

Association Of Age And Gender In Patients Undergoing Non Vital Bleaching In Endodontically Treated Teeth

Research Article

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Abstract

Discolouration of endodontically treated teeth may occur as the result of a number of circumstances. The bleaching of discolored non-vital teeth is an important phase of endodontic therapy and is a low-risk routine treatment for improving esthetics. The aim of the study was to find out the prevalence of non-vital bleaching and its association between age, gender and tooth number. 86000 patient records at a Private Dental College were reviewed between June 2019 to March 2020. Our study included all the people who had undergone non-vital bleaching treatment. A total of 13 non-vital bleaching procedures were done. The collected data was tabulated using microsoft excel and analysed using SPSS. Incomplete data was excluded from the study. Statistical analysis was done using a chi-square test. In the present study, we observed that males reported with higher incidence for non-vital bleaching procedures. ($p > 0.05$) Tooth number 22 ($p > 0.05$) most commonly involved tooth. Maximum number of teeth were restored with composite as final restoration post non-vital bleaching ($p > 0.05$) Within the limitations of the study, tooth number 22 was the most commonly involved tooth in non-vital bleaching, males reported with higher incidence for non-vital bleaching procedure and composite was used most commonly as final restoration post non-vital bleaching. There was no significant difference between age, gender and tooth number in relation to non-vital bleaching.

Keywords: Discolouration; Bleaching; Non-Vital Teeth; Esthetics.

Introduction

Dental caries are easily detectable and reversible at an early stage [28]. Bacteria play a major role in the formation and progression of pulpal and periapical diseases [23]. MMPs and tissue inhibitors of metalloproteinases (TIMPs) partially regulate the inflammatory pulpal tissue destruction [35]. Dental trauma is one of the most commonly seen injuries in the general population involving teeth and other surrounding structures [20]. If a patient only reports with chipped teeth or localised defects, veneers are usually the material of choice due to a conservative, esthetic approach as they are tooth coloured restorations in order to give the patient a perfect smile [31]. Pulp canal obliteration occurs commonly following traumatic injuries to teeth [21]. Other causes leading to pulpal involvement includes dental erosion which is caused by

acid attacks, either from extrinsic sources such as consumption of acidic beverages [22]. Non-carious loss of tooth structure in the cervical region is a very common clinical condition with the fact that the prevalence and severity of these lesions have been found to increase with age. The consequences of these lesions are sensitivity and high wear [18].

Discoloration of non-vital teeth is an aesthetic deficiency that requires an effective treatment. Attractive teeth have always been a patient's primary need. What most people want are teeth that make them look healthier, younger and more attractive. The sharp rise in the acceptance and demand for treatment of discolored teeth, to make them brighter, is becoming a big part of the practice. The most common cause of tooth discoloration is intracoronal blood decomposition [27, 39]. When the discoloration origi-

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nates from within the pulp chamber, the treatment should also start from there itself [2, 3, 5].

Diagnosing the exact pulpal status by direct examination is uncertain due to the fact that the pulp is enclosed within a hard tissue. In order to identify the actual pulp status surrogate test must be performed [19]. One of the important aspects of root canal therapy is to control pain after treatment [29]. The cleaning and shaping of root canal space is one of the most important and fundamental aspects of endodontic therapy. Preserving the original canal shape by using less invasive methods lead to better endodontic outcomes [30]. Irrigants play a crucial role in debridement and disinfection of the root canal space. Since microorganisms have been established as the sole entity responsible for initiating pulpal and periapical pathologies, mechanical instrumentation alone may not be sufficient to remove bacteria and necrotic tissue from root canals owing to the complex anatomy [33]. Saline can provide a flush out of debris and not the disinfection. Hence, the usage of disinfectants for irrigation is mandatory and universally accepted [34]. Antibacterial effects of chemomechanical procedures can be enhanced by the subsequent placement of an antimicrobial intracanal medication, particularly in those cases of exudation, haemorrhage, perforation, root resorption, trauma or incomplete root formation [24].

Incomplete root canal therapy means that necrotic debris in the pulp horns, filling materials located in the pulp chamber and endodontic sealer that lines the chamber walls could cause discoloration or a change in translucency [10, 11]. The majority of post-endodontic discoloration is caused by the failure of the operator to remove blood or other organic material from the pulp chamber during treatment [9]. Discoloration associated with pulpal involvement can be caused by intrapulpal hemorrhage (in which case it is pink or brown), necrotic pulpal tissue, secondary dentin formation (yellowish), and internal resorption (pink spot) [5, 6, 16].

Tooth discoloration varies in etiology, severity, location, appearance and affinity to tooth structure [12]. It can be classified as intrinsic, extrinsic, or a combination of both, according to its location and etiology. The principal causes of extrinsic discoloration are chromogens derived from habitual intake of dietary sources, such as wine, coffee, tea, carrots, oranges, licorice, chocolate, or from tobacco, mouth rinses, or plaque on the tooth surface [15]. Intrinsic causes include, systemic causes: 1) drug-related like tetracycline, 2) metabolic like dystrophic calcification and fluorosis, and 3) genetic which includes congenital erythropoietic porphyria, cystic fibrosis of the pancreas, hyperbilirubinemia, amelogenesis imperfecta, and dentinogenesis imperfecta. Local causes are 1) pulpal necrosis, 2) intrapulpal hemorrhage, 3) remnants of pulp tissue after endodontic therapy, 4) endodontic materials, 5) coronal filling materials, 6) resorption of root, and 7) aging [40].

Indications for internal bleaching are discoloration of pulpal origin, dentin stains, and stains not amenable to extracoronal bleaching. Contraindications to internal bleaching are superficial enamel stains that are superficial, enamel formation defect, severe loss of dentin, presence of caries, and discoloured composites [16].

The aim of the study was to find out the occurrence of non-vital bleaching and its association with age, gender and tooth number.

Materials And Methods

The setting for this study was a university setting. 86000 patient records at a private dental college were reviewed between June 2019 to March 2020. Our study included all the people who had undergone non-vital bleaching treatment. A total of 13 non-vital bleaching procedures were done. Cross verification of data was done using photographs and RVGs. Data was reviewed by an external reviewer. To minimize sampling bias, all the available data was included in the study.

Data collected included name, age, gender, tooth number and final restorative material used after non vital bleaching. The collected data was tabulated using microsoft excel and analysed using SPSS. Differential (frequency distribution and percentage) and inferential (chi-square test) statistics were done.

Results And Discussion

In our study, we observed that males reported with higher incidence for non-vital bleaching procedures. ($p > 0.05$) Tooth number 22 ($p > 0.05$) most commonly involved tooth. Maximum number of teeth were restored with composite as final restoration post non-vital bleaching. ($p > 0.05$).

Clinically, when a patient has a non-vital discolored tooth, the dentist must make a decision to take one of three approaches excluding extraction: to leave the tooth alone; to bleach it; or to restore it with a crown. If the decision to bleach the tooth is made, the particular bleaching procedure selected is probably based largely on empirical data, such as personal preference, instructor bias, and previous clinical experience, with little scientific data supporting that decision.

In our study, 13 samples of non-vital bleaching procedures were evaluated to find out the association between age, gender and tooth number commonly involved with the procedure. Also, restorative material used for final restoration post non-vital bleaching was noted. Age groups had no significance in our study. More number of males underwent non-vital bleaching. (92%) Upper left lateral incisor was the most commonly involved tooth in this procedure (38%) but both upper central incisors together had a higher incidence. (53%)

Reports on bleaching discolored non vital teeth were first described during the middle of the 19th century [38], advocating different chemical agents [17]. Initially, oxalic acid was used, until the tooth bleaching effect of hydrogen peroxide was discovered in 1884 [14]. However, it wasn't until 1951 that hydrogen peroxide was used to bleach non vital teeth. The bleaching of nonvital teeth is a minimally invasive intervention which, if performed correctly, bears only slight risks [26]. Over the years, bleaching by oxidation has been the preferred method because of its simplicity and more certain results. There have been two preferred bleaching agents, a 30% to 35% aqueous solution of hydrogen peroxide and powdered sodium perborate. They have been used either alone or in combination [25]. Two basic techniques have been widely used to bleach discolored pulpless teeth, the thermocatalytic and the walking bleach techniques. The only difference between the two techniques is the method of effecting the release of nascent oxygen from the chemicals [13].

Figure 1. Bar graph showing the association between age and tooth number. X axis represents the age (in years) and Y axis represents the number of teeth. Blue colour denotes tooth number 11, green colour denotes tooth number 21, beige colour denotes tooth number 22 and purple colour denotes tooth number 23. Tooth number 22 was the most commonly involved tooth in non-vital bleaching and tooth number 23 was the least commonly involved tooth. Chi-square test was done and the association between age and tooth number was found to be statistically not significant. Pearson's Chi-square value = 19.175, df = 21, p value 0.574 (>0.05) hence statistically not significant.

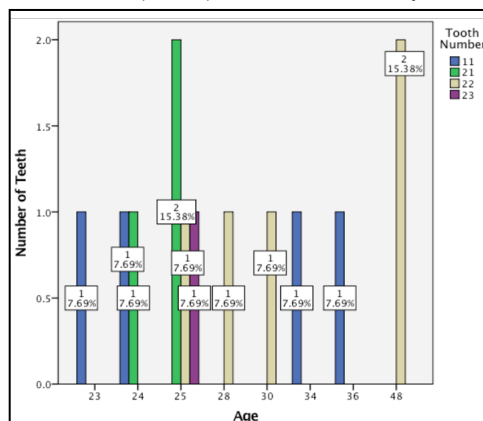


Figure 2. Bar graph showing the association between gender and tooth number. X axis represents the gender and Y axis represents the number of teeth. Tooth number 22 was the most commonly involved tooth in non-vital bleaching among males. Only tooth number 11 was involved in females. Chi-square test was done and the association between gender and tooth number was found to be statistically not significant. Pearson's Chi-square value = 2.438, df = 3, p value 0.487 (>0.05).

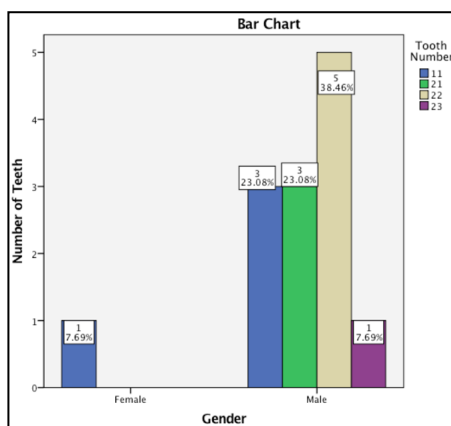
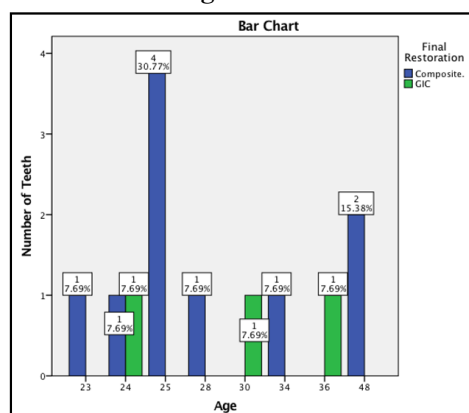


Figure 3. Bar graph showing the association between age and cement used for final restoration. X axis represents the age (in years) and Y axis represents the number of teeth. Composite was the most preferred final restoration post non-vital bleaching. Chi-square test was done and the association between age and the cement used for final restoration was found to be statistically not significant. Pearson's Chi-square value = 10.183, df = 7, p value 0.178 (>0.05) hence statistically not significant.



In a study done by Abbott P et al, 203 patients with a total of 255 teeth were included in his study. Of the 203 patients, 46 % were males and 54 % were females which was contrary to the results in our study. The most common age range of the patients

was 11-20 years although age was not significantly related to the cause of discolouration, the colour or the number of applications of bleach required. Of the teeth that required bleaching, 91 per cent were maxillary teeth, predominantly central (69 per cent) and lateral (20.4 per cent) incisors. Only 8.2 per cent of the teeth were

mandibular teeth, and there was only one posterior tooth included in his study [1].

The distribution of specific teeth types encountered in our study is consistent with the distribution of teeth requiring internal bleaching reported in other studies [10, 16, 4]. It also correlates to the typical distribution of teeth reported in dental trauma studies [8].

In 1996, one manufacturer (Ultradent Products, South Jordan, UT, USA) suggested the use of 10% carbamide peroxide applied in a tray for a tooth prepared for the traditional walking bleach technique. This technique is called inside-outside bleaching as the bleaching takes place simultaneously within and outside the tooth. Several authors have reported that this technique can be successfully used for bleaching non vital teeth [32].

After bleaching, the access cavity should be restored with a resin composite, which is bonded by means of the acid-etch technique to enamel and dentin. This avoids recontamination with bacteria and staining substances and improves the stability of the tooth. A sound restoration with sealed dentinal tubules is a prerequisite to successful bleaching therapy [2]. Some authors recommend using resin composites with lighter shades to compensate for bleaching that was not completely successful. The adhesive strength of resin composites and glass-ionomer cements to bleached enamel and dentin is temporarily reduced [36, 2]. It is less likely that changes in the enamel structure might influence resin composite adhesion [37]. Nevertheless, the appearance of the hybrid layer in bleached enamel is less regular and distinct than in unbleached enamel. This might explain why access cavities of bleached teeth that are restored with resin composite occasionally show marginal leakage [7].

The limitations of our study were that it was an institutional based study, the duration of cases taken into account was only 1 year and small sample size. Future scope includes taking a larger population into account and populations from different geographical locations.

Conclusion

Within the limitations of the study, maxillary left lateral incisor was the most commonly involved tooth in non-vital bleaching, males reported with higher incidence for non-vital bleaching procedure and composite was used most commonly as final restoration after non-vital bleaching. There was no significant difference between age, gender and tooth number in relation to non-vital bleaching.

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