

ESTHETIC REHABILITATION OF ANTERIOR TEETH WITH ENAMEL HYPOPLASIA USING PORCELAIN LAMINATE VENEERS

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Abstract: The use of porcelain laminate veneers to restore the esthetics of frontal teeth has been widely discussed in the literature. However management of all frontal teeth with enamel hypoplasia is a challenging process in order to fulfil esthetic expectations of patient and to preserve sound enamel and periodontal health. Therapeutic protocol must include mock-up for esthetic and functional trial. This mock-up could be used as guide for dental preparations.

INTRODUCTION

In the last 20 years, porcelain laminate veneers have made incredible things for dental professionals and patients. These tooth-coloured restorations improve the esthetic outcome of anterior teeth. Improvements in adhesive systems and the development of new-generation porcelain technology have supported the growing demand for porcelain laminate veneers.(1,2) Studies have shown high survival rate (3); a 94.4% survival rate at 12 years (4), respectively 99% was observed for veneers with preparations confined to enamel and 94% for veneers with enamel only at the margins.(5) These restorations are highly esthetic, biocompatible, and resistant to staining and wear.(6)

Despite the time that has passed since porcelain laminate veneers introduction, porcelain laminate veneer preparation can be stressful for dentists, numerous questions remain about preparation or non-preparation of teeth. In case of preparation the main issue is incisal edge and how much should be reduced. Another important issue is quantity and quality of enamel remained after preparation for etching and bonding.

Enamel hypoplasia, defined as an incomplete or deficient formation of the enamel organic matrix manifested as a surface defect (7), challenges the treatment plan.

In this paper, the esthetic management of case of enamel hypoplasia is described.

CASE REPORT

The patient complained about the appearance of frontal teeth (figure no. 1). On examination, the following findings were noted: enamel pits and irregularities with discoloration on incisal third of all frontal teeth, wear of the central incisor edges and gingival recession around the necks of canines.

Figure no. 1. Initial aspect of anterior teeth



Enamel pits and irregularities are scattered across the surface of the frontal teeth affecting only buccal surface. The enamel between the irregularities is of normal thickness, hardness and coloration and contact between teeth is normal.

A thorough case history of the patient was taken and a diagnostic impression was taken. After examination and radiograph, a provisional diagnosis of enamel hypoplasia was made. Periodontal conditions, presence of caries, occlusal interferences, smile esthetics, and facial symmetry were evaluated. Based on evaluation and patient's desire for a pleasant smile with change in colour and shape for anterior teeth, treatment plan involve home bleaching with carbamide peroxide 15% (Opalescence Ultradent) and porcelain laminate veneers. Porcelain laminate veneers made from lithium disilicate were chosen as treatment option due to high esthetic and minimal preparation of abutment teeth. Ceramic veneers allow change in colour, shape and lengthen of crown and were planned on all anterior teeth. Patient was informed about the existing condition, treatment procedure was explained and the consent was taken. Treatment was divided in two stages: firstly maxillary veneers and then mandible veneers.

A diagnostic wax-up was performed on study model (figure no. 2) to test the changes of anterior teeth. A direct mock-up with bis-acrylic resin (Telio CS C&B, Ivoclar Vivadent) wax done (figure no. 3) based on wax-up. Esthetics, symmetry, and occlusion were analyzed.

Figure no. 2. Wax-up on study cast

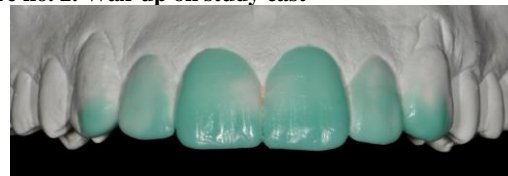


Figure no. 3. Direct mock-up



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CLINICAL ASPECTS

Patient approved the mock-up and then teeth were prepared in order to create room for the ceramic veneer material and to create a path of insertion, using mock-up as guide. The preparations were done based to the desired position of teeth, with all margins in sound enamel, without breaking interproximal contact area (figures no. 4 and 5). Since one treatment goal is to lengthen the teeth, preparation of the incisal edges were done and contacts with antagonist teeth were checked to be on unprepared enamel.

Figure no. 4. Porcelain laminate veneers preparation for maxillary teeth – buccal view



Figure no. 5. Porcelain laminate veneers preparation for maxillary teeth – occlusal view



Gingival displacement was obtained using retraction cord (#1, Ultradent). At the same appointment, the impression was done, using PVS silicone (Virtual, Ivoclar Vivadent) in rigid tray and temporary veneers were made (Telio CS C&B, Ivoclar Vivadent). Occlusal contacts were marked, and protrusive and lateral movements were checked with temporary veneers. The shade of porcelain laminates veneers was selected as A1 (IPS e.max Press, Ivoclar Vivadent).

The porcelain laminates veneers were checked for proximal and cervical adaptation, periodontal relation, and asymmetries and cemented (Variolink II, Ivoclar Vivadent). The final appearance is shown in figures no. 6 and 7.

Figure no. 6. Maxillary porcelain laminate veneers



Figure no. 7. Maxillary porcelain laminate veneers. – close-up



Two months later, treatment continued with porcelain laminates veneers for anterior mandibular teeth, following a similar protocol: wax-up, mock-up, preparation, temporary veneers and lithium disilicate veneers.

Preparations for lower incisors begin with incisal reduction of 1.5 mm to mask the colour and to lengthen the teeth. The facial reduction was rolled back mesial-distally to create a thicker area of porcelain in the areas where occlusal contacts occur. Since lower incisors do not have as much enamel as upper incisors, special care was given to ensure the preparation intraenamel (figures no. 8 and 9).

Figure no. 8. Porcelain laminate veneers preparation for mandibular teeth – buccal view

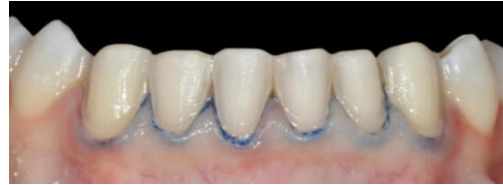


Figure no. 9. Porcelain laminate veneers preparation for mandibular teeth – occlusal view



The final aspect of case is shown in figures no. 10 and 11.

Figure no. 10. Mandibular porcelain laminate veneers



Figure no. 11. Completed veneers – retracted view



DISCUSSIONS

Esthetics is adversely affected by discoloration. In such cases, it is important to determine the nature of discoloration and the desired colour change. In the presented case, based on clinical examination and radiographs, the cause of discoloration was identified as enamel hypoplasia. Enamel hypoplasia is a type of amelogenesis imperfecta, characterized by alteration in quality of enamel (8) and treatment, regardless of the type of amelogenesis, involves the complete removal of the affected enamel in the adult patient's life.(9)

Another important issue is to identify the desired incisal edge position and contours of the final restorations, and consequently to prepare the teeth according to the desired shape and position not to the current one. The goal of preparation is to remove enough tooth structure, and as a result the veneer will

provide the desired colour and shape.

Proper treatment planning is essential to successfully predict esthetic and functional outcomes, to preserve the tooth structure and periodontal health, and to fulfil patient expectations. For this reason, the therapeutic protocol includes four sessions: (10) first - evaluation, second - mock-up, third - dental preparation, impression and interim restoration, fourth - proof and cementation.

The mock-up is the basis for the preparation; it represents the proposed final shape, contour, and colour of definitive restorations. Dentist needs to know that thickness of porcelain depends on shade change desire, for each shade change, 0.2 – 0.3 mm of ceramic is needed. (11)

Since the procedure was intended to be minimally invasive, therefore lithium disilicate ceramic veneers with thicknesses ranging from 0.3 to 0.5 mm were made because they have relatively high wear resistance without compromising optical properties. (12) In addition, lithium disilicate ceramic exhibited in vitro and in vivo studies high durability and wear friendly to opposing natural dentition. (13)

Because the clinical stability and longevity of ceramic veneers depend on preservation of the enamel to provide firm adhesion (14-16), minimally invasive intraenamel preparations were completed.

Preparation of incisal edge with chamfer on oral surface was performed for maxillary and mandibular teeth to allow lengthening. The chamfer offers the highest degree of freedom for the positioning of the incisal edge (17) and, there is estimated a higher survival rate for laminate veneers with incisal coverage than for those without incisal coverage. (18)

CONCLUSIONS

This case report described the esthetic rehabilitation treatment of anterior teeth with enamel hypoplasia using ceramic veneers. Although enamel hypoplasia can pose a treatment challenge, well-planned and well-executed ceramic veneers provide predictable and excellent esthetic results.

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