

Laminates — A Practical Approach to Restoring Tetracycline-Stained Teeth

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Abstract

Severe tetracycline-induced staining and hypoplasia were seen on the maxillary and mandibular teeth in a fifteen-year-old male. Discoloration of all teeth were seen in a sixteen-year-old female. Based on several practical considerations, a decision was made to use laminate veneers to restore the maxillary anterior teeth in both patients. This paper reports on the techniques used and the results subsequent to laminate placement after one year and after nine months.

Introduction

The administration of tetracycline drugs during tooth development has been shown to cause intrinsic staining in the dentition.^{1,2} The resulting tooth disfigurement is esthetically objectionable and is a major concern to the patient, the parents, and the dentist. Social and psychological difficulties may accompany this drug side effect.³

In the past, cosmetic techniques have included recontouring labial enamel with disks or stones, bleaching with hydrogen peroxide and heat,^{4,5} coating with composite resin,⁶ or full crown coverage. The drawbacks to full crown coverage include economics, extensive irreversible tooth reduction, and contraindication in young patients due to large pulp chambers and incomplete crown eruption.

The composite resin coating on the affected surfaces has the disadvantage of poor surface qualities such as color, roughness, and a tendency to abrade. In some instances, successful short-term esthetic results have been achieved by employing a conservative vital

bleaching technique.^{4,5} However, heat and hydrogen peroxide have been shown individually to irritate and cause damage to pulp tissue.^{7,8} There is lack of evidence for long-term esthetic benefits and long-term pulpal integrity.⁹ Furthermore, the bleaching process is undesirable due to repeated and long appointments. A newer procedure described below involves the use of laminate veneers which are hollow-ground, custom-fitted, acrylic denture teeth that are bonded to the affected surfaces.

Reports of Cases

A fifteen-year-old male and a sixteen-year-old female, seeking dental care to improve their "front teeth" were referred to the Pedodontic Clinic at The University of Iowa, College of Dentistry.

Extra-oral and intra-oral soft tissue examinations were unremarkable except for localized marginal gingivitis in both patients.

The first patient showed several hypoplastic and stained areas on the labial surfaces of both maxillary and mandibular anterior teeth (Figure 1). Probing of the hypoplastic areas revealed the tooth structure to be sound and not cariously involved. No significant radiographic findings were noted other than those associated with the enamel defects.

The second patient had discoloration of all teeth but no pitting (Figure 2).

For both patients, the decision was made to limit treatment to the maxillary anterior teeth because (1) the mandibular teeth were only slightly visible during speech and smiling, (2) economics was a major concern, (3) minimal overjet did not allow sufficient clearance for the thickness of the laminates, and (4) shear

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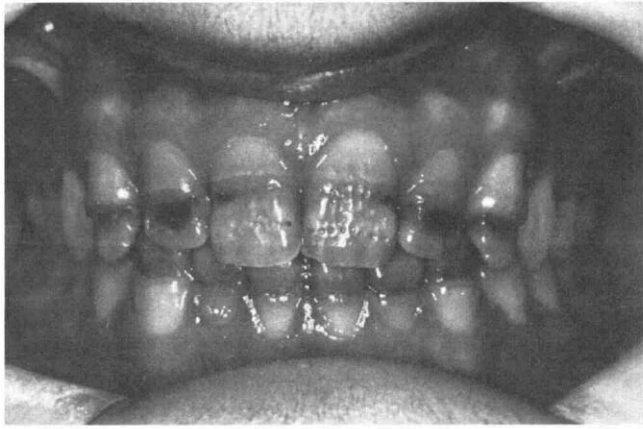


Figure 1. Severe tetracycline staining and hypoplasia in a fifteen-year-old male.

stresses on the mandibular anterior teeth would be greater, more frequent, and would increase the likelihood of laminate loss.

Procedure

The steps in the procedure are as follows:

1. Oral hygiene instruction.
2. Prophylaxis of teeth.
3. Select shade of the acrylic denture teeth.
4. Alginate impressions for working models.
5. Models are sent to a dental laboratory. The laboratory technician will select an appropriate mould and hollow-grind the lingual surface until only a label shell remains. No acrylic should extend beyond a tooth's gingival margin or incisal edge and the gingival aspect of the veneer should end as a knife edge. The model is painted with separating medium and the laminate is conditioned with methyl methacrylic monomer and relined against the model with a mix of acrylic of the same shade as the tooth. Excess is removed and the laminate is polished (Figure 3). If desired, these steps may be done by the dentist.
6. Isolate teeth using cheek retractors, or cotton rolls and clean with pumice.
7. At chairside, adjust each veneer to conform to the gingival margin contour, proper width, and incisal extension.
8. Clean and condition the back of each veneer with methyl methacrylate monomer for one minute to remove contaminants such as oils, debris, or separating medium.
9. The label surfaces of the teeth are acid-etched, rinsed, and thoroughly air dried according to the manufacturer's instructions.
10. Place celluloid strips interproximally to prevent bonding and paint a thin layer of bonding agent*

*Orthoconcise, 3M Company, St. Paul, Mn.



Figure 2. Generalized discoloration in a sixteen-year-old female.

on the teeth and the back of the veneers.

11. Place composite* on the inside of the veneers and press gently to place.
12. Finish margins using white stones, sandpaper disks, or finishing strips (Figure 4).



Figure 3. Laminates fabricated by a dental laboratory.

13. Using articulating paper, check centric occlusion, protrusive, and lateral excursions for any incisal prematurities.
14. Polish with disks.+
15. Give post-treatment instructions.

Discussion

At the completion of the treatment, the restorations produced an expression of satisfaction and acceptance by the patients. After many years of

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+ Sof-Lex, 3M Company, St. Paul, Mn.

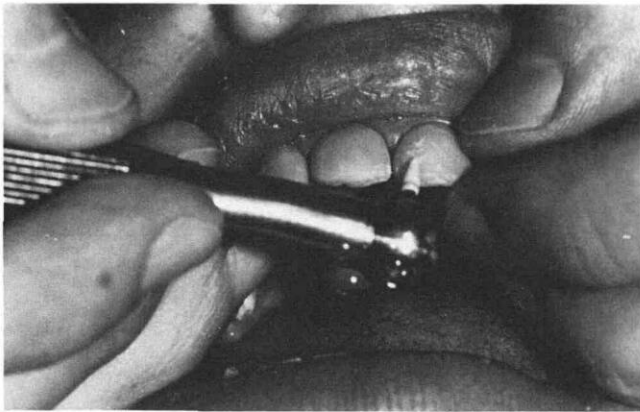


Figure 4. Finishing of laminate veneer.

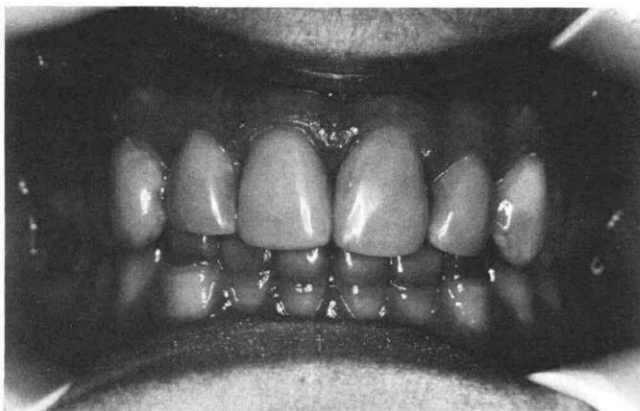


Figure 5. Post-operative result in the fifteen-year-old male immediately after placement.

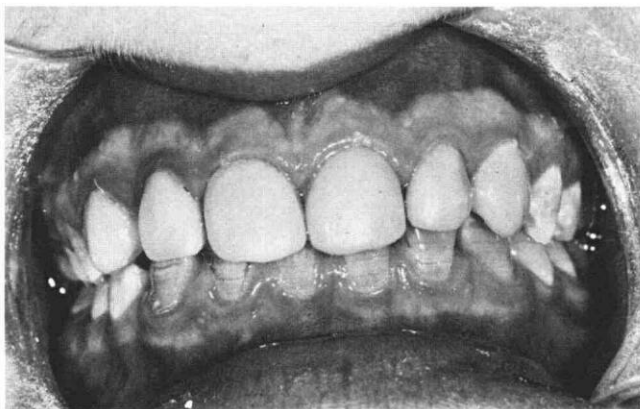


Figure 6. Post-operative result in the sixteen-year-old female immediately after placement.

unsightly-looking teeth, the patients and parents were pleasantly surprised at the dramatic improvement in the appearance (Figures 5 and 6).

Post-treatment instructions included (1) reassurance that the sensation of larger teeth is transitory, (2) stressing the need for meticulous oral hygiene to prevent gingival inflammation and discoloration, (3) avoidance of dental habits such as pencil or finger-

nail biting, (4) exercising caution during anterior function, and (5) stressing the importance of follow-up appointments.

The entire procedure can be accomplished in a relatively short time at chairside as most of the veneer adaptation can be done by the laboratory technician. Although the laminates may occasionally be subject to fracture or wear, this procedure is amenable to simple reattachment or replacement. As previously mentioned, the backs of the laminate veneers should be cleaned and conditioned with methyl methacrylate monomer to reduce the incidence of retention failures. Chalkley has shown that methyl methacrylate monomer should be applied for only one minute since a longer application causes softening of the backs of the veneers.¹⁰

Despite the proper adaptation of the rubber dam, the authors feel that the entire procedure would be facilitated by using alternative isolation methods such as cheek retractors or cotton rolls. Partially-filled



Figure 7. Laminates after one year in the fifteen-year-old male.

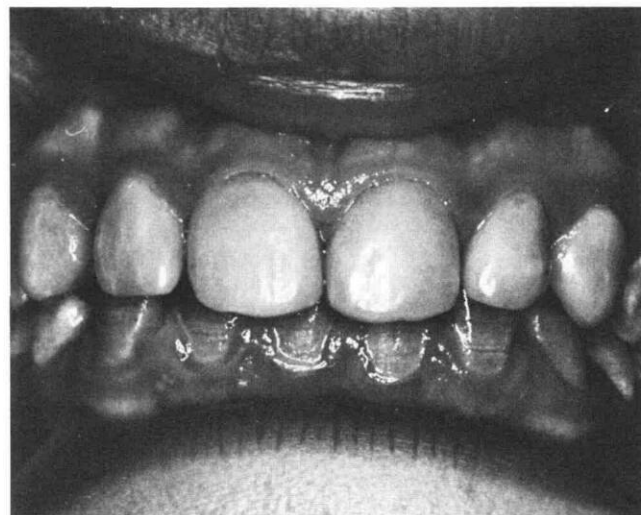


Figure 8. Laminates after nine months in the sixteen-year-old female.

resin* was used because it has better flow qualities and lends itself to easier placement of the veneers.

The use of laminate veneers is an economical, conservative, and reversible treatment that yields immediate esthetic benefits. Mouradian¹¹ reported on a two-year study using this technique and showed excellent retention and esthetics. Faunce also reported two-year results but used completely-filled resin as the luting medium.¹²

The laminates have been in place for one year in the male patient and for nine months in the female patient (Figures 7 and 8). Gingival health appeared normal in both patients.

Conclusions

The use of laminate veneers is not a permanent solution to the problem of tetracycline staining but serves as an interim treatment to be followed by full crown coverage, when indicated. The ultimate solution is prevention; the tetracycline antibiotics should be avoided during periods of tooth development. Since many children with these unfortunate drug side effects are at an age when peer acceptance is important, the dentist may serve as a useful catalyst in promoting a healthy social and psychological environment.

*Orthoconcise, 3M Company, St. Paul, Mn.

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The opinions or assertions expressed herein are those of the author and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense.

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