

CLINICAL ATTITUDES TOWARDS LIGHTENING OF VITAL AND NON-VITAL TEETH

Samar Hatem Abuzinadah¹*

¹ Department of Restorative Dentistry, Faculty of Dentistry, King Abdul-Aziz University, Jeddah, Saudi Arabia. sabuzinadah1@kau.edu.sa

ABSTRACT

Tooth discoloration treatment has become difficult, especially as individuals seek for white teeth and good appearance. Lightening was thought to be the most cost-effective and conservative cosmetic treatment. Discolored teeth can have an effect on a person's self-image, physical attractiveness, and self-confidence. At-home, and over-the-counter lightening methods are frequently used for both non-vital and vital lightening. This study was an observational cross-sectional study, pretested to assess opinions regarding various aspects of teeth whitening among clinical dental students. An electronic questionnaire was circulated among clinical dentistry students from several universities, and percentages for categorical variables were computed. The connection between the category variables was evaluated using the Chi-square test. All of the data was evaluated using a p0.05 value as a significant value. The survey was completed by 2386 dental students and interns from 14 different governmental and private dentistry colleges in Saudi Arabia. Females made up 68.4% of the participants, while males made up just 31.6%. Dental interns have a higher level of knowledge 42% followed by 33.7% 5th year students, and 22.9% of 6th year students. The majority of participants 62.8% did not use any lightening techniques. The majority of participants 58.8% attend governmental universities, while the remainder attend private universities. Finally, the findings of the study showed that clinical dental students who performed lightening treatments had superior knowledge and attitudes regarding tooth lightening materials and methods, followed by dental interns, 6th year students, and 5th year students.

Key words: Dental biomaterial, Tooth lightening, Lightening techniques, In-office lightening, At-home lightening.

Introduction

Teeth esthetics, including tooth color, are very important to patients. For example, 28% of adults in the UK have been unsatisfied with appearance of the teeth and 34% of adults in the United States are unsatisfied with their current tooth color [1]. The dental profession and the public expend considerable amounts of and money time to enhance the discolored teeth's appearance [2]. Dentists strive to meet the dental esthetics expectations of their patients and the public longing for white teeth and Patients of esthetic motivation are more likely to be subject to preventive regular dental care and understand the importance of healthy teeth [3]. There are two types of tooth stains; extrinsic and intrinsic. Extrinsic stains caused by a lot of factors; smoking, aging, some foods, drink (Ex, coffee). These discoloration could be taken away by regular prophylactic measures, and if these discoloration become darker, it can be treated by lightening [4]. Internal discoloration are subsequent of enamel defects or internal discoloration. Internal discoloration affected by aging, ingestion of chromogenic drinks and food, tetracycline medication, enamel microcracks, tobacco usage, porphyria, dental caries, ingestion of massive unnecessary fluoride during developing, and the thinning of the enamel layer [5]. Internal discoloration hard to be removed by prophylactic measures. Though, lightening with materials piercing dentin and enamel can minimize the internal discoloration [6]. Discolored anterior teeth are often perceived as an esthetic detraction, the lightening of no vital teeth has become

increasingly important in the recent years [7]. Permanent incisors may discolor following trauma, loss of vitality, restorative procedures, and endodontic treatment. Discolor teeth affect on a person's confidence, and physical attractiveness [8]. Lightening techniques of vital and non-vital teeth mostly come in either at-home technique or in-office procedure and over-the-counter modalities. Different kind of lightening materials are used, like: carbamide /hydrogen peroxide and sodium perborate with many concentrations [9]. In-office lightening (50.9%) was demanded more than at-home lightening. Sodium perborate in water or along with Hydrogen peroxide (46.5%) is the first option of management of the discolored teeth [10]. The types of lightening are internally on non-vital teeth or externally on vital teeth at-home or in-office and can be done by used carbamide peroxide, hydrogen peroxide or sodium perborate with/without additional light activation [9]. Internal lightening can be done by thermocatalytic technique and walking bleach technique. The walking bleaches technique is better because it's less chair time and is more comfortable and safer for the patient [11]. There are two components to form the current lightening agent; inactive and active ingredients. Inactive ingredients can include binding agents, flavoring, surfactants (detergents) coloring dispersants, carriers, and preservatives whereas the active ingredients include different concentration varying from of carbamide / 3%-40% of hydrogen peroxide compounds. Carbamide / Hydrogen peroxide derived tooth whitening is safe and efficient when used according to manufacturer instructions.

Although, there are dangers, as in all dental procedures, and treatments should be adjusted to each particular patient needs depending on the form and severity of staining, food patterns, prior restorations, and other intraoral conditions. In order to seek professional help if necessary, patients should be informed of the potential risks with tooth whitening and instructed to describe adverse reactions when using a home agent. An oral health care professional monitoring of the tooth whitening strategy will minimize the possible risks and maximize the benefits of tooth lightening [12]. Many antagonistic effects are reported on vital tooth lightening, which include alterations in the dental structure [13, 14]. In non-vital lightening, resorption variation of dental materials' features and decrease of tooth resistance, morphological changing in dental tissues, the occurrence of external root and adhesion have also been reported [1, 15]. Lightening procedures is more conservative and easier to perform, and less expensive compared to restorative procedure like veneers. Procedures can be internal (within the pulp chamber) or external (on the enamel surface). The aim of treatment is to reduce or eliminate discoloration, and to improve the degree of coronal translucency [16]. The management of tooth discoloration has become a challenge, especially as people are seeking for white teeth and good looks. The causes of tooth discoloration are multifactorial with different parts of the tooth taking up different stains [17]. This study aims to assess attitudes toward various aspects of tooth lightening of clinical dental students were developed, reviewed, and pretested in Saudi Arabia.

Materials and Methods

This research carried out to assess attitudes toward various aspects of tooth lightening of clinical dental students was developed, reviewed, and pretested in Saudi Arabia. Clinical dental students and interns from 17 governmental and private dental colleges in Saudi Arabia were given an electronic online survey questionnaire created by "Google form". The participants were presented with a questionnaire that contained Fourteen closed questions concerning lightening procedures. The knowledge assessment questionnaire was designed to ask specific questions that are related to oral health awareness and knowledge of teeth lightening. Descriptive statistics of frequent distribution and percentages were calculated for the categorical variables. Chi-square test was applied to assess the relationship among the categorical variables. A p value less than 0.05 considered significant, all the data was evaluated by using SPSS v.25 (Armonk, NY; USA).

Results and Discussion

2386 dental students and interns from 17 different governmental and private dental colleges in Saudi Arabia completed the survey. Female participants made up 68.4 percent of the total, while male participants made up just 31.6 percent. There was a statistically significant difference between different levels of students in terms of knowledge

teeth lightening materials and techniques as well as clinical case scenarios. Dental interns had more knowledge (42%), followed by 33.7 percent for 5th year students, and 22.9 percent for 6th 168 year students' values (.02), (.021) & (.001). When asked about a university there was 29,1% of the King Khalid University participants, 18.8% of them from Riyadh Elm University, 10,6% from AlFarabi Colleges, 10,5% from other Saudi Arabia universities and 10% from Prince Sattam Bin Abdul-Aziz University. The majority of the participants 62.8 percent There was a significant statistical variation in the knowledge about tooth lightening materials and techniques between participants who did not practice tooth bleach during clinical training and who did not perform the lightening procedure. (p) values (.000), (.007), & (.004), and those who experienced lightening procedure tend to have better knowledge of the lightening materials and techniques. The majority of participants (58.8%) attend public schools, while the remaining 41.2 percent attend private schools. Also, our results showed a significant difference in knowledge among students of private and governmental Universities p values (.025) & (.000), and students in private Universities have a higher level of knowledge than students in governmental Universities.

When we ask about the preferred procedure to lightening vital teeth we found that 45.5% of participants like the combination of both at-home and in-office lightening on vital teeth. When asked what is the favorite protocol to bleach vital teeth, we found that 45.5 percent of participants said they prefer both of in-office and at-home lightening. 38.3% of participants prefer >30% hydrogen peroxide as their first choice for lightening discolored vital teeth. Furthermore, we observed that 38% of participants use Sodium Perborate + water or Hydrogen Peroxide as their first-choice lightening material for discolored non-vital teeth. The majority of participants 73.3% agreed that root resorption may occur with non-vital lightening procedure. 68.6% of participants disagreed that lightening can be considered a good treatment choice for discoloration of teeth resulted from systemic conditions like amelogenesis imperfecta. 63.3% of participants agreed that professional cleanings at the dentist's office and regular oral hygiene routine at home, make the results last as long as possible. 24.4% of participants chose office lightening followed by home lightening. 85.1% of participants agreed that there is no effect of lightening material to bleach the existing restorations such as fillings, veneers or crowns.

We found that 68.2% of participants agree with this sentence "Using desensitizing toothpaste that has potassium nitrate for two weeks before lightening minimize the sensitivity". When asked whether they would encourage a patient to use a home kit lightening agent, 58.8% said they would, but only with caution. Prior to non-vital lightening, 60.1 percent of participants proposed using Glass Ionomer as a mechanical cervical seal. 205 When we asked about 3 cases senior we found In the case of an 18-year-old patient who presents

with discolored tooth #11 that has been endodontically treated, 72.4 percent of participants choose non-vital lightening with 18 percent Hydrogen Peroxide as their first choice of material. In the case of a 32-year-old pregnant woman (first trimester) who demands vital lightening for moderately stained anterior teeth, 66.7 percent of participants choose to delay lightening until after birth. In the case of a 24-year-old patient with tetracycline staining who demands a better smile, 58.7% of participants choose vital lightening and full coverage crowns.

In this study, 62.8% of clinical dental students did not perform any lightening procedure neither for vital nor non-vital teeth. Most of their knowledge was based on theoretical sessions. Our results found a significant difference in knowledge about tooth lightening materials and techniques between participants who did and who did not perform tooth lightening procedure during clinical training with (.000), (.007), & (.004) p-values. Participants who experienced lightening procedure tend to have better knowledge toward lightening materials and techniques. 45.5% of respondents who have previously done lightening procedures preferred the combination technique. However, a study that was done by Tay LY et al. reported that there was no significant difference when performing at-home lightening technique combined with in-office treatment [18]. For lightening of vital tooth, in-office lightening, hydrogen peroxide can be used in high concentration (25–40%) because the dentist able to end the procedure after reaching the goal [19]. The gold standard of tooth discolor management approved by the American dental association for at-home lightening is 10% CP gel with custom tray [13, 20]. Some clinicians recommended to use hydrogen peroxide with 35% concentration in-office lightening then using at-home lightening with gels form containing 10%, 15%, or 20% of carbamide peroxide [21].

More so, higher concentration lightening gels in vital tooth lightening affecting the pulp tissue [22]. Some clinical reports have shown that internal lightening may result of external root resorption [16, 23]. Both the oxidizing agent "30% hydrogen peroxide" and heat can be the causes of resorption. Simply the dentinal tubules [24]. as the pathway for the chemical to the periodontium in the defects of cemento enamel junction [25]. However, when heat applied to this chemical may result of root resorption. To avoid the root resorption, it's preferred to use the mixture of sodium perborate and 30% of hydrogen peroxide along with distilled water in a ratio of 2:1 [16]. 68.8% of participants responded that lightening of tooth discoloration due to amylogenesis imperfecta is not considered a good option. It is consistent with a previous study which reported that this condition is not amenable to lightening and should be corrected by restorative means [26]. There is no study supported that discolored dental restoration material can be corrected by lightening procedure, it has to replace with a new one only. However, several studies found that the effect of lightening in Dental restorations material may result of

undesired color change even when using the home-based over-the-counter systems. a high degree of pain and Sensitivity of the restored tooth can be accrued in all cases when 35 % hydrogen peroxide product use for In-office lightening [27].

68.2% of participants agree to use a toothpaste that has a potassium nitrate two weeks in advance of lightening procedure to minimize sensitivity. Based on Haywood the use of the potassium nitrate plus fluoride dentifrice, two weeks prior to and throughout lightening, may be a useful to management of sensitivity caused by professionally dispensed lightening products [6]. 60.1% of participants choose Glass Ionomer as the best material to use for mechanical cervical seal prior to non-vital lightening and according Hansen-Bayless and Davis [28]. Sealing the root filling with a base by a GIC, IRM or Cavit is essential to avoid penetration of lightening agents to the root canal filling material. McNerney and Zillich [29] stated that Cavit and IRM provided better internal sealing of the dentin, in the opposite, Hansen-Bayless and Davis [28] found that Cavit was a more efficient to prevent the leakage than IRM. There was a statistically significant difference between different level of students toward knowledge tooth lightening materials and techniques as toward clinical cases scenarios p-values (.02), (.021) & (.001). In first case, relating discolored endodontically treated, 72.4% of participant decided to choose non-vital lightening with 18% Hydrogen. Discolored endodontically treated anterior tooth has more than two options for treatment [8]. The lightening procedure has high advantages than conventional options, especially it is the most conservative procedure [30]. In case 2, relating to a pregnant woman, 66.7% participants decided to defer lightening until after pregnancy. Because no studies have been done regarding to the safety of teeth whitening during pregnancy, the ADA advise that "clinicians may consider recommending that teeth lightening be deferred during pregnancy [31].

In case 3, relating to a tetracycline staining, 58.7% of participants decided to Vital lightening with full coverage crown. According to Jordan and Boksman the tetracycline discoloration has four degrees regarding to severity [30]. There are several treatment options related to the degree of severity of this discoloration, lightening procedure can be one of them and direct restoration over discolored area, direct veneer, ceramic laminate veneer, crowns. The result of treatment determined by the depth, severity and degree of discolored tooth [12]. Normally lightening procedure can be effective for the first three degrees, and not effective for fourth degree [20].

Conclusion

This study has demonstrated the clinical attitude of students among dental school in Saudi Arabia toward lightening of vital and non-vital teeth. Findings showed that clinical dental students who performed bleaching procedures tend to have

better knowledge and attitude toward tooth bleaching materials and procedures, also dental interns tend to have better knowledge, followed by 6th year students and 5th year students. Encouraging the dental students toward less traumatic procedures “tooth lightening” over a traumatic procedures “veneers” is recommended during their clinical training to improve their skills and knowledge about tooth lightening.

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Ethics statement: The research proposal was approved by the Regional Research and Ethics committee of Vision Colleges. The questionnaire contained a brief introduction explaining the objectives and benefits of the study. We obtained informed written consent from all participants. Data obscuring and discretion were maintained throughout the study.

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