

Flawless smile with zirconia crowns for tetracycline stained teeth

Abstract

Tetracycline is one of the teratogenic antibiotics used in various infections affecting both adults and children, has a side effect of staining teeth because of its ability to form a tetracycline calcium orthophosphate complex. It binds with calcium ions and forms this complex at the time of odontogenesis which not only causes a permanent unaesthetic appearance, living behind a huge psychologic impact on patients but also poses an esthetic challenge to the clinician. Many treatment options are available for whitening of teeth but choosing of correct option depends on the severity of discoloration, age of patient, requirements of the patient, good prognosis and also cost effectiveness. Thus here is case of 22 year old female patient having severely stained teeth because of long term usage of tetracycline and was rehabilitated using zirconia crowns.

Keywords: bleaching, rehabilitation, tetracycline, zirconia

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Introduction

Tetracyclines enjoy a wide range of clinical use against many gram negative, gram positive, chlamydial, mycoplasmal and rickettsial infections. Because of its broad spectrum antimicrobial activity it has got bacterial resistance and thus its use has been restricted to combination therapy for bone metastasis, prophylaxis of tuberculosis, anthrax, malaria and acne in adolescents and young adults.¹ Tetracycline is considered as teratogenic agent and has a number side-effects and one being tooth discolouration. Tooth staining with tetracycline is dependent on the amount of dose given, duration of treatment and stage of tooth development.² The mechanism to explain the staining by tetracycline is its ability to form a complex with calcium ions which is so called chelation.³ Tetracycline chelates with calcium ions to form a stable tetracycline calcium orthophosphate complex. These complexes are deposited into bone and teeth. Dentine is more susceptible to staining than enamel.⁴ The tetracycline-induced discolouration is considered to be permanent since dentine and enamel cannot be remodeled once formed. The staining varies from yellow or grey to brown with or without banding.³ Chlortetracycline grey-brown discolouration, tetracycline and dimethylchlortetracycline give yellow discolouration and oxytetracycline is the least discolouring.⁵ The calcification of primary dentition starts at the end of the fourth month of gestation and continues till 11-14 months of age and that of the permanent dentition begins after birth continue their calcification until 8 years of age. Thus tetracycline should be avoided for pregnant women during the second and third trimester of pregnancy and for children up to the age of eight.³ The staining takes place more frequently in the developing dentition when the total dosage is over 3g, or the administration exceeds 10 days.⁶ Tetracycline discolouration is classified as follows.¹

- First degree is mild staining which ranges from yellow to grey with no banding.
- Second degree is moderate staining ranging from yellow-brown to dark grey banded staining.

- Third degree is severe staining ranging from blue grey or black with significant banding across the tooth.

- Fourth degree is extended and more severe staining.

Thus here is case report of 22 year old female patient having third to fourth degree tetracycline stained teeth and prosthetic rehabilitation was done using zirconia crowns.

Case report

A 22 year old female patient visited to the department of Prosthodontics with the chief complaint of discolored teeth. On examination greyish black discolourations were seen with both maxillary and mandibular anterior teeth and all 1st premolars and 1st molars. 2nd premolars and 2nd molars were unaffected (Figure 1). The discolourations were in bands but tooth anatomy and texture appeared to be normal with no signs of hypoplasia. All teeth appeared to have normal mineralization except for the discolouration. Radiographic examination showed no changes in thickness of enamel, dentin and pulp. Family history was insignificant; none of the other family members had similar tooth discolourations. Parents gave a medical history of repeated infections during her childhood and local physician prescribed same type of medications each time. History, clinical and radiographic examination suggested that the discolouration is mainly due to ingestion of tetracycline during the development of teeth. Depending on the age and severity of discolourations prosthetic rehabilitation was planned. In the first appointment diagnostic impressions were made using irreversible hydrocolloid impression material and were poured with dental stone. Casts were mounted on the articulator using face bow transfer and interocclusal records. Tooth preparations were done to receive zirconia crowns for both maxillary and mandibular teeth (Figure 2). 1st molars were not included in tooth preparations as they were not in aesthetic zone. Impressions were made using elastomeric impression. Interocclusal records were taken and mounted on articulator. Temporization (Figure 3) was done and patient was recalled after 4-5 days for bisque try-in (Figure 4).

Temporary crowns were given in between. Once the zirconia crowns were fabricated, they were tried in oral cavity and interferences were corrected and finally cemented (Figure 5& 6). Patient is under continuous follow-up.



Figure 1 Preoperative photograph.



Figure 2 Tooth preparation.



Figure 3 Temporization.



Figure 4 Bisque try-in photograph.



Figure 5 Postoperative intra-oral photograph.



Figure 6 Postoperative extra-oral photograph.

Discussion

Tetracycline discolorations usually range from creamy white to grey brown and black colors. When these colors get exposed to sunlight they become browner, among which anterior teeth have more tendency to become darker as compared to posterior teeth.⁷ Bleaching, micro abrasion, porcelain laminate veneers, and full coverage crowns are the few treatment options for tetracycline stained teeth, however the option should be chosen cautiously depending on severity of discolorations.⁸ First degree stains can be treated using vital bleaching whereas third degree and fourth degree stains require full coverage crowns.⁹ Thus in the present case described, full coverage zirconia crowns are preferred, looking at the severity of stains and patient's requirements. Zirconia crowns simulate the natural tooth appearance and is preferred over porcelain fused to metal because of appearance of black lines at the margins over a period of time. However only disadvantage of using zirconia crowns is that, these are not cost effective. Porcelain laminate crowns could also be an option for this case but blackish appearance on lingual side would be a drawback. Patient was very particular about the aesthetics and did not want anything black left in the mouth.

Conclusion

Discoloured teeth are the most common dental problem which should be handled very carefully so as to meet both patient's expectation and limitations of treatment options which can improve the quality of life and provide psychologic benefits. Furthermore an effective communication with patients can clarify the misunderstandings and will decrease the disappointments at the end.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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