

Interdisciplinary treatment in office bleaching for discolored teeth with altered passive eruption: a case report

Perawatan interdisiplin *in office bleaching* untuk perubahan warna gigi dengan *altered passive eruption*: laporan kasus

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ABSTRACT

Objective: This case report aims to present *in office bleaching* treatment to restore the aesthetics of the teeth in a minimally invasive manner on a 35-year-old woman who had discolored teeth. The patient has a habit of consuming tea 2 times a day. **Method:** Tooth discoloration is treated by *in office bleaching* treatment using 40% hydrogen peroxide. In addition to discoloration, the teeth also experienced altered passive eruption thus a crown lengthening treatment was performed on teeth 13 to 23 by a periodontist. Two weeks later, *in office bleaching* treatment was performed. **Result:** There was an increase of 4 grades subsequent to *in office bleaching* treatment from shade guide number 7 (D2) to number 3 (W3) with cervical improvement. **Conclusion:** *In office bleaching* is effective in treating tooth discoloration and is able to provide satisfactory results.

Keywords: crown lengthening, tooth discoloration, *in office bleaching*

ABSTRAK

Tujuan: Laporan kasus menyajikan perawatan *office bleaching* untuk mengembalikan estetika gigi secara invasif minimal pada seorang wanita berusia 35 tahun yang mengalami perubahan warna gigi. Pasien memiliki kebiasaan mengkonsumsi teh 2 kali sehari. **Metode:** Perubahan warna gigi ditangani dengan perawatan *in office bleaching* menggunakan hidrogen peroksida 40%. Selain perubahan warna, gigi juga mengalami perubahan erupsi pasif sehingga perawatan pemanjangan mahkota dilakukan pada gigi 13 hingga 23 oleh seorang periodontis. Dua minggu pasca perawatan pemanjangan mahkota, dilakukan perawatan *in office bleaching*. **Hasil:** Terjadi peningkatan 4 tingkat setelah perawatan *office bleaching* dari *shade guide* nomor 7 (D2) menjadi nomor 3 (W3) dengan perbaikan servikal. **Simpulan:** *In office bleaching* efektif mengatasi perubahan warna gigi secara memuaskan.

Kata kunci: pemanjangan mahkota, perubahan warna gigi, di kantor bleaching

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INTRODUCTION

During the last few years, the increase in a person's appearance causes the increase of the popularity of aesthetic treatment.^{1,2} Nowadays, individuals are not satisfied with a healthy teeth and desires to have a captivating smile. Teeth discoloration is one of the aesthetic problems on teeth that can be caused by either intrinsic or extrinsic factors.²⁻⁴ In addition, gingiva tissue surrounding teeth holds an important role in aesthetics. Changes in the teeth colour can be surmounted with bleaching treatment.^{3,5,6} For vital teeth, external bleaching can be done, and for non-vital teeth, internal bleaching can be done.³

External bleaching is a tooth whitening treatment for removing stain as well as establishing aesthetic teeth colour so that the teeth appear brighter.^{3,5,6} External bleaching is divided into three, which are *in office*, *at home*, and *over the counter* (OTC) bleaching. *In office* bleaching is done at dental clinics with results observable soon after treatment.^{6,7}

Gingiva tissue condition in the form of gummy smile is often viewed as aesthetic problem. Gummy smile is an abnormality of the mucogingival shape and condition that affects area around the teeth and 3 mm will

be visible while smiling. Crown lengthening or periodontal resection is categorized as aesthetic or functional treatment that aims to remove parts of periodontal supportive tissues. It is usually done in aesthetic zone, such as the anterior upper jaw teeth region.^{8,9}

This case report will illustrate external discoloration on anterior upper and lower jaw teeth that is treated with *in office* bleaching procedure and has been treated with crown lengthening procedure beforehand.

CASE

A 35-years-old woman visits RSGMP Unhas with under the complain of yellowness of the front teeth. The patient enjoys consuming tea. Intraoral inspection showed yellowness of the 14, 13, 12, 11, 21, 22, 23, 24, 31, 32, 33, 34, 41, 42, 43, 44 teeth. In addition, the gum around the 13, 12, 11, 21, 22, 23 teeth appear to have swollen. Determination of initial teeth colour using opalescence shade guide showed colour number 7 (D2). Subjective and objective inspections showed normal pulp on all teeth while the gum around the 13, 12, 11, 21, 22, 23 altered passive eruption. The treatment plan for this case is *in office* bleaching after crown lengthening treatment.

MANAGEMENT

During the first visit, history taking and clinical inspection is done. Then, information, education, and communication; dental health educations, and patient signage of informed consent is done. Afterwards, cheek retractor is installed and the teeth is cleaned using pumice and brush. Initial teeth colour is assessed using shade guide opalescence boost, colour number 7 (D2). Then, treatment of altered passive eruption (Fig.1A) is done by periodontic colleague at the 13, 12, 11, 21, 22, 23 teeth's gum using crown lengthening procedure. First, local anaesthesia is applied, then a bleeding point is created to mark the height of the desired clinical height of the dental crown. Afterwards, bone sounding is done to determine the peak alveolar width using gingivectomy procedure without bone reduction at the 13, 12, 22, 23 teeth and with bone reduction at the 11 and 21 teeth. After that, suturing is done followed by the installation of periodontal pack. The visit is ended after patient is given post-treatment instruction and to visit for check-up.



Figure 1A Before and B after crown lengthening



Figure 2 Application of A astringent and B gingival barrier

During the second visit, post-treatment check-up for the crown lengthening procedure is done. History taking found no subjective complain from patient, intra-oral inspection on the 13, 12, 11, 21, 22, 23 teeth's gum found normal results (Fig.1B). Afterwards, in office bleaching procedure is done. First, lip balm is applied by rubbing the area around patient's mouth, continued by the installation of cheek retractor. The teeth are cleaned using pumice and brush and then rinsed with water. Cheek retractor is then removed, followed by the installation of lip and cheek retractor and bite lock, and teeth drying. Then, astringent haemostatic is applied (Fig.2A) followed by gingival barrier application (Fig.2B) on gingival margin followed by 20 seconds of light curing.

Then, 40% H_2O_2 as in office bleaching solution is applied in accordance of factory guideline, to teeth for 2x20 minutes. Then, bleaching solution is cleaned, followed by the removal of lip and cheek retractor, bite lock, and gingival barrier. Afterwards, final teeth colour is determined, that is number 3 (W3). Desensitizer agent is then applied. Lastly, patient is given instruction to

maintain oral hygiene, reduce acidic or coloured food/beverages such as tea, coffee, and soda, use antisensitizing toothpaste and to visit routinely for check-up.

Patient visits for check-up with no subjective complaint. Intraoral inspection on gingiva around teeth found normal results with stable teeth colour. The patient is very satisfied with the treatment result.



Figure 3 Application of A bleaching solution; B desensitizer



Figure 4A After bleaching; B check-up after procedures

DISCUSSION

Discoloration or the color shift of the teeth are the change in the hue, luminance, or color of the teeth. The colour of the teeth are based on its reflectance and absorbance which is affected by the enamel, dentin and pulpa structure of the teeth. Any change that affects the structure of the teeth may it happen before or after erosion will cause discoloration¹⁰⁻¹²

Extrinsic discoloration is the change of colour that happens on the surface of the enamel structure.^{3,12} It usually correlates with a patient's food and beverage consumption or their smoking habits. Pigments of beverages such as coffee and tea, or tar from cigarettes can cause teeth discolouration.^{2,7} Accurate diagnostic is very important as it directly influence management plan.³

In this case report, discolouration is found on anterior upper and lower jaw teeth that is caused by the patient's habit of drinking 2 glass of tea per day. Tea is a very popular drink worldwide as it has various benefits on health such as positively influencing diet, cancer, and cholesterol.^{13,14} However, tea contains tannin compound that can cause the shift of colour on the surface of the teeth.¹³ Tannin is made of polyphenols (catechin and leucoanthocyanin) that can cause the changing of the teeth colour.^{15,16} This change is the effect of conjugated double bond interacting with the enamel of the teeth through the exchange of ion.¹⁵

Bleaching is a procedure to brighten the teeth colour by oxidation the main cause of organic colour shift of the teeth. This process restored the physiologic colour and hue of the teeth, as well as removing any stain by using effective oxidants, also known as whitening agent. The effectiveness of whitening agent is based on the causative factors of the change in colour.¹⁷ The bleaching

technique used in this case is in office bleaching; is a bleaching procedure that uses high concentration oxidator agent that is done directly by dentist.^{7,17}

Before starting the treatment, assessment of the teeth, such as the presence of caries, periodontal condition, teeth sensitivity, and general condition, needs to be. In this case, the gingiva is found to have undergone altered passive eruption. Altered passive eruption is a condition that happens in between the teeth, alveolar bone, and soft tissues that causes over-emphasis of the gingiva when a person is smiling, causing what is known as gummy smile.⁸ Therefore, the crown lengthening is done while being assisted by a periodontic colleague. Crown lengthening is a common surgery procedure. This treatment is done in order to elongate the servico-occlusal ratio of the dental crown, therefore restoring the biologic width or the distance between gingiva sulci with the alveolar bone moving to a more apical position.⁹

During the next visit, in office bleaching procedure is done using 40% hydrogen peroxide (opalescence boost). Hydrogen peroxide is a potent oxidizer that can produce free radical ($H_2O + O_2$) that is very reactive with water and is acidic.¹⁸ Hydrogen peroxide is an unstable

molecule, when it touches organic substances, such as structure of teeth, a reaction will happen which causes the dissociation of molecules: H_2O_2 releases free radicals that interacts with organic substances, subsequently producing water. Released free radicals hold unpaired electron that can form a reaction with chromophore molecules (the cause of color shift), breaking the molecular bond between chromophore and teeth as well as reducing the size of said chromophore. The happening reactions are oxidation-reduction reactions, which produces whitening optical effect as light absorbance from chromophore is reduced.

Several researches suggested that in office bleaching using hydrogen peroxide is adequately safe and is a minimally invasive treatment.^{19,20} However, post-treatment sensitivity often happens, although temporarily. To prevent that, desensitizer agent containing 3% potassium nitrate and 0.11% fluoride gel are applied.^{7,21}

A dentist holds an important role in determining diagnosis, treatment plan, types an amount of material used, and is responsible for any post-treatment adverse effect. It was concluded that in office bleaching is effective to treat teeth discoloration satisfactorily.

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