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# Integrated approach of ceramic and composite veneers in tetracycline stained teeth : A case report

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### Abstract:

Tooth discoloration is one of the most frequent reasons that one seeks dental care. The common causes of tooth discoloration are fluorosis, enamel hypoplasia, tetracycline staining etc. Based on the severity of discoloration, treatment may vary from more conservative treatment like bleaching to more extensive treatments involving full crowns and veneers. The purpose of this article was to report the advanced treatment options and their integrated use for generalized intrinsic discoloration caused by Tetracycline encompassing bleaching to lighten the discoloration followed by Direct and Indirect veneer restorations using Composite resin and Ceramic respectively.

**Keywords:** Composite resin, fluorosis, intrinsic discoloration, tetracycline staining.

### Introduction:

Tooth discolorations pose major clinical and esthetical challenges. They impact on person's self-image and self-confidence. An understanding of the etiology of tooth discoloration is important to a dentist in order to make the correct diagnosis and the choice of the most conservative treatment plan with an aesthetic outcome that is acceptable to the patient and the dental practitioner.

Although whitening systems have become very effective at lightening the gray banding seen in tetracycline-stained teeth<sup>1</sup> often veneers are still required to completely disguise the darkness. Unfortunately, it is common to see a rebound of graying only months after whitening the teeth and also thermal sensitivity and mucosal irritation reported after extended treatment schedules.<sup>2</sup>

A conservative approach to restore teeth with both direct and indirect restorations has been introduced by various authors.<sup>3,4</sup> The clinical case presented in this article represents a rediscovered philosophy of adhesive and cosmetic dentistry.

### Case report:

An 18-year-old female patient presented with moderate discoloration upper and lower teeth. Patient gave history of tetracycline exposure in utero due to a chronic illness of her pregnant mother. On clinical examination, light-brown discolorations of all anterior teeth and premolar were observed (Fig 1).

The patients smile line exposed upper anteriors till middle thirds, mesial surface of upper premolars and only incisal edges of lower anteriors.

The occlusion was normal. Oral hygiene was good. Medical history was non contributory.

Considering the age and discoloration, the patient was informed that tetracycline-stained teeth can be manageable with modern tooth whitening procedures even though a 6-month treatment period may be required to achieve satisfactory results. If no color change occurs in the first 3 months, tooth whitening treatment will be suspended at no charge for the patient and a different treatment would be planned. The treatment plan was accepted and informed consent was secured.

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## Bleaching

Alginate impressions of the maxillary and mandibular arch were taken, custom trays fabricated and tooth whitening was accomplished of the upper arch first, using a 10% carbamide peroxide at-home bleaching agent. After two weeks an initial tooth color change was noticeable as compared to unbleached lower arch, but patient complained of severe sensitivity and refused to continue the treatment. Hence bleaching was terminated though there was an improvement in the shade due to bleaching. Based on patient's smile line, porcelain veneers for the maxillary teeth and direct composite veneers for mandibular teeth were planned.

## Tooth preparation for porcelain veneers

The tooth reduction for maxillary anteriors involved placement of multiple depth wells or horizontal grooves prepared with depth orientation burs. Bur depth wells were placed at the gingival in the mesiodistal center at both proximal angles. Three more were placed in the midincisogingival surface. (Fig 2 & 4)

Anaesthesia was required, although preparation was confined to enamel. The patient was having sensitivity as the preparation approached gingiva, enamel became thinner and tissue retraction was required to dilate the intracrevicular space to observe the cement-enamel junction and to avoid laceration of gingiva.

Incisal reduction was required as the incisal thickness was not enough to support the veneer, so a half round bur [0.07 mm] was used to notch the incisal edge in 3 parallel positions. The facial reduction was 0.75 mm incisal and 0.5 mm cervical, with a chamfer finish line in a slightly supragingival location and a lingual chamfer was prepared. This chamfer exposes porcelain to compression instead of shearing, during the initial phase of protrusive movement, and as long as forces are against the tooth, fracture resistance is high.

Facial surface was uniformly reduced with the fine diamond bur to the peripheral margins and labial depth guides. The preparation was progressively refined and polished to remove contour irregularities, internal line angles and bur striations to minimize stress to thin porcelain veneer. The natural lustre was maintained so temporization was not required. Chair side shade selection was done. The impression was recorded using elastomeric impression material using a combination of putty and light body for the reproduction of finer details of the preparation.

## Try in of the porcelain veneers

The fabricated laminates when returned from the laboratory were examined for fit and shade matching. Excess proximal contacts were relieved using abrasive polishing wheels. Using a neutral composite shade under the laminate, color was checked and confirmed.

## Bonding of porcelain veneers

### Tooth preparation

The prepared tooth surface was etched using 37% phosphoric acid for 15 seconds. Adper Single Bond Plus Adhesive (3M ESPE) was applied on the etched tooth surface and cured for 10 seconds according to manufacturer's instructions.

### Veneer preparation

The laminates were placed in a padded ultrasonic cleaner with the solution of acetone and alcohol to remove contaminates. They were then rinsed, dried and arranged in left and right contra lateral pairs, beginning with the centrals. Using hydrofluoric acid, the under surface of laminates were etched for a minute. A thin layer of Rely X ceramic primer was applied on etched laminates and dried for 5 seconds. Rely X ARC Resin cement was dispensed onto a mixing pad and mixed for 10 seconds and a thin layer of cement applied to the bonding surface of the laminate and seated slowly. Excess cement was removed and margins light cured for 40 seconds. (Fig 3)

Based on treatment plan, the low though intrinsic discoloration of teeth caused due to tetracycline is a major aesthetic problem, the advent of modern materials and techniques gives enormous option to present day practitioners. The dentist should be aware of all the treatment modalities available to date and provide treatment in the interest best to the patient. However, the severity of the lesion, the desires of the patient and his/her financial constraints determine the treatment option. Teeth were prepared similar to upper teeth. Margins were kept supragingival. Teeth were restored one at a time. After acid etching, rinsing and drying, resin bonding agent was applied and cured. Filtek Z250 composite resin was placed in increments and cured. Finishing and polishing was done. (Fig 5) The occlusion was checked for any high points, overjet and overbite.



**Fig 1: Pre-treatment photograph**



**Fig 2: Tooth preparation of upper anterior teeth for ceramic veneers**



**Fig 3: Cementation of ceramic veneers of upper anterior teeth**



**Fig 4: Tooth preparation of lower teeth for composite veneers**



**Fig 5: After restoration of lower anterior teeth with direct composite veneer**

## Discussion

Tetracyclines are effective broad spectrum antibiotic agents but they can create dental problem if ingested 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.<sup>5,6</sup> Tetracycline stained teeth are particularly difficult to bleach, and lightening can require 4 to 12 months of nightly treatment.<sup>1,7</sup> Tooth sensitivity becomes important issue when bleaching teeth, particularly when an extended treatment is required.<sup>2</sup>

Veneer/laminate bonding is indicated for a combination of mild to moderate anomalies of color, position and form of the teeth.<sup>8</sup> Porcelain veneers are stain resistant and have excellent esthetics. In heavily discolored teeth, to mask dark discolorations, the veneer had to be made from a very opaque porcelain which could mask the discoloration but resulted in a lifeless tooth. The more translucent the veneer, the better the aesthetic outcome, but poorer the masking ability.<sup>9</sup> Hence, in such situations bleaching prior to veneer placement can cause discoloration to lighten by one or two shades and acts as an adjunct to a successful veneer outcome.<sup>10</sup> Use of porcelain veneers provides desired aesthetic results and functional efficiency on a long term basis. But the main disadvantage with Porcelain veneers is its high costs and multiple visits.

In the present case, based on the patient's requirements, the direct composite veneers were given to lower anteriors. The advantage of direct composite resin veneer is that it requires minimal chair time compared to indirect veneers. Disadvantage is that it has poor long term wear resistance and poor long term color stability.<sup>11</sup>

## Conclusion:

Though intrinsic discoloration of teeth caused due to tetracycline is a major aesthetic problem, the advent of modern materials and techniques gives enormous option to present day practitioners. The dentist should be aware of all the treatment modalities available to date and provide treatment in the interest best to the patient. However, the severity of the lesion, the desires of the patient and his/her financial constraints determine the treatment option.

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