

Management of tetracycline stained teeth

Clinical Report

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ABSTRACT

Patients have many restorative options for changing the appearance of their teeth. It is difficult to mask dark underlying tooth colour and retain a natural appearance of the tetracycline stained tooth. While conservation of tooth structure is important, so is selecting the right treatment modality for each patient based on clinical findings. This case is an example to approach a tetracycline stained tooth to achieve a desirable esthetic result.

KEY WORDS: Porcelain veneers, resin cement, tetracycline stain

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INTRODUCTION

A healthy smile improves self-image, confidence and projects an aura of health to others. One of the most difficult esthetic procedures in dentistry can be the improvement in appearance of tetracycline stained teeth. Minocycline, a drug in the tetracycline family used to treat severe acne in adolescents and is also capable of discoloring teeth. Teeth may be discoloured as a result of tetracycline intake during a prophylactic or therapeutic regimen in the pregnant female or in the infant. Permanent teeth begin forming around birth, and continue until age twelve or so for most teeth. The color and severity of stains vary and are influenced by the dosage, type, duration of tetracycline use, and the stage of tooth development at the time the medication was prescribed. This case report highlights the management of tetracycline stained teeth by porcelain veneers.

CASE REPORT

A patient in her early 20s with badly discoloured teeth was seeking treatment to improve his esthetics. The patient's medical history was uneventful and her oral hygiene and periodontal status was very good and

stable. The clinical examination and history revealed that the present discoloration was due to tetracycline stains. She had all maxillary teeth discolored with yellow bands of discoloration prominently on the gingival third without any pitting or grooves. There was an angle fracture of maxillary left central incisor. Maxillary right canine was mesially rotated. She had a canine guided occlusion with a class I molar relationship. The challenge in this case was to mask the underlying tetracycline stain and thus gain more control over the final shade and contour of the teeth. Patient was interested in complete rehabilitation of upper anterior teeth only. The esthetic correction with indirect ceramic laminates for her upper anterior teeth was planned. Diagnostic radiographs, photographs, polyvinyl siloxane impressions, and a bite registration were taken and sent to the lab for a wax up to be made, which was used as a template for her temporaries and final porcelain veneers [Figure 1]. Smile design including the midline, axial inclination, lip line, incisal edges and phonetics, interproximal contacts, gradation, gingival symmetry, gingival contour, and zenith were all taken into consideration. A definitive chamfer finish line was established. The preparations were terminated at linguoincisor line angle [Figure 2]. An impression was taken with polyvinyl siloxane

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Figure 1: Preoperative photographic view of the patient



Figure 2: Tooth preparation for the veneers in the patient mouth



Figure 3: Postoperative photographic view of the patient

and inspected for marginal integrity, distortion, and voids near margins. After adjusting the occlusion, the temporaries were polished and cemented. On next visit, the temporaries were removed. The veneers were tried in for fit, marginal adaptation, contour, and color. The teeth surfaces were first cleaned with pumice slurry, rinsed with a water spray, and lightly air-dry so that the surface had a slightly glossy appearance. Rely X U 100 (3M ESPE, Germany) a dual cure self-adhesive resin cement was used to bond the veneers into place. All the veneers (pressed ceramic veneers IPS Empress 2; Ivoclar vivadent, Schaan, Liechtenstein) were placed at the same time; the two central incisors were followed by laterals and canines. Excess resin cement was removed after brief light exposure (app. 2 sec). Then light cured for 20 sec on each surface. The occlusion was checked and a final polish was achieved to finish the case. The patient was instructed to continue with oral hygiene regime [Figure 3].

DISCUSSION

Achieving perfection is the ultimate goal of any esthetic dentist. The problem with tetracycline stained teeth is its inability to absorb and reflect light like a non-tetracycline stained tooth. When dealing with light transmission, there are three things that can happen when light hits an object. When the object is transparent, all the light is able to pass through

the object. Conversely, when an object is opaque, no light is able to pass through. Translucency deals with the percentage of light that is able to pass through the object. As an example, the more translucent an object is, the more the light is able to pass through.^[1] The heavier the tetracycline staining, the lesser the light that can pass through, making the tooth less transparent or more opaque.^[2]

Trying to achieve the optimal hue, chroma, value, and translucency has been attempted by clinicians using techniques such as enamel microabrasion, bleaching procedures, crowns, and laminate veneers. Often a combination of the above procedures may be appropriate depending on the nature and degree of discoloration. Other factors such as occlusion, age, health and oral hygiene of the patient are important considerations in the treatment plan.

The most common tetracycline stain is made up of yellow-brown-orange colors.^[3] This is also the easiest and fastest to remove. Blue-gray stains in translucent teeth respond the poorest. This discoloration gradually becomes more brownish after exposure to light. Especially as they get more intense, they tend to have a horizontal banding pattern of stain across several teeth. The position of the bands of tetracycline stain corresponds to the part of the tooth that was developing at the time the child was taking tetracycline. Tetracycline stains are more problematic in the dentin. Staining of the incisal third or the middle third of the teeth is relatively easy to cover. Staining of the gingival third is a difficult situation.

Enamel micro-abrasion is used for superficial surface discolorations like white or brown spots that cover limited areas. Laser bleaching and in-office bleaching are two power bleaching treatments. This activates the applied peroxide with light and heat, speeding the breakup of stain molecules. There is more rebound of color with this method, so follow-up with home tray bleaching is recommended. Bleaching does not erase tetracycline stained teeth, but can lighten the stains.

Bleaching vital teeth is a safe procedure, but results are variable depending on the individual and hard to predict, especially for teeth showing tetracycline banding as in this case.

Porcelain veneers are a proven excellent treatment to treat even the most discolored teeth.^[4] Highly resistant to permanent staining from coffee, tea, or even cigarette smoking, the wafer-thin porcelain veneers can achieve a tenacious bond to the tooth, resulting in an esthetically pleasing naturalness that is unsurpassed by other restorative options. Porcelain veneers are an excellent alternative to crowns. They provide a much more conservative approach to changing a tooth's color, size, or shape and have a lower biological cost.

As with most dental treatment, there should not be a "one size fits all" philosophy for veneers. Some operators prefer to etch the tooth and apply the veneer directly over the entire untouched facial surface, thereby not removing any enamel. Several problems exist with such a method. The reversibility of these veneers may seem desirable, but the esthetic results and physiological contours are not always optimal. In fact, restorations are usually over-contoured and gingival inflammation may be observed. The removal of some enamel before placing a veneer is recommended to achieve ideal esthetic and physiological results. Teeth that have been stained by tetracycline are more difficult to mask with veneers, especially when the cervical areas are badly discoloured. To cover the dark portion stained by the antibiotic, Class V type preparations can be cut in dentin in the stained areas, thereby removing most of the dark pigmentation responsible for the coloration and restored by a light opaque stiff composite resin. To optimize the esthetic outcome, the tetracycline band needs to be opacified before cementation, or the opaqueness necessary in the porcelain to camouflage the stain will result in teeth with considerably less vitality.

The porcelain laminate veneer is a restoration that best serves to reproduce the capacity for light transmission of natural teeth although this can be altered by factors such as the color of the underlying structure, choice of the cement and depth of preparation. A careful patient selection, a uniform tooth reduction, a minimal thickness of luting composite not to exceed a 1:3 ratio to ceramic thickness and management of the antagonistic contact on the maxillary natural tooth structure has shown to reduce the risk of fracture.^[5] The type of luting cement in addition to the location of the prepared margins and fit of the restoration will impact the degree of microleakage as the coefficient of thermal expansion and amount of polymerization shrinkage vary among type of composite resin.^[6] Rely X U 100 (3M ESPE, Germany) is a dual cure self-adhesive resin cement. It is characterized by high stability in combination with good flowability under pressure (structure viscosity). According to the manufacturers, when RelyX U100 is used, etching and the use of a primer and/or bonding as pretreatment of the tooth substance are not necessary. Hydrogen peroxide, desensitizers, disinfectants, astringents, dentin sealants, rinsing solution containing EDTA should not be used, as residues can adversely affect the adhesive strength and setting reaction of RelyX U100. The use of temporary cements containing eugenol can inhibit the polymerization process of RelyX U100 during the final cementation. So temporary restorations should be sealed using a eugenol-free product.

All esthetic options need to be considered during treatment planning. In addition to the color, the clinician must also take into account the golden proportions and smile design. By beginning with esthetics and then taking into consideration the impact of the planned treatment on function, structure and biology, the various changes in dentistry can be used to deliver the highest level of dental care to each patient.

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