

## Interdisciplinary Management of Spacing with Maxillary Anterior Teeth with Orthodontics and Veneers

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**Abstract:** Diastemas are one of the most common forms of malocclusion seen frequently in the midst of the maxillary central incisors. Along with midline diastema, there can be generalized spacing in anterior teeth, especially in the maxillary arch. The etiology for the same is considered to be multifactorial. These spaces lead to an unpleasant smile, impairment of phonetics, and hindrance in maintaining oral hygiene. These can be managed either by surgical, orthodontic, periodontal, restorative, and prosthodontic procedures or by a combination of procedures to fulfill patient's esthetic and functional demands. This article presents a case of management of multiple diastemas with orthodontics, gingivectomy and veneers.

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### I. Introduction

A space between adjacent teeth is called a "diastema". Midline diastemata (or diastemas) occur in approximately 98% of 6 year olds, 49% of 11 year olds and 7% of 12–18 year olds.<sup>1</sup> In most children, the medial erupting path of the maxillary lateral incisors and maxillary canines, as described by Broadbent results in normal closure of this space.<sup>2</sup> In some individuals however, the diastema does not close spontaneously. The continuing presence of a diastema between the maxillary central incisors in adults often is considered an esthetic or malocclusion problem.<sup>3</sup> It can be one of the most negative factors in self perceived dental appearance. Treatment is mainly for esthetic and psychological reasons, rather than functional ones.<sup>4</sup>

The extent and the etiology of the diastema must be properly evaluated. Proper case selection, appropriate treatment selection, adequate patient cooperation, and good oral hygiene all are important factors for successful treatment outcomes.<sup>5-7</sup>

Depending on the etiology, a comprehensive treatment plan needs to be formulated.

### II. Case Report

A 45 year old female reported to our clinic with a chief complaint of proclined teeth and spacing with all anterior teeth. There was no relevant medical history contributing to the generalized spacing with teeth.

On clinical examination there was overjet of 5mm and considerable spacing with all maxillary anterior teeth and mandibular anterior teeth. The crown heights of the teeth also appeared to be small giving appearance of a 'gummy smile' (fig 1 ) A combination of orthodontic treatment followed by esthetic crown lengthening (gingivectomy) and ceramic veneers was decided.

Orthodontic treatment was carried out for a duration of 1 year 2 months to reduce the proclination of maxillary anterior teeth and also reduce spacing with maxillary and mandibular teeth. (fig 2)

After completion of orthodontic treatment, esthetic crown lengthening was performed with cautery (Perfect TCS Coltene ) After 1 week post operative healing period, patient was called for veneer preparations. (fig 3,4)

Before proceeding for tooth preparation, shade was selected using Vitapan Classical shade guide (Vita Zahnfabrik, Germany). The veneer preparations started with placement of depth cuts. The veneer margins were then established using long, tapered medium grit diamond to prepare definitive chamfer 0.3-0.4 mm deep at the gingival margin.

The preparation design porcelain should allow a thickness of 0.5mm at the gingival margin, 0.7mm in the mid body and at least 1 mm in the incisal third to prevent dentin shine-through and the same principle was followed in preparation.

The incisal edges were reduced 1 mm. Retraction cords were placed for 3 minutes to achieve maximum retraction of the gingiva at the margins (fig 5). A final impression was made using a 2-step polyvinyl impression technique (Affinis, Coltene Whaledent).

Pressable ceramic, glass-ceramic lithium disilicate was used (EMAX) for fabrication of PLV in the lab (fig 7). The internal surfaces of the veneers were etched with 9.5% hydrofluoric acid ( Angelus) for 20 s and the veneers were silanized with a silane coupling agent (Rely X ceramic primer ) before luting. The tooth surface

was cleaned using slurry of pumice and isolation was achieved with split dam technique. Acid etching was done with 37% phosphoric acid and the etchant was thoroughly rinsed off after a duration of 15 s following manufacturers recommendations. All the teeth surfaces and inner surface of veneers were coated with bonding agent in thin layer and light polymerized for 25-30 s.

Dual cure composite luting agent ( Rely X veneer) of translucent shade was selected and placed in the inner surface of porcelain veneers. Veneers with luting cement were placed on the teeth surfaces, margins were checked for proper seating, pressure was applied and initial polymerization was done for 5 s to remove excess luting agent and cured for 60 seconds.

Considerable improvement in patients esthetics was seen after the veneer cementation. (fig 8)

### **III. Discussion**

Midline diastema could be transient or created by developmental, pathological, or iatrogenic factors such as mesiodens, microdontia, hypodontia, abnormal oral habits, enlarged frenum, etc. Because of the potential for multiple etiologies, the diagnosis of a diastema must be based on a thorough medical/dental history, clinical examination, and radiographic survey. Different treatment modalities include removable orthodontic appliances, full arch, single arch or sectional fixed orthodontic appliances, excision of the frenum, restoration techniques, extraction of mesiodens.

Diastemas due to tooth size discrepancy are best treated with restorative and prosthodontics treatments. Orthodontics is also a viable treatment modality but is time consuming. Certain cases need a combination of both to give satisfactory esthetic results.

The restorative closure of diastema can be achieved by using any of the techniques mentioned; direct composite veneers, indirect composite veneers, porcelain laminate veneers, all ceramic crowns, metal ceramic crowns and composite crowns. Smaller diastema can be closed with microfilled and hybrid resins if the diastema is about 1-1.5mm in dimension.

Composite resin is easy to use, requires fewer appointments, is economic but offers less wear resistance and surface staining, which makes it inferior to dental porcelain. Porcelain laminate veneers (PLVs) have become the alternative to composite restorations ceramic crowns and the traditional porcelain-fused-to-metal. 5 Smiles can be transformed painlessly, conservatively and quickly with dramatic, long-lasting results with the successful use of the porcelain laminate veneer. Tissue response is excellent, and the finished surface is very similar to the natural tooth.

The subsequent introduction of special acid etching techniques improved the long-term retention of veneers.<sup>8</sup> Simonsen and Calamia demonstrated that the bond strength of hydrofluoric acid-etched and silanated veneer to the luting resin composite is generally greater than the bond strength of the same luting resin to the etched enamel surface.<sup>9</sup>

However, porcelain laminates have their own limitations too. They should not be used when remaining enamel is inadequate to provide adequate retention.

Diastemas can be an esthetic concern to many hampering their social interactions and lowering self confidence.

The combination of various modalities helps in achieving a favorable esthetic outcome. Orthodontic treatment helped to solve the problem of proclination and reduce the spaces so that we could close the gaps without increasing the mesiodistal dimensions of the teeth. Esthetic crown lengthening with cauterization increased the cervico-incisal length of the teeth to make the smile more esthetic. Golden proportions were considered for the smile designing.

Minimal preparation of teeth makes this treatment option extremely conservative.

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**Fig 1-** pre-op situation



**Fig 2-** After orthodontic treatment



**Fig-3** Esthetic crown lengthening with Perfect TCS cautery



**Fig-4** Healing after 1 week



**Fig-5** Retraction cords in place before final impression



**Fig-6** Veneers(EMAX) fabricated in laboratory



**Fig-7** Pre-op smile



**Fig-8** Post-op smile

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