SELF-PERCEPTION OF DENTAL SURGEONS ON COLOR SELECTION

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ABSTRACT

Objective: The objective of this study was to determine the dental surgeons' self-perception on color selection processes in Dentistry. **Methods:** The study followed a cross-sectional observational design using an electronic questionnaire with objective questions, to evaluate the influence of sociodemographic data —sex, age range, time of clinical service and dental specialty type— on the dental surgeons' experience on color selection in Dentistry, and reliability to perform direct (DER) and indirect (IER) esthetic restorations. Data was analyzed descriptively and by the chi-square test (α=0.05). **Results:** The sample (n=444) consisted mostly of females (63.1%), within 30 and 59 years (68.5%), with more than 10 years of clinical service time (42.3%), and specialists in Restorative Dentistry or Prosthodontics (28.8%). All participants considered the color selection in Dentistry as an important step to achieve aesthetic success on the restorative treatment. The majority of the participants reported having experience in color selection in Dentistry (65.8%) and certainty to performing direct (74.7%) and indirect (53.1%) aesthetic restorations. The clinical time of service and the dental specialty significantly influence on the color selection in Dentistry experience and the reliability to perform direct and indirect aesthetic restorations. **Conclusion:** It can be concluded that the dental surgeons' self-perception was influenced by the sociodemographic factors of clinical service time and dental specialty type.

KEYWORDS: Colorimetry. Visual perception. Color perception.

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INTRODUCTION

In contemporary restorative dentistry, dental surgeons use materials that besides replacing the form and function from the missing structures, are also able to reproduce the optical characteristics of adjacent dental tissues. Therefore, the aesthetic success of restorative treatment is dependent on the complete combination between the dental substrate and the restorative materials.[1,2]

When it is desired to identify all the dental tissues visual characteristics that form the teeth general appearance, the "color selection" simplified term is often used. However, color is only one of the several dimensions that influence the objects' general appearance, that are named optical properties[3], beeing shape, texture, opacity, translucency, opalescence, fluorescence, brightness, and the color itself, subdivided into three dimensions (value, hue, and chroma).

The "dental color selection", i.e., the identification of the different optical properties present in each part of the future restoration becomes necessary both for a direct and indirect restorative approaches. Due to the technical and scientific information amount which clinicians are subjected during their education and professional service, the color science field often goes unnoticed in the Restorative Dentistry learning. Culturally, the dental surgeons individual ability to perform the process of dental color selection in a empirically way receives credit for clinical success.[4,5,6] However, several studies show that color selection is a step that must be science-based and that can be improved.

Since several factors can impair the execution of aesthetically satisfactory restorations and recognizing the need to highlight the operator importance in the clinical success, avoiding an overestimation of materials role, it is necessary to evaluate how dental surgeons deal with "tooth color selection" in their daily activities. It is believed that different socio-demographic factors as clinical service time, education level, dental specialty type, clinical service location, age, and gender can all influence the self-perception and the knowledge of factors related to color selection in Dentistry. However this information has little scientific basis and needs better scientific evidence.

Based on the aforementioned doubts, the current study aimed to determine the dental surgeons' self-perception - how do they understand their attitudes and their beliefs based on their behaviors - on processes related to color selection in Dentistry. The research hypothesis was that the participants' self-perception would be influenced by the different sociodemographic factors.

MATERIAL AND METHODS

Study design

The study followed a cross-sectional observational design, using a closed questionnaire. Dental surgeons registered at the Dental Council from the State of Rio de Janeiro (CRO-RJ) were invited to collaborate with the study, approved by the Salgado de Oliveira University Research Ethics Committee (5289). All participants signed a free and informed consent before being submitted to the questionnaire.

The inclusion criteria included professionals properly registered in the CRO-RJ who agreed to participate and who claim to perform direct and indirect restorations routinely. The exclusion criteria included professional who did not answer the questionnaire within the established deadline and who were not registered in the CRO-RJ. All electronic questionnaires answered from the participants that met this study eligibility criteria were considered.

Questionnaire

An electronic questionnaire was developed in the Google® forms platform (http://docs.google.com/forms) and included objective questions divided into two groups: 1) sociodemographic data; and 2) dental surgeon' self-perception.

The invitation was sent by e-mail to a group of active and properly registered in the CRO-RJ dental surgeons (2,000 obtained by randomization from the database that has 19,125 clinicians in its entirety up to the present moment) in four distinct times, seven days equidistant in the period between October and November 2017. This study sample comprised 444 participating (22.2% return). Data was descriptively analyzed. Chi-square tests were used to verify the possibility of relationship between sociodemographic and self-perception aspects (α = 0.05).

RESULTS

The sample was majority composed by women (63.1%) . Considering the age, the participants' majority had 30 years at least (74.8%). With regard the graduation time, the majority reported to have graduated more than 5 years ago (82%), followed by those who graduated up to 5 years (18%). Considering the dental specialty, 28.8% of the participants declared to have postgraduate training in Restorative Dentistry or Prosthodontics while 71.2% declared to have other specialties or no postgraduate training.

1. SOCIODEMOGRAPHIC DATA
1.1 Gender
( ) Male
( ) Female
1.2 Age
( ) Between 20 and 29 years old
( ) 30 years old or higher
1.3 Graduate time
( ) Up to 5 years
( ) More than 5 years
1.4 Do you have a post–graduate training in Restorative Dentistry and / or Dental Prosthesis?
( ) Yes
( ) No
2. DENTAL SURGEON'S SELF–PERCEPTION
2.1 Do you have expertise in the dental color selection?
( ) Yes
( ) No
2.2 Do you feel secure to perform direct aesthetic restorations?
( ) Yes
( ) No
2.3 Do you feel secure to perform indirect aesthetic restorations?
( ) Yes
( ) No
2.4 Do you consider the dental color selection step as important aspect for the restorative procedure success?
( ) Yes
( ) No
2.5 How do you feel about the education on "dental color selection" received on your undergraduate program?
( ) Totally dissatisfied
( ) Dissatisfied
( ) Neutral
( ) Satisfied
( ) Totally satisfied

Figure 1:

Electronic questionnaire sent to participants, with objective questions about: 1) sociodemographic data; and professional self–perception.

Considering the dental surgeons' self-perception, 65.8% of the participants reported to have expertise in the dental color selection while 34.2% did not (Fig 2). It was observed significant influence only on the 'clinical service time' and 'dental specialty type' sociodemographic factors.

Regarding the self-assurance to perform direct aesthetic restorative procedures, 74.7% of participants reported to be reliable while 25.3% did not (Fig 3). It was observed significant influence only on the 'clinical service time' and 'dental specialty type' sociodemographic factors.

With regard the self-assurance to perform indirect aesthetic restorative procedures, 53.1% of participants reported having re-liability while 46.9% did not (Fig 3). It was observed significant influence only on the 'clinical service time' and 'dental specialty type' sociodemographic factors.

All participants reported considering the dental color selection step as important for the restorative procedure success. Considering the participants evaluation about the education received during their undergraduate program on "dental color selection" theme, 13.5% reported being totally dissatisfied, 36.9% dissatisfied, 25.2% neutrals, 22.5% satisfied, and only 1.8% totally satisfied (Fig 4).
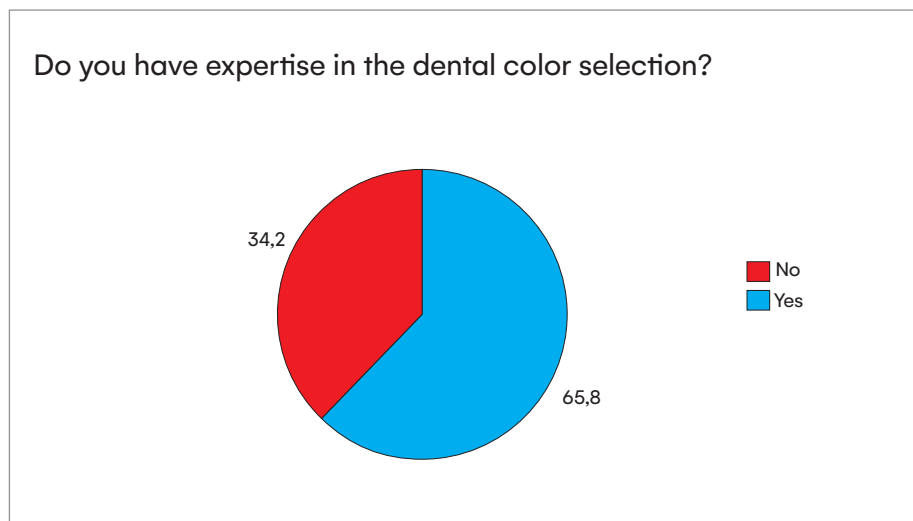

Do you have expertise in the dental color selection?

34,2 No
65,8 Yes

Figura 2:
Results of dental surgeons' self-perception about their expertise on dental color selection. Values in % (n=444). Significant influence (p<0.05) of 'clinical service time' and 'dental specialty type' sociodemographic factors.
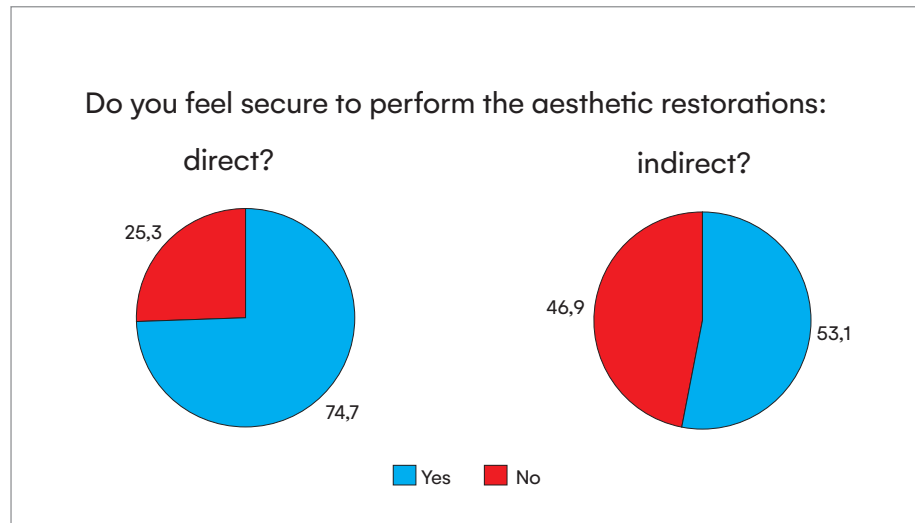
Do you feel secure to perform the aesthetic restorations:

direct?   indirect?

Figure 3:

Results of dental surgeons' self-perception about the self-assurance for direct (left) and indirect (right) aesthetic restorations execution. Values in % (n=444). Significant influence (p<0.05) of 'clinical service time' and 'dental specialty type' sociodemographic factors.
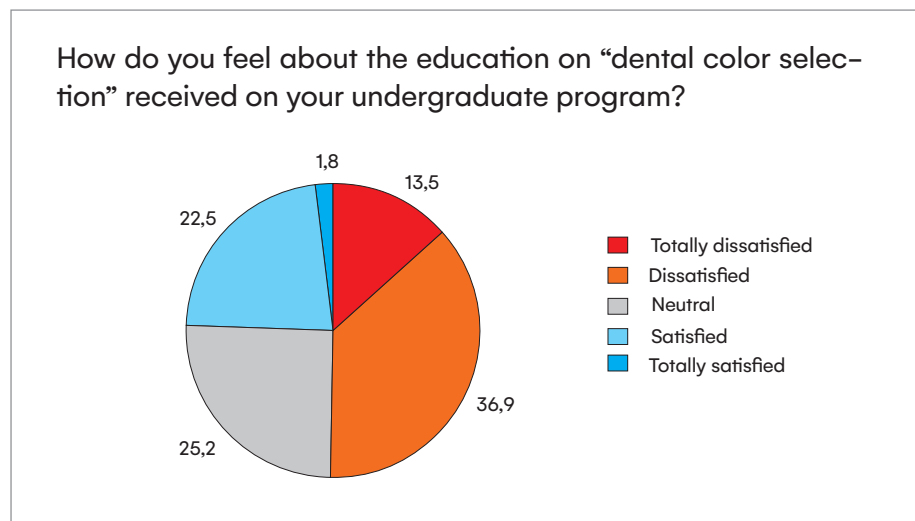
How do you feel about the education on "dental color selection" received on your undergraduate program?

Figure 4:

Results of dental surgeons' self-perception about the education received during undergraduate program on the theme "dental color selection". Values in % (n=444).

DISCUSSION

Self-perception is defined as the human capacity to understand his knowledge through its senses or mind. Unfortunately, however, there are few studies in Dentistry that evaluate such aspects. The understanding of how the clinician perceives himself, his qualifications and difficulties, is fundamental to achieve a better formation in Dentistry by developing new teaching strategies.

The color selection in Dentistry is a process that comprises many factors besides choosing the material's coloration that resembles the dental substrates` color on which it will be inserted. The success of this stage depends on the professional's understanding of the human visual perception and identification of the optical properties, resultant from the interaction of light in this process, such as color, opacity, translucency, opalescence, fluorescence, brightness and dental texture characteristics.[3] Unfortunately, it seems that undergraduate courses in Dentistry do not address this issue very often and effective methods for color selection have not been taught.[7,8] The explanation for this fact may be associated with many factors, like the maintenance of outdated scholar curriculums – in which the dental preparations and restoration biomechanics dominates the overall content — the lack of proper knowledge and adequate training by lecturers and staff.

In a general way, there are two different methods for color measurement in Dentistry: subjectively – through visual comparison between dental substrate and reference materials – or objectively, with specific devices. The subjective method can be performed comparing restorative materials increments over the tooth´s surface as well as the use of proper color scales' palettes. The second method consists of measuring tooth color through spectrophotometers, instruments that provide numerical values according to the light energy reflected by the surface.[9]

Unfortunately, digital spectrophotometers cost may still be an impediment to most dental surgeons and consequently the visual (subjective) comparison methods are the most frequently used.[6,10,11] With these methods, many factors related to the clinician may interfere on the precise match, such as gender, age, presence of genetic alterations, medication use, nutritional deficiencies, visual fatigue, observation distance, lighting conditions, theoretical knowledge and training.[7,10,12]

Auxiliary instruments are proposed to improve the match between restorative materials and the dental structures by the visual methods. The use of a neutral gray contrast background (18% gray) has been suggested to reduce the interference from the oral cavity dark background.[11] However, there are no reported studies in the literature demonstrating the efficacy of this method. Despite this, contrast backgrounds in this hue are already available in the market. In order to facilitate the communication of color with dental technicians, taking photographs with placement of a color scale palette in the same plane of the dental elements is also encouraged.[3] The photographic method is also stimulated for the objective evaluation of dental color.[13] However, professional photographic equipment with control of the illumination conditions and white balance have a high cost and, for this reason, its use is not possible by most professionals.

The color perception only happens because the light reflected by objects is received through the eye and absorbed in our retina by photoreceptors. These sensory cells are the rods, the main and greatest receptor of the value or intensity of light responsible for bringing the gray shades; and the cones, recipients of the hue or color itself.[14]

Some researchers have suggested that the education in color selection education and the visual perception training might increase the accuracy in the process.[15,16,17,18,19] Nevertheless, as previously mentioned, the visual perception education and training in dentistry schools is still unsatisfactory or non-existent. As seen in the present study, a huge part of the dental surgeons reported dissatisfaction with the education obtained in their undergraduate program (50.4% if considering dissatisfied and very dissatisfied results). In addition, the dental community suffers a great exposure of information from the materials' manufacturers that can generate a difficulty of understanding the basic concepts. As an example, there are several shade nomenclatures available for resin-based composites as well as different shade map layouts among different brands. Thus, the dental surgeon is forced to learn himself by trials, which explains the association between clinical service time and dental specialty with the security to his own ability to perform the color selection. Therefore, new studies are encouraged in the field of color selection in Dentistry. Special care should be taken to the development of simplified methodologies for application in dental training courses.

CONCLUSION

The dental surgeons' self-perception about the color selection in dentistry was influenced by the clinician experience and dental specialty.

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