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A Minimally Invasive Management Approach to Tetracycline Staining of Adult Dentition

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ABSTRACT

Tetracyclines were introduced as broad spectrum antibiotic for the treatment of various infections, both in children and adults. One of the major drawback with tetracycline is its incorporation into the tooth that are calcifying leading to discoloration which ranges from yellow grey to brownish black as they have the ability to chelate calcium. There is a possibility that this discoloration may not be limited to developing tooth but may also affect adult dentition after eruption. When given over long periods of time in adults, the tetracycline molecule is incorporated into the continuously forming secondary dentin. It is possible that continuous exposure of the incorporated tetracycline to the sun might lead to the formation of oxidation product and lead to discoloration. This case report suggests minimally invasive strategies to manage tetracycline staining in adult dentition.

Keywords: Tetracycline stains, Adult dentition, Bleaching, Microabrasion, Direct Veneers

INTRODUCTION

Tetracyclines, a broad spectrum antibiotic were the drug of choice for many infections pertaining to respiratory tract, skin, genitals, gastrointestinal tract and urinary tract for over 70 years. More recently it has been used for treating acne. Various analogues of tetracycline include: doxycycline, oxytetracycline, minocycline, chlortetracycline, and demeclocycline. Tetracyclines have proven to be effective antibiotic agents, but they can create severe dental aesthetic problems. [1]

When consumed by an expectant mother during the third trimester or by a child during tooth formation stages between 3 and 4 months and 7 to 8 years, tetracycline can be deposited in the tooth buds, causing significant discoloration. [2] It also may be deposited in teeth during early adult years if taken on a long-term basis, especially if taken during the time of secondary dentin formation, during growth periods, or following any traumatic injury to the teeth. It is important to note that there are a very few number of cases documented on staining occurring in permanent dentition of patients who as adults had been prescribed minocycline, which is a tetracycline derivative, for the treatment of acne. [3]

The treatment of tetracycline stained teeth mostly depend upon the severity of staining. Reports have shown that significant improvement in severely stained teeth can be achieved by extended bleaching regimen. [4] However most of the times these extended techniques do not remove all of the staining and only lighten the color of the stains. The treatment of choice for severely stained tooth includes partial or full coverage indirect aesthetic restorations so as to mask the dark colour of the staining.

This case report describes conservative aesthetic management of tetracycline staining in adult dentition.

CASE REPORT

A 24 years old male patient reported to the Department of Conservative Dentistry and Endodontics with the complaint of severely discolored upper front tooth since two month [Figure 1]. The cause of this discoloration was traced back to the consumption of tetracycline for the treatment of acne for almost 6 weeks. Patient had been advised for full coverage crowns as the only way to mask the the discoloration and he was not able to bear the expenditure. So a more conservative plan was proposed which involved cleaning of the teeth with Microabrasion followed by lightening of the tooth discoloration by Bleaching and masking the remaining stains and giving proper anatomy to the teeth by Direct Composite Veneers.

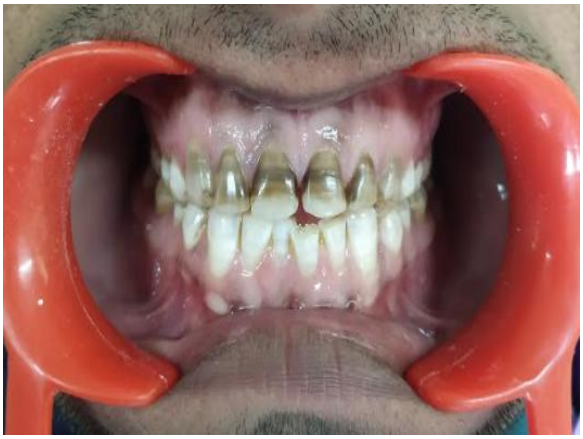

Figure 1: Preoperative clinical photograph

Rubber dam was applied and upper anterior teeth were isolated. Pumice stone was grounded into powder form and hydrochloric acid was prepared to a concentration of 18%. These two were mixed and was applied on to the tooth surface and the surface was cleaned using rubber cup [Figure 2a]. There was a slight reduction in discolouration after two cycles of Microabrasion [Figure2b].

Figure 2a: Microabrasion using rubber cup and slow speed handpiece; 2b: Results after Microabrasion

This was followed with vital bleaching with the help of Pola office Whitening kit (SDI). A gingival barrier was placed on the marginal gingiva slightly overlapping the cervical enamel with respect to 11, 12, 13, 21, 22, 23 and was light cured for 40 seconds. This was done to protect the gingiva from the seepage of the bleaching agent and cause irritation. The powder and 35% hydrogen peroxide liquid from the kit was mixed in a dapendish using an applicator brush until a homogenous gel consistency was obtained. This gel was applied in thick layer onto the discolored teeth and left in place and light cured for 10 minutes. Then the gel was suctioned from the surface and teeth were cleaned using cotton gauge. There was a significant reduction in the discoloration after first cycle of bleaching. The same procedure was repeated to form the second cycle of bleaching for another 10 minutes. After second application, the gel was suctioned and the tooth surface was washed with water and cleaned thoroughly. Following this the gingival barrier was removed and vitamin E gel was applied on to the gingiva. Patient was given post bleaching instructions and was recalled after a week [Figure 3].

Figure 3: Results after two cycles of Bleaching

In the next appointment the teeth were prepared to receive direct composite veneers which were a minimally invasive preparation [Figure 4].

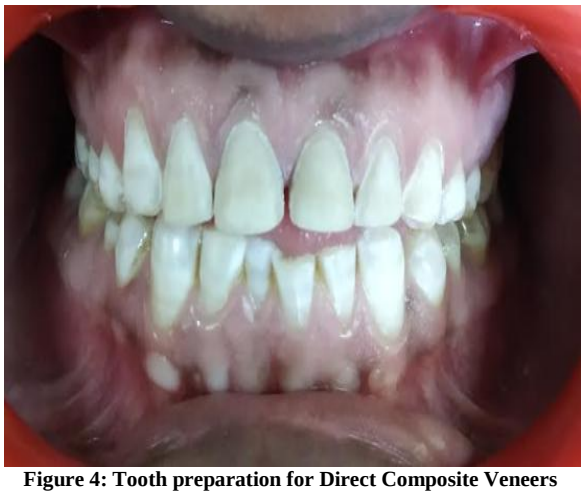

Figure 4: Tooth preparation for Direct Composite Veneers

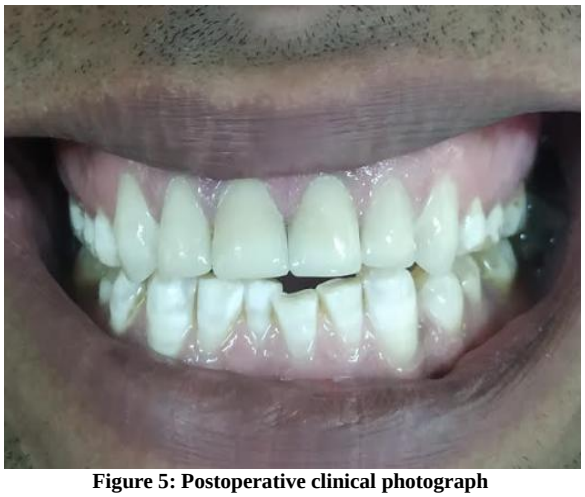

Figure 5: Postoperative clinical photograph

The teeth were etched using 37% orthophosphoric acid for 40 seconds and the rinsed off and air dried for 30 seconds. After etching, bonding agent was applied and air dried for 5 seconds and light cured for 20 seconds. The teeth were then restored with Filtek Z250 (3M ESPE) composite resin reinstituting the proper anatomy and color of the teeth. Shade A2 was used for the cervical two thirds and A1 for the incisal third [Figure 5].

DISCUSSION

This case report describes sequence of treatments for masking the unaesthetic brownish black discoloration caused due to long term consumption of tetracycline drug in adult permanent dentition. Tetracycline induces stains by chelating with the calcium of the tooth to form tetracycline orthophosphate which is responsible for discoloration. This is thought to be photoinitiated thus explaining why incisors tend to be more affected than molars. [5] Jordan and Boksman classified the discoloration by tetracyclines into five categories according to the clinical presentation and this case fell under score 3 which was dark grey, brownish or blue stain with marked banding. [6]

The unavailability of free calcium protects the erupted adult dentition against tooth discoloration induced by tetracycline. However, minocycline, a tetracycline derivative, has been reported to stain adult dentition in 3–6% of patients taking a daily dose >100 mg for longer than 1 month. The drug or its breakdown product forms insoluble salts by chelating with divalent metal ions in saliva and gingival fluid. [7] Since these stains were nearly reversible in nature the mechanisms of tooth staining termed as the “extrinsic theory” involves excretion of concentrated minocycline in saliva or attachment to the acquired pellicle’s glycoprotein and formation of insoluble black quinone from bacterial degradation of miniocycline. Also it is stated that when given over long periods of time in adults, the tetracycline molecule is incorporated into the continuously forming secondary dentin. It is possible that long term sun exposure (UV radiation) of the

incorporated tetracycline may cause a reddish-purple oxidation product to be formed, resulting in pronounced discoloration of the permanent teeth specially the upper incisors as seen in our patient as they are more exposed to sunlight. [8]

Microabrasion technique which involves mild acid etching in combination with rotary application of an abrasive medium was first described in 1916 by Dr. Walter Kane. [9] According to Sundfeld et al. enamel microabrasion technique is an excellent method to remove extrinsic enamel stains of any etiology, as well as to correct superficial irregularities on the buccal aspect of enamel or defects acquired after removal of orthodontic appliance. Because it is very difficult to acknowledge the real depth of intrinsic staining or surface irregularities, the application of the microabrasion technique, regardless of their dimensions and depths, should always be considered before trying a restorative procedure. [10]

Vital or in office bleaching is considered the least invasive option for the management of discoloration as it does not involve any tooth preparation. Bleaching gave a pleasing outcome in this case, but because slight discoloration was present even after two cycles of bleaching and presence of irregular anatomy of the teeth of the patient, other conservative treatment of direct composite veneers was considered.

Direct composite veneers which were completed in a single appointment, offered repairability, required minimal tooth preparation and were more cost effective for the patient. The longevity of direct composite veneers has not been thoroughly investigated when compared to data regarding indirect porcelain veneers. Nonetheless, as stated by Grensnigt et al., a survival of 80% can be acquired by composite systems for almost three and a half years in vivo veneer performance. [11]

Maintaining the aesthetics and functionality of the veneers involves not only the clinician but also the patient himself. Our patient was given post treatment instructions that included avoiding foods with artificial food colors, attending all dental recall appointments for follow up as well as for repair of any possible minor defect. Generally the patient should realize that the composite veneers in his mouth depend also on his overall hygiene and masticatory habits.

CONCLUSION

In this case, the change was profound enough that the patient expressed satisfaction with the results achieved. It was very clear that the patient, who had been quite reluctant to smile before treatment, had developed a ready smile postoperatively. Conservative treatment, such as that realistically described in this article, can be considered for patients who have limited financial resources.

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REFERENCES

1. Sanchez AR, Rogers RS III, Sheridan PJ. Tetracycline and other tetracycline-derivative staining of the teeth and oral cavity. Int J Dermatol 2004;43:709-15.
2. Moffitt JM, Cooley RO, Olsen NH, et al. Prediction of tetracycline-induced tooth discoloration. J Am Dent Assoc 1974;88: 547-52.
3. Cheek CC, Heymann HO. Dental and oral discolorations associated with minocycline and other tetracycline analogs. J Esthet Dent 1999;11:43-8.
4. Haywood VB, Leonard RH, Dickinson GL. Efficacy of six months of nightguard vital bleaching of tetracycline-stained teeth. J Esthet Dent 1997;9:13-9.
5. Cohen S, Burns RC. Pathways of the pulp. 6th edition. Mosby: St. Louis;2002.586-587.
6. Jordan BE, Boksman L. Conservative vital bleaching treatment of discolored dentition.

Compend Contin Educ Dent.1984;5(10): 803-7.
7. Westbury LW, Najera A . Minocycline-induced intraoral pharmacogenic pigmentation: case reports and review of the literature. J Periodontol 1997;68:84–91.
8. Berger RS, Mandel EB, Hayes TJ, Grimwood RR . Minocycline staining of the oral cavity. J Am Acad Dermatol 1989; 21:1300–1.
9. Croll TP. A case of enamel color modification: 60-year results. Quintessence Int 1987;18(7):493–5.
10. R. H. Sundfeld, T. P. Croll, A. L. F. Briso, R. S. De Alexandre, and D. S. Neto. Considerations about enamel microabrasion after 18 years. Am J Dent 2007;20(2)67–72.
11. Gresnigt N, Kalk W, Ozcan M. Randomised control split mouth clinical trial of direct laminate veneers with two micro hybrid resin composites. J Dent 2012;40(9):766-75.

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