

External Laser Bleaching Treatment on Tetracycline-stained Teeth

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ABSTRACT

We report a 47-year-old male army officer who came to the Oral and Maxillofacial Surgery Department of 94 Armed Forces Hospital Terendak Camp complaining of his greyish-brown stained teeth since his younger age. After a thorough history taking and physical examination, we concluded that the cause of discoloration was due to ingestion of Tetracycline drug. The choice of treatment for this patient was external laser bleaching using Laser Whitening System, Doctor Smile Products, GDF mbH Rossbach, German. A 35% Hydrogen Peroxide Gel (Laser Whitening System, Doctor Smile Products, GDF mbH Rossbach, Germany) was homogenously applied on the teeth (from 13-23) with activation using laser (5W, Laserevolution, Doctor Smile Products, Germany) for 1 minute on each quadrant. Patient was satisfied with the result as his teeth became whiter post treatment making external laser bleaching an excellent technique in managing tetracycline staining.

KEYWORDS: Bleaching, Tetracycline, Greyish-brown stained, Discolouration, External Laser Bleaching

Severity of pigmentation with tetracycline depends on time and duration of administration, type of tetracycline administered and dosage². Two approaches have been used to treat tetracycline discolouration by external bleaching and intracoronal bleaching following intentional root canal therapy⁴.

External bleaching is mainly used for vital tooth and intracoronal bleaching is for non-vital tooth that has been treated with root canal treatment⁵. Cohen, S and Parkins, FM was the first in 1970 to reveal there was significant esthetic improvement in five of the six patients with tetracycline-stained vital teeth by using external bleaching.⁶ Following studies by Haywood, Leonard and Dickinson in 1997 they showed that using external bleaching can be effective but the study took 6-months period⁷.

There are two types of external bleaching that can be used which are: in-office type bleaching (only qualified operators can perform this treatment) and at-home bleaching that is given to the patients by dentists to do self-bleaching at home with minimal concentration of Hydrogen Peroxide⁸.

We describe a case of 47-year-old male officer who presented with second-degree tetracycline staining and treated with external laser bleaching which is one of the in-office external bleaching treatment.

CASE PRESENTATION

A 47 year old male army officer came to the Oral and Maxillofacial Surgery Department of 94 Armed Forces Hospital Terendak Camp with greyish-brown stained teeth present since young and expressed a desire to improve his tooth colour by means of conservative esthetic therapy.

A clinical and radiographic examination was performed to rule out any preexisting pathosis other than tooth discolouration. The patient is otherwise fit, has no underlying disease and was not under any medication. However, based on his family background, his mother was on Tetracycline drug while pregnant with the patient. The pre-treatment photographs showed generalized greyish-brown discoloration without banding (Figure 1). Such condition can be classified as second degree in Jordan and Boksman's classification of Tetracycline stains (Table 1)⁹. Implant treated tooth was noted replacing the first upper right premolar.

INTRODUCTION

Tooth discolouration can contribute to poor esthetics and psychological distress. Various techniques have long been sought to regain natural tooth colour and thus, bleaching treatment has been discovered to overcome these problems apart from veneers and esthetic crowns. Unfortunately, not all tooth discolouration can be corrected. One such case is discolouration due to tetracycline drugs.

Tetracycline-stained teeth occurs when it has been ingested at a young age or by the patient's mother during pregnancy and results in a characteristic blue-grey or yellow-brown opalescent discolouration of the dentin^{1,2}. Chelation of tetracycline molecule with the calcium in hydroxyapatite crystals forms tetracycline orthophosphate which is responsible for discolored teeth². This is thought to be a photo-initiated reaction thus explaining why the incisors tend to be more affected than the molars³.

The patient was informed all about treatment options ranging from conservative tooth bleaching to more aggressive treatments including veneers and esthetic crowns. The patient decided on external laser bleaching which is part of in-office treatment since it is less invasive, time saving, cheaper than other treatments and he preferred to get it all done in one visit.

Table 1 : Jordan and Boksman's Classification of Tetracycline-stained Teeth⁹

Score	Clinical presentation
0	No tetracycline staining evident
1	Uniform light yellow, brown, or gray stain confined to incisal three quarters of the crown
2	Deep yellow, brown or gray stain, without banding
3	Dark gray or blue stain with marked banding
4	More severe or extreme staining



Figure 1: Pre-Treatment Photograph Showing Generalized Greyish-Brown Discoloration without Banding

In this case, we couldn't find the right pre-treatment colour using Vita shade guide as the teeth were darker than the available shade colour. Teeth were pumiced to remove all the superficial debris and patient was given protective glasses due to usage of laser during treatment. A cheek retractor was placed with Vaseline to avoid discomfort and gingival dam (Laser Whitening System, Doctor Smile Products, GDF mbH Rossbach, Germany) was applied approximately 0.5 mm on the tooth margin and 2 to 3 mm of the gingival tissue to protect from bleaching agent. A 35% Hydrogen Peroxide Gel (Laser Whitening System, Doctor Smile Products, GDF mbH Rossbach, Germany) was homogenously applied on the teeth (from 13-23) and activated using laser (5W, Laserevolution, Doctor Smile Products, Germany) for 1 minute on each quadrant. The application of the gel was repeated up to 3 times to get the best result as long as the patient doesn't feel any sensitivity on the tooth.

The bleaching gel was then removed and teeth rinsed with water. The session was completed by applying a desensitizing gel of 5% Sodium Fluoride (3M ESPE Clinpro) for 10 minutes.

Photograph was taken after the treatment with Vita shade colour C2 (Figure 2). Patient was very satisfied with the esthetic result and refused to combine with at-home bleaching although the result can be achieved better. The patient was advised to not eat, drink or smoke for 1 hour after the treatment. Substances with strong colours such as red wine, coffee, curry and foods containing acid should also be avoided following the treatment as based on the products instructions.



Figure 2: Photograph Taken After the Treatment with Vita Shade Colour Guide

DISCUSSION

This clinical report describes the use of external laser bleaching which part of the in-office technique to treat second-degree tetracycline-stained teeth. Tetracycline exposure in utero and early childhood often results in intrinsic tooth discoloration that varies in severity based on the timing, duration and concentration of tetracycline administered¹⁰. According to Tredwin, anterior primary teeth are susceptible to discoloration by systemic Tetracycline from 4 months in-utero through 9 months post-partum and anterior permanent teeth are susceptible from 3 months post-partum to 8 years and in pregnancy in general¹¹. Because of this adverse effect, its administration is contraindicated during pregnancy.

Tetracycline-stained teeth in younger children appear bright yellow while as they get older, they are brownish and greyish due to oxidation process of Tetracycline compound in the teeth¹². Treatments depends on the degree of severity of the Tetracycline-stained teeth. Normally bleaching can be successful for the first three classifications⁵. Other treatments options are direct veneers, resin composite or ceramic laminate veneers and full-coverage crowns.¹³

The treatment of external laser bleaching provides a faster whitening result as chosen by the patient and undoubtedly effective for second-degree Tetracycline-stained teeth. The activation sets off the release of the oxygen that breaks the double bond of the pigments on the teeth, making them lose their colour. Besides, activation of hydrogen peroxide greatly speeds up the bleaching process. Studies conducted by Fekrad, R et al., 2017 shows that laser bleaching is more effective in altering tooth colour change and improving the release of stain containing molecules¹⁴.

CONCLUSIONS

It could be concluded that second-degree Tetracycline-stained teeth can be treated by in-office bleaching with external laser bleaching technique and provide a faster whitening result without any invasive treatment involved.

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