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Knowledge, attitude and practice based survey on intracoronal bleaching among undergraduate dental students

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***Abstract*---**Introduction: Intracoronal bleaching is a simple, useful procedure for restoring the colour of discoloured root - filled teeth that are not extensively restored. Aim: The aim of the study is to assess the knowledge, awareness and perception on intracoronal bleaching among undergraduate dental students. Materials and methods: A descriptive cross sectional survey was conducted among 100 undergraduate dental students through a self administered questionnaire. The responses were collected, tabulated in excel sheets and analysed using SPSS software. Chi square test was used to analyze the level of knowledge on intracoronal bleaching among dental students in different years of study with statistical significance of P< 0.05. Results: The 4th year undergraduate dental students had high knowledge on intracoronal bleaching compared to others. 60.3 % of the participants were aware of the intracoronal bleaching with the p value of 0.002, which is statistically significant. Conclusion: This study concludes that the undergraduate dental students have a good knowledge and awareness on intracoronal bleaching and its techniques.

***Keywords*---**awareness, intracoronal bleaching, knowledge, survey, innovative technique.

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Introduction

Intracoronal bleaching in non vital teeth is done by the oxidising agents in the coronal portions which can be an endodontically treated tooth for the discolouration (1). The usage of hydrogen peroxide and sodium perborate is very traditional for intracoronal bleaching but there is a lot of concern which is expressed in the use of hydrogen peroxide by the rule of "cause and effect" relationship between hydrogen peroxide and invasive cervical root resorption (1,2). The recent technology and techniques have been aiming at bleaching agent activation property which enhances the process or the property (3) which was introduced by Sparser in 1961 by using the perborate technique (4).

Intrinsic or internal discolorations or the deeper internal stains or the enamel defects; these stains are more complicated to treat than external types of the staining (5). Teeth with the vital or non-vital pulps and root canal–treated teeth have a high chance of getting affected. The various factors which cause this can be; hereditary disorders, medications (particularly tetracycline preparations), high fevers or sore throat issues associated with early childhood illnesses and excess fluoride content in the oral cavity (5,6). The staining may be present in enamel or in dentin. Discolorations or the staining which may be restricted to dentin still may show through the enamel (7).

Tooth sensitivity or at times irritation is a common adverse effect of external tooth bleaching (8). The data of the previous studies had reported that 10% carbamide peroxide indicates that 15 - 65% of patients had reported an increased tooth sensitivity (9). Higher cases of tooth sensitivity (67 - 78%) were reported after bleaching with Hydrogen peroxide in combination with heat. Tooth sensitivity normally persists for up to four days after bleaching but durations of up to 39 days have been reported.

In order to keep the particular levels of extraradicular diffusion of hydrogen peroxide below the safety limit in case of the intra coronal bleaching (10), it is imperative that an effective and an intermediate base cement of at least 2 mm should be placed at the level of the buccal cemento-enamel junction on top of the root-filling before the procedure of the bleaching has begun (11). The use of 35% carbamide peroxide as the intracoronal bleaching agent proves to be very useful in combining the safety of sodium perborate together with the efficacy of 35% hydrogen peroxide (11,12). As the bleaching agents may reduce the composite and the tooth bond belonging to some adhesive systems, the post-bleaching composite restoration should be delayed for at least three weeks. Our team has extensive knowledge and research experience that has translate into high quality publications(14–23),(24–27),(28–32) (33)

Aim and Objective

The aim of the study is to assess the knowledge, awareness and perception on intracoronal bleaching among undergraduate dental students.

Materials and Method

Study design

A cross sectional study was conducted through an online survey among undergraduate dental students of private dental institutions, Chennai.

Study subjects

A simple random sampling was used to select the study participants.
Inclusion criteria
Undergraduate dental students of private dental institutions who were willing to participate were included.

Ethical consideration

Returning the filled questionnaire was considered as implicit consent with no need for signing a written consent. Ethical approval for the study is obtained from the institutional review board (IRB).

Study method

A self administered questionnaire consisting of 12 questions was prepared and was distributed in the form of an online survey among the undergraduate dental students. The survey was distributed via an online platform, 'google forms'. Demographic details were also included in the questionnaire. The collected data was checked regularly for clarity, competence, consistency, accuracy and validity.

Statistical analysis

Data was analysed with SPSS version 22.0. Descriptive statistics as number and percent were calculated to summarise the qualitative data. Chi square test was used to analyze and compare the education level of students and their knowledge on intracoronal bleaching. The confidence level was 95% and of statistical significance $P < 0.05$. Finally, the result was presented by using bar charts and frequency tables.

Table 1: Depicts the frequency of responses on Knowledge and awareness of intracoronal bleaching

QUESTIONS	OPTIONS	RESPONSES
Are you aware of intra coronal bleaching	Yes No	60.78% 37.25%
Can you provide intracoronal bleaching for children upto 18 years?	Yes No	53.92% 44.12%

Can Intracoronal bleaching be done at both home or at the office?	Yes No Not sure	27.45% 39.22% 31.37%
The dentist prescribed home applied intracoronal bleaching technique?	10% carbamide peroxide 18% hydrochloric acid 35% hydrogen peroxide Sodium perborate	27.45% 37.25% 19.61% 13.73%
Glass ionomer cement is used as a barrier over gutta percha filling before bleaching an endodontically treated discoloured tooth to?	Prevent bleaching agent from dissolving gutta percha Prevent contamination of bleaching agent Discolouration of the tooth from obturation material Prevent percolation of the bleaching agent into the apical area	19.61% 22.55% 12.75% 43.14%
What is the ideal thickness of intra orifice barrier required during non vital bleaching?	1mm 2mm 3mm 4mm	18.63% 30.39% 26.47% 22.55%
Which of these materials show better sealing ability when used as an intra orifice barrier?	biodentine GIC MTA RMGIC	40.20% 17.65% 20.59% 19.61%
Following intracoronal bleaching, immediate composition restoration was required, what has to be done?	not possible Treat with antioxidants Treat with H2O2 for 3minutes Wait for 7 days is mandatory	16.67% 15.69% 41.18% 24.51%
What is the most common complication with intracoronal bleaching?	apical periodontitis Cervical resorption Pain Sensitivity	9.80% 34.31% 16.67% 37.25%
Do you think you are adequately equipped to perform intracoronal bleaching in your clinical practise?	Yes no	83.33% 14.71%

Results

The present study included 60% male participants and 40% female participants. Among the undergraduate dental students, 21% of the participants were 3rd year undergraduate dental students, 50% of the participants were 4th year undergraduate dental students and 29% of the participants were interns. It is seen in the present study that 60.78% OF dental students were aware about the intracoronal bleaching. The dental students accepted that intracoronal bleaching can be provided for children upto 18 years of age (53.92%). From the present study, dental students responded that intracoronal bleaching cannot be done at home or at the office (39.22%). From the present study, it is evident that 18% hydrochloric acid is used as a component for the dentist prescribed home applied intracoronal bleaching (37.25%). 2mm was considered to be the ideal thickness of intra orifice barrier required during non vital bleaching (30.39%). According to the present study, biodentine is the material which shows better sealing ability when used as an intra orifice barrier according to the dental students (40.20%). From the present study, apical periodontitis and sensitivity are the most common complications with intracoronal bleaching (34.31%).(Table 1)

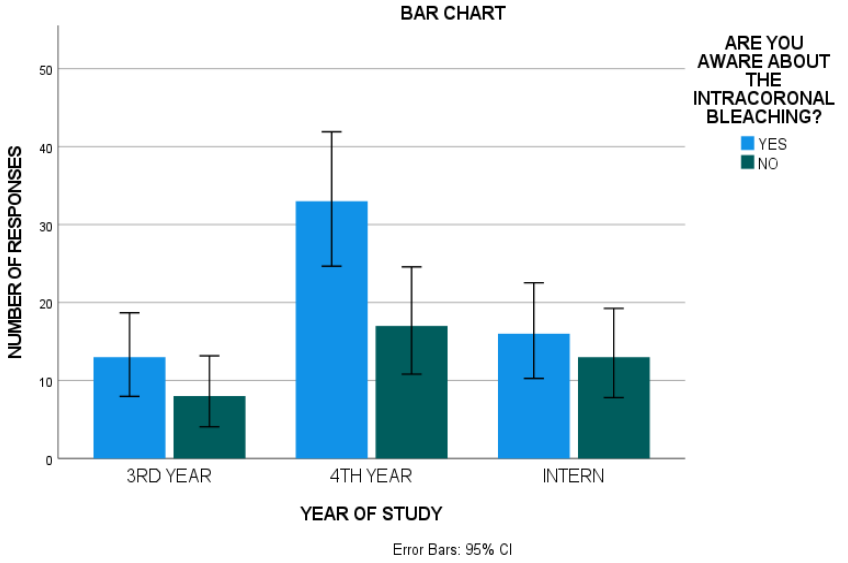

Figure 1 : Bar graph depicts the association between different educational levels of undergraduate dental students and the awareness of intracoronal bleaching. X axis represents different educational levels and Y axis represents the number of responses. Blue denotes yes and green denotes no. Majority of the undergraduate dental students are very well aware of intracoronal bleaching . And the difference was statistically significant. Chi square test P value = 0.002 <0.05 statistically significant.

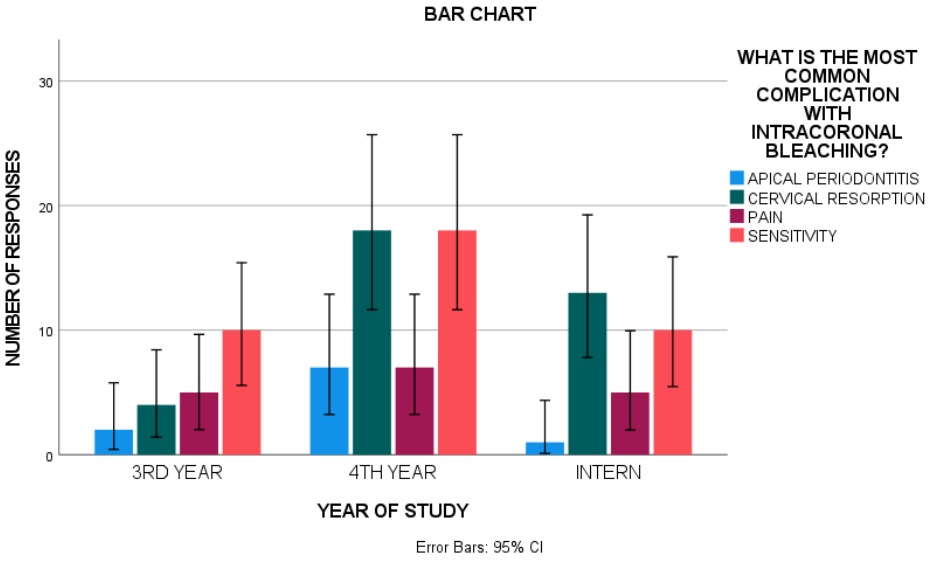

Figure 2: Bar graph depicts the association between different educational levels of undergraduate dental students and the most common complication with intracoronal bleaching. X axis represents different educational levels and Y axis represents the number of responses. Orange denotes sensitivity, purple denotes pain, green denotes cervical resorption and blue denotes apical periodontitis. Majority of the fourth year undergraduate dental students had good knowledge on most common complications with intracoronal bleaching (18%- cervical resorption and 18% - pain). And the difference was statistically significant. Chi square test P value = 0.010 <0.05 statistically significant.

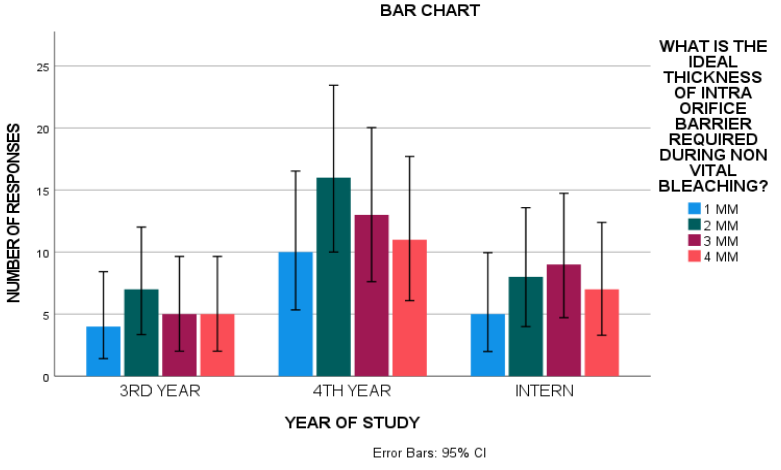

Figure 3: Bar graph depicts the association between different educational levels of undergraduate dental students and the ideal thickness of intra orifice barrier required during non vital bleaching. X axis represents different educational levels and Y axis represents the number of responses. Orange denotes 4mm, purple denotes 3mm, green denotes 2mm and blue denotes apical 1mm. Majority of the third and fourth year undergraduate dental students considered ideal thickness

to be 2mm while the interns considered it to be 3mm. However the difference was statistically not significant. Chi square test P value = 0.063 >0.05 statistically not significant.

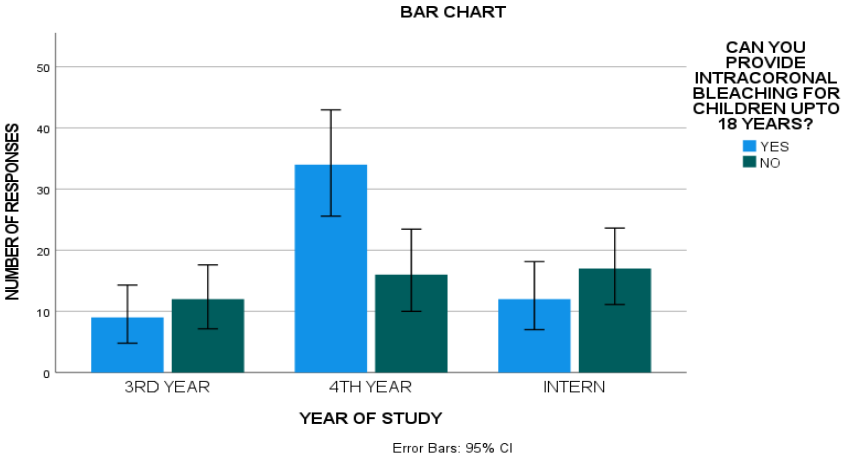

Figure 4: Bar graph depicts the association between different educational levels of undergraduate dental students and knowledge on whether providing intracoronal bleaching for children upto 18 years. X axis represents different educational levels and Y axis represents the number of responses. Blue denotes yes and green denotes no. Majority of the fourth year undergraduate dental students accept that intracoronal bleaching can be provided to children upto 18 years (34%- yes). However, the difference was statistically not significant. Chi square test P value = 0.412 (>0.05 statistically not significant).

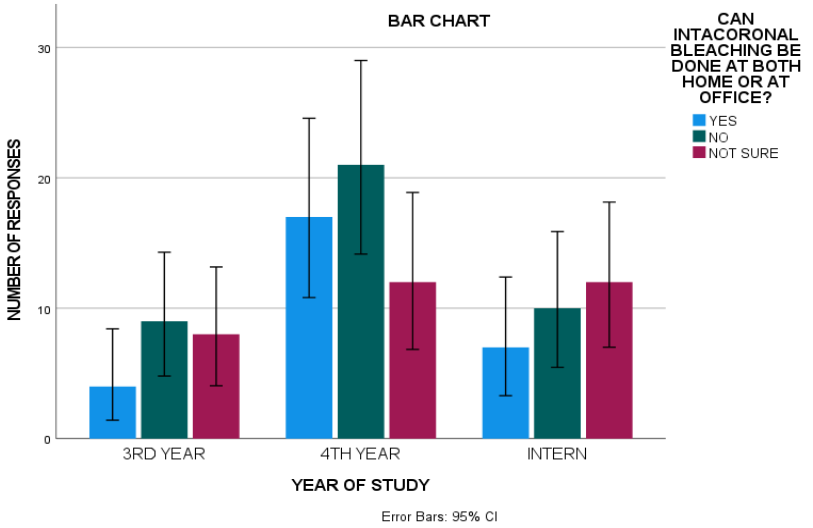

Figure 5: Bar graph depicts the association between different educational levels of undergraduate dental students and knowledge whether intracoronal bleaching be done at both home or at office. X axis represents different educational levels and Y axis represents the number of responses. Blue denotes yes, green denotes no and purple denotes not sure. Majority of the fourth year undergraduate dental

students did not accept that intracoronal bleaching cannot be provided at home or at the office (21%- no). However, the difference was statistically significant. Chi square test P value = 0.005 <0.05 statistically significant.

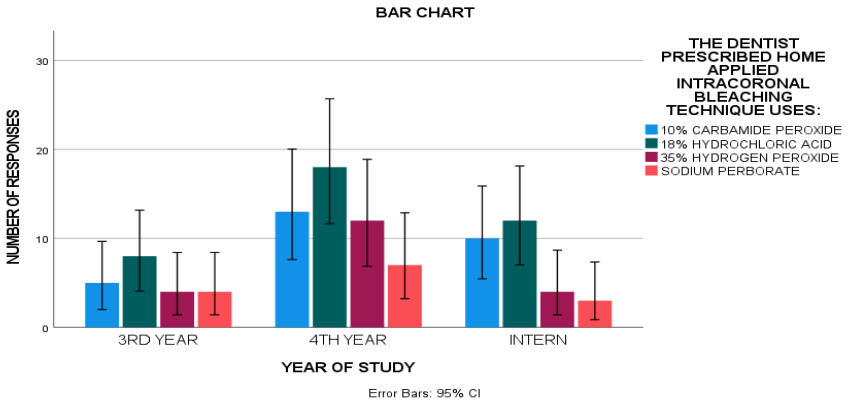

Figure 6: Bar graph depicts the association between different educational levels of undergraduate dental students and knowledge on the dentist prescribed home applied intracoronal bleaching technique. X axis represents different educational levels and Y axis represents the number of responses. Blue denotes 10% carbamide peroxide, green denotes 18% hydrochloric acid, purple denotes 35% hydrogen peroxide and orange denotes sodium perborate. Majority of the fourth year undergraduate dental students had good knowledge of dentist prescribed applied intracoronal bleaching technique uses (18% - 18% hydrochloric acid). However, the difference was statistically significant. Chi square test P value = 0.036 (<0.05 statistically significant).

Discussion

From the present study, it is evident that the undergraduate dental students are aware of the intracoronal bleaching (figure 1), where the maximum response was 33% by the 4th year undergraduate dental students with P value = 0.002, which is statistically significant. Similar findings were found in the study conducted by William H etal (13), the author had concluded that out of the male and female participants, the male population of undergraduate dental students were more aware of the intracoronal bleaching. There are no previous articles with opposing findings.

From the previous studies, it is evident that apical periodontitis and sensitivity are the most common complications with intra oral bleaching (figure 2), where the maximum response was 18% by the 4th year undergraduate dental students with P value = 0.010 which is statistically significant. Similar study was done by Piyush et al (6), where the author concludes that the apical periodontitis mainly occurs as a complication of postoperative intracoronal bleaching in which a tooth has not been adequately obturated. There are no previous articles with opposing findings.

From the present study, it is evident that 2mm is the ideal thickness of intra orifice barrier required during non vital bleaching (figure 3), where the maximum

response was 16% by the 4th year undergraduate dental students with P value=0.063 which is statistically insignificant. Similar study was done by Piyush et al (6), where the author concluded that a 2mm intra orifice barrier is required during non vital bleaching to provide coronal seal during walking bleaching procedure. There are no previous articles with opposing findings.

From the present study, it is evident that intracoronal bleaching can be provided to children upto 18 years of age (figure 4), where the maximum response was 34% by the 4th year undergraduate dental students with P value = 0.412 which is statistically insignificant. Similar study was done by Piyush K et al (6), where the author concludes that intracoronal bleaching when done to children of 12 -15 years the chances of completing the procedure is easy and heals and dries faster. There are no previous articles with opposing findings.

From the present study, it is evident that intracoronal bleaching cannot be done at home or at office (figure 5), where the maximum response was 21% by the 4th year undergraduate dental students with P value= 0.005 which is statistically significant. Similar study was done by Piyush et al (6), where the author had concluded that since intracoronal bleaching involves many of the special components which are to be used under the guidance of a practitioner, it cannot be done at home or at office . There are no previous articles with opposing findings.

From the present study, it is evident that 18% hydrochloric acid is used as the dentist prescribed home applied intracoronal bleaching (figure 6), where the maximum response was 18% by the 4th year undergraduate dental students with P value = 0.036 which is statistically significant. Similar study was conducted by Williams H et al (13), where the author concludes that the use of 18% hydrochloric acids is mainly in the enamel etching step. There are no previous articles with opposing findings.

The limitation of this study was biased sampling, an equal number of participants can be included from different years of study to get more accuracy in the results. The future scope of this study is that it can be expanded widely to include an equal number of participants to assess the awareness and knowledge on the intracoronal bleaching and its techniques.

Conclusion

This study concludes that the knowledge and awareness on intracoronal bleaching among undergraduate dental students was found to be good . On comparing different education levels, fourth year undergraduate dental students had good knowledge and awareness regarding intracoronal bleaching and its techniques.

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Author Contributions

Akifa Begum : Literature search, survey, data collection, analysis, manuscript writing
Dr. Sowmya : Study design, data verification, manuscript drafting

Conflicts of Interest

The authors declare that there are no conflicts of interest in the present study

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