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Reasons why at-home tooth bleaching should be avoided

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Abstract: External tooth bleaching demands knowledge and technology fully mastered by trained and highly professional dental surgeons. It is paid work that starts with detailed explanation and awareness by the patient regarding responsibilities assumed, time spent and operational costs. At-home tooth bleaching was once part of the historical evolution of the technique,

but current knowledge and technology allows ruling it out from the protocols offered to patients. At-home tooth bleaching causes damages to the cementoenamel junction and takes part in the carcinogenesis of the oral mucosa; although, with the protection of the cementoenamel junction and the oral mucosa, it is a totally safe procedure, as long as directly performed by a trained

professional with scientific basis. Any technique or product applied without direct action of a professional makes the hydrogen peroxide act on the cementoenamel junction and on gastrointestinal mucosae, thus potentiating the effects of several factors that trigger oral carcinogenesis. **Keywords:** Tooth bleaching. Carcinogenesis. Hydrogen peroxide.

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Professionalization is characterized by strictness in decision making and in the control of eventual consequences. The current degree of social and economic development has caused professionalization to be extended to activities that used to be done at home long ago – such as manicure, car wash and numerous types of aesthetic and hygienic services like waxing, hair dye and many others (Fig 1).

The emergence of medical and dental techniques used to be, almost always, preceded by a lot of research. A more open and virtual market, associated to an incredible speed of information, ended up modifying the order of things. Nowadays, many products are commercialized before proper presentation, training and awareness of patients and professionals, after all, we are at the liquid modernity age, as defined by Zygmunt Bauman!

In the present study, we will present two main reasons why at-home tooth bleaching should be avoided. ‘At-home’ is understood as any tooth bleaching performed or applied by patients themselves in their houses, without any direct and immediate intervention of a professional, even if it was recommended by one. In external tooth bleaching, the cervical region of the crown and the gingiva must be protected from any contact with the bleaching agent, due to the following reasons:

1 – The cemento-enamel junction, in all deciduous⁴ or permanent⁵ human teeth, shows in the cervical circumference these three types of relation between cementum and enamel:

- a) areas in which cementum covers enamel;
- b) areas in which cementum and enamel meet top-to-bottom;
- c) areas in which there are windows, or gaps, of exposed dentin.

The micro-windows of dentin exposed *in vivo* are, normally, covered by the gel represented by

the extracellular matrix, which is found among the cells of the gingival connective tissue in patients at the age of 30 years approximately. After that age, it is natural to find the cemento-enamel junction covered by the junctional epithelium or exposed on the dental surface of the gingival sulcus.

The use of dental bleachers – which get acid when acting on the dental surface – tends to enlarge the size of the dentin windows, whenever they are present in the gingival sulcus. In patients who are over 30 years old, such enlargement tends to contribute to the increase in dentin sensitivity after tooth bleaching. Under a scanning electron microscope, besides the enlargement of the dentin windows, it was verified that there is an increase in the diameter of the dentinal tubules when the bleachers come into contact with the cemento-enamel junction.²

The protection of the cemento-enamel junction by mechanical barriers, such as the resinous ones, preserves the structures of which it consists and enables the dentin windows to remain preserved in their natural dimensions. The protection of the cemento-enamel junction must be always provided during external tooth bleaching, regardless of the technique, product, type of activation of the product and the chosen protocol, including those performed by professionals in their offices. The bleaching trays, regardless of their quality and material, do not protect the cemento-enamel junction from the unintended effect of the external tooth bleacher.

2 – The dental bleaching agents are hydrogen peroxides at the moment they act on the teeth, no matter which names they may be given, such as carbamide peroxide, oxygenated water, urea peroxide or sodium perborate.

Hydrogen peroxide, in its various formulations and names, acts as a promoter of carcino-



Figure 1: The high level of professionalization has caused activities performed at home – esthetic and hygienical services, such as manicure, waxing, hair dye and make-up – to be performed by highly qualified professionals, at their work place.

genesis in the oral mucosa and other mucosae of the gastrointestinal (GI) tract.^{1,3,6,7} In other words, it is going to act over mutated cells that are initiated by other initiating carcinogenesis agents, such as substances of tobacco, alcohol, oncogenic viruses (HPV and herpes) and many other chemical substances, from a variety of sources, that pass by our mouth every day.

The physical barriers, such as the resinous ones, block the contact of the bleaching agents with the oral mucosa, while protecting the cemento-enamel junction, as previously explained. Such protection allows time for the bleaching agent applied to the teeth to be absorbed after the action time recommended by clinical protocols is exceeded. That stops the dental bleachers from being in contact with the mucosa and other parts of the mouth, or from reaching, via saliva, the other gastrointestinal mucosae, where bleachers are admittedly carcinogenesis promoters.

The bleaching trays, no matter how good they are, are not capable of sealing, and they allow the dental bleacher to overflow the mouth. The protection barrier of the cemento-enamel junction and of the mucosae is essential to the protection of both structures. Since the bleaching trays do not seal the outflow of hydrogen peroxide – even when they are made and applied by a professional –, it mixes with saliva and is brought into contact with other mucosal areas of the mouth and of the GI tract. As patients are lay people and do not have awareness of the subject, not being even trained for performing bleaching, they end up exceeding the application time of the product and its frequency of use.

FINAL CONSIDERATIONS: AT-HOME TOOTH BLEACHING SHOULD NOT BE RECOMMENDED BY PROFESSIONALS!

External tooth bleaching demands knowledge and technology that are fully mastered by trained and highly professional dental surgeons. Therefore, it must be applied and executed by dental surgeons in their office, and it is paid work that must start with a thorough explanation and awareness by the patient regarding the responsibilities assumed, time spent and operational costs.

At-home tooth bleaching was once part of the historical evolution of the technique; however, with the knowledge that we possess in these new times and with the current technology, we must rule it out from the protocols our patients are offered, especially due to harm caused to the cemento-enamel junction and the oral mucosa – considering carcinogenesis when it comes to the latter.

External tooth bleaching applied with protection of the cemento-enamel junction and of the oral mucosa is a totally safe procedure to patients, as long as it is directly performed by a trained professional with scientific basis, and only under that condition. Any technique or product that offers patients external tooth bleaching without the intervention of a professional causes hydrogen peroxide to act on the oral mucosa and other gastrointestinal mucosae. Hydrogen peroxide potentiates the effects or various factors that trigger carcinogenesis and, regardless of intensity, whenever its use by patients at home is recommended by health professionals – exposing the oral mucosa and other mucosae to it –, some ethical, moral and legal aspects must be questioned in such attitude.



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