A Minimally Invasive Approach for Treatment of a Peg-Shaped Maxillary Lateral Incisors : Composite Resin Restoration

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Abstract
Adolescents and adults want to have a perfect body, a perfect smile and a perfect face. Smiles are important to young and old. Peg lateral is a kind of anomaly which affects the esthetic of an individual. Restoration in the esthetic zone is a demanding and technique sensitive procedure. In this article a case of a bilateral peg-shaped maxillary lateral incisor is described along with the minimally invasive treatment approach.The esthetic approach is reported step by step and also discussed.

Introduction

The smile is very important for adults as well as for children and their guardians. Its harmony could be negatively influenced by the presence of dental anomalies like alterations in shape, size, position, color or texture.[1]Peg lateral is a kind of anomaly which affects the esthetic of an individual. A peg lateral is defined as "an undersized, tapered, maxillary lateral incisor"that may be associated with other dental anomalies, such as canine transposition and-over-retained deciduous teeth.[2]

Individuals with malformed lateral incisors often display a diastema in the midline region caused by the distal movement of the central incisor.[3] Aber-rations in tooth morphology resulting from late disturbances during the differentiation process most commonly result in size variations. Peg-shaped or mesiodistally deficient maxillary lateral incisors demonstrate variation in the expression of the trait, although the gene(s) causing hypodontia are not known.

Due to their reduced size, the malformed lateral incisors may also allow the formation of other diastemata in the anterior region. These patients may exhibit otherwise normal dentitions unless other congenital etiologic factors or habits are pre-sent.[4]Prevalence of peg-shaped maxill-ary lateral incisors has been reported to be higher than the prevalence of other developmental malformations of teeth. In a study by Backman and Wahlin, the incidence of peg-shaped incisors was found to be 0.8% in 739 children. In another study, it was found to be 0.4%.[5]

Treatment options vary but include the following:(1)extraction of the peg-shaped tooth and orthodontic movement of the canine into the space of the lateral incisor; the canines can then be recontoured to resemble lateral incisors; (2) extraction and replacement with a single-tooth implant-supported restoration or a fixed partial denture (FPD); or (3) direct or indirect restoration of the peg lateral incisors to develop normal tooth morphology. All of these treatment approaches may produce acceptable results but not conservative.

Direct or indirect restoration options include procedures such as porcelain laminate veneers, metal-ceramic restorations, and all-ceramic crowns, as well as minimally invasive procedures such as direct resin composite bonding.[6]

This clinical report describes a simple direct technique for restoring the esthetic appearance of peg-shaped lateral incisors, with good results.

Figure 1: A, B & C: Preoperative photographs of the peg lateral.

Case Report

A 24-year-old female patient reported to the OPD of Department of Conservative Dentistry and Endodontics at Bharati Vidyapeeth Dental College and Hospital Navi Mumbai. The patient complaint of malformed upper right and left front teeth.Patient reported with no relevant medical history. Clinical examination revealed the presence of peg shaped lateral incisors with 12 and 22 (Fig. 1A, 1B & 1C). There was good periodontal health, normal horizontal and vertical overlap and stable inter-cuspal relation. The peg shaped lateral incisor was planned to restore with resin composite using putty matrix technique.

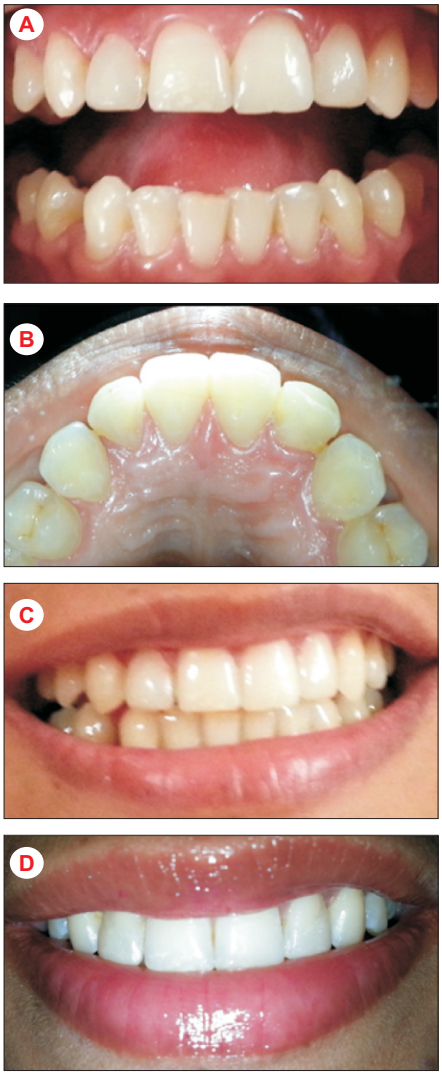
A diagnostic impression was made with alginate and a study model was fabricated with dental stone.Mock waxup was performed with tooth colored wax. A high-viscosity putty index was made from mock wax-up to aid in contouring the morphology of lateral incisor for better esthetic results. Two shades were selected: A1 shade was selected for body area and incisal area. B1 was selected for gingival area of tooth using vita shade guide. Putty matrix was checked for fit and necessary adjustments were made.Mylar strips were used to isolate the adjacent teeth.

Before starting the procedure, diamond bur was used on the labial surface to abrade the superficial layer of enamel for better bonding because bonding with cutted enamel is better than the uncutted enamel. First, retraction was done with retraction cord (Ultrapak #000 Retraction cord, US) to minimize crevicular fluid flow. All of the facial surface was etched using 37% phosphoric acid gel (3M Scotchbond; 3M ESPE, St. Paul, Minn) for 20 seconds. The gel was then rinsed off with water and lightly blown dried with air. Dentine bonding agent (Adper single bond 2; 3M ESPE, St. Paul, Minn) was applied following manufacturer instructions prior to being light cured.Composite resin (3M ESPE Z350 XT,

St. Paul, Minn) was used for this procedure. Using the putty index thin layer of lingual composite was placed and light polymerised for 20 seconds. This led to creation of lingual wall which acted as a 3-dimensional framework to support the additional layers of composite. Composite restorative material was added layer by layer to sculpture the entire restoration using putty index intermittently. After the establishment of primary anatomy, occlusion was evaluated to rule out any premature contacts.

Contouring of restoration surfaces was done with fine finishing diamonds burs. Occlusion was checked with a thin articulating paper. Examine centric and lateral excursion contacts. Carefully adjust occlusion by removing material with a fine polishing diamond or stone. Finish and Polishing: Polished with the Sof-Lex Finishing and Polishing System.

Figure 2: A, B, C & D: Postoperative photograph of the patient.



Discussion

Literature has reported a higher prevalence of peg-shaped upper lateral incisor in females which corresponds to the case resented.[7]Kook et al. in their study found it to occur more frequently on the left side of the maxilla, however the current case presented a right and left both pegged lateral.[8]The esthetic defect in patients with peg lateral incisors consists of both the malformed teeth and the presence of diastema between teeth.

The treatment includes 2 primary objectives: 1.to restore or replace the hypoplastic dental crowns and 2. to close the diastema.[9]If the patient does not smoke or drink dark-colored liquids that can alter the color of the teeth, esthetic bonding with resin composite may be the most conservative approach for several reasons: sound tooth structure will not be removed, the procedure may not require administration of local anaesthesia, the procedure may be accomplished in 1 appointment and the treatment is relatively inexpensive.

Moreover, in comparison to all-ceramic restorations, resin composite does not have the potential for catastrophic brittle fracture, nor does it cause abrasive wear of the opposing dentition. Other advantages of this type of treatment are the lower cost compared to an indirect technique, and the reversible nature of this procedure, which allows for other treatment approaches in the future.[10]Resin composite restorations exhibit excellent physical properties, marginal integrity, and esthetics.

A significant advantage of resin composite restorations over other restorative materials is that repair may be possible intraorally without the risk of modifying esthetics or mechanical performance.[11]The survival rates of these anterior composites were reported to be extremely satisfactory even in patients with worn dentition. With improvements in the bonding chemistry and introduction of nano-composites, it is speculated that the success rate of composites will improve even further.[12]

Disadvantages of direct composite bonding:1.Can chip and break, 2. Can discolour of older composite used, 3. Can develop marginal leakage, 4. Can pick up stain easily in those patients who smoke and have poor oral hygiene, 5. Can have a deleterious effect on gingival health on patient with poor oral hygiene.[13]

This procedure involved bonding with enamel only. Adper single bond 2 was used for this procedure becauseit is fifth generation (total-etch) bonding agent and shows better bonding to enamel than sixth and seventh generation ie. Self-etch bonding agent.

Filtek Z350 Universal Restorative, using novel techniques in nanotechnology to create a composite that displays the polish and polish retention of a microfill while maintaining the strength and wear properties of a modern hybrid. It is a visible-light activated direct restorative nanocomposite designed for anterior and posterior restorations.BIS-GMA, BIS-EMA, UDMA with small amounts of TEGDMA. The filler contains a combination of a non-agglomerated/non-aggregated, 20 nm nanosilica filler, and loosely bound agglomerated zirconia/silica nanocluster, consisting of agglomerates of primary zirconia/silica particles with size of 5-20 nm fillers. The cluster particle size range is 0.6 to 1.4 microns. The filler loading is 78.5% by weight.

Putty matrix technique allows for a Mock-up to be fabricated with great ease and short clinical time. A mock-up review of anticipated final restoration is an important tool of communication between the doctor and the patient.

This technique has several advantages: Does not require sophisticated software or digital imaging. Requires minimum chair time for setting of material and trimming. Patient can anticipate the results beforehand. The chair-side benefits of this matrix are creation of precise contact and contour which minimizes later adjustments for occlusion, incisal edge and thickness determination, Also, Facial and lingual anatomy can very well be replicated using putty matrix as a guide. Lastly, the composite finishing and polishing protocol enabled a highly-polished surface and resulted in a satisfied patient.[14]

Shade: Teeth are not monochromatic. The tooth can be divided into three regions, each with a characteristic color: a) Gingival area: Restorations in the gingival area of the tooth will have various amounts of yellow.b) Body area: Restorations in the body of the tooth may consist of shades of gray, yellow or brown. c) Incisal area: The incisal edges may contain a blue or graycolor. Additionally, the translucency of this area and the extent of the translucent portion of the tooth to be restored and neighbouring teeth should be matched.

Conclusion

Direct composite resin restoration is a minimally invasive treatment option to restore peg-shaped maxillary lateral incisors to normal contours. This esthetic bonding procedure gives a natural look and improves smile, favouring esthetics. This is the only procedure which is simple, cost-effective and replaceable treatment alternative without damaging the remaining tooth structure to restore the esthetics of these teeth.

References

References are available on request at editor@healtalkht.com