

# Treatment of Tetracycline-stained Teeth using Laminate Veneers

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## Abstract

Tetracycline is a commonly used antibiotic, the use of which during pregnancy can cause severe discoloration of the teeth, which can affect the patients' self-esteem and quality of life. Our patient was a 43-year-old woman with a chief complaint of severe teeth discoloration affecting her quality of life, and a history of tetracycline usage during her mother's pregnancy. An incisal edge fracture on one central incisor, and discrepancies in the gingival levels and anterior teeth length were also noted. Bleaching and restoration with a dental crown were eliminated as treatment options; the treatment of choice in this case was restoration with laminate veneers. Use of tetracycline during pregnancy should be avoided, as it may cause side effects such as discoloration of teeth. Restoration of tetracycline-stained teeth using laminate veneers is considered a predictable treatment as it can improve the shape, shade, and form of the teeth in a conservative manner.

**Keywords:** Tetracycline-stained teeth; Laminate veneers; Tetracycline; Discoloured teeth; Aesthetics; Veneers

## Introduction

Tetracycline, invented in 1948, [1] is a broad-spectrum antibiotic used to treat certain infections in adults and children. One of its side effects is its fusion with tissues such as the teeth, bone, and cartilage during calcification. Tetracycline can chelate calcium ions and be incorporated into calcifying tissues, such as teeth, causing severe discoloration. This discoloration varies from yellow or grey to brown, according to the administered dose of tetracycline. The first incidence of tetracycline staining in children's teeth was reported in 1956. Thereafter, tetracycline has been reportedly associated with enamel hypoplasia.

## Case Presentation

A 43-year-old female reported to our institution with a chief complaint of severe teeth discoloration that affected her quality of life and self-esteem [Figure 1]. Written informed consent for publication of this report was obtained from the patient. She reported tetracycline usage by her mother during pregnancy. Clinical examination of the patient's teeth revealed a discrepancy in the gingival margins of her anterior teeth, besides the severe discoloration. Moreover, the incisal edges of tooth #11 and #21 were fractured, and there was a discrepancy in the length of the four anterior teeth [Figure 2]. The treatment options for this case included: bleaching, laminate veneers, and complete crown coverage.

Bleaching was eliminated as an option, as it is effective only in cases of uniform staining, and may cause pulpal sensitivity. Furthermore, the fractured incisal edges could not have been treated by bleaching. Complete crown coverage was also eliminated as it is not a conservative treatment, and there were no restorations on the teeth. We opted for laminate veneers as it can improve the shape and the shade of the teeth in a conservative manner. According to Chen et al., who evaluated 546 tetracycline-stained teeth restored with veneers and then re-



**Figure 1:** Extra- and Intra-oral examinations. a: Extra-oral frontal view; b: Extra-oral right side view; c: Extra-oral left side view; d: Intra-oral frontal view.

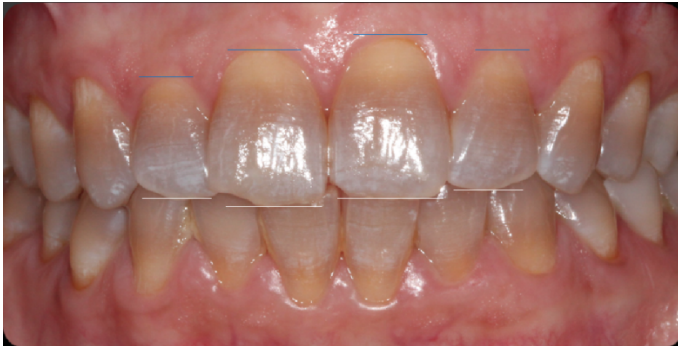
evaluated them after 0.5, 1.5 and 2.5 years, 99% of the veneers had perfect marginal adaptation, the shade was stable, and the patients were satisfied. The treatment of tetracycline-stained teeth with laminate veneers is, therefore, a predictable and highly recommended treatment option. [2]

After obtaining all the records, but before the wax-up, aesthetic and phonetic evaluation was performed. The dental midline coincided with the facial midline [Figure 3]; however, the incisal edges of the anterior teeth were at different levels [Figure 4]. During the articulation of the "F" sound, only the mesial half of

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**Figure 2:** Discrepancies in the gingival levels and length of the anterior teeth.



**Figure 5:** Evaluation of the length of the teeth during "F" sound articulation.



**Figure 3:** Evaluation of the dental midline.



**Figure 6:** Determination of the length of the central incisors.



**Figure 4:** The incisal edges of the two central incisors are at different levels.



**Figure 7:** Wax-up.

tooth #11 touched the vermillion border of the lower lip [Figure 5]. Therefore, the level of the mesial half of tooth #11 was determined as the final level of the incisal edge of the central incisors [Figure 6], and the wax-up was performed accordingly [Figure 7].

A mock-up was performed for the aesthetic and phonetic evaluation of the patient. The patient was satisfied with the aesthetic parameters: the teeth followed the curvature of the lower lip, and the incisal edges were parallel to the commissural line. Moreover, the incisal edges of the two central incisors touched the vermillion border of the lower lip during the pronunciation of the "F" sound [Figure 8].

Two preparation guides were used for tooth preparation. Silicon putty was used to check the proximal and incisal reduction, and a clear shell was used to evaluate the facial reduction [Figure 9].

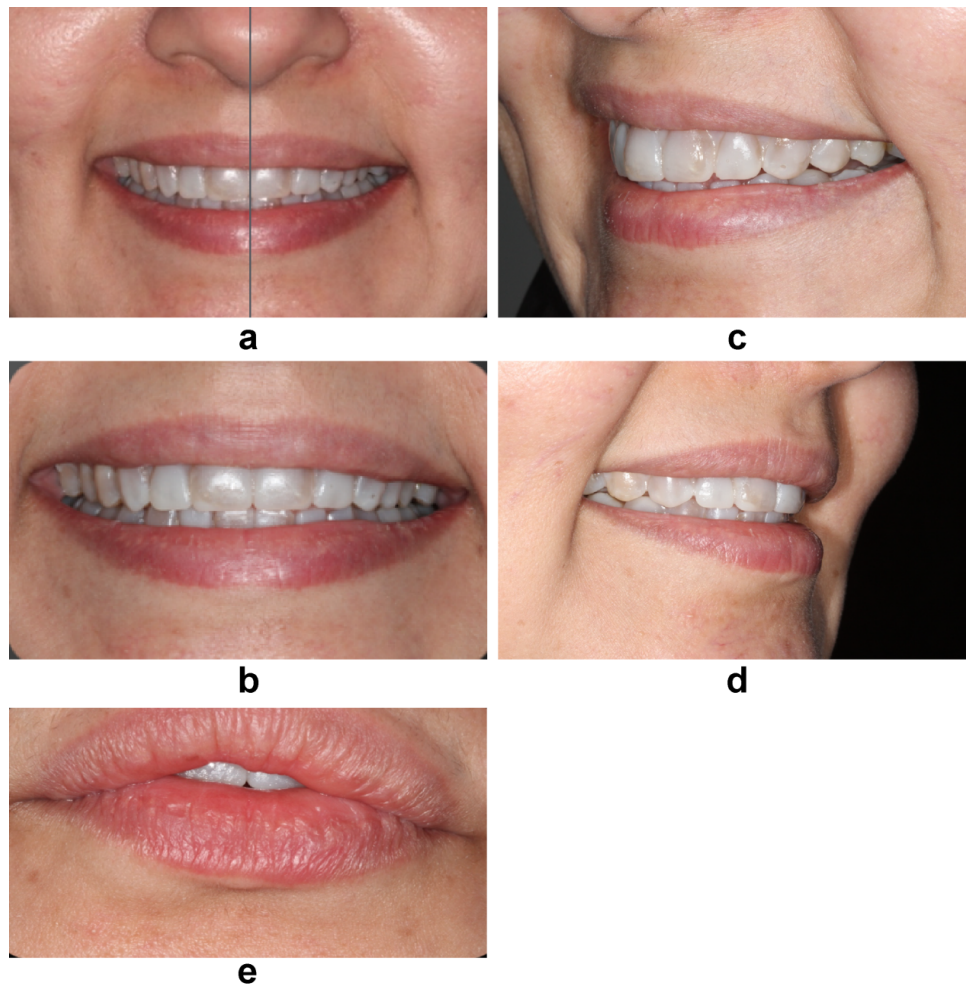
Final impression was made using a polyvinyl siloxane impression material [Figure 10]. High opacity ingots (IPS Emax) were used to mask the post-preparation severe teeth discoloration.

When the restorations were ready, the shade and shape of the veneers was evaluated using a try-in paste (Variolink esthetic LC system Kit) [Figure 11]. As the patient was satisfied with the transformation, permanent cementation of the veneers was performed [Figure 12].

Besides the dramatic transformation of the teeth color, the discrepancy in the gingival margins was adjusted, and symmetry between the length of the right and left teeth was achieved [Figure 13].

Extra-oral evaluation revealed a substantial improvement in the color and form of the teeth [Figure 14], which fulfilled the aesthetic requirements of the patient.

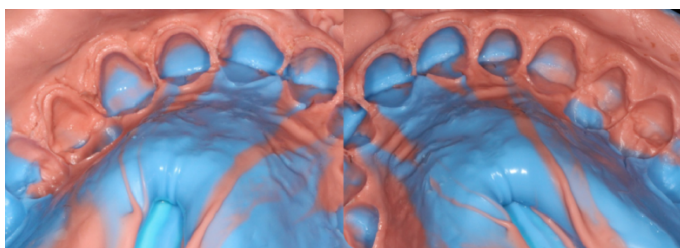




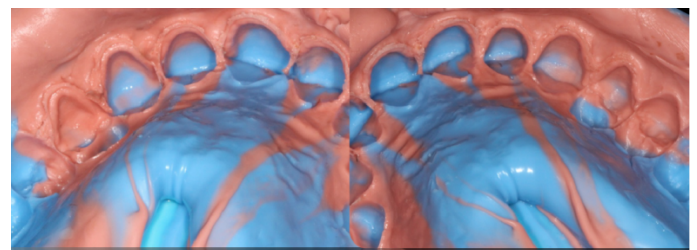
**Figure 8:** Evaluation of aesthetics and phonetics with the mock-up. **a:** Evaluation of the dental midline; **b:** Aesthetic evaluation – Frontal view; **c:** Aesthetic evaluation – Left side; **d:** Aesthetic evaluation – Right side; **e:** Phonetics evaluation – “F” sound



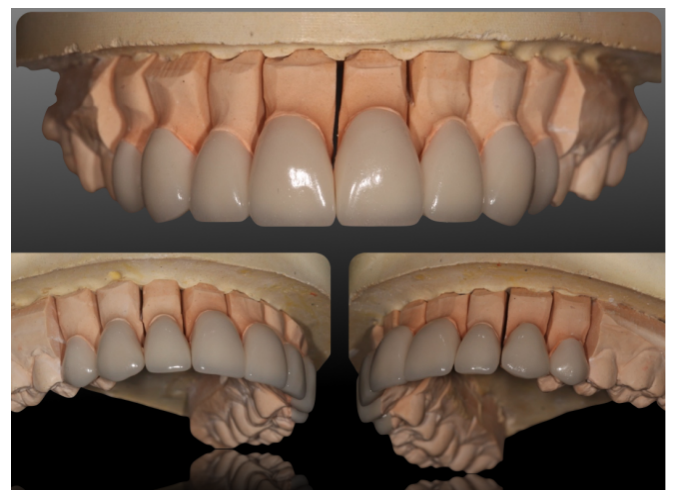
**Figure 9:** Using a putty index and clear shell during the preparation.



**Figure 10:** Final impression using polyvinyl siloxane.



**Figure 11:** The restorations are ready for cementation.



**Figure 12:** Intra-oral result after final cementation.



**Figure 13:** Evaluation of the gingival levels and length of teeth after cementation.



**Figure 14:** Extra-oral aesthetic evaluation. a: Frontal view – before treatment using laminate veneers; b: Frontal view – after treatment using laminate veneers; c: Right side – before treatment using laminate veneers; d: Left side – before treatment using laminate veneers; e: Right side – after treatment using laminate veneers; f: left side – after treatment using laminate veneers.

## Discussion

The adverse effects of tetracycline on calcified tissues have been known for a long time, which includes severe discoloration of teeth and enamel hypoplasia. Pregnant women should avoid using this antibiotic, and physicians should avoid prescribing it to them during pregnancy. For the treatment of this discoloration, different methods such as bleaching, laminate veneers, and complete crown coverage are available. In this case, complete crown coverage was not indicated as it is not conservative, and

the teeth were sound without any large restorations. Ralph et al. reported that bleaching of tetracycline-stained teeth is efficient, and that post-treatment color stability can last for 90 months.<sup>[3]</sup> Donald E also reported a satisfactory result after using hydrogen peroxide to treat tetracycline-stained teeth. In contrast, in their study on rats, William et al. concluded that bleaching can cause severe changes in the enamel and dentine. Moreover, it may cause pulpal sensitivity and other adverse effects on the pulp.<sup>[4]</sup> Chen et al. have reported satisfactory results after using veneers for tetracycline-stained teeth.<sup>[5]</sup>



In our case, laminate veneers were used to restore the discolored teeth. Bleaching is only effective in cases with uniform staining. In this case, the discoloration was severe, and bleaching could not have changed the shade sufficiently to satisfy the patient. Moreover, besides teeth discoloration, the fractured incisal edges and the non-uniform length of the anterior teeth could not have been treated with bleaching. Veneers were our treatment of choice as the shade, length, and the form of teeth could be sufficiently modified to satisfy both the dentist and the patient. Further, laminate veneers are a conservative option compared to full coverage crowns.

In summary, the use of tetracycline should be avoided during pregnancy, due to their side effects on calcified tissues such as the teeth, cartilage and bone. Tetracycline can cause severe discoloration of the teeth and affect the patient's quality of life. Restoring tetracycline-stained teeth with laminate veneers is an efficient and predictable option, which allows modification of the shade and form of the teeth, dramatically improving the patients' self-esteem.

### Competing Interests

The authors indicate no potential conflicts of interest.

### References

1. Sande MA, Mandell GL. Tetracyclines, chloramphenicol, erythromycin, and miscellaneous antibacterial agents. In: Goodman Gilman A, Rall TW, Nies AS, Taylor P (ed.) *The pharmacological Basis of Therapeutics*, 8th edn. New York, NY: Pergamon Press, 1990:1117-1118.
2. Chen JH, Shi CX, Wang M, Zhao SJ, Wang H. Clinical evaluation of 546 tetracycline-stained teeth treated with porcelain laminate veneers. *J Dent*. 2005;33:3-8.
3. Leonard RH Jr, Van Haywood B, Caplan DJ, Tart ND. Nightguard vital bleaching of tetracycline-stained teeth: 90 months post treatment. *J Esthet Restor Dent*. 2003;15:142-152.
4. Ledoux WR, Malloy RB, Hurst RV, McInnes-Ledoux P, Weinberg R. Structural effects of bleaching on tetracycline-stained vital rat teeth. *J Prosthet Dent*. 1985;54:55-59.
5. Chen JH, Shi CX, Wang M, Zhao SJ, Wang H. Clinical evaluation of 546 tetracycline-stained teeth treated with porcelain laminate veneers. *J Dent*. 2005;33:3-8.