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## Review Article

# A literature review on tooth bleaching

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### ABSTRACT

In today's time tooth/teeth whitening has become the most common requested procedure from the clinician. As per the increasing demand by the patient for whiter teeth, there are various home based products are available like gels, tooth pastes and some other products are also available that can be applied by the dentist and it contains high amount of bleaching agent with in it. Some of the aware risk of tooth whitening procedure was also known such as, sensitivity of the tooth, irritation of the gingiva, demineralization of the tooth surface along with roughening of the superficial layer of the tooth.

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## 1. Introduction

The self expectation regarding the esthetics and smile induce self awareness regarding the discolouration of the teeth /tooth. There are different types of products available in the market that involves both home applied bleaching product by the patient itself and the other by professionally applied bleaching technique by the dentist itself. The causes of tooth discolouration is basically classified in to intrinsic causes or intrinsic stains and extrinsic causes or extrinsic stains.<sup>1-3</sup>

Extrinsic stains are basically the stains that are acquired through the external environment, by some of the chromatogenic substances that get accumulated on the superficial surface of the tooth. Some of the other causes that are responsible for the extrinsic stains were poor oral hygiene, patient not been able to maintain the proper oral health, personal habits like chewing of tobacco, results in deposition of tobacco stains over the

superficial surface of the tooth, ingestion of food and drinks that are chromatogenic. These stains gets localized by the reaction between the amino acids present in the oral saliva and the sugar from the food or bevarages. The reaction that occurs between the amino acid and the sugar is known as the millards reaction. When these stains get chemically analyzed, they demonstrated the presence of furfuralaldehyde derivatives, that occurs due to the reaction between the amino acids and the sugar from the chromatogenic food or bevarages. Proteins that are present in the saliva gets attached to the superficial surface of the enamel through the calcium bridge and ultimately helps in the pellicle formation. Mostly these extrinsic stains gets easily removed through the normal prophylactic measures. If not removed at the initial stage, these extrinsic stains gets more persistent. These extrinsic stains are very much responsive to the procedure of bleaching.<sup>1,2</sup>

Intrinsic stains are basically due to the result of the enamel defects. They are mainly caused by as an aging process, microcracks in the superficial surface of enamel, ingestion of chromatogenic food or beverages, as a result

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from ingestion of tetracycline ingestion, due to intake of high fluoride, some systemic problems like jaundice in the infancy, porphyria, some dental reasons like, dental caries, dislodged restorations, fractures enamel surface. Aging is found to be the most common cause of intrinsic stains as with aging the dentine which is present underlying the enamel started darkening due to the formation of the secondary dentine. Secondary dentine is found to be much darker, and as when the aging occurs, enamel start becoming thinner and the underlying color of the secondary dentine started appearing. Metabolic alterations can occur in the matrix of ameloblasts, if there is more concentration of fluoride present in the drinking water, this may lead to altered process of calcification of the tooth. Drugs like tetracycline may cause discoloration of the teeth/tooth, as this drug gets incorporated in to the matrix of the dentine during the time period of tooth calcification. Some conditions like amelogenesis imperfecta, dentinogenesis imperfecta are associated with tooth discolouration, as inherited intrinsic stains. Intrinsic stains can not be removed easily by regular prophylactic measures, it requires special agents that can penetrate the matrix of enamel and dentine.<sup>4-8</sup>

### 1.1. Composition of bleaching agents

They are basically composed of hydrogen peroxide or carbamide peroxide as an active agent. Some of the other agents are carboxy poly methylene, that act as a thickening agent. They are used in concentration between 0.5 percent to 1.5 percent. Its primary function is, it helps in increasing the viscosity of the material. Other than this carrier such as glycerine or glycol propylene used in bleaching agent, as they provide adequate moisture content to the bleaching agent. Gels that are present with surfactants are found to be much more effective when compared to the one, which are not present with the surfactants. The prime function of surfactant is to permit the bleaching agent to diffuse properly. Methyl propylparaben or sodium benzoate can be used as a preservative agent. They basically inhibit the bacterial growth in the bleaching agent. Some substances known as flavoring agent are also used in the bleaching material to provide a better taste to the patient. Some examples of the flavoring agents are saccharin, sassafras, peppermint, spearmint.<sup>5-8</sup>

### 1.2. Different types of bleaching procedure

The process of bleaching is broadly classified in to two different types (i) vital tooth bleaching and the (ii) non vital tooth bleaching.

#### 1.3. Vital tooth bleaching

There are three different types of procedures that came under vital tooth bleaching process i.e. (a) in office

bleaching process or otherwise known as powerful bleaching, (b) at home bleaching or otherwise known as night guard bleaching process, (c) over the counter product bleaching

1. a) *In office bleaching*: It utilizes very high concentration of hydrogen peroxide (25 % to 40 %). This whole process is under the control of the clinician, and the clinician can stop the procedure when the desired shade of the tooth achieved. Initially the soft tissue is protected by the application of rubber dam or some other material, after than the whitening gel is applied over the tooth surface and the bleaching agent is activated by heat or light activated for a time period according to the manufacturer advise. Halogen curing light, Xe halogen light, diode lasers, can be used to activate the bleaching agent. Literature revealed that efficient effects achieved from in office bleaching treatment with single use only, but multiple visits needed to achieve the desired result.<sup>9-12</sup>
2. b) *At home bleaching pro*: It uses low amount of bleaching agent in the concentration of 10 % to 20 % of carbamide peroxide which is equals to the amount of 3.5% to 6.5% of hydrogen peroxide. This procedure is carried out by the patient him self or her self at home but with regular recall visits to the dentist. In this technique, it is advised to use the bleaching agent i.e. carbamide peroxide in the concentration of 10%, 8 hours a day or the concentration of carbamide peroxide 15 – 20 percent 3 to 4 hours per day. In this technique the bleaching agent is applied by a customized night guard containing the whitening gel and that customized night guard should be worn by the patient minimum for two weeks at night. This technique is found to be the most widely used technique<sup>9-14</sup> Some dentist recommend the use of hydrogen peroxide in the concentration of 35 percent in office bleaching technique, which is followed by home bleaching technique that contains carbamide peroxide in the concentration of 15 percent or 20 percent, and they concluded that, this procedure induce faster results. But on the other hand, this rapid technique of tooth bleaching produce side effects related to gingival irritation, sensitivity to the tooth.<sup>15,16</sup>
3. c) *In the recent time, over the counter products* achieved great popularity in the recent years. They constitute very low amount of bleaching agent, in the concentration of 3 – 6 percent of hydrogen peroxide. And the main advantage of over the counter product is they are self applied with strips or via paint on mechanism over the teeth surface. For better results they should be applied two times in a day for minimum of two weeks.

#### 1.4. Non vital tooth bleaching technique

It constitutes of different bleaching techniques like walking bleach technique, modified walking bleaching technique, inside / outside bleaching. In walking bleach a mixture of sodium perborate mixed with distilled water is placed in the pulpal chamber, and this procedure is repeated until the desirable result is achieved. Along with this a modification of this technique in which hydrogen peroxide with concentration of 30 percent mixed along with sodium perborate solution is placed in the pulpal chamber for a week. This procedure is known as modified walking bleach procedure. Internal non vital power bleach method includes the use of hydrogen peroxide in the concentration of 30 to 35 percent was placed in the chamber of the pulp and gets activated with the help of light or with the help of temperature ranges between 50 to 60 degree and than this temperature is maintained for at least 5 minutes before the tooth is allowed to cool after than the gel that is applied in the pulpal chamber should be removed, tooth should be dried and after than the walking bleach procedure should be followed in between the visits until the desired results with respect to the tooth should be obtained. And lastly inside / outside bleaching technique is a combination of non vital teeth internal bleaching along with home bleaching technique.<sup>12–16</sup>

#### 1.5. Effects of bleaching process

1. It can easily produce soft tissue burns
2. Gingival irritation
3. Inflammation of the soft tissue
4. Systemic effects may lead to mucosal irritation of gastrointestinal wall
5. Burning throat
6. Morphological alteration of the superficial enamel surface
7. Increased porosity of the superficial surface of the enamel
8. Demineralization of the tooth structure
9. Significant decrease in hardness of the enamel surface after being treated with the bleaching agent

#### 2. Conclusion

Tooth bleaching found to be a good treatment option in now a days for curing the discolouration related to the tooth. But the dentist should take in mind the consequences of tooth bleaching. So a dentist should have a thorough knowledge regarding the material to be used in the process of tooth bleaching, so that one should avoid any sort of complications related to tooth bleaching procedure.

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#### 4. Conflict of Interest

None.

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