Perawatan *Bleaching* Eksternal pada Diskolorasi Gigi Ekstrinsik: Laporan Kasus

(External Bleaching Treatment for Extrinsic Tooth Discoloration:A Case Report)

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Abstrak

Gigi anterior yang mengalami perubahan warna seringkali membuat masyarakat kurang percaya diri sehingga perawatan untuk mencerahkan dan mengembalikan fungsi estetika banyak diminati. Perawatan untuk gigi yang terjadi perubahan warna merupakan salah satu perawatan non-invasif dalam dunia kedokteran gigi yang dikenal dengan tindakan *bleaching* eksternal. Laporan kasus ini menyajikan tata laksana prosedur *bleaching* eksternal. Seorang wanita berusia 25 tahun datang dengan keluhan tidak percaya diri karena gigi rahang atas dan rahang bawah yang berubah warna kekuningan semenjak memiliki kebiasaan konsumsi kopi hampir setiap hari. Prosedur *bleaching* eksternal dilakukan pada gigi rahang atas dan rahang bawah sesuai dengan petunjuk pabrik menggunakan bahan hidrogen peroksida 40% tanpa aktivasi sinar. Hasil perawatan tersebut menunjukkan terjadinya peningkatan warna lebih cerah setelah diaplikasikan prosedur *bleaching* eksternal dalam satu kali kunjungan. Perawatan non-invasif berupa *bleaching* eksternal efektif meningkatkan kepuasan pasien pada kasus perubahan warna gigi.

Kata kunci: *Bleaching*, Hidrogen peroksida, Perubahan warna gigi

Abstract

Discolored anterior teeth often cause people to lose confidence, so treatments to brighten and restore aesthetic function are in high demand. Treatment for discolored teeth is a non-invasive dental procedure known as external bleaching. This case report presents the management of external bleaching procedures. A 25-year-old woman presented with complaints of a lack of confidence because her upper and lower jaw teeth had turned yellowish due to her habit of drinking tea almost every day. Bleaching Procedure. External bleaching was performed on the upper and lower teeth according to the manufacturer's instructions, using 40% hydrogen peroxide without light activation. The treatment results showed a brighter color after the bleaching procedure in one visit. Non-invasive treatment in the form of external bleaching is effective in increasing patient satisfaction in cases of discoloration.

Keywords: *Bleaching, Hydrogen peroxid, Tooth discoloration*

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Teeth are an important aesthetic factor, including tooth color. Discolored anterior teeth often make people feel less confident. Discoloration is a condition where the teeth change color due to several causes. The etiological factors indicate appearance, location, and varying levels of severity. Discoloration can be divided into intrinsic, extrinsic, or a combination of both. Extrinsic factors refer to causes of discoloration that originate outside the tooth, rather than within the tooth itself. These factors can adhere to the tooth surface or penetrate slightly into the enamel, causing discoloration that can be removed through cleaning or bleaching. Some extrinsic factors include consuming chromogenic foods and beverages, tobacco use, poor oral hygiene, and the use of mouthwash.[1]

Discoloration treatment depends on the degree of discoloration and may include veneers, crowns, enamel microabrasion, and bleaching. One minimally invasive treatment that can be used for discoloration is bleaching. Bleaching is a treatment that does not require the removal of more tooth structure, is easy to perform, fast, effective, more conservative, and non-invasive compared to treatments such as crowns and veneers. The American Dental Association (ADA) states that bleaching has become the most popular aesthetic dental treatment for treating tooth discoloration.[1,2,3]

Bleaching uses chemicals from chromogens and active ingredients, namely hydrogen peroxide, sodium perborate, sodium hypochlorite, carbamide peroxide, and other oxidizing agents such as oxyborates. Sodium perborate and hydrogen peroxide are often used for intracoronal bleaching, while carbamide peroxide and hydrogen peroxide are used for extracoronal bleaching. External bleaching is a cost-effective aesthetic maintenance option in conservative (minimal invasive) dentistry compared to tooth restoration and provides satisfactory results to the patient. [3]

The purpose of this case report is to describe the procedure for handling extrinsic tooth discoloration in the patient with minimally invasive treatment in the form of external bleaching.

CASE

A 25-year-old woman presented with a lack of self-confidence due to her upper and lower teeth, which had become yellowish since drinking tea almost daily. She wanted to have her teeth treated to brighten their original color and regain her confidence.

TREATMENTS

First, the anamnesis, clinical examination, and diagnostic enforcement were done. The patient is also provided with Communication, Information, and Education (KIE) and informed consent covering the diagnosis of teeth, factors causing discoloration, procedure costs, as well as the side effects of external bleaching.

Preparation for external bleaching started with scaling, cleaning the surface of the teeth with prophylactic paste (Figure 1A), and determining the initial color of the patient's tooth, namely No. 8 (Shade guide Opalescent Boost, Ultradent) (Figure 1B). The next stages include applying protective lip balm and using a soft isolation barrier, such as Optragate and Isoblock. Once the oral cavity is adequately protected, an astringent agent can be applied (Figure 1C) in the gingival sulcus to stimulate the production of fluid obstructing the gingival sulcus. Afterward, a gingival barrier (Figure 1D) should be applied along the gingival margin of the upper and lower jaws, followed by curing for 20 seconds.

Figure 1. (A) Brushing with pumice; (B) Determining color beginning; (C) Application of astringent agent; (D) Application of gingival barrier.

Figure 2. (A) Application of H2O2 40%; (B) Cleaning with surgical lip suction; (C) Discharging gingival barrier; (D) Determining color after external bleaching.

Bleaching material is applied to the first premolar teeth, right to the left of the upper and lower jaw, over a course of 2 sessions using a 40% hydrogen peroxide (H2O2) solution for 20 minutes each session (Figure 2A). If conducted over 2 sessions, the bleaching material can be reapplied or, if the desired color is achieved, the next stage involves cleaning with 40% hydrogen peroxide (H2O2) using a surgical suction tip (Figure 2B) and comprehensive rinsing with water and air spray. Once clean, the gingival barrier, isoblock, and optragate can be removed from the oral cavity (Figure 2C). Subsequently, color determination occurs, where it is observed that the shade has changed to a brighter hue, specifically to No. 5 (Figure 2D), compared to the original tooth color.

Application material desensitization containing 0.11% fluoride and 3% potassium nitrate was applied on the labial surfaces of the upper and lower jaws with the objective of reducing tooth sensitivity after the procedure. The patient was instructed not to gargle, eat, or drink for about 1 hour after external bleaching. Additionally, recommendations were made for oral health, including being mindful of food and drink consumption and maintaining periodic check-ups. The second visit was conducted 7 days after the first visit, during which the patient returned for a clinical evaluation of the condition and color stability after external bleaching. Anamnesis results showed there were no complaints, no gingival abnormalities, and the tooth color remained stable (No. 5, shade guide Opalescent Boost) after external bleaching.

DISCUSSION

Discoloration extrinsic is a change in color that occurs on the surface of the teeth. The causes of extrinsic discoloration are habits involving the consumption of colored foods or drinks, which can leave stains on the tooth enamel layer. Some habits that contribute to extrinsic discoloration include the consumption of coffee, tea, and smoking. [4]

Discoloration of teeth in this case is caused by the habit of consuming tea almost every day. Tea contains tannin compounds, with tannin content in tea leaves ranging from 5-15%. Tannin is one of the chromogenic agents that can cause the color of teeth to darken. The density of the color of the tea influences the level of tannins. The more concentrated the tea is brewed, the lower the tannin level. The tannin content in tea is also influenced by several factors, including exposure to light and air, high heat levels, the refinement level of tea powder, and the types of tea. [5]

Tannins can attach to the surface of teeth due to the existence of double conjugated bonds, which are slowly absorbed into the enamel and dentin through interprismatic enamel. This interaction occurs through an ion exchange mechanism, causing the teeth to appear discolored. [6]

Bleaching is one of the most common minimally invasive treatments done at the moment because it is considered a safe and effective procedure if supervised directly by a dentist. The external bleaching material used in this case is hydrogen peroxide (H2O2) at 40% concentration, as this material, with a higher concentration, can produce more perhydroxyl ions that easily penetrate the tooth structure to break down chromophore molecules, resulting in a faster color change. [7]

The mechanism of 40% H2O2 consists of oxidation and reduction reactions. It increases the permeability of the tooth structure by reducing the molecular weight of H2O2, which facilitates its penetration into the organic matrix of enamel and dentin. The decomposition of H2O2 produces free radical ions in the form of oxygen and perhydroxyl, which quickly oxidize chromophore molecules that have double bonds, breaking them down into simpler compounds, resulting in a brighter color change. High concentrations of H2O2 can also adversely affect the hard tissue of the tooth by altering the morphology of the enamel surface and significantly increasing sensitivity.[8]

Although external bleaching is a conservative maintenance treatment, it is usually associated with painful post-treatment effects. This condition can be managed with the use of desensitizers.[9] In such cases, patients are treated with a desensitizing material consisting of 3% potassium nitrate and 0.11% fluoride.[10] Potassium ions in potassium nitrate help reduce the activity of sensory nerves in the dentin caused by depolarization of K+ ions, while fluoride ions in sodium fluoride block open dentinal tubules, reducing the flow of dentin fluid and preventing stimulus transmission, thereby reducing tooth sensitivity after external bleaching.[1]

Research conducted by Kutuk et al. on the effects of bleaching agents combined with desensitizers on enamel shows that the use of desensitizers containing fluoride, CPP-ACP, potassium nitrate, or nano-hydroxyapatite in external bleaching or mixed with bleaching agents does not hinder the external bleaching procedure. Desensitizers can also restore the integrity of micro enamel within 14 days after in-office bleaching procedures.[11]

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Management of cases of extrinsic discoloration can be effectively done with external bleaching, as it is a minimally invasive treatment that does not require the removal of healthy tooth tissue and has a short maintenance duration, leading to increased patient satisfaction due to the immediate noticeable change after treatment.

REFERENCES

1. Kansal S, Jindal L, Garg K, Thakur K, Mehta S, Pachori H. Discoloration of teeth: a literature review. IJHCR. 2020; 3(2): 58-62

2. Baroudi K, Hassan NA. The effect of light-activation sources on tooth bleaching. Niger Med J. 2014; 55(5): 363-368. DOI: 10.4103%2F0300-1652.140316

3. Sari Dewiyani. Pemutihan Gigi: Indikasi, Bahan, Teknik, Mekanisme dan Efek Samping Bleaching. Moestopo Publishing, 2024

4. Perdigao J. Tooth whitening. Switzerland: Springer International Publishing; 2016. 21,28.

5. Fajrina, A., Junuarty, J., & Stevani, S. 2016. Penetapan Kadar Tanin pada Teh Celup yang Beredar di Pasaran Secara Spektrofotometri UV-VIS. Jurnal Farmasi Higea, Vol 8 No 2.

6. Pratomo AH, Triaminingsih S, Indrani DJ. Effect on tooth discoloration from the coffee drink at various smoke disposal during coffee bean roasting. J Phys Conf Ser. 2018; 1073(3): 32031. DOI: 10.1088/1742-6596/1073/3/032031

7. Alqahtani MQ. Tooth-bleaching procedures and their controversial effects: A literature review. Saudi Dent J. 2014; 26(2): 33-46. DOI: 10.1016/j.sdentj.2014.02.002

8. Coceska E, Gjorgievska E, Coleman NJ, Gabric D, Slipper IJ, Stevanovic M, Nicholson JW. Enamel alteration following tooth bleaching and remineralization. J Microsc. 2016; 262(3): 232-44. DOI: 10.1111/jmi.12357

9. Ameli N, Kinvash Rad N, Nikpour F, Ghorbani R, Mohebi S. Effect of short-and long-term use of home and in-office bleaching with carbamide peroxide and hydrogen peroxide on enamel microhardness. J Den Indo. 2020; 27(2): 50-5. DOI: 10.14693/jdi.v27i2.1118.

10. Bashir H, Rahim S, Shah JA, Afreen Z, Afreen A, Shuja E. Comparison of mean efficacy of gluma and ultraez desensitizer to decrease hypersensitivity of vital abutment teeth prepared for full coverage restoration. J Bahria Univ Med Dent Coll. 2020;10(3):192-6. DOI: 10.51985/JBUMDC2020010.

11. Kutuk ZB, Ergin E, Cakir FY, Gurgan S. Effects of in-office bleaching agent combined with different desensitizing agents on enamel. J Appl Oral Sci. 2019; 27:e20180233. DOI: 10.1590/1678-7757-2018-0233