



Analysis of The Degree of Familiarity of The Ninth and Tenth Semester Students of the Uao Uniandes with Respect to the Use and the Results of the Teeth Whitening Treatment by Means of Hydrogen Peroxide

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Article History	Abstract
Received: 06 June 2023 Revised: 05 Sept 2023 Accepted: 11 Sept 2023	Aim: Teeth whitening is a very popular dental treatment due to the quest to improve dental esthetics. To perform this procedure safely, it is crucial that dental professionals and students are well informed and trained in proper patient diagnosis, treatment and follow-up. Material and method: An observational study evaluated the level of knowledge of 123 dental students on the use and effects of hydrogen peroxide-based bleaching agents. The results showed that 11.6% had excellent knowledge, 41.5% had a good level of knowledge, 37.4% had fair knowledge, and 9.5% had unfavourable knowledge. Statistics and Result: It is important for students to understand the indications and contraindications, as well as the application techniques and the advantages and disadvantages of this procedure in order to minimize possible side effects associated with dental bleaching.
CC License CC-BY-NC-SA 4.0	Keywords: Dental Treatment, Dental Whitening, Dentists, Teeth, Aesthetics, Hydrogen Peroxide

1. Introduction

Most of the economically active population, with more incidence in Western and European countries, have experienced this problem from the aesthetic point of view. The supremacy of good presence as an antecedent for labour insertion, social networks, commercials, have generated this expectation that, although it is not presented as a tangible reality, the testimony of dentists corroborates the premise that the global trend is the concern to improve appearance, for which the smile is the most relevant point.

This process is known as bleaching, the same that is done with two conventionally accepted products such as hydrogen peroxides and carbamide peroxide, the first is applied in office days, through the influence of photopolymerization that acts as a trigger for the process that meets the peroxide; the second is considered optimal outpatient treatment through the use of dental buckets for several hours a day; In both cases the percentage of concentration of the peroxide will guarantee the release of the hydroxyls so that they fulfil their purpose, which will be carried out by the mechanism of action of the same.

The effectiveness of whitening depends on what has been the cause of the coloration, the prognosis is reserved in the case that it has been by restorative materials containing silver or zinc-eugenol, in adult

teeth, when it is enough time elapsed since the darkening of the tooth. Inflammation of periodontal tissues and external root and bone resorption occurs most frequently in young teeth due to the larger diameter of the dentinal tubules that allow penetration of intracoronal whitening material from non-vital teeth into periodontal tissues (Ricardo et al., 2021; Palacios et al., 2020).

The sensitivity of soft tissues such as redness in the vicinity of whitened teeth or oral irritation very common at the beginning of the process are related to the concentration of peroxides and the frequency of their application.

Postoperative tooth sensitivity seems to be related to the passage of hydrogen peroxide through the enamel and dentin, which produces slight pulp irritation.

Whitening has harmful effects on the tooth-restoration interface, decreasing the adhesive properties of the restoration; therefore, it is recommended to perform aesthetic restorations one week after the end of the teeth whitening process, while other studies do not find a significant effect; probably depending on the concentration of the peroxides used (Schemehorn et al., 2004; Santamaría et al., 2020).

Other studies show that humanity seeks information on teeth whitening treatment between 16 and 54 years in an increasing way (Sierra & Avendano, 2018), as well as in 2001 they were 11% and in 2003 it increased to 20%. At the same time for 2014, in the United Kingdom 28% of adults were not satisfied with the appearance of their teeth and up to 34% of Americans showed complaint or desire to improve aesthetics (Samaniego & Cevallos, 2018) and surely this year this percentage will triple.

One of the most common causes to opt for teeth whitening is discoloration or the presence of intrinsic and extrinsic stains, produced by factors such as the consumption of foods with dye, smoking, excess fluoride in water, red wine, curry, paprika, a situation that according to studies affects men by 31% and women by 21%. Although it is evident that teeth whitening is a commonly used, required treatment that has been shown to be biologically safe, highly effective and with minimal involvement, sensitivity has been reported as an adverse effect in 55% of the population and of these, 14% fail to complete the treatment. For this and many other aspects the population should be aware that although a healthy denture is synonymous with good health, its obsession can lead to blanchorexia which is a repetitive process of whitening without the supervision of a dentist which could lead to gingivitis, acute tooth sensitivity and the consequent loss of the tooth.

Once the aforementioned background has been analyzed, it is considered of utmost importance to identify the level of knowledge of the ninth and tenth semester students of the UAO Uniandes, on the use and effects of teeth whitening based on hydrogen peroxide, taking into account that in the near future this procedure will be executed in patients with various clinical situations and it will be relevant to know its use, Criteria and effects to be able to make an accurate diagnosis and a highly effective treatment.

2. Materials And Methods

There are different types of research that allow us to address the issue of the effects of teeth whitening based on hydrogen peroxide, a topic that will be addressed by ninth and tenth semester students at Uniandes University. These types of research are classified according to focus, scope, and objective.

As for the analytical approach, it helps us obtain data to define the level of knowledge of students on the subject at hand. In this case, the inductive approach will allow us to explore students' knowledge about hydrogen peroxide-based teeth whitening, identify the difficulties they face, and look for possible solutions.

In addition, from a systemic perspective, by collecting the information of the students who attend the Uniandes dental clinic, we will obtain real and scientific data that will allow us to provide adequate solutions.

In terms of research techniques, desk analysis is a useful tool to support and obtain evidence on the use and effects of teeth whitening on students.

The instruments used in these research techniques include the survey, the selection of the population and sample, the inclusion criteria and the line of research. In this case, we chose to conduct an

individualized survey to obtain a more accurate analysis. The population and sample was defined as ninth and tenth semester students who provided care at the Uniandes clinic during the May-September 2021 academic period. To obtain significant results, inclusion and exclusion criteria were applied, resulting in a total sample of 123 students.

In summary, through analytical, inductive and systemic research, using research techniques such as documentary analysis and survey, it was possible to obtain valuable information on the level of knowledge of ninth and tenth semester students in relation to teeth whitening based on hydrogen peroxide. These results will allow the development of effective solutions and improved training in this area for future dental professionals.

After the collection of information, we proceed to make a scale and Microsoft Excel based only on 8 questions that were chosen randomly and it was like this:

LEVEL OF KNOWLEDGE	RANK
70-100%	EXCELLENT
60-70%	WELL
50-60%	REGULAR
40-50%	Bad boy

3. Results and Discussion

The percentages collected based on a literature review on the effects of hydrogen peroxide-based teeth whitening were examined using graphs that allow a better understanding of the results of the 123 9th and 10th semester students who have provided care at the Dental Clinic of the UNIANDES University in the period May-September 2021.

Since a survey of 13 closed and open questions was carried out to be able to observe the degree of knowledge that gives us the students of 9th and 10th semester.

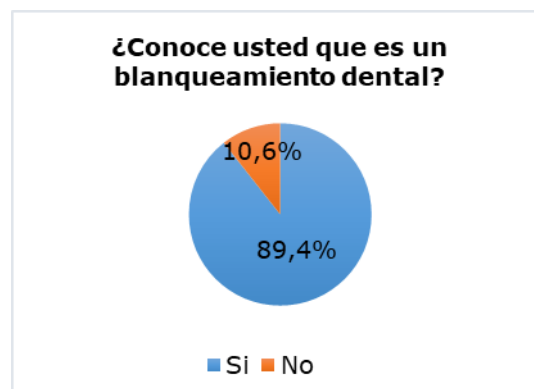


Figure 1 Knowledge about what is teeth whitening?

Figure 1. shows that (89.4%) know that it is teeth whitening, while (10.6%) do not know the subject.

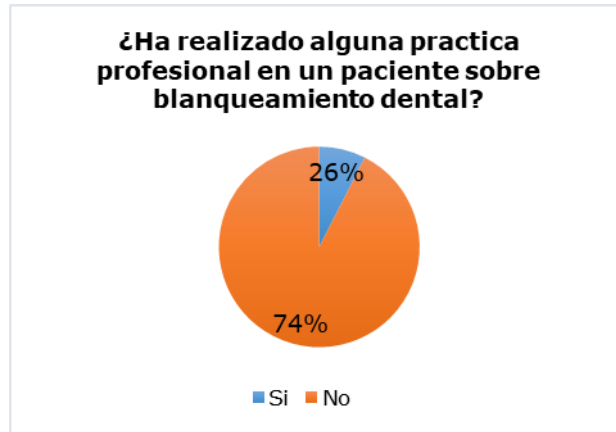


Figure 2. Professional practice of teeth whitening in a patient

Figure 2. shows that (74%) mention not having performed any teeth whitening practice, while (26%) have performed it on a patient.

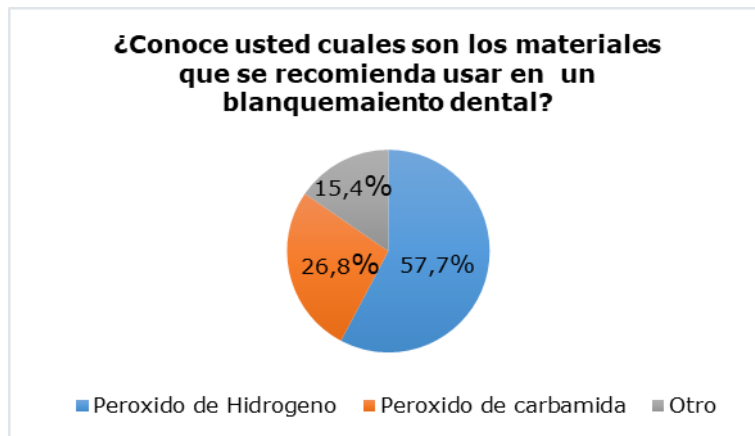


Figure 3. Materials used for teeth whitening

In Figure 3, one (57.7%) of the students know that the material used for teeth whitening is hydrogen peroxide, while one (26.8) mention that carbamide peroxide is used and one (15.4%) state that they know another material such as whitening paste.

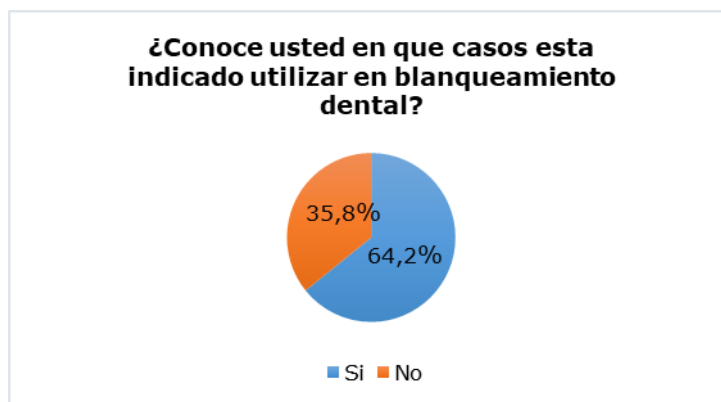


Figure 4. Some indications of teeth whitening

In Figure 4, one (64.2%) of students indicate that they do not know properly the indications for performing teeth whitening, while (35.8) do not know the subject.

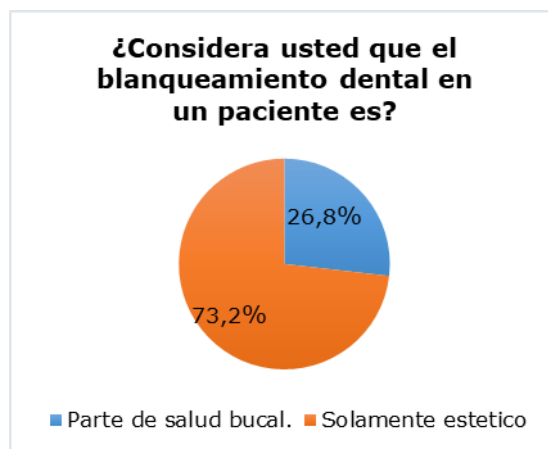


Figure 5. Teeth whitening considerations

In Figure 5, (73.2%) of students know that teeth whitening is a procedure for aesthetic purposes, while (26.8%) consider it to be part of oral health.

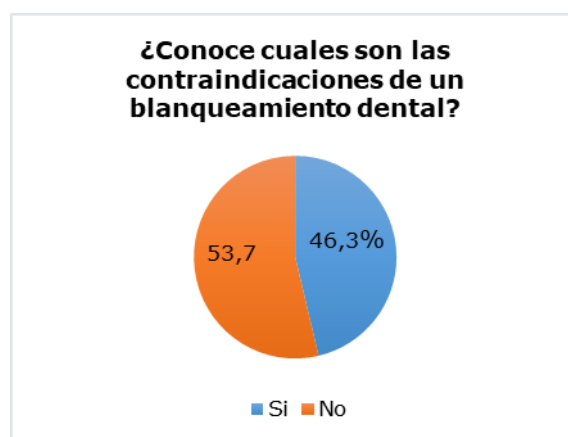


Figure 6. Contraindications of teeth whitening

In Figure 6, (46.3%) of students say they know the contraindications of teeth whitening, while (53.7%) do not know.

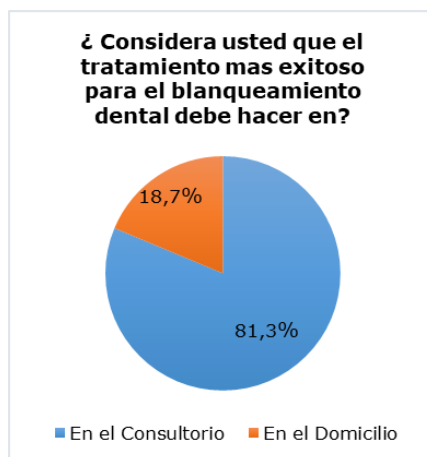


Figure 7. Considerations on the success of teeth whitening

In Figure 7, (81.3%) of students indicate that the most successful treatment for teeth whitening is performed in the office, while (18.7) indicate that it is most successful at home.



Figure 8. Importance of teeth whitening compared to other clinical actions

Figure 8, it is observed that (47.8%) of students adequately indicate that performing restorative treatment has a higher level of importance, while (42.4%) indicate that performing endodontic treatment is more excellent and (9.8%) shows that teeth whitening is more expressive than other procedures.

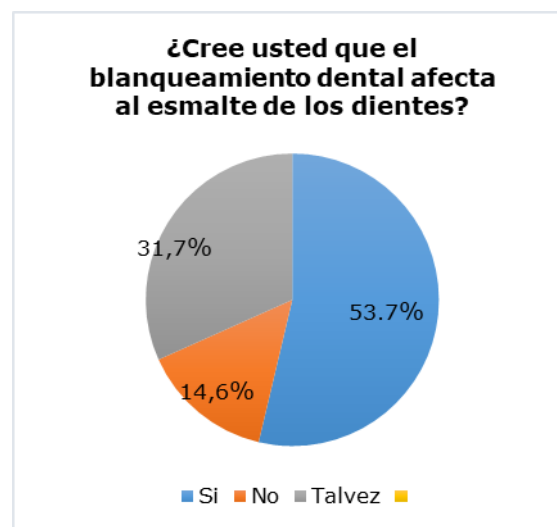


Figure 9. Involvement of tooth enamel by whitening

Figure 9 shows that one (53.7%) of students indicates that teeth whitening can have effects on enamel, while one (14.6) indicates that it does not present any type of affectation towards the enamel and one (31.7) indicates that there may be some type of effect to the enamel.

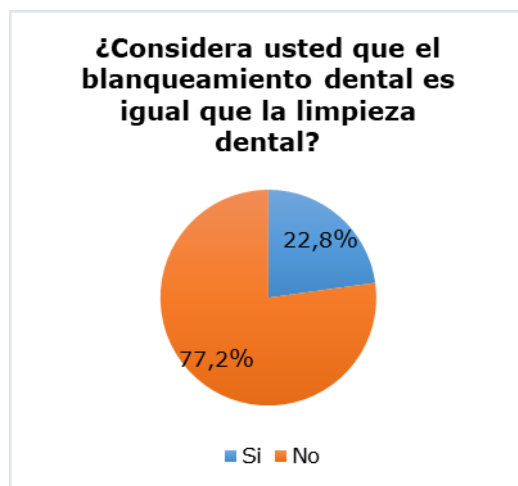


Figure 10. Teeth whitening in contrast to teeth cleaning.

Figure 10 shows that (22.8%) of students indicate that teeth whitening is the same as a dental cleaning, while (72.2%) mention that they are a totally different procedure.

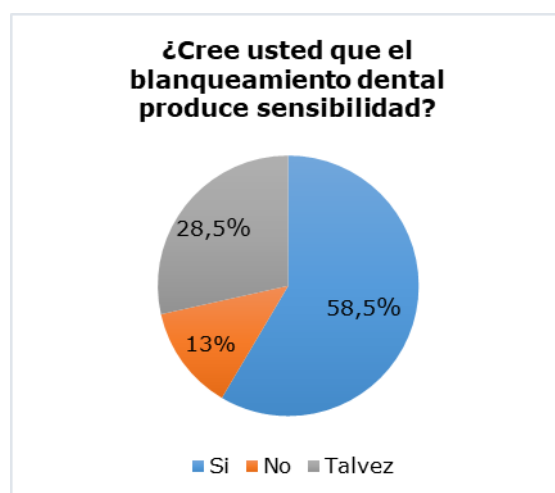


Figure 11. Sensitivity during teeth whitening.

Figure 11 shows that (58.5%) of students think that teeth whitening produces sensitivity, while (13%) indicate that it does not present sensitivity and (28.5%) mention that it may produce sensitivity.

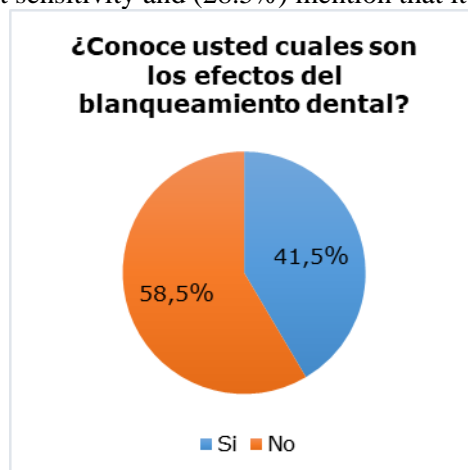


Figure 12. Effects of teeth whitening.

In Figure 12, (41.5%) of students indicate that they do know the effects caused by teeth whitening, while (58.5%) do not know the effects that teeth whitening can produce.



Figure 13. Have you done teeth whitening?

Figure 13 shows that (34.1%) of student's state that they have ever had teeth whitening, while (65.9%) have not.



Figure 14. General level of knowledge of students

In figure 14, you can see the final result of the knowledge of the students surveyed in 9th and 10th grade, which obtained the following results: 11.6% of students are certain of having an excellent level of knowledge about the use of teeth whitening, 41.5% of students have a good level of knowledge, 37.4% of students maintain a regular knowledge and finally 9.5% of students have a bad or unfavourable knowledge. That is why it is necessary that we can teach topics about teeth whitening.

The advancement of knowledge in the field of dental whitening has been remarkable throughout history. From its beginnings in 1868, when substances such as oxalic acid or pyrozone were used, until the introduction of hydrogen peroxide as a bleaching agent, there has been a significant evolution in the methods and techniques use (Fische, 1911; Tixi et al., 2019). In 1911, an important milestone was made in this field with the recognition of the use of concentrated hydrogen peroxide and its application by instruments or light sources in dental clinics. This marked a turning point in the treatment of tooth whitening as it was considered an acceptable and effective method (Fischer, 1911;

Paucar et al., 2022). Later, in the 1990s, over-the-counter (OTC) clearance systems emerged in the United States. These systems, available for home use, contained lower concentrations of hydrogen peroxide or carbamide peroxide and gave consumers the possibility to perform teeth whitening themselves (EBSCO, 2023; Ricardo et al., 2019). Today, the whitening technique in the dental office has evolved even further. Different concentrations of hydrogen peroxide are used, ranging from 3% to 40%, and it is done with or without the use of light, in addition to gingival insulation to protect the surrounding tissues (Ontiveros, 2011; Ricardo et al., 2020). These treatments manage to modify the colour of the teeth, reducing several shades and providing a brighter and whiter appearance. It should be noted that hydrogen peroxide is safe to use, as it can pass through tooth enamel without causing any damage.

Today, there are various approaches to teeth whitening, such as professional, mixed, home and internal. Choosing the right concentration of hydrogen peroxide is key to achieving the desired results. These procedures are performed in a clinical setting under the supervision of highly trained dental professionals, and are considered excellent options for teeth whitening. However, it is important to note that, according to the present study, dental students present certain deficits in their knowledge about the use and management of these substances. The lack of thorough undergraduate education has contributed to this situation. Therefore, as future dental professionals, it is critical that students stay up-to-date on technological and scientific advances related to teeth whitening, with the aim of providing quality and safe care to their patients.

4. Conclusion

After analyzing all the information collected in the work, it was concluded that teeth whitening is an aesthetic treatment widely requested by the population, since it aims to remove stains and improve the appearance of teeth. The bleaching agents used in this procedure act by an oxidation mechanism that diffuses through the enamel and dentin. In addition, there are several causes that can affect the outcome of treatment, such as the consumption of foods with dyes, smoking, excess fluoride in water, red wine, curry and paprika, among others. In this sense, it is crucial that ninth and tenth semester students of the Uniandes dentistry career have a clear and detailed knowledge about the use, selection criteria, possible side effects and management of bleaching agents. This deep understanding is critical to making an accurate diagnosis and highly effective treatment.

It is of utmost importance that the subject of teeth whitening is addressed in the semesters that comprise the professionalizing subjects within the curriculum. These contents should cover relevant aspects such as the appropriate indications for treatment, the advantages and disadvantages, the necessary previous diagnoses, the materials used, the different types of whitening available, the possible adverse effects and the contraindications to be taken into account. Education in the field of teeth whitening should provide students with the necessary tools to provide comprehensive, quality dental care. By ensuring that future professionals are properly trained in this subject, safety and efficacy in the application of teeth whitening treatments are promoted, resulting in patient satisfaction and well-being.

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