable of providing quantitative results through the CIEL *a*b system (SS MEIRELES et. al; 2008).

Figure 5 - Shade taking devices
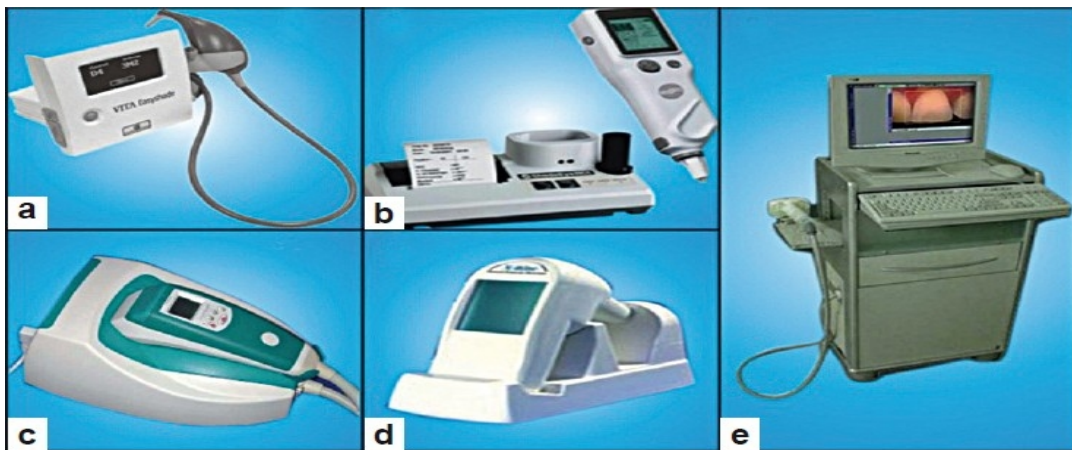
a) Vita easyshade b) Shade eye NCC c) Shade scan d) Shade rite dental vision system e) Spectroshade

Source: Color: Implications in dentistry- Vimal K Sikri

The French organization CIE (Comission Internationale de l'Eclairage) defined three dimensions of color for better comunication, expression and evaluation of color. CIEL*a*b is one of them, it provides color evaluation in a tridimensional space. In which, L refers to the luminosity of the object, +a refers to red, -a refers to green, +b refers to yellow and -b to blue. The spectrophotometer measure the light reflected from the object, determine the coordinates and transform into numerical data (SS MEIRELES et. al; 2008 e JOHNSTON; 2009).

Figure 6: L * a * b * system
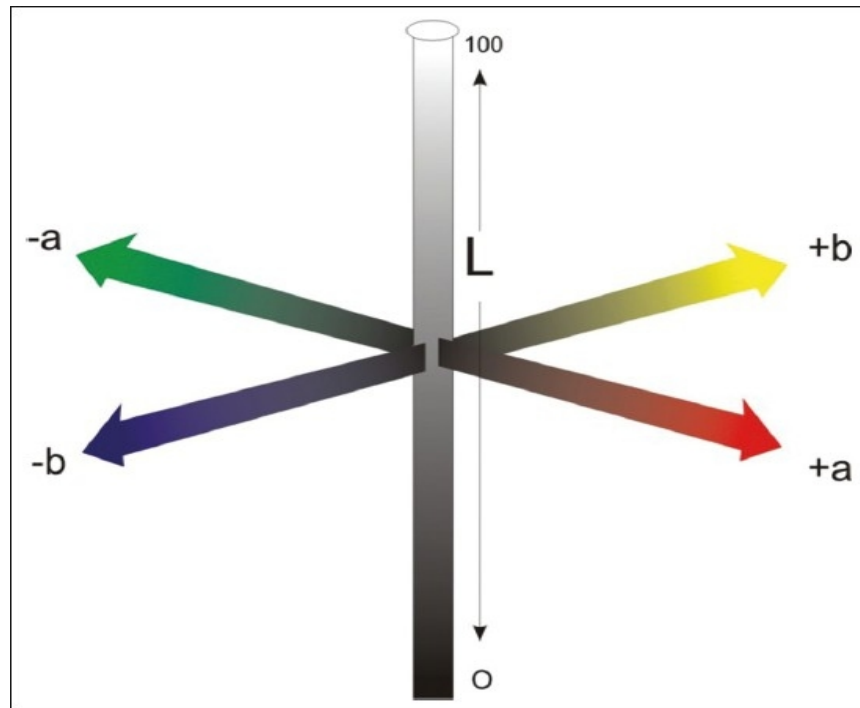
Source: Color: Implications in dentistry- Vimal K Sikri

The formula $\Delta E^* = [\Delta L^{*2} + \Delta a^{*2} + \Delta b^{*2}]^{1/2}$ is used to compare the numerical difference between coordinates: ΔL^* refers to the difference from lighter to darker, Δa^* refers to the difference from red and green, Δb^* refers to the difference from yellow and blue and ΔE^* refers to the total difference (SS MEIRELES et. al; 2008 e JOHNSTON; 2009).

Beyond the quantitative results through the CIEL*a*b system the spectrophotometers also indicate the teeth color by the VITA scale. Although, in some events it conflicts with the visual technique (CHEN et. al; 2012).

3. METHODS

3.1 ETHICAL CONSIDERATIONS

This paper was submitted to the Comitê de Ética da Universidade Franciscana (UFN). The objective of this study was explained to the students and as they agree to participate they signed the Termo de Consentimento Livre e Esclarecido presented in - appendices 1.

3.2 STANDARDIZATION OF VITA CLASSICAL SHADE GUIDE VALUES

In order to quantify and calculate the difference between colors of visual and instrumental measurement, the values of L*, a* and b* were organized for each color of the Vita Classical shade guide. The colors A1, A2, A3, A3,5, A4, B1, B2, B3, B4, C1, C2, C3, C4, D2, D3 e D4 were measured by a previously trained operator using the spectrophotometer VITA Easy Shade.

Each teeth was removed from the shade guide and positioned in a white paper. The operator positioned the tip of the device on the medium third crowns for measurement. Every element had a corresponding color to the VITA Classical shade guide as well as the L*, a* and b* values.

3.3 VISUAL TECHNIQUE EVALUATION

The sample of this research for the visual technique was 43 dentistry students regularly registered in the tenth semester of the Dentistry Course in Universidade Franciscana (UFN).

The academic received a standard VITA Classical shade guide and five samples removed from the shade guide numbered from 1 to 5. The student classified the 5 samples comparing with the standard shade guide. The color selected was registered in a chart containing the L*, a* and b* values previously obtained by the operator.

Therefore, the numbers corresponding to visual and electronic method were applied to a formula for color variation (ΔE). The formula is: $\Delta E^* = [\Delta L^{*2} + \Delta a^{*2} + \Delta b^{*2}]1/2$ in which L*, a* and b* were the difference between the spectrophotometer value and the value informed by the academic for each sample.

Consequently, if the result is 0 means that the student chose the right color for the sample. And the higher it is the result, the bigger it is the difference from the original color.

3.4 ELECTRONIC METHOD EVALUATION

During 20 days one operator will do the measurement through the electronic technique utilizing the VITA Easy Shade spectrophotometer of the five samples previously used by the academics.

3.5 DATA ANALYSIS

After being organized all the numbers are going to be submitted to a statistic analysis to compare both visual an electronic technicques.

4. RESULTS

The Table 1 represents the results from the color selection realized by 38 students from the tenth semester.

Table 1 - Visual technique of color selection realized by 38 academics from de tenth semester from de Dentistry Course.

	A1	A3	B2	C3	D3	CORRECT
Student 1	B1	A2	C1	C3	D3	2
Student 2	A1	A3	B2	C3	D3	5
Student 3	B1	D3	D2	A4	B3	0
Student 4	A1	A3	C1	C2	D3	3
Student 5	A1	A2	B2	C2	D2	2
Student 6	A1	A3	B2	A3.5	D4	3
Student 7	C1	A2	B2	C2	D3	2
Student 8	A1	A3	B2	C3	D3	5
Student 9	B1	A3	C1	D4	D3	2
Student 10	A1	A3	B1	D3	C2	2
Student 11	A1	D3	C1	C3	C2	2
Student 12	A1	D2	B2	C3	D3	4
Student 13	A1	A3	B2	C2	D3	4
Student 14	A1	A3	B1	C3	D3	4
Student 15	A1	A3	C1	C3	D2	3
Student 16	A1	A2	B2	C2	D3	3
Student 17	A1	A3	B2	B3	D3	4
Student 18	A1	A3	B2	C3	D3	5
Student 19	A1	A3	B2	A3.5	B3	3
Student 20	D2	A3	B2	C3	D3	4
Student 21	A1	D3	B2	A3	B3	2
Student 22	A1	A2	B2	C3	A3	3
Student 23	A1	A3	B2	C2	D3	4

|	**A1**	**A3**	**B2**	**C3**	**D3**	**CORRECT**
Student 24	A1	D2	A3	D3	C2	1
Student 25	A1	B2	B3	C3	C2	2
Student 26	A1	A3	B2	C3	D3	5
Student 27	A1	A3	B2	D3	C3	3
Student 28	D2	A3	A2	D4	D3	2
Student 29	A1	A2	B1	D3	C2	1
Student 30	A1	A2	B2	C2	A3	2
Student 31	A1	A3	B2	D4	D3	4
Student 32	A1	A3	B2	C3	D3	5
Student 33	A1	A2	D2	C2	A2	1
Student 34	A1	A3	B2	C3	B3	4
Student 35	A1	A3	B2	C3	D3	5
Student 36	A1	A2	B2	C2	D3	3
Student 37	A1	A3	A2	D4	D2	2
Student 38	A1	D3	B2	A3	B3	2

The results of the visual technique for color selection demonstrated that the average of correct answers is 3 and the standard deviation is 1,33.

The color that had the more correct answers was A1, it had 32 correct answers, followed by B2, with 24 correct answers and A3 with 22 correct answers. The two color with less correct answers were D3, that had 20 correct answers and C3, with 15 correct answers. This data is shown on the following 5 graphics.
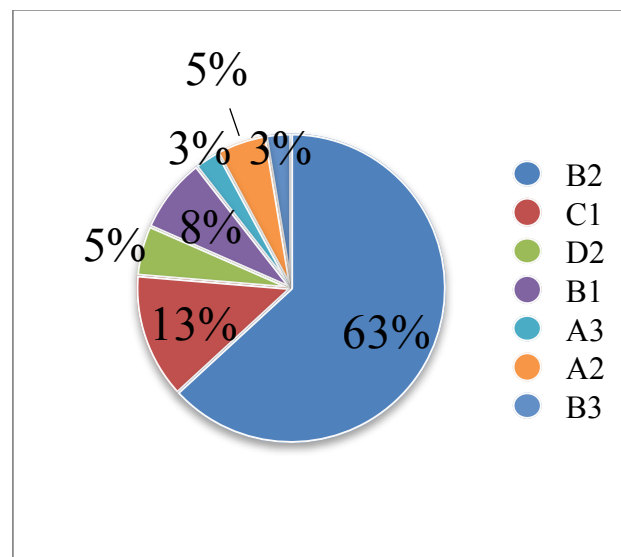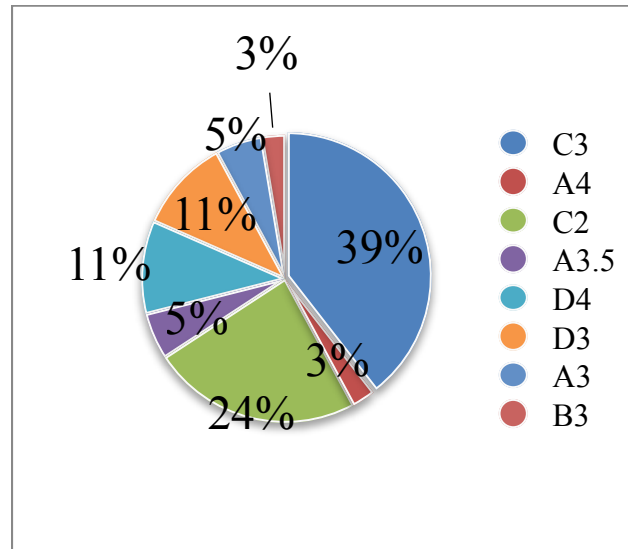
Graphic 1: Students answers for color A1.
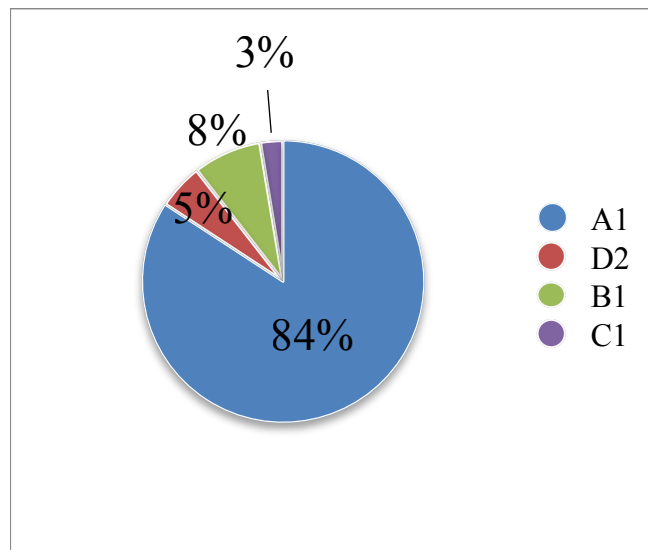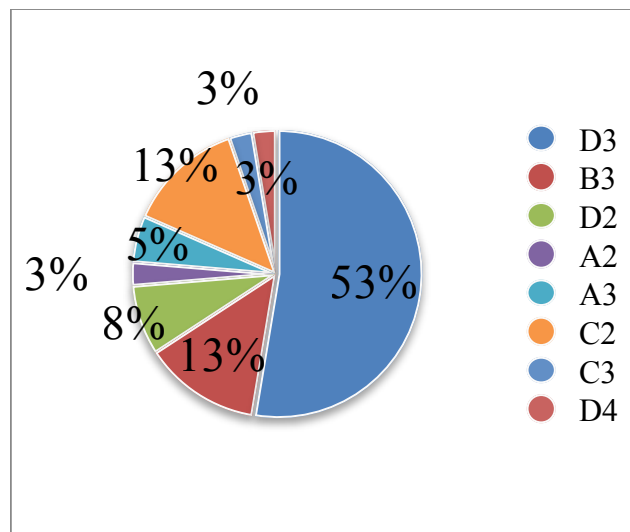

Graphic 2: Students answers for color A3.
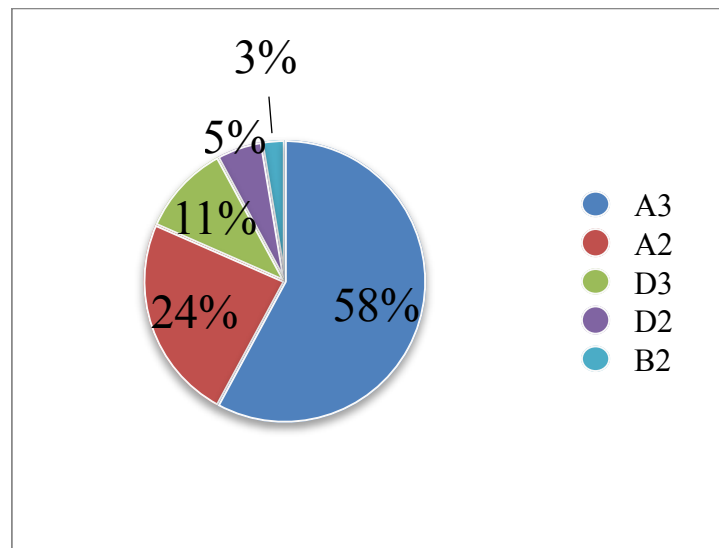
Graphic 3: Students answers for color B2.

Graphic 4: Students answers for color C3.

Graphic 5: Students answers for color D3.

The table 2 presents the results of the color selection using the spectrophotometer Easyshade during 20 days.

Table 2 - Color selection by electronic method using spectrophotometer in 20 days.

|	A1	A3	B2	C3	D3	Correct
Day 1	A1	A3	A2	C3	C2	3
Day 2	B1	A1	B1	A1	B1	0
Day 3	A1	A3	B2	C3	D3	5
Day 4	B1	B1	B1	C3	D3	2
Day 5	A1	A3	B2	C3	A3	4
Day 6	A1	A3	B2	C3	A3	4
Day 7	A1	A3	B2	C3	A3	4
Day 8	A1	A3	B2	C3	C2	4
Day 9	A1	A2	B2	C3	C2	3
Day 10	A1	A2	B2	C3	C2	3
Day 11	A1	A2	B2	C3	C2	3
Day 12	A1	A3	B2	C3	D3	5
Day 13	A1	A3	B2	C3	D3	5
Day 14	A1	A3	B2	C3	A3	4
Day 15	A1	A3	B2	C3	A3	4
Day 16	A1	A2	B2	C3	A3	3
Day 17	A1	A2	B2	C3	C2	3
Day 18	A1	A3	B2	C3	D3	5
Day 19	A1	A3	B2	C3	A3	4
Day 20	A1	A3	B2	C3	A3	4

The results of the electronic technique for color selection demonstrated that the average of correct answers is 3,6 and the standard deviation is 1,19.

Any of the colors had 100% of correct answers. The colors with less mistakes was C3, it had 1 wrong answer, A1, it had 2 wrong answers and B2 that had 3 wrong answers. And the colors with most mistakes was D3, that had 15 wrong answers and A3 thats had 7 wrong answers.
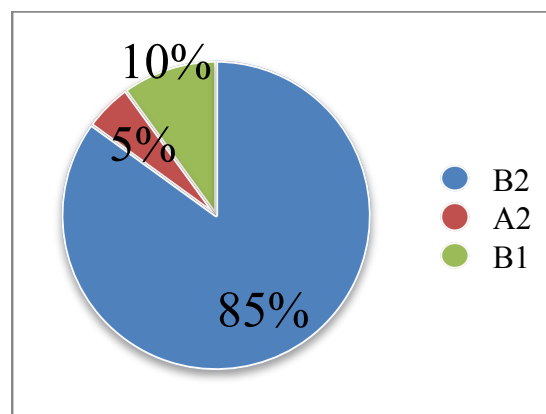
Graphic 6: Electronic method answers for color A1.
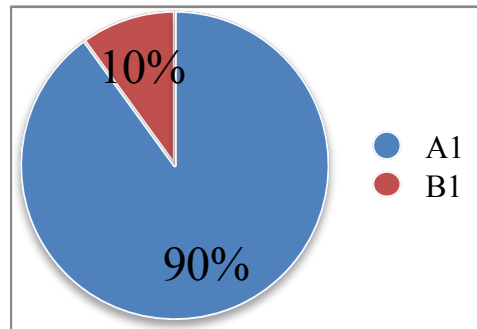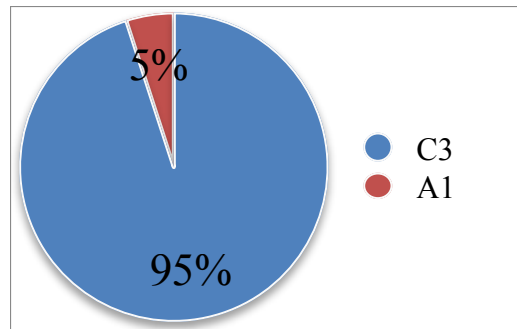

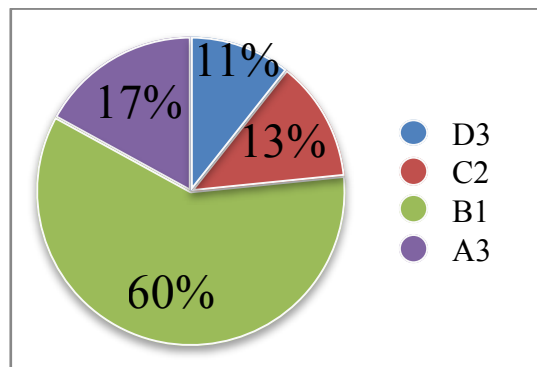**Graphic 7:** Electronic method answers for color A3.
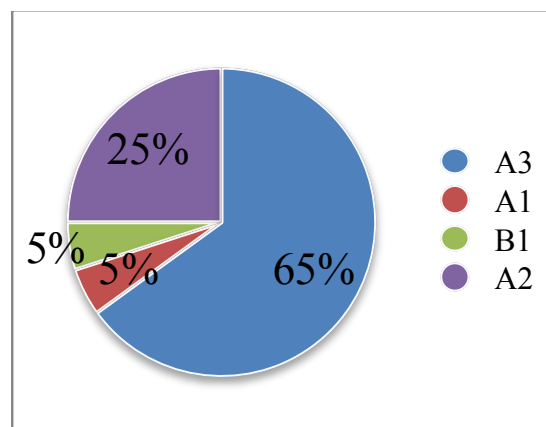
Graphic 8: Electronic method answers for color B2.

Graphic 9: Electronic method answers for color C3.

Graphic 10: Electronic method answers for color D3.

5. DISCUSSION

Although the methods and scale used in this study were different, the results found came across the ones in pre existent literature. The outcome in the research confirm the hypothesis that there are no significant variation from the visual to the electronic method by the spectrophotometer Easyshade. Still, the electronic technique shows a small advantage than the comparison method.

The results found by visual technique are correspondent to previous similar studies (IGIEL et al, 2017; DELLA BONA et al, 2009). These studies demonstrated difficulties to obtain good results through the visual method, which means that the participants shown bigger variability in their answers when compared to the electronic evaluation. It proves the difficulty that professionals face in esthetic procedures, specially in natural teeth, that presents more than one color.

Color selection by electronic method did not present 100% correct answers for any of the colors in the scale. However, it also did not present 100% wrong answers for any color. The error may be related to the L*a*b* values read by the device. Even though, it is important to recall that the scale is standardized, as well as the device because the are produced by the same manufacturer. Also, the spectrophotometer analysis were made by the same operator, which should present a great condition for color selection.

Systematic errors has already been questioned by Lagouvardos e col. in 2009, that are hard to control and affect directly its validity. These differences are related to the variation of the L*a*b* values in the color guide because the device identifies each color from the guide by the ΔE defined by the producer.

In the clinical routine, the use of the spectrophotometer is intended to make the color selection routine easier. Even though quantitative data shows that the electronic method is better, the visual method is the most commonly used day by day in practices.

6. CONCLUSION

It can be concluded that the electronic and visual methods are not always accurate and are equally viable techniques for color selection.

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APÊNDICE 1

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO (TCLE)

Você está sendo convidado a participar do projeto de pesquisa **"Comparação do método eletrônico e método visual para seleção de cor em odontologia"** da pesquisadora Pâmela Gutheil Diesel.

Com relação a sua participação neste projeto, leia as informações a seguir:

1.   O estudo destina-se a investigar, em uma amostra de estudantes da Universidade Franciscana a capacidade de seleção de cor de dentes baseada na escala Vita Classical.

2.   A importância deste estudo é de identificar a facilidade ou dificuldade do ato de seleção de cor de dentes através da técnica visual por comparação com escala padrão para acadêmicos do último semestre do curso de Odontologia.

3.   A coleta de dados se dará nos meses de abril e maio de 2019.

4.   O estudo será feito entregando para o acadêmico uma escala padrão Vita Classical e mais 5 dentes numerados de 1 a 5 retirados de outra escala de dentes idêntica e caberá ao acadêmico a identificação de cada um dos dentes comparando-os com a escala padrão.

5.   A sua participação será em uma única etapa realizando a avaliação dos 5 dentes da escala e atribuindo a seleção de cor para cada elemento.

6.   Os incômodos e possíveis riscos a sua saúde física e/ou mental são: desconforto, vergonha ou ansiedade.

7.   Os benefícios esperados com a sua participação no projeto de pesquisa , mesmo que não diretamente, envolvem a possibilidade de manusear uma das escalas de cor mais usadas na odontologia e treinar habilidade estimulada durante a graduação do curso para selecionar cor de dentes através da técnica visual comparativa.

8.   Você poderá contar com a seguinte assistência: esclarecimento por parte do pesquisador, sendo o responsável por ela Pâmela Gutheil Diesel.

9.   Você será informado (a) do resultado final do projeto e sempre que desejar, serão fornecidos esclarecimentos sobre cada uma das etapas do estudo.

10.   A qualquer momento, você poderá recusar a continuar participando do estudo e, também, que poderá retirar seu conhecimento, sem que isso lhe traga qualquer penalidade ou prejuízo.

11.   As informações conseguidas através da sua participação não permitirão a identificação da sua pessoa, exceto para a equipe de pesquisa, e que a divulgação das mencionadas informações só será feita entre os profissionais estudiosos do assunto após a sua autorização.

12.   O estudo não acarretará nenhuma despesa para você.

13.   Você será indenizado(a) por qualquer dano que venha a sofrer com a sua participação na pesquisa (nexo causal).

14.   Você receberá uma via do Termo de Consentimento Livre e Esclarecido assinado por todos.

Eu, _____, tendo compreendido perfeitamente tudo o que me foi informado sobre a minha participação no mencionado estudo e estando consciente dos meus direitos, das minhas responsabilidades, dos riscos e dos benefícios que minha participação implicam, concordo em dele participar e para isso eu DOU O MEU CONSENTIMENTO SEM QUE PARA ISSO EU TENHA SIDO FORÇADO OU OBRIGADO.

Endereço do responsável pela pesquisa:

Instituição: Universidade Franciscana

Endereço: Rua Silva Jardim, 1175

Complemento: Prédio 17, sala 611, 6o. Andar

Cidade: Santa Maria (RS) Cep: 97010-491

Telefone: (55) 3220 1200

Ponto de Referência: Em frente a Igreja do Rosário

Contato de urgência: Sra. Pâmela Gutheil Diesel

Endereço: Rua Duque de Caxias 1361

Complemento: apto 2401

Cidade: Santa Maria (RS) Cep: 97015-190

Telefone: (55) 99622 1012

Ponto de Referência: Praça Saturnino de Brito

ATENÇÃO: O Comitê de Ética da UFN analisou e aprovou este projeto de pesquisa. Para obter mais informações a respeito deste projeto de pesquisa, informar ocorrências irregulares ou danosas durante a sua participação no estudo, dirija-se a:

Rua dos Andradas 1614, Prédio Reitoria – Campus I – 7o. Andar

Comitê de Ética em Pesquisa da Universidade Francicana

Telefone: (55) 3220 1220

Santa Maria,_____de_____de 2019.

Assinatura do(a) voluntário (a) e rubricar as demais folhas

ANEXO 1

UNIVERSIDADE
FRANCISCANA

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: COMPARAÇÃO DO MÉTODO ELETRÔNICO E MÉTODO VISUAL PARA SELEÇÃO DE COR EM ODONTOLOGIA

Pesquisador: Pâmela Guthell Diesel

Área Temática:

Versão: 1

CAAE: 10500919.3.0000.5306

Instituição Proponente: SOC CARIT E LIT SAO FRANCISCO DE ASSIS ZONA NORTE

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 3.254.408

Apresentação do Projeto:

Inúmeros procedimentos odontológicos utilizam de escala de cor de dentes para avaliar dentes. A comparação com escalas pode ser feita através da técnica visual comparando dente e escala ou pela técnica eletrônica, fazendo uso de aparelho para esta verificação. Sendo assim, o presente trabalho tem por objetivo comparar o método visual para avaliação e registro da cor utilizando a escala Vitapan Classical com o método eletrônico para avaliação e registro da cor utilizando o espectrofotômetro Vita Easyshade. Para técnica visual serão selecionados 20 acadêmicos de odontologia e cada um receberá uma escala padrão e mais cinco dentes numerados de 1 a 5. Caberá ao acadêmico, através da comparação com a escala padrão, determinar a classificação de cada um dos 5 elementos. A técnica eletrônica será testada por 20 dias, onde um mesmo operador fará a avaliação, usando o espectrofotômetro VITA Easy Shade, das cinco cores usadas pelos alunos anteriormente. De posse dos dados, os mesmos serão tabulados para comparação entre acerto e erro de cada técnica.

Objetivo da Pesquisa:

O presente estudo tem por objetivo comparar o método visual para avaliação e registro da cor utilizando a escala Vitapan Classical com o método eletrônico para avaliação e registro da cor utilizando o espectrofotômetro Vita Easyshade.

Endereço: R. dos Andrada, 1614 - Prédio da Reitoria - Campus I - 6º andar
Bairro: Centro   CEP: 97.010-032
UF: RS   Município: SANTA MARIA
Telefone: (55)3220-1200   Fax: (55)3222-6484   E-mail: cep@ufn.edu.br

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Avaliação dos Riscos e Benefícios:

Segundo a pesquisadora, o estudo poderá apresentar incômodos e possíveis riscos a sua saúde física e/ou mental como: desconforto, vergonha ou ansiedade. Os benefícios esperados com a participação no projeto de pesquisa envolvem a possibilidade de manusear uma das escalas de cor mais usadas na odontologia e treinar habilidade estimulada durante a graduação para selecionar cor de dentes através da técnica visual comparativa.

Comentários e Considerações sobre a Pesquisa:

O projeto analisado apresenta os principais elementos necessários ao desenvolvimento de uma pesquisa necessária à elaboração do Trabalho Final de Graduação em Odontologia (TFG).

Considerações sobre os Termos de apresentação obrigatória:

O protocolo analisado apresenta todos os termos e documentos preconizados pelas Resoluções CNS/MS 466/12 e 510/16. No entanto, uma observação diz respeito à elaboração do Termo de Consentimento Livre e Esclarecido (TCLE), conforme consta no item recomendação.

Recomendações:

Recomenda-se que, em estudos futuros, o TCLE seja redigido em texto corrido, em linguagem amigável e não em uma sequência de itens, remetendo à ideia de "contrato entre duas partes interessadas em um determinado assunto".

Conclusões ou Pendências e Lista de Inadequações:

Diante do exposto, este Colegiado em Pesquisa com Seres Humanos é de parecer favorável à aprovação do presente protocolo de pesquisa.

Considerações Finais a critério do CEP:

Toda e qualquer alteração do Projeto, assim como os eventos adversos graves, deverão ser comunicados imediatamente a este Comitê. O pesquisador deve apresentar relatório final da pesquisa, ao CEP, via Plataforma Brasil, no mês de setembro de 2019, conforme determinação do CONEP.

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações	PB_INFORMAÇÕES_BÁSICAS_DO_P	21/03/2019		Aceito