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CLINICAL ARTICLE

Predictably Restoring Natural Beauty: A Clinically Proven Direct Approach

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ABSTRACT

A clinically proven restorative approach is presented to achieve natural esthetics using an utmost conservative freehand bonding technique respecting the patient`s wish for immediate esthetic and functional rehabilitation to affordable costs.

Keywords: Esthetics, Long-term result, Redentistry, Bioeconomics, Bioesthetics, Biomimetics, Adhesive technologies, Composite, Conservative approach.

INTRODUCTION

The growing demand for esthetic treatments in the dental field has led to an abundant variety of treatment modalities and the introduction of a multitude of esthetic materials provided by the industry. Thus, making the establishment of an appropriate treatment plan and selection of the ideal material are sometimes an almost impossible task for the clinician.

The long-term result of any dental reconstruction not only depends strongly on the physical and biological properties of the material used. Factors far out of the clinicians control, e.g. nutrition preferences, parafunctional habits and quality of daily homecare may be very influential also.[1] Furthermore, the dental community is well aware of the fact that redentistry is inevitable independent of today's treatment plan, the materials used or the quality provided currently.[2]

Considering these facts, a modern treatment concept must respect bioeconomic, bioesthetic and biomimetic principles to guarantee the best possible long-term result.[3-6] Classical treatment modalites relying on retention and friction necessitating aggressive tooth reduction clearly do not fulfill the above-mentioned requirements.[7,8]

The ongoing research in the last decade on adhesive technologies, taking into account both treatment modalities and materials, leads to tremendous improvement in the field of bonded dentistry. Especially the improvement in dental composite technology culminated in broad acceptance of the metal-free branch of dentistry.[5]

Taking into account their unrivaled bioeconomic superiority compared to all other bondable materials and because of their broad indication spectrum (direct and indirect restorations) composites, it became a pillar of paramount importance in the everyday practice. Their improved physical and optical properties made especially microhybrids the true all purpose material.

A thorough understanding of the optical properties in natural teeth resulted in simpler to use materials. Yet today all purpose materials provide more esthetic outcomes.[9]

Generally, one or two dentin replacement materials covered by an enamel shade suffice for an acceptable result. Occasionally, the additional use of an opacious white material is required to restore a compromised tooth back to its natural beauty. Nowadays, these reconstructions virtually defy detection because of their outstanding ability to mimick hue, chroma, value and the other more particular optical properties inherent in natural teeth (fluorescence, opalescence, internal staining).[10,11]

CASE REPORT

A 16-year-old girl presented in our clinic showing two class IV restorations on the mesial surfaces of her upper central incisors as a result of traumatic injury. The existing restorations were considered to be deficient in form and contour. They lacked value and luminosity. Marginal discolorations and deficiencies were diagnosed (Fig. 1). A complete renewal of the old restorations was proposed to the patient.

After profound analysis and subsequent minute record of the teeth's optical characteristics, a palatal silicon stent was produced intraorally. The appropriate composite shades were selected and local anesthesia was administered. The operatory

Fig. 1: Initial situation: old form deficient composit restorations

Fig. 2: Insulated operatory field with prepared cavities

Fig. 3: First layer: palatal shell made from enamel shade

Fig. 4: Second layer made of a highly saturated dentin shade

Fig. 5: Third layer made of a moderately saturated dentin shade

Fig. 6: Application of an opacious white composite shade to imitate white calcifications in enamel layer

Fig. 7: Right central incisor insulated with silicon tape after completed and finished build up, left central incisor after application of buccal enamel shade layer before finishing

field was isolated using rubberdam from first premolar to first premolar.

The insufficient restorations were removed using a coarse ball shaped diamond bur in a high-speed contra-angle under abundant water spray. The buccal margins were finished to a deep champfer. On the palatal, a butt margin was prepared. All margins were polished with a Brownie silikon point to eliminate eventually existing loose enamel prisms (Fig. 2).

The preparations were acid etched using coupious amounts of phosphoric etchant (30 seconds on enamel and 20 on dentin). After rinsing for 20 seconds, a multistep bonding agent was applied according to manufacturers' recommendations and cured for 40 seconds using a broadband LED curing unit.

A first thin layer of enamel shade composite was applied into the previously fabricated palatal silikon stent as suggested by L Vanini. The uncured material was then brought into the mouth by positioning the stent with firm pressure onto the teeth simultaniously restoring the oral aspect of both central incisors (Fig. 3). A second layer of highly saturated dentin shade material was brought into the cavity. This layer was kept at a medium thickness paying attention to cover the deep champfer preparation on the buccal aspect only partly. The mammelons were shaped (Fig. 4). A third layer of medium saturated dentin shade completed the core buildup. This layer covered the buccal champfer to about 75% (Fig. 5). A tiny amount of white opacious material was used to imitate the whitish spots inherent in the remaining natural enamel (Fig. 6). When sculpting the last dentin shade layer, care was taken that the final layer of enamel shade would have a uniform thickness of about 0.5 mm after finishing (Fig. 7). Each layer was subsequently cured for 20 seconds.

Finishing of the oral and buccal surfaces was performed with coarse grit diamond burs first followed by fine grit diamonds. The difficult to access interdental areas were contourd anatomically using diamond coated strips. Then Brownie point was used to further smoothen and prepolish the surface. Both finishing and prepolishing were performed at medium speed without waterspray. Only a very low pressure

Fig. 8: Polished restorations at time of recall showing good overall integration

was applied to avoid overheating the composit. After prepolishing, the patient was sent to home.

After rehydration of the tissues, the patient was reappointed for final check up and polishing. The surface texture of the adjacent teeth was carefully analyzed and then reproduced with the aid of diamond burs. To achieve the good luster, the surface restorations were touched up with occlubrush starting from low speed and pressure without waterspray, continuously increasing speed and pressure while adding waterspray. Then the final photographs were taken for a minute assessment of the work provided (Fig. 8).

SUMMARY

Pairing profound knowledge of dental anatomy and optical properties of human dental tissues with proper material selection and careful operating techniques allow for composite restorations that can mimick natural situations to high extent. The technique described provides esthetics outcomes combining an utmost conservative approach and affordable costs facilitating future reinterventions.

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