

Esthetic restoration of dental fluorosis with ceramic veneers: A case report.

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Abstract

Intrinsic tooth discoloration due to dental fluorosis is a challenging situation which demands prompt and durable treatment plan along with restoration of anterior esthetics. Porcelain dental veneers, previously called as 'The Hollywood Smile' was first developed by Californian dental surgeon, Pincus in 1928. It gained profound popularity in the aesthetic field of dentistry since then. The longevity of dental veneers depends on the case selection, material used and habits of the patient. A 21-year-old male patient reported with chief complaint of stained teeth and was diagnosed with severe grade dental fluorosis. Due to the effect of fluoride, teeth were not fully formed in desired shape. The focus was mainly conserving the remaining unaffected enamel and utilizing the mineralised surface of the enamel with a restoration which would provide a micromechanical bond with both the tooth surface and the restoration. Porcelain laminate veneers ranging in thickness between 0.5-1 mm provided the best treatment option along with provision of translucency, opalescence and reflectance quality close to that of natural teeth. The outcome of the treatment had achieved the desired qualities instilling self-confidence and imparting a better quality of life to the patient.

Keywords: Dental fluorosis, dental laminates/veneers, ceramic, lingual wrap, shade matching

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Introduction

Dental fluorosis is a developmental disturbance affecting tooth morphology causing unesthetic appearance of the dentition. It is common where fluoride levels in drinking water >1.5 mg/l.^[1] In the year 2005, endemic fluorosis were found in 43 blocks of seven districts of West Bengal with an affected population of approximately 2.26 lakhs.^[2] Excessive fluoride during enamel formation causes outer hypermineralized, acid-resistant layer and retains porous enamel in the areas of subsurface hypomineralization.^[3] The affected enamel may display lustreless white lines or diffuse opacities (milder form) to generalized opaque chalky appearance with confluent pitting and staining of hypomineralized tissues (severe form).^[3] Although dental fluorosis affects both deciduous and permanent dentition,

the esthetic changes in permanent dentition deserve attention in concerned patients.

Porcelain laminates/ veneers (PLV) are the most esthetically appreciable treatment modality in patients with discolouration due to dental fluorosis. They are more conservative than conventional crowns as the tooth preparation lie 0.5-0.7 mm into enamel.^[4] Their inherent optical properties makes them look cosmetically pleasing, simulating natural teeth.^[5] Due to superior bonding mechanisms, resin cements provide advantage when used with ceramic restorations, especially in fluorosis stained teeth where the tooth structure is altered.^[6] In the following case report, management of dental fluorosis with indirect porcelain laminate/veneers have been described.

Case report

A 21-year-old male reported with chief complaint of stained teeth (Figure 1) History revealed that his native village has endemic fluorosis. According to Dean's fluorosis index, the case was classified as SEVERE.^[7] There was midline diastema. No gross TMJ derangement was detected. The patient had no interference during protrusive or lateral movements. Overjet and overbite was optimum (2mm). Treatment plan decided was indirect porcelain veneers with lingual wrap technique for maxillary and mandibular anterior teeth.

After diagnostic impressions, teeth preparation started. Depth-cutting diamond burs were used to keep depth of preparation 0.5 mm. Cervically preparation was subgingival to maximise esthetics (Figure 2). Proximal preparations were kept short of contact points facially for all teeth except maxillary central incisors (Figure 2). The incisal preparation was a lingual wrap design where the incisal edges were reduced by 1mm and preparation extended lingually/palatally by 0.5 mm from the reduced edge. The lingual preparation was terminated in butt joints. Shade selection (VITA Classical shade guide) was done under natural daylight.

Impressions were made for both arches on same day using putty and light body (ZETAPLUS PUTTY AND KIT, ZHERMACK SPA, ITALY). Fig3 Prior to that, gingival retraction was done (ULTRAPAK KNITTED RETRACTION CORD #000, ULTRADENT, GERMANY). Since, the veneers were cemented in 48 hours, temporisation was not done. The laminates (IPS Empress Emax) (Figure 4) were tried in using a drop of glycerine. The shade was analysed, finish lines assessed and incisal interferences in maximum intercuspation corrected. Following adjustments, they were glazed and cemented.

The inner surfaces of veneers were etched with 9% hydrofluoric acid (Ultradent

Porcelain Etch and Silane, Germany) for 90 seconds and silane coupling agent (Ultradent Porcelain Etch and Silane, Germany) applied for 60 seconds. Tooth surface was cleaned using pumice, isolated and etched with 37% phosphoric acid for 60 seconds, rinsed thoroughly and air dried. Bonding agent (Single Bond Universal Adhesive, 3M ESPE, USA) was applied. Resin cement (Relyx Ultimate Adhesive Resin Cement, 3M ESPE, USA) was applied on the inner surfaces of the laminates and placed on prepared teeth. Flash curing for 10 seconds was done and flash cement removed. Final curing was done for 60 seconds facially and incisally. Excess cement was removed. Occlusion was checked in maximum intercuspation and eccentric movements. Following necessary adjustments, polishing was done and patient dismissed with oral hygiene instructions. Final result yielded satisfactory esthetics (Figure 5). The post-operative pictures (Figure 6) shows that results were very much satisfactory. A four year follow-up of the patient showed marginal discolouration in maxillary centrals (Figure 7) The oral hygiene was satisfactory without debonding or fracture of the veneers.

Discussion

Dental fluorosis renders the teeth discoloured due to intrinsic staining. Various treatment modalities can restore the esthetics in such teeth. While composite veneers have advantage of ease of use, low cost and less operative time, poor wear resistance and low colour stability make them inferior to ceramic veneers.^[8] PLVs overcome the disadvantages of composite restorations. They provide excellent esthetics, conservative teeth preparation, less plaque retention and cleansability. Optical properties like opalescence, fluorescence, reflection which are found in natural teeth, are essentially simulated by PLVs giving restorations a life-like appearance.^[5] This, however, depends on

the thickness of restoration and the shade of the underlying resin cement. Several clinical studies have reported a veneer thickness of 0.5mm and use of opaque cement effectively masks the underlying discolouration of a fluorosed teeth while retaining the optical properties.^[9] However, porcelain laminates can often fail due to debonding/fracture, marginal discolouration, loss of marginal integrity.^[6] Contraindications exist for bruxers, patients with deep bite as well as high caries index.^[4]

Another procedural concern during use of PLVs for fluorosis-affected teeth, is the bonding protocol of the adhesive cement.^[10] All steps remaining similar as seen in normal teeth, in severe dental fluorosis the hypermineralized surface layer together with the organic network should be ground away before etching the subsurface enamel and produce micromechanical tags. Hence, the etching time has to be increased fourfold (60secs) with 37% phosphoric acid.

Marginal discolouration, as in this case, may result most commonly from poor colour stability of dual cure resin or marginal cement breakdown causing leakage. Use of light cure cements ensures better colour stability. Careful removal of excess cement with sharp instruments and finishing with burs and subsequent polishing may take care of marginal leakage. Studies have shown estimated survival probability of porcelain laminate veneers over a period of 10 years is 91-95%, provided all parameters are maintained.^[10]

Although glazed porcelain is resistant to plaque accumulation, it is imperative to use soft toothbrush and flossing to prevent marginal leakage. Mouthguards are also recommended before any contact sport.

Conclusion

Dental fluorosis is a common developmental condition leading to tooth staining. Teeth discolouration, thus, leads

to esthetic compromise, especially in young individuals. In such patients, porcelain laminate veneers can be used as a conservative treatment modality, restoring the natural appearance of the affected teeth and rehabilitating the cosmetic need of the patient satisfactorily.

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FIGURES



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7